



Test Plan

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Rev.	Author	Description of Changes	Date
1.0	Verizon Wireless	Initial release.	November 2009
2.0	Verizon Wireless	Version 2.0 Updates/Clarifications/Additions to the following sections: 1.3, 1.4, 1.5, 8	December 2009
3.0	Verizon Wireless	Version 3.0 Added test cases 4.4 and 6.2. Modified test case 6.1.	February 2010
4.0	Verizon Wireless	Version 4.0 Updates/Clarifications/Additions to the following sections: 1.4, 1.5, 8	March 2010
5.0	Verizon Wireless	Version 5.0 Added tests 6.3 6.6 and 7.1-7.2. Updates to the following sections: 2.2, 2.3, 3.1, 3.2, 3.3, 3.6, 3.7, 3.8,	June 2010

		4.1, 4.2, 4.3, 4.5, 4.6, 4.7, 4.8, 5.1, 5.2, 5.3, 5.4, 6.7 (formerly section 6.3), and 6.8 (formerly section 6.4).	
6.0	Verizon Wireless	Version 6.0 Updates to the following sections: 3.1 3.5 4.1 4.8 5.1 5.4 6.1 6.8 7.1 7.2	Sept. 2010
7.0	Verizon Wireless	Version 7.0 Updates to the following sections: 1.3, 3.6, 3.7, 3.8, 4.5, 4.6, 4.7, 4.8, 6.5, 6.6, 8, 9 Updates to Release 9 throughout the document	Dec. 2010
8.0	Verizon Wireless	Version 8.0 Update to test case 6.7	March 2011
9.0	Verizon Wireless	Version 9.0 Updates to the following sections: 2.4, 4.2.2, 4.2.3, 4.5.2, 4.5.3, 4.7.2, 4.7.3, 5.2.2, 5.2.3, 8	June 2011

10.0	Verizon Wireless	<p>Version 10.0</p> <p>Updates to the following sections:</p> <p>2.1, 2.2, 2.3, 2.4, 2.5, 4.5, 4.7, 4.9, 5.4, 5.5, 5.6,</p> <p>5.7, 5.8, 5.9, 5.10, 5.11, 5.12, 6.7, 6.9, 8</p>	September 2011
11.0	Verizon Wireless	<p>Version 11.0</p> <p>Updates to the following sections:</p> <p>2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 4.5, 5.5, 5.6, 5.11</p>	December 2011
12.0	Verizon Wireless	<p>Version 12.0</p> <p>Updates to the following sections:</p> <p>2.5, 5.5, 5.11</p>	April 2012
13.0	Verizon Wireless	<p>Version 13.0</p> <p>Updates to the following sections:</p> <p>4.4, 4.9, 5.5, 5.6, 5.11, 5.12, 6.1, 6.3, 6.6, 6.7</p> <p>Added the following tests: 6.10, 6.11, 6.12, 6.13,</p> <p>6.14, 6.15, 6.16, 7.3</p>	July 2012
14.0	Verizon Wireless	<p>Updates to the following sections: 2.2, 3.3, 4.1,</p> <p>4.2, 4.3, 4.5, 4.6, 4.7, 4.8, 4.9, 5.1, 5.2, 5.3, 5.4,</p> <p>5.5, 5.6, 5.7, 5.8, 5.9, 5.10, 5.11, 5.12, 6.3, 6.4,</p> <p>6.7, 6.8, 6.9, 6.11, 6.13, 7.2, 7.3</p>	October 2012

15.0	Verizon Wireless	Updates to the following sections: 2.1, 2.4, 2.5, 3.5, 4.4, 4.5, 4.9, 5.5, 5.12, 6.7, 6.9, 6.10, 6.11, 6.14 Added the following tests: 6.17, 6.18	February 2013
16.0	Verizon Wireless	Updates to the following sections: 1.5, 2.1, 2.2, 2.3, 2.5, 5.5, 5.7, 5.11, 6.5, 6.6, 6.7, 6.9, 6.10 Added the following tests: 4.10, 4.11, 4.12, 4.13, 5.13, 5.14, 5.15, 5.16, 6.19, 6.20	June 2013
17.0	Verizon Wireless	Updates to the following sections: 2.3, 2.4, 2.5, 3.4, 3.5, 4.1, 4.2, 4.3, 4.4, 4.5, 4.9, 4.10, 4.11, 4.12, 4.13, 5.1, 5.4, 5.7, 5.8, 5.10, 5.12, 5.13, 5.15, 5.16, 6.2, 6.3, 6.5, 6.10, 6.11, 6.12, 6.14, 6.16, 6.18 Added the following tests: 4.14, 6.21	October 2013
18.0	Verizon Wireless	Version 18.0 Updates to the following sections: 2.4, 2.5, 3.5, 4.4, 4.9, 4.12, 4.13, 5.12, 5.16, 6.11, 6.14, 6.18	February 2014
19.0	Verizon Wireless	Updates to the following sections: 4.12, 4.13, 4.14, 6.10, 6.18, 6.21	June 2014
20.0	Verizon Wireless	Updates to the following sections: 4.10, 4.12, 5.13, 5.15, 6.8, 6.20, 6.21	October 2014

21.0	Verizon Wireless	Updates to the following sections: 4.12, 5.2, 6.18	February 2015
22.0	Verizon Wireless	Updates to the following sections: 4.4, 4.9, 5.2, 5.12, 5.16 Added the following sections: 4.15, 4.16, 5.17, 5.18	June 2015
23.0	Verizon Wireless	Updates to the following sections: 4.14, 6.18	October 2015
24.0	Verizon Wireless	Updates to the following sections: 4.10, 4.14, 5.5, 5.13, 5.15, 6.9, 6.17	February 2016
25.0	Verizon Wireless	Updates to the following sections: 3.5, 4.7, 4.12, 4.14, 5.2, 5.9, 5.12, 6.10, 6.18 Added the following sections: 4.18, 6.22, 6.23	October 2016
26.0	Verizon Wireless	Updates to the following sections: 4.14, 4.17, 4.18, 5.5, 5.18, 6.9, 6.17	February 2017
27.0	Verizon Wireless	Updated Introduction Updates to the following sections: 2.4, 2.5, 3.1, 4.6, 4.7, 4.15, 4.16, 4.18, 5.5, 5.17, 5.18, 6.9, 6.10, 6.14, 6.17, 6.18, 6.21, 6.22	June 2017
28.0	Verizon Wireless	Updated Introduction Updates on test sequences to the following sections: 2.4, 2.5, 4.18, 5.5, 5.11, 6.9, 6.17, 6.22 Updates on test applicability to the following sections: 6.2, 6.5, 6.6, 6.10, 6.16, 6.19 Retired test case: 6.23	Oct 2017

29.0	Verizon Wireless	Updated TC 4.14, 5.11, 5.14, 5.16 and 6.18	Feb 2018
30.0	Verizon Wireless	Updated TC 4.10, 5.5, 5.13, 5.15 and 6.17	June 2018
31.0	Verizon Wireless	Updated TCs 2.5, 5.13 and 6.9	October 2019
32.0	Verizon Wireless	Updated TC 2.5	February 2021
33.0	Verizon Wireless	Added TC 2.6, Updated TC 5.5	February 2023
34.0	Verizon Wireless	<p>Updates TC 2.4 for Rel17/+ device.</p> <p>Updated and Duplicated multiple TCs with special suffixes for different technology variants.</p> <p>Updated test case numbering for consistency</p>	June 2023
35.0	Verizon Wireless	<p>Added Test Cases 8.1.-8.4 for various IMSI range</p> <p>Updated TC 2.6</p>	October 2023
36.0	Verizon Wireless	Updated TC 2.4 & 2.6	February 2024
37.0	Verizon Wireless	Updated TC 2.6 & 5.11	June 2024
38.0	Verizon Wireless	Minor Update to TC 6.14	October 2024

• Introduction

This test plan applies only to devices that support IMS.

Verizon Wireless requires that all devices operating on the network behave in a non-disruptive manner when errors are encountered while attempting to set up a data session. To this end, devices shall comply with data throttling requirements as defined in the Verizon Wireless document "Device Requirements- Data Requirements". . These requirements include the need for the device to invoke a throttling algorithm when the device encounters specific errors while setting up the data session. This test plan is designed to verify the compliance of the device under test with these requirements.

Test Objectives

The objective of this document is to define the data throttling testing for all Verizon Wireless Devices. This includes, but is not limited to, handsets, data cards, modems, modules, remote devices, and smartphone devices.

This document will be used by NDET lab personnel or personnel designated by the NDET lab to guide the manual execution of the data retry testing. This document will also be used to define the data retry test for test automation development.

Specifically, this document includes:

- Verification that the data call throttling algorithm is invoked in the call stack and data stack when the appropriate error conditions are encountered
- Verification that the data call throttling algorithm is invoked in the call stack and data stack for all applicable device configurations (e.g. when connecting a data session for embedded applications, tethered laptop applications, etc.) and data bearers (1xRTT, 1xEVDO, etc)
- Verification that the data call throttling algorithm is cancelled at the appropriate times

Definitions

The following terms are used in this document:

1xEVDO	1x Evolution Data Optimized
1xRTT	1x Radio Transmission Technology
CDMA	Code Division Multiple Access

CCF	CDMA Certification Forum
eHRPD	evolved High Rate Packet Data

Entrance Criteria

Entrance criteria for applicable devices should follow all current VZW submittal procedures. Refer to the Verizon Wireless documents "Verizon Wireless Device Testing Process" and "Verizon Wireless Device Compliance Test Entrance Criteria" for specific test process and test entrance criteria details.

All native applications shall be tested. The device vendor shall test all native applications. The device vendor shall test all VZW-Branded pre-loaded applications (ex: VOD, MOD, IM, etc.) if delivered in time of scheduled CCF activities. The device vendor will not be responsible for re-execution of this testing when the pre-loaded applications are made available.

Test Equipment Configuration

- All tests shall be executed at a minimum signal level of -70dBm. The reverse RF link attenuation shall be equal to the forward link attenuation so that all access probes can be received by the base station without repeat i.e. the RF path shall be balanced so that the mobile only has to transmit a single access probe for any given access attempt before receiving a "Base Station Ack" message. All devices should be set to Mobile IP- Preferred mode during this testing. The test cases in this test plan may be executed in either a conducted environment or a radiated environment. Calibrated signal levels are not required for the test cases in this test plan.
- VZW Device Evaluation Lab Test Equipment:

Refer to VZW Device Test Equipment List for the most current test equipment information

Note: All specific test equipment configurations are noted within the VZW Device Test Equipment List. Test channels, test suites and sessions utilized are provided in the VZW Device Test Equipment List.

- For the purposes of VZW testing the term embedded includes native and pre-loaded applications. Data session throttling test cases will be executed for each native and/or preloaded applications.
- For the purposes of VZW testing of host devices with VZW certified modules, the embedded application need not be tested and all testing may be conducted using dial-up networking (tethered mode).
- For any test case, if embedded applications are being tested on the device, it is not necessary to re-execute the test case for dial up networking (tethered mode).
- For any test case, if the device under test does not include embedded applications, then the test case must be executed for dial up networking.
- The device shall be configured for all test cases as it will be when device is commercially available.
- If the device under test supports 1xEV-DO Rev A, then the tester should perform the 1xEV-DO portion of the tests using Rev. A infrastructure as opposed to Rev. o infrastructure. The tester is not required to perform the tests on both versions of 1xEV-DO infrastructure.

Introduction

Verizon Wireless requires all devices designed to operate on the Verizon Wireless LTE 3GPP Band 13 network to meet Verizon Wireless specific data retry behavior as detailed in the Verizon Wireless LTE Data Retry Requirements. This document describes the procedure for verifying that these requirements have been met. Verizon Wireless specific data retry requirements and testing are in addition to standard 3GPP LTE requirements and conformance testing defined in 3GPP TS 36.523-1: Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification and 3GPP TS 36.521-3: Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) conformance specification; Radio transmission and reception; Part 3: Radio Resource Management (RRM) conformance testing, respectively.

This publication is part of Verizon Wireless compliance with the FCC's rules for 700 MHz C Block (47 C.F.R. § 27.16), as explained in the FCC's Second Report and Order in WT Docket No. 06-150, "Service Rules for the 698-746, 747-762 and 777-792 MHz Bands" released on August 10, 2007.

In this document, the terms LTE (Long Term Evolution) and E-UTRA (Evolved Universal Terrestrial Radio Access) are considered equivalent.

Test Objectives

The objective of this document is to define the Verizon Wireless-specific data retry test procedures for devices designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

This document will be used by employees of device manufacturers, test labs, and Verizon Wireless to guide the execution of Verizon Wireless specific data retry testing. This document will also be used to define the Verizon Wireless specific data retry test procedures for test automation development.

Definitions

The following terms are used in this document:

Acronym/Term	Definition
3GPP	3 rd Generation Partnership Project, manages GSM, EDGE, UMTS, HSPA, and LTE standards
AMF	Authentication Management Field
AUTN	Authentication Token
DUT	Device Under Test
EMM	EPS Mobility Management
EPC	Evolved Packet Core
EPS	Evolved Packet System

ESM	EPS Session Management
E-UTRA	Evolved Universal Terrestrial Radio Access
IMS	IP Multimedia Subsystem
LTE	Long Term Evolution
MAC	Message Authentication Code
NAS	Non Access Stratum
PDN	Packet Data Network
PLMN	Public Land Mobile Network
RFC	Request For Comments
RRC	Radio Resource Control
RRM	Radio Resource Management
SMS	Short Messaging Service
SN	Sequence Number
TAI	Tracking Area Identifier
UE	User Equipment
VZW	Verizon Wireless

3GPP Release 9 Specifications

Refer to the 3GPP Release 9 Specifications section of the Verizon Wireless LTE 3GPP Band 13 Network Access Requirements for details on the correct version for all 3GPP specification documents referenced in this test plan.

Entrance Criteria

All vendors shall successfully pass this test plan per the Verizon Wireless LTE 3GPP Band 13 Lab Conformance Test Plan and in accordance with the Verizon Wireless LTE 3GPP Band 13 Device Conformance Test Process. Prior to testing, Verizon Wireless strongly recommends that all devices pass 3GPP standard signaling and RRM conformance per 3GPP TS 36.523-1: Evolved Universal Terrestrial Radio Access (E-UTRA) and Packet Core; User Equipment (UE) conformance specification; Part 1: Protocol conformance specification and 3GPP TS 36.521-3: Evolved Universal Terrestrial Radio Access (E-UTRA; User Equipment (UE) conformance specification Radio transmission and reception; Part 3: Radio Resource Management Conformance Testing.

Test Equipment Configuration

For details on test equipment currently approved by Verizon Wireless, refer to the Verizon Wireless LTE 3GPP Band 13 Test Equipment List.

The device under test shall support a Test Application to facilitate data retry testing. The Test Application shall connect to the network using the internet PDN. It shall support at least three states:

1. Application Disconnected: in this state, the UE does not have a connection established to the internet PDN on behalf of the Test Application. (Note: this is not to be confused with RRC Disconnected. While in the state of "Application Disconnected", the UE may be connected to a PDN on behalf of a different application e.g. the IMS application.)
2. Application Idle: in this state, the UE has a connection established to the internet PDN but the application is not actively sending data. The UE may be in a state of EMM_IDLE.
3. Application Transmitting: in this state the application is attempting to send data. Because the application is sending data, the UE will either be in the EMM_CONNECTED state or it will attempt to transition to the EMM_CONNECTED state. The application shall support a configurable retransmission timer which dictates how often the application will request retransmissions from the UE if there is a failure.

If the device under test is a device which requires a host computer (e.g. USB dongle), then the test environment shall be a host PC/laptop (with Windows XX Operating System) with a Test Application (the Test Application is TBD at this time) running on the host. If the device under test is a device

which operates autonomously, then the device shall support a Test Application to facilitate data retry testing. If the device under test is a device which can operate either autonomously or connected to a host computer, the test environment shall be a host PC/laptop (with Windows XX Operating System) with a Test Application running on the host. The Test Application shall request attempt to connect to the internet for data retry testing; the device, as per device requirements, shall attempt to connect to the internet PDN.

The device under test also shall support an IMS Test Application to facilitate data retry testing. The IMS Test Application shall connect to the network using the IMS PDN. The application shall support a configurable retransmission timer which dictates how often the application will request retransmissions from the UE if there is a failure. The application shall be able to support an aggressive retransmission rate of 1 minute or less.

Test equipment test scripts shall support the ability to initiate PDN Connectivity Requests for the Internet/IMS PDNs for data retry testing.

Unless otherwise indicated in the test case, the following PLMN values shall be used on the DUT SIM card throughout this test plan:

- PLMN Y1: 311/480. This PLMN shall be configured in the HPLMN and EHPLMN files.
- PLMN Y2: 311/479. This PLMN shall be configured in the OPLMN file.
- PLMN Y3: 311/478. This PLMN shall be configured in the OPLMN file.
- PLMN Y4: 311/481. This PLMN shall be configured in the HPLMN and EHPLMN files.
- PLMN Y5: 311/477. This PLMN shall be configured in the OPLMN file.

Test Results Template

PRODUCT TESTED		Version	
MFR/Model: <AAAAA/B-cccc>	Hardware	Software	
IMEI: <xxxxxxxx>	<hwhwhwhwhwhwh>	<SWSWSWSWSW>	
Additional Information:			
Tester: <Name>	Test Date(s): <mm-dd-yy>		
Test Equipment	Version	Calibration	
<Instrument 1>	<version>	<mm-dd-yy>	
<Instrument 2>	<version>	< mm-dd-yy >	
<SW tool 1>	<version>	N/A	
<SW tool 2>	<version>	< mm-dd-yy >	

Test No.	Test	Expected	Actual	PASS/FAIL
2.1	RRCConnectionReject message: Initial Attach			
2.2	RRCConnectionReject message: Sending Data to a Connected PDN			
2.3	Void			
2.4	Network does not Respond to RACH			
2.5	Multiple RRC Failures			
3.1	UE Fails to Authenticate the Network: Invalid MAC Code			
3.2	UE Fails to Authenticate the Network: Invalid Value for Separation Bit			

3.3	UE Fails to Authenticate the Network: Invalid Value for SQN Field			
3.4	Void			
3.5	UE Sends "Security Mode Reject" Message: Initial Attach			
3.6	Void			
3.7	Void			
3.8	Void			
4.1	Void			
4.2	Void			
4.3	Void			
4.4	UE Receives Attach Reject message from the Network: Code 19			
4.5	Void			
4.6	UE Receives Detach Request message from the Network: Codes 3, 6, 7, and 8			
4.7	UE Receives Detach Request message from the Network: Codes 11 and 14			
4.8	UE Receives Detach Request message from the Network: Codes 12, 13, and 15			
4.9	UE Receives Attach Reject message from the Network: Code 17			
4.10	UE with T3346 Timer Support Receives Attach Reject message from the Network: Code 22			

4.11	Void			
4.12	UE Receives Attach Reject and PDN Connectivity Reject Messages from the Network			
4.13	UE Receives Attach Reject message from the Network: Codes 95, 96, 97, 99, and 111			
4.14	UE with T3245 Timer Receives Attach Reject message from the Network: Codes 11 and 14			
4.15	Permanent Attach Failures Across Power Cycle			
4.16	Permanent EMM Failures Across Power Cycle with Detach Request			
5.1	Void			
5.2	UE Receive Service Reject Message from the Network Code 11			
5.3	UE Receives Service Reject message from the Network: Codes 12, 13, and 15			
5.4	Void			
5.5	Service Request Fails: Throttling Algorithm			

	Invoked			
5.6	UE Receives Service Reject message from the Network: Code 17			
5.7	Void			
5.8	UE Receives Tracking Area Update Reject message from the Network: Codes 11 and 14			
5.9	UE Receives Tracking Area Update Reject message from the Network: Codes 12, 13, and 15			
5.10	Void			
5.11	Tracking Area Update Request Fails: Tracking Area Update Attempt Counter Reaches Max Value			
5.12	UE Receives Tracking Area Update Reject message from the Network: Code 17			
5.13	UE with T3346 Timer Support Receives Service Reject Message from the Network: Code 22			
5.14	UE without T3346 Timer Support Receives Service Reject Message from the Network: Code 22			
5.15	UE with T3346 Timer Support Receives Tracking Area Update Reject Message from the Network: Code 22			

5.16	UE without T3346 Timer Support Receives Tracking Area Update Reject Message from the Network: Code 22			
5.17	Permanent EMM Failures Across Power Cycle with Service Request			
5.18	Permanent EMM Failures Across Power Cycle with Tracking Area Update			
6.1	Network Fails to Assign an IPv6 Address			
6.2	Network Fails to Refresh the IPv6 Address for the IMS PDN			
6.3	Network Fails to Assign an IPv6 Address for a non-IMS PDN- Initial Connection, no IPv4 address assigned			
6.4	Network Fails to Assign an IPv6 Address for a non-IMS PDN- Initial Connection, IPv4 address assigned			
6.5	UE Receives PDN Connectivity Reject message from the Network for the IMS PDN- Initial Attachment			
6.6	UE Receives PDN Connectivity Reject message from the Network for the IMS			

	PDN- Subsequent Attachment			
6.7	UE Receives PDN Connectivity Reject message from the Network for non-IMS PDN: Codes 26, 30, 31, 34, 38, 95, 96, 97, 98, 99, 100, 101, and 111			
6.8	Void			
6.9	UE Receives PDN Connectivity Reject message from the Network for non-IMS PDN: Codes 8, 27, 29, 32, 33, and 112			
6.10	UE Receives PDN Connectivity Reject message from the Network for IMS PDN: Codes 8, 27, 29, 32, 33, and 112			
6.11	Network Fails to Respond to PDN Connectivity Request			
6.12	Network Fails to Refresh the IPv6 Address for the IMS PDN, IPv4 Address Assigned			
6.13	Network Fails to Assign an IPv6 Address on Network Attach, IPv4 Address Assigned			
6.14	Network Fails to Assign an IPv6 Address for the Internet PDN on Network Attach, No IPv4 Address Assigned			
6.15	Network Fails to Include IMS P-CSCF Address in Activate Default EPS Bearer Context Request message for the IMS PDN, Initial Attach			

6.16	Network Fails to Include IMS P-CSCF Address in Active Default EPS Bearer Context Request message during an IMS PDN Connection Attempt			
6.17	UE Receives PDN Connectivity Reject message from the Network for ADMIN PDN: Code 33			
6.18	UE Makes Excessive PDN Connectivity Requests			
6.19	UE Makes Attach Request while Throttling on PDN			
6.20	Void			
6.21	UE Receives PDN Connectivity Reject message from the Network for non-IMS PDN: Codes 26 and 27 with T3396 Timer Set			
7.1	UE Receives Deactivate EPS Bearer Context Request message from the Network: 2 PDN Connections Open			
7.2	UE Receives Detach Request message			
	from the Network: 1 PDN Connection Open			
7.3	UE Receives Deactivate EPS Bearer Context Request message from the Network: Code 39			

References

<Industry Standards References>

Change requests may cause modification to the specifications listed below. Please refer to www.3gpp.org for the latest version of the 3GPP specifications. Verizon Wireless LTE 3GPP Band 13 specifications are available at .

3GPP TS 24.301: Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3 (Release 9)

3GPP TS 36.331: Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification (Release 9)

3GPP TS 36.521-3: Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) conformance specification; Radio transmission and reception; Part 3: Radio Resource Management (RRM) conformance testing (Release 9)

3GPP TS 36.523-1: Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification

(Release 9)

IETF RFC 4861: Neighbor Discovery for IP version 6 (IPv6)

<Verizon Wireless Specific Documentation References>

"Verizon Wireless LTE Data Retry Requirements"

"Verizon Wireless LTE 3GPP Band 13 Test Equipment List"

"Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements"

"Verizon Wireless LTE 3GPP Band 13 Device Conformance Test Process"

"Verizon Wireless LTE 3GPP Band 13 Lab Conformance Test Plan"

2.1

2.1 RRCCONNECTIONREJECT MESSAGE INITIAL ATTACH VZ_TC_DATARTRY_5340

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the network responds to an RRCConnectionRequest message with an RRCConnectionReject message. This test verifies UE behavior when the RRCConnectionReject message is received during the UEs initial attempt to attach to the LTE network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements,
- Verizon Wireless Device Requirements LTE Data Retry, *Section 4.1.4*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
Test Procedure <ol style="list-style-type: none"> 1. Configure the test equipment to respond to all RRCConnectionRequest messages with an RRCConnectionReject message. Configure the test equipment such that the value for waitTime in the RRCConnectionReject message is 10 seconds. 2. Verify that the device under test (DUT) has an IMS application that will attempt to connect to the IMS PDN as soon as the DUT is powered on and finds service on the LTE network. 3. Power the DUT on and allow it to find LTE service. 4. Verify that the DUT attempts to attach to the LTE network and that the network responds to the RRCConnectionRequest message with an RRCConnectionReject message with a waitTime value of 10 seconds. 5. Verify that after 10 seconds, the DUT attempts to attach to the LTE network a second time and that the network responds to the RRCConnectionRequest message with an RRCConnectionReject message with a waitTime value of 10 seconds. 6. Re-configure the LTE network emulator to allow the RRC connection setup to succeed. 7. After T302 expires, verify that the DUT attempts to establish an RRC connection and that the network accepts the RRC connection. Verify that the DUT attempts to attach to the LTE network and that the network accepts the attach.
Expected Results
Expected Result The UE waits at least waitTime seconds between transmissions of RRC connection attempts.

2.2 RRC CONNECTION REJECT MESSAGE SENDING DATA TO A CONNECTED PDN VZ_TC_DATARETRY_5341

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the network responds to an RRCConnectionRequest message with an RRCConnectionReject message. This test verifies UE behavior when the RRCConnectionReject message is received while the UE is attempting to send data to a PDN that has previously been connected.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements,
- Verizon Wireless Device Requirements LTE Data Retry, *Section 4.1.4*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
Test Procedure <ol style="list-style-type: none"> 1. Configure the test equipment so that all attachments and connections are allowed. 2. Power the DUT on and allow it to find LTE service. 3. Verify that the DUT successfully attaches to the LTE network. 4. Initiate the test application that can be configured to aggressively attempt to connect to the network using the internet PDN (see section 1.5). 5. Verify that the UE is successful in connecting to the internet PDN on behalf of the test application. Configure the application to the application idle state. 6. Force the DUT to the RRC IDLE state by having the network transmit an RRCConnectionRelease message. 7. Re-configure the test equipment to respond to all RRCConnectionRequest messages with an RRCConnectionReject message. Configure the test equipment such that the value for waitTime in the RRCConnectionReject message is 10 seconds. 8. Switch the test application to the application transmitting state and set the retransmission timer to 5 seconds. 9. Verify that the DUT attempts to connect to the LTE network and the network responds to the RRCConnectionRequest message with an RRCConnectionReject message with a waitTime value of 10 seconds. 10. Verify that after 10 seconds, the DUT attempts to attach to the LTE network a second time and that the network responds to the RRCConnectionRequest message with an RRCConnectionReject message with a waitTime value of 10 seconds.. 11. Verify that after 10 seconds, the DUT attempts to attach to the LTE network a third time and that the network responds to the RRCConnectionRequest message with an RRCConnectionReject message with a waitTime value of 10 seconds. 12. Re-configure the LTE network emulator to allow the RRC connection setup to succeed 13. Once the T302 (10 second) timer expires, verify that the UE attempts to connect upon the next request of the test application with no delay and that the network allows the connection. Configure the application to the application idle state.

- I 4. Force the DUT to the RRC IDLE state by having the network transmit an RRCConnectionRelease message.
- I 5. Switch the test application to the application transmitting state.
- I 6. Verify that the UE attempts to connect upon the next request of the test application with no delay and that the network allows the connection.

Expected Results

Expected Result

The UE waits at least waitTime seconds between transmissions of RRC connection attempts.

2.4 NETWORK DOES NOT RESPOND TO RACH VZ_TC_DATARETRY_5342

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the network does not respond to the RACH from the UE.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE Data Retry, Section 4.1*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
Test Procedure <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1. Configure the test equipment such that the network sets the T3402 timer to 4 minutes in the Attach Accept message. <ol style="list-style-type: none"> o <u>For Rel-17/+ devices, Configure DUT:</u> <ul style="list-style-type: none"> □ CustomLLFailureRetry: 1 (enabled)_MinRetryTimer: 10 seconds MaxRetryTimer: 240-seconds_MaxMinRetry: 45 2. Verify that the device under test (DUT) has an IMS application that will attempt to connect to the IMS PDN as soon as the DUT is powered on and finds service on the LTE network. 3. Power the DUT on and allow it to find LTE service 4. Verify that the DUT sends an Attach Request and that the network responds with an Attach Accept with the T3402 timer set to 4 minutes.

5. Configure the test equipment such that the network sends a Detach Request to the DUT with "re-attach required" in the Detach Type IE.
6. Verify that the DUT detaches from the LTE network.
7. Configure the test equipment such that the network does not respond to RACH attempts from the UE.
8. Verify that the UE sends a RACH request in an attempt to re-attach to the LTE network.
9. Verify that the LTE network does not respond to the RACH attempt on PLMN Y₁ before step 13.
10. Verify that the UE sends a RACH request message 4 more times with each message separated by at least $T_{3411} / \text{MinRetryTimer}$ seconds.
11. After the fifth attempt fails, verify that the UE does not make a RACH attempt.
12. While the T_{3402} timer or MaxretryTimer is running, re-configure the network so that the UE finds service on an eNodeB with a PLMN id equal to Y₄ where Y₄ is not equal to Y₁. The frequency of the second PLMN shall be the same as the first. The network should still be configured to not respond to RACH attempts from the UE.
13. Verify that the UE sends a RACH request to the LTE network PLMN Y₄.
14. Verify that the LTE network does not respond to the RACH attempt.
15. Verify that the UE sends a RACH request message 4 more times with each message separated by at least $T_{3411} / \text{MinRetryTimer}$ seconds.
16. After the fifth attempt fails, verify that the UE does not make a RACH attempt on PLMN Y₄.
17. ~~While the T_{3402} timer is running for PLMN Y₄, r~~ Re-configure the network so that the UE again finds service on PLMN Y₁.
18. Proceed as following:

For Rel 16 and earlier devices:

- If the DUT supports multiple RATs, verify that the UE does not send a series of RACH attempts to PLMN Y₁ until the expiration of the original T_{3402} timer (T_{3402} triggered at step 11).
- If the DUT supports LTE only, verify that the UE sends a series of RACH attempts to PLMN Y₁ no later than $T_{3402} + 10\text{sec}$ after step 11

For Rel-17/+ devices:

- Verify that the UE sends RACH attempts to PLMN Y₁ after MaxRetryTimer expires

Expected Results

Expected Result

The UE applies its attach attempt counter and throttling as defined in *section Situation: UE*

<p><i>Encounters RRC Failures During an Attach Attempt</i> of the Verizon Wireless LTE Data Retry Requirements.</p>

2.5 MULTIPLE RRC FAILURES VZ_TC_DATARETRY_5343

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE encounters multiple RRC failures.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements,
- Verizon Wireless Device Requirements LTE Data Retry, *Section 4.1*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
<p>Test Procedure</p> <ol style="list-style-type: none">1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1. Configure the test equipment such that the network sets the T3402 timer to 4 minutes in the Attach Accept message.2. Verify that the device under test (DUT) has an IMS application that will attempt to connect to the IMS PDN as soon as the DUT is powered on and finds service on the LTE network.3. Power the DUT on and allow it to find LTE service.4. Verify that the DUT sends an Attach Request and that the network responds with an Attach Accept with the T3402 timer set to 4 minutes.5. Configure the test equipment such that the network sends a Detach Request to the DUT with "re-attach required" in the Detach Type IE.6. Verify that the DUT detaches from the LTE network.

7. Configure the test equipment such that the network does not respond to RACH attempts from the UE (i.e., ignores the random access preamble).
8. Verify that the UE sends a RACH request in an attempt to re-attach to the LTE network.
9. Verify that the LTE network does not respond to the RACH attempt.
10. Verify that after T₃₄₁₁ seconds the DUT attempts to attach to the LTE network a second time and that the LTE network does not respond to the RACH attempt. This is considered Retry #1.
11. Verify that after T₃₄₁₁ seconds the DUT attempts to attach to the LTE network a third time and that the network ignores the random access preamble. This is considered Retry #2.
12. Verify that after T₃₄₁₁ seconds the DUT attempts to attach to the LTE network a fourth time and that the network ignores the random access preamble. This is considered Retry #3.
13. After the random access procedure fails due to timeout (i.e. UE exceeds preambleTransMax), re-configure the network emulator such that the network emulator responds to the RACH and allows the random access procedure to complete. Also configure the test equipment to respond to all RRCConnectionRequest messages with an RRCConnectionReject message. The value for waitTime in the RRCConnectionReject message shall be set to 10 seconds.
14. Verify that the DUT attempts to attach to the LTE network and that the network responds to the RRCConnectionRequest message with an RRCConnectionReject message with a waitTime value of 10 seconds. [Note: the device attach counter should not be incremented upon reception of an RRCConnectionReject message.]
15. Verify that after 10 seconds, the DUT attempts to attach to the LTE network and that the network responds to the RRCConnectionRequest message with an RRCConnectionReject message with a waitTime of 10 seconds.
16. While the T₃₀₂ timer is running, re-configure the network to accept RRCConnectionRequests but to not respond to RACH attempts from the UE (i.e., ignores the random access preamble).
17. Verify that after T₃₀₂ expires, the UE sends a RACH request to the LTE network and that the network ignores the random access preamble. This is considered Retry #4. The attach counter should now have reached a value of 5.
18. After the fourth retry attempt fails, verify there is no next attach attempt on this PLMN Y₁ before step 21.
19. While the T₃₄₀₂ timer is running, re-configure the network so that the UE finds service on an eNodeB with a PLMN id equal to Y₄ where Y₄ is not equal to Y₁. The frequency of the second PLMN shall be the same as the first. The network should still be configured to not respond to RACH attempts from the UE.
20. Verify that the DUT attempts to attach to the network without waiting for the T₃₄₀₂ timer to expire.
21. Re-configure the network so that the DUT again finds service on PLMN Y₁.

22. Proceed as following:

- If the DUT supports multiple RATs, verify that the DUT does not attempt to attach to the network until the expiration of the original T_{3402} timer, which started after step 17.
- If the DUT support LTE RAT only, verify that the DUT sends a series of RACH attempts to PLMN Y_1 no later than $T_{3402} + 10\text{sec}$ after step 17.

Expected Results

Expected Result

The UE applies attach attempt throttling as defined in section 4.3.1 of the Verizon Wireless LTE Data Retry Requirements.

2.6 MULTIPLE RRC FAILURES-Rel-17 VZ_TC_DATARETRY_4105999311931544

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE encounters multiple RRC failures.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements,
- Verizon Wireless Device Requirements LTE Data Retry, *Section 4.1*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all Rel-17 and later UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
<p><u>Test Procedure</u></p> <ol style="list-style-type: none">1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1. Configure the UE with<ul style="list-style-type: none">□ CustomLLFailureRetry: 1 (enabled)□ MinRetryTimer: 10 seconds□ MaxRetryTimer: 150 seconds□ MaxMinRetry: 102. Verify that the device under test (DUT) has an IMS application that will attempt to connect to the IMS PDN as soon as the DUT is powered on and finds service on the LTE network.3. Power the DUT on and allow it to find LTE service.4. Verify that the DUT sends an Attach Request and that the network responds with an Attach Accept.

5. Configure the test equipment such that the network sends a Detach Request to the DUT with "re-attach required" in the Detach Type IE.
6. Verify that the DUT detaches from the LTE network.
7. Configure the test equipment such that the network does not respond to RACH attempts from the UE (i.e., ignores the random access preamble).
8. Verify that the UE sends a RACH request in an attempt to re-attach to the LTE network.
9. Verify that the LTE network does not respond to the RACH attempt.
10. Verify that after MinRetryTimer seconds the DUT attempts to attach to the LTE network a second time and that the LTE network does not respond to the RACH attempt. This is considered Retry #1.
11. Verify that after MinRetryTimer seconds the DUT attempts to attach to the LTE network a third time and that the network ignores the random access preamble. This is considered Retry #2.
12. Verify that after MinRetryTimer seconds the DUT attempts to attach to the LTE network a fourth time and that the network ignores the random access preamble. This is considered Retry #3.
13. Verify that after MinRetryTimer seconds the DUT attempts to attach to the LTE network a fourth time and that the network ignores the random access preamble. This is considered Retry #4.
14. Verify that after MinRetryTimer seconds the DUT attempts to attach to the LTE network and that the network ignores the random access preamble. This is considered Retry #5.
15. Verify that after MinRetryTimer seconds the DUT attempts to attach to the LTE network and that the network ignores the random access preamble. This is considered Retry #6.
16. Verify that after MinRetryTimer seconds the DUT attempts to attach to the LTE network and that the network ignores the random access preamble. This is considered Retry #7.
17. Verify that after MinRetryTimer seconds the DUT attempts to attach to the LTE network and that the network ignores the random access preamble. This is considered Retry #8.
18. Verify that after MinRetryTimer seconds the DUT attempts to attach to the LTE network and that the network ignores the random access preamble. This is considered Retry #9.
19. Verify that after MinRetryTimer seconds the DUT attempts to attach to the LTE network and that the network ignores the random access preamble. This is considered Retry #10

~~Verify that after MinRetryTimer seconds the DUT attempts to attach to the LTE network and that the network ignores the random access preamble. This is considered Retry #10.~~

20. Verify that after MaxRetryTimer seconds the DUT attempts to attach to the LTE network and that the network ignores the random access preamble.
21. Verify that after ~~Max~~ MinRetryTimer seconds the DUT attempts to attach to the LTE network and that the network accepts the random access preamble and allow attach

procedure
Expected Results
<p><u>Expected Result</u></p> <p>The UE applies attach attempt as defined in section 1.4.3.1.3.1 of the <u>Verizon Wireless LTE Data Retry Requirements</u>.</p>

3.1 UE FAILS TO AUTHENTICATE THE NETWORK INVALID MAC CODE

VZ_TC_DATARETRY_5344

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE is unable to authenticate the network because of an invalid MAC code in the NAS Authentication Request message.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE Data Retry, Section 4.2.1.1*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
<p>Test Procedure</p> <ol style="list-style-type: none"> 1. Configure the test setup so that the DUT finds service on a single eNodeB with cell id equal to value X1 and PLMN id equal to value Y1. 2. Configure the test equipment such that the MAC code in the AUTN information element of the NAS Authentication Request message is set to an invalid value. 3. Verify that the device under test (DUT) has an IMS application that will attempt to connect to the IMS PDN as soon as the DUT is powered on and finds service on the LTE network. 4. Power the DUT on and allow it to find LTE service. 5. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message. 6. Verify that, during the authentication portion of the attachment process, the network sends a NAS Authentication Request message in which the MAC code in the AUTN information element is set to an invalid value. 7. Verify that the UE sends a NAS Authentication Failure message to the network in which the EMM cause code is #20 (MAC failure). 8. Ensure that the network does not transmit another NAS Authentication Request message for at least 25 seconds which will cause timer T3418 to expire. 9. Monitor the DUT for more than 5 minutes and verify that it does not attempt to attach to the

LTE network for at least 300 seconds after the initial failure.

10. Attempt to initiate a connection to the Internet PDN from the DUT.
11. Verify that the DUT attempts to connect to that eNodeB. (Note: this attempt may be suppressed if the IMS application made a second attempt and the device began a new 300 second timer).
12. Reconfigure the test setup so that the DUT now finds service on a different eNodeB with cell id equal to value X2 where X2 is not equal to X1. X1 and X2 are on the same frequency. The PLMN id is still equal to Y1.
13. Verify that the DUT attempts to attach to the LTE network on the new eNodeB.
14. Re-run the test with the following exception: at step 12.), configure the eNodeB such that the cell id equal to X1 and change the PLMN id to value Y4 where Y4 is not equal to Y1. The frequency of the second PLMN shall be the same as the first.
15. Verify that the DUT attempts to attach to the LTE network on the new eNodeB.

Expected Results

Expected Result

UE does not attempt any further connections with an LTE eNodeB for 300 seconds if it is unable to authenticate the network. UE will attempt connections on a different eNodeB.

3.1.1 UE FAILS TO AUTHENTICATE THE NETWORK INVALID MAC CODE - Test I

VZ_TC_DATARTRY_4105999311931732

3.1.2 UE FAILS TO AUTHENTICATE THE NETWORK INVALID MAC CODE - Test2

VZ_TC_DATARTRY_4105999311931733

3.2 UE FAILS TO AUTHENTICATE THE NETWORK INVALID VALUE FOR SEPARATION BIT VZ_TC_DATARETRY_5345

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE is unable to authenticate the network because of an invalid value for the separation bit in the AMF field of the AUTN information element in the NAS Authentication Request message. It verifies that a power cycle of the device will clear throttling behavior.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE Data Retry, Section 4.2.1.1*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
<p>Test Procedure</p> <ol style="list-style-type: none"> 1. Configure the test setup so that the DUT finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1 and PLMN id equal to value Y1. 2. Configure the test equipment such that the separation bit in the AMF field of the AUTN information element in the NAS Authentication Request message is set to a value of 0. 3. Verify that the device under test (DUT) has an IMS application that will attempt to connect to the IMS PDN as soon as the DUT is powered on and finds service on the LTE network. 4. Power the DUT on and allow it to find LTE service. 5. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message. 6. Verify that, during the authentication portion of the attachment process, the network sends a NAS Authentication Request message in which the AMF field in the AUTN information element is set to a value of 0. 7. Verify that the UE sends a NAS Authentication Failure message to the network with EMM Cause Code #26 "Non-EPS authentication not acceptable". 8. Ensure that the network does not transmit any further UE-directed NAS messages for at least 25 seconds which will cause timer T3418 to expire. 9. Monitor the DUT for more than 5 minutes and verify that it does not attempt to attach to the LTE network for at least 300 seconds after the initial failure. 10. Attempt to initiate a connection to the Internet PDN from the DUT. 11. Verify that the DUT attempts to connect to the LTE network. (Note: this attempt may be suppressed if the IMS application made a second attempt and the device began a new 300 second timer). 12. Cycle the power on the DUT (turn the device off and then back on again). Verify that the UE finds service on the same eNodeB, that the

UE attempts to attach, and that during the authentication portion of the attachment process, the network sends a NAS Authentication Request message in which the AMF field in the AUTN information element is set to a value of 0.

- I 3. Verify that the UE sends a NAS Authentication Failure message to the network with EMM Cause Code #26 "Non-EPS authentication not acceptable".
- I 4. Ensure that the network does not transmit any further UE-directed messages for at least 25 seconds which will cause timer T₃₄₁₈ to expire.
- I 5. Monitor the DUT for 5 minutes and verify that it does not attempt to attach to the LTE network.
- I 6. Attempt to initiate a connection to the Internet PDN from the DUT.
- I 7. Verify that the DUT does attempts to connect to the LTE network. (Note: this attempt may be suppressed if the IMS application made a second attempt and the device began a new 300 second timer).
- I 8. Reconfigure the test setup so that the DUT now finds service on a different eNodeB with cell id equal to value X₂ where X₂ is not equal to X₁. X₁ and X₂ are on the same frequency. The PLMN id is still equal to Y₁.
- I 9. Verify that the DUT attempts to attach to the LTE network on the new eNodeB.

Expected Results

Expected Result

UE does not attempt any further connections with an LTE eNodeB for at least 300 seconds if it is unable to authenticate the network until power cycle.
UE will attempt connections on a different eNodeB.

3.3 UE FAILS TO AUTHENTICATE THE NETWORK INVALID VALUE FOR SQN FIELD VZ_TC_DATARTRY_5346

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE is unable to authenticate the network because of an invalid value for the SQN field of the AUTN information element in the NAS Authentication Request message.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE Data Retry, Section 4.2.1.1*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
<p>Test Procedure</p> <ol style="list-style-type: none"> 1. Configure the test setup so that the DUT finds service on a single eNodeB with cell id equal to value X1 and PLMN id equal to value Y1. 2. Configure the test equipment such that the SQN field of the AUTN information element in the NAS Authentication Request message is set to an invalid value. 3. Verify that the device under test (DUT) has an IMS application that will attempt to connect to the IMS PDN as soon as the DUT is powered on and finds service on the LTE network. 4. Power the DUT on and allow it to find LTE service. 5. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message. 6. Verify that, during the authentication portion of the attachment process, the network sends a NAS Authentication Request message in which the SQN code in the AUTN information element is set to an invalid value. 7. Verify that the UE sends a NAS Authentication Failure message to the network with an EMM cause code of #21 "Sync failure". 8. Ensure that the network does not transmit any further UE-directed NAS messages for at least 25 seconds which will cause timer T3420 to expire. 9. Monitor the DUT for at least 5 minutes and verify that it does not attempt to attach to the LTE network for at least 300 seconds after the initial failure. 10. Attempt to initiate a connection to the Internet PDN from the DUT. 11. Verify that the DUT attempts to connect to the LTE network. (Note: this attempt may be suppressed if the IMS application made a second attempt and the device began a new 300 second timer). 12. Reconfigure the test setup so that attach attempts will succeed and the UE will now successfully authenticate the network. 13. Reconfigure the test setup so that the DUT now finds service on a different eNodeB with cell id equal to value X2 where X2 is not equal to X1. X1 and X2 are on the same frequency. The PLMN id is still equal to Y1. 14. Verify that the DUT attempts to attach to the LTE network on the new eNodeB.

- I 5. Verify that the DUT is successful in attaching to the network and connecting to the IMS PDN.
- I 6. Reconfigure the test setup so that the DUT finds service on the original eNodeB (cell id = X1, PLMN id = Y1).
- I 7. Attempt to initiate a connection to the Internet PDN from the DUT. Configure the test application for the application transmitting state with a retransmission timer set to 10 seconds.
- I 8. Verify that the DUT does not attempt to connect to the LTE network until at least 5 minutes after the previous failure.

Expected Results

Expected Result

UE does not attempt any further connections with an LTE eNodeB for at least 300 seconds if it is unable to authenticate the network. UE will attempt connections on a different eNodeB.

3.4 NETWORK FAILS TO AUTHENTICATE THE UE- NETWORK SENDS AUTHENTICATION REJECT MESSAGE VZ_TC_DATARTRY_7194

VOID

3.5 UE SENDS SECURITY MODE REJECT MESSAGE INITIAL ATTACH

VZ_TC_DATARETRY_5347

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE sends a NAS Security Mode Reject message to the network in response to a NAS Security Mode Command message. This test applies to the situation in which the UE is attempting an initial attach.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE Data Retry, Section 4.2.2*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
Test Procedure <ol style="list-style-type: none">1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with PLMN id equal to value Y1. Configure the test equipment such that the network sets the T3402 timer to 4 minutes in the Attach Accept message.2. Verify that the device under test (DUT) has an IMS application that will attempt to connect to the IMS PDN as soon as the DUT is powered on and finds service on the LTE network.3. Power the DUT on and allow it to find LTE service4. Verify that the DUT sends an Attach Request and that the network responds with an Attach Accept with the T3402 timer set to 4 minutes.5. Configure the test equipment such that the network sends a Detach Request to the DUT with "re-attach required" in the Detach Type IE.6. Verify that the DUT detaches from the LTE network.7. Configure the test equipment such that the network proposes capabilities that the UE does not support when sending a NAS Security Mode Command message.8. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.9. Verify that the network sends a NAS Authentication Request message and that the UE responds by sending a NAS Authentication Response message.

10. Verify that the network then sends a NAS Security Mode Command message and that the UE sends a NAS Security Mode Reject message.
11. Verify that the attachment attempt is aborted by the network per 3GPP TS24.301.
12. Initiate the test application (see **section TEST EQUIPMENT CONFIGURATION**). Configure the test application for the application transmitting state with a retransmission timer set to 10 seconds.
13. Verify that the UE attempts to attach on behalf of the test application (or on behalf of the IMS application) after a time defined by timer T₃₄₁₁. Verify that the UE again sends a NAS Security Mode Reject message during the Authentication/Security stage of the attach process and the network aborts the attachment attempt. This is considered Retry #1.
14. Verify that the UE again attempts to attach on behalf of the test application (or on behalf of the IMS application) after waiting at least T₃₄₁₁ seconds. Verify that the UE again sends a NAS Security Mode Reject message during the Authentication/Security stage of the attach process and the network aborts the attachment attempt. This is considered Retry #2.
15. Verify that the UE again attempts to attach on behalf of the test application (or on behalf of the IMS application) after waiting at least T₃₄₁₁ seconds. Verify that the UE again sends a NAS Security Mode Reject message during the Authentication/Security stage of the attach process and then abandons the attachment attempt. This is considered Retry #3.
16. Verify that the UE again attempts to attach on behalf of the test application (or on behalf of the IMS application) after waiting at least T₃₄₁₁ seconds. Verify that the UE again sends a NAS Security Mode Reject message during the Authentication/Security stage of the attach process and then abandons the attachment attempt. This is considered Retry #4. The attach counter should now have reached a value of 5.
17. After the fourth retry attempt fails, verify that the next attempt does not occur for T₃₄₀₂ minutes (4 minutes).
18. Verify that the UE sends a second cluster of 5 more attach requests with each individual attempt separated by at least T₃₄₁₁ seconds. After that, verify that the UE sends no additional attach attempts for at least T₃₄₀₂ minutes (4 minutes).

Expected Results

Expected Result

UE follows the data retry algorithm described in the document "Verizon Wireless LTE Data Retry" when it sends a NAS Security mode Reject message during the initial attach process.

4.1 UE RECEIVES ATTACH REJECT MESSAGE FROM THE NETWORK CODES 3, 6, 7, AND 8 VZ_TC_LTE DATARETRY_7184

VOID

4.2 UE RECEIVES ATTACH REJECT MESSAGE FROM THE NETWORK CODES 11 AND 14 VZ_TC_DATARTRY_7185

VOID

4.3 UE RECEIVES ATTACH REJECT MESSAGE FROM THE NETWORK CODES 12, 13, AND 15 VZ_TC_DATARTRY_7186

VOID

4.4 UE RECEIVES ATTACH REJECT MESSAGE FROM THE NETWORK CODE 19 VZ_TC_DATARTRY_5348

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE receives a NAS Attach Reject message while attempting to attach to the LTE network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE 3GPP Band 13 Network Access, Section 3.2.6*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
<p>Test Procedure</p> <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1. Configure the test system such that timer T3411 is set to 10 seconds. Configure the test equipment such that the network sets the T3402 timer to 4 minutes in the Attach Accept message. 2. Verify that the device under test (DUT) has an IMS application that will attempt to connect to the IMS PDN as soon as the DUT is powered on and finds service on the LTE network. 3. Power the DUT on and allow it to find LTE service 4. Verify that the DUT sends an Attach Request and that the network responds with an Attach Accept with the T3402 timer set to 4 minutes. 5. Configure the test equipment such that the network sends a Detach Request to the DUT with "re-attach required" in the Detach Type IE. 6. Verify that the DUT detaches from the LTE network. 7. Configure the test equipment such that the network will respond to attach attempts by sending a NAS Attach Reject message with an EMM Cause Code equal to 19. Configure the test equipment such that the network will respond to a piggybacked PDN connectivity request by sending a NAS PDN Connectivity Reject message with an ESM Cause Code equal to 54. 8. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message. 9. Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 19 and a NAS PDN Connectivity Reject message in which the ESM Cause Code is set to a value of 54. 10. Verify that the UE waits at least T3411 seconds before attempting to attach again. The next attempt is considered attempt #2. Verify that the Request Type IE in the PDN Connectivity Request message is set to "Initial Request." 11. Verify that the network again responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 19 and a NAS PDN Connectivity Reject message in which the ESM Cause Code is set to a value of 54.

- I 2. Verify that the UE waits at least T_{3411} seconds before attempting to attach again. The next attempt is considered attempt #3. Verify that the Request Type IE in the PDN Connectivity Request message is set to "Initial Request."
- I 3. Verify that the network again responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 19 and a NAS PDN Connectivity Reject message in which the ESM Cause Code is set to a value of 54.
- I 4. Verify the DUT does not send an Attach Request while T_{3402} is running.

Expected Results

Expected Result

UE sets the attach attempt counter to 5 after receiving 3 NAS Attach Reject messages with EMM Cause Code of 19. The first three attachment attempts are separated by T_{3411} seconds. The next attempt does not occur for at least T_{3402} minutes.

4.5 ATTACH REQUEST FAILS - ATTACH COUNTER REACHES MAX VALUE `VZ_TC_DATARTRY_7187`

VOID

4.6 UE RECEIVES DETACH REQUEST MESSAGE FROM THE NETWORK CODES 3, 6, 7, AND 8 VZ_TC_DATARETRY_5349

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE receives a NAS Detach Request message from the network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE Data Retry, Section 4.3.3*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
Test Procedure <ol style="list-style-type: none">Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1.Configure the test equipment such that the network will allow the UE to attach successfully.Power the DUT on and allow it to find LTE service.Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network.From the network, send a NAS Detach Request message to the DUT. Configure the message such that re-attach is not required and the EMM Cause Code is set to 3. Verify that the UE sends a Detach Accept message.Monitor the DUT for 5 minutes and verify that it does not attempt to attach to the LTE network.Attempt to initiate a connection to the Internet PDN from the DUT.Verify that the DUT does not attempt to connect to the LTE network.Reconfigure the test setup so that the DUT now finds service on a different eNodeB with cell_id equal to value X2 where X2 is not equal to X1. X1 and X2 are on the same frequency. The PLMN id is still equal to Y1.

10. Verify that the DUT does not attempt to attach to the LTE network on the new eNodeB.
11. Attempt to initiate a connection to the Internet PDN from the DUT.
12. Verify that the DUT does not attempt to connect to the LTE network.
13. Reconfigure the test setup so that the DUT now finds service on a different PLMN with id equal to value Y₄ where Y₄ is not equal to Y₁. The frequency of the second PLMN shall be the same as the first.
14. Verify that the DUT does not attempt to attach to the LTE network on the new network.
15. Attempt to initiate a connection to the Internet PDN from the DUT.
16. Verify that the DUT does not attempt to connect to the LTE network.
17. Reconfigure the test setup so that the DUT now finds service on a different Tracking Area with id equal to value Z₂ where Z₂ is not equal to Z₁.
18. Verify that the DUT does not attempt to attach to the LTE network on the new network.
19. Attempt to initiate a connection to the Internet PDN from the DUT.
20. Verify that the DUT does not attempt to connect to the LTE network.
21. Power cycle the DUT.
22. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.
23. Verify that the DUT attaches to the LTE network successfully.
24. Attempt to initiate a connection to the Internet PDN from the DUT.
25. Verify that the DUT connects to the Internet PDN.
26. Power the device off.
27. Repeat the test for EMM Cause Codes of 3, 6, 7, and 8.

Expected Results

Expected Result

UE does not attempt any further connections with an LTE system if it receives a NAS Detach Request message with cause codes 3, 6, 7, or 8.

4.6.1 _Code6 UE receives "Detach Request" from NW - code 6 VZ_TC_DATARTRY_3602992

4.6.2 _Code7 UE receives "Detach Request" from NW - code 7 VZ_TC_DATARTRY_3602999

4.6.3 _Code3 UE receives "Detach Request" from NW - code 3 VZ_TC_DATARTRY_3601621

4.6.4 _Code8 UE receives "Detach Request" from NW - code 8 VZ_TC_DATARTRY_3603114

4.7.1 UE RECEIVES DETACH REQUEST MESSAGE FROM THE NETWORK CODES 11 AND 14 VZ_TC_DATARETRY_5350

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE receives a NAS Detach Request message from the network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE Data Retry, Section 4.3.3*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
Test Procedure <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y3, and TAI equal to value Z1. The PLMN Y3 shall not be a home PLMN. 2. Configure the test equipment such that the network will allow the UE to attach successfully. 3. Power the DUT on and allow it to find LTE service. 4. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network. <ul style="list-style-type: none"> • If the DUT supports IMS roaming, verify that the DUT connects to the IMS PDN using PDN Type IPv6. • If the DUT does not support IMS roaming, verify that the DUT connects to the Internet PDN using PDN Type IPv4.

5. From the network, send a NAS Detach Request message to the DUT. Configure the message such that re-attach is not required and the EMM Cause Code is set to 11. Verify that the UE sends a Detach Accept message.
6. Monitor the DUT for 5 minutes and verify that it does not attempt to attach to the LTE network.
7. Attempt to initiate a connection to the Internet PDN from the DUT.
8. Verify that the DUT does not attempt to connect to the LTE network.
9. Reconfigure the test setup so that the DUT now finds service on a different eNodeB with cell_id equal to value X2 where X2 is not equal to X1. X1 and X2 are on the same frequency. The PLMN id is still equal to Y3.
10. Verify that the DUT does not attempt to attach to the LTE network on the new eNodeB.
11. Attempt to initiate a connection to the Internet PDN from the DUT.
12. Verify that the DUT does not attempt to connect to the LTE network.
13. Reconfigure the test setup so that the DUT now finds service on a different Tracking Area with TAI equal to value Z2 where Z2 is not equal to Z1. Note that only the TAC portion of the TAI will be different; the PLMN id is still equal to Y3.
14. Verify that the DUT does not attempt to attach to the LTE network on the new Tracking Area.
15. Attempt to initiate a connection to the Internet PDN from the DUT.
16. Verify that the DUT does not attempt to connect to the LTE network.
17. Reconfigure the test setup so that the DUT now finds service on a different PLMN with id equal to value Y2 where Y2 is not equal to Y3. The frequency of the second PLMN shall be the same as the first.
18. Verify that the DUT now attempts to attach to the LTE network and is successful.
 - If the DUT supports IMS roaming, verify that the DUT connects to the IMS PDN using PDN Type IPv6.
 - If the DUT does not support IMS roaming, verify that the DUT connects to the Internet PDN using PDN Type IPv4. Then skip to Step 21.
19. Attempt to initiate a connection to the Internet PDN from the DUT.
20. Verify that the DUT connects to the Internet PDN.
21. Reconfigure the test setup so that the DUT again finds service on the original PLMN (with id equal to value Y3).
22. Verify that the DUT does not attempt to attach on PLMN Y3.
23. Power the device off.
24. Change the PLMN identifier to a new value, Y5. The PLMN Y5 shall not be a home PLMN.
25. Repeat the test for EMM Cause Code of 14. When the test is repeated, use value Y5 instead of Y3. This is done in case the device is still storing PLMN Y3 on the forbidden list.

Expected Results
<p>Expected Result</p> <p>UE does not attempt any further connections within a roaming PLMN if it receives a NAS Detach Request message with cause codes 11 or 14.</p>

4.7.2 _Code14 UE receives "Detach Request" from NW - code 14 VZ_TC_DATARETRY_3603128

4.7.3 _C11_IMSRoam UE receives "Detach Request" from NW - code 11
VZ_TC_DATARTRY_3606888

4.7.4 _C14_IMSRoam UE receives "Detach Request" from NW - code 14
VZ_TC_DATARTRY_3606895

4.7.5 _C11_NoIMSRoam UE receives "Detach Request" from NW - code 11
VZ_TC_DATARTRY_3606908

4.7.6 _C14_NoIMSRoam UE receives "Detach Request" from NW - code 14
VZ_TC_DATARTRY_360692.1

4.8 UE RECEIVES DETACH REQUEST MESSAGE FROM THE NETWORK CODES 12, 13, AND 15 VZ_TC_DATARTRY_5351

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE receives a NAS Detach Request message from the network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE Data Retry, Section 4.3.3*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
<p>Test Procedure</p> <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1. 2. Configure the test equipment such that the network will allow the UE to attach successfully. 3. Power the DUT on and allow it to find LTE service. 4. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network. 5. From the network, send a NAS Detach Request message to the DUT. Configure the message such that re-attach is not required and the EMM Cause Code is set to 12. Verify that the UE sends a Detach Accept message. 6. Monitor the DUT for 5 minutes and verify that it does not attempt to re-attach to the LTE network. 7. Attempt to initiate a connection to the Internet PDN from the DUT. 8. Verify that the DUT does not attempt to connect to the LTE network. 9. Reconfigure the test setup so that the DUT now finds service on a different eNodeB with cell_id equal to value X2 where X2 is not equal to X1. X1 and X2 are on the same frequency. The PLMN id is still equal to Y1. The TAI is still equal to Z1. 10. Verify that the DUT does not attempt to attach to the LTE network on the new eNodeB. 11. Attempt to initiate a connection to the Internet PDN from the DUT. 12. Verify that the DUT does not attempt to connect to the LTE network. 13. Reconfigure the test setup so that the DUT now finds service on a different Tracking Area with TAI equal to value Z2 where Z2 is not equal to Z1. Note that only the TAC portion of the TAI will be different; the PLMN id is still equal to Y1. 14. Verify that the DUT now attempts to attach to the LTE network and is successful. 15. Attempt to initiate a connection to the Internet PDN from the DUT. 16. Verify that the DUT connects to the Internet PDN.

- I 7. Reconfigure the test setup so that the DUT again finds service on the original TAI (with id equal to value Z1).
- I 8. Verify that the DUT does not attempt to attach on TAI Z1.
- I 9. Power the device off.
20. Repeat the test for EMM Cause Codes of 13 and 15.

Expected Results

Expected Result

UE does not attempt any further connections within a TAI if it receives a NAS Detach Request message with cause codes 12, 13, or 15.

4.8.1 _Code12 UE receives "Detach Request" from NW - code 12 VZ_TC_DATARETRY_3603141

4.8.2 _Code13 UE receives "Detach Request" from NW - code 13 VZ_TC_DATARETRY_3603142

4.8.3 _Code15 UE receives "Detach Request" from NW - code 15 VZ_TC_DATARETRY_3603155

4.9 UE RECEIVES ATTACH REJECT MESSAGE FROM THE NETWORK

CODE 17 VZ_TC_DATARTRY_5352

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE receives a NAS Attach Reject message while attempting to attach to the LTE network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE Data Retry, Section 4.3.1.3*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
Test Procedure <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1. Configure the test system such that timer T3411 is set to 10 seconds. Configure the test equipment such that the network sets the T3402 timer to 4 minutes in the Attach Accept message. 2. Verify that the device under test (DUT) has an IMS application that will attempt to connect to the IMS PDN as soon as the DUT is powered on and finds service on the LTE network. 3. Power the DUT on and allow it to find LTE service 4. Verify that the DUT sends an Attach Request and that the network responds with an Attach Accept with the T3402 timer set to 4 minutes. 5. Configure the test equipment such that the network sends a Detach Request to the DUT with "re-attach required" in the Detach Type IE. 6. Verify that the DUT detaches from the LTE network. 7. Configure the test equipment such that the network will respond to attach attempts by sending a NAS Attach Reject message with an EMM Cause Code equal to 17.. 8. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message. 9. Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 17. 10. Verify that the UE waits at least T3411 seconds before attempting to attach again. The next attempt is considered attempt #2. Verify that the network again responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 17. 11. Verify that the UE attempts to attach 3 more times with each attempt separated by at least T3411 seconds. 12. After the fifth attempt fails, verify the UE does not send an Attach Request while T3402 is running.
Expected Results
Expected Result

After receiving the NAS Attach Reject message, the UE attempts to attach 4 more times with each attempt separated by at least T_{3411} seconds. After the fifth attempt fails, the next attempt does not occur for at least T_{3402} minutes.

4.10 UE WITH T₃₃₄₆ TIMER SUPPORT RECEIVES ATTACH REJECT MESSAGE FROM THE NETWORK CODE 22 VZ_TC_DATARETRY_5381

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE receives a NAS Attach Reject message while attempting to attach to the LTE network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements,
- Verizon Wireless Device Requirements LTE Data Retry, *Section 4.3.1.1*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*, Release 10 or later.
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies only to UEs with T₃₃₄₆ timer support designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
<p>Test Procedure</p> <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1. Configure the test system such that timer T₃₄₁₁ is set to 10 seconds. 2. Configure the test equipment such that the network will respond to attach attempts by sending a NAS Attach Reject message with an EMM Cause Code equal to 22 and a T₃₃₄₆ Timer value set to 15 minutes. 3. Power the DUT on and allow it to find LTE service. 4. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message. 5. Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 22. 6. Verify that the UE does not re-issue an Attach Request while the T₃₃₄₆ timer is running. 7. While the T₃₃₄₆ timer is running, power cycle the UE. 8. Verify that the UE does not issue an Attach Request. 9. While the T₃₃₄₆ timer is running, re-configure the test setup so that the DUT now finds

service on a different Tracking Area with id equal to value Z2 where Z2 is not equal to Z1, and Z2 is not on the UEs list of tracking areas. Note that only the TAC portion of the TAI will be different. The PLMN id is still equal to Y1.

10. Verify that the UE does not issue an Attach Request.
11. While the T3346 timer is running, re-configure the network (bring down PLMN Y1 completely and then bring up PLMN Y2) so that the UE finds service on an eNodeB with a PLMN id equal to Y2 where Y2 is not equal to Y1. PLMN Y2 shall not be a home PLMN. The frequency of the second PLMN shall be the same as the first. T3346 shall not be running in this second PLMN.
12. Verify that the UE successfully attaches to the LTE network.
 - If the UE supports IMS roaming, verify that the UE connects to the IMS PDN using PDN Type IPv6.
 - If the UE does not support IMS roaming, verify that the UE connects to the Internet PDN using PDN Type IPv4.
13. While the T3346 timer is running, re-configure the test setup so that the DUT again finds service on PLMN Y1.
14. Verify that the UE issues an Attach Request without waiting for T3346 to expire.
15. Power the UE off.

Expected Results

Expected Result

After receiving the NAS Attach Reject message, the UE waits T3346 minutes before its next attach attempt in that PLMN. If the UE enters a new PLMN, it shall stop timer T3346 before issuing an attach attempt in that PLMN.

4.10.1 _IMSRoam UE with T₃₃₄₆ Timer Support Receives Attach Reject message from the Network: Code 22 VZ_TC_DATARTRY_3603501

4.10.2 _NoIMSRoam UE with T₃₃₄₆ Timer Support Receives Attach Reject message from the Network: Code 22 VZ_TC_DATARTRY_3603520

4.1.2 UE RECEIVES ATTACH REJECT AND PDN CONNECTIVITY REJECT MESSAGES FROM THE NETWORK VZ_TC_DATARTRY_5382

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE receives a NAS Attach Reject and PDN Connectivity Reject message while attempting to attach to the LTE network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements,
- Verizon Wireless Device Requirements LTE Data Retry, *Section 4.3.1.1*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
<p>Test Procedure</p> <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1. Configure the test system such that timer T3411 is set to 10 seconds. Configure the test equipment such that the network sets the T3402 timer to 4 minutes in the Attach Accept message. 2. Verify that the device under test (DUT) has an IMS application that will attempt to connect to the IMS PDN as soon as the DUT is powered on and finds service on the LTE network. 3. Power the DUT on and allow it to find LTE service 4. Verify that the DUT sends an Attach Request and that the network responds with an Attach Accept with the T3402 timer set to 4 minutes. 5. Configure the test equipment such that the network sends a Detach Request to the DUT with "re-attach required" in the Detach Type IE.. 6. Verify that the DUT detaches from the LTE network. 7. Configure the test equipment such that the network will respond to attach attempts by sending a NAS Attach Reject message with an EMM Cause Code equal to 19 and the

- T₃₄₀₂ timer set to 4 minutes. Configure the test equipment such that the network will respond to a piggybacked PDN connectivity request by sending a NAS PDN Connectivity Reject message with an ESM Cause Code equal to 26. Note that the T₃₃₉₆ Value IE is not included in the PDN Connectivity Reject message.
8. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.
 9. Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 19 and a NAS PDN Connectivity Reject message in which the ESM Cause Code is set to a value of 26.
 10. Verify that the UE waits at least T₃₄₁₁ seconds before attempting to attach again. The next attempt is considered attempt #2. Verify that the Request Type IE in the PDN Connectivity Request message is set to "Initial Request." Verify that the PDN Type is set to the class 3 (Internet) PDN.
 11. Verify that the network again responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 19 and a NAS PDN Connectivity Reject message in which the ESM Cause Code is set to a value of 26.
 12. Verify that the UE waits at least T₃₄₁₁ seconds before attempting to attach again. The next attempt is considered attempt #3. Verify that the Request Type IE in the PDN Connectivity Request message is set to "Initial Request." Verify that the PDN Type is set to the class 3 (Internet) PDN.
 13. Verify that the network again responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 19 and a NAS PDN Connectivity Reject message in which the ESM Cause Code is set to a value of 26.
 14. Monitor the DUT and verify that it does not attempt to attach to the LTE network for at least T₃₄₀₂ minutes (4 minutes).
 15. After T₃₄₀₂ expires, verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.
 16. Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 19 and a NAS PDN Connectivity Reject message in which the ESM Cause Code is set to a value of 26.
 17. Verify that the UE waits at least T₃₄₁₁ seconds before attempting to attach again. The next attempt is considered attempt #2. Verify that the Request Type IE in the PDN Connectivity Request message is set to "Initial Request." Verify that the PDN Type is set to the class 3 (Internet) PDN.
 18. Verify that the network again responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 19 and a NAS PDN Connectivity Reject message in which the ESM Cause Code is set to a value of 26.
 19. Verify that the UE waits at least T₃₄₁₁ seconds before attempting to attach again. The next attempt is considered attempt #3. Verify that the Request Type IE in the PDN Connectivity

Request message is set to "Initial Request." Verify that the PDN Type is set to the class 3 (Internet) PDN.

20. Verify that the network again responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 19 and a NAS PDN Connectivity Reject message in which the ESM Cause Code is set to a value of 26.
21. Monitor the DUT and verify that it does not attempt to attach to the LTE network for at least T₃₄₀₂ minutes (4 minutes).
22. While the T₃₄₀₂ timer is running, re-configure the network so that the network accepts the attach request and PDN connectivity request.
23. After T₃₄₀₂ expires, verify that the DUT attempts to attach to the LTE network using the IMS PDN, and that the network accepts the requests.

Expected Results

Expected Result

UE sets the attach attempt counter to 5 after receiving 3 NAS Attach Reject messages with EMM Cause Code of 19. The first three attachment attempts are separated by T₃₄₁₁ seconds. The next attempt does not occur for at least T₃₄₀₂ minutes (4 minutes). All attachment attempts after the first and prior to T₃₄₀₂ expiry use the Internet PDN. After T₃₄₀₂ expiry, the UE attempts to attach using the IMS PDN.

4.1.3 UE RECEIVES ATTACH REJECT MESSAGE FROM THE NETWORK CODES 95, 96, 97, 99, AND 111 VZ_TC_DATARETRY_5383

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE receives a NAS Attach Reject message while attempting to attach to the LTE network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements,
- Verizon Wireless Device Requirements LTE Data Retry, *Section 4.3.1.1*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
Test Procedure <ol style="list-style-type: none">1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1. Configure the test equipment such that the network sets the T3402 timer to 4 minutes in the Attach Accept message.2. Verify that the device under test (DUT) has an IMS application that will attempt to connect to the IMS PDN as soon as the DUT is powered on and finds service on the LTE network.3. Power the DUT on and allow it to find LTE service4. Verify that the DUT sends an Attach Request and that the network responds with an Attach Accept with the T3402 timer set to 4 minutes.5. Configure the test equipment such that the network sends a Detach Request to the DUT with "re-attach required" in the Detach Type IE.6. Verify that the DUT detaches from the LTE network.7. Configure the test equipment such that the network will respond to attach attempts by sending a NAS Attach Reject message with an EMM Cause Code equal to 95.8. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.9. Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 95.10. Verify that the UE sends no additional attach attempts for at least T3402 minutes.11. After T3402 expires, verify that the DUT attempts to attach to the LTE network and that the network again responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 95.12. While the T3402 timer is running, re-configure the network so that the network accepts the attach request. Configure the test equipment such that the network sets the T3402 timer to 4 minutes in the Attach Accept message.13. After T3402 expires, verify that the DUT attempts to attach to the LTE network and that the network accepts the attach.

- I 4. Power the device off.
- I 5. Repeat the test for EMM Cause Codes 96, 97, 99, and 111.

Expected Results

Expected Result

After receiving the NAS Attach Reject message, the next attempt does not occur for at least T₃₄₀₂ minutes.

4.13.1 _Code95 UE Receives Attach Reject message from the Network: Code 95 VZ_TC_DATARTRY_3603670

4.13.2 _Code96 UE Receives Attach Reject message from the Network: Code 96

VZ_TC_DATARTRY_3603671

4.13.3 _Code97 UE Receives Attach Reject message from the Network: Code 97 VZ_TC_DATARTRY_3603678

4.13.4 _Code99 UE Receives Attach Reject message from the Network: Code 99 VZ_TC_DATARTRY_3603685

4.13.5 _Code111 UE Receives Attach Reject message from the Network: Code 111 VZ_TC_DATARTRY_3603686

4.14 UE WITH T₃₂₄₅ TIMER RECEIVES ATTACH REJECT MESSAGE FROM THE NETWORK CODE 11 VZ_TC_DATARETRY_5390

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE with T₃₂₄₅ timer enabled receives a NAS Attach Reject message with cause code 11 while attempting to attach to the LTE network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements,
- Verizon Wireless LTE Data Retry Device Requirements, *Section 3.8*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

These test cases apply to UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network. Test Case 1 applies only to devices capable of determining the time elapsed between switch off and switch on. Test Case 2 applies only to devices that are not capable of determining the time elapsed between switch off and switch on.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
Test Procedure--Test 1 <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y2, and TAI equal to value Z1. The PLMN Y2 shall not be a home PLMN. 2. Configure the test equipment such that the network will respond to attach attempts by sending a NAS Attach Reject message with an EMM Cause Code equal to 11. 3. Configure the USIM on the DUT such that the Timer T₃₂₄₅ Behaviour parameter in the EFNASConfig file is enabled. 4. Power the DUT on and allow it to find LTE service. 5. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message. <ul style="list-style-type: none"> • If the DUT supports IMS roaming, verify that the DUT requests a connection to the IMS PDN using PDN Type IPv6. • If the DUT does not support IMS roaming, verify that the DUT requests a connection

to the Internet PDN using PDN Type IPv4.

6. Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 11.
7. Set a timer for 15 minutes and execute the following steps 8 through 22 within the 15 minutes.
8. Verify that the DUT does not attempt to attach to the LTE network after receiving the NAS Attach Reject message.
9. Attempt to initiate a connection to the Internet PDN from the DUT.
10. Verify that the DUT does not attempt to connect to the LTE network.
11. Reconfigure the test setup so that the DUT now finds service on a different eNodeB with cell_id equal to value X2 where X2 is not equal to X1. X1 and X2 are on the same frequency. The PLMN id is still equal to Y2.
12. Verify that the DUT does not attempt to attach to the LTE network on the new eNodeB.
13. Attempt to initiate a connection to the Internet PDN from the DUT.
14. Verify that the DUT does not attempt to connect to the LTE network.
15. Reconfigure the test setup so that the DUT now finds service on a different Tracking Area with TAI equal to value Z2 where Z2 is not equal to Z1. Note that only the TAC portion of the TAI will be different; the PLMN id is still equal to Y2.
16. Verify that the DUT does not attempt to attach to the LTE network on the new Tracking Area.
17. Attempt to initiate a connection to the Internet PDN from the DUT.
18. Verify that the DUT does not attempt to connect to the LTE network.
19. Reconfigure the test setup so that the DUT now finds service on a different PLMN with id equal to value Y3 where Y3 is not equal to Y2. The frequency of the second PLMN may or may not be the same as the first. Configure the test equipment such that the network will allow attachment on PLMN Y3.
20. Verify that the DUT now attempts to attach to the LTE network and is successful.
 - If the DUT supports IMS roaming, verify that the DUT connects to the IMS PDN using PDN Type IPv6.
 - If the DUT does not support IMS roaming, verify that the DUT connects to the Internet PDN using PDN Type IPv4.
21. Reconfigure the test setup so that the DUT again finds service on the original PLMN (with id equal to value Y2).
22. Verify that the DUT does not attempt to attach on PLMN Y2 for the remaining duration of the 15 minute timer.
23. For release 12 or earlier UEs, perform the following steps:
 1. Power the device off and turn off the test script, and keep the device and test script off for 23 hours and 30 minutes.
 2. After 23 hours and 30 minutes have elapsed, resume the test script then power the

<div data-bbox="373 199 1427 850"> <p>device on.</p> <ol style="list-style-type: none"> 3. Monitor the device for 15 minutes and verify that it does not attempt to attach on PLMN Y2. (At this point, the device shall have refrained from attaching to PLMN Y2 for 24 hours since the initial NAS Attach Reject message.) 4. Power the device off and turn off the test script, and keep the device and test script off for an additional 24 hours. 5. While the device is powered off, configure the test equipment such that the network will allow the UE to attach successfully on PLMN Y2. 6. After 24 hours have expired, resume the test script then power the device on, and verify that the device successfully attaches to the LTE network. <ul style="list-style-type: none"> • If the DUT supports IMS roaming, verify that the DUT connects to the IMS PDN using PDN Type IPv6. • If the DUT does not support IMS roaming, verify that the DUT connects to the Internet PDN using PDN Type IPv4. 7. Power the device off. </div> <div data-bbox="235 856 1427 1680"> <p>24. For release 13 or later UEs, perform the following steps:</p> <ol style="list-style-type: none"> 1. Power the device off and turn off the test script, and keep the device and test script off for 11 hours and 30 minutes. 2. After 11 hours and 30 minutes have elapsed, resume the test script then power the device on. 3. Monitor the device for 15 minutes and verify that it does not attempt to attach on PLMN Y2. (At this point, the device shall have refrained from attaching to PLMN Y2 for 12 hours since the initial NAS Attach Reject message.) 4. Power the device off and turn off the test script, and keep the device and test script off for an additional 12 hours. 5. While the device is powered off, configure the test equipment such that the network will allow the UE to attach successfully on PLMN Y2. 6. After 12 hours have expired, resume the test script then power the device on, and verify that the device successfully attaches to the LTE network. 7. If the DUT supports IMS roaming, verify that the DUT connects to the IMS PDN using PDN Type IPv6. 8. If the DUT does not support IMS roaming, verify that the DUT connects to the Internet PDN using PDN Type IPv4. 9. Power the device off. </div>	<div data-bbox="185 1690 1427 1738"> <p>Expected Results</p> </div> <div data-bbox="185 1738 1427 1871"> <p>Expected Result</p> <p>A release 12 or earlier UE configured for timer T₃₂₄₅ does not attempt any further connections within a roaming PLMN for at least 24 hours but no more than 48 hours if it receives a NAS Attach</p> </div>
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Reject message with cause code 11.

A Release 13 or later UE configured for timer T₃₂₄₅ does not attempt any further connections within a roaming PLMN for at least 12 hours but no more than 24 hours if it receives a NAS Attach Reject message with cause code 11.

Design Steps

Step Name

Step 2

Pre-Conditions

Procedures

Test Procedure--Test 2

1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X₁, PLMN id equal to value Y₂, and TAI equal to value Z₁. The PLMN Y₂ shall not be a home PLMN.
2. Configure the test equipment such that the network will respond to attach attempts by sending a NAS Attach Reject message with an EMM Cause Code equal to 11.
3. Configure the USIM on the DUT such that the Timer T₃₂₄₅ Behaviour parameter in the EFNASConfig file is enabled.
4. Power the DUT on and allow it to find LTE service.
5. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.
6. Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 11.
7. Set a timer for 15 minutes and execute the following steps 8 through 22 within the 15 minutes.
8. Verify that the DUT does not attempt to attach to the LTE network after receiving the NAS Attach Reject message.
9. Attempt to initiate a connection to the Internet PDN from the DUT.
10. Verify that the DUT does not attempt to connect to the LTE network.
11. Reconfigure the test setup so that the DUT now finds service on a different eNodeB with cell_id equal to value X₂ where X₂ is not equal to X₁. X₁ and X₂ are on the same frequency. The PLMN id is still equal to Y₂.
12. Verify that the DUT does not attempt to attach to the LTE network on the new eNodeB.
13. Attempt to initiate a connection to the Internet PDN from the DUT.

14. Verify that the DUT does not attempt to connect to the LTE network.
15. Reconfigure the test setup so that the DUT now finds service on a different Tracking Area with TAI equal to value Z₂ where Z₂ is not equal to Z₁. Note that only the TAC portion of the TAI will be different; the PLMN id is still equal to Y₂.
16. Verify that the DUT does not attempt to attach to the LTE network on the new Tracking Area.
17. Attempt to initiate a connection to the Internet PDN from the DUT.
18. Verify that the DUT does not attempt to connect to the LTE network.
19. Reconfigure the test setup so that the DUT now finds service on a different PLMN with id equal to value Y₃ where Y₃ is not equal to Y₂. The frequency of the second PLMN may or may not be the same as the first. Configure the test equipment such that the network will allow attachment on PLMN Y₃.
20. Verify that the DUT now attempts to attach to the LTE network and is successful.
 - If the DUT supports IMS roaming, verify that the DUT connects to the IMS PDN using PDN Type IPv6.
 - If the DUT does not support IMS roaming, verify that the DUT connects to the Internet PDN using PDN Type IPv4.
21. Reconfigure the test setup so that the DUT again finds service on the original PLMN (with id equal to value Y₂).
22. Verify that the DUT does not attempt to attach on PLMN Y₂ for the remaining duration of the 15 minute timer.
23. For release 12 or earlier UEs, perform the following steps:
 1. Power the device off, and then power the device on.
 2. Monitor the device for 23 hours 45 minutes and verify that it does not attempt to attach on PLMN Y₂. (At this point, the device shall have refrained from attaching to PLMN Y₂ for 24 hours since the initial NAS Attach Reject message.)
 3. Power the device off.
 4. While the device is powered off, configure the test equipment such that the network will allow the UE to attach successfully on PLMN Y₂.
 5. Power the device on, and verify that the device successfully attaches to the LTE network within 24 hours.
 6. Power the device off.
24. For release 13 or later UEs, perform the following steps:
 1. Power the device off, and then power the device on.
 2. Monitor the device for 11 hours 45 minutes and verify that it does not attempt to attach on PLMN Y₂. (At this point, the device shall have refrained from attaching to PLMN Y₂ for 12 hours since the initial NAS Attach Reject message.)
 3. Power the device off.
 4. While the device is powered off, configure the test equipment such that the network

- will allow the UE to attach successfully on PLMN Y₂.
5. Power the device on, and verify that the device successfully attaches to the LTE network within 12 hours.
 6. Power the device off.

Expected Results

An LTE Release 12 or earlier UE configured for timer T₃₂₄₅ does not attempt any further connections within a roaming PLMN for at least 24 hours but no more than 48 hours if it receives a NAS Attach Reject message with cause code 11.

An LTE Release 13 or later UE configured for timer T₃₂₄₅ does not attempt any further connections within a roaming PLMN for at least 12 hours but no more than 24 hours if it receives a NAS Attach Reject message with cause code 11.

4.14.1 Test1 UE with T3245 Timer Receives Attach Reject message from the Network: Code 11 VZ_TC_DATARETRY_3603699

4.14.2 Test2 UE with T3245 Timer Receives Attach Reject message from the Network: Code 11 VZ_TC_DATARTRY_3603700

4.14.3 Test1_IMSRoam UE with T₃₂₄₅ Timer Receives Attach Reject message from the Network: Code 11 VZ_TC_DATARTRY_3606928

4.14.4 Test2_IMSRoam UE with T₃₂₄₅ Timer Receives Attach Reject message from the Network: Code 11 VZ_TC_DATARTRY_3606935

4.14.5 Test1_NoIMSRoam UE with T₃₂₄₅ Timer Receives Attach Reject message from the Network: Code 11 VZ_TC_DATARETRY_3606942

4.14.6 Test2_NoIMSRoam UE with T₃₂₄₅ Timer Receives Attach Reject message from the Network: Code 11 VZ_TC_DATARETRY_3606949

4.15 PERMANENT ATTACH FAILURES ACROSS POWER CYCLE

VZ_TC_DATARTRY_9558

Description

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE attempts multiple power cycles in response to permanent EMM Attach failures.

Traceability

- Verizon Wireless *Device Requirements LTE Data Retry*, Section 3.10
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
<p>Test Procedure</p> <ol style="list-style-type: none">1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1.2. Configure the test equipment such that the network will respond to attach attempts by sending a NAS Attach Reject message with an EMM Cause Code equal to 3.3. Ensure DUT has parameter MAXEVENTCOUNTER set to default value of 5 and parameter MAXLOGTIME set to default value of 120.4. Power the DUT on and allow it to find LTE service.5. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.6. Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 3.7. Power cycle the DUT.8. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.9. Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 3.10. Power cycle the DUT.

11. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.
12. Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 3.
13. Power cycle the DUT.
14. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.
15. Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 3.
16. Power cycle the DUT
17. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.
18. Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 3.
19. Power cycle the DUT.
20. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.
21. Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 3.
22. Power cycle the DUT
23. Monitor the DUT for 5 minutes and verify that it does not attempt to attach to the LTE network.
24. Power off the DUT.
25. Replace the UICC in the DUT with another valid UICC which have different ICCID..
26. Power on the DUT.
27. Verify that the DUT successfully attaches to the LTE network.
28. Power off the DUT.
29. Repeat the test for EMM Cause Codes of 6, 7, and 8.

Expected Results

Expected Result

Once the UE receives more than 5 successive EMM cause code events or power cycles., the UE shall not attempt to attach to the LTE network untill the UICC is replaced.

4.15.1 _Code3 PERMANENT ATTACH FAILURES ACROSS POWER CYCLE:

Code 3 VZ_TC_DATARTRY_3604277

4.15.2 _Code6 PERMANENT ATTACH FAILURES ACROSS POWER CYCLE:

Code 6 VZ_TC_DATARTRY_3604298

4.15.3 _Code7 PERMANENT ATTACH FAILURES ACROSS POWER CYCLE:

Code 7 VZ_TC_DATARTRY_3604300

4.15.4 _Code8 PERMANENT ATTACH FAILURES ACROSS POWER CYCLE:

Code 8 VZ_TC_DATARTRY_3604498

4.16 PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH DETACH REQUEST

VZ_TC_DATARETRY_9559

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE attempts multiple power cycles in response to permanent EMM failures, including a Detach Request.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE Data Retry, Section 4.3.3*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
<p>Test Procedure</p> <ol style="list-style-type: none">1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1.2. Configure the test equipment such that the network will allow the UE to attach successfully.3. Ensure DUT has parameter MAXEVENTCOUNTER set to default value of 5 and parameter MAXLOGTIME set to default value of 120.4. Power the DUT on and allow it to find LTE service.5. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network.6. From the network, send a NAS Detach Request message to the DUT. Configure the message such that re-attach is not required and the EMM Cause Code is set to 3. Verify that the UE sends a Detach Accept message.7. Re-configure the test equipment such that the network will respond to attach attempts by sending a NAS Attach Reject message with an EMM Cause Code equal to 3.8. Power cycle the DUT.9. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.

10. Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 3.
11. Power cycle the DUT.
12. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.
13. Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 3.
14. Power cycle the DUT.
15. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.
16. Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 3.
17. Power cycle the DUT.
18. **Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.**
19. **Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 3.**
20. **Power cycle the DUT.**
21. **Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.**
22. **Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 3.**
23. Power cycle the DUT
24. Monitor the DUT for 5 minutes and verify that it does not attempt to connect to the LTE network.
25. Power off the DUT.
26. Replace the UICC in the DUT with another valid UICC which have different ICCID.
27. Power on the DUT.
28. Verify that the DUT successfully attaches to the LTE network.
29. Power off the DUT.
30. Repeat the test for EMM Cause Codes of 6, 7, and 8.

Expected Results

Expected Result

Once the UE receives more than **5** successive EMM cause code events or power cycles., the UE shall not attempt to attach to the LTE network until the UICC is replaced.

4.16.1 _Code3 PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH DETACH REQUEST: Code 3 VZ_TC_DATARTRY_3604502

4.16.2 _Code6 PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH DETACH REQUEST: Code 6 VZ_TC_DATARTRY_3604823

4.16.3 _Code7 PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH DETACH REQUEST: Code 7 VZ_TC_DATARTRY_3604825

4.16.4 _Code8 PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH DETACH REQUEST: Code 8

VZ_TC_DATARTRY_3604973

4.17 UE WITH T₃₂₄₅ TIMER RECEIVES ATTACH REJECT MESSAGE FROM THE NETWORK CODE 14 VZ_TC_DATARETRY_10283

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE with T₃₂₄₅ timer enabled receives a NAS Attach Reject message with cause code 14 while attempting to attach to the LTE network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements,
- Verizon Wireless LTE Data Retry Device Requirements, **Section 3.8**
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

These test cases apply to UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
<ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y3, and TAI equal to value Z1. The PLMN Y3 shall not be a home PLMN. 2. Configure the test equipment such that the network will respond to attach attempts by sending a NAS Attach Reject message with an EMM Cause Code equal to 14. 3. Configure the USIM on the DUT such that the Timer T₃₂₄₅ Behaviour parameter in the EFNASConfig file is enabled. 4. Power the DUT on and allow it to find LTE service. 5. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message. <ul style="list-style-type: none"> • If the DUT supports IMS roaming, verify that the DUT requests a connection to the IMS PDN using PDN Type IPv6. • If the DUT does not support IMS roaming, verify that the DUT requests a connection to the Internet PDN using PDN Type IPv4. 6. Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 14.

7. Set a timer for 15 minutes and execute the following steps 8 through 22 within the 15 minutes.
8. Verify that the DUT does not attempt to attach to the LTE network after receiving the NAS Attach Reject message.
9. Attempt to initiate a connection to the Internet PDN from the DUT.
10. Verify that the DUT does not attempt to connect to the LTE network.
11. Reconfigure the test setup so that the DUT now finds service on a different eNodeB with cell_id equal to value X2 where X2 is not equal to X1. X1 and X2 are on the same frequency. The PLMN id is still equal to Y3.
12. Verify that the DUT does not attempt to attach to the LTE network on the new eNodeB.
13. Attempt to initiate a connection to the Internet PDN from the DUT.
14. Verify that the DUT does not attempt to connect to the LTE network.
15. Reconfigure the test setup so that the DUT now finds service on a different Tracking Area with TAI equal to value Z2 where Z2 is not equal to Z1. Note that only the TAC portion of the TAI will be different; the PLMN id is still equal to Y3.
16. Verify that the DUT does not attempt to attach to the LTE network on the new Tracking Area.
17. Attempt to initiate a connection to the Internet PDN from the DUT.
18. Verify that the DUT does not attempt to connect to the LTE network.
19. Reconfigure the test setup so that the DUT now finds service on a different PLMN with id equal to value Y2 where Y2 is not equal to Y3. The frequency of the second PLMN may or may not be the same as the first. Configure the test equipment such that the network will allow attachment on PLMN Y2.
20. Verify that the DUT now attempts to attach to the LTE network and is successful.
 - If the DUT supports IMS roaming, verify that the DUT requests a connection to the IMS PDN using PDN Type IPv6.
 - If the DUT does not support IMS roaming, verify that the DUT requests a connection to the Internet PDN using PDN Type IPv4.
21. Reconfigure the test setup so that the DUT again finds service on the original PLMN (with id equal to value Y3).
22. Verify that the DUT does not attempt to attach on PLMN Y3 for the remaining duration of the 15 minute timer.
23. For release 12 and earlier UEs, perform the following steps:
 1. Monitor the device for 23 hours 45 minutes and verify that it does not attempt to attach on PLMN Y3. (At this point, the device shall have refrained from attaching to PLMN Y3 for 24 hours since the initial NAS Attach Reject message.)
 2. Power the device off.
 3. While the device is powered off, configure the test equipment such that the network will allow the UE to attach successfully on PLMN Y3.

<ol style="list-style-type: none"> 4. Power the device on and verify that the device successfully attaches to the LTE network. <ul style="list-style-type: none"> • If the DUT supports IMS roaming, verify that the DUT connects to the IMS PDN using PDN Type IPv6. • If the DUT does not support IMS roaming, verify that the DUT connects to the Internet PDN using PDN Type IPv4. 5. Power the device off. <p>24. For release 13 or later UEs, perform the following steps:</p> <ol style="list-style-type: none"> 1. Monitor the device for 11 hours 45 minutes and verify that it does not attempt to attach on PLMN Y₃. (At this point, the device shall have refrained from attaching to PLMN Y₃ for 12 hours since the initial NAS Attach Reject message.) 2. Power the device off. 3. While the device is powered off, configure the test equipment such that the network will allow the UE to attach successfully on PLMN Y₃. 4. Power the device on and verify that the device successfully attaches to the LTE network. 5. If the DUT supports IMS roaming, verify that the DUT connects to the IMS PDN using PDN Type IPv6. 6. If the DUT does not support IMS roaming, verify that the DUT connects to the Internet PDN using PDN Type IPv4. 7. Power the device off 	<div data-bbox="185 1161 1421 1213" data-label="Section-Header"> <h3>Expected Results</h3> </div> <p>A release 12 or earlier UE configured for timer T₃₂₄₅ does not attempt any further connections within a roaming PLMN for at least 24 hours if it receives a NAS Attach Reject message with cause code 14.</p> <p>A Release 13 or later UE configured for timer T₃₂₄₅ does not attempt any further connections within a roaming PLMN for at least 12 hours if it receives a NAS Attach Reject message with cause code 14.</p>
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4.17.1 UE WITH T₃₂₄₅ TIMER RECEIVES ATTACH REJECT MESSAGE FROM THE NETWORK CODE 14 - IMSRoam

VZ_TC_DATARTRY_4105999311931730

4.17.2 UE WITH T₃₂₄₅ TIMER RECEIVES ATTACH REJECT MESSAGE FROM THE NETWORK CODE 14 - NoIMSRoam

VZ_TC_DATARETRY_4105999311931731

4.18 UE WITH T₃₂₄₅ TIMER RECEIVES ATTACH REJECT MESSAGE FROM THE NETWORK CODE 8

VZ_TC_DATARETRY_1491645

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE with T₃₂₄₅ timer enabled receives a NAS Attach Reject message with cause code 8 while attempting to attach to the LTE network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements,
- Verizon Wireless LTE Data Retry Device Requirements, *Section 3.8*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

These test cases apply to UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1 - Test 1
Pre-Conditions
Procedures
<ol style="list-style-type: none">1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1.2. Configure the test equipment such that the network will respond to attach attempts by sending a NAS Attach Reject message with an EMM Cause Code equal to 8.3. Configure the USIM on the DUT such that the Timer T₃₂₄₅ Behaviour parameter in the EFNASConfig file is enabled.4. Power the DUT on and allow it to find LTE service.

5. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.
6. Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 8.
7. Set a timer for 15 minutes and execute the following steps 8 through 22 within the 15 minutes.
8. Verify that the DUT does not attempt to attach to the LTE network after receiving the NAS Attach Reject message.
9. Attempt to initiate a connection to the Internet PDN from the DUT.
10. Verify that the DUT does not attempt to connect to the LTE network.
11. Reconfigure the test setup so that the DUT now finds service on a different eNodeB with cell_id equal to value X2 where X2 is not equal to X1. X1 and X2 are on the same frequency. The PLMN id is still equal to Y1.
12. Verify that the DUT does not attempt to attach to the LTE network on the new eNodeB.
13. Attempt to initiate a connection to the Internet PDN from the DUT.
14. Verify that the DUT does not attempt to connect to the LTE network.
15. Reconfigure the test setup so that the DUT now finds service on a different Tracking Area with TAI equal to value Z2 where Z2 is not equal to Z1. Note that only the TAC portion of the TAI will be different; the PLMN id is still equal to Y1.
16. Verify that the DUT does not attempt to attach to the LTE network on the new Tracking Area.
17. Attempt to initiate a connection to the Internet PDN from the DUT.
18. Verify that the DUT does not attempt to connect to the LTE network.
19. Reconfigure the test setup so that the DUT now finds service on a different PLMN with id equal to value Y4 where Y4 is not equal to Y1. The frequency of the second PLMN may or may not be the same as the first. Configure the test equipment such that the network will allow attachment on PLMN Y4.
20. Verify that the DUT does not attempt to attach to the LTE network.
21. Reconfigure the test setup so that the DUT again finds service on the original PLMN (with id equal to value Y1).
22. Verify that the DUT does not attempt to attach on PLMN Y1 for the remaining duration of the 15 minute timer.
23. Power off device. Configure the test equipment such that the network will allow the UE to attach successfully on PLMN Y1.
24. Power on device. Verify that DUT successfully attaches to the PLMN Y1.

Expected Results

UE can properly attach the LTE cell after power cycle regardless T ₃₂₄₅ configuration.

4.18 _Test2 UE WITH T₃₂₄₅ TIMER RECEIVES ATTACH REJECT CODE 8- Test2 VZ_TC_DATARTRY_3607011

5.2 UE RECEIVES SERVICE REJECT MESSAGE FROM THE NETWORK

CODE 1 I VZ_TC_DATARTRY_5353

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE receives a NAS Service Reject message while attempting to re-connect to the LTE network .

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE Data Retry, Section 4.4.1*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
<p>Test Procedure</p> <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y2, and TAI equal to value Z1. The PLMN Y2 shall not be a home PLMN. 2. Configure the test equipment such that the network will allow the UE to attach and connect to PDNs. 3. Power the DUT on and allow it to find LTE service. 4. Verify that the DUT successfully establishes an RRC connection and attaches to the network. <ul style="list-style-type: none"> • If the DUT supports IMS roaming, verify that the DUT connects to the IMS PDN using PDN Type IPv6. • If the DUT does not support IMS roaming, verify that the DUT connects to the Internet PDN using PDN Type IPv4. 5. Initiate the test application (see <i>section TEST EQUIPMENT CONFIGURATION</i>) and verify that it connects successfully to the internet PDN. Configure the test application for the application idle state.

6. Force the DUT to the RRC IDLE state by having the network transmit an RRCConnectionRelease message.
7. Configure the test equipment so that the network responds to all NAS Service Request messages with a NAS Service Reject message with an EMM Cause Code of 11.
8. Configure the test application for the application transmitting state with a retransmission timer of 10 seconds.
9. Verify that the UE sends a NAS Service Request message and that the network responds with a NAS Service Reject message in which the EMM Cause Code is set to 11.
10. Monitor the DUT for 5 minutes and verify that it does not attempt to connect to the LTE network.
11. Reconfigure the test setup so that the DUT now finds service on a different eNodeB with cell_id equal to value X2 where X2 is not equal to X1. X1 and X2 are on the same frequency. The PLMN id is still equal to Y2.
12. Verify that the DUT does not attempt to connect to the LTE network on the new eNodeB.
13. Reconfigure the test setup so that the DUT now finds service on a different Tracking Area with TAI equal to value Z2 where Z2 is not equal to Z1. Note that only the TAC portion of the TAI will be different; the PLMN id is still equal to Y2.
14. Verify that the DUT does not attempt to connect to the LTE network on the new Tracking Area.
15. Configure the test equipment such that the network will allow attachment.
16. Reconfigure the test setup so that the DUT now finds service on a different PLMN with id equal to value Y3 where Y3 is not equal to Y2. The frequency of the second PLMN shall be the same as the first.
17. Verify that the DUT now attempts to connect to the LTE network and is successful.
 - If the DUT supports IMS roaming, verify that the DUT connects to the IMS PDN using PDN Type IPv6.
 - If the DUT does not support IMS roaming, verify that the DUT connects to the Internet PDN using PDN Type IPv4.

Expected Results

Expected Result

UE does not attempt any further connections within a roaming PLMN if it receives a NAS Service Reject message with cause code 11.

5.2.2 _NoIMSRoam UE receives "Service Reject" from NW - Code 11
VZ_TC_DATARTRY_3606957

5.3 UE RECEIVES SERVICE REJECT MESSAGE FROM THE NETWORK CODES 12, 13, AND 15 VZ_TC_DATARETRY_5354

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE receives a NAS Service Reject message while attempting to re-connect to the LTE network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE Data Retry, Section 4.4.1*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
<p>Test Procedure</p> <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1. 2. Configure the test equipment such that the network will allow the UE to attach and connect to PDNs. 3. Power the DUT on and allow it to find LTE service. 4. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network. 5. Initiate the test application (see section TEST EQUIPMENT CONFIGURATION) and verify that it connects successfully to the internet PDN. Configure the test application for the application idle state. 6. Force the DUT to the RRC IDLE state by having the network transmit an RRCConnectionRelease message. 7. Configure the test equipment so that the network responds to all NAS Service Request messages with a NAS Service Reject message with an EMM Cause Code of 12. 8. Configure the test application for the application transmitting state with a retransmission timer of 10 seconds. 9. Verify that the UE sends a NAS Service Request message and that the network responds with a NAS Service Reject message in which the EMM Cause Code is set to 12. 10. Monitor the DUT for 5 minutes and verify that it does not attempt to connect to the LTE network. 11. Reconfigure the test setup so that the DUT now finds service on a different eNodeB with cell_id equal to value X2 where X2 is not equal to X1. X1 and X2 are on the same frequency. The PLMN id is still equal to Y1. The TAI is still equal to Z1. 12. Verify that the DUT does not attempt to connect to the LTE network on the new eNodeB. 13. Reconfigure the test setup so that the DUT now finds service on a different Tracking Area with TAI equal to value Z2 where Z2 is not equal to Z1. Note that only the TAC portion of the TAI will be different; the PLMN id is still equal to Y1. 14. Verify that the DUT now attempts to connect to the LTE network and is successful.

15. Reconfigure the test setup so that the DUT again finds service on the original TAI (with id equal to value Z1).
16. Verify that the DUT does not attempt to connect on TAI Z1.
17. Power cycle the DUT.
18. Verify that the DUT successfully establishes an RRC connection on the eNodeB with TAI equal to Z1 and sends a NAS Attach Request message.
19. Verify that the DUT attaches to the LTE network successfully.
20. Initiate the test application (see section 1.5) and verify that it connects successfully to the Internet PDN.
21. Power the device off.
22. Repeat the test for EMM Cause Codes of 13 and 15.

Expected Results

Expected Result

UE does not attempt any further connections within a TAI if it receives a NAS Service Reject message with cause codes 12, 13, or 15.

5.2.1 _IMSRoam UE receives "Service Reject" from NW - Code 11 VZ_TC_DATARTRY_3606950

5.3.1 _Code12 UE receives "Service Reject" from NW - Code 12 VZ_TC_DATA_RETRY_3604985

5.3.2 _Code13 UE receives "Service Reject" from NW - Code 13 VZ_TC_DATARTRY_3605305

5.3.3 _Code15 UE receives "Service Reject" from NW - Code 15 VZ_TC_DATARTRY_3605307

5.5 SERVICE REQUEST FAILS GENERIC THROTTLING ALGORITHM INVOKED VZ_TC_DATARETRY_5355

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UEs generic throttling algorithm is executed as a result of a service request failure.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements,
- Verizon Wireless Device Requirements LTE Data Retry, *Section 4.4.1.2 and 4.5.2.2*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
Test Procedure
Release 11 and Earlier UE
<ol style="list-style-type: none">1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1.2. Configure the test equipment such that the network will allow the UE to attach and connect to PDNs.3. Power the DUT on and allow it to find LTE service.4. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network.5. Force the DUT to the RRC IDLE state by having the network transmit an RRCConnectionRelease message.

6. Initiate the test application (see *section TEST EQUIPMENT CONFIGURATION*) so that the UE needs to initiate the service procedure for the internet PDN. Configure the test equipment such that the network does not respond to the NAS Service Requests from the UE.
7. Verify that the UE sends a NAS Service Request to the network.
8. Verify that the network does not respond to the NAS Service Request from the UE.
9. Verify that the UE waits at least T₃₄₁₇ seconds before sending another NAS Service Request. Verify that the network ignores the NAS Service Request.
10. After T₃₄₁₇ expires, verify that the UE sends three more NAS Service Request attempts each separated by T₃₄₁₇ seconds and that the network does not respond to the Service Requests.
11. Verify that the UE does not request the connection over the air for the next 30 seconds ~~++ minute~~ plus a random time between 0 and 15 seconds.
12. Once the 30-75 seconds ~~++ minute~~ timer expires, verify that the UE attempts to connect upon the next request of the test application with no delay. Verify that the UE sends another series of five NAS Service Requests each separated by T₃₄₁₇ seconds and that the network does not respond to the NAS Service Request messages. This is considered Retry #3.
13. Verify that the UE does not request the connection over the air for the next 30 seconds ~~± minutes~~.
14. Once the 30-120 seconds ~~± minute~~ timer expires, verify that the UE attempts to connect upon the next request of the test application with no delay. Verify that the UE sends another series of five NAS Service Requests each separated by T₃₄₁₇ seconds and that the network does not respond to the NAS Service Request messages. This is considered Retry #4.
15. Verify that the UE does not request the connection over the air for the next 30 seconds ~~& minutes~~.
16. While the ~~fifteen-minute~~ throttling timer is running, re-configure the network (bring down PLMN Y₁ completely and then bring up PLMN Y₂) so that the UE finds service on an eNodeB with a PLMN id equal to Y₂ where Y₂ is not equal to Y₁. PLMN Y₂ shall not be a home PLMN. The frequency of the second PLMN shall be the same as the first.
17. Verify that the UE behavior as following sends a NAS Attach Request for PLMN Y₂.
 - If the DUT supports IMS roaming,
 - o verify that the DUT sends TRACKING AREA UPDATE REQUEST for PLMN Y₂. Configure test equipment to reject the TRACKING AREA UPDATE REQUEST with EMM 9.
 - o verify that the DUT initiates a new attach to PLMN Y₂ with IMS PDN using PDN Type IPv6.
 - If the DUT does not support IMS roaming,
 - o configure test equipment to reject the TRACKING AREA UPDATE REQUEST with EMM 9 if DUT sends

- TRACKING AREA REQUEST. The test equipment shall not consider it a failure if DUT doesn't initiate TRACKING AREA UPDATE REQUEST.
- o verify that the DUT initiates a new attach to PLMN Y₂ with Internet PDN using PDN Type IPv4.
18. While the ~~fifteen minute~~ throttling timer continues to run, re-configure the network so that the UE again finds service on PLMN Y₁. Verify that the UE does not attempt to connect ~~before 30 seconds after step 14.~~until the expiration of the original 15 minute timer.
 19. Power the device off.
 20. ~~Once the 8 minute timer expires, verify that the UE attempts to connect upon the next request of the test application with no delay. Verify that the UE sends another series of five NAS Service Requests each separated by T₃₄₁₇ seconds and that the network does not respond to the NAS Service Request messages. This is considered Retry #5.~~
 21. ~~Verify that the UE does not request the connection over the air for the next 15 minutes.~~
 22. ~~Once the 15 minute timer expires, verify that the UE attempts to connect upon the next request of the test application with no delay. Verify that the UE sends another series of five NAS Service Requests each separated by T₃₄₁₇ seconds and that the network does not respond to the NAS Service Request messages. This is considered Retry #6.~~
 23. ~~Verify that the UE does not request the connection over the air for the next 15 minutes.~~
 24. ~~While the fifteen minute throttling timer is running, re-configure the network (bring down PLMN Y₁ completely and then bring up PLMN Y₂) so that the UE finds service on an eNodeB with a PLMN id equal to Y₂ where Y₂ is not equal to Y₁. PLMN Y₂ shall not be a home PLMN. The frequency of the second PLMN shall be the same as the first.~~
 25. ~~Verify that the UE behavior as following sends a NAS Attach Request for PLMN Y₂.~~
 - ~~If the DUT supports IMS roaming,~~
 - o ~~verify that the DUT sends TRACKING AREA UPDATE REQUEST for PLMN Y₂. Configure test equipment to reject the TRACKING AREA UPDATE REQUEST with EMM 9.~~
 - o ~~verify that the DUT initiates a new attach to PLMN Y₂ with IMS PDN using PDN Type IPv6.~~
 - ~~If the DUT does not support IMS roaming,~~
 - o ~~configure test equipment to reject the TRACKING AREA UPDATE REQUEST with EMM 9 if DUT sends TRACKING AREA REQUEST. The test equipment shall not consider it a failure if DUT doesn't initiate TRACKING AREA UPDATE REQUEST.~~
 - o ~~verify that the DUT initiates a new attach to PLMN Y₂ with Internet PDN using PDN Type IPv4.~~
 22. ~~While the fifteen minute throttling timer continues to run, re-configure the network so that~~

~~the UE again finds service on PLMN Y₁. Verify that the UE does not attempt to connect until the expiration of the original 15 minute timer.~~

~~23. Power the device off.~~

Release 12 and later UE

1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X₁, PLMN id equal to value Y₁, and TAI equal to value Z₁.
2. Configure the test equipment such that the network will allow the UE to attach and connect to PDNs.
3. Power the DUT on and allow it to find LTE service.
4. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network.
5. Force the DUT to the RRC IDLE state by having the network transmit an RRCConnectionRelease message.
6. Initiate the test application (see **section TEST EQUIPMENT CONFIGURATION**) so that the UE needs to initiate the service procedure for the internet PDN. Configure the test equipment such that the network does not respond to the NAS Service Requests from the UE.
7. Verify that the UE sends a NAS Service Request to the network.
8. Verify that the network does not respond to the NAS Service Request from the UE.
9. Verify that the UE waits at least T₃₄₁₇ seconds before sending another NAS Service Request. Verify that the network ignores the NAS Service Request.
10. After T₃₄₁₇ expires, Verify that the UE sends three more NAS Service Request attempts each separated by T₃₄₁₇ seconds and that the network does not respond to the Service Requests.
11. Verify that the UE does not request the connection over the air for the next 1 minute.
12. Once the 1 minute timer expires, verify that the UE attempts to connect upon the next request of the test application within 15sec. Verify that the UE sends another NAS Service Requests and that the network does not respond to the NAS Service Request messages.
13. Verify that the UE does not request the connection over the air for the next 1 minute.
14. After 1 min timer expire, verify that the UE does attempt to connect to the LTE network within 15sec.
15. Power the device off.

Expected Results

Expected Result

Release 11 and earlier UE

The UE applies the throttling behavior as defined in sections *GENERIC THROTTLING ALGORITHM* and *Other Abnormal Cases in the UE* of the Verizon Wireless LTE Data Retry Requirements.

Release 12 and later UE

The UE applies the throttling behavior as defined in VZ_REQ_LTEDATARETRY_7780 and VZ_REQ_LTEDATARETRY_40042 Verizon Wireless LTE Data Retry Requirements

5.5.1 SERVICE REQUEST FAILS GENERIC THROTTLING ALGORITHM INVOKED - IMSRoam VZ_TC_DATARTRY_4105999311931734

5.5.2 SERVICE REQUEST FAILS GENERIC THROTTLING ALGORITHM INVOKED - NoIMSRoam VZ_TC_DATARTRY_4105999311931735

5.7 UE RECEIVES TRACKING AREA UPDATE REJECT MESSAGE FROM THE NETWORK - CODES 3, 6, AND 7 VZ_TC_DATARTRY_7191

VOID

5.9 UE RECEIVES TRACKING AREA UPDATE REJECT MESSAGE FROM THE NETWORK CODES 12, 13, AND 15 VZ_TC_DATARETRY_5357

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE receives a NAS Tracking Area Update Reject message while attempting a tracking area update with the LTE network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE Data Retry, Section 4.3.4*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
<p>Test Procedure</p> <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1. 2. Configure the test equipment such that the network will allow the UE to attach and connect to PDNs. 3. Power the DUT on and allow it to find LTE service. 4. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network. 5. Force the DUT to the RRC IDLE state by having the network transmit an RRCConnectionRelease message. 6. Configure the test equipment so that the network responds to all NAS Tracking Area Update Request messages with a NAS Tracking Area Update Reject message with an EMM Cause Code of 12. 7. Reconfigure the test setup so that the DUT now finds service on a different Tracking Area with id equal to value Z2 where Z2 is not equal to Z1, and Z2 is not on the UEs list of tracking areas. Note that only the TAC portion of the TAI will be different. The PLMN id is still equal to Y1.

8. Verify that the UE sends a NAS Tracking Area Update Request message and that the network responds with a NAS Tracking Area Update Reject message in which the EMM Cause Code is set to 12.
9. Monitor the DUT for 5 minutes and verify that it does not attempt to connect to the LTE network.
10. Reconfigure the test setup so that the DUT now finds service on a different eNodeB with cell_id equal to value X2 where X2 is not equal to X1. X1 and X2 are on the same frequency. The PLMN id is still equal to Y1. The TAI is still equal to Z2.
11. Verify that the DUT does not attempt to connect to the LTE network on the new eNodeB.
12. Reconfigure the test setup so that the DUT now finds service on a different Tracking Area with TAI equal to value Z3 where Z3 is not equal to Z1 or Z2. Note that only the TAC portion of the TAI will be different. The PLMN id is still equal to Y1.
13. Verify that the DUT behaves as follows depending on EMM cause code received in Step 8:
 - If EMM cause code is 12, DUT now attempts to attach to the LTE network and is successful.
 - If EMM cause code is 13 or 15, DUT sends Tracking Area Update Request message and is successful.
14. Reconfigure the test setup so that the DUT again finds service on tracking area Z2.
15. Verify that the DUT does not attempt to connect on TAI Z2.
16. Power cycle the DUT.
17. Verify that the DUT successfully establishes an RRC connection on the eNodeB with TAI equal to Z2 and sends a NAS Attach Request message.
18. Verify that the DUT attaches to the LTE network successfully.
19. Power the device off.
20. Repeat the test for EMM Cause Codes of 13 and 15.

Expected Results

Expected Result

UE does not attempt any further connections within a TAI if it receives a NAS Tracking Area Update Reject message with cause codes 12, 13, or 15.

5.9.1 _Code12 UE Receives TrackingArea Update Reject Message From The
Network: Code 12 VZ_TC_DATARETRY_3606958

5.9.2 _Code13 UE Receives TrackingArea Update Reject Message From The
Network: Code 13 VZ_TC_DATARETRY_3606965

5.9.3 _Code15 UE Receives TrackingArea Update Reject Message From The
Network: Code 15 VZ_TC_DATARETRY_3606972

5.10 UE RECEIVES TRACKING AREA UPDATE REJECT MESSAGE FROM THE NETWORK- CODES 9 AND 10 VZ_TC_LTE_7211

VOID

5.1.1 TRACKING AREA UPDATE REQUEST FAILS TRACKING AREA UPDATE ATTEMPT COUNTER REACHES MAX VALUE VZ_TC_DATARTRY_5358

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UEs tracking area update attempt counter reaches its maximum value.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE Data Retry, Section 4.3.4*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
Test Procedure <ol style="list-style-type: none">1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1. Configure the test system such that T3402 is set to 12 minutes.2. Configure the test equipment such that the network will allow the UE to attach and connect to PDNs.3. Power the DUT on and allow it to find LTE service.4. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network.5. Initiate the test application (see section TEST EQUIPMENT CONFIGURATION) and verify that it connects successfully to the internet PDN. Configure the test application for the application idle state.6. Force the DUT to the RRC IDLE state by having the network transmit an RRCConnectionRelease message.7. Reconfigure the test setup so that the DUT now finds service on a different Tracking Area with id equal to value Z2 where Z2 is not equal to Z1, and Z2 is not on the UEs list of tracking areas. Note that only the TAC portion of the TAI will be different. The PLMN id is still

- equal to Y_1 . Configure the test equipment such that the network does not respond to RACH attempts from the UE (i.e., ignores the random access preamble).
8. Verify that the UE sends a series of RACH attempts for T_{300} seconds.
 9. Verify that the network does not respond to the RACH attempts from the UE.
 10. Verify that the UE waits at least T_{3411} seconds before sending another series of RACH attempts. Verify that the network ignores the random access procedure.
 11. After the random access procedure fails, verify that the UE waits at least T_{3411} seconds before sending another series of RACH attempts. Re-configure the network emulator such that the network emulator responds to the RACH and allows the random access procedure to complete. Re-configure the network emulator to respond to the RRCConnectionRequest message with an RRCConnectionReject message with a waitTime value of 10 seconds.
 12. Verify that the DUT sends an RRCConnectionRequest message to the LTE network and that the network responds to the RRCConnectionRequest message with an RRCConnectionReject message with a waitTime value of 10 seconds. [Note: the device tracking area updating attempt counter should *not* be incremented upon reception of an RRCConnectionReject message.]
 13. After the RRCConnectionRequest fails, verify that the UE waits at least 10 seconds before sending another series of RACH attempts.
 14. Re-configure the network emulator to allow the RACH and RRC connection setup to succeed. Configure the test equipment such that the network does not respond to NAS Tracking Area Update Request messages.
 15. Verify that after the expiration of $T_{3430} + T_{3411}$, the UE sends a NAS Tracking Area Update Request message to the network.
 16. Verify that the network does not respond to the NAS Tracking Area Update Request message.
 17. Verify that after the expiration of $T_{3430} + T_{3411}$, the UE sends a NAS Tracking Area Update Request message to the network.
 18. Verify that the network does not respond to the NAS Tracking Area Update Request message.

Release 16 and earlier

19. After the NAS Tracking Area Update Request (fifth attempt) fails, verify that the UE does not send a NAS Tracking Area Update Request message for at least T_{3402} minutes. [Skip to Step 26](#)

Release 17 and later

20. [Verify that after the expiration of \$T_{3430} + T_{3411}\$, the UE sends a NAS Tracking Area Update Request message to the network](#)

21. Verify that the network does not respond to the NAS Tracking Area Update Request message
22. Verify that after the expiration of $T_{3430} + T_{3411}$, the UE sends a NAS Tracking Area Update Request message to the network
23. Verify that the network does not respond to the NAS Tracking Area Update Request message
24. Verify that after the expiration of $T_{3430} + T_{3411}$, the UE sends a NAS Tracking Area Update Request message to the network
25. Verify that the network does not respond to the NAS Tracking Area Update Request message. After the NAS Tracking Area Update Request (fifth attempt) fails verify that the UE does not send a NAS Tracking Area Update Request message for at least T_{3402} minutes
26. Verify that the UE sends a second cluster of five NAS Tracking Area Update Request messages with each individual message separated by at least T_{3411} seconds. After that, verify that the UE sends no additional NAS Tracking Area Update Request messages for at least T_{3402} minutes.
27. Verify that the UE sends a third cluster of NAS Tracking Area Update Request messages with each individual message separated by at least T_{3411} seconds. After that, verify that the UE sends no additional NAS Tracking Area Update Request messages for at least T_{3402} minutes.
28. While the T_{3402} timer is running, re-configure the network so that the UE finds service on an eNodeB with a PLMN id equal to Y_2 where Y_2 is not equal to Y_1 . The frequency of the second PLMN shall be the same as the first.
29. Verify that the UE sends a NAS Tracking Area Update Request to the network without waiting for the T_{3402} timer to expire.
30. Re-configure the network so that the UE again finds service on PLMN Y_1 .
31. Proceed as following:
 - If the DUT supports multiple RATs, verify that the UE does not attempt to attach to the network until the expiration of T_{3402} timer, which started after step 27~~+~~.
 - If the DUT supports LTE RAT only, verify that the UE sends a series of RACH attempts to PLMN Y_1 no later than $T_{3402} + 10\text{sec}$ after step 27~~+~~.
26. Power the device off.

Expected Results

Expected Result

The UE is limited to groups of 5 TAU attempts where each request is separated by T_{3411} seconds and each group is separated by T_{3402} minutes.

5.12 UE RECEIVES TRACKING AREA UPDATE REJECT MESSAGE FROM THE NETWORK CODE 17 VZ_TC_DATARETRY_5359

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE receives a NAS Tracking Area Update Reject message while attempting a tracking area update with the LTE network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE Data Retry, Section 4.4.1*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
Test Procedure <ol style="list-style-type: none">1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1. Configure the test system such that T3402 is set to 12 minutes.2. Configure the test equipment such that the network will allow the UE to attach and connect to PDNs.3. Verify that the device under test (DUT) has an IMS application that will attempt to connect to the IMS PDN as soon as the DUT is powered on and finds service on the LTE network.4. Power the DUT on and allow it to find LTE service5. Verify that the DUT sends an Attach Request and that the network responds with an Attach Accept.6. Force the DUT to the RRC IDLE state by having the network transmit an RRCConnectionRelease message.7. Configure the test equipment so that the network responds to all NAS Tracking Area Update Request messages with a NAS Tracking Area Update Reject message with an EMM Cause Code of 17.8. Reconfigure the test setup so that the DUT now finds service on a different Tracking Area

with id equal to value Z2 where Z2 is not equal to Z1, and Z2 is not on the UEs list of tracking areas. Note that only the TAC portion of the TAI will be different. The PLMN id is still equal to Y1.

9. Verify that the UE sends a NAS Tracking Area Update Request message and that the network responds with a NAS Tracking Area Update Reject message in which the EMM Cause Code is set to 17.
10. Verify that after T₃₄₁₁ seconds, the UE sends a second NAS Tracking Area Update Request message and that the network responds with a NAS Tracking Area Update Reject message in which the EMM Cause Code is set to 17.
11. Verify that the UE attempts a Tracking Area Update 3 more times with each attempt separated by at least T₃₄₁₁ seconds.
12. After the fifth attempt fails, verify the UE does not send a Tracking Area Update Request while T₃₄₀₂ is running.

Expected Results

Expected Result

After receiving the NAS Tracking Area Update Reject message, the UE attempts a Tracking Area Update 4 more times with each attempt separated by at least T₃₄₁₁ seconds. After the fifth attempt fails, the next tracking area update attempt does not occur for at least T₃₄₀₂ minutes.

5.13 UE WITH T₃₃₄₆ TIMER SUPPORT RECEIVES SERVICE REJECT MESSAGE FROM THE NETWORK CODE 22 VZ_TC_DATARETRY_5384

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE receives a NAS Service Reject message while attempting to re-connect to the LTE network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements,
- Verizon Wireless Device Requirements LTE Data Retry, *Section 4.4.1.1*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies only to UEs with T₃₃₄₆ timer support designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
<p>Test Procedure</p> <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X₁, PLMN id equal to value Y₁, and TAI equal to value Z₁. 2. Configure the test equipment such that the network will allow the UE to attach and connect to PDNs. 3. Power the DUT on and allow it to find LTE service. 4. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network. 5. Initiate the test application (see section TEST EQUIPMENT CONFIGURATION) and verify that it connects successfully to the internet PDN. Configure the test application for the application idle state. 6. Force the DUT to the RRC IDLE state by having the network transmit an RRCConnectionRelease message. 7. Configure the test equipment so that the network responds to all NAS Service Request messages with a NAS Service Reject message with an EMM Cause Code of 22 and a T₃₃₄₆ Timer value of 15 minutes.

8. Configure the test application for the application transmitting state with a retransmission timer of 10 seconds.
9. Verify that the UE sends a NAS Service Request message and that the network responds with a NAS Service Reject message in which the EMM Cause Code is set to 22.
10. Verify that the UE does not re-issue a Service Request while the T₃₃₄₆ timer is running.
11. While the T₃₃₄₆ timer is running, power cycle the UE.
12. Verify that the UE does not issue a Service Request.
13. While the T₃₃₄₆ timer is running, re-configure the test setup so that the DUT now finds service on a different Tracking Area with id equal to value Z₂ where Z₂ is not equal to Z₁, and Z₂ is not on the UEs list of tracking areas. Note that only the TAC portion of the TAI will be different. The PLMN id is still equal to Y₁.
14. Verify that the UE does not issue a Service Request.
15. While the T₃₃₄₆ timer is running, re-configure the network (bring down PLMN Y₁ completely and then bring up PLMN Y₂) so that the UE finds service on an eNodeB with a PLMN id equal to Y₂ where Y₂ is not equal to Y₁. PLMN Y₂ shall not be a home PLMN. The frequency of the second PLMN shall be the same as the first. T₃₃₄₆ shall not be running in this second PLMN.
16. Verify that the UE successfully attaches to the LTE network.
 - If the UE supports IMS roaming, verify that the UE connects to the IMS PDN using PDN Type IPv6.
 - If the UE does not support IMS roaming, verify that the UE connects to the Internet PDN using PDN Type IPv4.
17. While the T₃₃₄₆ timer is running, re-configure the test setup so that the DUT again finds service on PLMN Y₁.
18. Verify that the UE issues a Tracking Area Update Request without waiting for T₃₃₄₆ to expire.
19. Power the UE off.

Expected Results

Expected Result

After receiving the NAS Service Reject message, the UE waits T₃₃₄₆ minutes before issuing its next Service Request in that PLMN. If the UE enters a new PLMN, it shall stop timer T₃₃₄₆ before issuing a Tracking Area Update Request in that PLMN.

5.13.1 _IMSRoam UE with T₃₃₄₆ Timer Support Receives Service Reject message from the Network: Code 22 VZ_TC_DATARTRY_3605308

5.13.2 _NoIMSRoam UE with T3346 Timer Support Receives Service Reject message from the Network: Code 22 VZ_TC_DATARTRY_3605309

5.14 UE WITHOUT T₃₃₄₆ TIMER SUPPORT RECEIVES SERVICE REJECT MESSAGE FROM THE NETWORK CODE 22 VZ_TC_DATARETRY_5385

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE receives a NAS Service Reject message while attempting to re-connect to the LTE network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements,
- Verizon Wireless Device Requirements LTE Data Retry, *Section 4.4.1*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies only to R-9 and earlier UEs without T₃₃₄₆ timer support designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
<p>Test Procedure</p> <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1. 2. Configure the test equipment such that the network will allow the UE to attach and connect to PDNs. 3. Power the DUT on and allow it to find LTE service. 4. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network. 5. Initiate the test application (see section TEST EQUIPMENT CONFIGURATION) and verify that it connects successfully to the internet PDN. Configure the test application for the application idle state. 6. Force the DUT to the RRC IDLE state by having the network transmit an RRCConnectionRelease message. 7. Configure the test equipment so that the network responds to all NAS Service Request messages with a NAS Service Reject message with an EMM Cause Code of 22 and a T₃₃₄₆ Timer value of 15 minutes. 8. Configure the test application for the application transmitting state with a retransmission timer of 10 seconds. 9. Verify that the UE sends a NAS Service Request message and that the network responds with a NAS Service Reject message in which the EMM Cause Code is set to 22. 10. Verify that the UE sends a second NAS Service Request message and that the network responds with a NAS Service Reject message in which the EMM Cause Code is set to 22.

- I 1. Verify that the UE sends a third NAS Service Request message and that the network responds with a NAS Service Reject message in which the EMM Cause Code is set to 22.
- I 2. Verify that the UE does not request the connection over the air for the next 1 minute plus a random time between 0 and 15 seconds.
- I 3. Once the 1+ minute timer expires, verify that the UE attempts to connect upon the next request of the test application with no delay. Verify that the UE sends a fourth NAS Service Request message and that the network responds with a NAS Service Reject message in which the EMM Cause Code is set to 22.
- I 4. Verify that the UE does not request the connection over the air for the next 2 minutes.
- I 5. Once the 2 minute timer expires, verify that the UE attempts to connect upon the next request of the test application with no delay. Verify that the UE sends a fifth NAS Service Request message and that the network responds with a NAS Service Reject message in which the EMM Cause Code is set to 22.
- I 6. Verify that the UE does not request the connection over the air for the next 8 minutes.
- I 7. Once the 8 minute timer expires, verify that the UE attempts to connect upon the next request of the test application with no delay. Verify that the UE sends a sixth NAS Service Request message and that the network responds with a NAS Service Reject message in which the EMM Cause Code is set to 22.
- I 8. Verify that the UE does not request the connection over the air for the next 15 minutes.
- I 9. Once the 15 minute timer expires, verify that the UE attempts to connect upon the next request of the test application with no delay. Verify that the UE sends a seventh NAS Service Request message and that the network responds with a NAS Service Reject message in which the EMM Cause Code is set to 22.
20. Verify that the UE does not request the connection over the air for the next 15 minutes.

Expected Results

Expected Result

The UE applies the throttling behavior as defined in *sections GENERIC THROTTLING ALGORITHM* and *Other abnormal cases in the UE* of the Verizon Wireless LTE Data Retry Requirements.

5.15 UE WITH T₃₃₄₆ TIMER SUPPORT RECEIVES TRACKING AREA UPDATE REJECT MESSAGE FROM THE NETWORK CODE 22

VZ_TC_DATARTRY_5386

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE receives a NAS Tracking Area Update Reject message while attempting a tracking area update with the LTE network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements,
- Verizon Wireless Device Requirements LTE Data Retry, *Section 4.3.4.1*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*, Release 10 or later
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies only to UEs with T₃₃₄₆ timer support designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
Test Procedure <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X₁, PLMN id equal to value Y₁, and TAI equal to value Z₁. 2. Configure the test equipment such that the network will allow the UE to attach and connect to PDNs. 3. Power the DUT on and allow it to find LTE service. 4. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network. 5. Force the DUT to the RRC IDLE state by having the network transmit an RRCConnectionRelease message. 6. Configure the test equipment so that the network responds to all NAS Tracking Area Update Request messages with a NAS Tracking Area Update Reject message with an EMM Cause Code of 22 and a T₃₃₄₆ Timer value of 15 minutes. 7. Reconfigure the test setup so that the DUT now finds service on a different Tracking Area with id equal to value Z₂ where Z₂ is not equal to Z₁, and Z₂ is not on the UEs list of tracking

areas. Note that only the TAC portion of the TAI will be different. The PLMN id is still equal to Y₁.

8. Verify that the UE sends a NAS Tracking Area Update Request message and that the network responds with a NAS Tracking Area Update Reject message in which the EMM Cause Code is set to 22.
9. Verify that the UE does not re-issue a Tracking Area Update Request while the T₃₃₄₆ timer is running.
10. While the T₃₃₄₆ timer is running, power cycle the UE.
11. Verify that the UE does not issue a Tracking Area Update Request.
12. While the T₃₃₄₆ timer is running, re-configure the test setup so that the DUT now finds service on a different Tracking Area with id equal to value Z₃ where Z₃ is not equal to Z₁ or Z₂, and Z₃ is not on the UEs list of tracking areas. Note that only the TAC portion of the TAI will be different. The PLMN id is still equal to Y₁.
13. Verify that the UE does not issue a Tracking Area Update Request.
14. While the T₃₃₄₆ timer is running, re-configure the network (bring down PLMN Y₁ completely and then bring up PLMN Y₂) so that the UE finds service on an eNodeB with a PLMN id equal to Y₂ where Y₂ is not equal to Y₁. PLMN Y₂ shall not be a home PLMN. The frequency of the second PLMN shall be the same as the first. T₃₃₄₆ shall not be running in this second PLMN.
15. Verify that the UE successfully attaches to the LTE network.
 - If the UE supports IMS roaming, verify that the UE connects to the IMS PDN using PDN Type IPv6.
 - If the UE does not support IMS roaming, verify that the UE connects to the Internet PDN using PDN Type IPv4.
16. While the T₃₃₄₆ timer is running, re-configure the test setup so that the DUT again finds service on PLMN Y₁.
17. Verify that the UE issues a Tracking Area Update Request without waiting for T₃₃₄₆ to expire.

Expected Results

Expected Result

After receiving the NAS Tracking Area Update Reject message, the UE waits T₃₃₄₆ minutes before its next TAU attempt in that PLMN. If the UE enters a new PLMN, it shall stop timer T₃₃₄₆ before issuing a TAU attempt in that PLMN.

5.15.1 _IMSRoam UE with T₃₃₄₆ Timer Support Receives Tracking Area Update
Reject message from the Network: Code 22 VZ_TC_DATARTRY_3605310

5.1 5.2 _NoIMSRoam UE with T₃₃₄₆ Timer Support Receives Tracking Area Update
Reject message from the Network: Code 22 VZ_TC_DATARTRY_3605311

5.16 UE WITHOUT T₃₃₄₆ TIMER SUPPORT RECEIVES TRACKING AREA UPDATE REJECT MESSAGE FROM THE NETWORK CODE 22

VZ_TC_DATARTRY_5387

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE receives a NAS Tracking Area Update Reject message while attempting a tracking area update with the LTE network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements,
- Verizon Wireless Device Requirements LTE Data Retry, *Section 4.3.4.2*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*, Release 10 or later
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies only to R-9 and earlier UEs without T₃₃₄₆ timer support designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
Test Procedure <ol style="list-style-type: none">1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1.2. Configure the test equipment such that the network will allow the UE to attach and connect to PDNs.3. Configure the test equipment such that the network sets the T₃₄₀₂ timer to 4 minutes in the Attach Accept message.4. Verify that the device under test (DUT) has an IMS application that will attempt to connect to the IMS PDN as soon as the DUT is powered on and finds service on the LTE network.5. Power the DUT on and allow it to find LTE service6. Verify that the DUT sends an Attach Request and that the network responds with an Attach Accept with the T₃₄₀₂ timer set to 4 minutes.7. Configure the test equipment such that the network sends a Detach Request to the DUT with "re-attach required" in the Detach Type IE.8. Verify that the DUT detaches from the LTE network.9. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network.

- I 0. Force the DUT to the RRC IDLE state by having the network transmit an RRCConnectionRelease message.
- I 1. Configure the test equipment so that the network responds to all NAS Tracking Area Update Request messages with a NAS Tracking Area Update Reject message with an EMM Cause Code of 22 and a T₃₃₄₆ Timer value of 15 minutes.
- I 2. Reconfigure the test setup so that the DUT now finds service on a different Tracking Area with id equal to value Z2 where Z2 is not equal to Z1, and Z2 is not on the UEs list of tracking areas. Note that only the TAC portion of the TAI will be different. The PLMN id is still equal to Y1.
- I 3. Verify that the UE sends a NAS Tracking Area Update Request message and that the network responds with a NAS Tracking Area Update Reject message in which the EMM Cause Code is set to 22.
- I 4. Verify that after T₃₄₁₁ seconds, the UE sends a second NAS Tracking Area Update Request message and that the network responds with a NAS Tracking Area Update Reject message in which the EMM Cause Code is set to 22.
- I 5. Verify that the UE attempts a Tracking Area Update 3 more times with each attempt separated by at least T₃₄₁₁ seconds.
- I 6. After the fifth attempt fails, verify the UE does not send a Tracking Area Update Request while T₃₄₀₂ is running.

Expected Results

Expected Result

After receiving the NAS Tracking Area Update Reject message, the UE attempts a Tracking Area Update 4 more times with each attempt separated by at least T₃₄₁₁ seconds. After the fifth attempt fails, the next tracking area update attempt does not occur for at least T₃₄₀₂ minutes.

5.17 PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH SERVICE REQUEST VZ_TC_DATARETRY_9561

Description

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE attempts multiple power cycles in response to permanent EMM failures, including a Service Request failure.

Traceability

- Verizon Wireless *Device Requirements LTE Data Retry, Section 3.10*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
<p>Test Procedure</p> <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1. 2. Configure the test equipment such that the network will allow the UE to attach and connect to PDNs. 3. Ensure DUT has parameter MAXEVENTCOUNTER set to default value of 5 and parameter MAXLOGTIME set to default value of 120. 4. Power the DUT on and allow it to find LTE service. 5. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network. 6. Initiate the test application (see section 1.5) and verify that it connects successfully to the internet PDN. Configure the test application for the application idle state. 7. Force the DUT to the RRC IDLE state by having the network transmit an RRCConnectionRelease message. 8. Configure the test equipment so that the network responds to all NAS Service Request messages with a NAS Service Reject message with an EMM Cause Code of 3. 9. Configure the test application for the application transmitting state with a retransmission timer of 10 seconds.

10. Verify that the UE sends a NAS Service Request message and that the network responds with a NAS Service Reject message in which the EMM Cause Code is set to 3.
11. Verify that the DUT behaves as follows:
 - o For EMM cause codes 3,6,7, and (for Release 11 and higher UEs) 8:
 1. Monitor the DUT for 5 minutes and verify that the DUT does not attempt to attach to the LTE network.
 2. Re-configure the test equipment such that the network will respond to attach attempts by sending a NAS Attach Reject message with an EMM Cause Code equal to 3.
 3. Power cycle the DUT.
 - o For EMM cause code 8 (for Release 10 and earlier UEs only):
 1. Verify that the UE sends a second NAS Service Request message and that the network responds with a NAS Service Reject message in which the EMM Cause Code is set to 8.
 2. Verify that the UE sends a third NAS Service Request message and that the network responds with a NAS Service Reject message in which the EMM Cause Code is set to 8.
 3. Verify that the UE does not request the connection over the air for the next 1 minute plus a random time between 0 and 15 seconds.
 4. Once the 1+ minute timer expires, verify that the UE attempts to connect upon the next request of the test application with no delay. Verify that the UE sends a fourth NAS Service Request message and that the network responds with a NAS Service Reject message in which the EMM Cause Code is set to 8.
 5. Verify that the UE does not request the connection over the air for the next 2 minutes.
 6. While the 2 minute timer is running, re-configure the test equipment such that the network will respond to attach attempts by sending a NAS Attach Reject message with an EMM Cause Code equal to 3.
 7. Once the 2 minute timer expires, power cycle the DUT.
 8. Skip to step 21.
12. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.
13. Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 3.
14. Power cycle the DUT.
15. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.
16. Verify that the network responds with a NAS Attach Reject message in which the EMM

- Cause Code is set to a value of 3.
17. Power cycle the DUT.
 18. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.
 19. Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 3.
 20. Power cycle the DUT.
 21. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.
 22. Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 3.
 23. Power cycle the DUT.
 24. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.
 25. Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 3.
 26. Power cycle the DUT
 27. Monitor the DUT for 5 minutes and verify that it does not attempt to connect to the LTE network.
 28. Power off the DUT.
 29. Replace the UICC in the DUT with another valid UICC which have different ICCID.
 30. Power on the DUT.
 31. Verify that the DUT successfully attaches to the LTE network.
 32. Power off the DUT.
 33. Repeat the test for EMM Cause Codes of 6, 7, and 8.

Expected Results

Expected Result

Once the UE receives more than 5 successive EMM cause code events or power cycles., the UE shall not attempt to attach to the LTE network untill the UICC is replaced.

5.17.1 _Code3 PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH SERVICE REQUEST: Code 3 VZ_TC_DATARTRY_3605312

5.17.2 _Code7 PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH SERVICE REQUEST: Code 7 VZ_TC_DATARTRY_3605314

5.17.3 _Code6 PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH SERVICE REQUEST: Code 6 VZ_TC_DATARTRY_3605313

5.17.4 _Code8 PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH SERVICE REQUEST: Code 8 VZ_TC_DATARTRY_3605315

5.18 PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH TRACKING AREA UPDATE VZ_TC_DATARETRY_9563

Description

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE attempts multiple power cycles in response to permanent EMM failures, including a Tracking Area Update Request failure.

Traceability

- Verizon Wireless *Device Requirements LTE Data Retry, Section 3.10*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
<p>Procedures (Step 1)</p> <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1. 2. Configure the test equipment such that the network will allow the UE to attach and connect to PDNs. 3. Ensure DUT has parameter MAXEVENTCOUNTER set to default value of 5 and parameter MAXLOGTIME set to default value of 120. 4. Power the DUT on and allow it to find LTE service. 5. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network. 6. Force the DUT to the RRC IDLE state by having the network transmit an RRCConnectionRelease message. 7. Configure the test equipment so that the network responds to all NAS Tracking Area Update Request messages with a NAS Tracking Area Update Reject message with an EMM Cause Code of 3. 8. Reconfigure the test setup so that the DUT now finds service on a different Tracking Area with id equal to value Z2 where Z2 is not equal to Z1, and Z2 is not on the UEs list of tracking

- areas. Note that only the TAC portion of the TAI will be different. The PLMN id is still equal to Y1.
9. Verify that the UE sends a NAS Tracking Area Update message and that the network responds with a NAS Tracking Area Reject message in which the EMM Cause Code is set to 3.
 10. Verify that the DUT behaves as follows:
 - o For EMM cause codes 3,6,7, and (for Release 11 and higher UEs) 8:
 1. Monitor the DUT for 5 minutes and verify that the DUT does not attempt to attach to the LTE network.
 2. Re-configure the test equipment such that the network will respond to attach attempts by sending a NAS Attach Reject message with an EMM Cause Code equal to 3.
 3. Power cycle the DUT.
 - o For EMM cause code 8 (for Release 10 and earlier UEs only):
 1. Verify that after the expiration of T3411, the UE sends a NAS Tracking Area Update Request message to the network.
 2. Verify that the network responds with a NAS Tracking Area Reject message.in which the EMM Cause Code is set to 8.
 3. Verify that after the expiration of T3411, the UE sends a NAS Tracking Area Update Request message to the network.
 4. Verify that the network responds with a NAS Tracking Area Reject message.in which the EMM Cause Code is set to 8.
 5. After the NAS Tracking Area Update Request (fifth attempt) fails, verify that the UE does not send a NAS Tracking Area Update Request message for at least T3402 minutes.
 6. While the T3402 timer is running, re-configure the test equipment such that the network will respond to attach attempts by sending a NAS Attach Reject message with an EMM Cause Code equal to 3.
 7. When the T3402 timer expires, power cycle the DUT.
 8. Skip to step 23.
 11. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.
 12. Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 3.
 13. Power cycle the DUT.
 14. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.
 15. Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 3.

16. Power cycle the DUT.
17. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.
18. Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 3.
19. Power cycle the DUT.
20. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.
21. Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 3.
22. Power cycle the DUT.
23. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.
24. Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 3.
25. Power cycle the DUT.
26. Monitor the DUT for 5 minutes and verify that it does not attempt to connect to the LTE network.
27. Power off the DUT.
28. Replace the UICC in the DUT with another valid UICC which have different ICCID.
29. Power on the DUT.
30. Verify that the DUT successfully attaches to the LTE network.
31. Power off the DUT.
32. Repeat the test for EMM Cause Codes of 6, 7, and 8.

Expected Results

Expected Result

Once the UE receives more than 5 successive EMM cause code events or power cycles., the UE shall not attempt to attach to the LTE network untill the UICC is replaced.

5.18.1 _Code3 PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH TRACKING AREA UPDATE: Code 3 VZ_TC_DATARTRY_3605316

5.18.2 _Code6 PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH TRACKING AREA UPDATE: Code 6 VZ_TC_DATARTRY_3605317

5.18.3 _Code7 PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH TRACKING AREA UPDATE: Code 7 VZ_TC_DATARTRY_3605798

5.18.4 _Code8 PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH TRACKING AREA UPDATE: Code 8

VZ_TC_DATARTRY_3605491

6.1 NETWORK FAILS TO ASSIGN AN IPV6 ADDRESS FOR THE IMS PDN

VZ_TC_DATARETRY_5360

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the network fails to assign an IPv6 address to the UE.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE 3GPP Network Access*, Section 4.1.8
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*
- IETF RFC 4861: *Neighbor Discovery for IP version 6 (IPv6)*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
Test Procedure <ol style="list-style-type: none">1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1.2. Configure the test equipment such that the network will allow the UE to attach and connect to the IMS PDN but the IMS PDN will not respond to the UE's IPv6 Router Solicitation messages. The Internet PDN will respond to the UE's IPv6 Router Solicitation messages.3. Verify that the DUT has an IMS application that will attempt to connect as soon as the DUT is powered on.4. Power the DUT on and allow it to find LTE service.5. Initiate the test application that can be configured to aggressively attempt to connect to the network using the internet PDN (see section TEST EQUIPMENT CONFIGURATION).6. Verify that the DUT successfully establishes an RRC connection, attaches to the network, and connects to the IMS PDN.7. Verify that the UE sends IPv6 Router Solicitation messages to the network for the IMS PDN and that the network does not respond. Verify that the UE does not send more than MAX_RTR_SOLICITATION (3 per RFC 4861) Router Solicitation messages separated by RTR_SOLICITATION_INTERVAL (4) seconds.8. Verify that the UE detaches from the LTE network.9. Verify that the UE re-attaches to the network using the Internet PDN.
Expected Results
Expected Result <p>When the IMS PDN does not assign an IPv6 address, the UE detaches from the LTE network, then re-attaches and connects to the Internet PDN.</p>

6.2 NETWORK FAILS TO REFRESH THE IPV6 ADDRESS FOR THE IMS PDN, NO IPV4 ADDRESS ASSIGNED VZ_TC_DATARTRY_5361

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the network fails to refresh an IPv6 address to the UE.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE 3GPP Network Access, Section 4.1.8*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*
- IETF RFC 4861: *Neighbor Discovery for IP version 6 (IPv6)*

Applicability

This test case applies to all UEs, except CDMA-less voice centric device, designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
<p>Test Procedure</p> <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1. 2. Configure the test equipment such that the network will allow the UE to attach and connect to the IMS PDN and the IMS PDN will respond to the UE's initial request for an IPv6 Router Solicitation message but will not respond to all subsequent requests. 3. Configure the test equipment so that the network will assign an IPv6 Interface ID but it will not assign an IPv4 address when the device connects to the IMS PDN. 4. Verify that the DUT has an IMS application that will attempt to connect as soon as the DUT is powered on and an application that will connect to the Internet PDN. 5. Power the DUT on and allow it to find LTE service. 6. Verify that the DUT successfully establishes an RRC connection, attaches to the network, and connects to the IMS PDN. 7. Verify that the UE sends IPv6 Router Solicitation messages to the network and that the network responds. Configure the network so that the Router Advertisement message uses a "Valid Lifetime" of 5 minutes, a "Preferred Lifetime" of 5 minutes, and a "Router Lifetime" of 4 minutes. 8. Initiate the application that connects to the Internet PDN and verify that it connects successfully.

9. Verify that the device sends a Router Solicitation message to the IMS PDN after between 3 and 4 minutes have elapsed from the receipt of the first Router Advertisement message.
Verify that the network does not respond to the Router Solicitation messages.
- I 0. Verify that the UE does not send more than MAX_RTR_SOLICITATION (3 per RFC 4861) Router Solicitation messages separated by RTR_SOLICITATION_INTERVAL (4) seconds.
- I 1. Verify that the UE disconnects from the IMS PDN.
- I 2. Verify that the device connects to the IMS PDN within one minute. Verify that the network does not assign an IPv4 address during the connection.
- I 3. Verify that the UE sends IPv6 Router Solicitation messages to the network for the IMS PDN and that the network does not respond. Verify that the UE does not send more than MAX_RTR_SOLICITATION (3 per RFC 4861) Router Solicitation messages separated by RTR_SOLICITATION_INTERVAL (4) seconds.
- I 4. Verify that the UE disconnects from the IMS PDN. This is considered Retry #1.
- I 5. Verify that the device connects to the IMS PDN within one minute. Verify that the network does not assign an IPv4 address during the connection.
- I 6. Verify that the UE sends IPv6 Router Solicitation messages to the network for the IMS PDN and that the network does not respond. Verify that the UE does not send more than MAX_RTR_SOLICITATION (3 per RFC 4861) Router Solicitation messages separated by RTR_SOLICITATION_INTERVAL (4) seconds.
- I 7. Verify that the UE disconnects from the IMS PDN. This is considered Retry #2.
- I 8. Verify that the device does not connect to the IMS PDN for at least 1 minute. Once the UE does connect again to the IMS PDN, verify that the network does not assign an IPv4 address during the connection.
- I 9. Verify that the UE sends IPv6 Router Solicitation messages to the network for the IMS PDN and that the network does not respond. Verify that the UE does not send more than MAX_RTR_SOLICITATION (3 per RFC 4861) Router Solicitation messages separated by RTR_SOLICITATION_INTERVAL (4) seconds.
20. Verify that the UE disconnects from the IMS PDN. This is considered Retry #3.
- 2 I. Verify that the device does not connect to the IMS PDN for at least 2 minutes. Once the UE does connect again to the IMS PDN, verify that the network does not assign an IPv4 address during the connection.
22. Verify that the UE sends IPv6 Router Solicitation messages to the network for the IMS PDN and that the network does not respond. Verify that the UE does not send more than MAX_RTR_SOLICITATION (3 per RFC 4861) Router Solicitation messages separated by RTR_SOLICITATION_INTERVAL (4) seconds.
23. Verify that the UE disconnects from the IMS PDN. This is considered Retry #4.
24. Verify that the device does not connect to the IMS PDN for at least 8 minutes. Once the UE does connect again to the IMS PDN, verify that the network does not assign an IPv4 address during the connection.
25. Verify that the UE sends IPv6 Router Solicitation messages to the network for the IMS PDN and that the network does not respond. Verify that the UE does not send more than MAX_RTR_SOLICITATION (3 per RFC 4861) Router Solicitation messages separated by RTR_SOLICITATION_INTERVAL (4) seconds.
26. Verify that the UE disconnects from the IMS PDN. This is considered Retry #5.
27. Verify that the device does not connect to the IMS PDN for at least 15 minutes. Once the UE does connect again to the IMS PDN, verify that the network does not assign an IPv4 address during the connection.
28. Verify that the UE sends IPv6 Router Solicitation messages to the network for the IMS PDN and that the network does not respond. Verify that the UE does not send more than MAX_RTR_SOLICITATION (3 per RFC 4861) Router Solicitation messages separated by RTR_SOLICITATION_INTERVAL (4) seconds.
29. Verify that the UE disconnects from the IMS PDN. This is considered Retry #6.
30. Verify that the device does not connect to the IMS PDN for at least 15 minutes. Once the UE does connect again to the IMS PDN, verify that the network does not assign an IPv4 address during the connection.
- 3 I. Verify that the UE sends IPv6 Router Solicitation messages to the network for the IMS PDN and that the network does not respond. Verify that the UE does not send more than MAX_RTR_SOLICITATION (3 per RFC 4861) Router Solicitation messages separated by RTR_SOLICITATION_INTERVAL (4) seconds.
32. Verify that the UE disconnects from the IMS PDN. This is considered Retry #7.

Expected Results

Expected Result

UE follows the required retry algorithm when the PDN does not refresh the IPv6 address of the IMS PDN.
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6.3 NETWORK FAILS TO ASSIGN AN IPV6 ADDRESS FOR A NON-IMS PDN- INITIAL CONNECTION, NO IPV4 ADDRESS ASSIGNED

VZ_TC_DATARTRY_5362

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the network fails to assign an IPv6 address to the UE for a non-IMS PDN initial connection where no IPv4 address is assigned.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE Data Retry, Section 4.6*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*
- IETF RFC 4861: *Neighbor Discovery for IP version 6 (IPv6)*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
<p>Test Procedure</p> <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1. 2. Configure the test equipment such that the network will allow the UE to attach and connect to the Internet PDN but the Internet PDN will not respond to the UEs request for an IPv6 Router Solicitation message. 3. Configure the test equipment so that the network will assign an IPv6 Interface ID but it will not assign an IPv4 address when the device connects to the Internet PDN. 4. Power the DUT on and allow it to find LTE service. 5. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network. 6. Initiate the test application (see section section TEST EQUIPMENT CONFIGURATION) and configure it for the application transmitting state with a retransmission timer set to 10 seconds. 7. Verify that the device connects to the Internet PDN. Verify that the network does not assign an IPv4 address during the connection. 8. Verify that the UE sends IPv6 Router Solicitation messages to the network for the Internet PDN and that the network does not respond. Verify that the UE does not send more than MAX_RTR_SOLICITATION (3 per RFC 4861) Router Solicitation messages separated by RTR_SOLICITATION_INTERVAL (4) seconds. 9. Verify that the UE disconnects from the Internet PDN. 10. Verify that the device connects to the internet PDN within one minute. Verify that the network does not assign an IPv4 address during the connection. 11. Verify that the UE sends IPv6 Router Solicitation messages to the network for the Internet PDN and that the network does not respond. Verify that the UE does not send more than MAX_RTR_SOLICITATION (3 per RFC 4861) Router Solicitation messages separated by RTR_SOLICITATION_INTERVAL (4) seconds.

- I 2. Verify that the UE disconnects from the Internet PDN. This is considered Retry #1.
- I 3. Verify that the device connects to the internet PDN within one minute. Verify that the network does not assign an IPv4 address during the connection.
- I 4. Verify that the UE sends IPv6 Router Solicitation messages to the network for the Internet PDN and that the network does not respond. Verify that the UE does not send more than MAX_RTR_SOLICITATION (3 per RFC 4861) Router Solicitation messages separated by RTR_SOLICITATION_INTERVAL (4) seconds.
- I 5. Verify that the UE disconnects from the Internet PDN. This is considered Retry #2.
- I 6. Verify that the device does not connect to the Internet PDN for at least [1 minute minus (MAX_RTR_SOLICITATION)(RTR_SOLICITATION_INTERVAL) seconds (i.e., 12 seconds)]. Once the UE does connect again to the Internet PDN, verify that the network does not assign an IPv4 address during the connection.
- I 7. Verify that the UE sends IPv6 Router Solicitation messages to the network for the Internet PDN and that the network does not respond. Verify that the UE does not send more than MAX_RTR_SOLICITATION (3 per RFC 4861) Router Solicitation messages separated by RTR_SOLICITATION_INTERVAL (4) seconds.
- I 8. Verify that the UE disconnects from the Internet PDN. This is considered Retry #3.
- I 9. Verify that the device does not connect to the Internet PDN for at least [2 minutes minus 12 seconds]. Once the UE does connect again to the Internet PDN, verify that the network does not assign an IPv4 address during the connection.
20. Verify that the UE sends IPv6 Router Solicitation messages to the network for the Internet PDN and that the network does not respond. Verify that the UE does not send more than MAX_RTR_SOLICITATION (3 per RFC 4861) Router Solicitation messages separated by RTR_SOLICITATION_INTERVAL (4) seconds.
21. Verify that the UE disconnects from the Internet PDN. This is considered Retry #4.
22. Verify that the device does not connect to the Internet PDN for at least [8 minutes minus 12 seconds]. Once the UE does connect again to the Internet PDN, verify that the network does not assign an IPv4 address during the connection.
23. Verify that the UE sends IPv6 Router Solicitation messages to the network for the Internet PDN and that the network does not respond. Verify that the UE does not send more than MAX_RTR_SOLICITATION (3 per RFC 4861) Router Solicitation messages separated by RTR_SOLICITATION_INTERVAL (4) seconds.
24. Verify that the UE disconnects from the Internet PDN. This is considered Retry #5.
25. Verify that the device does not connect to the Internet PDN for at least [15 minutes minus 12 seconds]. Once the UE does connect again to the Internet PDN, verify that the network does not assign an IPv4 address during the connection.
26. Verify that the UE sends IPv6 Router Solicitation messages to the network for the Internet PDN and that the network does not respond. Verify that the UE does not send more than MAX_RTR_SOLICITATION (3 per RFC 4861) Router Solicitation messages separated by RTR_SOLICITATION_INTERVAL (4) seconds.
27. Verify that the UE disconnects from the Internet PDN. This is considered Retry #6.
28. Verify that the device does not connect to the Internet PDN for at least [15 minutes minus 12 seconds]. Once the UE does connect again to the Internet PDN, verify that the network does not assign an IPv4 address during the connection.
29. Verify that the UE sends IPv6 Router Solicitation messages to the network for the Internet PDN and that the network does not respond. Verify that the UE does not send more than MAX_RTR_SOLICITATION (3 per RFC 4861) Router Solicitation messages separated by RTR_SOLICITATION_INTERVAL (4) seconds.
30. Verify that the UE disconnects from the Internet PDN. This is considered Retry #7.

Expected Results

Expected Result

UE follows the required retry algorithm when the PDN does not assign an IPv6 address for the Internet PDN.

6.4 NETWORK FAILS TO ASSIGN AN IPV6 ADDRESS FOR A NON-IMS PDN- INITIAL CONNECTION, IPV4 ADDRESS ASSIGNED VZ_TC_DATARTRY_5363

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the network fails to assign an IPv6 address to the UE for a non-IMS PDN initial connection where an IPv4 address is assigned.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE Data Retry, Section 4.6*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*
- IETF RFC 4861: *Neighbor Discovery for IP version 6 (IPv6)*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
Test Procedure <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1. 2. Configure the test equipment such that the network will allow the UE to attach and connect to the Internet PDN but the Internet PDN will not respond to the UEs request for an IPv6 Router Solicitation message. 3. Configure the test equipment so that the network will assign an IPv6 address and an IPv4 address when the device connects to the Internet PDN. 4. Power the DUT on and allow it to find LTE service. 5. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network. 6. Initiate the test application (see section TEST EQUIPMENT CONFIGURATION) and configure it for the application transmitting state with a retransmission timer set to 10 seconds. 7. Verify that the device connects to the Internet PDN. Verify that the network assigns an IPv4 and IPv6 IID address during the connection. 8. Verify that the UE sends IPv6 Router Solicitation messages to the network for the Internet PDN and that the network does not respond. Verify that the UE does not send more than MAX_RTR_SOLICITATION (3 per RFC 4861) Router Solicitation messages separated by RTR_SOLICITATION_INTERVAL (4) seconds. 9. Verify that the UE stays connected to the Internet PDN and uses the IPv4 address for all communication with the Internet PDN.
Expected Results
Expected Result UE follows the required retry algorithm when the PDN does not assign an IPv6 address for the Internet PDN.

6.5 UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR THE IMS PDN- INITIAL ATTACHMENT

VZ_TC_DATARETRY_5364

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE receives a NAS PDN Connectivity Reject message while attempting to re-connect to the IMS PDN on the LTE network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE Data Retry, Section 4.5.2.1.1*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs, except CDMA-less voice centric device, designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
Test Procedure <ol style="list-style-type: none">1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1.2. Configure the test equipment such that the network will send a NAS PDN Connectivity Reject message with cause code 26 and a NAS Attach Reject message with a cause code of 19 when the UE attempts to connect to the IMS PDN. Note that the T3396 Value IE is not included in the PDN Connectivity Reject message.3. Verify that the DUT has an IMS application that will attempt to connect as soon as the DUT is powered on.4. Power the DUT on and allow it to find LTE service.5. Initiate the test application (see section TEST EQUIPMENT CONFIGURATION). Configure the test application for the application transmitting state.6. Verify that the DUT successfully establishes an RRC connection, attempts to attach to the network, and attempts to connect to the IMS PDN.7. Verify that the network sends a NAS PDN Connectivity Reject message with cause code 26 embedded in a NAS Attach Reject message with a cause code of 19 when the UE attempts to connect to the IMS PDN.8. Verify that the UE attempts to attach to the network and attempts to connect to the Internet PDN within one minute.

9. Verify that the UE connects to the Internet PDN.
10. Verify that the UE attempts to connect to the IMS PDN within one minute.
11. Verify that the network sends a NAS PDN Connectivity Reject message with cause code 26 when the UE attempts to connect to the IMS PDN.
12. Verify that the UE immediately attempts to re-connect to the IMS PDN by sending a NAS PDN Connectivity Request message.
13. Verify that the network sends a NAS PDN Connectivity Reject message with cause code 26 when the UE attempts to connect to the IMS PDN.
14. Verify that the UE immediately attempts to re-connect to the IMS PDN by sending a NAS PDN Connectivity Request message and that the network responds with a NAS PDN Connectivity Reject message with cause code 26.
15. Verify that the UE does not attempt a NAS PDN Connectivity Request for the IMS PDN for the next 1 minute plus a random time between 0 and 15 seconds.
16. Once the 1+ minute timer expires, verify that the UE sends another NAS PDN Connectivity Request and that the network responds with a NAS PDN Connectivity Reject message with cause code 26.
17. Verify that the UE does not attempt a NAS PDN Connectivity Request for the IMS PDN for the next 2 minutes.
18. Once the 2 minute timer expires, verify that the UE sends another NAS PDN Connectivity Request and that the network responds with a NAS PDN Connectivity Reject message with cause code 26.
19. Verify that the UE does not attempt a NAS PDN Connectivity Request for the IMS PDN for the next 8 minutes.
20. Once the 8 minute timer expires, verify that the UE sends another NAS PDN Connectivity Request and that the network responds with a NAS PDN Connectivity Reject message with cause code 26.
21. Verify that the UE does not attempt a NAS PDN Connectivity Request for the IMS PDN for the next 15 minutes.
22. Once the 15 minute timer expires, verify that the UE sends another NAS PDN Connectivity Request and that the network responds with a NAS PDN Connectivity Reject message with cause code 26.
23. Verify that the UE does not attempt a NAS PDN Connectivity Request for the IMS PDN for the next 15 minutes.
24. While the fifteen minute throttling timer is running, re-configure the network so that the network accepts the PDN Connectivity Request for the IMS PDN.
25. Once the fifteen minute timer expires, verify that the UE successfully connects to the IMS PDN.

Expected Results

Expected Result

UE follows the data retry algorithm described in the document "Verizon Wireless LTE Data Retry" when it receives a NAS PDN Connectivity Reject message for the IMS PDN.

6.6 UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR THE IMS PDN- SUBSEQUENT ATTACHMENT

VZ_TC_DATARTRY_5365

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE receives a NAS PDN Connectivity Reject message while attempting to re-connect to the IMS PDN on the LTE network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE Data Retry, Section 4.5.2.1.1*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs, except CDMA-less voice centric device, designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
<p>Test Procedure</p> <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1. 2. Configure the test equipment to allow the device to attach and connect to all PDNs. 3. Verify that the DUT has an IMS application that will attempt to connect as soon as the DUT is powered on. 4. Power the DUT on and allow it to find LTE service. 5. Verify that the DUT successfully establishes an RRC connection, attaches to the network, and connects to the IMS PDN. 6. Initiate the test application (see section TEST EQUIPMENT CONFIGURATION) and verify that it connects successfully to the internet PDN. Configure the test application for the application idle state. 7. Allow the RRC connection to go idle. 8. Configure the test equipment to send a NAS "Deactivate EPS Bearer Context Request" message to disconnect the IMS PDN. 9. Verify that the UE disconnects from the IMS PDN. 10. Configure the test equipment such that the network will send a NAS PDN Connectivity Reject message with cause code 26 when the UE attempts to connect to the IMS PDN. Note that the T3396 Value IE is not included in the PDN Connectivity Reject message.

11. Verify that the UE immediately attempts to re-connect to the IMS PDN by sending a NAS PDN Connectivity Request message.
12. Verify that the network sends a NAS PDN Connectivity Reject message with cause code 26 when the UE attempts to connect to the IMS PDN.
13. Verify that the UE immediately attempts to re-connect to the IMS PDN by sending a NAS PDN Connectivity Request message and that the network responds with a NAS PDN Connectivity Reject message with cause code 26.
14. Verify that the UE immediately attempts a third time to connect to the IMS PDN by sending a NAS PDN Connectivity Request message and that the network responds with a NAS PDN Connectivity Reject message with cause code 26.
15. Verify that the UE does not attempt a NAS PDN Connectivity Request for the IMS PDN for the next 1 minute plus a random time between 0 and 15 seconds.
16. Once the 1+ minute timer expires, verify that the UE sends another NAS PDN Connectivity Request and that the network responds with a NAS PDN Connectivity Reject message with cause code 26.
17. Verify that the UE does not attempt a NAS PDN Connectivity Request for the IMS PDN for the next 2 minutes.
18. Once the 2 minute timer expires, verify that the UE sends another NAS PDN Connectivity Request and that the network responds with a NAS PDN Connectivity Reject message with cause code 26.
19. Verify that the UE does not attempt a NAS PDN Connectivity Request for the IMS PDN for the next 8 minutes.
20. Once the 8 minute timer expires, verify that the UE sends another NAS PDN Connectivity Request and that the network responds with a NAS PDN Connectivity Reject message with cause code 26.
21. Verify that the UE does not attempt a NAS PDN Connectivity Request for the IMS PDN for the next 15 minutes.
22. Once the 15 minute timer expires, verify that the UE sends another NAS PDN Connectivity Request and that the network responds with a NAS PDN Connectivity Reject message with cause code 26.
23. Verify that the UE does not attempt a NAS PDN Connectivity Request for the IMS PDN for the next 15 minutes.
24. While the fifteen minute throttling timer is running, re-configure the network so that the network accepts the PDN Connectivity Request for the IMS PDN.
25. Once the fifteen minute timer expires, verify that the UE successfully connects to the IMS PDN.
26. Repeat the test for ESM Cause Codes 30, 31, 34, 38, 95-101, and 111.

Expected Results

Expected Result

UE follows the data retry algorithm described in the document "Verizon Wireless LTE Data Retry" when it receives a NAS PDN Connectivity Reject message for the IMS PDN.

6.6.1 _Code26 UE Receives PDN Connectivity Reject message from the Network for the IMS PDN- Subsequent Attachment: 26 VZ_TC_DATARTRY_3605799

6.6.2 _Code30 UE Receives PDN Connectivity Reject message from the Network for the IMS PDN- Subsequent Attachment: 30 VZ_TC_DATARTRY_3605800

6.6.3 _Code3 I UE Receives PDN Connectivity Reject message from the Network for the IMS PDN- Subsequent Attachment: 3 I VZ_TC_DATARTRY_3605801

6.6.4 _Code34 UE Receives PDN Connectivity Reject message from the Network for the IMS PDN- Subsequent Attachment: 34 VZ_TC_DATARTRY_3605802

6.6.5 _Code38 UE Receives PDN Connectivity Reject message from the Network for the IMS PDN- Subsequent Attachment: 38 VZ_TC_DATARTRY_3605803

6.6.6 _Code95 UE Receives PDN Connectivity Reject message from the Network for the IMS PDN- Subsequent Attachment: 95 VZ_TC_DATARTRY_3605804

6.6.7 _Code96 UE Receives PDN Connectivity Reject message from the Network for the IMS PDN- Subsequent Attachment: 96 VZ_TC_DATARTRY_3605805

6.6.8 _Code97 UE Receives PDN Connectivity Reject message from the Network for the IMS PDN- Subsequent Attachment: 97 VZ_TC_DATARTRY_3605806

6.6.9 _Code98 UE Receives PDN Connectivity Reject message from the Network for the IMS PDN- Subsequent Attachment: 98 VZ_TC_DATARTRY_3605807

6.6.10 _Code99 UE Receives PDN Connectivity Reject message from the Network for the IMS PDN- Subsequent Attachment: 99 VZ_TC_DATARTRY_3605808

6.6.11 _Code100 UE Receives PDN Connectivity Reject message from the Network
for the IMS PDN- Subsequent Attachment: 100 VZ_TC_DATARTRY_3605809

6.6.12 _Code101 UE Receives PDN Connectivity Reject message from the Network
for the IMS PDN- Subsequent Attachment: 101 VZ_TC_DATARTRY_3605810

6.6.13 _Code111 UE Receives PDN Connectivity Reject message from the Network
for the IMS PDN- Subsequent Attachment: 111 VZ_TC_DATARTRY_3606103

6.7 UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR NON-IMS PDN CODES 26, 30, 31, 34, 38, 95, 96, 97, 98, 99, 100, 101, and 111 VZ_TC_DATARETRY_5366

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE receives a NAS PDN Connectivity Reject message while attempting to connect to a PDN on the LTE network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE Data Retry, Section 4.5.1*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
<p>Test Procedure</p> <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1. 2. Configure the test equipment such that the network will allow the UE to attach to the LTE network but the network will send a NAS PDN Connectivity Reject message with cause code 26 when the UE attempts to connect to the internet PDN. Note that the T3396 Value IE is not included in the PDN Connectivity Reject message. Configure the DUT so that, for the Internet PDN, the MAX_CONN parameter is set to 2 and the MAX_CONN_T parameter is set to 300 seconds. 3. Power the DUT on and allow it to find LTE service. 4. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network. 5. Initiate the test application (see section TEST EQUIPMENT CONFIGURATION). Configure the test application for the application transmitting state with the retransmission timer set to 8 seconds. 6. Verify that the network responds to a PDN Connectivity Request message from the UE by sending a PDN Connectivity Reject message with an ESM cause code of 26. 7. Verify that the UE sends a NAS PDN Connectivity Request without delay at the request of the test application and that the network again responds with a NAS PDN Connectivity Reject message in which the ESM Cause Code is set to 26. This is considered Retry #1. 8. Verify that the UE sends another NAS PDN Connectivity Request without delay at the request of the test application and that the network responds with a NAS PDN Connectivity Reject message in which the ESM Cause Code is set to 26. This is considered Retry #2. 9. Verify that the test application requests a connection every 10 seconds and that the UE does not request the connection over the air for the next 1 minute plus a random time between 0 and 15 seconds. 10. Once the 1+ minute timer expires, verify that the UE attempts to connect upon the next request of the test application with no delay. Verify that the UE sends another NAS PDN Connectivity Request and that the network responds with a NAS PDN Connectivity Reject message

in which the ESM Cause Code is set to 26. This is considered Retry #3.

- I 1. Verify that the test application requests a connection every 10 seconds and that the UE does not request the connection over the air for the next 2 minutes.
- I 2. Once the 2 minute timer expires, verify that the UE attempts to connect upon the next request of the test application with no delay. Verify that the UE sends another NAS PDN Connectivity Request and that the network responds with a NAS PDN Connectivity Reject message in which the ESM Cause Code is set to 26. This is considered Retry #4.
- I 3. Verify that the test application requests a connection every 10 seconds and that the UE does not request the connection over the air for the next 8 minutes.
- I 4. Once the 8 minute timer expires, verify that the UE attempts to connect upon the next request of the test application with no delay. Verify that the UE sends another NAS PDN Connectivity Request and that the network responds with a NAS PDN Connectivity Reject message in which the ESM Cause Code is set to 26. This is considered Retry #5.
- I 5. Verify that the test application requests a connection every 10 seconds and that the UE does not request the connection over the air for the next 15 minutes.
- I 6. Once the 15 minute timer expires, verify that the UE attempts to connect upon the next request of the test application with no delay. Verify that the UE sends another NAS PDN Connectivity Request and that the network responds with a NAS PDN Connectivity Reject message in which the ESM Cause Code is set to 26. This is considered Retry #6.
- I 7. Verify that the test application requests a connection every 10 seconds and that the UE does not request the connection over the air for the next 15 minutes.
- I 8. Once the 15 minute timer expires, verify that the UE attempts to connect upon the next request of the test application with no delay. Verify that the UE sends another NAS PDN Connectivity Request and that the network responds with a NAS PDN Connectivity Reject message in which the ESM Cause Code is set to 26. This considered Retry #7.
- I 9. Repeat the test for ESM cause codes 26, 30, 31, 34, 38, 95, 96, 97, 98, 99, 100, 101, and 111.

Expected Results

Expected Result

UE follows the data retry algorithm described in the document "Verizon Wireless LTE Data Retry" when it receives a NAS PDN Connectivity Reject message.

6.7.1 _Code26 UE receives "PDN Connectivity Reject" msg from NW for Non-IMS
PDN Code 26 VZ_TC_DATARTRY_3606323

6.7.2 _Code3o UE receives "PDN Connectivity Reject" msg from NW for Non-IMS
PDN Code 3o VZ_TC_DATARTRY_571891o

6.7.3 _Code31 UE receives "PDN Connectivity Reject" msg from NW for Non-IMS
PDN Code 31 VZ_TC_DATARTRY_5718914

6.7.4 _Code34 UE receives "PDN Connectivity Reject" msg from NW for Non-IMS
PDN Code 34 VZ_TC_DATARTRY_5724266

6.7.5 _Code38 UE receives "PDN Connectivity Reject" msg from NW for Non-IMS
PDN Code 38 VZ_TC_DATARTRY_5724268

6.7.6 _Code95 UE receives "PDN Connectivity Reject" msg from NW for Non-IMS
PDN Code 95 VZ_TC_DATARTRY_5724269

6.7.7 _Code96 UE receives "PDN Connectivity Reject" msg from NW for Non-IMS
PDN Code 96 VZ_TC_DATARTRY_5724271

6.7.8 _Code97 UE receives "PDN Connectivity Reject" msg from NW for Non-IMS
PDN Code 97 VZ_TC_DATARTRY_5724641

6.7.9 _Code98 UE receives "PDN Connectivity Reject" msg from NW for Non-IMS
PDN Code 98 VZ_TC_DATARTRY_5724642

6.7.10 _Code99 UE receives "PDN Connectivity Reject" msg from NW for Non-IMS
PDN Code 99 VZ_TC_DATARTRY_5724643

6.7.1.1 _Code100 UE receives "PDN Connectivity Reject" msg from NW for Non-IMS
PDN Code 100 VZ_TC_DATARETRY_5724644

6.7.12 _Code101 UE receives "PDN Connectivity Reject" msg from NW for Non-IMS
PDN Code 101 VZ_TC_DATARTRY_5724645

6.7.13 _Code I I I UE receives "PDN Connectivity Reject" msg from NW for Non-IMS
PDN Code I I I VZ_TC_DATARTRY_5724646

6.9 UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR NON-IMS PDN CODES 8, 27, 29, 32, 33, AND 112

VZ_TC_DATARTRY_5368

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE receives a NAS PDN Connectivity Reject message while attempting to connect to a PDN on the LTE network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE Data Retry, Section 4.5.1*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
Test Procedure For Release 11 and earlier UE <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1. 2. Configure the test equipment such that the network will allow the UE to attach to the LTE network but the network will send a NAS PDN Connectivity Reject message with cause code 8 when the UE attempts to connect to the internet PDN. Note that the T3396 Value IE is not included in the PDN Connectivity Reject message. Configure the DUT so that, for the Internet PDN, the MAX_CONN parameter is set to 2 and the MAX_CONN_T parameter is set to 300 seconds. 3. Power the DUT on and allow it to find LTE service. 4. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network. 5. Initiate the test application (see section TEST EQUIPMENT CONFIGURATION). Configure the test application for the application transmitting state with the retransmission timer set to 8 seconds.

6. Verify that the UE sends a NAS PDN Connectivity Request message for the internet PDN to the LTE network, and that the network responds to the PDN Connectivity Request message from the UE by sending a PDN Connectivity Reject message with an ESM cause code of 8.
7. Verify that the UE sends a second NAS PDN Connectivity Request without delay at the request of the test application and that the network again responds with a NAS PDN Connectivity Reject message in which the ESM Cause Code is set to 8.
8. Monitor the DUT for 2 minutes and verify that it does not attempt to send a NAS PDN Connectivity Request to the LTE network.
9. Reconfigure the test setup so that the DUT now finds service on a different eNodeB with cell_id equal to value X2 where X2 is not equal to X1. X1 and X2 are on the same frequency. The PLMN id is still equal to Y1.
10. Verify that the DUT does not attempt to send a NAS PDN Connectivity Request to the LTE network on the new eNodeB.
11. Reconfigure the test setup so that the DUT now finds service on a different Tracking Area with id equal to value Z2 where Z2 is not equal to Z1. Note that only the TAC portion of the TAI will be different. The PLMN id is still equal to Y1.
12. Verify that the DUT does not attempt to send a NAS PDN Connectivity Request to the LTE network on the new tracking area.
13. Power off all existing cell(s).
14. Reconfigure the test setup (bring down PLMN Y1 completely and then bring up PLMN Y2) so that the DUT now finds service on a different PLMN with id equal to value Y2 where Y2 is not equal to Y1. PLMN Y2 shall not be a home PLMN. The frequency of the second PLMN shall be the same as the first.
15. Proceed as following:
 - If the DUT supports IMS Roaming, proceed to step 16.
 - If the DUT doesn't support IMS Roaming, proceed to step 21.
16. Verify that the DUT sends TRACKING AREA UPDATE REQUEST for PLMN Y2. Configure test equipment to reject the TRACKING AREA UPDATE REQUEST with EMM9.
17. Verify that the DUT initiates a new attach to PLMN Y2 with IMS PDN using PDN Type IPv6.
18. Verify that the UE sends a NAS PDN Connectivity Request message for the internet PDN using IP Type IPv4 to the LTE network, and that the network responds to the PDN Connectivity Request message from the UE by sending a PDN Connectivity Reject message with an ESM cause code of 8.
19. Verify that the UE sends a second NAS PDN Connectivity Request without delay at the request of the test application and that the network again responds with a NAS PDN Connectivity Reject message in which the ESM Cause Code is set to 8.

20. Monitor the DUT for 2 minutes and verify that it does not attempt to send a NAS PDN Connectivity Request to the LTE network. Skip to step 29.
21. Configure test equipment to reject the TRACKING AREA UPDATE REQUEST with EMM9, if DUT sends TRACK AREA REQUEST. The test equipment shall not consider it a failure if DUT doesn't initiate TRACK AREA UPDATE REQUEST.
22. Verify that the DUT attempts to attach to the new network and connect to the internet PDN using PDN Type IPv4. Configure test equipment responds with an Attach Reject message with EMM cause code 19 and a PDN Connectivity Reject message with ESM cause code 8.
23. Verify that the UE waits at least T₃₄₁₁ seconds before attempting to attach again. The next attempt is considered attempt #2.
24. Verify that the network again responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 19 and a NAS PDN Connectivity Reject message in which the ESM Cause Code is set to a value of 26.
25. Verify that the UE waits at least T₃₄₁₁ seconds before attempting to attach again. The next attempt is considered attempt #3.
26. Verify that the network again responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 19 and a NAS PDN Connectivity Reject message in which the ESM Cause Code is set to a value of 26.
27. Monitor the DUT and verify that it does not attempt to attach to the LTE network for at least T₃₄₀₂ minutes.
28. After T₃₄₀₂ expires, verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.
29. Re-configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X₁, PLMN id equal to value Y₁, and TAI equal to value Z₁.
30. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network.
31. Monitor the DUT for 2 minutes and verify that it does not attempt to send a NAS PDN Connectivity Request to the LTE network.
32. Power cycle the DUT.
33. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network.
34. Initiate the test application (see ***section TEST EQUIPMENT CONFIGURATION***). Configure the test application for the application transmitting state with the retransmission timer set to 8 seconds.
35. Verify that the UE sends a NAS PDN Connectivity Request message for the internet PDN to the LTE network.
36. Power the device off.
37. Repeat the test for ESM Cause Codes 29, 32, 33, and 112.

For Rel 12 and later UE

1. Configure the test equipment such that the network will allow the UE to attach to the LTE network but the network will send a NAS PDN Connectivity Reject message with cause code 8 including back off timer value set to 0 when the UE attempts to connect to the internet PDN. Configure the DUT so that, for the Internet PDN, the MAX_CONN parameter is set to 20 and the MAX_CONN_T parameter is set to 300 seconds.
2. Power the DUT on and allow it to find LTE service.
3. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network.
4. Initiate the test application (see *section TEST EQUIPMENT CONFIGURATION*). Configure the test application for the application transmitting state with the retransmission timer set to 8 seconds.
5. Re-configure the test equipment such that the network will send a NAS PDN Connectivity Reject message including back off timer value set to 0 with cause code 8 when the UE attempts to connect to the internet PDN.
6. Verify that the UE sends a NAS PDN Connectivity Request message for the internet PDN to the LTE network, and that the network responds to the PDN Connectivity Request message from the UE by sending a PDN Connectivity Reject message with an ESM cause code of 8.
7. Verify that the UE sends a second NAS PDN Connectivity Request without delay at the request of the test application and that the network again responds with a NAS PDN Connectivity Reject message including back off timer value 0 with ESM Cause Code is set to 8.
8. Re-configure the test equipment such that the network will send a NAS PDN Connectivity Reject message including back off timer value set to 2 min with cause code 8 when the UE attempts to connect to the internet PDN.
9. Verify that the UE sends a third NAS PDN Connectivity Request without delay at the request of the test application and that the network again responds with a NAS PDN Connectivity Reject message including back off timer value (2 min) with ESM Cause Code is set to 8.
10. Monitor the DUT for 2 minutes and verify that it does not attempt to send a NAS PDN Connectivity Request to the LTE network.
11. Re-configure the test equipment such that the network will send a NAS PDN Connectivity Reject message with cause code 8 where back off timer value is not present when the UE attempts to connect to the internet PDN.
12. Verify that the UE sends a fourth NAS PDN Connectivity Request once back off timer (2 min) expired at the request of the test application and that the network again responds with a NAS PDN Connectivity Reject message with ESM Cause Code is set to 8 where back off

timer value is not present.

13. Monitor DUT for 5 min and Verify that the DUT does not attempt to trigger INTERNET PDN to the LTE network.
14. Power off the device.
15. Power on the device and Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network.
16. Initiate the test application (see *section TEST EQUIPMENT CONFIGURATION*). Configure the test application for the application transmitting state with the retransmission timer set to 8 seconds.
17. Verify that the UE sends a NAS PDN Connectivity Request message for the internet PDN to the LTE network.
18. Repeat the test for ESM Cause Codes 29, 32, 33, and 112.

Expected Results

Expected Result

Release 11 and earlier UE

The UE ceases to send NAS PDN Connectivity Requests for a non-IMS PDN after receiving two consecutive NAS PDN Connectivity Reject messages with the same ESM cause code where the ESM Cause Code is 8, 27, 29, 32, 33, and 112 until the UE enters a new PLMN or is power cycled.

Release 12 and later UE

The UE ceases to send NAS PDN Connectivity Requests for a non-IMS PDN after NAS PDN Connectivity Reject messages with back off timer value is not present where the ESM Cause Code is 8, 27, 29, 32, 33, and 112 Until UE is power cycled.

6.9.1 _C8_IMSRoam UE Receives PDN Connectivity Reject Message From The
Network for Non-IMS PDN: Code 8 VZ_TC_DATARTRY_3606325

6.9.2 _C27_IMSRoam UE Receives PDN Connectivity Reject Message From The Network for Non-IMS PDN: Code 27 VZ_TC_DATARTRY_3606332

6.9.3 _C29_IMSRoam UE Receives PDN Connectivity Reject Message From The Network for Non-IMS PDN: Code 29 VZ_TC_DATARTRY_3606345

6.9.4 _C32_IMSRoam UE Receives PDN Connectivity Reject Message From The
Network for Non-IMS PDN: Code 32 VZ_TC_DATARTRY_3606352

6.9.5 _C33_IMSRoam UE Receives PDN Connectivity Reject Message From The
Network for Non-IMS PDN: Code 33 VZ_TC_DATARTRY_3606359

6.9.6 _C112_IMSRoam UE Receives PDN Connectivity Reject Message From The
Network for Non-IMS PDN: Code 112 VZ_TC_DATARTRY_3606360

6.9.7 _C8_NoIMSRm UE Receives PDN Connectivity Reject Message From The Network for Non-IMS PDN: Code 8 VZ_TC_DATARTRY_3606373

6.9.8 _C27_NoIMSRm UE Receives PDN Connectivity Reject Message From The
Network for Non-IMS PDN: Code 27 VZ_TC_DATARTRY_3606386

6.9.9 _C29_NoIMSRm UE Receives PDN Connectivity Reject Message From The
Network for Non-IMS PDN: Code 29 VZ_TC_DATARTRY_3606393

6.9.10 _C32_NoIMSRm UE Receives PDN Connectivity Reject Message From The
Network for Non-IMS PDN: Code 32 VZ_TC_DATARETRY_3606394

6.9.1.1 _C33_NoIMSRm UE Receives PDN Connectivity Reject Message From The
Network for Non-IMS PDN: Code 33 VZ_TC_DATARETRY_3606401

6.9.12 _C112_NoIMSRm UE Receives PDN Connectivity Reject Message From The
Network for Non-IMS PDN: Code 112 VZ_TC_DATARTRY_3606408

6.10 UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR IMS PDN CODES 8, 27, 29, 32, 33, AND 112 VZ_TC_DATARETRY_5371

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE receives a NAS PDN Connectivity Reject message while attempting to connect to the IMS PDN on the LTE network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE Data Retry, Section 4.5.1*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs, except CDMA-less voice-centric device, designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
Test Procedure
Release 11 and earlier UE
<ol style="list-style-type: none">1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1.2. Configure the test equipment such that the network will respond to attach attempts by sending a NAS Attach Reject message with an EMM Cause Code equal to 19. Configure the test equipment such that the network will respond to a piggybacked PDN connectivity request by sending a NAS PDN Connectivity Reject message with an ESM Cause Code equal to 8. Note that the T3396 Value IE is not included in the PDN Connectivity Reject message.

3. Verify that the DUT has an IMS application that will attempt to connect as soon as the DUT is powered on. Configure the DUT SIM such that both PLMN Y₁ and Y₄ are specified in the EF_EHPLMN file.
4. Power the DUT on and allow it to find LTE service.
5. Initiate the test application (see **section TEST EQUIPMENT CONFIGURATION**). Configure the test application for the application transmitting state.
6. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.
7. Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 19 and a NAS PDN Connectivity Reject message in which the ESM Cause Code is set to a value of 8.
8. Verify that the UE attempts to attach to the network using the Internet PDN within one minute.
9. Verify that the UE connects to the Internet PDN.
10. Verify that the UE sends a NAS PDN Connectivity Request message for the IMS PDN to the LTE network, and that the network responds to the PDN Connectivity Request message from the UE by sending a PDN Connectivity Reject message with an ESM cause code of 8.
11. Verify that the UE sends a second NAS PDN Connectivity Request without delay at the request of the IMS application and that the network again responds with a NAS PDN Connectivity Reject message in which the ESM Cause Code is set to 8.
12. Monitor the DUT for 2 minutes and verify that it does not attempt to send a NAS PDN Connectivity Request to the LTE network.
13. Reconfigure the test setup so that the DUT now finds service on a different PLMN with id equal to value Y₄ where Y₄ is not equal to Y₁. The frequency of the second PLMN shall be the same as the first. Configure the test equipment such that the new LTE network will allow the UE to attach and connect to the IMS PDN.
14. Verify that the DUT successfully establishes an RRC connection, sends a Tracking Area Update Request message to the new network, and connects to the IMS PDN.
15. Re-configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB₁) equal to value X₁, PLMN id equal to value Y₁, and TAI equal to value Z₁.
16. Power cycle the DUT.
17. Verify that the DUT successfully establishes an RRC connection, attaches to the network, and connects to the IMS PDN.
18. Power the device off.
19. Repeat the test for ESM Cause Codes 27, 29, 32, 33, and 112.

Release 12 and later UE

1. Configure the test equipment such that the network will respond to attach attempts by

- sending a NAS Attach Reject message with an EMM Cause Code equal to 19. Configure the test equipment such that the network will respond to a piggybacked PDN connectivity request by sending a NAS PDN Connectivity Reject message with an ESM Cause Code equal to 8 including back off timer value set to 0.
2. Verify that the DUT has an IMS application that will attempt to connect as soon as the DUT is powered on.
3. Power the DUT on and allow it to find LTE service.
4. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network.
5. Initiate the test application (see **section TEST EQUIPMENT CONFIGURATION**). Configure the test application for the application transmitting state.
6. Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 19 and a NAS PDN Connectivity Reject message in which the ESM Cause Code is set to a value of 8 with back off timer value set to 0.
7. Verify that the UE attempts to attach to the network using the Internet PDN within one minute.
8. Verify that the UE connects to the Internet PDN.
9. Verify that the UE sends a NAS PDN Connectivity Request message for the IMS PDN to the LTE network, and that the network responds to the PDN Connectivity Request message from the UE by sending a PDN Connectivity Reject message with an ESM cause code of 8 with back off timer set to 0.
10. Verify that the UE sends a NAS second PDN Connectivity Request without delay at the request of the IMS application and that the network again responds with a NAS PDN Connectivity Reject message including back off timer value 0 with ESM Cause Code is set to 8.
11. Re-configure the test equipment such that the network will send a NAS PDN Connectivity Reject message including back off timer value set to 2 min with cause code 8 when the UE attempts to connect to the IMS PDN.
12. Verify that the UE sends a third NAS PDN Connectivity Request without delay at the request of the test application and that the network again responds with a NAS PDN Connectivity Reject message including back off timer value (2 min) with ESM Cause Code is set to 8.
13. Monitor the DUT for 2 minutes and verify that it does not attempt to send a NAS PDN Connectivity Request to the LTE network.
14. Re-configure the test equipment such that the network will send a NAS PDN Connectivity Reject message with cause code 8 where back off timer value is not present when the UE attempts to connect to the IMS PDN.
15. Verify that the UE sends a fourth NAS PDN Connectivity Request after expiration of back off timer (2 min) at the request of the test application and that the network again responds

with a NAS PDN Connectivity Reject message with ESM Cause Code is set to 8 where back off timer value is not present.

16. Verify that the UE sends another NAS PDN Connectivity request for IMS PDN where network responds with a NAS PDN Connectivity Reject message with ESM Cause Code is set to 8 where back off timer value is not present.
17. Monitor DUT for 2 min and Verify that the DUT does not attempt to connect to IMS PDN.
18. Power off the device.
19. Power on the device and Verify that the DUT successfully establishes an RRC connection, attaches to the network, and connects to the IMS PDN.
20. Repeat the test for ESM Cause Codes 27, 29, 32, 33, and 112.

Expected Results

Expected Result

Release 11 and Earlier UE

The UE ceases to send NAS PDN Connectivity Requests for the IMS PDN after receiving two consecutive NAS PDN Connectivity Reject messages with the same ESM cause code where the ESM Cause Code is 8, 27, 29, 32, 33, and 112 until the UE enters a new PLMN or is power cycled.

Release 12 and later UE

The UE ceases to send NAS PDN Connectivity Requests for IMS PDN after NAS PDN Connectivity Reject messages with back off timer value is not present where the ESM Cause Code is 8, 27, 29, 32, 33, and 112 until the UE is power cycled.

6.10.1 _Code8 UE Receives PDN Connectivity Reject message from the Network for
IMS PDN: Code 8 VZ_TC_DATARTRY_3606979

6.10.2 _Code27 UE Receives PDN Connectivity Reject message from the Network for
IMS PDN: Code 27 VZ_TC_DATARTRY_3606986

6.10.3 _Code29 UE Receives PDN Connectivity Reject message from the Network for
IMS PDN: Code 29 VZ_TC_DATARTRY_3606987

6.10.4 _Code32 UE Receives PDN Connectivity Reject message from the Network for
IMS PDN: Code 32 VZ_TC_DATARTRY_3606994

6.10.5 _Code33 UE Receives PDN Connectivity Reject message from the Network for
IMS PDN: Code 33 VZ_TC_DATARTRY_3607001

6.10.6 _Code112 UE Receives PDN Connectivity Reject message from the Network
for IMS PDN: Code 112 VZ_TC_DATARETRY_3607002

6.1.1 NETWORK FAILS TO RESPOND TO PDN CONNECTIVITY REQUEST

VZ_TC_DATARTRY_5372

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the network fails to respond to a NAS PDN Connectivity Request message while attempting to connect to the Internet PDN on the LTE network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE Data Retry, Section 4-5.1*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
<p>Test Procedure</p> <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1. 2. Configure the test equipment such that the network will allow the UE to attach to the LTE network. Configure the test equipment such that the network sets the T3402 timer to 4 minutes in the Attach Accept message. 3. Verify that the device under test (DUT) has an IMS application that will attempt to connect to the IMS PDN as soon as the DUT is powered on and finds service on the LTE network. 4. Power the DUT on and allow it to find LTE service 5. Verify that the DUT sends an Attach Request and that the network responds with an Attach Accept with the T3402 timer set to 4 minutes. 6. Configure the test equipment such that the network sends a Detach Request to the DUT with "re-attach required" in the Detach Type IE. 7. Verify that the DUT detaches from the LTE network. 8. Configure the test equipment such that the network does not respond to the PDN Connectivity Request for the Internet PDN. Configure the DUT so that, for the Internet PDN, the MAX_CONN parameter is set to 2 and the MAX_CONN_T parameter is set to 300 seconds. 9. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network. 10. Initiate the test application (see section TEST EQUIPMENT CONFIGURATION) so that the UE needs to make a PDN connection request for the Internet PDN. 11. Verify that the UE sends a NAS PDN Connectivity Request and that the network does not respond to the NAS PDN Connectivity Request message. 12. Verify that the UE waits at least T3482 seconds before sending another NAS PDN Connectivity Request and that the network does not respond to the NAS PDN Connectivity Request message. 13. Verify that the UE makes three more NAS PDN Connectivity requests, each separated by at least T3482 seconds, and that the network does not respond to the NAS PDN Connectivity Request messages.

- I 4. Verify that the UE does not request the connection over the air for the next 1 minute plus a random time between 0 and 15 seconds.
- I 5. Once the 1+ minute timer expires, verify that the UE attempts to connect upon the next request of the test application with no delay. Verify that the UE sends another NAS PDN Connectivity Request and that the network does not respond to the NAS PDN Connectivity Request message.
- I 6. Verify that the UE waits at least T₃₄₈₂ seconds before sending another NAS PDN Connectivity Request and that the network does not respond to the NAS PDN Connectivity Request message.
- I 7. Verify that the UE makes three more NAS PDN Connectivity requests, each separated by at least T₃₄₈₂ seconds, and that the network does not respond to the NAS PDN Connectivity Request messages.
- I 8. Verify that the UE does not request the connection over the air for the next 2 minutes.
- I 9. Once the 2 minute timer expires, verify that the UE attempts to connect upon the next request of the test application with no delay. Verify that the UE sends another series of five NAS PDN Connectivity Requests, each separated by at least T₃₄₈₂ seconds, and that the network does not respond to the NAS PDN Connectivity Request messages.
20. Verify that the UE does not request the connection over the air for the next 8 minutes.
21. Once the 8 minute timer expires, verify that the UE attempts to connect upon the next request of the test application with no delay. Verify that the UE sends another series of five NAS PDN Connectivity Requests, each separated by at least T₃₄₈₂ seconds, and that the network does not respond to the NAS PDN Connectivity Request messages.
22. Verify that the UE does not request the connection over the air for the next 15 minutes.
23. Once the 15 minute timer expires, verify that the UE attempts to connect upon the next request of the test application with no delay. Verify that the UE sends another series of five NAS PDN Connectivity Requests, each separated by at least T₃₄₈₂ seconds, and that the network does not respond to the NAS PDN Connectivity Request messages.
24. Verify that the UE does not request the connection over the air for the next 15 minutes.
25. Power the device off.

Expected Results

Expected Behavior

The UE applies the throttling behavior as defined in *sections GENERIC THROTTLING ALGORITHM* and *Network Does Not Respond to the "PDN CONNECTIVITY REQUEST" message from the UE or the Network Responds with a "PDN CONNECTIVITY REJECT" message with no ESM Cause Code* of the Verizon Wireless LTE Data Retry Requirements.

6.1.2 NETWORK FAILS TO REFRESH THE IPV6 ADDRESS FOR THE IMS PDN, IPV4 ADDRESS ASSIGNED VZ_TC_DATARTRY_5373

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the network fails to refresh an IPv6 address to the UE.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE 3GPP Network Access, Section 4.1.8*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*
- IETF RFC 4861: *Neighbor Discovery for IP version 6 (IPv6)*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
Test Procedure <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1. 2. Configure the test equipment such that the network will allow the UE to attach and connect to the IMS PDN and the IMS PDN will respond to the UEs initial request for an IPv6 Router Solicitation message but will not respond to all subsequent requests. 3. Configure the test equipment so that the network will assign an IPv6 Interface ID and an IPv4 address when the device connects to the IMS PDN. 4. Verify that the DUT has an IMS application that will attempt to connect as soon as the DUT is powered on and an application that will connect to the Internet PDN. 5. Power the DUT on and allow it to find LTE service. 6. Verify that the DUT successfully establishes an RRC connection, attaches to the network, and connects to the IMS PDN. 7. Verify that the UE sends IPv6 Router Solicitation messages to the network and that the network responds. Configure the network so that the Router Advertisement message uses a "Valid Lifetime" of 5 minutes, a "Preferred Lifetime" of 5 minutes, and a "Router Lifetime" of 4 minutes. 8. Verify that the device sends a Router Solicitation message to the IMS PDN after between 3 and 4 minutes have elapsed from the receipt of the first Router Advertisement message. 9. Verify that the network does not respond to the Router Solicitation messages. Verify that the UE does not send more than MAX_RTR_SOLICITATION (3 per RFC 4861) Router Solicitation messages separated by RTR_SOLICITATION_INTERVAL (4) seconds. 10. Verify that the UE stays connected to the IMS PDN and uses the IPv4 address for all communication with the IMS PDN.
Expected Results

Expected Result

UE follows the required retry algorithm when the PDN does not refresh the IPv6 address of the IMS PDN.
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6.13 NETWORK FAILS TO ASSIGN AN IPV6 ADDRESS FOR THE IMS AND INTERNET PDNS ON NETWORK ATTACH, IPV4 ADDRESS ASSIGNED TO INTERNET VZ_TC_DATARTRY_5374

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the network fails to assign an IPv6 address to the UE.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements,
- Verizon Wireless LTE Data Retry Device Requirements, *Sections 3.6, 4.6.1, and 4.6.2*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*
- IETF RFC 4861: *Neighbor Discovery for IP version 6 (IPv6)*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
<p>Test Procedure</p> <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1. 2. Configure the test equipment such that the network will allow the UE to attach and connect to the IMS PDN but the network will not respond to the UEs IPv6 Router Solicitation messages for either the IMS or Internet PDNs. 3. Configure the test equipment so that the network will assign an IPv4 address when the device connects to the Internet PDN. 4. Verify that the DUT has an IMS application that will attempt to connect as soon as the DUT is powered on. 5. Power the DUT on and allow it to find LTE service. 6. Initiate the test application that can be configured to aggressively transmit data over the Internet PDN (see section TEST EQUIPMENT CONFIGURATION). 7. Verify that the DUT successfully establishes an RRC connection, attaches to the network, and connects to the IMS PDN. 8. Verify that the UE sends IPv6 Router Solicitation messages to the network for the IMS PDN and that the network does not respond. 9. Verify that the UE detaches from the LTE network then re-attaches using the Internet PDN. 10. Verify that the network assigns an IPv4 address to the device for the Internet PDN. 11. Verify that the UE sends IPv6 Router Solicitation messages to the network for the Internet PDN and that the network does not respond. 12. Verify that the device uses its IPv4 address for all communication with the Internet PDN. 13. Re-configure the network to respond to the UEs IPv6 Router Solicitation messages for the IMS PDN. 14. Power cycle the UE.

I 5. Verify that the UE successfully attaches to the LTE network and connects to the IMS PDN.

Expected Results

Expected Result

When the network does not assign an IPv6 address for the Internet PDN but assigns an IPv4 address, the UE uses the IPv4 address for all communication to the Internet PDN.

6.14 NETWORK FAILS TO ASSIGN AN IPV6 ADDRESS FOR THE INTERNET PDN ON NETWORK ATTACH, NO IPV4 ADDRESS ASSIGNED

VZ_TC_DATARTRY_5375

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the network fails to assign both an IPv6 address and IPv4 address to the UE for the Internet PDN.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements,
- Verizon Wireless LTE Data Retry Device Requirements, *Section 4.6.2*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*
- IETF RFC 4861: *Neighbor Discovery for IP version 6 (IPv6)*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
Test Procedure <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1. Configure the test equipment such that the network sets the T3402 timer to <u>14</u> minutes in the Attach Accept message. 2. Verify that the device under test (DUT) has an IMS application that will attempt to connect to the IMS PDN as soon as the DUT is powered on and finds service on the LTE network. 3. Power the DUT on and allow it to find LTE service 4. Verify that the DUT sends an Attach Request and that the network responds with an Attach Accept with the T3402 timer set to <u>14</u> minutes. 5. Configure the test equipment such that the network sends a Detach Request to the DUT with "re-attach required" in the Detach Type IE. 6. Verify that the DUT detaches from the LTE network. 7. Configure the test equipment such that the network will allow the UE to attach and connect

- to the IMS PDN but the network will not respond to the UEs IPv6 Router Solicitation messages for either the IMS or Internet PDNs.
8. Verify that the DUT successfully establishes an RRC connection, attaches to the network, and connects to the IMS PDN.
 9. Verify that the UE sends IPv6 Router Solicitation messages to the network for the IMS PDN and that the network does not respond.
 10. Verify that the UE detaches from the LTE network then attempts to re-attach using the Internet PDN.
 11. Verify that the UE sends IPv6 Router Solicitation messages to the network for the Internet PDN and that the network does not respond.
 12. Verify that the UE detaches from the LTE network. and starts timer T₃₄₀₂.
 13. Monitor the UE for 8 minutes and verify that the UE does not initiate attachment attempts before T₃₄₀₂ expires.
 14. While T₃₄₀₂ is running, re-configure the network to respond to the UE's IPv6 Router Solicitation messages on the IMS PDN.
 15. Upon expiry of timer T₃₄₀₂, verify that the UE re-attaches to the network and connects to the IMS PDN.
 16. Re-configure the network so that the UE finds service on an eNodeB with a PLMN id equal to Y₄ where Y₄ is not equal to Y₁. The frequency of the second PLMN shall be the same as the first. Configure the network to respond to the UEs IPv6 Router Solicitation messages for the IMS PDN.
 17. Verify that the DUT sends a NAS Tracking Area Update Request for PLMN Y₄ and connects to the IMS PDN.

Expected Results

Expected Result

When the network does not assign an IPv6 address for the IMS PDN, the UE detaches from the LTE network, then re-attaches and connects to the Internet PDN. When the network does not assign an IPv6 address for the Internet PDN, the UE detaches from the LTE network and starts timer T₃₄₀₂. Upon expiry of timer T₃₄₀₂, the UE attempts to re-attach and connect to the IMS PDN.

6.15 NETWORK FAILS TO INCLUDE IMS P-CSCF ADDRESS IN ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST MESSAGE FOR THE IMS PDN, INITIAL VZ_TC_DATARTRY_5376

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the network fails to include IMS P-CSCF address(es) in the Activate Default EPS Bearer Context Request message for the IMS PDN during an LTE network attach procedure.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE 3GPP Network Access*, Section 4.1.8
- Verizon Wireless LTE Data Retry Device Requirements, Section 4.7
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS)*; Stage 3
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
Test Procedure <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1. 2. Configure the test equipment such that the network will respond to attach attempts by sending a NAS Activate Default EPS Bearer Context Request message without IMS P-CSCF address(es) specified. 3. Verify that the DUT has an IMS application that will attempt to connect as soon as the DUT is powered on. 4. Power the DUT on and allow it to find LTE service. 5. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request/PDN Connectivity Request message, and that the PDN Connectivity Request message includes a request for the IMS P-CSCF address in the PCO information element. 6. Verify that the network responds with a NAS Attach Accept/Activate Default EPS Bearer Context Request message, and that the network fails to include the IMS P-CSCF address(es) in the PCO information element of the Activate Default EPS Bearer Context Request message. 7. Verify that the DUT responds with a NAS Attach Complete/Activate Default EPS Bearer Context Accept message. 8. Verify that the DUT immediately initiates a successful DETACH procedure. 9. Verify that the DUT immediately re-attaches to the LTE network using the Internet PDN. 10. Re-configure the network so that the network includes the IMS P-CSCF address in the NAS Activate Default EPS Bearer Context Request message for the IMS PDN.. 11. Verify that the UE sends a PDN Connectivity Request for the IMS PDN and successfully connects to the IMS PDN.

Expected Results
<p>Expected Result</p> <p>When the network fails to include IMS P-CSCF address(es) in the Activate Default EPS Bearer Context Request message for the IMS PDN during an LTE network attach procedure, the UE detaches from the LTE network and re-attaches using the Internet PDN.</p>

6.16 NETWORK FAILS TO INCLUDE IMS P-CSCF ADDRESS IN ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST MESSAGE DURING AN IMS PDN CONNEC

VZ_TC_DATA_RETRY_5377

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the network fails to include IMS P-CSCF address(es) in the Activate Default EPS Bearer Context Request message for the IMS PDN during an IMS PDN connection attempt that is not part of the LTE network attach procedure.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE 3GPP Network Access, Section 4.1.8*
- Verizon Wireless LTE Data Retry Device Requirements, *Section 4.7*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs, except CDMA-less voice-centric device, designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
Test Procedure <ol style="list-style-type: none">1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1.2. Configure the test equipment such that the network will allow the DUT to attach and connect to PDNs.3. Verify that the DUT has an IMS application that will attempt to connect as soon as the DUT is powered on.4. Power the DUT on and allow it to find LTE service.5. Initiate the test application (see section TEST EQUIPMENT CONFIGURATION) and configure it for the application transmitting state.6. Verify that the DUT successfully establishes an RRC connection, attaches to the network, and connects to the IMS PDN.7. Re-configure the test equipment to send a NAS "Deactivate EPS Bearer Context Request" message to disconnect the IMS PDN.8. Verify that the DUT disconnects from the IMS PDN.

9. Re-configure the test equipment such that the network will respond to IMS PDN connection attempts by sending a NAS Activate Default EPS Bearer Context Request message without IMS P-CSCF address(es) specified.
10. Verify that the UE immediately attempts to re-connect to the IMS PDN.
11. Verify that the PDN Connectivity Request message includes a request for the IMS P-CSCF address in the PCO information element.
12. Verify that the network responds with a NAS Activate Default EPS Bearer Context Request message, and that the network fails to include the IMS P-CSCF address(es) in the PCO information element of the Activate Default EPS Bearer Context Request message.
13. Verify that the DUT responds with a NAS Activate Default EPS Bearer Context Accept message.
14. Verify that the DUT immediately disconnects from the IMS PDN.
15. Verify that the device attempts to connect to the IMS PDN within one minute. Verify that the network responds with a NAS Activate Default EPS Bearer Context Request message without IMS P-CSCF address(es) specified.
16. Verify that the DUT responds with a NAS Activate Default EPS Bearer Context Accept message.
17. Verify that the UE disconnects from the IMS PDN.
18. Verify that the device attempts to connect to the IMS PDN within one minute. Verify that the network responds with a NAS Activate Default EPS Bearer Context Request message without IMS P-CSCF address(es) specified.
19. Verify that the DUT responds with a NAS Activate Default EPS Bearer Context Accept message.
20. Verify that the UE disconnects from the IMS PDN.
21. Verify that the DUT does not request the IMS PDN connection over the air for the next 1 minute plus a random time between 0 and 15 seconds.
22. Once the 1+ minute timer expires, verify that the DUT attempts to connect to the IMS PDN and that the network responds with a NAS Activate Default EPS Bearer Context Request message without IMS P-CSCF address(es) specified.
23. Verify that the DUT responds with a NAS Activate Default EPS Bearer Context Accept message.
24. Verify that the DUT immediately disconnects from the IMS PDN.
25. Verify that the DUT does not request the connection over the air for the next 2 minutes.
26. Once the 2 minute timer expires, verify that the DUT attempts to connect to the IMS PDN and that the network responds with a NAS Activate Default EPS Bearer Context Request message without IMS P-CSCF address(es) specified.
27. Verify that the DUT responds with a NAS Activate Default EPS Bearer Context Accept message.
28. Verify that the DUT immediately disconnects from the IMS PDN.
29. Verify that the DUT does not request the connection over the air for the next 8 minutes.
30. Once the 8 minute timer expires, verify that the DUT attempts to connect to the IMS PDN and that the network responds with a NAS Activate Default EPS Bearer Context Request message without IMS P-CSCF address(es) specified.
31. Verify that the DUT responds with a NAS Activate Default EPS Bearer Context Accept message.
32. Verify that the DUT immediately disconnects from the IMS PDN.
33. Verify that the DUT does not request the connection over the air for the next 15 minutes.
34. Once the 15 minute timer expires, verify that the DUT attempts to connect to the IMS PDN and that the network responds with a NAS Activate Default EPS Bearer Context Request message without IMS P-CSCF address(es) specified.
35. Verify that the DUT responds with a NAS Activate Default EPS Bearer Context Accept message.
36. Verify that the DUT immediately disconnects from the IMS PDN.
37. Verify that the UE does not request the connection over the air for the next 15 minutes.
38. While the fifteen minute throttling timer continues to run, re-configure the test equipment such that the network will respond to IMS PDN connection attempts by sending a NAS Activate Default EPS Bearer Context Request message with IMS P-CSCF address(es) included.
39. Verify that the DUT successfully connects to the IMS PDN.
40. Power the device off.

Expected Results

Expected Result

When the network fails to include IMS P-CSCF address(es) in the Activate Default EPS Bearer Context Request message for the IMS PDN during a

PDN connectivity request procedure, the UE disconnects from the PDN then applies the throttling behavior as defined in *sections GENERIC THROTTLING ALGORITHM* and *Situation: Network fails to Include the IMS P-CSCF Address(es) in the "Activate Default EPS Bearer Context Request" message for the IMS PDN* of the Verizon Wireless LTE Data Retry Requirements.

6.17 UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR ADMIN PDN CODE 33 VZ_TC_DATARETRY_5379

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE receives a NAS PDN Connectivity Reject message while attempting to connect to the Admin PDN on the LTE network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE Data Retry, Section 4.5.1*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
Test Procedure
Release 11 and earlier UE <ol style="list-style-type: none">1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1.2. Configure the test equipment such that the network will allow the UE to attach to the LTE network but the network will send a NAS PDN Connectivity Reject message with cause code 33 when the UE attempts to connect to the Admin PDN.3. Insert a warm, preactivated SIM into the DUT, then power the DUT on and allow it to find LTE service.4. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network. After attach completed, initiate the test application (see <i>section TEST EQUIPMENT CONFIGURATION</i>) and verify that it connects successfully to the internet PDN.5. Verify that the UE sends a NAS PDN Connectivity Request message for the Admin PDN to the LTE network, and that the network responds to the PDN Connectivity Request message from the UE by sending a PDN Connectivity Reject message with an ESM cause code of 33.

6. Verify that the UE sends a second NAS PDN Connectivity Request without delay and that the network again responds with a NAS PDN Connectivity Reject message in which the ESM Cause Code is set to 33.
7. Monitor the DUT for 2 minutes and verify that it does not attempt to send a NAS PDN Connectivity Request to the LTE network.
8. Reconfigure the test setup so that the DUT now finds service on a different eNodeB with cell_id equal to value X2 where X2 is not equal to X1. X1 and X2 are on the same frequency. The PLMN id is still equal to Y1.
9. Verify that the DUT does not attempt to send a NAS PDN Connectivity Request to the LTE network on the new eNodeB.
10. Reconfigure the test setup so that the DUT now finds service on a different Tracking Area with id equal to value Z2 where Z2 is not equal to Z1. Note that only the TAC portion of the TAI will be different. The PLMN id is still equal to Y1.
11. Verify that the DUT does not attempt to send a NAS PDN Connectivity Request to the LTE network on the new tracking area.
12. Reconfigure the test setup (bring down PLMN Y1 completely and then bring up PLMN Y2) so that the DUT now finds service on a different PLMN with id equal to value Y2 where Y2 is not equal to Y1. PLMN Y2 shall not be a home PLMN. The frequency of the second PLMN shall be the same as the first. Configure the test equipment as follows:
 - Configure the test equipment such that the new LTE network will allow the UE to attach but the network will send a NAS PDN Connectivity Reject message with cause code 33 when the UE attempts to connect to the Admin PDN.
13. Verify that the DUT sends TRACKING AREA UPDATE REQUEST for PLMN Y2. Configure test equipment to reject the TRACKING AREA UPDATE REQUEST with EMM9.
14. Verify DUT successfully establishes an RRC connection and attaches to the new network.
 - If the UE supports IMS roaming, verify that the UE connects to the IMS PDN using PDN Type IPv6.
 - If the UE does not support IMS roaming, verify the the UE connects to the Internet PDN using PDN Type IPv4.
14. Verify that the UE sends a NAS PDN Connectivity Request message for the Admin PDN using PDN Type IPv4 to the LTE network, and that the network responds to the PDN Connectivity Request message from the UE by sending a PDN Connectivity Reject message with an ESM cause code of 33.
15. Verify that the UE sends a second NAS PDN Connectivity Request without delay and that the network again responds with a NAS PDN Connectivity Reject message in which the ESM Cause Code is set to 33.
16. Monitor the DUT for 2 minutes and verify that it does not attempt to send a NAS PDN Connectivity Request to the LTE network.
17. Re-configure the test setup so that the device under test (DUT) finds service on a single

eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1.

18. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network.
19. Monitor the DUT for 2 minutes and verify that it does not attempt to send a NAS PDN Connectivity Request to the LTE network.
20. Power cycle the DUT.
21. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network.
22. Verify that the UE sends a NAS PDN Connectivity Request message for the Admin PDN to the LTE network.
23. Power the device off.

Release 12 and later UE

1. Configure the test equipment such that the network will allow the UE to attach to the LTE network but the network will send a NAS PDN Connectivity Reject message with cause code 33 including back off timer value set to 0 when the UE attempts to connect to the Admin PDN.
2. Insert a warm, preactivated SIM into the DUT, then power the DUT on and allow it to find LTE service.
3. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network.
4. Verify that the UE sends a NAS PDN Connectivity Request message for the Admin PDN to the LTE network, and that the network responds to the PDN Connectivity Request message from the UE by sending a PDN Connectivity Reject message with an ESM cause code of 33 including back off timer value set to 0.
5. Verify that the UE sends a second NAS PDN Connectivity Request without delay and that the network again responds with a NAS PDN Connectivity Reject message in which the ESM Cause Code is set to 33 and back off timer value set to 0.
6. Re-configure the test equipment such that the network will send a NAS PDN Connectivity Reject message including back off timer value set to 2 min with cause code 33 when the UE attempts to connect to the Admin PDN.
7. Verify that the UE sends a third NAS PDN Connectivity Request without delay at the request of the test application and that the network again responds with a NAS PDN Connectivity Reject message including back off timer value (2 min) with ESM Cause Code is set to 33.
8. Monitor the DUT for 2 minutes and verify that it does not attempt to send a NAS PDN Connectivity Request to the LTE network.
9. Re-configure the test equipment such that the network will send a NAS PDN Connectivity

Reject message with ESM cause code 33 where back off timer value is not present when the UE attempts to connect to the Admin PDN.

10. Verify that the UE sends a fourth NAS PDN Connectivity Request after expiration of back off timer (2 min) and that the network again responds with a NAS PDN Connectivity Reject message with ESM Cause Code is set to 33 where back off timer value is not present.
11. Monitor DUT for 5 min and verify that the DUT does not attempt to connect to ADMIN PDN.
12. Power off the device.
13. Power on the device and Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network.
14. Verify that the UE sends a NAS PDN Connectivity Request message for the Admin PDN to the LTE network.

Expected Results

Expected Result

Release 11 and Earlier UE

The UE ceases to send NAS PDN Connectivity Requests for the Admin PDN after receiving two consecutive NAS PDN Connectivity Reject messages with an ESM cause code of 33 until the UE enters a new PLMN or is power cycled.

Release 12 and later UE

The UE ceases to send NAS PDN Connectivity Requests for ADMIN PDN after NAS PDN Connectivity Reject messages with back off timer value is not present where the ESM Cause Code is 8, 27, 29, 32, 33, and 112 Until UE is power cycled.

6.17.1 _IMSRoam UE Receives PDN Connectivity Reject message from the Network
for ADMIN PDN: Code 33 VZ_TC_DATARTRY_3606433

6.17.2 _NoIMSRoam UE Receives PDN Connectivity Reject message from the
Network for ADMIN PDN: Code 33 VZ_TC_DATARETRY_3606434

6.18 UE MAKES EXCESSIVE PDN CONNECTIVITY REQUESTS

VZ_TC_DATARTRY_5380

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE makes excessive NAS PDN Connectivity Requests to the Internet PDN on the LTE network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements,
- Verizon Wireless LTE Data Retry Device Requirements, *Section 4.5.2.4*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
<p>Test Procedure--Test Case 1</p> <p>NOTE: This test shall be executed with the device in tethered mode with the AT command interface active.</p> <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1. Configure the DUT so that, for the Internet PDN, the MAX_CONN parameter is set to 2, the MAX_CONN_T parameter is set to 300 seconds, and the WAIT_TIME parameter is set to 60 seconds. 2. Configure the test equipment such that the network will allow the UE to attach to the LTE

- network and connect to the Internet PDN.
3. Power the DUT on and allow it to find LTE service.
4. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network.
5. Send the AT test command to define a PDP context (+CGACT) on the DUT for the Internet PDN.
6. Verify that the UE sends a NAS PDN Connectivity Request and successfully connects to the Internet PDN.
7. Send the AT test command to deactivate the PDP context (+CGACT) on the DUT for the Internet PDN.
8. Verify that the UE disconnects from the Internet PDN.
9. Wait one minute, then send the AT test command to define a PDP context (+CGACT) on the DUT for the Internet PDN.
10. Verify that the UE sends a second NAS PDN Connectivity Request and successfully re-connects to the Internet PDN.
11. Send the AT test command to deactivate the PDP context (+CGACT) on the DUT for the Internet PDN.
12. Verify that the UE disconnects from the Internet PDN.
13. At one minute intervals, send the AT test command to define a PDP context (+CGACT) on the DUT for the Internet PDN.
14. Verify that the UE waits at least 15 minutes before sending another NAS PDN Connectivity Request for the Internet PDN.
15. Reconfigure the DUT so that the WAIT_TIME parameter is set to 180 seconds.
16. Verify the UE successfully connects to the Internet PDN.
17. Send the AT test command to deactivate the PDP context (+CGACT) on the DUT for the Internet PDN.
18. Verify that the UE disconnects from the Internet PDN.
19. At 30 second intervals, send the AT test command to define a PDP context (+CGACT) on the DUT for the Internet PDN.
20. Verify that the UE waits at least 3 minutes before sending another NAS PDN Connectivity Request for the Internet PDN.
21. Verify the UE successfully connects to the Internet PDN.
22. Send the AT test command to deactivate the PDP context (+CGACT) on the DUT for the Internet PDN.
23. Verify that the UE disconnects from the Internet PDN.
24. At one minute intervals, send the AT test command to define a PDP context (+CGACT) on the DUT for the Internet PDN.
25. Verify that the UE waits at least 3 minutes before sending another NAS PDN Connectivity Request for the Internet PDN.

26. Reconfigure the DUT so that the WAIT_TIME parameter is set to 30 seconds.
27. Verify the UE successfully connects to the Internet PDN.
28. Send the AT test command to deactivate the PDP context (+CGACT) on the DUT for the Internet PDN.
29. Verify that the UE disconnects from the Internet PDN.
30. At 15 second intervals, send the AT test command to define a PDP context (+CGACT) on the DUT for the Internet PDN.
31. Verify that the UE waits at least 30 seconds before sending another NAS PDN Connectivity Request for the Internet PDN.
32. Reconfigure the DUT so that the WAIT_TIME parameter is set to 15 min.
33. Verify the UE successfully connects to the Internet PDN.
34. Send the AT test command to deactivate the PDP context (+CGACT) on the DUT for the Internet PDN.
35. Verify that the UE disconnects from the Internet PDN.
36. At one minute intervals, send the AT test command to define a PDP context (+CGACT) on the DUT for the Internet PDN.
37. Verify that the UE waits at least 15 minutes before sending another NAS PDN Connectivity Request for the Internet PDN.
38. While the 15 minute timer is running, re-configure the network so that the UE finds service on an eNodeB with a PLMN id equal to Y₄ where Y₄ is not equal to Y₁. The frequency of the second PLMN shall be the same as the first.
39. Verify that the UE waits until the 15 minute timer has expired before sending another NAS PDN Connectivity Request for the Internet PDN.
40. Verify the UE successfully connects to the Internet PDN.
41. Send the AT test command to deactivate the PDP context (+CGACT) on the DUT for the Internet PDN.
42. Verify that the UE disconnects from the Internet PDN.
43. Verify that the UE waits at least 15 minutes before sending another NAS PDN Connectivity Request for the Internet PDN.
44. After 10 minutes of the 15 minute timer have elapsed, power off the UE for 5 minutes.
45. After 5 minutes have elapsed, power on the UE.
46. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network.
47. Send the AT test command to define a PDP context (+CGACT) on the DUT for the Internet PDN.
48. Verify that the UE sends a NAS PDN Connectivity Request within 5 minutes and successfully connects to the Internet PDN.
49. Send the AT test command to deactivate the PDP context (+CGACT) on the DUT for the Internet PDN.

50. Verify that the UE disconnects from the Internet PDN.
51. Wait one minute, then send the AT test command to define a PDP context (+CGACT) on the DUT for the Internet PDN.
52. Verify that the UE wait at least 15 minutes before sending a second NAS PDN Connectivity Request for the internet PDN.
53. Verify that the UE successfully re-connects to the Internet PDN.
54. Send the AT test command to deactivate the PDP context (+CGACT) on the DUT for the Internet PDN.
55. Verify that the UE disconnects from the Internet PDN.
56. Power the device off.

Expected Results

Expected Result

The UE applies the throttling behavior as defined in *section UE Makes Excessive PDN Connection Requests to the Network* of the Verizon Wireless LTE Data Retry Requirements.

6.18.1 Test 1 UE Makes Excessive PDN Connectivity Requests VZ_TC_DATARETRY_3606436

6.18.2 Test2 UE Makes Excessive PDN Connectivity Requests VZ_TC_DATARTRY_3606437

6.18.3 Test2 UE Makes Excessive PDN Connectivity Requests VZ_TC_DATARTRY_3607010

6.19 UE MAKES ATTACH REQUEST WHILE THROTTLING ON PDN

VZ_TC_DATARETRY_5388

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE receives a NAS Detach Request message with re-attach required while throttling connection attempts to the IMS PDN on the LTE network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements,
- Verizon Wireless Device Requirements LTE Data Retry, *Section 4.5.2.3*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs, except CDMA-less voice-centric device, designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
<p>Test Procedure</p> <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1. 2. Configure the test equipment to allow the device to attach and connect to all PDNs. 3. Verify that the DUT has an IMS application that will attempt to connect as soon as the DUT is powered on. 4. Power the DUT on and allow it to find LTE service. 5. Verify that the DUT successfully establishes an RRC connection, attaches to the network, and connects to the IMS PDN. 6. Initiate the test application (see section TEST EQUIPMENT CONFIGURATION) and verify that it connects successfully to the internet PDN. Configure the test application for the application idle state. 7. Allow the RRC connection to go idle. 8. Configure the test equipment to send a NAS "Deactivate EPS Bearer Context Request" message to disconnect the IMS PDN. 9. Verify that the UE disconnects from the IMS PDN. 10. Configure the test equipment such that the network will send a NAS PDN Connectivity Reject message with cause code 26 when the UE attempts to connect to the IMS PDN. Note that the T3396 Value IE is not included in the PDN Connectivity Reject message. 11. Verify that the UE immediately attempts to re-connect to the IMS PDN by sending a NAS PDN Connectivity Request message. 12. Verify that the network sends a NAS PDN Connectivity Reject message with cause code 26 when the UE attempts to connect to the IMS PDN.

- I 3. Verify that the UE immediately attempts to re-connect to the IMS PDN by sending a NAS PDN Connectivity Request message and that the network responds with a NAS PDN Connectivity Reject message with cause code 26.
- I 4. Verify that the UE immediately attempts a third time to connect to the IMS PDN by sending a NAS PDN Connectivity Request message and that the network responds with a NAS PDN Connectivity Reject message with cause code 26.
- I 5. Verify that the UE does not attempt a NAS PDN Connectivity Request for the IMS PDN for the next 1 minute plus a random time between 0 and 15 seconds.
- I 6. Once the 1+ minute timer expires, verify that the UE sends another NAS PDN Connectivity Request and that the network responds with a NAS PDN Connectivity Reject message with cause code 26.
- I 7. Verify that the UE does not attempt a NAS PDN Connectivity Request for the IMS PDN for the next 2 minutes.
- I 8. Once the 2 minute timer expires, verify that the UE sends another NAS PDN Connectivity Request and that the network responds with a NAS PDN Connectivity Reject message with cause code 26.
- I 9. Verify that the UE does not attempt a NAS PDN Connectivity Request for the IMS PDN for the next 8 minutes.
20. While the 8 minute timer is running, re-configure the test equipment to send a NAS Detach Request with "re-attach required." Configure the test equipment to accept connection requests to the IMS PDN.
21. Verify that the UE immediately attempts to attach to the LTE network and connect to the IMS PDN.
22. Verify that the UE successfully attaches to the LTE network and connects to the IMS PDN.

Expected Results

Expected Result

UE follows the data retry algorithm described in the document "Verizon Wireless LTE Data Retry" when it receives a NAS Detach Request message with "re-attach required" while throttling connection attempts for the IMS PDN.

6.2.1 UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR NON-IMS PDN CODES 26 AND 27 WITH T₃₃₉₆ TIMER SET VZ_TC_DATARETRY_5391

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE receives a NAS PDN Connectivity Reject message while attempting to connect to a PDN on the LTE network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements,
- Verizon Wireless LTE Data Retry Device Requirements, *Section 4.5.2.1.2*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
<p>Test Procedure</p> <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X₁, PLMN id equal to value Y₁, and TAI equal to value Z₁. 2. Configure the test equipment such that the network will allow the UE to attach to the LTE network but the network will send a NAS PDN Connectivity Reject message with cause code 26 and the T₃₃₉₆ Value IE set to a base value of 1 minute with increments of 10 minutes when the UE attempts to connect to the internet PDN. 3. Power the DUT on and allow it to find LTE service. 4. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network. 5. Initiate the test application (see section TEST EQUIPMENT CONFIGURATION). Configure the test application for the application transmitting state with the retransmission timer set to 8 seconds. 6. Verify that the UE sends a NAS PDN Connectivity Request message for the internet PDN, and that the network responds by sending a PDN Connectivity Reject message with an ESM

cause code of 26 and a T₃₃₉₆ Value IE set to a base value of 1 minute with increments of 10 minutes.

7. Verify that the UE waits 10 minutes before issuing another NAS PDN Connectivity Request for the Internet PDN and that the network responds with a PDN Connectivity Reject message.
8. Verify that the UE does not re-issue a NAS PDN Connectivity Request in PLMN Y₁ for at least 10 minutes while the T₃₃₉₆ timer is running.
9. While the T₃₃₉₆ timer is running, re-configure the network so that the UE finds service on an eNodeB with a PLMN id equal to Y₄ where Y₄ is not equal to Y₁. The frequency of the second PLMN shall be the same as the first. T₃₃₉₆ shall not be running in this second PLMN.
10. Verify that the UE successfully attaches to the LTE network and that the UE issues a PDN Connectivity Request for the Internet PDN upon request of the test application .
11. While the T₃₃₉₆ timer is running, re-configure the test setup so that the DUT again finds service on PLMN Y₁.
12. Verify that the UE successfully attaches to the LTE network but that the UE waits until the 10 minute T₃₃₉₆ timer expires before issuing a PDN Connectivity Request for the Internet PDN.
13. Verify that the network responds with a PDN Connectivity Reject message.
14. While the T₃₃₉₆ timer is running, power cycle the UE.
15. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network.
16. Initiate the test application (see **section TEST EQUIPMENT CONFIGURATION**).
Configure the test application for the application transmitting state with the retransmission timer set to 8 seconds.
17. Verify that the UE exhibits the correct behavior, according to cause code:
 - For ESM cause code 26, the UE waits for the T₃₃₉₆ timer to expire before issuing a PDN Connectivity Request for the Internet PDN.
 - For ESM cause code 27, the UE issues a PDN Connectivity Request for the Internet PDN without waiting for the T₃₃₉₆ timer to expire.
18. Power the device off.
19. Repeat the test for ESM Cause Code 27.

Expected Results

Expected Result

After receiving a NAS PDN Connectivity Reject message with the T₃₃₉₆ Value IE set, the UE ceases to send NAS PDN Connectivity Requests for a non-IMS PDN for T₃₃₉₆ minutes unless the UE enters a new PLMN or, for cause code 27, is power cycled.

6.21.1 _Code26 UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE
FROM THE NETWORK FOR NON-IMS PDN: CODE 26 WITH T₃₃₉₆ TIMER
SET VZ_TC_DATARETRY_3606439

6.21.2 -Code27 UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE
FROM THE NETWORK FOR NON-IMS PDN: CODE 27 WITH T₃₃₉₆ TIMER
SET VZ_TC_DATARETRY_3606451

6.2.2 IOT UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR IMS PDN CODES 8, 27, 29, 32, AND 33

VZ_TC_DATARETRY_1494145

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE receives a NAS PDN Connectivity Reject message while attempting to connect to the IMS PDN on the LTE network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements,
- Verizon Wireless *Device Requirements LTE Data Retry, Section 4.5.2.1.2.12*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all IoT UEs that cannot be power cycled and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
Test Procedure <ol style="list-style-type: none">1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1.2. Configure the test equipment such that the network will respond to attach attempts by sending a NAS Attach Reject message with an EMM Cause Code equal to 19. Configure the test equipment such that the network will respond to a piggybacked PDN connectivity

- request by sending a NAS PDN Connectivity Reject message with an ESM Cause Code equal to 8. Note that the T₃₃₉₆ Value IE is not included in the PDN Connectivity Reject message.
3. Verify that the DUT has an IMS application that will attempt to connect as soon as the DUT is powered on. Configure the DUT SIM such that both PLMN Y₁ and Y₄ are specified in the EF_EHPLMN file. Use the lab application to set the value of TPDN_Reject_IoT on the DUT to 1 hour.
 4. Power the DUT on and allow it to find LTE service.
 5. Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.
 6. Verify that the network responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 19 and a NAS PDN Connectivity Reject message in which the ESM Cause Code is set to a value of 8.
 7. Verify that the UE sends a second NAS Attach Request using VZWINTERNET without delay and that the network again responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 19 and a NAS PDN Connectivity Reject message in which the ESM Cause Code is set to a value of 8.
 8. Verify that the UE sends a third NAS Attach Request using VZWINTERNET and that the network again responds with a NAS Attach Reject message in which the EMM Cause Code is set to a value of 19 and a NAS PDN Connectivity Reject message in which the ESM Cause Code is set to a value of 8.
 9. Monitor the DUT for 15 minutes and verify that it does not attempt to attach to the LTE network.
 10. While the 1 hour TPDN_Reject_IoT timer is running, reconfigure the test setup so that the DUT now finds service on a different PLMN with id equal to value Y₄ where Y₄ is not equal to Y₁. The frequency of the second PLMN shall be the same as the first. Configure the test equipment such that the new LTE network will allow the UE to attach and connect to the IMS PDN.
 11. Verify that the DUT successfully establishes an RRC connection, sends a Attach Request message to the new network, and connects to the IMS PDN.
 12. Turn off the test script, and keep the test script off for 35 minutes. Keep the DUT powered on.
 13. After 35 minutes have elapsed, resume the test script.
 14. Re-configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB₁) equal to value X₁, PLMN id equal to value Y₁, and TAI equal to value Z₁.
 15. Monitor the device for 10 minutes and verify that it does not attempt to attach on PLMN Y₁. (At this point, the device shall have refrained from attaching to PLMN Y₁ for 1 hour since the last NAS Attach Reject message.)

16. Once the 1 hour TPDN_Reject_IoT timer expires, verify that the DUT successfully establishes an RRC connection, attaches to the network, and connects to the IMS PDN.
17. Power the device off.
18. Repeat the test for ESM Cause Codes 27, 29, 32, and 33.

Expected Results

The UE ceases to send NAS PDN Connectivity Requests for the IMS PDN after receiving three consecutive NAS PDN Connectivity Reject messages with the same ESM cause code where the ESM Cause Code is 8, 27, 29, 32, and 33 until the UE enters a new PLMN or timer TPDN_Reject_IoT expires.

6.22.1 _Code8 IOT UE RECEIVES PDN CONNECTIVITY REJECT FROM THE NETWORK FOR INTERNET PDN CODE 8

VZ_TC_DATARTRY_3607074

6.22.2 _Code27 IOT UE RECEIVES PDN CONNECTIVITY REJECT FROM THE NETWORK FOR INTERNET PDN CODE 27

VZ_TC_DATARTRY_3607075

6.22.3 _Code29 IOT UE RECEIVES PDN CONNECTIVITY REJECT FROM THE NETWORK FOR INTERNET PDN CODE 29

VZ_TC_DATARTRY_3607082

6.22.4 _Code32 IOT UE RECEIVES PDN CONNECTIVITY REJECT FROM THE NETWORK FOR INTERNET PDN CODE 32 VZ_TC_DATARTRY_3607083

6.22.5 _Code33 IOT UE RECEIVES PDN CONNECTIVITY REJECT FROM THE NETWORK FOR INTERNET PDN CODE 33

VZ_TC_DATARTRY_3607084

7.1 UE RECEIVES DEACTIVATE EPS BEARER CONTEXT REQUEST MESSAGE FROM THE NETWORK 2 PDN CONNECTIONS OPEN

VZ_TC_DATARTRY_5369

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE receives a NAS Deactivate EPS Bearer Context Request message while connected to both the IMS and Internet PDNs on the LTE network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE 3GPP Network Access*, Section 4.1.4.1
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS)*; Stage 3
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
<p>Test Procedure</p> <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1. 2. Configure the test equipment to allow the device to attach and connect to all PDNs. 3. Verify that the DUT has an IMS application that will attempt to connect as soon as the DUT is powered on. 4. Power the DUT on and allow it to find LTE service. 5. Verify that the DUT successfully establishes an RRC connection, attaches to the network, and connects to the IMS PDN. 6. Initiate the test application (see section TEST EQUIPMENT CONFIGURATION) and verify that it connects successfully to the internet PDN. Configure the test application for the application idle state. 7. Configure the test equipment to send a NAS "Deactivate EPS Bearer Context Request" message to disconnect the IMS PDN. 8. Verify that the UE disconnects from the IMS PDN. 9. Configure the test equipment such that the network will allow connectivity to the IMS PDN when the UE attempts to re-connect to the IMS PDN. 10. Verify that the UE immediately attempts to re-connect to the IMS PDN and that the reconnection is successful.
Expected Results
<p>Expected Result</p> <p>UE follows the algorithm described in the section entitled "PDN Disconnection" in the document "Device Requirements LTE 3GPP Network Access" when it receives a NAS PDN Deactivate EPS Bearer Context Request message for the IMS PDN.</p>

7.2 UE RECEIVES DETACH REQUEST MESSAGE FROM THE NETWORK 1

PDN CONNECTION OPEN VZ_TC_DATARETRY_5379

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE receives a NAS Detach Request message while connected to the IMS PDN on the LTE network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE 3GPP Network Access, Section 4.1.4.1*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
Test Procedure <ol style="list-style-type: none">1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1.2. Configure the test equipment to allow the device to attach and connect to all PDNs.3. Verify that the DUT has an IMS application that will attempt to connect as soon as the DUT is powered on.4. Power the DUT on and allow it to find LTE service.5. Verify that the DUT successfully establishes an RRC connection, attaches to the network, and connects to the IMS PDN.6. Configure the test equipment to send a NAS "Detach Request" message to disconnect the IMS PDN.7. Verify that the UE immediately initiates a successful DETACH procedure and disconnects from the IMS PDN.8. Verify that the UE immediately re-attaches to the LTE network and re-connects to the IMS PDN.
Expected Results
Expected Result <p>UE follows the algorithm described in the section entitled "PDN Disconnection" in the document "Device Requirements LTE 3GPP Network Access" when it receives a NAS PDN Detach Request message for the IMS PDN.</p>

7.3 UE RECEIVES DEACTIVATE EPS BEARER CONTEXT REQUEST MESSAGE FROM THE NETWORK CODE 39 VZ_TC_DATARETRY_5378

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE receives a NAS Deactivate EPS Bearer Context Request message while connected to the Internet PDN on the LTE network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE 3GPP Network Access, Section 4.1.4.1*
- Verizon Wireless LTE Data Retry Device Requirements, *Section 4.5.4*
- 3GPP TS 24.301: *Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3*
- 3GPP TS 36.331: *Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification*

Applicability

This test case applies to all UEs designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
Test Procedure <ol style="list-style-type: none"> 1. Configure the test setup so that the device under test (DUT) finds service on a single eNodeB with cell_id (where "cell_id" refers to the "CellIdentity" parameter that is broadcast in SIB1) equal to value X1, PLMN id equal to value Y1, and TAI equal to value Z1. 2. Configure the test equipment to allow the device to attach and connect to all PDNs. 3. Power the DUT on and allow it to find LTE service. 4. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network. 5. Initiate the test application (see section TEST EQUIPMENT CONFIGURATION) and verify that it connects successfully to the internet PDN. Configure the test application for the application idle state. 6. Configure the test equipment to send a NAS "Deactivate EPS Bearer Context Request" message to disconnect the default bearer for the internet PDN with an ESM Cause Code of 39. 7. Verify that the UE disconnects from the internet PDN. 8. Configure the test equipment such that the network will allow connectivity to the internet PDN when the UE attempts to re-connect to the internet PDN. Configure the test application for the application transmitting state with a retransmission timer set to 10 seconds. 9. Verify that the UE attempts to re-connect to the internet PDN and that the reconnection is successful.
Expected Results
Expected Result UE follows the algorithm described defined in section Situation: Network Sends a "DEACTIVATE EPS BEARER CONTEXT REQUEST" message to the UE of the Verizon Wireless LTE Data Retry Requirements when it receives a NAS PDN Deactivate EPS Bearer Context Request message for the internet PDN with cause code 39.

6.6a UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR THE IMS PDN- SUBSEQUENT ATTACHMENT - Code 100

VZ_TC_DATARTRY_4105999311931736

6.6b UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR THE IMS PDN- SUBSEQUENT ATTACHMENT - Code 101

VZ_TC_DATARTRY_4105999311931737

6.6c UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR THE IMS PDN- SUBSEQUENT ATTACHMENT - Code 111

VZ_TC_DATARTRY_4105999311931738

8 Retry behavior with different IMSI Values VZ_TC_DATARETRY_4105999311932381

8.1 NETWORK FAILS TO RESPOND TO PDN CONNECTIVITY REQUEST-

Test 1 VZ_TC_DATARTRY_4105999311932382

Execute TC 6.1.1 with UICC with IMSI value 311270123456789

8.2 NETWORK FAILS TO RESPOND TO PDN CONNECTIVITY REQUEST-

Test 2 VZ_TC_DATARTRY_4105999311932383

Execute TC 6.1.1 with UICC with IMSI value 310590123456789

8.3 NETWORK FAILS TO RESPOND TO PDN CONNECTIVITY REQUEST-

Test 3 VZ_TC_DATARTRY_4105999311932384

Execute TC 6.1.1 with UICC with IMSI value 310599123456789

8.4 NETWORK FAILS TO RESPOND TO PDN CONNECTIVITY REQUEST-

Test 4 VZ_TC_DATARTRY_4105999311932385

Execute TC 6.1.1 with UICC with IMSI value 311280123456789

RequirementCoverageForTestPlan2.1 RRC CONNECTION REJECT MESSAGE INITIAL ATTACH VZ_TC_DATARETRY_5340

Requirement Name	Requirement Plan Id	Created By	Created Date
If the attach attempt counter reaches a value of 5, the UE shall follow the proce	LTEDATARETRY	Admin User	11-07-0013 15:03:18
If the device encounters any type of RRC related failure during an attach attempt	LTEDATARETRY	Admin User	11-07-0013 15:03:51
The UE shall follow the steps detailed in the document 3GPP TS 24.301 (reference	LTEDATARETRY	Admin User	11-07-0013 15:03:16

2.2 RRC CONNECTION REJECT MESSAGE SENDING DATA TO A CONNECTED PDN VZ_TC_DATARETRY_5341

Requirement Name	Requirement Plan Id	Created By	Created Date
Algorithm Details	LTEDATARETRY	Admin User	11-07-0013 15:02:42
Algorithm Details - Notes	LTEDATARETRY	Admin User	11-07-0013 15:02:40
General Rules	LTEDATARETRY	Admin User	11-07-0013 15:02:39
Generic Throttling Algorithm	LTEDATARETRY	Admin User	11-07-0013 15:02:37

If the device encounters any of the following during a service request procedure:	LTEDATARETRY	Admin User	11-07-0013 15:03:56
If the device encounters any type of RRC related failure during a service attempt	LTEDATARETRY	Admin User	11-07-0013 15:03:54
Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:44

2.4 NETWORK DOES NOT RESPOND TO RACH VZ_TC_DATARTRY_5342

Requirement Name	Requirement Plan Id	Created By	Created Date
If the attach attempt counter reaches a value of 5, the UE shall follow the proce	LTEDATARETRY	Admin User	11-07-0013 15:03:18
If the device encounters any type of RRC related failure during an attach attempt	LTEDATARETRY	Admin User	11-07-0013 15:03:51
The UE shall follow the steps detailed in the document 3GPP TS 24.301 (reference	LTEDATARETRY	Admin User	11-07-0013 15:03:16

2.5 MULTIPLE RRC FAILURES VZ_TC_DATARTRY_5343

Requirement Name	Requirement Plan Id	Created By	Created Date
If the attach attempt counter reaches a value of 5, the UE shall follow the proce	LTEDATARETRY	Admin User	11-07-0013 15:03:18

If the device encounters any type of RRC related failure during an attach attempt	LTEDATARETRY	Admin User	11-07-0013 15:03:51
The UE shall follow the steps detailed in the document 3GPP TS 24.301 (reference	LTEDATARETRY	Admin User	11-07-0013 15:03:16

3.1 UE FAILS TO AUTHENTICATE THE NETWORK INVALID MAC CODE VZ_TC_DATARTRY_5344

Requirement Name	Requirement Plan Id	Created By	Created Date
The UE shall follow the steps detailed in the document 3GPP TS 24.301 (reference	LTEDATARETRY	Admin User	11-07-0013 15:02:57

3.2 UE FAILS TO AUTHENTICATE THE NETWORK INVALID VALUE FOR SEPARATION BIT VZ_TC_DATARTRY_5345

Requirement Name	Requirement Plan Id	Created By	Created Date
The UE shall follow the steps detailed in the document 3GPP TS 24.301 (reference	LTEDATARETRY	Admin User	11-07-0013 15:02:57

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3.3 UE FAILS TO AUTHENTICATE THE NETWORK INVALID VALUE FOR SQN FIELD
VZ_TC_DATARETRY_5346

Requirement Name	Requirement Plan Id	Created By	Created Date
The UE shall follow the steps detailed in the document 3GPP TS 24.301 (reference	LTEDATARETRY	Admin User	11-07-0013 15:02:57

3.5 UE SENDS SECURITY MODE REJECT MESSAGE INITIAL ATTACH
VZ_TC_DATARETRY_5347

Requirement Name	Requirement Plan Id	Created By	Created Date
If the attach attempt counter reaches a value of 5, the UE shall follow the proce	LTEDATARETRY	Admin User	11-07-0013 15:03:18
The UE shall follow the steps detailed in the document 3GPP TS 24.301 (reference	LTEDATARETRY	Admin User	11-07-0013 15:03:00
The UE shall follow the steps detailed in the document 3GPP TS 24.301 (reference	LTEDATARETRY	Admin User	11-07-0013 15:03:16

4.1 UE RECEIVES ATTACH REJECT MESSAGE FROM THE NETWORK CODES 3, 6, 7,
AND 8 VZ_TC_LTEDATARETRY_7184

Requirement Name	Requirement Plan Id	Created By	Created Date
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EMM Cause Codes 3, 6, 7, 8	LTEDATARETRY	Admin User	11-07-0013 15:03:03
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4.4 UE RECEIVES ATTACH REJECT MESSAGE FROM THE NETWORK CODE 19
VZ_TC_DATARETRY_5348

Requirement Name	Requirement Plan Id	Created By	Created Date
EMM Cause Code 19	LTEDATARETRY	Admin User	11-07-0013 15:03:08
If the attach attempt counter reaches a value of 5, the UE shall follow the proce	LTEDATARETRY	Admin User	11-07-0013 15:03:18
Network sends an 'ATTACH REJECT' with an EMM Cause Code	LTEDATARETRY	Admin User	11-07-0013 15:03:01
PDN CONNECTIVITY REJECT piggybacked with an ATTACH REJECT message	LTEDATARETRY	Admin User	11-07-0013 15:03:44
PDN CONNECTIVITY REJECT with cause code 54	LTEDATARETRY	Admin User	11-07-0013 15:03:41
Receipt of ATTACH REJECT message with EMM Cause Code 19 piggybacked with PDN CONNECTIVITY REJECT message	LTEDATARETRY	Admin User	11-07-0013 15:03:10

4.6 UE RECEIVES DETACH REQUEST MESSAGE FROM THE NETWORK CODES 3, 6, 7, AND 8 VZ_TC_DATARETRY_5349

Requirement Name	Requirement Plan Id	Created By	Created Date
The UE shall follow the steps detailed in the document 3GPP TS 24.301 (reference	LTEDATARETRY	Admin User	11-07-0013 15:03:23

4.7.1 UE RECEIVES DETACH REQUEST MESSAGE FROM THE NETWORK CODES 11 AND 14 VZ_TC_DATARETRY_5350

Requirement Name	Requirement Plan Id	Created By	Created Date
The UE shall follow the steps detailed in the document 3GPP TS 24.301 (reference	LTEDATARETRY	Admin User	11-07-0013 15:03:23

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4.8 UE RECEIVES DETACH REQUEST MESSAGE FROM THE NETWORK CODES 12, 13, AND 15 VZ_TC_DATARETRY_5351

Requirement Name	Requirement Plan Id	Created By	Created Date
The UE shall follow the steps detailed in the document 3GPP TS 24.301 (reference	LTEDATARETRY	Admin User	11-07-0013 15:03:23

4.9 UE RECEIVES ATTACH REJECT MESSAGE FROM THE NETWORK CODE 17 VZ_TC_DATARETRY_5352

Requirement Name	Requirement Plan Id	Created By	Created Date
The UE shall follow the steps detailed in the document 3GPP TS 24.301 (reference	LTEDATARETRY	Admin User	11-07-0013 15:03:16

4.10 UE WITH T₃₃₄₆ TIMER SUPPORT RECEIVES ATTACH REJECT MESSAGE FROM THE NETWORK CODE 22 VZ_TC_DATARETRY_5381

Requirement Name	Requirement Plan Id	Created By	Created Date
EMM Cause Code 19	LTEDATARETRY	Admin User	11-07-0013 15:03:08
EMM Cause Codes 12, 13, 15	LTEDATARETRY	Admin User	11-07-0013 15:03:06
Network sends an 'ATTACH REJECT' with an EMM Cause Code	LTEDATARETRY	Admin User	11-07-0013 15:03:01
The UE shall support T ₃₃₄₆ per the Release 10 version of 3GPP TS 24.301 (referenc	LTEDATARETRY	Admin User	11-07-0013 15:04:15
Upon receipt of an ATTACH REJECT message with a cause code '22: Congestion' and with the T ₃₃₄₆ value information	LTEDATARETRY	Admin User	11-07-0013 15:04:20

4.12 UE RECEIVES ATTACH REJECT AND PDN CONNECTIVITY REJECT MESSAGES FROM THE NETWORK VZ_TC_DATARETRY_5382

Requirement Name	Requirement Plan Id	Created By	Created Date
EMM Cause Code 19	LTEDATARETRY	Admin User	11-07-0013 15:03:08
EMM Cause Codes 12, 13, 15	LTEDATARETRY	Admin User	11-07-0013 15:03:06
Network sends an 'ATTACH REJECT' with an	LTEDATARETRY	Admin	11-07-0013

EMM Cause Code		User	15:03:01
Receipt of ATTACH REJECT message with EMM Cause Code 19 piggybacked with PDN CONNECTIVITY REJECT message	LTEDATARETRY	Admin User	11-07-0013 15:03:10

4.13 UE RECEIVES ATTACH REJECT MESSAGE FROM THE NETWORK CODES 95, 96, 97, 99, AND 111 VZ_TC_DATARETRY_5383

Requirement Name	Requirement Plan Id	Created By	Created Date
EMM Cause Code 19	LTEDATARETRY	Admin User	11-07-0013 15:03:08
EMM Cause Code 95, 96, 97, 99, 100, 101, 111	LTEDATARETRY	Admin User	11-07-0013 15:03:11
EMM Cause Codes 12, 13, 15	LTEDATARETRY	Admin User	11-07-0013 15:03:06
Network sends an 'ATTACH REJECT' with an EMM Cause Code	LTEDATARETRY	Admin User	11-07-0013 15:03:01

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4.14 UE WITH T₃₂₄₅ TIMER RECEIVES ATTACH REJECT MESSAGE FROM THE NETWORK CODE 11 VZ_TC_DATARETRY_5390

Requirement Name	Requirement Plan Id	Created By	Created Date
EMM Cause Codes 11, 14	LTEDATARETRY	Admin User	11-07-0013 15:03:05
The device shall support T ₃₂₄₅ per section 5.3.7a of Release 10 version of 3GPP TS	LTEDATARETRY	Admin User	11-07-0013 15:04:17

4.15 PERMANENT ATTACH FAILURES ACROSS POWER CYCLE VZ_TC_DATARETRY_9558

Requirement Name	Requirement Plan Id	Created By	Created Date
In addition to the forbidden tracking area list and the forbidden PLMN list maint	LTEDATARETRY	Admin User	11-07-0013 15:04:27

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4.16 PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH DETACH REQUEST VZ_TC_DATARETRY_9559

Requirement Name	Requirement Plan Id	Created By	Created Date
In addition to the forbidden tracking area list and the forbidden PLMN list maint	LTEDATARETRY	Admin User	11-07-0013 15:04:27

4.17 UE WITH T₃₂₄₅ TIMER RECEIVES ATTACH REJECT MESSAGE FROM THE NETWORK CODE 14 VZ_TC_DATARETRY_10283

Requirement Name	Requirement Plan Id	Created By	Created Date
EMM Cause Codes 11, 14	LTEDATARETRY	Admin User	11-07-0013 15:03:05

The device shall support T ₃₂₄₅ per section 5.3.7a of Release 10 version of 3GPP TS 24.301	LTEDATARETRY	Admin User	11-07-0013 15:04:17
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4.18 UE WITH T₃₂₄₅ TIMER RECEIVES ATTACH REJECT MESSAGE FROM THE NETWORK CODE 8 VZ_TC_DATARETRY_1491645

Requirement Name	Requirement Plan Id	Created By	Created Date
TIMER T ₃₂₄₅	LTEDATARETRY	Joseph Kuhn	10-07-0013 11:14:47

5.2 UE RECEIVES SERVICE REJECT MESSAGE FROM THE NETWORK CODE 11 VZ_TC_DATARETRY_5353

Requirement Name	Requirement Plan Id	Created By	Created Date
The UE shall follow the steps detailed in the document 3GPP TS 24.301 (reference	LTEDATARETRY	Admin User	11-07-0013 15:03:29

5.3 UE RECEIVES SERVICE REJECT MESSAGE FROM THE NETWORK CODES 12, 13, AND 15 VZ_TC_DATARETRY_5354

Requirement Name	Requirement Plan Id	Created By	Created Date
If the device encounters any of the following during a service request procedure:	LTEDATARETRY	Admin User	11-07-0013 15:03:56
The UE shall follow the steps detailed in the document 3GPP TS 24.301 (reference	LTEDATARETRY	Admin User	11-07-0013 15:03:29

5.5 SERVICE REQUEST FAILS GENERIC THROTTLING ALGORITHM INVOKED
VZ_TC_DATARETRY_5355

Requirement Name	Requirement Plan Id	Created By	Created Date
Algorithm Details	LTEDATARETRY	Admin User	11-07-0013 15:02:42
Algorithm Details - Notes	LTEDATARETRY	Admin User	11-07-0013 15:02:40
Example1 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:45
General Rules	LTEDATARETRY	Admin User	11-07-0013 15:02:39

Generic Throttling Algorithm	LTEDATARETRY	Admin User	11-07-0013 15:02:37
If the UE sends a PDN CONNECTIVITY REQUEST message and either: Ø the ne	LTEDATARETRY	Admin User	11-07-0013 15:04:07
If the device encounters any of the following during a service request procedure:	LTEDATARETRY	Admin User	11-07-0013 15:03:56
Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:44

5.9 UE RECEIVES TRACKING AREA UPDATE REJECT MESSAGE FROM THE NETWORK CODES 12, 13, AND 15 VZ_TC_DATARETRY_5357

Requirement Name	Requirement Plan Id	Created By	Created Date
If the tracking area updating attempt counter reaches a value of 5, the UE shall	LTEDATARETRY	Admin User	11-07-0013 15:03:28
The UE shall follow the steps detailed in the document 3GPP TS 24.301 (reference	LTEDATARETRY	Admin User	11-07-0013 15:03:25
The UE shall follow the steps detailed in the document 3GPP TS 24.301 (reference	LTEDATARETRY	Admin User	11-07-0013 15:03:26

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5.11 TRACKING AREA UPDATE REQUEST FAILS TRACKING AREA UPDATE
ATTEMPT COUNTER REACHES MAX VALUE VZ_TC_DATARETRY_5358

Requirement Name	Requirement Plan Id	Created By	Created Date
If the tracking area updating attempt counter reaches a value of 5, the UE shall	LTEDATARETRY	Admin User	11-07-0013 15:03:28
The UE shall follow the steps detailed in the document 3GPP TS 24.301 (reference	LTEDATARETRY	Admin User	11-07-0013 15:03:25
The UE shall follow the steps detailed in the document 3GPP TS 24.301 (reference	LTEDATARETRY	Admin User	11-07-0013 15:03:26

5.12 UE RECEIVES TRACKING AREA UPDATE REJECT MESSAGE FROM THE
NETWORK CODE 17 VZ_TC_DATARETRY_5359

Requirement Name	Requirement Plan Id	Created By	Created Date
If the tracking area updating attempt counter reaches a value of 5, the UE shall	LTEDATARETRY	Admin User	11-07-0013 15:03:28
The UE shall follow the steps detailed in the document 3GPP TS 24.301 (reference	LTEDATARETRY	Admin User	11-07-0013 15:03:25

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5.13 UE WITH T₃₃₄₆ TIMER SUPPORT RECEIVES SERVICE REJECT MESSAGE FROM THE NETWORK CODE 22 VZ_TC_DATARETRY_5384

Requirement Name	Requirement Plan Id	Created By	Created Date
The UE shall follow the steps detailed in the document 3GPP TS 24.301 (reference	LTEDATARETRY	Admin User	11-07-0013 15:03:29
The UE shall support T ₃₃₄₆ per the Release 10 version of 3GPP TS 24.301 (referenc	LTEDATARETRY	Admin User	11-07-0013 15:04:15

5.14 UE WITHOUT T₃₃₄₆ TIMER SUPPORT RECEIVES SERVICE REJECT MESSAGE FROM THE NETWORK CODE 22 VZ_TC_DATARETRY_5385

Requirement Name	Requirement Plan Id	Created By	Created Date
If the device encounters any of the following during a service request procedure:	LTEDATARETRY	Admin User	11-07-0013 15:03:56
The UE shall follow the steps detailed in the document 3GPP TS 24.301 (reference	LTEDATARETRY	Admin User	11-07-0013 15:03:29

5.15 UE WITH T₃₃₄₆ TIMER SUPPORT RECEIVES TRACKING AREA UPDATE REJECT MESSAGE FROM THE NETWORK CODE 22 VZ_TC_DATARETRY_5386

Requirement Name	Requirement Plan Id	Created By	Created Date
The UE shall follow the steps detailed in the document 3GPP TS 24.301 (reference	LTEDATARETRY	Admin User	11-07-0013 15:03:25
The UE shall support T ₃₃₄₆ per the Release 10 version of 3GPP TS 24.301 (referenc	LTEDATARETRY	Admin User	11-07-0013 15:04:15

5.16 UE WITHOUT T₃₃₄₆ TIMER SUPPORT RECEIVES TRACKING AREA UPDATE REJECT MESSAGE FROM THE NETWORK CODE 22 VZ_TC_DATARETRY_5387

Requirement Name	Requirement Plan Id	Created By	Created Date
The UE shall follow the steps detailed in the document 3GPP TS 24.301 (reference	LTEDATARETRY	Admin User	11-07-0013 15:03:26

5.17 PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH SERVICE REQUEST VZ_TC_DATARETRY_9561

Requirement Name	Requirement Plan Id	Created By	Created Date
In addition to the forbidden tracking area list	LTEDATARETRY	Admin	11-07-0013

and the forbidden PLMN list maint		User	15:04:27
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5.18 PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH TRACKING AREA UPDATE VZ_TC_DATARTRY_9563

Requirement Name	Requirement Plan Id	Created By	Created Date
In addition to the forbidden tracking area list and the forbidden PLMN list maint	LTEDATARETRY	Admin User	11-07-0013 15:04:27

6.1 NETWORK FAILS TO ASSIGN AN IPV6 ADDRESS FOR THE IMS PDN VZ_TC_DATARTRY_5360

Requirement Name	Requirement Plan Id	Created By	Created Date
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If the network fails to send a Router Advertisement message after the device has exhausted its solicitations dur	LTEDATARETRY	Admin User	11-07-0013 15:04:01
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6.2 NETWORK FAILS TO REFRESH THE IPV6 ADDRESS FOR THE IMS PDN, NO IPV4 ADDRESS ASSIGNED VZ_TC_DATARTRY_5361

Requirement Name	Requirement Plan Id	Created By	Created Date
Algorithm Details	LTEDATARETRY	Admin User	11-07-0013 15:02:42
Algorithm Details - Notes	LTEDATARETRY	Admin User	11-07-0013 15:02:40
Example 4 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:50
Example 5 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:52
Example 6 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:53
Example1 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:45
Example2 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:47
Example3 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:48
General Rules	LTEDATARETRY	Admin User	11-07-0013 15:02:39

Generic Throttling Algorithm	LTEDATARETRY	Admin User	11-07-0013 15:02:37
If the device is unsuccessful in refreshing its IPv6 address for any PDN connecti	LTEDATARETRY	Admin User	11-07-0013 15:04:06
Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:44

6.3 NETWORK FAILS TO ASSIGN AN IPV6 ADDRESS FOR A NON-IMS PDN- INITIAL CONNECTION, NO IPV4 ADDRESS ASSIGNED VZ_TC_DATARTRY_5362

Requirement Name	Requirement Plan Id	Created By	Created Date
Algorithm Details	LTEDATARETRY	Admin User	11-07-0013 15:02:42
Algorithm Details - Notes	LTEDATARETRY	Admin User	11-07-0013 15:02:40
Example 4 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:50
Example 5 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:52
Example 6 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:53
Example1 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:45
Example2 - Per System Nature of Throttling	LTEDATARETRY	Admin	11-07-0013

		User	15:02:47
Example3 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:48
For any PDN connection attempt after network attach, if the network fails to send	LTEDATARETRY	Admin User	11-07-0013 15:03:49
General Rules	LTEDATARETRY	Admin User	11-07-0013 15:02:39
Generic Throttling Algorithm	LTEDATARETRY	Admin User	11-07-0013 15:02:37
If the device is unsuccessful in refreshing its IPv6 address for any PDN connecti	LTEDATARETRY	Admin User	11-07-0013 15:04:06
If the network fails to send a Router Advertisement message after the device has exhausted its solicitations dur	LTEDATARETRY	Admin User	11-07-0013 15:04:01
If the network fails to send a Router Advertisement message after the device has exhausted its solicitations dur	LTEDATARETRY	Admin User	11-07-0013 15:04:02
Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:44

6.4 NETWORK FAILS TO ASSIGN AN IPV6 ADDRESS FOR A NON-IMS PDN- INITIAL CONNECTION, IPV4 ADDRESS ASSIGNED VZ_TC_DATARTRY_5363

Requirement Name	Requirement Plan Id	Created By	Created Date
Algorithm Details	LTEDATARETRY	Admin	11-07-0013

		User	15:02:42
Algorithm Details - Notes	LTEDATARETRY	Admin User	11-07-0013 15:02:40
Example 4 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:50
Example 5 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:52
Example 6 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:53
Example 1 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:45
Example 2 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:47
Example 3 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:48
For any PDN connection attempt after network attach, if the network fails to send	LTEDATARETRY	Admin User	11-07-0013 15:03:49
General Rules	LTEDATARETRY	Admin User	11-07-0013 15:02:39
Generic Throttling Algorithm	LTEDATARETRY	Admin User	11-07-0013 15:02:37
If the device is unsuccessful in refreshing its IPv6 address for any PDN connecti	LTEDATARETRY	Admin User	11-07-0013 15:04:06
If the network fails to send a Router Advertisement message after the device has exhausted its solicitations dur	LTEDATARETRY	Admin User	11-07-0013 15:04:01

If the network fails to send a Router Advertisement message after the device has exhausted its solicitations dur	LTEDATARETRY	Admin User	11-07-0013 15:04:02
Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:44

6.5 UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR THE IMS PDN- INITIAL ATTACHMENT VZ_TC_DATARTRY_5364

Requirement Name	Requirement Plan Id	Created By	Created Date
Algorithm Details	LTEDATARETRY	Admin User	11-07-0013 15:02:42
Algorithm Details - Notes	LTEDATARETRY	Admin User	11-07-0013 15:02:40
Example 4 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:50
Example 5 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:52
Example 6 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:53
Example1 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:45
Example2 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:47

Example3 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:48
General Rules	LTEDATARETRY	Admin User	11-07-0013 15:02:39
Generic Throttling Algorithm	LTEDATARETRY	Admin User	11-07-0013 15:02:37
If the UE receives a 'PDN CONNECTIVITY REJECT' message after sending a 'PDN CONNE	LTEDATARETRY	Admin User	11-07-0013 15:03:31
Non-IMS PDN	LTEDATARETRY	Admin User	11-07-0013 15:03:33
Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:44

6.6 UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR THE IMS PDN- SUBSEQUENT ATTACHMENT VZ_TC_DATARETRY_5365

Requirement Name	Requirement Plan Id	Created By	Created Date
Algorithm Details	LTEDATARETRY	Admin User	11-07-0013 15:02:42
Algorithm Details - Notes	LTEDATARETRY	Admin User	11-07-0013 15:02:40
Example 4 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:50
Example 5 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:52

Example 6 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:53
Example 1 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:45
Example 2 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:47
Example 3 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:48
General Rules	LTEDATARETRY	Admin User	11-07-0013 15:02:39
Generic Throttling Algorithm	LTEDATARETRY	Admin User	11-07-0013 15:02:37
If the UE receives a 'PDN CONNECTIVITY REJECT' message after sending a 'PDN CONNE	LTEDATARETRY	Admin User	11-07-0013 15:03:31
Non-IMS PDN	LTEDATARETRY	Admin User	11-07-0013 15:03:33
PDN CONNECTIVITY REJECT with cause codes 26, 30, 31, 34, 38, 95-101 or 111	LTEDATARETRY	Admin User	11-07-0013 15:03:42
Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:44

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6.7 UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR NON-IMS PDN CODES 26, 30, 31, 34, 38, 95, 96, 97, 98, 99, 100, 101, and 111 VZ_TC_DATARETRY_5366

Requirement Name	Requirement Plan Id	Created By	Created Date
Algorithm Details	LTEDATARETRY	Admin User	11-07-0013 15:02:42
Algorithm Details - Notes	LTEDATARETRY	Admin User	11-07-0013 15:02:40
Example 4 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:50
Example 5 - Per System Nature of Throttling	LTEDATARETRY	Admin	11-07-0013

		User	15:02:52
Example 6 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:53
Example 1 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:45
Example 2 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:47
Example 3 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:48
General Rules	LTEDATARETRY	Admin User	11-07-0013 15:02:39
Generic Throttling Algorithm	LTEDATARETRY	Admin User	11-07-0013 15:02:37
Non-IMS PDN	LTEDATARETRY	Admin User	11-07-0013 15:03:33
PDN CONNECTIVITY REJECT with cause codes 26, 30, 31, 34, 38, 95-101 or 111	LTEDATARETRY	Admin User	11-07-0013 15:03:42
Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:44

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6.9 UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR NON-IMS PDN CODES 8, 27, 29, 32, 33, AND 112 VZ_TC_DATARETRY_5368

Requirement Name	Requirement Plan Id	Created By	Created Date
Non-IMS PDN	LTEDATARETRY	Admin User	11-07-0013 15:03:33
Two consecutive PDN CONNECTIVITY REJECT with Cause Code 8, 27, 29, 32, 33, 112	LTEDATARETRY	Admin User	11-07-0013 15:03:34

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6.10 UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR IMS PDN CODES 8, 27, 29, 32, 33, AND 112 VZ_TC_DATARETRY_5371

Requirement Name	Requirement Plan Id	Created By	Created Date
Non-IMS PDN	LTEDATARETRY	Admin User	11-07-0013 15:03:33
Two consecutive PDN CONNECTIVITY REJECT with Cause Code 8, 27, 29, 32, 33, 112	LTEDATARETRY	Admin User	11-07-0013 15:03:34

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6.1.1 NETWORK FAILS TO RESPOND TO PDN CONNECTIVITY REQUEST
VZ_TC_DATA_RETRY_5372

Requirement Name	Requirement Plan Id	Created By	Created Date
Algorithm Details	LTEDATARETRY	Admin User	11-07-0013 15:02:42
Algorithm Details - Notes	LTEDATARETRY	Admin User	11-07-0013 15:02:40
Example 4 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:50
Example 5 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:52
Example 6 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:53
Example1 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:45
Example2 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:47
Example3 - Per System Nature of Throttling	LTEDATARETRY	Admin	11-07-0013

		User	15:02:48
General Rules	LTEDATARETRY	Admin User	11-07-0013 15:02:39
Generic Throttling Algorithm	LTEDATARETRY	Admin User	11-07-0013 15:02:37
If the UE sends a PDN CONNECTIVITY REQUEST message and either: Ø the ne	LTEDATARETRY	Admin User	11-07-0013 15:04:07
Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:44

6.12 NETWORK FAILS TO REFRESH THE IPV6 ADDRESS FOR THE IMS PDN, IPV4 ADDRESS ASSIGNED VZ_TC_DATARTRY_5373

Requirement Name	Requirement Plan Id	Created By	Created Date
If the device is unsuccessful in refreshing its IPv6 address for any PDN connecti	LTEDATARETRY	Admin User	11-07-0013 15:04:06

6.13 NETWORK FAILS TO ASSIGN AN IPV6 ADDRESS FOR THE IMS AND INTERNET PDNS ON NETWORK ATTACH, IPV4 ADDRESS ASSIGNED TO INTERNET VZ_TC_DATARTRY_5374

Requirement Name	Requirement Plan Id	Created By	Created Date
If the device is instructed by any requirement in this document to switch to the	LTEDATARETRY	Admin User	11-07-0013 15:03:59

If the network fails to send a Router Advertisement message after the device has exhausted its solicitations dur	LTEDATARETRY	Admin User	11-07-0013 15:04:01
If the network fails to send a Router Advertisement message after the device has exhausted its solicitations dur	LTEDATARETRY	Admin User	11-07-0013 15:04:02

6.14 NETWORK FAILS TO ASSIGN AN IPV6 ADDRESS FOR THE INTERNET PDN ON NETWORK ATTACH, NO IPV4 ADDRESS ASSIGNED VZ_TC_DATARTRY_5375

Requirement Name	Requirement Plan Id	Created By	Created Date
If the network fails to send a Router Advertisement message after the device has exhausted its solicitations dur	LTEDATARETRY	Admin User	11-07-0013 15:04:02
The UE shall implement T ₃₄₀₂ on a PLMN basis. Once timer T ₃₄₀₂ is started for a p	LTEDATARETRY	Admin User	11-07-0013 15:02:55

6.15 NETWORK FAILS TO INCLUDE IMS P-CSCF ADDRESS IN ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST MESSAGE FOR THE IMS PDN, INITIAL VZ_TC_DATARTRY_5376

Requirement Name	Requirement Plan Id	Created By	Created Date
If the network fails to include the IMS P-CSCF address(es) in the PCO information element of the ACTIVATE DEFAULT	LTEDATARETRY	Admin User	11-07-0013 15:04:04

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6.16 NETWORK FAILS TO INCLUDE IMS P-CSCF ADDRESS IN ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST MESSAGE DURING AN IMS PDN CONNEC
VZ_TC_DATARETRY_5377

Requirement Name	Requirement Plan Id	Created By	Created Date
Algorithm Details	LTEDATARETRY	Admin User	11-07-0013 15:02:42
Algorithm Details - Notes	LTEDATARETRY	Admin User	11-07-0013 15:02:40
Example 4 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:50
Example 5 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:52
Example 6 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:53
Example1 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:45
Example2 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:47
Example3 - Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:48
General Rules	LTEDATARETRY	Admin User	11-07-0013 15:02:39
Generic Throttling Algorithm	LTEDATARETRY	Admin User	11-07-0013 15:02:37

If the network fails to include the IMS P-CSCF address(es) in the PCO information element of the ACTIVATE DEFAULT	LTEDATARETRY	Admin User	11-07-0013 15:04:04
Per System Nature of Throttling	LTEDATARETRY	Admin User	11-07-0013 15:02:44

6.17 UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR ADMIN PDN CODE 33 VZ_TC_DATARTRY_5379

Requirement Name	Requirement Plan Id	Created By	Created Date
Two consecutive PDN CONNECTIVITY REJECT with Cause Code 8, 27, 29, 32, 33, 112	LTEDATARETRY	Admin User	11-07-0013 15:03:34

6.18 UE MAKES EXCESSIVE PDN CONNECTIVITY REQUESTS VZ_TC_DATARTRY_5380

Requirement Name	Requirement Plan Id	Created By	Created Date
To prevent the excessive PDN connection requests to the network, the UE shall com	LTEDATARETRY	Admin User	11-07-0013 15:04:14

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6.19 UE MAKES ATTACH REQUEST WHILE THROTTLING ON PDN
VZ_TC_DATARTRY_5388

Requirement Name	Requirement Plan Id	Created By	Created Date
If the device is required to make an attach request using a given PDN and the device is throttling connection re	LTEDATARETRY	Admin User	11-07-0013 15:04:11

6.21 UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK
FOR NON-IMS PDN CODES 26 AND 27 WITH T3396 TIMER SET
VZ_TC_DATARTRY_5391

Requirement Name	Requirement Plan Id	Created By	Created Date
Non-IMS PDN	LTEDATARETRY	Admin User	11-07-0013 15:03:33
PDN CONNECTIVITY REJECT piggybacked with an ATTACH REJECT message	LTEDATARETRY	Admin User	11-07-0013 15:03:44
PDN CONNECTIVITY REJECT with cause code 28	LTEDATARETRY	Admin User	11-07-0013 15:03:36
PDN CONNECTIVITY REJECT with cause code 50	LTEDATARETRY	Admin User	11-07-0013 15:03:37

PDN CONNECTIVITY REJECT with cause code 51	LTEDATARETRY	Admin User	11-07-0013 15:03:39
PDN CONNECTIVITY REJECT with cause code 54	LTEDATARETRY	Admin User	11-07-0013 15:03:41
PDN CONNECTIVITY REJECT with cause codes 26, 30, 31, 34, 38, 95-101 or 111	LTEDATARETRY	Admin User	11-07-0013 15:03:42
The UE shall support T3396 per the Release 10 version of 3GPP TS 24.301 (referenc	LTEDATARETRY	Admin User	11-07-0013 15:04:19
Two consecutive PDN CONNECTIVITY REJECT with Cause Code 8, 27, 29, 32, 33, 112	LTEDATARETRY	Admin User	11-07-0013 15:03:34

6.22 IOT UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR IMS PDN CODES 8, 27, 29, 32, AND 33 VZ_TC_DATARETRY_1494145

Requirement Name	Requirement Plan Id	Created By	Created Date
PDN CONNECTIVITY REJECT with IoT Devices that cannot be power-cycled	LTEDATARETRY	Joseph Kuhn	02-07-0016 13:45:58

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7.1 UE RECEIVES DEACTIVATE EPS BEARER CONTEXT REQUEST MESSAGE FROM THE NETWORK 2 PDN CONNECTIONS OPEN VZ_TC_DATARTRY_5369

Requirement Name	Requirement Plan Id	Created By	Created Date
If the network sends a DEACTIVATE EPS BEARER CONTEXT REQUEST to the UE, the UE shall follow the steps detailed i	LTEDATARETRY	Admin User	11-07-0013 15:04:09
NETWORK INITIATED PDN DISCONNECTION	LTEB13NAC	Admin User	11-07-0013 14:26:57

7.2 UE RECEIVES DETACH REQUEST MESSAGE FROM THE NETWORK 1 PDN CONNECTION OPEN VZ_TC_DATARTRY_5370

Requirement Name	Requirement Plan Id	Created By	Created Date
NETWORK INITIATED PDN DISCONNECTION	LTEB13NAC	Admin User	11-07-0013 14:26:57

7.3 UE RECEIVES DEACTIVATE EPS BEARER CONTEXT REQUEST MESSAGE FROM THE NETWORK CODE 39 VZ_TC_DATARTRY_5378

Requirement Name	Requirement Plan	Created	Created
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	Id	By	Date
If the network sends a DEACTIVATE EPS BEARER CONTEXT REQUEST to the UE, the UE shall follow the steps detailed i	LTEDATARETRY	Admin User	11-07-0013 15:04:09