

**Test Plan**

Plan Name: LTE Data Retry IMS Less Test Plan

Plan Id: DATARETRYIMSLESS

Version Number: 14

Release Date: October 2023

Latest Release Date: October 2023 : Open Access

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Revision History

Rev.	Author	Description of Changes	Date
1.0	Verizon Wireless	Initial release.	October 2016
2.0	Verizon Wireless	Updated Introduction Updates to the following sections: 4.9, 4.12, 4.13, 6.4,7.1	February 2017
3.0	Verizon Wireless	Updates to the following sections: 4.9, 4.3,5.3	June 2017
4.0	Verizon Wireless	Add Release 12 scenario in TC 6.6 change applicability for TC 6.12 Updated TC 2.4 and 5.6 Removed Test 2 from TC 4.9	Feb 2018
5.0	Verizon Wireless	Updated TC 6.16	June 2018
6.0	Verizon Wireless	Retire TC 6.17 Updated TC 6.6, 6.15	Oct 2018
7.0	Verizon Wireless	Updated TC 2.3, 2.4 and 4.13	June 2019
8.0	Verizon Wireless	Updated TCs2.4, 4.13, 5.8,6.10,6.13 and 6.15	Oct 2019
9.0	Verizon Wireless	Updated TC 4.13, 5.9, 5.11, 6.16	Feb 2020
10.0	Verizon Wireless	Updated TC 6.13 Retired TC 5.9, 5.11 and 6.16	June 2020
11.0	Verizon Wireless	Updated TC 6.13	October 2020
12.0	Verizon Wireless	Updated TC 2.4	February 2022
13.0	Verizon Wireless	Updated TC 6.13 and 6.15 Added case for NB-IOT in TC 2.4	June 2022
13.1	Device Technologies	Updated and Duplicated multiple TCs with a,b & c suffix for different technology variants.	May 2023
14	Device Technologies	Updated and Duplicated multiple TCs with a,b & c suffix for different technology variants.	June 2023

Introduction

This test plan applies only to devices that do not support IMS. This includes data-centric CAT-M1 devices and CAT 0 and higher devices that do not support IMS. These devices attach to LTE using the Internet (class 3) APN.

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 FCCs rules for 700 MHz C Block (47 C.F.R. § 27.16), as explained in the FCCs 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	3rd 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
SQN	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 Admin PDN. It shall support at least three states:

1. Application Disconnected: in this state, the UE does not have a connection established to the Admin 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 Internet application.)
2. Application Idle: in this state, the UE has a connection established to the Admin 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 Internet Test Application to facilitate data retry testing. The Internet Test Application shall connect to the network using the Internet 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.

For NB-IoT device testing, TE vendor should refer to NB-IoT guard-band test frequencies for operating Band 13 from section-8.1.3.1.1 of "3GPP TS 36.508, 3GPP EUTRA and EPC Common Test environments for User Equipment (UE) conformance testing.

Test equipment test scripts shall support the ability to initiate PDN Connectivity Requests for the Internet PDN 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	RRConnectionReject message: Initial Attach				
2.2	RRConnectionReject message: Sending Data to a Connected PDN				
2.3	Network does not Respond to RACH				
2.4	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	UE Sends "Security Mode Reject" Message: Initial Attach				
4.1	UE Receives Attach Reject message from the Network: Code 19				
4.2	UE Receives Detach Request message from the Network: Codes 3, 6, 7, and 8				
4.3	UE Receives Detach Request message from the Network: Codes 11 and 14				
4.4	UE Receives Detach Request message from the Network: Codes 12, 13, and 15				
4.5	UE Receives Attach Reject message from the Network: Code 17				
4.6	UE with T3346 Timer Support Receives Attach Reject message from the Network: Code 22				
4.7	UE Receives Attach Reject and PDN Connectivity Reject Messages from the Network				
4.8	UE Receives Attach Reject message from the Network: Codes 95, 96, 97, 99, and 111				
4.9	UE with T3245 Timer Receives Attach Reject message from the Network: Code 11				
4.10	Permanent Attach Failures Across Power Cycle				
4.11	Permanent EMM Failures Across				

	Power Cycle with Detach Request			
4.12	UE with T3245 Timer Receives Attach Reject Message from the Network Code 14			
4.13	UE with T3245 Timer Receives Attach Reject Message from the Network Code 8			
5.1	UE Receive Service Reject Message from the Network Code 11			
5.2	UE Receives Service Reject message from the Network: Codes 12, 13, and 15			
5.3	Service Request Fails: Throttling Algorithm Invoked			
5.4	UE Receives Service Reject message from the Network: Code 17			
5.5	UE Receives Tracking Area Update Reject message from the Network: Codes 12, 13, and 15			
5.6	Tracking Area Update Request Fails: Tracking Area Update Attempt Counter Reaches Max Value			
5.7	UE Receives Tracking Area Update Reject message from the Network: Code 17			
5.8	UE with T3346 Timer Support Receives Service Reject Message from the Network: Code 22			
5.10	UE with T3346 Timer Support Receives Tracking Area Update Reject Message from the Network: Code 22			
5.12	Permanent EMM Failures Across Power Cycle with Service Request			
5.13	Permanent EMM Failures Across Power Cycle with Tracking Area Update			
6.1	Network Fails to Refresh the IPv6 Address for the Internet PDN, No IPv4 Address Assigned			
6.2	Network Fails to Assign an IPv6 Address for the Admin PDN- Initial Connection, no IPv4 address assigned			
6.3	Network Fails to Assign an IPv6 Address for the Admin PDN- Initial Connection, IPv4 address assigned			
6.4	UE Receives PDN Connectivity Reject message from the Network for the Internet PDN- Subsequent Attachment			
6.5	UE Receives PDN Connectivity Reject message from the Network for Admin PDN: Codes 26, 30, 31, 34, 38, 95, 96, 97, 98, 99, 100, 101, and 111			
6.6	UE Receives PDN Connectivity Reject message from the Network for Admin PDN: Codes 8, 27, 29, 32, 33, and 112			
6.7	UE Receives PDN Connectivity Reject message from the Network for Internet PDN: Codes 8, 27, 29, 32, 33, and 112			
6.8	Network Fails to Respond to PDN Connectivity Request			

6.9	Network Fails to Refresh the IPv6 Address for the Internet PDN, IPv4 Address Assigned			
6.10	Network Fails to Assign an IPv6 Address for the Internet PDN on Network Attach, IPv4 Address Assigned on Internet			
6.12	UE Receives PDN Connectivity Reject message from the Network for ADMIN PDN: Code 33			
6.13	UE Makes Excessive PDN Connectivity Requests			
6.14	UE Makes Attach Request while Throttling on PDN			
6.15	UE Receives PDN Connectivity Reject message from the Network for Admin PDN: Codes 26 and 27 with T3396 Timer Set			
6.16	IoT UE Receives PDN Connectivity Reject Message from the Network for Internet PDN Codes 8, 27, 29, 32, and 33			
6.17	UE Receives PDN Connectivity Reject Message from the Network for Non-IMS PDN Code 55			
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 RRCONNECTIONREJECT MESSAGE INITIAL ATTACH

VZ_TC_DATA_RETRY_IMS_LESS_1500713

Description

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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 Internet application that will attempt to connect to the Internet 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 (Step 1)

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

2.2 RRCConnectionReject MESSAGE SENDING DATA TO A CONNECTED PDN VZ_TC_DATA_RETRY_IMS_LESS_1500714

Description

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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 Admin PDN (see section 1.5).
5. Verify that the UE is successful in connecting to the Admin 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.
 14. Force the DUT to the RRC IDLE state by having the network transmit an RRCConnectionRelease message.
 15. Switch the test application to the application transmitting state.
 16. 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 (Step 1)

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

2.3 NETWORK DOES NOT RESPOND TO RACH VZ_TC_DATA_RETRY_IMS_LESS_1500715

Description
<p>Definition</p> <p>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.</p> <p>Traceability</p> <ul style="list-style-type: none"> Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, <i>Device Requirements LTE Data Retry, Section 4.1</i> 3GPP TS 24.301: <i>Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3</i> 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification</i> <p>Applicability</p> <p>This test case applies to all UEs that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.</p>

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 Internet application that will attempt to connect to the Internet 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.

10. Verify that the UE sends a RACH request message 4 more times with each message separated by at least T3411 seconds.
11. After the fifth attempt fails, verify that the UE does not make a RACH attempt for at least T3402 minutes.
12. 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 Y2 where Y2 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.
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 T3411 seconds.
16. After the fifth attempt fails, verify that the UE does not make a RACH attempt for at least T3402 minutes.
17. While the second T3402 timer is running, re-configure the network so that the UE again finds service on PLMN Y1. Verify that the UE does not send a series of RACH attempts to the network until the expiration of the original T3402 timer.
Note : If UE support LTE only RAT , then UE may attempt to attach to the Network without waiting for the original T3402 timer to expire.

Expected Results (Step 1)

The UE applies its attach attempt counter and throttling as defined in **section Situation: UE Encounters RRC Failures During an Attach Attempt** of the Verizon Wireless LTE Data Retry Requirements.

2.4 MULTIPLE RRC FAILURES VZ_TC_DATA_RETRY_IMSLESS_1500716

Description
<p>Definition</p> <p>This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE encounters multiple RRC failures.</p> <p>Traceability</p> <ul style="list-style-type: none"> Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, Verizon Wireless Device Requirements LTE Data Retry, <i>Section 4.1</i> 3GPP TS 24.301: <i>Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3</i> 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification</i> <p>Applicability</p> <p>This test case applies to all UEs that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.</p>

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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. Configure the test equipment so that connEstFailOffset in SIB2 is set to 0.
2. Verify that the device under test (DUT) has an Internet application that will attempt to connect to the Internet 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. [Note: TE shall configure extendedWaitTimer for NB-IOT devices only]
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. Case-A (For Devices except Case-B) , perform the following steps:
 1. 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).
 2. 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.
 3. After the fourth retry attempt fails, verify that the next attach attempt does not occur for T3402 minutes.
 4. 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 Y2 where Y2 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.

5. Verify that the UE attempts to attach to the network without waiting for the T3402 timer to expire.
6. Re-configure the network so that the UE again finds service on PLMN Y1. Verify that the UE does not attempt to attach to the network until the expiration of the original T3402 timer. **Note** : If UE support LTE only RAT , then UE may attempt to attach to the Network without waiting for the original T3402 timer to expire.
7. Once the T3402 timer expires, verify that the DUT attempts to attach to the LTE network and that the network ignores the random access preamble.

17. Case-B : NBIOT (or Others if configured for NAS signaling Low priority) UEs, perform the following steps:

1. While the T3346 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).
2. Verify that after T3346 expires, the UE sends a RACH request to the LTE network and that the network ignores the random access preamble. This is considered Retry #1.
3. Verify that after T3411 seconds, UE sends an attach attempt to the LTE network and that the LTE network does not respond to the RACH attempt.
4. While the T3411 timer is running, re-configure the network so that the UE finds service on an eNodeB with a PLMN id equal to Y2 where Y2 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.
5. Verify that the UE attempts to attach to the network.
6. Re-configure the network so that the UE again finds service on PLMN Y1 and that accept the attach request from the UE. Verify that the UE sends an attach attempt to the network and it is accepted by the network.

18. Power the device off.

Expected Results (Step 1)

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

3.1 UE FAILS TO AUTHENTICATE THE NETWORK INVALID MAC CODE

VZ_TC_DATARETRYIMSLESS_1500717

Description

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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 Internet application that will attempt to connect to the Internet 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 Admin PDN from the DUT.
 11. Verify that the DUT attempts to connect to that eNodeB. (Note: this attempt may be suppressed if the Internet 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 Y2 where Y2 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 (Step 1)

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.

3.1a UE fails to authenticate to the NW - Invalid MAC - T1

VZ_TC_DATA_RETRYIMSLESS_4105999311931631

3.1b UE fails to authenticate to the NW - Invalid MAC - T2

VZ_TC_DATA_RETRY_IMSLESS_4105999311931632

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

VZ_TC_DATA_RETRYIMSLESS_1500718

Description

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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

- 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.
- 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.
- Verify that the device under test (DUT) has an Internet application that will attempt to connect to the Internet PDN as soon as the DUT is powered on and finds service on the LTE network.
- Power the DUT on and allow it to find LTE service.
- Verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.
- 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.
- 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 Admin PDN from the DUT.
11. Verify that the DUT attempts to connect to the LTE network. (Note: this attempt may be suppressed if the Internet 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.
13. Verify that the UE sends a NAS Authentication Failure message to the network with EMM Cause Code #26 "Non-EPS authentication not acceptable".
14. Ensure that the network does not transmit any further UE-directed messages for at least 25 seconds which will cause timer T3418 to expire.
15. Monitor the DUT for 5 minutes and verify that it does not attempt to attach to the LTE network.
16. Attempt to initiate a connection to the Admin PDN from the DUT.
17. Verify that the DUT does attempts to connect to the LTE network. (Note: this attempt may be suppressed if the Internet application made a second attempt and the device began a new 300 second timer).
18. 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.
19. Verify that the DUT attempts to attach to the LTE network on the new eNodeB.

Expected Results (Step 1)

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_DATA_RETRY_IMSLESS_1500719

Description

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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 Internet application that will attempt to connect to the Internet 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 Admin PDN from the DUT.
11. Verify that the DUT attempts to connect to the LTE network. (Note: this attempt may be suppressed if the Internet 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.
15. Verify that the DUT is successful in attaching to the network and connecting to the Internet PDN.
16. Reconfigure the test setup so that the DUT finds service on the original eNodeB (cell id = X1, PLMN id = Y1).
17. Attempt to initiate a connection to the Admin PDN from the DUT. Configure the test application for the application transmitting state with a retransmission timer set to 10 seconds.
18. Verify that the DUT does not attempt to connect to the LTE network until at least 5 minutes after the previous failure.

Expected Results (Step 1)

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 UE SENDS SECURITY MODE REJECT MESSAGE INITIAL ATTACH

VZ_TC_DATA_RETRY_IMS_LESS_1500720

Description

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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 Internet application that will attempt to connect to the Internet 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 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 Internet 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 Internet 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 Internet 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 Internet 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 (Step 1)

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.

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

VZ_TC_DATA_RETRY_IMSLESS_1500721

Description

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.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 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 and 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 (Step 1)

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.

4.7 UE RECEIVES ATTACH REJECT AND PDN CONNECTIVITY REJECT MESSAGES FROM THE NETWORK VZ_TC_DATA_RETRY_IMSLESS_1500722

Description

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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 Internet application that will attempt to connect to the Internet 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 Internet PDN, and that the network accepts the requests.

Expected Results (Step 1)

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).

4.8 UE RECEIVES ATTACH REJECT MESSAGE FROM THE NETWORK CODES 95, 96, 97, 99, AND 111 VZ_TC_DATARETRYIMSLESS_1500723

Description

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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 Internet application that will attempt to connect to the Internet 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 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.
14. Power the device off.
15. Repeat the test for EMM Cause Codes 96, 97, 99, and 111.

Expected Results (Step 1)

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

4.8a UE RECEIVES ATTACH REJECT MESSAGE FROM THE NETWORK CODES 95, 96, 97, 99, AND 111 - Code 95

VZ_TC_DATA_RETRYIMSLESS_4105999311931633

4.8b UE RECEIVES ATTACH REJECT MESSAGE FROM THE NETWORK CODES 95, 96, 97, 99, AND 111 - Code 96

VZ_TC_DATA_RETRYIMSLESS_4105999311931634

4.8c UE RECEIVES ATTACH REJECT MESSAGE FROM THE NETWORK CODES 95, 96, 97, 99, AND 111 - Code 97

VZ_TC_DATA_RETRYIMSLESS_4105999311931635

4.8d UE RECEIVES ATTACH REJECT MESSAGE FROM THE NETWORK CODES 95, 96, 97, 99, AND 111 - Code 98

VZ_TC_DATA_RETRYIMSLESS_4105999311931636

4.8e UE RECEIVES ATTACH REJECT MESSAGE FROM THE NETWORK CODES 95, 96, 97, 99, AND 111 - Code 111

VZ_TC_DATA_RETRYIMSLESS_4105999311931637

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

VZ_TC_DATA_RETRY_IMS_LESS_1500724

Description

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 that do not support IMS and are 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.

Pre-Conditions (Step 1 - Test 1)

Procedures (Step 1 - Test 1)

Test Procedure--Test 1

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 and 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 Admin 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 Admin 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 Admin 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.
21. Verify that the DUT connects to the Internet PDN using PDN Type IPv4.
22. Reconfigure the test setup so that the DUT again finds service on the original PLMN (with id equal to value Y2).
23. Verify that the DUT does not attempt to attach on PLMN Y2 for the remaining duration of the 15 minute timer.
24. For release 12 and 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 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 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.
 7. Verify that the DUT connects to the Internet PDN using PDN Type IPv4.

8. Power the device off.
25. For release 13 or later 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 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. Verify that the DUT connects to the Internet PDN using PDN Type IPv4.
 8. Power the device off.

Expected Results (Step 1 - Test 1)

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 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 24 hours but no more than 48 hours if it receives a NAS Attach Reject message with cause code 11.

Pre-Conditions (Step 2 - Test 2)

Procedures (Step 2 - Test 2)

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 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 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 Admin 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 Admin 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 Admin 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.
 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. 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 Y3. (At this point, the device shall have refrained from attaching to PLMN Y3 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 Y3.
 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 and 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 Y3. (At this point, the device shall have refrained from attaching to PLMN Y3 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 Y3.
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 (Step 2 - Test 2)

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 12hours but no more than 24hours if it receives a NAS Attach Reject message with cause code 11.

4.9a UE WITH T3245 TIMER RECEIVES ATTACH REJECT MESSAGE FROM THE NETWORK CODE 11 - T1

VZ_TC_DATA_RETRY_IMS_LESS_4105999311931655

4.9b UE WITH T3245 TIMER RECEIVES ATTACH REJECT MESSAGE FROM THE NETWORK CODE 11 - T2

VZ_TC_DATA_RETRY_IMS_LESS_4105999311931656

4.10 PERMANENT ATTACH FAILURES ACROSS POWER CYCLE

VZ_TC_DATA_RETRY_IMS_LESS_1500725

Description
<p>Description</p> <p>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.</p> <p>Traceability</p> <ul style="list-style-type: none"> • Verizon Wireless <i>Device Requirements LTE Data Retry, Section 3.10</i> • 3GPP TS 24.301: <i>Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3</i> • 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification</i> <p>Applicability</p> <p>This test case applies to all UEs that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.</p>

Pre-Conditions (Step 1)
Procedures (Step 1)
<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.
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 (Step 1)

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.

4.10a PERMANENT ATTACH FAILURES ACROSS POWER CYCLE - Code 3

VZ_TC_DATA_RETRY_IMSLESS_4105999311931657

4.10b PERMANENT ATTACH FAILURES ACROSS POWER CYCLE - Code 6 VZ_TC_DATA_RETRYIMSLESS_4105999311931658

4.10c PERMANENT ATTACH FAILURES ACROSS POWER CYCLE - Code 7

VZ_TC_DATA_RETRY_IMSLESS_4105999311931659

4.10d PERMANENT ATTACH FAILURES ACROSS POWER CYCLE - Code 8 VZ_TC_DATA_RETRYIMSLESS_4105999311931660

4.11 PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH DETACH REQUEST

VZ_TC_DATARETRYIMSLess_1500726

Description

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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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.
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 (Step 1)

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.

**4.11a PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH
DETACH REQUEST - Code 3** VZ_TC_DATA_RETRYIMSLESS_4105999311931661

4.11b PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH DETACH REQUEST - Code 6

VZ_TC_DATA_RETRY_IMSLESS_4105999311931662

**4.11c PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH
DETACH REQUEST - Code 7** VZ_TC_DATA_RETRYIMSLESS_4105999311931663

4.11d PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH DETACH REQUEST - Code 8

VZ_TC_DATA_RETRYIMSLESS_4105999311931664

4.1 UE RECEIVES ATTACH REJECT MESSAGE FROM THE NETWORK

CODE 19 VZ_TC_DATARETRYIMSLESS_1500727

Description

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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 Internet application that will attempt to connect to the Internet 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.
 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."
 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 54.
 14. Verify the DUT does not send an Attach Request while T3402 is running.

Expected Results (Step 1)

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

4.2 UE RECEIVES DETACH REQUEST MESSAGE FROM THE NETWORK CODES 3, 6, 7, AND 8 VZ_TC_DATA_RETRY_IMS_LESS_1500728

Description

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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 3. 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 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 Admin 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 Y2 where Y2 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 Admin 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 Admin 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 Admin PDN from the DUT.
 25. Verify that the DUT connects to the Admin PDN.
 26. Power the device off.
 27. Repeat the test for EMM Cause Codes of 3, 6, 7, and 8.

Expected Results (Step 1)

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.

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

VZ_TC_DATA_RETRY_IMS_LESS_1500729

Description

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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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, attaches to the LTE network, and 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 Admin 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 Admin 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 Admin 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.
 19. Verify that the DUT connects to the Internet PDN.
 20. Reconfigure the test setup so that the DUT again finds service on the original PLMN (with id equal to value Y3).
 21. Verify that the DUT does not attempt to attach on PLMN Y1.
 22. Power the device off.
 23. Change the PLMN identifier to a new value, Y5. The PLMN Y5 shall not be a home PLMN.
 24. 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 (Step 1)

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.

4.4 UE RECEIVES DETACH REQUEST MESSAGE FROM THE NETWORK CODES 12, 13, AND 15 VZ_TC_DATARETRYIMSLESS_1500730

Description

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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 Admin 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 Admin 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 Admin PDN from the DUT.
16. Verify that the DUT connects to the Admin PDN.
17. Reconfigure the test setup so that the DUT again finds service on the original TAI (with id equal to value Z1).
18. Verify that the DUT does not attempt to attach on TAI Z1.
19. Power the device off.
20. Repeat the test for EMM Cause Codes of 13 and 15.

Expected Results (Step 1)

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.

4.5 UE RECEIVES ATTACH REJECT MESSAGE FROM THE NETWORK

CODE 17 VZ_TC_DATARETRYIMSLESS_1500731

Description

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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 Internet application that will attempt to connect to the Internet 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 (Step 1)

After receiving the NAS Attach Reject message, the UE attempts to attach 4 more times with each attempt separated by at least T3411 seconds. After the fifth attempt fails, the next attempt does not occur for at least T3402 minutes.

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

VZ_TC_DATA_RETRY_IMS_LESS_1500732

Description

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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 and 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 Admin 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 Admin 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 Admin 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.
21. Verify that the DUT connects to the Internet PDN using PDN Type IPv4.
22. Reconfigure the test setup so that the DUT again finds service on the original PLMN (with id equal to value Y3).
23. Verify that the DUT does not attempt to attach on PLMN Y3 for the remaining duration of the 15 minute timer.
24. 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.
 4. Power the device on and verify that the device successfully attaches to the LTE network.
 5. Verify that the DUT connects to the Internet PDN using PDN Type IPv4.
 6. Power the device off.
25. For release 13 or later UEs, perform the following steps:
 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. Verify that the DUT connects to the Internet PDN using PDN Type IPv4.
6. Power the device off

Expected Results (Step 1)

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.

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.

4.13 UE WITH T3245 TIMER RECEIVES ATTACH REJECT MESSAGE FROM THE NETWORK CODE 8 VZ_TC_DATA_RETRY_IMS_LESS_1500733

Description
<p>Definition</p> <p>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.</p> <p>Traceability</p> <ul style="list-style-type: none"> Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, Verizon Wireless LTE Data Retry Device Requirements, <i>Section 3.8</i> 3GPP TS 24.301: <i>Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3</i> 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification</i> <p>Applicability</p> <p>These test cases apply to UEs that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.</p>

Pre-Conditions (Step 1)
Procedures (Step 1)
<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 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 Admin 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 Admin 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 Admin 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 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 Y2.
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. For release 12 or earlier UEs, perform the following steps:
 1. While keeping the device power on, remove the device from the test equipment and turn off the test script, and keep the device power on but test script off for 23 hours and 30 minutes.
 2. After 23 hours and 30 minutes have elapsed, reconnect the device to the test equipment and resume the test script.
 3. Monitor the device for 15 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 24 hours since the initial NAS Attach Reject message.)
 4. While keeping the device power on, remove the device from the test equipment and turn off the test script, and keep the device power on but test script off for an additional 24 hours.
 5. While the device is powered on and removed from the test equipment, configure the test equipment such that the network will allow the UE to attach successfully on PLMN Y1.
 6. After 24 hours has expired, reconnect the device to the test equipment and resume the test script. Verify that the device successfully attaches to the LTE network.
 7. Power the device off.

24. For release 13 or later UEs, perform the following steps:

1. While keeping the device power on, remove the device from the test equipment and turn off the test script, and keep the device power on but test script off for 11 hours and 30 minutes.
2. After 11 hours and 30 minutes have elapsed, reconnect the device to the test equipment and resume the test script.
3. Monitor the device for 15 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 12 hours since the initial NAS Attach Reject message.)
4. While keeping the device power on, remove the device from the test equipment and turn off the test script, and keep the device power on but test script off for an additional 12 hours.
5. While the device is powered on and removed from the test equipment, configure the test equipment such that the network will allow the UE to attach successfully on PLMN Y1.
6. After 12 hours has expired, reconnect the device to the test equipment and resume the test script. Verify that the device successfully attaches to the LTE network.
7. Power the device off.

Expected Results (Step 1)

An LTE Release 12 or earlier UE configured for timer T3245 does not attempt any further connections within a PLMN for at least 24 hours but no more than 48 hours if it receives a NAS Attach Reject message with cause code 8.

An LTE Release 13 or later UE configured for timer T3245 does not attempt any further connections within a PLMN for at least 12 hours but no more than 24 hours if it receives a NAS Attach Reject message with cause code 8.

5.6 TRACKING AREA UPDATE REQUEST FAILS TRACKING AREA UPDATE ATTEMPT COUNTER REACHES MAX VALUE

VZ_TC_DATA_RETRY_IMS_LESS_1500734

Description
<p>Definition</p> <p>This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE's tracking area update attempt counter reaches its maximum value.</p> <p>Traceability</p> <ul style="list-style-type: none"> Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, <i>Device Requirements LTE Data Retry, Section 4.3.4</i> 3GPP TS 24.301: <i>Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3</i> 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification</i> <p>Applicability</p> <p>This test case applies to all UEs that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.</p>

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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. Force the DUT to the RRC IDLE state by having the network transmit an RRCConnectionRelease message.
6. 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 UE's list of tracking areas. Note that only the TAC portion of the TAI will be different. The PLMN id is still equal to Y1. Configure the test equipment such that the network does not respond to RACH attempts from the UE (i.e.,

- ignores the random access preamble).
7. Verify that the UE sends a series of RACH attempts for T300 seconds.
 8. Verify that the network does not respond to the RACH attempts from the UE.
 9. Verify that the UE waits at least T3411 seconds before sending another series of RACH attempts. Verify that the network ignores the random access procedure.
 10. After the random access procedure fails, verify that the UE waits at least T3411 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.
 11. 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.]
 12. After the RRCConnectionRequest fails, verify that the UE waits at least 10 seconds before sending another series of RACH attempts.
 13. 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.
 14. Verify that after the expiration of T3430 + T3411, the UE sends a NAS Tracking Area Update Request message to the network.
 15. Verify that the network does not respond to the NAS Tracking Area Update Request message.
 16. Verify that after the expiration of T3430 + T3411, the UE sends a NAS Tracking Area Update Request message to the network.
 17. Verify that the network does not respond to the NAS Tracking Area Update Request message.
 18. 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.
 19. Verify that the UE sends a second cluster of five NAS Tracking Area Update Request messages with each individual message separated by at least T3411 seconds. After that, verify that the UE sends no additional NAS Tracking Area Update Request messages for at least T3402 minutes.
 20. Verify that the UE sends a third cluster of NAS Tracking Area Update Request messages with each individual message separated by at least T3411 seconds. After that, verify that the UE sends no additional NAS Tracking Area Update Request messages for at least T3402 minutes.
 21. 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 Y2 where Y2 is not equal to Y1. The frequency of the second PLMN shall be the same as the first.
 22. Verify that the UE sends a NAS Tracking Area Update Request to the network without waiting for the T3402 timer to expire.

23. Re-configure the network so that the UE again finds service on PLMN Y1. Verify that the UE does not attempt to attach to the network until the expiration of the original T3402 timer. **Note** : If UE support LTE only RAT , then UE may attempt to attach to the Network without waiting for the original T3402 timer to expire.
24. Power the device off.

Expected Results (Step 1)

The UE is limited to groups of 5 TAU attempts where each request is separated by T3411 seconds and each group is separated by T3402 minutes.

5.7 UE RECEIVES TRACKING AREA UPDATE REJECT MESSAGE FROM THE NETWORK CODE 17 VZ_TC_DATA_RETRY_IMS_LESS_1500735

Description

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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 Internet application that will attempt to connect to the Internet 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.
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 (Step 1)

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.

5.8 UE WITH T3346 TIMER SUPPORT RECEIVES SERVICE REJECT MESSAGE FROM THE NETWORK CODE 22 VZ_TC_DATARETRYIMSLESS_1500736

Description

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.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 Admin 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 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 and 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 service request without waiting for T3346 to expire.
19. Power the UE off.

Expected Results (Step 1)

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 Service Request in that PLMN.

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

VZ_TC_DATA_RETRY_IMS_LESS_1500738

Description
<p>Definition</p> <p>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.</p> <p>Traceability</p> <ul style="list-style-type: none"> Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, Verizon Wireless Device Requirements LTE Data Retry, <i>Section 4.3.4.1</i> 3GPP TS 24.301: <i>Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3, Release 10 or later</i> 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification</i> <p>Applicability</p> <p>This test case applies only to UEs with T3346 timer support that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.</p>

Pre-Conditions (Step 1)
Procedures (Step 1)
<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 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 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 and 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 (Step 1)

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.

5.12 PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH SERVICE REQUEST

VZ_TC_DATA_RETRY_IMS_LESS_1500740

Description
<p>Description</p> <p>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.</p> <p>Traceability</p> <ul style="list-style-type: none"> Verizon Wireless <i>Device Requirements LTE Data Retry, Section 3.10</i> 3GPP TS 24.301: <i>Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3</i> 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification</i> <p>Applicability</p> <p>This test case applies to all UEs that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.</p>

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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

Expected Results (Step 1)

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.

5.13 PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH TRACKING AREA UPDATE

VZ_TC_DATA_RETRY_IMS_LESS_1500741

Description

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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Step 1)

Procedures (Step 1)

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 UE's 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. 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.
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. 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.
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 (Step 1)

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.

5.1 UE RECEIVES SERVICE REJECT MESSAGE FROM THE NETWORKCODE 11 VZ_TC_DATA_RETRY_IMSLESS_1500742

Description

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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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. 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.
 - Verify that the DUT successfully establishes an RRC connection and attaches to the network, and connects to the Internet PDN using PDN Type IPv4.
4. Initiate the test application (see *section TEST EQUIPMENT CONFIGURATION*) and verify that it connects successfully to the Admin PDN. Configure the test application for the application idle state.
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 Service Request messages with a NAS Service Reject message with an EMM Cause

Code of 11.

7. Configure the test application for the application transmitting state with a retransmission timer of 10 seconds.
8. 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.
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 Y2.
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 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.
13. Verify that the DUT does not attempt to connect to the LTE network on the new Tracking Area.
14. Configure the test equipment such that the network will allow attachment.
15. 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.
16. Verify that the DUT now attempts to connect to the LTE network and is successful
17. .Verify that the DUT connects to the Internet PDN using PDN Type IPv4.

Expected Results (Step 1)

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

VZ_TC_DATA_RETRY_IMSLESS_1500743

Description

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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 Admin 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 Admin PDN.
21. Power the device off.
22. Repeat the test for EMM Cause Codes of 13 and 15.

Expected Results (Step 1)

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.

5.3 SERVICE REQUEST FAILS GENERIC THROTTLING ALGORITHM INVOKED VZ_TC_DATA_RETRY_IMS_LESS_1500744

Description

Definition

This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE's 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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

Release 11 and Earlier 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 Admin 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 plus a random time between 0 and 15 seconds.
12. 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 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 2 minutes.
14. 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 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 8 minutes.
16. 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.
17. Verify that the UE does not request the connection over the air for the next 15 minutes.
18. 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.
19. Verify that the UE does not request the connection over the air for the next 15 minutes.
20. While the fifteen minute throttling timer is running, re-configure the network 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.

21. Verify that the UE sends a NAS Tracking Area Update Request for PLMN Y2 and connects to the 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 Admin 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 plus a random time equal to or greater than 15 seconds.
12. 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 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 plus a random time equal to or greater than 15 seconds.

14. After 1+ minute timer expire, verify that the UE does attempt to connect to the LTE network.
15. Power the device off.

Expected Results (Step 1)

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

5.4 UE RECEIVES SERVICE REJECT MESSAGE FROM THE NETWORK CODE 17 VZ_TC_DATA_RETRY_IMSLESS_1500745

Description

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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 Admin 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 17.
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 17.
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 17.
11. 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 17.
12. 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.
13. 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 17.
14. Verify that the UE does not request the connection over the air for the next 2 minutes.
15. 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 17.
16. Verify that the UE does not request the connection over the air for the next 8 minutes.
17. 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 17.
18. Verify that the UE does not request the connection over the air for the next 15 minutes.
19. 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 17.
20. Verify that the UE does not request the connection over the air for the next 15 minutes.

Expected Results (Step 1)

The UE applies the throttling behavior as defined in sections 3.3 and 4.4.1.2 of the Verizon Wireless LTE Data Retry Requirements.

5.5 UE RECEIVES TRACKING AREA UPDATE REJECT MESSAGE FROM THE NETWORK CODES 12, 13, AND 15 VZ_TC_DATA_RETRY_IMS_LESS_1500746

Description

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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 (Step 1)

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.

6.7 UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR INTERNET PDN CODES 8, 27, 29, 32, 33, AND 112

VZ_TC_DATA_RETRY_IMSLESS_1500747

Description

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 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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 Internet application that will attempt to connect to the Internet 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 8. 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 8.
 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 8.
 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 8.
 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 8.
 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 8.
 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 8.

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 Internet PDN, and that the network accepts the requests.
24. Power the device off.
25. Repeat the test for ESM Cause Codes 27, 29, 32, 33, and 112.

Expected Results (Step 1)

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).

6.8 NETWORK FAILS TO RESPOND TO PDN CONNECTIVITY REQUEST

VZ_TC_DATA_RETRY_IMS_LESS_1500748

Description

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 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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 Internet application that will attempt to connect to the Internet 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 Admin PDN. Configure the DUT so that, for the Admin 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 Admin 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.
14. 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.
15. 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.
16. 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.
17. 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.
18. Verify that the UE does not request the connection over the air for the next 2 minutes.
19. 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 (Step 1)

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 eNetwork Responds with a "PDN CONNECTIVITY REJECT" message with no ESM Cause Code*** of the Verizon Wireless LTE Data Retry Requirements.

6.9 NETWORK FAILS TO REFRESH THE IPV6 ADDRESS FOR THE INTERNET PDN, IPV4 ADDRESS ASSIGNED VZ_TC_DATA_RETRY_IMS_LESS_1500749

Description

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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 and the Internet 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 and an IPv4 address when the device connects to the Internet PDN.
4. Verify that the DUT has an Internet application that will attempt to connect as soon as the DUT is powered on and an application that will connect to the Admin 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 Internet 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 Internet 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 Internet PDN and uses the IPv4 address for all communication with the Internet PDN.

Expected Results (Step 1)

UE follows the required retry algorithm when the PDN does not refresh the IPv6 address of the Internet PDN.

6.10 NETWORK FAILS TO ASSIGN AN IPV6 ADDRESS FOR THE INTERNET PDN ON NETWORK ATTACH, IPV4 ADDRESS ASSIGNED TO INTERNET VZ_TC_DATA_RETRY_IMS_LESS_1500750

Description

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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Test Procedure)

Procedures (Test Procedure)

Test Procedure

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 network will not respond to the UE's IPv6 Router Solicitation messages for the Internet PDN.
3. Configure the test equipment so that the network will assign an IPv6 Interface ID and IPv4 address when the device connects to the Internet PDN.
4. Verify that the DUT has an Internet 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. Verify that the DUT successfully establishes an RRC connection, attaches to the network, and connects to the Internet PDN.
7. Verify that the UE sends IPv6 Router Solicitation messages to the network for

- the Internet PDN and that the network does not respond.
8. 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.
 10. Re-configure the network to respond to the UE's IPv6 Router Solicitation messages for the Internet PDN.
 11. Power cycle the UE.
 12. Verify that the UE successfully attaches to the LTE network and connects to the Internet PDN.
 13. Power the device off.

Expected Results (Test Procedure)

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.

6.11 NETWORK FAILS TO ASSIGN AN IPV6 ADDRESS FOR THE INTERNET PDN ON NETWORK ATTACH, NO IPV4 ADDRESS ASSIGNED VZ_TC_DATA_RETRY_IMS_LESS_1500751

Description

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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 Internet application that will attempt to connect to the Internet 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 allow the UE to attach and connect to the Internet PDN but the network will not respond to the UEs IPv6 Router Solicitation messages for the Internet PDN.
8. 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.
9. Verify that the DUT successfully establishes an RRC connection, attaches to the network, and connects to the Internet PDN.
10. Verify that the UE sends IPv6 Router Solicitation messages to the network for the Internet PDN and that the network does not respond.
11. 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.
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 Internet PDN.
15. Upon expiry of timer T3402, verify that the UE re-attaches to the network and connects to the Internet PDN.

Expected Results (Step 1)

When the network does not assign either an IPv6 address or IPv4 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 Internet PDN.

6.13 UE MAKES EXCESSIVE PDN CONNECTIVITY REQUESTS

VZ_TC_DATA_RETRY_IMS_LESS_1500753

Description
<p>Definition</p> <p>This test verifies that the UE meets Verizon Wireless requirements for data retry when the UE makes excessive NAS PDN Connectivity Requests to the Admin PDN on the LTE network.</p> <p>Traceability</p> <ul style="list-style-type: none"> Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, Verizon Wireless LTE Data Retry Device Requirements, <i>Section 4.5.2.4</i> 3GPP TS 24.301: <i>Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3</i> 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification</i> <p>Applicability</p> <p>This test case applies to all UEs that do not support IMS and are 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.</p>

Pre-Conditions (Step 1 - Test 1)
NOTE: This test shall be executed with the device in tethered mode with the AT command interface active.
Procedures (Step 1 - Test 1)
<p>Test Procedure--Test 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. Configure the DUT so that, for the Admin 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 Admin 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 Admin PDN. 6. Verify that the UE sends a NAS PDN Connectivity Request and successfully

- connects to the Admin PDN.
7. Send the AT test command to deactivate the PDP context (+CGACT) on the DUT for the Admin PDN.
8. Verify that the UE disconnects from the Admin PDN.
9. Wait one minute, then send the AT test command to define a PDP context (+CGACT) on the DUT for the Admin PDN.
10. Verify that the UE sends a second NAS PDN Connectivity Request and successfully re-connects to the Admin PDN.
11. Send the AT test command to deactivate the PDP context (+CGACT) on the DUT for the Admin PDN.
12. Verify that the UE disconnects from the Admin PDN.
13. At one minute intervals, send the AT test command to define a PDP context (+CGACT) on the DUT for the Admin PDN.
14. Verify that the UE waits at least 15 minutes before sending another NAS PDN Connectivity Request for the Admin PDN.
15. Verify the UE successfully connects to the Admin PDN.
16. Reconfigure the DUT so that the WAIT_TIME parameter is set to 180 seconds.
17. Send the AT test command to deactivate the PDP context (+CGACT) on the DUT for the Admin PDN.
18. Verify that the UE disconnects from the Admin PDN.
19. At 30 second intervals, send the AT test command to define a PDP context (+CGACT) on the DUT for the Admin PDN.
20. Verify that the UE waits at least 3 minutes before sending another NAS PDN Connectivity Request for the Admin PDN.
21. Verify the UE successfully connects to the Admin PDN.
22. Send the AT test command to deactivate the PDP context (+CGACT) on the DUT for the Admin PDN.
23. Verify that the UE disconnects from the Admin PDN.
24. At one minute intervals, send the AT test command to define a PDP context (+CGACT) on the DUT for the Admin PDN.
25. Verify that the UE waits at least 3 minutes before sending another NAS PDN Connectivity Request for the Admin PDN.
26. Verify the UE successfully connects to the Admin PDN.
27. Reconfigure the DUT so that the WAIT_TIME parameter is set to 30 seconds.
28. Send the AT test command to deactivate the PDP context (+CGACT) on the DUT for the Admin PDN.
29. Verify that the UE disconnects from the Admin PDN.
30. At 15 second intervals, send the AT test command to define a PDP context (+CGACT) on the DUT for the Admin PDN.
31. Verify that the UE waits at least 30 seconds before sending another NAS PDN Connectivity Request for the Admin PDN.
32. Verify the UE successfully connects to the Admin PDN.
33. Send the AT test command to deactivate the PDP context (+CGACT) on the DUT for the Admin PDN.
34. Verify that the UE disconnects from the Admin PDN.
35. At one minute intervals, send the AT test command to define a PDP context

- (+CGACT) on the DUT for the Admin PDN.
36. Verify that the UE waits at least 15 minutes before sending another NAS PDN Connectivity Request for the Admin PDN.
37. 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.
38. Verify that the UE waits until the 15 minute timer has expired before sending another NAS PDN Connectivity Request for the Admin PDN.
39. Verify the UE successfully connects to the Admin PDN.
40. Send the AT test command to deactivate the PDP context (+CGACT) on the DUT for the Admin PDN.
41. Verify that the UE disconnects from the Admin PDN.
42. Verify that the UE waits at least 30 seconds before sending another NAS PDN Connectivity Request for the Admin PDN.
43. Verify the UE successfully connects to the Admin PDN.
44. Send the AT test command to deactivate the PDP context (+CGACT) on the DUT for the Admin PDN.
45. Verify that the UE disconnects from the Admin PDN.
46. Verify that the UE waits at least 15 minutes before sending another NAS PDN Connectivity Request for the Admin PDN.
47. After 10 minutes of the 15 minute timer have elapsed, power off the UE for 5 minutes.
48. After 5 minutes have elapsed, power on the UE.
49. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network.
50. Send the AT test command to define a PDP context (+CGACT) on the DUT for the Admin PDN.
51. Verify that the UE sends a NAS PDN Connectivity Request within 5 minutes and successfully connects to the Admin PDN.
52. Send the AT test command to deactivate the PDP context (+CGACT) on the DUT for the Admin PDN.
53. Verify that the UE disconnects from the Admin PDN.
54. Wait one minute, then send the AT test command to define a PDP context (+CGACT) on the DUT for the Admin PDN.
55. Verify that the UE sends a second NAS PDN Connectivity Request and successfully re-connects to the Admin PDN.
56. Send the AT test command to deactivate the PDP context (+CGACT) on the DUT for the Admin PDN.
57. Verify that the UE disconnects from the Admin PDN.
58. At 30 second intervals, send the AT test command to define a PDP context (+CGACT) on the DUT for the Admin PDN.
59. Verify that the UE waits at least 15 minutes before sending another NAS PDN Connectivity Request for the Admin PDN.
60. Verify the UE successfully connects to the Admin PDN.
61. Power the device off.

Expected Results (Step 1 - Test 1)

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.

Pre-Conditions (Step 2 - Test 2)

NOTE: This test shall be executed with the device in tethered mode with the AT command interface active.

Procedures (Step 2 - Test 2)

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 Y1, and TAI equal to value Z1. Configure the DUT so that, for the Admin 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 Admin 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 Admin PDN.
6. Verify that the UE sends a NAS PDN Connectivity Request and successfully connects to the Admin PDN.
7. Send the AT test command to deactivate the PDP context (+CGACT) on the DUT for the Admin PDN.
8. Verify that the UE disconnects from the Admin PDN.
9. Wait one minute, then send the AT test command to define a PDP context (+CGACT) on the DUT for the Admin PDN.
10. Verify that the UE sends a second NAS PDN Connectivity Request and successfully re-connects to the Admin PDN.
11. Send the AT test command to deactivate the PDP context (+CGACT) on the DUT for the Admin PDN.
12. Verify that the UE disconnects from the Admin PDN.
13. At one minute intervals, send the AT test command to define a PDP context (+CGACT) on the DUT for the Admin PDN.
14. Verify that the UE waits at least 15 minutes before sending another NAS PDN Connectivity Request for the Admin PDN.
15. Verify the UE successfully connects to the Admin PDN.
16. Reconfigure the DUT so that the WAIT_TIME parameter is set to 180 seconds.
17. Send the AT test command to deactivate the PDP context (+CGACT) on the DUT for the Admin PDN.

18. Verify that the UE disconnects from the Admin PDN.
- 19.
20. At 30 second intervals, send the AT test command to define a PDP context (+CGACT) on the DUT for the Admin PDN.
21. Verify that the UE waits at least 3 minutes before sending another NAS PDN Connectivity Request for the Admin PDN.
22. Verify the UE successfully connects to the Admin PDN.
23. Send the AT test command to deactivate the PDP context (+CGACT) on the DUT for the Admin PDN.
24. Verify that the UE disconnects from the Admin PDN.
25. At one minute intervals, send the AT test command to define a PDP context (+CGACT) on the DUT for the Admin PDN.
26. Verify that the UE waits at least 2 minutes before sending another NAS PDN Connectivity Request for the Admin PDN.
27. Verify the UE successfully connects to the Admin PDN.
28. Reconfigure the DUT so that the WAIT_TIME parameter is set to 30 seconds.
29. Send the AT test command to deactivate the PDP context (+CGACT) on the DUT for the Admin PDN.
30. Verify that the UE disconnects from the Admin PDN.
- 31.
32. At 15 second intervals, send the AT test command to define a PDP context (+CGACT) on the DUT for the Admin PDN.
33. Verify that the UE waits at least 30 seconds before sending another NAS PDN Connectivity Request for the Admin PDN.
34. Verify the UE successfully connects to the Admin PDN.
35. Send the AT test command to deactivate the PDP context (+CGACT) on the DUT for the Admin PDN.
36. Verify that the UE disconnects from the Admin PDN.
37. At one minute intervals, send the AT test command to define a PDP context (+CGACT) on the DUT for the Admin PDN.
38. Verify that the UE waits at least 15 minutes before sending another NAS PDN Connectivity Request for the Admin PDN.
39. 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.
40. Verify that the UE waits until the 15 minute timer has expired before sending another NAS PDN Connectivity Request for the Admin PDN.
41. Verify the UE successfully connects to the Admin PDN.
42. Send the AT test command to deactivate the PDP context (+CGACT) on the DUT for the Admin PDN.
43. Verify that the UE disconnects from the Admin PDN.
44. Verify that the UE waits at least 30 seconds before sending another NAS PDN Connectivity Request for the Admin PDN.
45. Verify the UE successfully connects to the Admin PDN.
46. Send the AT test command to deactivate the PDP context (+CGACT) on the DUT for the Admin PDN.

47. Verify that the UE disconnects from the Admin PDN.
48. Verify that the UE waits at least 15 minutes before sending another NAS PDN Connectivity Request for the Admin PDN.
49. After 5 minutes have elapsed since Step 45), power off the UE for 5 minutes.
50. After 5 minutes have elapsed, power on the UE.
51. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network.
52. Send the AT test command to define a PDP context (+CGACT) on the DUT for the Admin PDN.
53. Verify that the UE waits at least 10 minutes from power on before sending another NAS PDN Connectivity Request for the Admin PDN.
54. Verify that the UE successfully connects to the Admin PDN.
55. Send the AT test command to deactivate the PDP context (+CGACT) on the DUT for the Admin PDN.
56. Verify that the UE disconnects from the Admin PDN.
57. Wait one minute, then send the AT test command to define a PDP context (+CGACT) on the DUT for the Admin PDN.
58. Verify that the UE sends a second NAS PDN Connectivity Request and successfully re-connects to the Admin PDN.
59. Send the AT test command to deactivate the PDP context (+CGACT) on the DUT for the Admin PDN.
60. Verify that the UE disconnects from the Admin PDN.
61. At 30 second intervals, send the AT test command to define a PDP context (+CGACT) on the DUT for the Admin PDN.
62. Verify that the UE waits at least 15 minutes before sending another NAS PDN Connectivity Request for the Admin PDN.
63. Verify the UE successfully connects to the Admin PDN.
64. Power the device off.

Expected Results (Step 2 - Test 2)

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.

6.14 UE MAKES ATTACH REQUEST WHILE THROTTLING ON PDN

VZ_TC_DATA_RETRY_IMS_LESS_1500754

Description
<p>Definition</p> <p>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 Internet PDN on the LTE network.</p> <p>Traceability</p> <ul style="list-style-type: none"> Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, Verizon Wireless Device Requirements LTE Data Retry, <i>Section 4.5.2.3</i> 3GPP TS 24.301: <i>Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3</i> 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification</i> <p>Applicability</p> <p>This test case applies to all UEs that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.</p>

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 Internet 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 Internet PDN.
6. Initiate the test application (see **section TEST EQUIPMENT CONFIGURATION**) and verify that it connects successfully to the Admin 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 Internet PDN.
9. Verify that the UE disconnects from the Internet 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 Internet 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 Internet 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 Internet PDN.
13. Verify that the UE immediately attempts to re-connect to the Internet 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 Internet 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 Internet 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 Internet 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 Internet 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 Internet PDN.
21. Verify that the UE immediately attempts to attach to the LTE network and connect to the Internet PDN.
22. Verify that the UE successfully attaches to the LTE network and connects to the Internet PDN.

Expected Results (Step 1)

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 Internet PDN.

6.1 NETWORK FAILS TO REFRESH THE IPV6 ADDRESS FOR THE INTERNET PDN, NO IPV4 ADDRESS ASSIGNED VZ_TC_DATA_RETRY_IMS_LESS_1500755

Description

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.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 and the Internet 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 Internet PDN.
4. Verify that the DUT has an Internet application that will attempt to connect as soon as the DUT is powered on and an application that will connect to the Admin 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 Internet 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 Admin PDN and verify that it connects successfully.
 9. Verify that the device sends a Router Solicitation message to the Internet PDN after between 3 and 4 minutes have elapsed from the receipt of the first Router Advertisement message.
 10. Verify that the network does not respond to the Router Solicitation messages.
 11. 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.
 12. Verify that the UE disconnects from the Internet PDN.
 13. 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.
 14. 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.
 15. Verify that the UE disconnects from the Internet PDN. This is considered Retry #1.
 16. 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.
 17. 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.
 18. Verify that the UE disconnects from the Internet PDN. This is considered Retry #2.
 19. Verify that the device does not connect to the Internet PDN for at least 1 minute. 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 #3.
 22. Verify that the device does not connect to the Internet PDN for at least 2 minutes. 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 #4.
25. Verify that the device does not connect to the Internet PDN for at least 8 minutes. 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 #5.
28. Verify that the device does not connect to the Internet PDN for at least 15 minutes. 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 #6.
31. Verify that the device does not connect to the Internet PDN for at least 15 minutes. Once the UE does connect again to the Internet PDN, verify that the network does not assign an IPv4 address during the connection.
32. 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.
33. Verify that the UE disconnects from the Internet PDN. This is considered Retry #7.

Expected Results (Step 1)

UE follows the required retry algorithm when the PDN does not refresh the IPv6 address of the Internet PDN.

6.15 UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR ADMIN PDN CODES 26 AND 27 WITH T3396 TIMER SET VZ_TC_DATA_RETRY_IMS_LESS_1500756

Description

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 1.4.5.2.1.4*
VZ_REQ_LTE_DATA_RETRY_7766
- 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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 10 minutes when the UE attempts to connect to the Admin 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 Admin 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 10 minutes.

7. Verify that the UE waits 10 minutes before issuing another NAS PDN Connectivity Request for the Admin 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 Admin 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 Admin 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 Admin PDN.
 - For ESM cause code 27, the UE issues a PDN Connectivity Request for the Admin 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 (Step 1)

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

6.2 NETWORK FAILS TO ASSIGN AN IPV6 ADDRESS FOR THE ADMIN PDN- INITIAL CONNECTION, NO IPV4 ADDRESS ASSIGNED

VZ_TC_DATA_RETRY_IMS_LESS_1500757

Description
<p>Definition</p> <p>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.</p> <p>Traceability</p> <ul style="list-style-type: none"> Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, <i>Device Requirements LTE Data Retry, Section 4.6</i> 3GPP TS 24.301: <i>Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3</i> 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification</i> IETF RFC 4861: <i>Neighbor Discovery for IP version 6 (IPv6)</i> <p>Applicability</p> <p>This test case applies to all UEs that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.</p>

Pre-Conditions (Step 1)
Procedures (Step 1)
<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 Admin PDN but the Admin 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 Admin 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 Admin 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 Admin 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 Admin PDN.
10. Verify that the device connects to the Admin 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 Admin 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.
12. Verify that the UE disconnects from the Admin PDN. This is considered Retry #1.
13. Verify that the device connects to the Admin PDN within one minute. Verify that the network does not assign an IPv4 address during the connection.
14. Verify that the UE sends IPv6 Router Solicitation messages to the network for the Admin 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.
15. Verify that the UE disconnects from the Admin PDN. This is considered Retry #2.
16. Verify that the device does not connect to the Admin 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.
17. Verify that the UE sends IPv6 Router Solicitation messages to the network for the Admin 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.
18. Verify that the UE disconnects from the Admin PDN. This is considered Retry #3.
19. Verify that the device does not connect to the Admin 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 Admin 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 Admin PDN. This is considered Retry #4.
22. Verify that the device does not connect to the Admin PDN for at least [8 minutes minus 12 seconds]. Once the UE does connect again to the Admin 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 Admin 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 Admin PDN. This is considered Retry #5.
25. Verify that the device does not connect to the Admin PDN for at least [15 minutes minus 12 seconds]. Once the UE does connect again to the Admin 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 Admin 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 Admin PDN. This is considered Retry #6.
28. Verify that the device does not connect to the Admin PDN for at least [15 minutes minus 12 seconds]. Once the UE does connect again to the Admin 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 Admin 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 Admin PDN. This is considered Retry #7.

Expected Results (Step 1)

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

6.3 NETWORK FAILS TO ASSIGN AN IPV6 ADDRESS FOR THE ADMIN PDN- INITIAL CONNECTION, IPV4 ADDRESS ASSIGNED

VZ_TC_DATA_RETRY_IMS_LESS_1500758

Description
<p>Definition</p> <p>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 the Admin PDN initial connection where an IPv4 address is assigned.</p> <p>Traceability</p> <ul style="list-style-type: none"> Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, <i>Device Requirements LTE Data Retry, Section 4.6</i> 3GPP TS 24.301: <i>Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3</i> 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification</i> IETF RFC 4861: <i>Neighbor Discovery for IP version 6 (IPv6)</i> <p>Applicability</p> <p>This test case applies to all UEs that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.</p>

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 Admin PDN but the Admin 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 Admin 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 Admin 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 Admin 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 Admin PDN and uses the IPv4 address for all communication with the Admin PDN.

Expected Results (Step 1)

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

6.4 UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR THE INTERNET PDN- SUBSEQUENT ATTACHMENT

VZ_TC_DATA_RETRY_IMS_LESS_1500759

Description

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 Internet PDN on the LTE network.

Traceability

- Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, *Device Requirements LTE Data Retry, Section 4.5.2.1.1*
- 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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 Internet 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 Internet PDN.
6. Initiate the test application (see **section TEST EQUIPMENT CONFIGURATION**) and verify that it connects successfully to the Admin 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 Internet PDN.

9. Verify that the UE disconnects from the Internet 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 Internet PDN. Note that the T3396 Value IE is not included in the PDN Connectivity Reject message.
11. Initiate the Internet test application (see **section TEST EQUIPMENT CONFIGURATION**) for the application transmitting state with a retransmission timer of 10 seconds..
12. Verify that the UE immediately attempts to re-connect to the Internet PDN on behalf of the test application 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 Internet PDN.
14. Verify that upon the next request of the test application the UE attempts to re-connect to the Internet PDN without delay 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 upon the next request of the test application the UE attempts a third time to connect to the Internet PDN without delay by sending a NAS PDN Connectivity Request message and that the network responds with a NAS PDN Connectivity Reject message with cause code 26.
16. Verify that the UE does not attempt a NAS PDN Connectivity Request for the Internet PDN for the next 1 minute plus a random time between 0 and 15 seconds.
17. 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.
18. Verify that the UE does not attempt a NAS PDN Connectivity Request for the Internet PDN for the next 2 minutes.
19. 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.
20. Verify that the UE does not attempt a NAS PDN Connectivity Request for the Internet PDN for the next 8 minutes.
21. 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.
22. Verify that the UE does not attempt a NAS PDN Connectivity Request for the Internet PDN for the next 15 minutes.
23. 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.
24. Verify that the UE does not attempt a NAS PDN Connectivity Request for the Internet PDN for the next 15 minutes.
25. While the fifteen minute throttling timer is running, re-configure the network so that the network accepts the PDN Connectivity Request for the Internet PDN.

26. Once the fifteen minute timer expires, verify that the UE successfully connects to the Internet PDN.
27. Repeat the test for ESM Cause Codes 30, 31, 34, 38, 95-101, and 111.

Expected Results (Step 1)

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 Internet PDN.

6.5 UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR ADMIN PDN CODES 26, 30, 31, 34, 38, 95, 96, 97, 98, 99, 100, 101, and 111 VZ_TC_DATA_RETRY_IMSLESS_1500760

Description

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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 Admin PDN. Note that the T3396 Value IE is not included in the PDN Connectivity Reject message. Configure the DUT so that, for the Admin 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.
11. 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.
12. 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.
13. 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.
14. 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.
15. 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.
16. 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.
17. 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.
18. 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.
19. Repeat the test for ESM cause codes 26, 30, 31, 34, 38, 95, 96, 97, 98, 99, 100, 101, and 111.

Expected Results (Step 1)

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

6.6 UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR ADMIN PDN CODES 8, 27, 29, 32, 33, AND 112

VZ_TC_DATA_RETRY_IMS_LESS_1500761

Description
<p>Definition</p> <p>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.</p> <p>Traceability</p> <ul style="list-style-type: none"> Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, <i>Device Requirements LTE Data Retry, Section 4.5.1</i> 3GPP TS 24.301: <i>Non-Access-Stratum (NAS) Protocol for Evolved Packet System (EPS); Stage 3</i> 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification</i> <p>Applicability</p> <p>This test case applies to all UEs that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network. The Test case is not applicable for IOT devices which can not be power cycled.</p>

Pre-Conditions (Step 1)
Procedures (Step 1)
<p>Test Procedure</p> <p>Release 11 and Earlier UE</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 8 when the UE attempts to connect to the Admin PDN. Note that the T3396 Value IE is not included in the PDN Connectivity Reject message. Configure the DUT so that, for the Admin 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 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 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. 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 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 to reject a tracking area update request from the UE with EMM cause value #9.
 - Configure the test equipment such the the new LTE network will send an Attach Reject message with EMM cause code 19 and a PDN Connectivity Reject message with ESM cause code 8 when the UE attempts to attach and connect to the internet PDN.
14. Verify that the UE attempts to connect to PLMN Y2 by sending a tracking area update request and that the network rejects the tracking area update request with EMM cause value #9.
15. Verify that the DUT successfully establishes an RRC connection and attempts to attach to the new network and connect to the internet PDN using PDN Type IPv4. Verify that the network responds with an Attach Reject message with EMM cause code 19 and a PDN Connectivity Reject message with ESM cause code 8.
16. Verify that the UE waits at least T3411 seconds before attempting to attach again. The next attempt is considered attempt #2.
17. 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.

18. Verify that the UE waits at least T3411 seconds before attempting to attach again. The next attempt is considered attempt #3.
19. 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.
20. Monitor the DUT and verify that it does not attempt to attach to the LTE network for at least T3402 minutes.
21. After T3402 expires, verify that the DUT successfully establishes an RRC connection and sends a NAS Attach Request message.
22. 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.
23. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network.
24. Monitor the DUT for 2 minutes and verify that it does not attempt to send a NAS PDN Connectivity Request to the LTE network.
25. Power cycle the DUT.
26. Verify that the DUT successfully establishes an RRC connection and attaches to the LTE network.
27. 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.
28. Verify that the UE sends a NAS PDN Connectivity Request message for the Admin PDN to the LTE network.
29. Power the device off.
30. Repeat the test for ESM Cause Codes 29, 32, 33, and 112.

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 8 including back off timer value set to 0 when the UE attempts to connect to the Admin PDN.
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. 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 8 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 8 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 8 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 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. Re-configure the test equipment such that the network will send a NAS PDN Connectivity Reject message with ESM cause code 8 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) 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.
11. Monitor DUT for 10 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 DUT attempt to send a NAS PDN Connectivity Request for ADMIN PDN to the LTE network.
14. Repeat the test for ESM Cause Codes 27,29, 32, 33 and 112.

Expected Results (Step 1)

Release 11 and Earlier UE

The UE ceases to send NAS PDN Connectivity Requests for an Admin 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 Request 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.

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

VZ_TC_DATA_RETRY_IMS_LESS_1500764

Description

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 Internet and Admin 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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 Internet 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 Internet PDN.
6. Initiate the test application (see **section TEST EQUIPMENT CONFIGURATION**) and verify that it connects successfully to the Admin 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 Internet PDN.
8. Verify that the UE disconnects from the Internet PDN.

9. 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.
10. Initiate the Internet test application (see **section TEST EQUIPMENT CONFIGURATION**) for the application transmitting state with a retransmission timer of 10 seconds.
11. Verify that the UE immediately attempts to re-connect to the Internet PDN on behalf of the test application and that the reconnection is successful.

Expected Results (Step 1)

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 Internet PDN.

7.2 UE RECEIVES DETACH REQUEST MESSAGE FROM THE NETWORK 1 PDN CONNECTION OPEN VZ_TC_DATA_RETRY_IMSLESS_1500765

Description

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 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*
- 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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 Internet 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 Internet PDN.
6. Configure the test equipment to send a NAS "Detach Request" message to disconnect the Internet PDN.
7. Verify that the UE immediately initiates a successful DETACH procedure and disconnects from the Internet PDN.
8. Verify that the UE immediately re-attaches to the LTE network and re-connects to the Internet PDN.

Expected Results (Step 1)

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 Internet PDN.

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

VZ_TC_DATA_RETRY_IMS_LESS_1500766

Description

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 Admin 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 that do not support IMS and are designed to operate on the Verizon Wireless LTE 3GPP Band 13 network.

Pre-Conditions (Step 1)

Procedures (Step 1)

Test Procedure

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 Admin 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 Admin PDN with an ESM Cause Code of 39.
7. Verify that the UE disconnects from the Admin PDN.
8. Configure the test equipment such that the network will allow connectivity to the

Admin PDN when the UE attempts to re-connect to the Admin 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 Admin PDN and that the reconnection is successful.

Expected Results (Step 1)

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 Admin PDN with cause code 39.

4.2a UE RECEIVES DETACH REQUEST MESSAGE FROM THE NETWORK CODES 3, 6, 7, AND 8 - code 3

VZ_TC_DATA_RETRY_IMSLESS_4105999311931665

4.2b UE RECEIVES DETACH REQUEST MESSAGE FROM THE NETWORK CODES 3, 6, 7, AND 8 - code 6

VZ_TC_DATA_RETRY_IMSLESS_4105999311931666

4.2c UE RECEIVES DETACH REQUEST MESSAGE FROM THE NETWORKCODES 3, 6, 7, AND 8 - code 7

VZ_TC_DATA_RETRYIMSLess_4105999311931667

4.2d UE RECEIVES DETACH REQUEST MESSAGE FROM THE NETWORK CODES 3, 6, 7, AND 8 - code 8

VZ_TC_DATA_RETRY_IMSLESS_4105999311931668

4.3a UE RECEIVES DETACH REQUEST MESSAGE FROM THE NETWORKCODES 11 AND 14 - code 11

VZ_TC_DATA_RETRYIMSLESS_4105999311931669

4.3b UE RECEIVES DETACH REQUEST MESSAGE FROM THE NETWORK CODES 11 AND 14 - code 14

VZ_TC_DATA_RETRY_IMS_LESS_4105999311931670

4.4a UE RECEIVES DETACH REQUEST MESSAGE FROM THE NETWORKCODES 12, 13, AND 15 - core 12

VZ_TC_DATA_RETRY_IMS_LESS_4105999311931671

4.4b UE RECEIVES DETACH REQUEST MESSAGE FROM THE NETWORK CODES 12, 13, AND 15 - core 13

VZ_TC_DATA_RETRY_IMSLESS_4105999311931672

4.4c UE RECEIVES DETACH REQUEST MESSAGE FROM THE NETWORKCODES 12, 13, AND 15 - core 15

VZ_TC_DATA_RETRYIMSLESS_4105999311931673

**5.12a PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH
SERVICE REQUEST - code 3** VZ_TC_DATA_RETRYIMSLESS_4105999311931674

**5.12b PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH
SERVICE REQUEST - code 6** VZ_TC_DATA_RETRYIMSLESS_4105999311931675

**5.12c PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH
SERVICE REQUEST - code 7** VZ_TC_DATA_RETRYIMSLESS_4105999311931676

**5.12d PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH
SERVICE REQUEST - code 8** VZ_TC_DATA_RETRYIMSLESS_4105999311931677

**5.13a PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH
TRACKING AREA UPDATE - code 3** VZ_TC_DATA_RETRYIMSLESS_4105999311931678

**5.13b PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH
TRACKING AREA UPDATE - code 6** VZ_TC_DATA_RETRYIMSLESS_4105999311931679

**5.13c PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH
TRACKING AREA UPDATE - code 7** VZ_TC_DATA_RETRYIMSLESS_4105999311931680

**5.13d PERMANENT EMM FAILURES ACROSS POWER CYCLE WITH
TRACKING AREA UPDATE - code 8** VZ_TC_DATA_RETRYIMSLESS_4105999311931681

5.2a UE RECEIVES SERVICE REJECT MESSAGE FROM THE NETWORKCODES 12, 13, AND 15 - Code 12

VZ_TC_DATA_RETRYIMSLESS_4105999311931682

5.2b UE RECEIVES SERVICE REJECT MESSAGE FROM THE NETWORKCODES 12, 13, AND 15 - Code 13

VZ_TC_DATA_RETRYIMSLESS_4105999311931683

5.2c UE RECEIVES SERVICE REJECT MESSAGE FROM THE NETWORKCODES 12, 13, AND 15 - Code 15

VZ_TC_DATA_RETRYIMSLESS_4105999311931684

5.5a UE RECEIVES TRACKING AREA UPDATE REJECT MESSAGE FROM THE NETWORK CODES 12, 13, AND 15 - Code 12

VZ_TC_DATA_RETRYIMSLESS_4105999311931685

5.5b UE RECEIVES TRACKING AREA UPDATE REJECT MESSAGE FROM THE NETWORK CODES 12, 13, AND 15 - Code 13

VZ_TC_DATA_RETRYIMSLESS_4105999311931686

5.5c UE RECEIVES TRACKING AREA UPDATE REJECT MESSAGE FROM THE NETWORK CODES 12, 13, AND 15 - Code 15

VZ_TC_DATA_RETRYIMSLESS_4105999311931687

6.7a UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR INTERNET PDN CODES 8, 27, 29, 32, 33, AND 112 - Code 8

VZ_TC_DATA_RETRY_IMSLESS_4105999311931688

6.7b UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR INTERNET PDN CODES 8, 27, 29, 32, 33, AND 112 - Code 27

VZ_TC_DATA_RETRY_IMSLESS_4105999311931689

6.7c UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR INTERNET PDN CODES 8, 27, 29, 32, 33, AND 112 - Code 29

VZ_TC_DATA_RETRY_IMSLESS_4105999311931690

6.7d UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR INTERNET PDN CODES 8, 27, 29, 32, 33, AND 112 - Code 32

VZ_TC_DATA_RETRY_IMSLESS_4105999311931691

6.7e UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR INTERNET PDN CODES 8, 27, 29, 32, 33, AND 112 - Code 33

VZ_TC_DATA_RETRY_IMSLESS_4105999311931692

6.7f UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR INTERNET PDN CODES 8, 27, 29, 32, 33, AND 112 - Code 112

VZ_TC_DATA_RETRY_IMS_LESS_4105999311931693

6.13a UE MAKES EXCESSIVE PDN CONNECTIVITY REQUESTS - T1

VZ_TC_DATA_RETRYIMSLESS_4105999311931694

6.13b UE MAKES EXCESSIVE PDN CONNECTIVITY REQUESTS - T2

VZ_TC_DATARETRYIMSLESS_4105999311931695

**6.15a UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM
THE NETWORK FOR ADMIN PDN CODES 26 AND 27 WITH T3396
TIMER SET - Code 26** VZ_TC_DATA_RETRY_IMSLESS_4105999311931696

**6.15b UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM
THE NETWORK FOR ADMIN PDN CODES 26 AND 27 WITH T3396
TIMER SET - Code 27** VZ_TC_DATA_RETRY_IMSLESS_4105999311931697

6.4a UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR THE INTERNET PDN- SUBSEQUENT ATTACHMENT - CC26

VZ_TC_DATA_RETRY_IMS_LESS_410599311931698

6.4b UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR THE INTERNET PDN- SUBSEQUENT ATTACHMENT - CC30

VZ_TC_DATA_RETRY_IMS_LESS_4105999311931699

6.4c UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR THE INTERNET PDN- SUBSEQUENT ATTACHMENT - CC31

VZ_TC_DATA_RETRY_IMS_LESS_410599311931700

6.4d UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR THE INTERNET PDN- SUBSEQUENT ATTACHMENT - CC34

VZ_TC_DATA_RETRY_IMS_LESS_410599311931701

6.4e UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR THE INTERNET PDN- SUBSEQUENT ATTACHMENT - CC38

VZ_TC_DATA_RETRY_IMS_LESS_410599311931702

6.4f UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR THE INTERNET PDN- SUBSEQUENT ATTACHMENT - CC95

VZ_TC_DATA_RETRY_IMS_LESS_4105999311931703

6.4g UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR THE INTERNET PDN- SUBSEQUENT ATTACHMENT - CC96

VZ_TC_DATA_RETRY_IMS_LESS_410599311931704

6.4h UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR THE INTERNET PDN- SUBSEQUENT ATTACHMENT - CC97

VZ_TC_DATA_RETRY_IMS_LESS_410599311931705

6.4i UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR THE INTERNET PDN- SUBSEQUENT ATTACHMENT - CC98

VZ_TC_DATA_RETRY_IMS_LESS_410599311931706

6.4j UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR THE INTERNET PDN- SUBSEQUENT ATTACHMENT - CC99

VZ_TC_DATA_RETRY_IMS_LESS_4105999311931707

**6.4k UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM
THE NETWORK FOR THE INTERNET PDN- SUBSEQUENT
ATTACHMENT - CC100** VZ_TC_DATA_RETRY_IMS_LESS_4105999311931708

6.4I UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR THE INTERNET PDN- SUBSEQUENT ATTACHMENT - CC101

VZ_TC_DATA_RETRY_IMS_LESS_4105999311931709

**6.4m UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM
THE NETWORK FOR THE INTERNET PDN- SUBSEQUENT
ATTACHMENT-CC111** VZ_TC_DATA_RETRY_IMS_LESS_4105999311931710

6.5a UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR ADMIN PDN CODES 26, 30, 31, 34, 38, 95, 96, 97, 98, 99, 100, 101, and 111 - CC26 VZ_TC_DATA_RETRYIMSLESS_4105999311931711

6.5b UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR ADMIN PDN CODES 26, 30, 31, 34, 38, 95, 96, 97, 98, 99, 100, 101, and 111 - CC30 VZ_TC_DATA_RETRYIMSLESS_4105999311931712

6.5c UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR ADMIN PDN CODES 26, 30, 31, 34, 38, 95, 96, 97, 98, 99, 100, 101, and 111 - CC31 VZ_TC_DATA_RETRYIMSLESS_4105999311931713

**6.5d UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM
THE NETWORK FOR ADMIN PDN CODES 26, 30, 31, 34, 38, 95, 96, 97,
98, 99, 100, 101, and 111 - CC34** VZ_TC_DATA_RETRYIMSLESS_4105999311931714

6.5e UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR ADMIN PDN CODES 26, 30, 31, 34, 38, 95, 96, 97, 98, 99, 100, 101, and 111 - CC38 VZ_TC_DATA_RETRYIMSLESS_4105999311931715

6.5f UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR ADMIN PDN CODES 26, 30, 31, 34, 38, 95, 96, 97, 98, 99, 100, 101, and 111 - CC95 VZ_TC_DATA_RETRYIMSLESS_4105999311931716

6.5g UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR ADMIN PDN CODES 26, 30, 31, 34, 38, 95, 96, 97, 98, 99, 100, 101, and 111 - CC96 VZ_TC_DATA_RETRYIMSLESS_4105999311931717

6.5h UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR ADMIN PDN CODES 26, 30, 31, 34, 38, 95, 96, 97, 98, 99, 100, 101, and 111 - CC97 VZ_TC_DATA_RETRYIMSLESS_4105999311931718

6.5i UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR ADMIN PDN CODES 26, 30, 31, 34, 38, 95, 96, 97, 98, 99, 100, 101, and 111 - CC98 VZ_TC_DATA_RETRYIMSLESS_4105999311931719

6.5j UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR ADMIN PDN CODES 26, 30, 31, 34, 38, 95, 96, 97, 98, 99, 100, 101, and 111 - CC99 VZ_TC_DATA_RETRYIMSLESS_4105999311931720

6.5k UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR ADMIN PDN CODES 26, 30, 31, 34, 38, 95, 96, 97, 98, 99, 100, 101, and 111 - CC100 VZ_TC_DATA_RETRYIMSLESS_4105999311931721

6.5I UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR ADMIN PDN CODES 26, 30, 31, 34, 38, 95, 96, 97, 98, 99, 100, 101, and 111 - CC101 VZ_TC_DATA_RETRYIMSLESS_4105999311931722

**6.5m UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM
THE NETWORK FOR ADMIN PDN CODES 26, 30, 31, 34, 38, 95, 96, 97,
98, 99, 100, 101, and 111 - CC111** VZ_TC_DATA_RETRY_IMS_LESS_4105999311931723

6.6a UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR ADMIN PDN CODES 8, 27, 29, 32, 33, AND 112 - Code 8

VZ_TC_DATA_RETRY_IMSLESS_4105999311931724

6.6b UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR ADMIN PDN CODES 8, 27, 29, 32, 33, AND 112 - Code 27

VZ_TC_DATA_RETRY_IMSLESS_4105999311931725

6.6c UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR ADMIN PDN CODES 8, 27, 29, 32, 33, AND 112 - Code 29

VZ_TC_DATA_RETRY_IMSLESS_4105999311931726

6.6d UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR ADMIN PDN CODES 8, 27, 29, 32, 33, AND 112 - Code 32

VZ_TC_DATA_RETRY_IMSLESS_4105999311931727

6.6e UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR ADMIN PDN CODES 8, 27, 29, 32, 33, AND 112 - Code 33

VZ_TC_DATA_RETRY_IMSLESS_4105999311931728

6.6f UE RECEIVES PDN CONNECTIVITY REJECT MESSAGE FROM THE NETWORK FOR ADMIN PDN CODES 8, 27, 29, 32, 33, AND 112 - Code 112

VZ_TC_DATA_RETRY_IMSLESS_4105999311931729