



## Test Plan

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Plan VZ\_TC\_SUPLCONFIMSLESS\_1500770



Subject VZ\_TC\_SUPLCONFIMSLESS\_1500771

## LTE Supplementary Signaling Conformance IMSless VZ\_TC\_SUPLCONFIMSLESS\_1500772

### Revision History

Rev.	Author	Description of Changes	Date
1.0	Verizon Wireless	Initial release.	10/2016
2.0	Verizon Wireless	Updated following sections: 2.1	2/2017
3.0	Verizon Wireless	Updated TC 2.13	2/2018
4.0	Verizon Wireless	Updated TC 2.13	6/2018
5.0	Verizon Wireless	Retired the TC 2.14, 2.15, 2.26, 2.35, 2.36  Update TC 2.1, 2.2, 2.16  Updated TC 2.28, 2.29, 2.31, 2.32, 2.38, 2.41	10/2018
6.0	Verizon Wireless	Retired the TC 2.7 since it have conflict with TC 2.4.  Modify applicability in TC 2.37.	2/2019
7.0	Verizon Wireless	Updated TC 2.1, 2.2, 2.3, 2.6, 2.9, 2.10, 2.11 and 2.37	6/2019
8.0	Verizon Wireless	Retired 2.13 Updated TC 2.2, 2.33	10/2019
9.0	Verizon Wireless	Updated TC 2.2, 2.24, 2.44, 2.45 Added TC 2.46, 2.47, 2.48	2/2020
10.0	Verizon Wireless	Updated TC 2.1, 2.24, 2.48 Retired TC 2.44, 2.45, 2.46 and 2.47 Added TC 2.49	6/2020
11.0	Verizon Wireless	Updated TC 2.25	2/2021
12.0	Verizon Wireless	Updated and Duplicated multiple TCs with extra suffixes for different technology variants.	June 2023
13.0	Verizon Wireless	Test case IDs changed from alphanumeric to numeric	2/2024

### Introduction

The test plan applies to IMS-less devices only. This includes data-centric CAT-M1 devices and CAT 0 and higher devices that do not support IMS.

This test plan is supplementary to the Verizon Wireless LTE 3GPP Band 13 Signaling Conformance Test Plan, to ensure compliance with the Verizon Wireless LTE 3GPP Band 13 Network Access requirements.

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

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

### Test Objectives

The objective of this document is to define the LTE supplementary signaling tests for LTE devices that are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network. This includes the establishment and de-establishment of various types of connections, which involves Layer 2, 3 and NAS signaling.

This document will be used by test personnel to guide the manual execution of LTE supplementary signaling testing. This document will also be used to define the LTE supplementary signaling test for test automation development.

Additionally, this document includes tests related to PLMN operations.

### 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
APN	Access Point Name
Admin	Administrative
EMM	EPS Mobility Management
EPDCCH	Enhanced Physical Downlink Control Channel
E-UTRA	Evolved Universal Terrestrial Radio Access
EUTRAN	Evolved Universal Terrestrial Radio Access Network
FFS	For Future Study
HTTP	Hypertext Transfer Protocol
IMEI	International Mobile Equipment Identity
IMS	IP Multimedia Subsystem
IMSI	International Mobile Subscriber Identity
Legacy 3GPP	3GPP wireless standards preceding LTE (GSM/GPRS, EDGE, UMTS, HSPA, HSPA+)
LTE	Long Term Evolution
OTAPA	Over-the-Air Parameter Administration
OTASP	Over-the-Air Service Provisioning
PDN	Packet Data Network
QoS	Quality of Service
RAT	Radio Access Technology
RRC	Radio Resource Control
SCM	Smart Congestion Mitigation
SMS	Short Message Service
TCP	Transmission Control Protocol
UDP	User Datagram Protocol
UE	User Equipment
UICC	Universal Integrated Circuit Card
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 devices 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 the Verizon Wireless LTE 3GPP Band 13 RF and RRM Conformance Test Plan and the Verizon Wireless LTE 3GPP Band 13 Signaling Conformance Test Plan.

### 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.

A network system simulator is used to model the eNB, MME, S-GW, P-GW, PCRF, HSS/SPR and 3GPP AAA. The configuration of the simulator is described in: "3GPP TS 36.508, 3GPP EUTRA and EPC Common Test environments for User Equipment (UE) conformance testing". In this document, the terminology network simulator and serving station (SS) are used interchangeably. (For Connection Diagrams Please Refer to the Attached Diagrams *Figure\_1.jpeg* and *Figure\_2.jpeg*)

The UE under test is connected to a laptop computer, which is used to control the test configuration, generate and receive data traffic. The parameter "SMS\_Over\_IP\_Networks\_Indication" on the UE under test shall be disabled, i.e., set to "0".

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 Results Template

The header block for the test results should define: what device was tested, when it was tested, who tested it, and what equipment was used to test it.

PRODUCT TESTED		Version	
MFR/Model: <AAAAA/B-cccc>	Hardware	Software	
ESN/MEID: <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	EUTRAN Initial Attach (for IMS PDN with Piggybacking)	PASS		
2.2	RRC UE Feature Group Support	PASS		
2.3	IPv6 Address Assignment	PASS		
2.4	E-UTRAN Initial Attach (APN Disabled)	PASS		
2.5	UE Initiated PDN Connection (EMM-Idle)	PASS		
2.6	UE Initiated PDN Connection (EMM-Connected)	PASS		
2.7	UE Initiated PDN Connection (APN disabled)	PASS		
2.8	P-GW Initiated PDN Disconnect (EMM-Connected)	PASS		
2.9	UE Initiated Detach for E-UTRAN (EMM-Connected) 3 PDNs Scenario	PASS		
2.10	UE Initiated Detach for E-UTRAN (EMM-Idle) 3 PDNs Scenario	PASS		
2.11	MME Initiated Detach (EMM-Connected) 3 PDNs Scenario	PASS		



2.1.2	UE re-initiated connection to IMS PDN after disconnected	PASS		
2.1.3	UE initiated LTE Detach Update to APN parameters	PASS		
2.1.4	UE initiated PDN disconnection Update to APN parameters (EMM-Idle)			
2.1.5	UE initiated PDN disconnection Update to APN parameters (EMM-Connected)	PASS		
2.1.6	UE support of multiple DNS addresses	PASS		
2.1.7	Network initiated EPS bearer modification without QoS update (EMM-Connected)	PASS		
2.1.8	Network initiated EPS bearer modification with QoS update (EMM-Connected)	PASS		
2.1.9	Network Initiated EPS Dedicated Bearer Activation (EMM-Connected)	PASS		
2.2.0	Network Initiated PDN Disconnect (No Data Usage Available)	PASS		
2.2.1	Dedicated Bearer Activation with QoS (EMM-Connected)	PASS		
2.2.2	Time Retrieval via SIB16 Message	PASS		
2.2.3	UE Indicates RACH Report Capability	PASS		
2.2.4	UE Reports RACH Information Upon Request by Network	PASS		
2.2.5	UE Initiated Tracking Area Update after Radio Link Failure	PASS		
2.2.6	UE Response to PDN Disconnect Reject Code 43	PASS		
2.2.7	UE Routes DNS Queries	PASS		
2.2.8	feICIC GCF Signaling and Protocol Test Cases	PASS		
2.2.9	feICIC Feature Group and UE Capability Support	PASS		
2.3.0	RRCConnectionReconfiguration when CRS-AssistanceInfoList-r11 is present	PASS		
2.3.1	DL CoMP UE Capability Support	PASS		
2.3.2	DL CoMP handover with transmission mode change	PASS		
2.3.3	UE Downlink Supervision	PASS		
2.3.4	Non-Essential System Information Detection Failure	PASS		
2.3.5	MDT GCF Signaling and Protocol Test cases	PASS		
2.3.6	R10 Logged MDT UE capability Report	PASS		
2.3.7	UE is paged in RRC connected state	PASS		
2.3.8	Contention-free based HO with TTIB enabled	PASS		
2.3.9	EPDCCH GCF Signalling and Protocol Conformance Test Cases	PASS		
2.4.0	EPDCCH UE Capability Support	PASS		
2.4.1	256QAM UE Capability Support	PASS		
2.4.2	Handover with MCS&CQI Table Change	PASS		
2.4.3	Dedicated Bearer Setup with Extended QCI over Internet PDN Connection (EMM-Connected)	PASS		
2.4.8.1	"CIoT / Control Plane MO and MT IP and non-IP Data Transfer / Serving PLMN Rate Control / APN Rate Control"	PASS		
2.4.8.2	"CIoT Optimization / Control Plane / MT and MO SMS Data Transfer"	PASS		
2.4.8.3	NB-IoT / Control Plane CIoT EPS optimisation for EPS services	PASS		
2.4.8.4	"NB-IoT/RDS (new protocol of NON-IP transmission) between UE and SCEF"	PASS		
2.4.8.5	"NB-IoT/APN rate control for MO exception data"	PASS		
2.4.9.1	NB-IoT / DL-SCH /UL-SCH transport block size	PASS		

	selection / DCI format N <sub>I</sub> / N <sub>O</sub> / Category NB <sub>2</sub>			
2.49.2	NB-IoT / Correct HARQ process / 2 HARQ processes	PASS		

#### References

<Industry Standards References>

Change requests may cause modification to the specifications listed below. Please refer to [www.3gpp.org](http://www.3gpp.org) for the latest version of the 3GPP specifications. Verizon Wireless LTE 3GPP Band 13 specifications are available at [opennetwork.verizonwireless.com](http://opennetwork.verizonwireless.com).

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

3GPP TS 23.401: *General Packet Radio Service enhancements for EUTRAN access*, Release 9

3GPP TS 36.300: *Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description*, Stage 2, Release 9

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

3GPP TS 36.508: *Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access (E-UTRAN); Common Test Environments for User Equipment (UE) Conformance Testing*, Release 9

3GPP TS 36.523-1: *EUTRA and EPC User equipment conformance specification; Part 1: Protocol conformance 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 Conformance Testing*, Release 9.

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

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

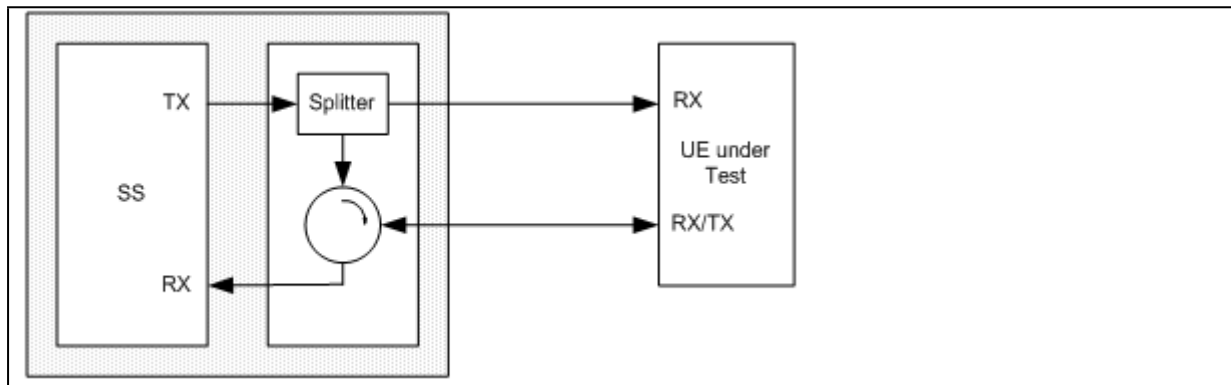
"Verizon Wireless LTE 3GPP Band 13 Device Conformance Test Process"

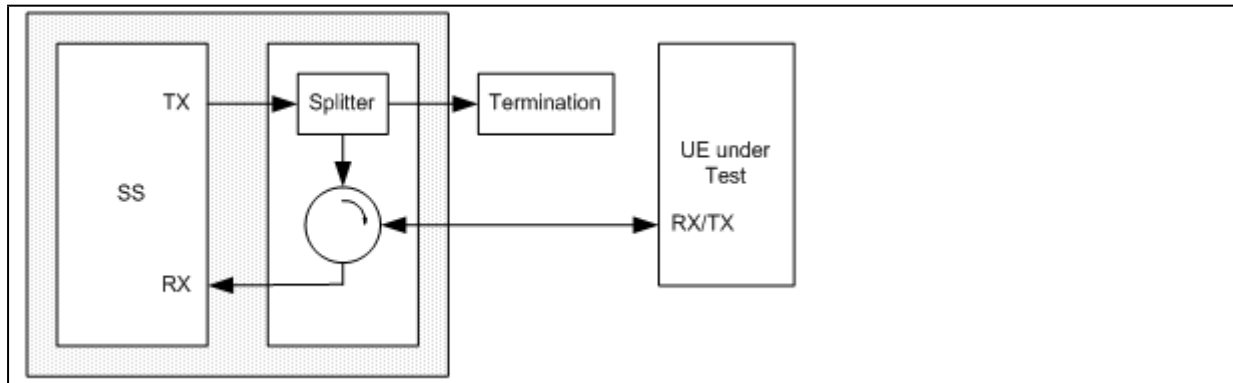
"Verizon Wireless LTE 3GPP Band 13 Test Equipment List"

"Verizon Wireless LTE 3GPP Band 13 RF and RRM Conformance Test Plan"

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

"Verizon Wireless LTE SMS Requirements"





## 2.1 EUTRAN INITIAL ATTACH (WITH PIGGYBACKING) FOR DEVICES THAT DO NOT SUPPORT IMS VZ\_TC\_SUPLCONFIMSLESS\_1500773

Description
<p><b>Definition</b> The procedure of EUTRAN Initial Attach with the establishment of an Internet PDN connection through piggybacking is tested. This is performed after the UE is synchronized to the network.</p> <p><b>Traceability:</b></p> <ul style="list-style-type: none"> <li>• "Verizon Wireless LTE 3GPP Band 13 Network Access Requirements"</li> <li>• 3GPP TS 36.300: <i>Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2</i>, Release 9</li> <li>• 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification</i>, Release 9</li> <li>• 3GPP TS 24.301: <i>Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3</i>, Release 9</li> </ul> <p><b>Applicability:</b> This test applies to all devices that do not support IMS and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network.</p>

Design Steps
Step Name
Step 1
Pre-Conditions
<p>The network simulator is configured for signal conformance testing as described in Section <b><i>Test Equipment Configuration</i></b> and powered on. The device (UE) under test is then connected to the network simulator. After the UE is powered on, acquired and synchronized to the network, the following procedures should be either initiated by the UE or performed in response to messages received by the UE. Enable the Class 2 and Class 3 APNs, i.e., corresponding to the Administrative PDN and Internet PDN. Reset the UE.</p>
Procedures
Step

Procedure

Message Sequence

Verdict

U - S

Message

I

RRC connection establishment

-

-

N/A

1 a

Check: Does the UE send the EMM:Attach Request and ESM:PDN Connectivity Request messages together with the *RRCConnectionSetupComplete* message'

=>

EMM:Attach Request

ESM:PDN Connectivity Request

Pass if message

sent

1 b

Check: Does the "EPS Attach type" = EPS Attach or Combined EPS/IMSI Attach in the Attach

Request message?

1c

Check: Is the "add\_update\_type" = 1(0x1) (SMS only)?

Note: for NB-IoT devices only.

Pass if type is correct

1d

Check: Is the "Request Type" = Initial Request?

Pass if type is correct

1e

Check: Is the PDN type = IPv4v6?

Pass if type is correct

1f

Check: Is the ESM Information Transfer Flag not included in the ESM:PDN Connectivity Request

message?

Pass if the flag is

not included

ig

Check: Is the APN not included?

Pass if APN is not

included

ih

Check: Is the Protocol Option (PCO) =

- DNS IPv6 address request
- DNS IPv4 address request
- IPv4 Link MTU
- MSISDN
- Operator reserved PCO container ID=FF00H, with MCC=311 and MNC=480

Note: MSISDN in PCO is optional for Cat-M1 and NB-IoT devices.

Pass if protocol option

is correct

2

Network simulator sends the Attach Accept/Activate Default EPS Bearer Context Request messages with the following information elements:

- ATTACH ACCEPT:

- GUTI
- EMM Cause = 18 (if "EPS Attach Type" was Combined EPS/IMSI Attach)
- Additional update result = 2SMS (if SMS over NAS capable device)

- ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST:

- "APN-AMBR"
- "EPS bearer Identity"
- "PDN Address" =
  - o IPv4 address
  - o IPv6 interface ID
- "Access Point Name"=VZWINTERNET
- "Protocol Configuration Options" =
  - o DNS IP address
  - o IPv6 prefix
  - o IPv4 Link MTU
  - o MSISDN
  - o Operator reserved PCO container ID=FF00H, with MCC=311 and MNC=480

<=

Attach Accept

Activate Default EPS Bearer Context Request

N/A

2a

Check: Does the UE transmit the ATTACH COMPLETE and ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT messages?

=>



ATTACH COMPLETE + ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT
Pass if message sent
Expected Results
The device shall meet the verdicts in the Table above.

## 2.2 RRC UE FEATURE GROUP SUPPORT VZ\_TC\_SUPLCONFIMSLESS\_1500774

Description
<p><b>Definition</b> This procedure is to test the compliance of UE Feature Group Indicator support to the VzW requirements.</p> <p><b>Traceability:</b></p> <ul style="list-style-type: none"> <li>"Verizon Wireless LTE 3GPP Band 13 Network Access Requirements"</li> <li>3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification</i>, Release 9</li> </ul> <p><b>Applicability:</b> This test applies to all devices that do not support IMS and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network. Not applicable to NB-IoT, which doesn't support FGI as per 3GPP 36.331 section#6.7.3.6(UE-Capability-NB).</p>

Design Steps				
Step Name				
Step 1				
Pre-Conditions				
<p>The network simulator is configured for signal conformance testing as described in Section <b><i>Test Equipment Configuration</i></b> and powered on. The device (UE) under test is then connected to the network simulator. After the UE is powered on, acquired and synchronized to the network, the following procedures should be either initiated by the UE or performed in response to messages received by the UE.</p>				
Procedures				
Step	Procedure	Message Sequence		Verdict
		U - S	Message	
1	UE performs the Initial Attach procedure	-	-	N/A

	to the LTE network as in Test 2.1			
2	Configure the network simulator to send the Capability Inquiry message to the UE	<=	Capability Inquiry	N/A
2a	Check: Does UE respond to the enquiry by sending the UE Capability Information message to eNB?	=>	UE Capability Information	Pass if message sent
2b	Check: Does the featureGroupIndicators field in the UE-EUTRA-Capability IE indicate the feature groups supported by the UE?			Pass if contents are correct
Expected Results				
Devices except Cat M1 shall support the FGI 2, 3, 4, 5, 6, 7, 14, 16, 17, 20, and 21. Cat M1 device shall support FGI 5, 6, and 20. Additional FGI may be supported based on device capabilities. “				

## 2.3 IPV6 ADDRESS ASSIGNMENT VZ\_TC\_SUPLCONFIMSLESS\_1500775

Description
<p><b>Definition</b> This procedure is to test the compliance of the device in obtaining an IPv6 address assignment.</p> <p><b>Traceability:</b></p> <ul style="list-style-type: none"> <li>"Verizon Wireless LTE 3GPP Band 13 Network Access Requirements"</li> </ul> <p>3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification</i>, Release 9</p> <ul style="list-style-type: none"> <li>RFC 4861, section 4.6.2</li> <li>RFC 4862</li> </ul> <p><b>Applicability:</b> This test applies to all devices that do not support IMS and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network.</p>

Design Steps				
Step Name				
Step 1				
Pre-Conditions				
<p>The network simulator is configured for signal conformance testing as described in Section <b>Test Equipment Configuration</b> and powered on. The device (UE) under test is then connected to the network simulator. After the UE is powered on, acquired and synchronized to the network, the following procedures should be either initiated by the UE or performed in response to messages received by the UE.</p>				
Procedures				
Step	Procedure	Message Sequence		Verdict
		U - S	Message	

1	Configure the UE to perform the Initial Attach procedure to the LTE network	-	-	N/A
2	Ensure the Initial Attach procedure in Section 2.1 is completed			N/A
2a	Check: Confirm that the UE does not send out any Neighbor Solicitation messages during the initial Attach procedure.			Pass if no Neighbor Solicitation messages sent
2b	Check: Does the UE send out the Router Solicitations to P-GW, using the link-local address, which is formed using the interface id received in the "PDN Address" information element of the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message?	=>	Router Solicitations	Pass if message sent with the correct link-local address
3	Network simulator sends the router advertisement, with the "ValidLifetime" value set to 3 minutes, and the "RouterLifetime" value set to 5 minutes.	<=	Router Advertisement	N/A
3a	Check: Examine the source IP address of an IPv6 packet			Pass if IPv6 address is

	to verify the construction of an IPv6 address by appending an interface id to the IPv6 prefix in the Router Advertisement message?			constructed correctly
4	After the first router advertisement is sent for 2 minutes, Network simulator sends another router advertisement with the same IPv6 prefix, the "ValidLifetime" value set to 8 minutes, and the "RouterLifetime" value set to 6 minutes.	<=	Router Advertisement	N/A
5	Wait for 5 minutes			
5a	Check: Does the UE send a new Router Solicitation message?			Fail if the message is sent earlier than 4.5 min after receiving the router advertisement
Expected Results				
UE shall meet the verdicts in the Table above.				

## 2.4 EUTRAN INITIAL ATTACH (APN DISABLED) VZ\_TC\_SUPLCONFIMSLESS\_1500776

Description
<p><b>Definition</b> The function of APN disable is tested under the procedure of EUTRAN Initial Attach.</p> <p><b>Traceability:</b></p> <ul style="list-style-type: none"> <li>• "Verizon Wireless LTE 3GPP Band 13 Network Access Requirements"</li> <li>• 3GPP TS 36.300: <i>Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2, Release 9</i></li> <li>• 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification, Release 9</i></li> <li>• 3GPP TS 24.301: <i>Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3, Release 9</i></li> </ul> <p><b>Applicability:</b> This test applies to all devices that do not support IMS and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network.</p>

Design Steps		
Step Name		
Step 1		
Pre-Conditions		
<p>The network simulator is configured for signal conformance testing as described in Section <b>Test Equipment Configuration</b> and powered on. The device (UE) under test is then connected to the network simulator. Power on the UE. Configure the Class 3 and Class 2 APNs of the UE as shown in APN Test Case 1 in Table 2.4.21. Reset the UE and perform the test procedures as described in Table 2.4.22.</p>		
<b>Table 2.4.21 APN Test Case Configuration</b>		
APN Test Case	Class 3 APN (Internet PDN)	Class 2 APN (Administrative PDN)
1	Disable	Enable

2	Enable	Disable
3	Disable	Disable

## Procedures

**Table 2.4.22 Test Procedures for Initial Attach with disabled APN**

Step	Procedure	Message Sequence		Verdict
		U - S	Message	
1	RRC connection establishment	-	-	N/A
1a	Check: Does the UE send the random access preamble'	=>		Fail if message sent
2	Configure Class 3 and Class 2 APNs for APN Test Case 2; reset the UE and repeat steps 1, 1a			N/A
2a	Check: Does the UE send the random access preamble'	=>		Fail if message sent
3	Configure Class 3 and Class 2 APNs for APN Test Case 3; reset the UE and repeat steps 1, 1a			N/A
3a	Check: Does the UE send the random access preamble'	=>		Fail if message sent

## Expected Results



UE shall meet the verdicts in the Table above. The UE shall not attempt to establish a connection.
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## 2.5 UE INITIATED PDN CONNECTION (EMM-IDLE) VZ\_TC\_SUPLCONFIMSLESS\_1500777

Description
<p><b>Definition</b></p> <p>The UE has already completed the initial attach to the network such that it is EMM registered. However, there has been no active traffic between the UE and the network such that the UE is in RRC idle and EMM-idle states. With the trigger from an application (e.g., polling email server), the UE initiates a Service Request to return to the RRC-connected and EMM-connected states. Consequently, UE requests for the setup of a connection to the Administrative PDN.</p> <p><b>Traceability:</b></p> <ul style="list-style-type: none"> <li>• "Verizon Wireless LTE 3GPP Band 13 Network Access Requirements"</li> <li>• 3GPP TS 36.300: <i>Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2, Release 9</i></li> <li>• 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification, Release 9, Section 5</i></li> <li>• 3GPP TS 24.301: <i>Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3, Release 9, Section 5.6.1</i></li> <li>• 3GPP TS 23.401: <i>Release 9, Section 5.3.4</i></li> </ul> <p><b>Applicability:</b></p> <p>This test applies to all devices that do not support IMS and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network.</p>

Design Steps
Step Name
Step 1
Pre-Conditions
The UE under test shall have already completed the Initial Attach procedure 2.1 resulting in the setup of a default Internet PDN bearer.
Procedures
This procedure tests the setup of connection to an additional PDN.

Step	Procedure	Message Sequence		Verdict
		U - S	Message	
1	Network simulator sends a RRC connection release message to the UE.	<=	RRC Connection Release	N/A
1a	Check: Does UE release all its RRC connections?			Pass if all RRC connections are released
2	Network simulator sends the Package #0 SMS message to the UE to trigger an Admin PDN connection request	-	-	N/A
2a	Check: Does the <i>RRCConnectionRequest</i> message carry a <i>ue-Identity</i> S-TMSI?	=>	<i>RRCConnectionRequest</i>	Pass if message carries the correct UE identifier
2b	Check: Does the UE send the EMM: Service Request message together with the <i>RRCConnectionSetupComplete</i> message?	=>	EMM: Service Request <i>RRCConnectionSetupComplete</i>	Pass if message sent

3	Wait for 1 minute to allow the service request procedure to be completed	=>		N/A
4	UL information transfer			N/A
4a	Check: Does UE send an ESM: PDN Connectivity Request message?	=>	UL Information Transfer ESM: PDN Connectivity Request	Pass if message sent
4b	Check: Is the "Request Type" = Initial Request?			Pass if type is correct
4c	Check: Is the PDN type = IPv4v6?			Pass if type is correct
4d	Check: Is the ESM Information Transfer Flag omitted in the ESM:PDN Connectivity Request message?			Pass if the flag is omitted
4e	Check: Does the UE include an APN corresponding to the Administrative PDN that is enabled?			Pass if the Administrative APN is included
4f	Check: Is the Protocol Option (PCO) =  <ul style="list-style-type: none"> <li>• DNS</li> <li>• IPv4 Link MTU</li> <li>• Operator reserved PCO container ID=FF00H, with</li> </ul>			Pass if protocol option is correct

	MCC=311 and MNC=480			
	Check: Does Protocol Option (PCO) NOT include P-CSCF IPv6 addresses?			
5	<p>Network simulator sends an Activate Default EPS Bearer Context Request message to the UE, with the following information elements:</p> <ul style="list-style-type: none"> <li>• "APN-AMBR"</li> <li>• "Protocol Configuration Options" =</li> <li>• DNS IP addresses.</li> <li>• IPv4 address</li> <li>• IPv6 prefix</li> <li>• IPv4 Link MTU</li> <li>• Operator reserved PCO container ID=FF00H, with MCC=311 and MNC=480</li> </ul>			N/A
5a	Check: Does the UE get assigned an IPv4 address?			Pass if IPv4 address is assigned
6	RRC Connection Reconfiguration			N/A
6a	Check: Does the UE send an ESM: Activate Default EPS Bearer Context Accept message?	=>	Activate Default EPS Bearer Context Accept	Pass if message sent
Expected Results				
UE shall meet the verdicts in the Table above.				

## 2.6 UE INITIATED PDN CONNECTION (EMM-CONNECTED)

VZ\_TC\_SUPLCONFIMSLESS\_1500778

Description
<p><b>Definition</b></p> <p>The UE has already completed the initial attach to the network such that it is EMM registered. It is in EMM-connected and RRC-connected states with a default bearer for the Internet PDN. UE requests for the setup of a new PDN bearer depending on the new traffic type to be supported, e.g., Admin PDN for OTADM, or Verizon Wireless Application PDN for Verizon Wireless applications.</p> <p><b>Traceability:</b></p> <ul style="list-style-type: none"> <li>• "Verizon Wireless LTE 3GPP Band 13 Network Access Requirements"</li> <li>• 3GPP TS 36.300: <i>Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2, Release 9</i></li> <li>• 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification, Release 9, Section 5</i></li> <li>• 3GPP TS 24.301: <i>Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3, Release 9</i></li> <li>• 3GPP TS 23.401: Release 9</li> </ul> <p><b>Applicability:</b></p> <p>This test applies to all devices that do not support IMS and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network except for NB-IoT devices.</p>

Design Steps
Step Name
Step 1
Pre-Conditions
The UE under test shall have already completed the Initial Attach procedure 2.1 resulting in the setup of a default Internet PDN bearer
Procedures
This procedure tests the setup of connections to two additional PDNs, i.e., an Admin PDN, and a Verizon Wireless Application PDN.

Step	Procedure	Message Sequence		Verdict
		U - S	Message	
1	Start with UE in EMM registered/EMM connected state			N/A
2	Network simulator sends the Package #0 SMS message to the UE to trigger an Admin PDN connection request			N/A
3	Check: Does UE send an UL Information Transfer message ESM: PDN Connectivity Request message?	=>	UL Information Transfer ESM: PDN Connectivity Request	Pass if message sent
3a	Check: Is the "Request Type" = Initial Request?			Pass if type is correct
3b	Check: Is the PDN type = IPv4v6?			Pass if type is correct
3c	Check: Is the ESM Information Transfer Flag omitted in the ESM:PDN Connectivity Request message?			Pass if type is correct
3d	Check: Is an enabled APN included for an Admin PDN?			Pass if type is correct

3e	<p>Check: Is the Protocol Option (PCO) =</p> <ul style="list-style-type: none"> <li>• DNS</li> <li>• IPv4 Link MTU</li> <li>• Operator reserved PCO container ID=FF00H, with MCC=311 and MNC=480?</li> </ul> <p>Check: Does Protocol Option (PCO) NOT include P-CSCF IPv6 addresses?</p>			Pass if type is correct
4	<p>Network simulator sends an Activate Default EPS Bearer Context Request message to the UE, with the following information elements:</p> <ul style="list-style-type: none"> <li>• "APN-AMBR"</li> <li>• "Protocol Configuration Options" = <ul style="list-style-type: none"> <li>o DNS IP addresses.</li> <li>o IPv4 address</li> <li>o IPv6 prefix</li> <li>o IPv4 Link MTU</li> <li>o Operator reserved PCO container ID=FF00H, with MCC=311 and MNC=480</li> </ul> </li> </ul>			N/A
5	RRC Connection Reconfiguration			N/A



5a	Check: Does the UE send an ESM: Activate Default EPS Bearer Context Accept message?	=>	Activate Default EPS Bearer Context Accept	Pass if message sent
6	Check: Does the UE get an IPv4 and an IPv6 address for the Admin PDN?			Pass if an IPv4 and an IPv6 address is assigned
7	Repeat Steps 3 to 5 to set up a Default bearer for the Verizon Wireless Application PDN.			N/A
7a	Check: Does the UE get an IPv4 and an IPv6 address for the Verizon Wireless Application PDN?			Pass if an IPv4 and an IPv6 address is assigned
Expected Results				
UE shall meet the verdicts in the Table above.				

## 2.8 NETWORK INITIATED PDN DISCONNECT (EMM-CONNECTED)

VZ\_TC\_SUPLCONFIMSLESS\_1500781

Description
<p><b>Definition</b></p> <p>The UE has already completed the initial attach to the network so that it is EMM registered and is in EMM-Connected and RRC-connected states. The network requests for disconnection from a PDN after idle timeout.</p> <p><b>Traceability:</b></p> <ul style="list-style-type: none"> <li>• "Verizon Wireless LTE 3GPP Band 13 Network Access Requirements"</li> <li>• 3GPP TS 36.300: <i>Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2, Release 9</i></li> <li>• 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification, Release 9</i></li> <li>• 3GPP TS 24.301: <i>Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3, Release 9</i></li> <li>• 3GPP TS 23.401: <i>Release 9</i></li> </ul> <p><b>Applicability:</b></p> <p>This test applies to all devices that do not support IMS and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network.</p>

Design Steps				
Step Name				
Step 1				
Pre-Conditions				
The UE under test should have already completed the Initial Attach procedure resulting in the setup of a default Internet PDN bearer. An Administrative PDN connection has been set up according to procedure 2.5 (UE INITIATED PDN CONNECTION [EMM-IDLE]).				
Procedures				
Step	Procedure	Message Sequence		Verdict
		U - S	Message	

1	Network simulator sends a PDN Disconnect request for the Administrative PDN.			N/A
2	RRC Connection Reconfiguration			N/A
2a	Network simulator sends the RRC Connection Reconfiguration message to the UE, with the ESM:Deactivate EPS Bearer Context Request message	<=	RRC Connection Reconfiguration Deactivate EPS Bearer Context Request	N/A
2b	Check: Does the UE send the RRC Connection Reconfiguration Complete message?	=>	RRC Connection Reconfiguration Complete	Pass if message sent
3	UL information transfer			N/A
3a	Check: Does the UE send an UL information Transfer message that carries the ESM: Deactivate EPS Bearer Context Accept message?	=>	Deactivate EPS Bearer Context Accept	Pass if message sent
4	Network initiated UE context Release			N/A

4a	Network simulator sends the RRC connection Release message to the UE	<=	RRC connection Release	N/A
4b	Check: Does UE send an RLC Acknowledgement to the SS?	=>	RLC ACK	Pass if message sent
Expected Results				
UE shall meet the verdicts in the Table above.				

## 2.9 UE INITIATED DETACH FOR E-UTRAN (EMM-CONNECTED) 3 PDNS SCENARIO VZ\_TC\_SUPLCONFIMSLESS\_1500782

Description
<p><b>Definition</b></p> <p>The UE has already completed the initial attach to the network so that it is EMM registered and is in EMM-Connected and RRC-connected states. UE requests for detach from the EUTRAN, e.g., when the UE is soft reset.</p> <p><b>Traceability:</b></p> <ul style="list-style-type: none"> <li>• "Verizon Wireless LTE 3GPP Band 13 Network Access Requirements"</li> <li>• 3GPP TS 36.300: <i>Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2, Release 9</i></li> <li>• 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification, Release 9</i></li> <li>• 3GPP TS 24.301: <i>Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3, Release 9</i></li> <li>• 3GPP TS 23.401: <i>Release 9</i></li> </ul> <p><b>Applicability:</b></p> <p>This test applies to all devices that do not support IMS and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network except for NB-IoT devices.</p>

Design Steps				
Step Name				
Step 1				
Pre-Conditions				
The UE under test should have already completed the Initial Attach procedure 2.1 resulting in the setup of a default Internet PDN bearer.				
Procedures				
Step	Procedure	Message Sequence		Verdict
		U - S	Message	

1	The UE has established 3 PDN connections according to Test Case: VZ_TC_LTESUPSIGCONF_5398 (UE INITIATED PDN CONNECTION [EMM-CONNECTED])			N/A
2	Soft reset the UE using appropriate AT Command			N/A
3	UL information transfer			N/A
3a	Check: Does the UE send an UL Information Transfer with the EMM: Detach Request message?	=>	UL Information Transfer EMM: Detach Request	Pass if message sent
Expected Results				
UE shall meet the verdicts in the Table above.				

## 2.10 UE INITIATED DETACH FOR E-UTRAN (EMM-IDLE) - 3 PDNS SCENARIO VZ\_TC\_SUPLCONFIMSLESS\_1500783

Description
<p><b>Definition</b></p> <p>The UE has already completed the initial attach to the network so that it is EMM registered, but it is in EMM-Idle and RRC-Idle states. A RRC connection needs to be established before UE can request for detach from the EUTRAN, e.g., when the UE is powered off.</p> <p><b>Traceability:</b></p> <ul style="list-style-type: none"> <li>• "Verizon Wireless LTE 3GPP Band 13 Network Access Requirements"</li> <li>• 3GPP TS 36.300: <i>Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2, Release 9</i></li> <li>• 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification, Release 9</i></li> <li>• 3GPP TS 24.301: <i>Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3, Release 9</i></li> <li>• 3GPP TS 23.401: <i>Release 9</i></li> </ul> <p><b>Applicability:</b></p> <p>This test applies to all devices that do not support IMS and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network except for NB-IoT devices.</p>

Design Steps				
Step Name				
Step 1				
Pre-Conditions				
The UE under test should have already completed the Initial Attach procedure 2.1 resulting in the setup of a default Internet PDN bearer.				
Procedures				
Step	Procedure	Message Sequence		Verdict
		U - S	Message	

1	The UE has established 3 PDN connections according to Test Case 2.6 (UE INITIATED PDN CONNECTION [EMM-CONNECTED]).			N/A
2	Turn off the UE power.			N/A
3	RRC Connection Establishment			N/A
4	RRC connection reconfiguration			N/A
4a	Check: Does the UE send the RRC Connection Reconfiguration Complete message?	=>	RRC Connection Reconfiguration Complete	Pass if message sent
5	UL information transfer			N/A
5a	Check: Does the UE send an UL Information Transfer with the EMM: Detach Request message?	=>	UL Information Transfer EMM: Detach Request	Pass if message sent
Expected Results				
UE shall meet the verdicts in the Table above.				



## 2.1.1 MME INITIATED DETACH (EMM-CONNECTED) -3 PDNS SCENARIO

VZ\_TC\_SUPLCONFIMLESS\_1500784

Description
<p><b>Definition</b></p> <p>The UE has already completed the initial attach to the network so that it is EMM registered and is in EMM-Connected and RRC-connected states. The network simulator initiates detach of the UE from the EUTRAN, e.g., radio link to the UE failed or the UE is powered off.</p> <p><b>Traceability:</b></p> <ul style="list-style-type: none"> <li>• "Verizon Wireless LTE 3GPP Band 13 Network Access Requirements"</li> <li>• 3GPP TS 36.300: <i>Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2, Release 9</i></li> <li>• 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification, Release 9</i></li> <li>• 3GPP TS 24.301: <i>Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3, Release 9</i></li> <li>• 3GPP TS 23.401: <i>Release 9</i></li> </ul> <p><b>Applicability:</b></p> <p>This test applies to all devices that do not support IMS and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network except for NB-IoT devices.</p>

Design Steps				
Step Name				
Step 1				
Pre-Conditions				
The UE under test should have already completed the Initial Attach procedure 2.1 resulting in the setup of a default Internet PDN bearer.				
Procedures				
Step	Procedure	Message Sequence		Verdict
		U - S	Message	
1	The UE has established 3 PDN connections according to Test Case			N/A

	2.6(UE INITIATED PDN CONNECTION [EMM_CONNECTED])			
2	Network simulator sends a DL Information Transfer message with the EMM: Detach Request message to the UE	β	DL Information Transfer EMM: Detach Request	N/A
3	UL information transfer			N/A
3a	Check: Does the UE send a UL Information Transfer message to the eNB carrying the EMM:Detach Accept message for the MME'	à	UL Information Transfer EMM: Detach Accept	Pass if message sent
4	Network simulator sends the RRC connection Release message to the UE and an indication to release all RABs and detach from the network	β	RRC connection Release	N/A
4a	Check: Does UE send an RLC Acknowledgement to the eNB?	à	RLC ACK	Pass if message sent
Expected Results				
UE shall meet the verdicts in the Table above.				

## 2.12 UE RE-INITIATED CONNECTION TO INTERNET PDN AFTER DISCONNECTED VZ\_TC\_SUPLCONFIMSLESS\_1500785

Description
<p><b>Definition</b></p> <p>The UE has been disconnected from the Internet PDN while still connected to another PDN, e.g., Administrative PDN. In this scenario, the UE has to request for a re-connection to the Internet PDN. These procedures test the UEs capability to re-connect to the Internet PDN while connecting to the Administrative PDN, immediately following a disconnection from the Internet PDN.</p> <p><b>Traceability:</b></p> <ul style="list-style-type: none"> <li>• "Verizon Wireless LTE 3GPP Band 13 Network Access Requirements"</li> <li>• 3GPP TS 36.300: <i>Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2</i>, Release 9</li> <li>• 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification</i>, Release 9, Section 5</li> <li>• 3GPP TS 24.301: <i>Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3</i>, Release 9</li> <li>• 3GPP TS 23.401: Release 9</li> </ul> <p><b>Applicability:</b></p> <p>This test applies to all devices that do not support IMS and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network.</p>

Design Steps			
Step Name			
Step 1			
Pre-Conditions			
The UE under test shall have already completed the initial Attach procedure to connect to the Internet PDN and established a connection to the Administrative PDN			
Procedures			
Step	Procedure	Message Sequence	Verdict

		U - S	Message	
1	Network simulator initiates the PDN disconnect from the Internet PDN	<=		
2	Check: Is the UE disconnected from the Internet PDN?			Pass if UE is disconnected from the Internet PDN
3	Check: Does UE send an UL Information Transfer message ESM: PDN Connectivity Request message?	=>	UL Information Transfer ESM: PDN Connectivity Request	Pass if message sent
3a	Check: Is the "Request Type" = Initial Request?			Pass if type is correct
3b	Check: Is the PDN type = IPv4v6?			Pass if type is correct
3c	Check: Is the ESM Information Transfer Flag omitted in the ESM:PDN Connectivity Request message?			Pass if type is correct
3d	Check: Is APN = 3 included for the Internet PDN?			Pass if type is correct
3e	Check: Is the Protocol Option			Pass if type is

	(PCO) =  • DNS • IPv4 Link MTU • Operator reserved PCO container ID=FF00H, with MCC=311 and MNC=480?			correct
4	Network simulator sends an Activate Default EPS Bearer Context Request message to the UE, with the following information elements:  • "APN-AMBR"  "Protocol Configuration Options" =  • DNS IP addresses. • IPv4 address • IPv6 prefix • IPv4 Link MTU • Operator reserved PCO container ID=FF00H, with MCC=311 and MNC=480	<=	Activate Default EPS Bearer Context Request	N/A
5	Check: Does the UE send an ESM: Activate Default EPS Bearer Context Accept message?	=>	Activate Default EPS Bearer Context Accept	Pass if message sent
6	Check: Does the UE get a new IPv6 and IPv4 address for the Internet PDN?			Pass if an IPv6 and IPv4 address is created

Expected Results
UE shall meet the verdicts in the Table above.

## 2.16 UE SUPPORT OF MULTIPLE DNS ADDRESSES VZ\_TC\_SUPLCONFIMSLSS\_1500789

Description
<p><b>Definition</b></p> <p>The UE is required to support up to 2 IPv4 DNS server addresses, and up to 2 IPv6 DNS server addresses. This capability is verified in the current test case.</p> <p><b>Traceability:</b></p> <ul style="list-style-type: none"> <li>• "Verizon Wireless LTE 3GPP Band 13 Network Access Requirements"</li> <li>• 3GPP TS 36.300: <i>Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2, Release 9</i></li> <li>• 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification, Release 9, Section 5</i></li> <li>• 3GPP TS 24.301: <i>Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3, Release 9</i></li> <li>• 3GPP TS 23.401: <i>Release 9</i></li> </ul> <p><b>Applicability:</b></p> <p>This test applies to all devices that do not support IMS and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network.</p>

Design Steps				
Step Name				
Step 1				
Pre-Conditions				
The UE under test shall have already completed the initial Attach procedure to connect to the Internet PDN.				
Procedures				
Step	Procedure	Message Sequence		Verdict
		U - S	Message	
1	Network simulator sends the Package #0 SMS message to the UE to trigger an Admin PDN			NA

	connection request			
2	Check: Does UE send an UL Information Transfer message ESM: PDN Connectivity Request message?	=>	UL Information Transfer ESM: PDN Connectivity Request	Pass if message sent
2a	Check: Is the "Request Type" = Initial Request?			Pass if type is correct
2b	Check: Is the PDN type = IPv4v6?			Pass if type is correct
2c	Check: Is the ESM Information Transfer Flag omitted in the ESM:PDN Connectivity Request message?			Pass if type is correct
2d	Check: Is APN included for the Admin PDN?			Pass if type is correct
2e	Check: Is the Protocol Option (PCO) =  <ul style="list-style-type: none"> <li>• DNS</li> <li>• IPv4 Link MTU</li> <li>• Operator reserved PCO container ID=FF00H, with MCC=311 and MNC=480?</li> </ul>			Pass if type is correct
3	Network simulator sends an Activate Default EPS Bearer	<=	Activate Default EPS Bearer Context	N/A



	Context Request message to the UE, with the following information elements:  <ul style="list-style-type: none"> <li>• "APN-AMBR"</li> </ul> "Protocol Configuration Options" =  <ul style="list-style-type: none"> <li>• IPv4 address</li> <li>• IPv6 prefix</li> <li>• 2 IPv4 DNS addresses</li> <li>• 2 IPv6 DNS addresses</li> <li>• IPv4 Link MTU</li> <li>• Operator reserved PCO container ID=FF00H, with MCC=311 and MNC=480</li> </ul>		Request	
4a	Check: Does the UE send an ESM: Activate Default EPS Bearer Context Accept message?	=>	Activate Default EPS Bearer Context Accept	Pass if message sent
5	Check: Does the UE show the support of 2 IPv4 DNS and 2 IPv6 DNS addresses?			Pass if all 2 IPv4 and 2 IPv6 DNS addresses are supported
Expected Results				
UE shall meet the verdicts in the Table above.				

## 2.17 NETWORK INITIATED EPS BEARER MODIFICATION WITHOUT QOS UPDATE (EMM-CONNECTED) VZ\_TC\_SUPLCONFIMSLESS\_1500790

Description
<p><b>Definition</b></p> <p>The UE has already completed the initial attach to the network so that it is EMM registered and is in EMM-Connected and RRC-connected states. The network requests for modification of the TFT of the default EPS bearer for the Internet PDN.</p> <p><b>Traceability:</b></p> <ul style="list-style-type: none"> <li>"Verizon Wireless LTE 3GPP Band 13 Network Access Requirements"</li> <li>3GPP TS 36.300: <i>Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2</i>, Release 9</li> <li>3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification</i>, Release 9</li> <li>3GPP TS 24.301: <i>Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3</i>, Release 9</li> <li>3GPP TS 23.401: Release 9</li> </ul> <p><b>Applicability:</b></p> <p>This test applies to all devices that do not support IMS and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network.</p>

Design Steps				
Step Name				
Step 1				
Pre-Conditions				
The UE under test should have already completed the Initial Attach procedure 2.1 resulting in the setup of a default Internet PDN bearer.				
Procedures				
This procedure tests the modification of the default EPS bearer for the Internet PDN.				
Step	Procedure	Message Sequence		Verdict
		U - S	Message	

1	UE has established a default EPS bearer for the Internet PDN.			N/A
2	<p>Network simulator sends a DL Information Transfer message to the UE carrying the Modify EPS Bearer Context Request message, with the following information elements:</p> <ul style="list-style-type: none"> <li>• "EPS bearer Identity"</li> <li>• "TFT" with "number of packet filters"=15</li> <li>• "Protocol Configuration Options" = Operator reserved PCO container ID=FF00H, with MCC=311 and MNC=480. Action = 3 (Redirect)</li> </ul>	<=	DL Information Transfer Modify EPS Bearer Context Request	N/A
3	UL information transfer			N/A
3a	Check: Does the UE send an UL information Transfer message that carries the ESM: Modify EPS Bearer Context Accept message?	=>	Modify EPS Bearer Context Accept	Pass if message sent
Expected Results				
UE shall meet the verdicts in the Table above.				

## 2.18 NETWORK INITIATED EPS BEARER MODIFICATION WITH QoS UPDATE (EMM-CONNECTED) VZ\_TC\_SUPLCONFIMSLESS\_1500791

Description
<p><b>Definition</b></p> <p>The UE has already completed the initial attach to the network so that it is EMM registered and is in EMM-Connected and RRC-connected states. The network requests for QoS modification/rate throttling of the default EPS bearer for the Internet PDN.</p> <p><b>Traceability:</b></p> <ul style="list-style-type: none"> <li>• "Verizon Wireless LTE 3GPP Band 13 Network Access Requirements"</li> <li>• 3GPP TS 36.300: <i>Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2, Release 9</i></li> <li>• 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification, Release 9</i></li> <li>• 3GPP TS 24.301: <i>Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3, Release 9</i></li> <li>• 3GPP TS 23.401: <i>Release 9</i></li> </ul> <p><b>Applicability:</b></p> <p>This test applies to all devices that do not support IMS and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network.</p>

Design Steps				
Step Name				
Step 1				
Pre-Conditions				
The UE under test should have already completed the Initial Attach procedure resulting in the setup of a default Internet PDN bearer.				
Procedures				
Step	Procedure	Message Sequence		Verdict
		U - S	Message	
1	UE has established a default EPS bearer for			N/A

	the Internet PDN			
2	RRC Connection Reconfiguration			N/A
2a	<p>Network simulator sends the RRC Connection Reconfiguration message to the UE, with the ESM:Modify EPS Bearer Context Request message with the following information elements:</p> <ul style="list-style-type: none"> <li>• "EPS bearer Identity"</li> <li>• "New EPS QoS"</li> <li>• "Protocol Configuration Options" = Operator reserved PCO container ID=FF00H, with MCC=311 and MNC=480. Action = 4 (Rate Throttling)</li> </ul>	<=	<p>RRC Connection Reconfiguration</p> <p>Modify EPS Bearer Context Request</p>	N/A
2b	Check: Does the UE send the RRC Connection Reconfiguration Complete message?	=>	RRC Connection Reconfiguration Complete	Pass if message sent
3	UL information transfer			N/A
3a	Check: Does the UE send an UL information Transfer message that carries the ESM: Modify EPS Bearer Context Accept message?	=>	Modify EPS Bearer Context Accept	Pass if message sent
Expected Results				
UE shall meet the verdicts in the Table above.				

## 2.19 NETWORK INITIATED EPS DEDICATED BEARER ACTIVATION (EMM-CONNECTED) VZ\_TC\_SUPLCONFIMSLESS\_1500792

Description
<p><b>Definition</b></p> <p>The UE has already completed the initial attach to the network so that it is EMM registered and is in EMM-Connected and RRC-Connected states. The network requests activation of a dedicated EPS bearer with TFT for the Internet PDN.</p> <p><b>Traceability:</b></p> <ul style="list-style-type: none"> <li>• "Verizon Wireless LTE 3GPP Band 13 Network Access Requirements"</li> <li>• 3GPP TS 36.300: <i>Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2, Release 9</i></li> <li>• 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification, Release 9</i></li> <li>• 3GPP TS 24.301: <i>Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3, Release 9</i></li> <li>• 3GPP TS 23.401: <i>Release 9</i></li> </ul> <p><b>Applicability:</b></p> <p>This test applies to all devices that do not support IMS and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network.</p>

Design Steps
Step Name
Step 1
Pre-Conditions
The UE under test should have already completed the Initial Attach procedure 2.1 resulting in the setup of a default Internet PDN bearer.
Procedures
This procedure tests the activation of a dedicated EPS bearer for the Internet PDN.

Step	Procedure	Message Sequence		Verdict
		U - S	Message	
1	UE has established a default EPS bearer for the Internet PDN			N/A
2	<p>Network simulator sends a DL Information Transfer message to the UE carrying two Activate Dedicated EPS Bearer Context Request messages, with the following information elements:</p> <ul style="list-style-type: none"> <li>• ACTIVATE DEDICATED EPS BEARER CONTEXT REQUEST:</li> <li>• "EPS bearer Identity"</li> <li>• "Linked EPS bearer identity"</li> <li>• "TFT" with "number of packet filters"=9</li> <li>• ACTIVATE DEDICATED EPS BEARER CONTEXT REQUEST:</li> <li>• "EPS bearer Identity"</li> <li>• "Linked EPS bearer identity"</li> <li>• "TFT" with "number of packet filters"=7</li> </ul>	<=	<p>DL Information Transfer</p> <p>Activate Dedicated EPS Bearer Context Request</p> <p>Activate Dedicated EPS Bearer Context Request</p>	N/A
3	UL information transfer			N/A
3a	Check: Does the UE send an UL information Transfer message that carries the ESM: Activate Dedicated EPS Bearer Context Accept message?	=>	Activate Dedicated EPS Bearer Context Accept	Pass if message sent
3b	Check: Does the UE send an UL information Transfer message that carries the ESM: Activate Dedicated EPS	=>	Activate Dedicated EPS	Pass if message

	Bearer Context Accept message?		Bearer Context Accept	sent
Expected Results				
UE shall meet the verdicts in the Table above.				



## 2.20 NETWORK INITIATED PDN DISCONNECT (NO DATA USAGE AVAILABLE) VZ\_TC\_SUPLCONFIMSLESS\_1500793

Description
<p><b>Definition</b> The UE has already completed the initial attach to the network so that it is EMM registered and is in EMM-Connected and RRC-Connected states. The network requests for disconnection from a PDN after account has no data usage available.</p> <p><b>Traceability:</b></p> <ul style="list-style-type: none"> <li>"Verizon Wireless LTE 3GPP Band 13 Network Access Requirements"</li> <li>3GPP TS 36.300: <i>Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2, Release 9</i></li> <li>3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification, Release 9</i></li> <li>3GPP TS 24.301: <i>Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3, Release 9</i></li> <li>3GPP TS 23.401: <i>Release 9</i></li> </ul> <p><b>Applicability:</b> This test applies to all devices that do not support IMS and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network.</p>

Design Steps				
Step Name				
Step 1				
Pre-Conditions				
The UE under test should have already completed the Initial Attach procedure resulting in the setup of a default Internet PDN bearer. An Administrative PDN connection has been set up according to procedure 2.5 (UE INITIATED PDN CONNECTION[EMM-IDLE])				
Procedures				
Step	Procedure	Message Sequence		Verdict
		U - S	Message	

1	Start with UE running an Internet application			N/A
2	RRC Connection Reconfiguration			N/A
2a	<p>Network simulator sends the RRC Connection Reconfiguration message to the UE, with the ESM:Deactivate EPS Bearer Context Request message with the following information elements:</p> <ul style="list-style-type: none"> <li>• "Protocol Configuration Options" = <ul style="list-style-type: none"> <li>o Operator reserved PCO container ID=FF00H, with MCC=311 and MNC=480. Action = 1 (Terminate)</li> </ul> </li> </ul>	<=	<p>RRC Connection Reconfiguration</p> <p>Deactivate EPS Bearer Context Request</p>	N/A
2b	Check: Does the UE send the RRC Connection Reconfiguration Complete message?	=>	RRC Connection Reconfiguration Complete	Pass if message sent
3	UL information transfer			N/A
3a	Check: Does the UE send an UL information Transfer message that carries the ESM: Deactivate EPS Bearer Context Accept message?	=>	Deactivate EPS Bearer Context Accept	Pass if message sent

Expected Results
UE shall meet the verdicts in the Table above.

## 2.2.1 DEDICATED BEARER ACTIVATION WITH QOS (EMM-CONNECTED) VZ\_TC\_SUPLCONFIMSLESS\_1500794

Description
<p><b>Definition</b></p> <p>The UE has already completed the initial attach to the network such that it is EMM registered. It is in EMM-connected and RRC-connected states with a default bearer for the Internet PDN. This procedure tests the setup of dedicated bearers on the Internet PDN.</p> <p><b>Traceability:</b></p> <ul style="list-style-type: none"> <li>• "Verizon Wireless LTE 3GPP Band 13 Network Access Requirements"</li> <li>• 3GPP TS 36.300: <i>Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2, Release 9</i></li> <li>• 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification, Release 9, Section 5</i></li> <li>• 3GPP TS 24.301: <i>Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3, Release 9</i></li> <li>• 3GPP TS 23.401: <i>Release 9</i></li> </ul> <p><b>Applicability:</b></p> <p>This test applies to all devices that do not support IMS and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network.</p>

Design Steps
Step Name
Step 1
Pre-Conditions
The UE under test shall have already completed the Initial Attach procedure resulting in the setup of a default Internet PDN bearer.
Procedures
<p>This procedure tests the setup of dedicated bearers on the Internet PDN.</p> <p>This test requires a PC to generate the packets specified in tables 5-13 and send these packets through the UE. Depending on the UE under test, the PC may be connected to the UE via either a tethered or</p>

LAN connection.				
Step	Procedure	Message Sequence		Verdict
		U - S	Message	
1	Start with UE in EMM registered/EMM connected state			N/A
2	RRC Connection Reconfiguration			N/A
	<p>Network simulator sends two Activate Dedicated EPS Bearer Context Request messages to the UE, with the following information elements:</p> <ul style="list-style-type: none"> <li>• ACTIVATE DEDICATED EPS BEARER CONTEXT REQUEST:</li> <li>• "EPS bearer Identity"</li> <li>• "Linked EPS bearer identity"</li> <li>• "TFT" with elements as specified in table 3 for dedicated bearer 1.</li> <li>• ACTIVATE DEDICATED EPS BEARER CONTEXT REQUEST:</li> <li>• "EPS bearer Identity"</li> </ul>	<=	Activate Dedicated EPS Bearer Context Request messages	N/A

	<ul style="list-style-type: none"> <li>• "Linked EPS bearer identity"</li> <li>• "TFT" with elements as specified in table 3 for dedicated bearer 2.</li> </ul>			
3	Check: Does the UE send an ESM: Activate Dedicated EPS Bearer Context Accept message?	=>	Activate Dedicated EPS Bearer Context Accept	Pass if message sent
4	Check: Does the UE send an ESM: Activate Dedicated EPS Bearer Context Accept message?	=>	Activate Dedicated EPS Bearer Context Accept	Pass if message sent
	EXCEPTION: Test steps 5 to 6 are repeated for N=1 to 11			
5	PC transmits one IP packet according to Table 4 for sub-test index=N	-	-	
6	Check: Does UE send the IP Packet on the data radio bearer as specified by Table 4 for sub-test index=N?	-	-	Pass if packet sent on specified bearer

The following table shall be used to create the traffic flow templates sent to the UE:

Packet	Bearer	Packet	IPv4 /	Protocol	Single	Single	IPSec SPI	Type of	Flow
--------	--------	--------	--------	----------	--------	--------	-----------	---------	------

Filter ID		Filter Evaluation Precedence	IPv6 Remote Address and Subnet Mask	Identifier (IPv4) / Next Header (IPv6)	Local Port / Local Port Range (UE)	Remote Port / Remote Port Range (Network)	range	Service (IPv4)/Traffic Class (IPv6) and Mask	Label (IPv6)
1	Dedicated Bearer 1	1						TOS/Traffic Class: 1 0 1 0 0 0 0 0  Mask:  1 1 1 0 0 0 0 0	
2	Dedicated Bearer 2	2						TOS/Traffic Class: 1 0 0 0 0 0 0 0  Mask:  1 1 0 0 0 0 0 0	
3	Dedicated Bearer 2	3						TOS/Traffic Class: 0 1 1 0 0 0 0 0  Mask:  1 1 1 0 0 0 0 0	
4	Dedicated Bearer 2	4		1 (ICMP)					
5	Dedicated Bearer 2	5		50 IPSec (ESP)			0x0F80F0000		

6	Dedicated Bearer 2	6		51 IPSec (AH)					
7	Dedicated Bearer 2	7		17 (UDP)					
8	Dedicated Bearer 2	8		6 (TCP)					

**Table 3: Traffic Flow Template Contents**

The following table identifies sub-test parameters and test requirements.

Sub-test Index	Test data (IP Packet)	Expected DRB associated with the EPS bearer context for the matching packet filter	Packet filter component under test	Comment
1	1	DRB <sub>2</sub>	Type of service/Traffic class	The IP packet is only matching Packet Filter 1 and 2. The IP packet is returned on DRB <sub>2</sub> as Packet Filter 1 is evaluated before Packet Filter 2.
2	2	DRB <sub>3</sub>	Type of service/Traffic class	The IP packet is only matching Packet Filter 2. The IP packet is returned on DRB <sub>3</sub> .
3	3	DRB <sub>3</sub>	Type of service/Traffic class	The IP packet is only matching Packet Filter 3. The IP packet is



			class	returned on DRB <sub>3</sub> .
4	4	DRB <sub>3</sub>	Protocol identifier/Next header match	The IP packet is only matching Packet Filter 4. The IP packet is returned on DRB <sub>3</sub> .
5	5	DRB <sub>3</sub>	IPSec SPI value match	The IP packet is only matching Packet Filter 5. The IP packet is returned on DRB <sub>3</sub> .
6	6	DRB <sub>3</sub>	Protocol identifier/Next header match	The IP packet is only matching Packet Filter 6. The IP packet is returned on DRB <sub>3</sub> .
7	7	DRB <sub>3</sub>	Protocol identifier/Next header match	The IP packet is only matching Packet Filter 7. The IP packet is returned on DRB <sub>3</sub> .
8	8	DRB <sub>3</sub>	Protocol identifier/Next header match	The IP packet is only matching Packet Filter 8. The IP packet is returned on DRB <sub>3</sub> .
9	9	DRB <sub>1</sub>	Protocol identifier/Next header does not match	No packet filter matches. The IP packet is returned on DRB <sub>1</sub> (default bearer)
10	10	DRB <sub>1</sub>	Type of service/Traffic class does not match	No packet filter matches. The IP packet is returned on DRB <sub>1</sub> (default bearer)
11	11	DRB <sub>1</sub>	Security parameter index does not match	No packet filter matches. The IP packet is returned on DRB <sub>1</sub> (default bearer)

**Table 4: Sub-test test parameters and test requirements**

The following tables define test packet contents.

**Table 5: IP Packet #1**

Information element	Value/Remark	Comment
Type of service/Traffic class	10111000	Significant for packet filters 1, 2, and 3. Value matches packet filters 1 and 2.

**Table 6: IP Packet #2**

Information element	Value/Remark	Comment
Protocol identifier/Next header	17	Significant for packet filters 1, 2, 3, 4, 5, and 6. Value matches packet filters 1 and 2. Value does not match packet filters 3, 4, 5, or 6.
Type of service/Traffic class	10000000	Significant for packet filters 1, 2, and 3. Value matches packet filter 2.

**Table 7: IP Packet #3**

Information element	Value/Remark	Comment
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Type of service/Traffic class	01100000	Significant for packet filters 1, 2, and 3. Value matches packet filter 3.
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**Table 8: IP Packet #4**

Information element	Value/Remark	Comment
Protocol identifier/Next header	1	Significant for packet filters 4, 5, 6, 7, and 8. Value matches packet filter 4. Value does not match packet filters 5, 6, 7, or 8.

**Table 9: IP Packet #5**

Information element	Value/Remark	Comment
Protocol identifier/Next header	50	Significant for packet filters 4, 5, 6, 7, and 8. Value matches packet filter 5. Value does not match packet filters 4, 6, 7, or 8.
IPsec Security parameter index	0x0F80F0000	Significant for packet filter 5. Value matches packet filter 5.

**Table 10: IP Packet #6**

Information element	Value/Remark	Comment
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Protocol identifier/Next header	51	Significant for packet filters 4, 5, 6, 7, and 8. Value matches packet filter 6. Value does not match packet filters 4, 5, 7, or 8.
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**Table 11: IP Packet #7**

Protocol identifier/Next header	17	Significant for packet filters 4, 5, 6, 7, and 8. Value matches packet filter 7. Value does not match packet filters 4, 5, 6, or 8.
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**Table 12: IP Packet #8**

Protocol identifier/Next header	6	Significant for packet filters 4, 5, 6, 7, and 8. Value matches packet filter 8. Value does not match packet filters 4, 5, 6, or 7.
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**Table 13: IP Packet #9**

Information element	Value/Remark	Comment
Protocol identifier/Next header	46	Significant for packet filters 4, 5, 6, 7, and 8. Value does not match packet filters 4, 5, 6, 7, or 8.

**Table 14: IP Packet #10**

Information element	Value/Remark	Comment
Type of service/Traffic class	01000000	Significant for packet filters 1, 2, and 3. Value does not match packet filters 1,2, or 3.

**Table 15: IP Packet #11**

Information element	Value/Remark	Comment
IPsec Security parameter index	0x0F90F0000	Significant for packet filter 5. Value does not match packet filter 5.

#### Expected Results

UE shall meet the verdicts in the Table above.

## 2.2.2 TIME RETRIEVAL VIA SIB<sub>16</sub> MESSAGE VZ\_TC\_SUPLCONFIMSLESS\_1500795

Description
<p><b>Definition</b> This procedure is to test the ability of the UE to retrieve time information via the RRC SIB<sub>16</sub> message.</p> <p><b>Traceability:</b></p> <ul style="list-style-type: none"> <li>• "Verizon Wireless LTE 3GPP Band 13 Network Access Requirements," section 3.2.11</li> <li>• 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification</i>, Release 11</li> <li>• 3GPP TS 24.301: <i>Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3</i>, Release 9</li> </ul> <p><b>Applicability:</b> This test applies to all devices that do not support IMS and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network.</p>

Design Steps			
Step Name			
Step 1			
Pre-Conditions			
The network simulator is configured for signal conformance testing as described in Section <b>Test Equipment Configuration</b> and powered on. The device (UE) under test is then connected to the network simulator.			
Procedures			
The following procedures should be either initiated by the UE or performed in response to messages received by the UE.			
Step	Procedure	Message Sequence	Verdict

		U - S	Message	
1	Power on the UE	-	-	N/A
2	<p>Configure the network simulator to broadcast the SystemInformationBlockType16 message with the following information elements:</p> <ul style="list-style-type: none"> <li>• systemTimeInfoUTC</li> <li>• dayLightSavingIndicator</li> <li>• localTimeOffset</li> <li>• leapSeconds</li> </ul>	<=	SystemInformationBlock16	
3	UE performs the Initial Attach procedure to the LTE network as in Test 2.1	-	-	N/A
4	<p>Configure the network simulator to send the EMM Information message to the UE with the following information elements. Ensure the information element values are different from those broadcast in SIB 16:</p> <ul style="list-style-type: none"> <li>• Local time zone</li> <li>• Universal time and local time zone</li> <li>• Network daylight saving time</li> </ul>	<=	EMM Information	N/A
5	Check: Does UE display proper time based on data received in			Pass if displayed

	SystemInformationBlockType16 message'			time is correct
Expected Results				
UE shall meet verdict in the Table above.				



## 2.2.3 UE INDICATES RACH REPORT CAPABILITY VZ\_TC\_SUPLCONFIMLESS\_1500796

Description
<p><b>Definition</b></p> <p>This procedure validates that the UE indicates its capability to support the RACH information report when requested by the network:</p> <ul style="list-style-type: none"> <li>son-Parameters-r9::rach-report-r9 = supported</li> </ul> <p><b>Traceability:</b></p> <ul style="list-style-type: none"> <li>"Verizon Wireless LTE 3GPP Band 13 Network Access Requirements", section 4.1.15</li> <li>3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification</i>, Release 10, section 6.3.6</li> </ul> <p><b>Applicability:</b></p> <p>This test applies to all release 10 devices that do not support IMS and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network.</p>

Design Steps			
Step Name			
Step 1			
Pre-Conditions			
Procedures			
<p>The test procedure defined in 3GPP TS 523-1, V11.1.1, section 8.5.4 "UE capability transfer" shall be followed with the following change in red:</p>			
Information Element	Value/Remark	Comment	Condition
UECapabilityInformation ::= SEQUENCE {			
nonCriticalExtension SEQUENCE {			

&&&.			
son-Parameters-r9	Checked	This is an optional field indicating if the UE supports rach report	rach-report-r9 shall be set to "supported"
Expected Results			
UE shall meet the verdicts in the Table above.			

## 2.24 UE REPORTS RACH INFORMATION UPON REQUEST BY NETWORK

VZ\_TC\_SUPLCONFIMSLESS\_1500797

Description
<p><b>Definition</b></p> <p>The UE reports the stored RACH information in a rach-report via UEInformationResponse message when requested by the network.</p> <ul style="list-style-type: none"> <li>The number of preambles sent for the last successfully completed random access procedure</li> <li>Whether contention was detected for at least one of the transmitted preambles during the procedure</li> </ul> <p><b>Traceability:</b></p> <ul style="list-style-type: none"> <li>"Verizon Wireless LTE 3GPP Band 13 Network Access Requirements", section 4.1.15</li> <li>3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification</i>, Release 10, section 5.6.5.3</li> </ul> <p><b>Applicability:</b></p> <p>This test applies to all release 10 devices that do not support IMS and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network except for NB-IoT, which doesn't support "UEInformationRequest" as per 3GPP 36.331.</p> <p>Not applicable to NB-IoT, which doesn't support "UEInformationRequest" as per 3GPP 36.331.</p>

Design Steps				
Step Name				
Step 1				
Pre-Conditions				
The UE under test should have already completed the Initial Attach procedure resulting in the setup of a default Internet PDN bearer. An Administrative PDN connection has been set up according to Section 2.6 and the UE is in RRC connected state and has data to send or receive (inactivity timer will not expire). The UE should have already indicated its RACH information report capability in UECapabilityInformation in Test Case 2.23 (UE INDICATES RACH REPORT CAPABILITY)				
Procedures				
Step	Procedure	Message Sequence		Verdict
		U - S	Message	

1	Start with UE in RRC Connected state and connect the UE to a PC such that there is data to be sent to maintain RRC connection			N/A
2	SS sends <i>UEInformationRequest</i> message with <i>rach-reportReq</i> set to true,	<=	<i>UEInformationRequest</i>	N/A
3	Upon receiving <i>UEInformationRequest</i> message, if <i>rach-reportReq</i> is set to true,			N/A
3a	Check: Does the UE send an <i>UEInformationResponse</i> message including <i>rach-Report</i> containing the following IEs:  <ul style="list-style-type: none"> <li>• <i>numberOfPreamblesSent=1</i></li> <li>• <i>contentionDetected=false</i></li> </ul>	=>	<i>UEInformationResponse</i>	Pass if yes
4	TE emulator sends disconnects RRC connection and transition the UE to RRC Idle mode.	<=	<i>RRCConnectionRelease</i>	N/A
5	Configure the network emulator to ignore the next two random access preambles from the device. On the 3rd access preamble, indicates contention resolution not successful in MSG4 by setting a different Contention Resolution ID (not	-	-	-

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9	<ul style="list-style-type: none"> <li>• Power Off the device</li> </ul>			
Expected Results				
UE shall meet the verdicts in the Table above.				

## 2.25 UE INITIATED TRACKING AREA UPDATE AFTER RADIO LINK FAILURE VZ\_TC\_SUPLCONFIMSLESS\_1500798

Description
<p><b>Definition</b></p> <p>The procedure tests the execution of the tracking area update procedure after a radio link failure (RLF).</p> <p><b>Traceability:</b></p> <ul style="list-style-type: none"> <li>"Verizon Wireless LTE 3GPP Band 13 Network Access Requirements"</li> <li>3GPP TS 36.300: <i>Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2, Release 9</i></li> <li>3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification, Release 9</i></li> <li>3GPP TS 24.301: <i>Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3, Release 9</i></li> </ul> <p><b>Applicability:</b></p> <p>This test applies to all devices that do not support IMS and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network.</p>

Design Steps				
Step Name				
Step 1				
Pre-Conditions				
Procedures				
Step	Procedure	Message Sequence		
		U - S	Message	
1	Start with UE in RRC Connected state on cell A and connect the UE to a PC such that there is data to be sent to maintain RRC	-	-	N/A

	connection			
2	Set cell A transmit power to off  Set cell B transmit power to -85 dBm	-	-	N/A
2a	The following messages are sent and shall be received on cell B.	-	-	N/A
3	Check: Does the UE send  <i>RRCCONNECTIONREESTABLISHMENTREQUEST</i>  message on Cell B?  For the UE supports any ue-Category-NB (NB1 or NB1&NB2)  Check: Does the NB-IoT UE send  <i>RRCCONNECTIONREQUEST</i> message on Cell-B?	=>	<i>RRCCONNECTIONREESTABLISHMENTREQUEST</i>  For NB-IoT, <i>RRCCONNECTIONREQUEST</i>	Pass if message sent
4	The network simulator transmits  <i>RRCCONNECTIONREESTABLISHMENT</i> message.  For the UE supports any ue-Category-NB (NB1 or NB1&NB2)  The network simulator transmits  <i>RRCCONNECTIONSETUP</i> message.	<=	<i>RRCCONNECTIONREESTABLISHMENT</i>  For NB-IoT, <i>RRCCONNECTIONSETUP</i>	N/A
5	The UE transmits  <i>RRCCONNECTIONREESTABLISHMENTCOMPLETE</i>	=>	<i>RRCCONNECTIONREESTABLISHMENTCOMPLETE</i>  For NB-IoT, <i>RRCCONNECTIONSETUPCOMPLETE</i>	Pass if message sent



	<p>message.</p> <p>For the UE supports any ue-Category-NB (NB<sub>1</sub> or NB<sub>1</sub>&amp;NB<sub>2</sub>)</p> <p>Check: The UE transmits</p> <p><i>RRCCONNECTIONSetupComplete</i> message.</p>			
6	<p>The network simulator transmits</p> <p><i>RRCCONNECTIONReconfiguration</i> message.</p> <p>For the UE supports any ue-Category-NB (NB<sub>1</sub> or NB<sub>1</sub>&amp;NB<sub>2</sub>), skip this step.</p>	<=	<i>RRCCONNECTIONReconfiguration</i>	N/A
7	<p>The UE transmits</p> <p><i>RRCCONNECTIONReconfigurationComplete</i> message.</p> <p>For the UE supports any ue-Category-NB (NB<sub>1</sub> or NB<sub>1</sub>&amp;NB<sub>2</sub>), skip this step.</p>	=>	<i>RRCCONNECTIONReconfigurationComplete</i>	Pass if message sent
8	<p>Check: Does the UE transmit an UL Information Transfer message EMM: TRACKING AREA UPDATE REQUEST message?</p>	=>	TRACKING AREA UPDATE REQUEST	Pass if message sent
9	<p>The network simulator transmits a TRACKING AREA UPDATE ACCEPT message with a new value for GUTI IE.</p>	<=	TRACKING AREA UPDATE ACCEPT	N/A

10	Check: Does the UE transmit a TRACKING AREA UPDATE COMPLETE message?	=>	TRACKING AREA UPDATE COMPLETE	Pass if message sent
Expected Results				
UE shall meet the verdicts in the Table above.				

## 2.27 UE ROUTES DNS QUERIES VZ\_TC\_SUPLCONFIMSLESS\_1500800

Description
<p><b>Description:</b> This test verifies that UE-initiated DNS queries intended for Internet-based DNS servers are sent over the Internet PDN..</p> <p><b>Traceability:</b></p> <ul style="list-style-type: none"> <li>• "Verizon Wireless LTE 3GPP Band 13 Network Access Requirements"</li> <li>• 3GPP TS 36.300: <i>Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2, Release 9</i></li> <li>• 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification, Release 9</i></li> <li>• 3GPP TS 24.301: <i>Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3, Release 9</i></li> </ul> <p><b>Applicability:</b> This test applies to all devices that do not support IMS and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network.</p>

Design Steps
Step Name
Step 1 - Test 1
Pre-Conditions
<p>The UE under test shall have already completed the Initial Attach procedure 2.1 resulting in the setup of a default Internet PDN bearer.</p> <p>This test requires a PC to generate DNS queries and send these queries through the UE. Depending on the UE under test, the PC may be connected to the UE via either a tethered or LAN connection.</p> <p>Configure the network simulator to provide the same DNS Server IPv6 address in the Protocol Configuration Options (PCO) IE of the Activate Default EPS Bearer Context Request message for both the Internet and Administrative PDNs.</p>
Procedures
<p>This procedure tests the setup of connections to the Administrative PDN and routing of DNS queries over the default Internet PDN bearer.</p>

Step	Procedure	Message Sequence		Verdict
		U - S	Message	
1	Start with UE in EMM registered/EMM connected state with a connection to the Internet PDN			N/A
2	Network simulator sends the Package #0 SMS message to the UE to trigger an Admin PDN connection request	-	-	N/A
3	Check: Does UE send an UL Information Transfer message ESM: PDN Connectivity Request message?	=>	UL Information Transfer ESM: PDN Connectivity Request	Pass if message sent
3a	Check: Is the "Request Type" = Initial Request?			Pass if type is correct
3b	Check: Is the PDN type = IPv4v6?			Pass if type is correct
3c	Check: Is the ESM Information Transfer Flag omitted in the ESM:PDN Connectivity Request message?			Pass if type is correct
3d	Check: Is an enabled APN included for the Administrative			Pass if type is correct

	PDN?			
3e	<p>Check: Is the Protocol Option (PCO) =</p> <ul style="list-style-type: none"> <li>• DNS</li> <li>• IPv4 Link MTU</li> <li>• Operator reserved PCO container ID=FF00H, with MCC=311 and MNC=480?</li> </ul> <p>Check: Does Protocol Option (PCO) NOT include P-CSCF IPv6 addresses?</p>			Pass if type is correct
4	RRC Connection Reconfiguration			N/A
4a	<p>Network simulator sends an Activate Default EPS Bearer Context Request message to the UE, with the following information elements:</p> <ul style="list-style-type: none"> <li>• "APN-AMBR"</li> <li>• "EPS bearer Identity"</li> <li>• "PDN Address"= <ul style="list-style-type: none"> <li>o IPv4 address</li> <li>o IPv6 interface ID</li> </ul> </li> <li>• "Protocol Configuration Options" = <ul style="list-style-type: none"> <li>o DNS IP addresses.</li> <li>o IPv4 Link MTU</li> <li>o Operator reserved PCO container</li> </ul> </li> </ul>	<=	Activate Default EPS Bearer Context Request	N/A

	<p>ID=FF00H, with MCC=311 and MNC=480</p> <p>Note: the DNS server IPv6 address provided should be the same as the DNS server IPv6 address provided in Step 1.</p>			
5	<p>Check: Does the UE send an ESM: Activate Default EPS Bearer Context Accept message?</p>	=>	Activate Default EPS Bearer Context Accept	Pass if message sent
6	<p>Network simulator sends an IPv6 Router Advertisement, with the "IPv6 Prefix" value included.</p>	<=	Router Advertisement	N/A
7	<p>PC transmits an IPv6 DNS AAAA query to www.test-ipv6.com</p>			
7a	<p>Check: Does UE send the DNS Packet as follows?:</p> <ul style="list-style-type: none"> <li>• Is packet sent from source IPv6 address with IP prefix set to value received in step 1?</li> <li>• Is packet sent to IPv6 DNS server address as specified in Step 1?</li> <li>• Is packet sent on EPS bearer as specified in Step 1?</li> </ul>	-	-	Pass if packet sent with specified source/destination addresses on specified bearer

Expected Results					
UE shall meet the verdicts in the Table above.					
Design Steps					
Step Name					
Step 2 - Test 2					
Pre-Conditions					
<p>The UE under test shall have already completed the initial Attach procedure to connect to the Internet PDN.</p> <p>This test requires a PC to generate DNS queries and send these queries through the UE. Depending on the UE under test, the PC may be connected to the UE via either a tethered or LAN connection.</p> <p>Configure the network simulator to provide the same DNS Server IPv6 address in the Protocol Configuration Options (PCO) IE of the Activate Default EPS Bearer Context Request message for both the Internet and Administrative PDNs.</p>					
Procedures					
This procedure tests the setup of connections to the Internet and Administrative PDNs and routing of DNS queries over the default Internet PDN bearer.					
Step	Procedure	Message Sequence		Verdict	
		U - S	Message		
1	Start with UE in EMM registered/EMM connected state with a connection to the Internet PDN.			N/A	
2	Network simulator sends the Package #0 SMS message to the UE to trigger an Admin	-	-	N/A	

	PDN connection request				
3	Check: Does UE send an UL Information Transfer message ESM: PDN Connectivity Request message?	=>	UL Information Transfer ESM: PDN Connectivity Request	Pass if message sent	
3a	Check: Is the "Request Type" = Initial Request?			Pass if type is correct	
3b	Check: Is the PDN type = IPv4v6?			Pass if type is correct	
3c	Check: Is the ESM Information Transfer Flag omitted in the ESM:PDN Connectivity Request message?			Pass if type is correct	
3d	Check: Is an enabled APN included for the Administrative PDN?			Pass if type is correct	
3e	Check: Is the Protocol Option (PCO) = <ul style="list-style-type: none"> <li>• DNS</li> <li>• IPv4 Link MTU</li> <li>• Operator reserved PCO container ID=FF00H, with MCC=311 and MNC=480?</li> </ul> Check: Does Protocol Option (PCO) NOT include P-CSCF IPv6 addresses?			Pass if type is correct	
4	RRC Connection Reconfiguration			N/A	



4a	<p>Network simulator sends an Activate Default EPS Bearer Context Request message to the UE, with the following information elements:</p> <ul style="list-style-type: none"> <li>• "APN-AMBR"</li> <li>• "EPS bearer Identity"</li> <li>• "PDN Address"= <ul style="list-style-type: none"> <li>o IPv4 address</li> <li>o IPv6 interface ID</li> </ul> </li> <li>• "Protocol Configuration Options" = <ul style="list-style-type: none"> <li>o DNS IP addresses.</li> <li>o IPv4 Link MTU</li> <li>o Operator reserved PCO container ID=FF00H, with MCC=311 and MNC=480</li> </ul> </li> </ul>	<=	Activate Default EPS Bearer Context Request	N/A
5	Check: Does the UE send an ESM: Activate Default EPS Bearer Context Accept message?	=>	Activate Default EPS Bearer Context Accept	Pass if message sent
6	Network simulator sends an IPv6 Router Advertisement, with the "IPv6 Prefix" value included.	<=	Router Advertisement	N/A
7	Network simulator initiates the PDN disconnect from the Internet PDN	<=		
8	Check: Is the UE disconnected from the Internet PDN?			Pass if UE is disconnected from the IMS PDN
9	Check: Does UE send an UL Information Transfer message ESM: PDN Connectivity	=>	UL Information	Pass if message

	Request message?		Transfer  ESM: PDN Connectivity Request	sent	
9a	Check: Is the "Request Type" = Initial Request?			Pass if type is correct	
9b	Check: Is the PDN type = IPv4v6?			Pass if type is correct	
9c	Check: Is the ESM Information Transfer Flag omitted in the ESM:PDN Connectivity Request message?			Pass if type is correct	
9d	Check: Is APN = 3 included for the Internet PDN?			Pass if type is correct	
9e	Check: Is the Protocol Option (PCO) =  • DNS • IPv4 Link MTU  Operator reserved PCO container ID=FF00H, with MCC=311 and MNC=480?			Pass if type is correct	
10	Network simulator sends an Activate Default EPS Bearer Context Request message to the UE, with the following information elements:  • "APN-AMBR"  • "EPS bearer Identity"  • "PDN Address"=	<=	Activate Default EPS Bearer Context Request	N/A	

	<ul style="list-style-type: none"> <li>o IPv4 address</li> <li>o IPv6 interface ID</li> </ul> <p>"Protocol Configuration Options" =</p> <ul style="list-style-type: none"> <li>• DNS IP addresses.</li> <li>• IPv6 prefix</li> <li>• IPv4 Link MTU</li> <li>• Operator reserved PCO container ID=FF00H, with MCC=311 and MNC=480</li> </ul> <p>Note: the DNS server IPv6 address provided should be the same as the DNS server IPv6 address provided in Step 4a.</p>				
11	Check: Does the UE send an ESM: Activate Default EPS Bearer Context Accept message?	=>	Activate Default EPS Bearer Context Accept	Pass if message sent	
12	Check: Does the UE get a new IPv6 address for the Internet PDN?			Pass if an IPv6 address is created	
13	PC transmits an IPv6 DNS AAAA query to www.test-ipv6.com				
13a	<p>Check: Does UE send the DNS Packet as follows?:</p> <ul style="list-style-type: none"> <li>• Is packet sent from source IPv6 address with IP prefix set to value received in</li> </ul>	-	-	Pass if packet sent with specified source/destination addresses on	

	step 10? • Is packet sent to IPv6 DNS server address as specified in Step 10? • Is packet sent on EPS bearer as specified in Step 10?				specified bearer		
Expected Results							
UE shall meet the verdicts in the Table above.							

## 2.27.1 UE ROUTES DNS QUERIES - Test 1

VZ\_TC\_SUPLCONFIMSLESS\_4105999311931765

## 2.27.2 UE ROUTES DNS QUERIES - Test2

VZ\_TC\_SUPLCONFIMSLESS\_4105999311931766

## 2.28 feICIC GCF Signaling and Protocol Test Cases VZ\_TC\_SUPLCONFIMSLESS\_1500801

Description
<p><b>Definition</b></p> <p>In order to comply with Verizon Wireless feICIC requirements, devices shall pass all applicable test cases listed in 3GPP TS 36.523-1 : <i>Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification</i>, Release 12.</p> <p><b>Traceability:</b></p> <ul style="list-style-type: none"> <li>• "Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements,"</li> <li>• 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification</i>, Release 11</li> <li>• 3GPP TS 36.523-1 : <i>Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification</i>, Release 12.</li> </ul> <p><b>Applicability:</b></p> <p>This test applies to all devices except cat M that do not support IMS and are designed to support the Verizon Wireless LTE 3GPP Band 13 network.</p>

Design Steps
Step Name
Step 1
Pre-Conditions
Procedures
<p>All test steps in the below list in TS 36.523-1 shall be followed:</p> <ul style="list-style-type: none"> <li>• Section 8.2.2.8: test SIB1 reception in dedicated RRC signaling</li> <li>• Measurement events and handover signaling <ul style="list-style-type: none"> <li>o Section 8.3.1.19 (neighbor ABS, CSI measurement on dirty SF and clean SF configuration and reporting)</li> <li>o Section 8.3.1.20 (neighbor ABS configuration and measurement reporting) ,</li> <li>o Section 8.3.1.21 (HO with neighbor RSRP measurement under ABS: macro -&gt; pico)</li> </ul> </li> </ul>

o Section 8.3.1.28 (serving ABS configuration and reporting)
Expected Results
As specified in 3GPP test cases



## 2.29 feICIC FEATURE GROUP and UE Capability SUPPORT

VZ\_TC\_SUPLCONFIMSLESS\_1500802

Description
<p><b>Definition</b></p> <p>This procedure is to test the compliance of UE Feature Group Indicator support and feICIC capability report support to the VzW requirements.</p> <p><b>Traceability:</b></p> <ol style="list-style-type: none"> <li>1. "Verizon Wireless LTE 3GPP Band 13 Network Access Requirements"</li> <li>2. 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification</i>, Release 11, section 6.3.6</li> </ol> <p><b>Applicability:</b></p> <p>This test applies to all devices except Cat M that do not support IMS and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network.</p>

Design Steps			
Step Name			
Step 1			
Pre-Conditions			
<p>The network simulator is configured for signal conformance testing as described in Section <b>Test Equipment Configuration</b> and powered on. The device (UE) under test is then connected to the network simulator. After the UE is powered on, acquired and synchronized to the network, the following procedures should be either initiated by the UE or performed in response to messages received by the UE.</p>			
Procedures			
<p>Table 8.5.4.1.3.3-2: UECapabilityInformation defined in 3GPP TS 523-1, V12.2.0, section 8.5.4 "UE capability transfer" shall be followed:</p>			
Step	Procedure	Message Sequence	Verdict

		U - S	Message	
1	UE performs the Initial Attach procedure to the LTE network as in Test 2.1	-	-	N/A
2	Configure the network simulator to send the Capability Inquiry message to the UE	<=	Capability Inquiry	N/A
2a	Check: Does UE respond to the enquiry by sending the UE Capability Information message to eNB?	=>	UE Capability Information	Pass if message sent
2b	Check: Does featureGroupIndRel10-v1060 in fdd-Add-UE-EUTRA-Capabilities-v1060 of UE-EUTRA-Capability-v1060-IEs indicate the feature group 115 supported by the UE?			Pass if contents are correct
3	Check: Does the crs-InterfHandl-r11 field in phyLayerParameters-v1130 IE supported by the UE and set to "supported"?			Pass if contents are correct
4	Check: Does the ss-CCH-InterfHandl-r11 field in phyLayerParameters-v1130 IE supported by the UE and set to "supported"?			Pass if contents are correct
Expected Results				
UE shall meet the verdicts in the Table above.				



## 2.30 RRCConnectionReConfiguration when CRS-AssistanceInfoList-r11 is present VZ\_TC\_SUPLCONFIMSLess\_1500803

Description
<p><b>Definition</b> This procedure is to test the compliance of UE handling of CRS-AssistanceInfoList in Attach, Handover and Re-establishment procedures (RRCConnectionConfiguration message).</p> <p><b>Traceability:</b></p> <ol style="list-style-type: none"> <li>1. "Verizon Wireless LTE 3GPP Band 13 Network Access Requirements"</li> <li>2. 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification</i>, Release 11, section 6.3.6</li> </ol> <p><b>Applicability:</b> This test applies to all devices that do not support IMS and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network.</p>

Design Steps
Step Name
Step 1
Pre-Conditions
<p>The test configuration shall consist of three (3) cells. One serving and two neighbor cells with configurations below:</p> <ul style="list-style-type: none"> <li>• All the cells have the same EARFCNs on B13</li> <li>• Signal strength of the cells are configured as per T0 parameters below</li> </ul> <p>The network simulator is configured for signal conformance testing as described in Section <i>Test Equipment Configuration</i> and powered on. The device (UE) under test is then connected to the network simulator. After the UE is powered on, acquired and synchronized to the network, the following procedures should be either initiated by the UE or performed in response to messages received by the UE.</p>
Procedures

Step	Procedure	Message Sequence		Verdict
		U-S	Message	
1	UE performs the Initial Attach procedure to the LTE network	-	-	N/A
2	Configure the network simulator to send the Capability Inquiry message to the UE	<=	Capability Inquiry	N/A
2a	UE respond to the enquiry by sending the UE Capability Information message to eNB	=>	UE Capability Information	N/A
2b	FeatureGroupIndRel10-v1060 in fdd-Add-UE-EUTRA-Capabilities-v1060 of UE-EUTRA-Capability-v1060-IEs indicate the feature group 115 supported by the UE			N/A
3	The crs-InterfHandl-r11 field in phyLayerParameters-v1130 IE supported by the UE and set to "supported".  The ss-CCH-InterfHandl-r11 field in phyLayerParameters-v1130 IE supported by the UE and set to "supported".			N/A
4	The TE simulator sends RRCConnectionReconfiguration message with RadioResourceConfigDedicated with	<=	RRCConnectionReconfiguration	N/A

	CRS-AssistanceInfoList-r11 for the 2 neighbors (Cell 2 and Cell 3) that contains: <ul style="list-style-type: none"> <li>• 2 antenna ports per PCIs and</li> <li>• The respective physical cell id of the neighboring cells</li> <li>• No MBSFN configuration</li> </ul>			
5	Check: does UE send <i>RRCCONNECTIONRECONFIGURATIONCOMPLETE</i> message?	=>	<i>RRCCONNECTIONRECONFIGURATIONCOMPLETE</i>	Pass if yes
6	The TE simulator sends <i>RRCCONNECTIONRELEASE</i> to transition UE to idle mode	<=	<i>RRCCONNECTIONRELEASE</i>	N/A
7	The TE simulator pages the UE and establish data bearers for TCP data transfer			N/A
8	Verify that data transfer with maximum traffic (full buffer) can be successfully maintained			Pass if yes
9	The TE simulator transmits an <i>RRCCONNECTIONRECONFIGURATION</i> message and sets up <i>A3</i> -offset threshold (offset) = 0dB.  The TE simulator changes Cell 1, Cell 2 and Cell 3 parameters according to the row "T1" in table below.			N/A

I 0	The UE transmits an <i>RRCCONNECTIONRECONFIGURATIONCOMPLETE</i> message on Cell 1 to confirm the setup of intra frequency measurement.	=>	<i>RRCCONNECTIONRECONFIGURATIONCOMPLETE</i>	N/A
I 1	The UE transmit a <i>MeasurementReport</i> message on Cell 1 to report event A3 for cell 1 with the measured <b>RSRP</b> values for Cell 1(Pcell), and Cell 2 (neighbor).	=>	<i>MeasurementReport</i>	N/A
I 2	The TE simulator transmits an <i>RRCCONNECTIONRECONFIGURATION</i> (HO CMD) message on Cell 1 to order the UE to perform intra frequency handover to Cell 2 and contains the following IEs: <ul style="list-style-type: none"> <li>• MeasurementConfiguration <ul style="list-style-type: none"> <li>o Sets up A3-offset threshold (offset) = 0dB on Cell 2</li> </ul> </li> <li>• MobilityControlInfo</li> <li>• UERelatedInformation</li> <li>• RadioResourceConfigDedicated <ul style="list-style-type: none"> <li>o CRS-IC assistance information for the target cell is NOT present</li> </ul> </li> </ul>	<=	<i>RRCCONNECTIONRECONFIGURATION</i>	N/A
I 3	Check: does the UE send <i>RRCCONNECTIONRECONFIGURATIONCOMPLETE</i> message on Cell 2 to complete HO signaling?	=>	<i>RRCCONNECTIONRECONFIGURATIONCOMPLETE</i>	Pass if yes
I 4	Verify the data session continues (HO successful)	-	-	Pass

15	<p>The TE simulator transmits an <i>RRCConnectionReconfiguration</i> message with RadioResourceConfigDedicated with CRS-AssistanceInfoList-r11 for the 2 neighbors (Cell 1 and Cell 3) that contains:</p> <ul style="list-style-type: none"> <li>• 2 antenna ports per PCIs and</li> <li>• The respective physical cell id of the neighboring cells (cell 1 and cell 3)</li> <li>• No MBSFN configuration</li> </ul> <p>The TE simulator changes Cell 1, Cell 2 and Cell 3 parameters according to the row "T2" in table below.</p>			N/A
16	<p>The UE transmit a <i>MeasurementReport</i> message on Cell 2 to report event A3 for cell3 with the measured <b>RSRP</b> values for Cell 2 (Pcell), and 3 (neighbor)'</p>	=>	<i>MeasurementReport</i>	N/A
17	<p>The TE simulator transmits an <i>RRCConnectionReconfiguration</i> (HO CMD) message on Cell 2 to order the UE to perform intra frequency handover to Cell 3 and contains the following IEs:</p> <ul style="list-style-type: none"> <li>• fullConfig-r9</li> <li>• MeasurementConfiguration <ul style="list-style-type: none"> <li>o A2 threshold in Cell3 for RSRP to -80dbm in the associated <i>measObjectEUTRA</i> IE.</li> </ul> </li> <li>• MobilityControlInfo</li> <li>• UERelatedInformation</li> </ul>	<=	<i>RRCConnectionReconfiguration</i>	N/A



	<ul style="list-style-type: none"> <li>• RadioResourceConfigDedicated           <ul style="list-style-type: none"> <li>o CRS-IC assistance information for the target cell (cell 3) is present (cell 1 and cell 2)               <ul style="list-style-type: none"> <li>□ 2 antenna ports per PCIs and</li> <li>□ The respective physical cell id of the neighboring cells (cell 1 and cell 2)</li> <li>□</li> <li>□</li> <li>□</li> </ul> </li> <li>o MBSFN configuration on cell 3               <ul style="list-style-type: none"> <li>□ Radio Frame Allocation Period (RFAP) = 80 ms</li> <li>□ fourFrames - 0 (Offset = 0)</li> <li>□ fourFrames:</li> <li>□ 000000 100100 100100 100000</li> </ul> </li> <li>o</li> <li>o</li> <li>o</li> </ul> </li> </ul>			
18	Check: does the UE send <i>RRCConnectionReconfigurationComplete</i> message on Cell 3 to complete HO signaling?	=>	<i>RRCConnectionReconfigurationComplete</i>	Pass if yes
19	Verify the data session continues (HO successful) on Cell 3.	-	-	N/A

	The TE simulator changes Cell 1, Cell 2 and Cell 3 parameters according to the row "T <sub>3</sub> " in table below.			
20	Void	-	-	-
21	<p>The TE simulator transmits an <i>RRCCONNECTIONRECONFIGURATION</i> message on Cell 3 to order the UE to perform intra frequency handover to Cell 1 and contains the following IEs:</p> <ul style="list-style-type: none"> <li>• MeasurementConfiguration <ul style="list-style-type: none"> <li>o Sets up A3-offset threshold (offset) = 0dB on Cell 1</li> </ul> </li> <li>• MobilityControlInfo</li> <li>• UERelatedInformation</li> <li>• RadioResourceConfigDedicated <ul style="list-style-type: none"> <li>o CRS-IC assistance information for the target cell is NOT present</li> <li>o No MBSFN configuration</li> </ul> </li> </ul>	<=>	<i>RRCCONNECTIONRECONFIGURATION</i>	N/A
22	The UE transmits an <i>RRCCONNECTIONREESTABLISHMENTREQUEST</i> message on Cell 3.	=>	<i>RRCCONNECTIONREESTABLISHMENTREQUEST</i>	N/A
23	The TE simulator transmits an <i>RRCCONNECTIONREESTABLISHMENT</i> message to resume SRB1 operation and re-activate security on Cell 3.	<=>	<i>RRCCONNECTIONREESTABLISHMENT</i>	N/A
24	The UE transmits an	=>	<i>RRCCONNECTIONREESTABLISHMENTCOMPLETE</i>	N/A

	<i>RRCCONNECTIONReestablishmentComplete</i> message on Cell 3.		<i>te</i>	
25	<p>The TE simulator sends RRCCONNECTIONReconfiguration message with RadioResourceConfigDedicated with CRS-AssistanceInfoList-r11 for the 2 neighbors (Cell 1 and Cell 2) that contains:</p> <ul style="list-style-type: none"> <li>• 2 antenna ports per PCIs and</li> <li>• The respective physical cell id of the neighboring cells</li> <li>• No MBSFN configuration</li> </ul>	<=	RRCCONNECTIONReconfiguration	N/A
26	<p>Check: does UE send RRCCONNECTIONReconfigurationComplete message?</p>	=>	RRCCONNECTIONReconfigurationComplete	Pass if yes
27	Power off the UE			

	Parameter	Unit	Cell 1	Cell 2	Cell 3	Remark
To	Cell-specific RS EPRE	dBm/15kHz	-80	"Off"	"Off"	This is to make sure that UE connects to the Cell 1 as serving cell
T1	Cell-specific RS EPRE	dBm/15kHz	-90	-83	-90	This is to make sure that UE can perform HO to Cell 2
T2	Cell-specific RS	dBm/15kHz	-90	-90	-83	This is to make sure that UE meets the

	EPRE	z				condition for HO to cell 3.
T <sub>3</sub>	Cell-specific RS EPRE	dBm/15kHz	"Off"	-96	-90	This is to make sure that UE meets the condition for re-establishing back to Cell 3
Expected Results						
UE shall meet the verdicts in the Table above.						

## 2.3.1 DL CoMP UE CAPABILITY SUPPORT VZ\_TC\_SUPLCONFIMSLESS\_1500804

Description
<p><b>Definition</b> This procedure is to test the compliance of UE capability support for DL CoMP (Coordinated Multi-Point).</p> <p><b>Traceability:</b></p> <ol style="list-style-type: none"> <li>1. "Verizon Wireless LTE 3GPP Band 13 Network Access Requirements"</li> <li>2. 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification, Release 11, section 6.3.6</i></li> <li>3. 3GPP TS 36.523-1: <i>Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification, Release 12, section 8.5.4.</i></li> </ol> <p><b>Applicability:</b> This test applies to all devices except Cat M that do not support IMS and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network.</p>

Design Steps
Step Name
Step 1
Pre-Conditions
The network simulator is configured for signal conformance testing as described in Section <b>Test Equipment Configuration</b> and powered on. The device (UE) under test is then connected to the network simulator. After the UE is powered on, acquired and synchronized to the network, the following procedures should be either initiated by the UE or performed in response to messages received by the UE.
Procedures
Table 8.5.4.1.3.3-2: UECapabilityInformation defined in 3GPP TS 523-1, Release 12, section 8.5.4 "UE capability transfer" shall be followed.

Step	Procedure	Message Sequence		Verdict
		U - S	Message	
1	UE performs the Initial Attach procedure to the LTE network as in Test 2.1	-	-	N/A
2	Configure the network simulator to send the Capability Inquiry message to the UE	<=	Capability Inquiry	N/A
2a	Check: Does UE respond to the enquiry by sending the UE Capability Information message to eNB?	=>	UE Capability Information	Pass if message sent
2b	Check: Does UE include supportedCSI-Proc-r11 field in all bands in all band combinations'			Pass if contents are correct
Expected Results				
UE shall meet the verdicts in the Table above.				

## 2.32 DL CoMP HANDOVER WITH TRANSMISSION MODE CHANGE

VZ\_TC\_SUPLCONFIMLESS\_1500805

Description
<p><b>Definition</b> This test verifies UE handover between eNB supporting TM10 and eNB not supporting TM10 is successful.</p> <p><b>Traceability:</b></p> <ol style="list-style-type: none"> <li>1. "Verizon Wireless LTE 3GPP Band 13 Network Access Requirements"</li> <li>2. 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification, Release 11, section 5.3.5.4 and 5.3.10.6.</i></li> <li>3. 3GPP TS 36.523-1: <i>Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification, Release 12, section 8.2.4.</i></li> </ol> <p><b>Applicability:</b> This test applies to all devices except Cat M that do not support IMS and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network.</p>

Design Steps
Step Name
Step 1
Pre-Conditions
The network simulator is configured for signal conformance testing as described in Section <b>Test Equipment Configuration</b> and powered on. The device (UE) under test is then connected to the network simulator. After the UE is powered on, acquired and synchronized to the network, the following procedures should be either initiated by the UE or performed in response to messages received by the UE.
Procedures
<ol style="list-style-type: none"> <li>1. Set the initial conditions as per section 8.2.4.12.3.1 of 3GPP TS 36.523-1: <i>Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access</i></li> </ol>

*Network (E-UTRAN); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification for a 10 MHz channel in Band 13 with the following exceptions:*

- a. Cell 1 has 2 CRS antenna ports and supports TM4. Cell 2 has 2 CRS antenna ports and supports TM10.
2. Follow the test procedure sequence as per section 8.2.4.12.3.2 of 3GPP TS 36.523-1:  
*Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification with the following exceptions:*
  - a. The *RRCConnectionReconfiguration* message in Step 1 of Table 8.2.4.12.3.2-1 shall include radioResourceConfigDedicated IE with physicalConfigDedicated message content set according to Tables 9.2.4.1\_F.4.3-1 through 9.2.4.1\_F.4.3-8 of 3GPP TS 36.521-1: *Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) conformance specification; Radio transmission and reception; Part 1: conformance testing.*
  - b. The *RRCConnectionReconfiguration* message in Step 4 of Table 8.2.4.12.3.2-1 shall include radioResourceConfigDedicated IE with physicalConfigDedicated message content set according to Tables 9.2.2.1.4.3-1 through 9.2.2.1.4.3-3 of 3GPP TS 36.521-1: *Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) conformance specification; Radio transmission and reception; Part 1: conformance testing.*
  - c. Table 8.2.4.12.3.3-6 shall not apply.

## Expected Results

UE shall meet the verdicts in the test procedure above.



## 2.33 UE DOWNLINK SUPERVISION VZ\_TC\_SUPLCONFIMSLESS\_1500806

Description
<b>Definition</b> The procedure verifies that non-standardized DL supervision failure will not block the PCI for more than 5 second (for connectivity or reselection).
<b>Traceability</b> <ul style="list-style-type: none"> <li>"Verizon Wireless LTE 3GPP Band 13 Network Access Requirements"</li> <li>3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification</i>, Release 9</li> </ul>
<b>Applicability</b> This test applies to all devices that do not support IMS and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network.

Design Steps				
Step Name				
Step 1				
Pre-Conditions				
System Simulator: - cell A (belongs to TAI-1, home PLMN) transmit power is set to -85 dBm;				
Procedures				
Step	Procedure	Message Sequence		Verdict
		U - S	Message	
1	Start with UE in RRC Connected state on cell A and connect the UE to a PC such that there is data to be sent to maintain RRC connection	-	-	N/A

2	Set cell A transmit power to off for 3 seconds	-	-	N/A
3	Set cell A transmit power back on to -85dbm	-	-	N/A
4	Check: Does the UE send <i>RRCCConnectionReestablishmentRequest</i> message or <i>RRCCConnectionRequest</i> message on Cell A within 7 seconds after the beginning of step 2 (inclusive of the 3 second power off time)?	=>	<i>RRCCConnectionReestablishmentRequest</i>	Pass if message sent
	Capture UE's behavior 10 more seconds before powering off the UE.			
Expected Results				
UE shall meet the verdicts in the Table above.				

## 2.34 NON-ESSENTIAL SYSTEM INFORMATION DETECTION FAILURE

VZ\_TC\_SUPLCONFIMSLESS\_1500807

Description
<p><b>Definition</b> The procedure tests the UE behavior after HO when non-essential SIBs (e.g., SIB<sub>3</sub> and SIB<sub>5</sub>) are not readable.</p> <p><b>Traceability</b></p> <ul style="list-style-type: none"> <li>"Verizon Wireless LTE 3GPP Band 13 Network Access Requirements"</li> <li>3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification</i>, Release 9</li> </ul> <p><b>Applicability</b> This test applies to all devices that do not support IMS and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network.</p>

Design Steps			
Step Name			
Step 1			
Pre-Conditions			
<p>System Simulator:</p> <ul style="list-style-type: none"> <li>- cell A (belongs to TAI-1, home PLMN) transmit power is set to -85 dBm;</li> <li>- cell B (belongs to TAI-1, home PLMN) transmit power is set to "off".</li> </ul>			
Procedures			
Step	Procedure	Message Sequence	Verdict
		U-S Message	
1	Start with UE in RRC Connected state on cell A and connect the UE to a PC such that there is data to be sent to maintain	-	N/A

	RRC connection			
2	Reduce the power on cell A to -90dbm, set cell B power on at -83dbm.  (there is no need to configure HO trigger as we simply use a forced HO).	-		N/A
3	The TE simulator sends RRCConnectionConfiguration message on cell A to direct the UE to HO to cell B	<=	<i>RRCCConnectionReconfiguration</i>	N/A
4	The UE sends RRCConnectionReconfigurationComplete on cell B	=>	<i>RRCCConnectionReconfigurationComplete</i>	N/A
5	The TE simulator transmits MIB, SIB <sub>1</sub> , and SIB <sub>2</sub> periodically (each SIB is on their own, no bundling) without transmitting SIB <sub>3</sub> , SIB <sub>5</sub> or SIB <sub>8</sub> :  • SIB <sub>1</sub> specifies SIB <sub>3/5/8</sub> configuration so that UE will try to decode them	-		N/A
6	Verify that the RRC connection continues for the next 5 minutes without any RLF or RRC re-establishment.	-		N/A
7	Power off the device			
Expected Results				
UE shall meet the verdicts in the Table above.				



## 2.37 UE IS PAGED IN RRC\_CONNECTED STATE VZ\_TC\_SUPLCONFIMSLESS\_1500810

Description
<p><b>Definition:</b> The procedure tests UE handling of pages from network during RRC connected state</p> <p><b>Traceability:</b></p> <ul style="list-style-type: none"> <li>"Verizon Wireless LTE 3GPP Band 13 Network Access Requirements"</li> <li>3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification</i>, Release 9</li> </ul> <p><b>Applicability:</b> This test applies to all devices that do not support IMS except Cat M1, NB-IoT devices and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network except for NB-IoT, Cat-M1 UEs per 3GPP TS36.331 section 5.3.2.1.</p>

Design Steps				
Step Name				
Step 1				
Pre-Conditions				
<p><b>System Simulator:</b> - cell A (belongs to TAI-1, home PLMN) transmit power is set to -85 dBm;</p>				
Procedures				
Step	Procedure	Message Sequence		Verdict
		U - S	Message	
1	Start with UE in RRC Connected state on cell A and connect the UE to a PC such that there is data to be sent to maintain RRC connection	-	-	N/A

2	Set the TE to page the UE within the 1st 10 seconds after the RRC connection (after RRCConnectionSetupComplete message from the UE).	< -	PAGE message	N/A
3	Check: Does the UE respond to the Page message	-	-	Pass if no
4	After 10 seconds have passed since RRC connection setup, send another PAGE message to the UE		PAGE message	N/A
5	Check: Does the UE send <i>Page Response</i> message back to TE?	->	<i>Page Response in the form of RRC Connection Setup</i>	Pass if message sent
6	Power off the device			
Expected Results				
UE shall meet the verdicts in the Table above.				

## 2.38 CONTENTION-FREE HANDOVER CARRYING with TTIB ENABLED

VZ\_TC\_SUPLCONFIMSLESS\_1500811

Description
<p><b>Definition</b> The procedure tests UE handling of TTIB enabled configuration when accessing target cell during contention-free HO</p> <p><b>Traceability</b></p> <ul style="list-style-type: none"> <li>"Verizon Wireless LTE 3GPP Band 13 Network Access Requirements"</li> <li>3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification</i>, Release 9</li> </ul> <p><b>Applicability</b> This test applies to all devices except Cat M that do not support IMS and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network.</p>

Design Steps			
Step Name			
Step 1			
Pre-Conditions			
<p>System Simulator:</p> <p>- cell A (belongs to TAI-1, home PLMN) transmit power is set to -85 dBm;</p>			
Procedures			
Step	Procedure	Message Sequence	Verdict
		<div>U</div> <div>-</div> <div>S</div> <div>Message</div>	



1	Start with UE in RRC Connected state on cell A and connect the UE to a PC such that there is data to be sent to maintain RRC connection	-	-	N/A
2	Enable cell B (different PCI, same EARFCN) with transmit power set to --85dBm and attenuate cell As power by 10dB			
3	<p>TE sends RRCConnectionReconfiguration to the UE with the following fields:</p> <ul style="list-style-type: none"> <li>• ttibundling field in the radioResourceConfigDedicated IE under MAC-MainConfig is set to enabled</li> <li>• A pre-defined preamble assignment for the UE to use at RACH of the target cell</li> </ul>	<-	RRCConnectionReconfiguration message	N/A
4	UE sends PRACH preamble using the pre-assigned preamble signature in step 3	->	PRACH Preamble	N/A
5	TE sends PRACH response	<-	PRACH Response	N/A
6	<p>Check: Does the UE send RRCConnectionReconfiguration using TTIB configuration?</p>	->	RRCConnectionReconfiguration	Pass if message sent using TTIB

7	Enable cell B (different EARFCN) with transmit power set to -85dBm and attenuate cell A's power by 5dB			
8	<p>TE sends <i>RRCCONNECTIONRECONFIGURATION</i> to the UE on Cell A with the following fields indicating Cell B as the target cell:</p> <ul style="list-style-type: none"> <li>• <i>ttiBundling</i> field in the <i>radioResourceConfigDedicated</i> IE under <i>MAC-MainConfig</i> is set to enabled</li> <li>• A pre-defined preamble assignment for the UE to use at RACH of the target cell</li> </ul>	<-	<i>RRCCONNECTIONRECONFIGURATION</i> message	N/A
9	UE sends PRACH preamble using the pre-assigned preamble signature in step 3	->	<i>PRACH Preamble</i>	N/A
10	TE sends <i>PRACH response</i>	<-	<i>PRACH Response</i>	N/A
11	<p>Check: Does the UE send <i>RRCCONNECTIONRECONFIGURATIONCOMPLETE</i> using TTIB configuration?</p>	->	<i>RRCCONNECTIONRECONFIGURATIONCOMPLETE</i>	Pass if message sent using TTIB
12	Power off the device			
Expected Results				
UE shall meet the verdicts in the Table above.				

## 2.39 EPDCCH GCF Signalling and Protocol Conformance Test Cases

VZ\_TC\_SUPLCONFIMSLESS\_1500812

Description
<p><b>Definition</b></p> <p>In order to comply with Verizon Wireless EPDCCH (Enhanced Physical Downlink Control Channel) requirements, devices shall pass all applicable test cases listed in</p> <ul style="list-style-type: none"> <li>3GPP TS 36.523-1 : <i>Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification, Release 12.</i></li> </ul> <p><b>Traceability:</b></p> <ul style="list-style-type: none"> <li>"Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements,"</li> <li>3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification, Release 11</i></li> <li>3GPP TS 36.523-1 : <i>Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification, Release 12.</i></li> </ul> <p><b>Applicability:</b></p> <p>This test applies to all devices that do not support IMS and are designed to support the Verizon Wireless LTE 3GPP Band 13 network.</p>

Design Steps	
Step Name	
Step 1	
Pre-Conditions	
Procedures	
All the test steps in the following sections in 3GPP TS 36.523-1 shall be followed for EPDCCH signaling and protocol conformance tests:	
3GPP TS 36.523-1 Protocol conformance test	Title

<b>cases</b>	
7.1.3.14	Correct handling of DL assignment / Dynamic case / EPDCCH
7.1.3.15	Correct handling of DL assignment / Semi-persistent case / EPDCCH
<b>Expected Results</b>	
As specified in 3GPP test cases.	

## 2.4o EPDCCH UE CAPABILITY SUPPORT VZ\_TC\_SUPLCONFIMSLESS\_1500813

Description
<p><b>Definition</b> This procedure is to test the compliance of UE capability support for EPDCCH (Enhanced Physical Downlink Control Channel).</p> <p><b>Traceability:</b></p> <ol style="list-style-type: none"> <li>1. "Verizon Wireless LTE 3GPP Band 13 Network Access Requirements"</li> <li>2. 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification, Release 11, section 6.3.6</i></li> <li>3. 3GPP TS 36.523-1: <i>Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification, Release 12, section 8.5.4.</i></li> </ol> <p><b>Applicability:</b> This test applies to all devices that do not support IMS and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network.</p>

Design Steps
Step Name
Step 1
Pre-Conditions
<p>The network simulator is configured for signal conformance testing as described in Section <b>Test Equipment Configuration</b> and powered on. The device (UE) under test is then connected to the network simulator. After the UE is powered on, acquired and synchronized to the network, the following procedures should be either initiated by the UE or performed in response to messages received by the UE.</p>
Procedures
<p>Table 8.5.4.1.3.3-2: UECapabilityInformation defined in 3GPP TS 523-1, Release 12, section 8.5.4 "UE capability transfer" shall be followed.</p>

Step	Procedure	Message Sequence		Verdict
		U - S	Message	
1	UE performs the Initial Attach procedure to the LTE network as in Test 2.1	-	-	N/A
2	Configure the network simulator to send the Capability Inquiry message to the UE	<=	Capability Inquiry	N/A
2a	Check: Does UE respond to the enquiry by sending the UE Capability Information message to eNB?	=>	UE Capability Information	Pass if message sent
2b	Check: Does UE include ePDCCH-RI field in phyLayerParameters-V1130 IE and set to "supported"			Pass if contents are correct
Expected Results				
UE shall meet the verdicts in the Table above.				

## 2.4.1 256QAM UE CAPABILITY SUPPORT VZ\_TC\_SUPLCONFMSLESS\_1500814

Description
<p><b>Definition</b> This procedure is to test the compliance of UE capability support for 256QAM.</p> <p><b>Traceability:</b></p> <ol style="list-style-type: none"> <li>1. "Verizon Wireless LTE 3GPP Band 13 Network Access Requirements"</li> <li>2. 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification, Release 12, section 6.3.6</i></li> <li>3. 3GPP TS 36.523-1: <i>Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification, Release 12, section 8.5.4.</i></li> </ol> <p><b>Applicability:</b> This test applies to all devices except Cat M that do not support IMS but support 256QAM and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network.</p>

Design Steps
Step Name
Step 1
Pre-Conditions
The network simulator is configured for signal conformance testing as described in Section <b>Test Equipment Configuration</b> and powered on. The device (UE) under test is then connected to the network simulator. After the UE is powered on, acquired and synchronized to the network, the following procedures should be either initiated by the UE or performed in response to messages received by the UE.
Procedures
Table 8.5.4.1.3.3-2: UECapabilityInformation defined in 3GPP TS 523-1, Release 12, section 8.5.4

"UE capability transfer" shall be followed.				
Step	Procedure	Message Sequence		Verdict
		U - S	Message	
1	UE performs the Initial Attach procedure to the LTE network as in Test 2.1	-	-	N/A
2	Configure the network simulator to send the Capability Inquiry message to the UE	<=	Capability Inquiry	N/A
2a	Check: Does UE respond to the enquiry by sending the UE Capability Information message to eNB?	=>	UE Capability Information	Pass if message sent
2b	Check: Does UE include dl-256QAM-r12 field in SupportedBandEUTRA-v1250 IE and set to "supported" for all supported frequency bands'			Pass if contents are correct
Expected Results				
UE shall meet the verdicts in the Table above.				



## 2.4.2 HANDOVER WITH MCS&CQI TABLE CHANGE VZ\_TC\_SUPLCONFIMSLESS\_1500815

Description
<p><b>Definition</b> This test verifies UE handover between eNB supporting 256QAM modulation and eNB not supporting 256QAM modulation is successful.</p> <p><b>Traceability:</b></p> <ol style="list-style-type: none"> <li>1. "Verizon Wireless LTE 3GPP Band 13 Network Access Requirements"</li> <li>2. 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification, Release 12, section 5.3.5.4</i></li> <li>3. 3GPP TS 36.523-1: <i>Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification, Release 12, section 8.2.4.</i></li> </ol> <p><b>Applicability:</b> This test applies to all devices that do not support IMS but support 256QAM and are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network.</p>

Design Steps
Step Name
Step 1
Pre-Conditions
<p>The network simulator is configured for signal conformance testing as described in Section <b><i>Test Equipment Configuration</i></b> and powered on. The device (UE) under test is then connected to the network simulator. After the UE is powered on, acquired and synchronized to the network, the following procedures should be either initiated by the UE or performed in response to messages received by the UE.</p>
Procedures
<ol style="list-style-type: none"> <li>1. Set the initial conditions as per section 8.2.4.12.3.1 of 3GPP TS 36.523-1: <i>Evolved Universal</i></li> </ol>

*Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification* for a 10 MHz channel in Band 13 with the following exceptions:

- a. Both Cell 1 and Cell 2 have 2 antenna ports.
  - b. Cell 2 supports 256QAM modulation. Cell 1 does not support 256QAM modulation.
2. Follow the test procedure sequence as per section 8.2.4.12.3.2 of 3GPP TS 36.523-1: *Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification* with the following exceptions:
- a. The *RRCConnectionReconfiguration* message in Step 1 of Table 8.2.4.12.3.2-1 shall include altCQI-Table-r12 field with the setting of allSubframes, in CQI-ReportConfig-v1250 information element, as included in PhysicalConfigDedicated information element. Note: The *RRCConnectionReconfiguration* message in Step 4 of Table 8.2.4.12.3.2-1 shall not include altCQI-Table-r12 field
  - b. Table 8.2.4.12.3.3-6 shall not apply.

#### Expected Results

UE shall meet the verdicts in the test procedure above.

## 2.43 DEDICATED BEARER SETUP WITH EXTENDED QCI OVER INTERNET PDN CONNECTION (EMM-CONNECTED) VZ\_TC\_SUPLCONFIMSLESS\_1500816

Description
<p><b>Definition</b></p> <p>The UE has already completed the initial attach to the network such that it is EMM registered. It is in EMM-connected and RRC-connected states with a default bearer for the Internet PDN. This procedure tests the setup of dedicated bearers with specified QCI values on the Internet PDN.</p> <p><b>Traceability:</b></p> <ul style="list-style-type: none"> <li>• "Verizon Wireless LTE 3GPP Band 13 Network Access Requirements"</li> <li>• 3GPP TS 36.300: <i>Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2, Release 9</i></li> <li>• 3GPP TS 36.331: <i>Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification, Release 9, Section 5</i></li> <li>• 3GPP TS 24.301: <i>Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3, Release 9</i></li> </ul> <p><b>Applicability:</b></p> <p>This test applies to all devices that are designed to operate in the Verizon Wireless LTE 3GPP Band 13 network.</p>

Design Steps
Step Name
Step 1
Pre-Conditions
The UE under test shall have already completed the Initial Attach procedure resulting in the setup of a default Internet PDN bearer.
Procedures
This procedure tests the setup of dedicated bearers with specified QCI values on the Internet PDN.

Step	Procedure	Message Sequence		Verdict
		U - S	Message	
1	Start with UE in EMM registered/EMM connected state			N/A
4	RRC Connection Reconfiguration			N/A
	<p>Network simulator sends an Activate Dedicated EPS Bearer Context Request message to the UE, with the following information elements:</p> <p>ACTIVATE DEDICATED EPS BEARER CONTEXT REQUEST:</p> <ul style="list-style-type: none"> <li>• "EPS bearer Identity"</li> <li>• "Linked EPS bearer identity"</li> <li>• "EPS QoS" with QCI set to 253</li> <li>• "TFT" with elements as specified in table 14 for dedicated bearer 1</li> </ul>	<=	Activate Dedicated EPS Bearer Context Request	N/A
6	Check: Does the UE send an ESM: Activate Dedicated EPS Bearer Context Accept message?	=>	Activate Dedicated EPS Bearer Context Accept	Pass if message sent

7	RRC Connection Reconfiguration			N/A
	<p>Network simulator sends an Activate Dedicated EPS Bearer Context Request message to the UE, with the following information elements:</p> <p>ACTIVATE DEDICATED EPS BEARER CONTEXT REQUEST:</p> <ul style="list-style-type: none"> <li>• "EPS bearer Identity"</li> <li>• "Linked EPS bearer identity"</li> <li>• "EPS QoS" with QCI set to 128</li> <li>• "TFT" with elements as specified in table 14 for dedicated bearer 2</li> </ul>	<=	Activate Dedicated EPS Bearer Context Request	N/A
8	Check: Does the UE send an ESM: Activate Dedicated EPS Bearer Context Accept message?	=>	Activate Dedicated EPS Bearer Context Accept	Pass if message sent
9	Repeat steps 7 and 8 two times, first with "EPS QoS" with QCI set to 129, then with "EPS QoS" with QCI set to 130.	-	-	N/A

The following table shall be used to create the traffic flow templates sent to the UE:

Packet Filter ID	Bearer	Packet Filter Evaluation and Precedence	IPv4 / IPv6 Remote Address and Subnet Mask	Protocol Identifier (IPv4) / Next Header (IPv6)	Single Local Port / Local Port Range (UE)	Single Remote Port / Remote Port Range (Network)	IPSec SPI range	Type of Service (IPv4)/Traffic Class (IPv6) and Mask	Flow Label (IPv6)
1	Dedicated Bearer 1	1						TOS/Traffic Class: 10100000  Mask:  11100000	
2	Dedicated Bearer 2	2						TOS/Traffic Class: 10000000  Mask:  11000000	

**Table 14: Traffic Flow Template Contents**

#### Expected Results

The device shall meet the verdicts in the Table above.

## 2.48 Non IP and PDN-less Protocol Conformance Test Cases

VZ\_TC\_SUPLCONFIMSLESS\_4105999311152558

Description
<p><b>Definition</b></p> <p>In order to comply with Verizon Wireless NIDD/SCEF requirements and Attach without PDN requirements, devices shall pass all applicable all related test cases listed in 3GPP TS 36.523-1 : Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification.</p> <p><b>Traceability:</b></p> <ul style="list-style-type: none"> <li>• "Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements," section 1.4.3.</li> <li>• 3GPP TS 24.301: <i>Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3.</i></li> <li>• 3GPP TS 36.523-1 : <i>Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification.</i></li> </ul> <p><b>Applicability:</b></p> <p>This test case applies to Cat-M1 and NB-IoT devices that supports Non IP data delivery through SCEF and/or Attach without PDN functionality.</p>
Design Steps
Step Name
Step 1
Pre-Conditions

Procedures	
<p>All the test steps in the following sections listed in 3GPP TS 36.523-1 shall be followed for IP, Non IP and PDN-less protocol conformance tests:</p> <p>Note- Device shall perform below tests for all supported PDN types, such as IP PDN, Non-IP PDN or PDN-less</p> <p><b>Section-1 For Cat-M1 devices:</b></p>	
36.523-1 section	Title
23.1.1	"CIoT / Control Plane MO and MT IP and non-IP Data Transfer / Serving PLMN Rate Control / APN Rate Control"
23.1.2	"CIoT Optimization / Control Plane / MT and MO SMS Data Transfer"
<p><b>Section-2 For NB-IoT devices:</b></p>	
36.523-1 section	Title
22.1.1	"NB-IoT / Control Plane CIoT EPS optimisation for EPS services"



22.5.21	“NB-IoT/APN rate control for MO exception data”
Expected Results	
As specified in 3GPP test cases.	

2.49 Rel.14 NB-IoT (NB2) Protocol Conformance Test Cases  
VZ\_TC\_SUPLCONFIMSLESS\_4105999311928654

Description
<p><b>Definition</b></p> <p>In order to comply with Verizon Wireless NB-IoT Rel.14 requirements, devices shall pass all applicable listed in 3GPP TS 36.523-1 : Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification.</p> <p><b>Traceability:</b></p> <ul style="list-style-type: none"> <li>• "NB-IoT Requirements".</li> <li>• 3GPP TS 24.301 Release 14 or above: <i>Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3.</i></li> <li>• 3GPP TS 36.306 Release 14 or above: User Equipment (UE) radio access capabilities</li> <li>• 3GPP TS 36.331 Release 14 or above: Radio Resource Control (RRC); Protocol specification</li> <li>• 3GPP TS 36.523-1 : <i>Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification.</i></li> </ul> <p><b>Applicability:</b></p> <p>This test case applies to Rel.14 NB-IoT (NB2) devices that are designed to support the Verizon Wireless LTE 3GPP Band 13 network.</p>
Design Steps
Step Name
Step 1
Pre-Conditions
Procedures

All the test steps in the following sections listed in 3GPP TS 36.523-1 shall be followed for NB2 (Rel.14 NB-IOT) protocol conformance tests:	
36.523-1 TC#	Title
22.3.1.6a	NB-IoT / DL-SCH /UL-SCH transport block size selection / DCI format N <sub>1</sub> / N <sub>0</sub> / Category NB2
22.3.1.9	NB-IoT / Correct HARQ process / 2 HARQ processes
Expected Results	
As specified in 3GPP test cases.	

## 2.49.1 Rel.14 NB-IoT (NB2) Protocol Conformance Test Cases - Test1

VZ\_TC\_SUPLCONFIMSLESS\_4105999311931767

## 2.49.2 Rel.14 NB-IoT (NB2) Protocol Conformance Test Cases - Test2

VZ\_TC\_SUPLCONFIMSLESS\_4105999311931768