FCC 47 CFR Parts 1 & 2
Published RF Exposure KDB Procedures
IEEE Std 1528-2013

SAR EVALUATION REPORT

For
Tablet with cellular GSM/GPRS/EGPRS/WCDMA/HSPA+/DC-HSDPA/LTE radio, IEEE 802.11a/b/g/n radio (MIMO 2X2) and Bluetooth radio

Model: A1476
FCC ID: BCGA1476

Report Number: 13U16584-4B
Issue Date: 02/21/2014

Prepared for
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	2/7/2014	Initial Issue	--
A	2/14/2014	Made the following changes based on reviewer's comments: 1. Sec. 7.3: Updated section to explain the exclusion of Hotspot mode testing. 2. Sec. 10.1: Revised reference to *FCC OET Bulletin 65 Supplement C 01-01* as it is discontinued.	Roy Chen
B	2/21/2014	Made the following changes based on reviewer's comments: 1. Sec. 7.3: Updated section to explain the exclusion of Hotspot mode testing.	Roy Chen

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1. Attestation of Test Results

Applicant	Apple Inc.			
DUT description	Tablet with cellular GSM/GPRS/EGPRS/WCDMA/HSPA+/DC-HSDPA/LTE radio, IEEE 802.11a/b/g/n radio (MIMO 2X2) and Bluetooth radio			
Model	A1476			
Test device is	An identical prototype			
Device category	Portable			
Exposure category	General Population/Uncontrolled Exposure			
Date tested	01/02/2014 – 01/21/2014			
The highest reported SAR values	RF exposure condition	Licensed	DTS	UNII
	Body	1.190 W/kg	1.190 W/kg (2.4GHz) 1.017 W/kg (5.8GHz)	1.090 W/kg
	Simultaneous Transmission	1.301 W/kg	1.355 W/kg	1.451 W/kg
Applicable Standards	FCC 47 CFR Parts 1 & 2 Published RF Exposure KDB Procedures, and TCB workshop updates IEEE Std 1528-2013			
Test Results	Pass			

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government (NIST Handbook 150, Annex A). This report is written to support regulatory compliance of the applicable standards stated above.

Approved & Released By:

Bobby Bayani
WiSE Engineer
UL Verification Services Inc.

Prepared By:

Roy Chen
WiSE Laboratory Technician
UL Verification Services Inc.

2. Test Methodology

The tests documented in this report were performed in accordance with FCC 47 CFR Parts 1 & 2, IEEE STD 1528-2013, the following FCC Published RF exposure KDB procedures and TCB workshop updates:

- KDB 447498 D01 General RF Exposure Guidance v05r01
- KDB 616217 D04 SAR for laptop and tablets v01r01
- KDB 941225 D01 SAR test for 3G devices v02
- KDB 941225 D02 HSPA and 1x Advanced v02r02
- KDB 941225 D03 SAR Test Reduction GSM GPRS EDGE v01
- KDB 941225 D04 SAR for GSM E GPRS Dual Xfer Mode v01
- KDB 941225 D05 SAR for LTE Devices v02r02
- KDB 248227 D01 SAR meas for 802 11abg v01r02
- KDB 865664 D01 SAR measurement 100 MHz to 6 GHz v01r01
- KDB 865664 D02 SAR Reporting v01r01
- KDB 690783 D01 SAR Listings on Grants v01r03

3. Facilities and Accreditation

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

47173 Benicia Street	47266 Benicia Street
SAR Lab A	SAR Lab 1
SAR Lab B	SAR Lab 2
SAR Lab C	SAR Lab 3
SAR Lab D	SAR Lab 4
SAR Lab E	
SAR Lab F	

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://www.ccsemc.com.

4. Calibration and Uncertainty

4.1. Measuring Instrument Calibration

The measuring equipment used to perform the tests documented in this report has been calibrated in accordance with the manufacturers' recommendations, and is traceable to recognized national standards.

Tissue Dielectric Properties

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Network Analyzer	Agilent	8753ES	MY40001647	7/11/2014
Dielectronic Probe kit	SPEAG	DAK-3.5	1082	9/10/2014
Dielectronic Probe kit	SPEAG	DAK-3.5 Short	SM DAK 200 BA	N/A
Thermometer	Control Company	4242	122529162	9/19/2014

System Performance Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Synthesized Signal Generator	HP	8665B	3546A00784	3/26/2014
Power Meter	Agilent	N1912A	MY50001018	8/23/2014
Power Sensor	Agilent	E9323A	US40411556	8/9/2014
Power Sensor	Agilent	E9323A	MY53070009	4/3/2014
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1795093	N/A
Directional coupler	Werlatone	C8060-102	2711	N/A
DC Power Supply	AMETEK	XT20-3	1318A00529	N/A
Synthesized Signal Generator	HP	8665B	3438A00633	6/13/2014
Power Meter	HP	438A	2822A05684	10/10/2014
Power Sensor	HP	8481A	2237A31744	10/2/2014
Power Sensor	HP	8482A	2349A36506	9/30/2014
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1808939	N/A
Directional coupler	Werlatone	C8060-102	2710	N/A
DC Power Supply	AMETEK	XT15-4	1319A02778	N/A
E-Field Probe	SPEAG	EX3DV4	3749	1/15/2014
E-Field Probe	SPEAG	EX3DV4	3871	7/29/2014
E-Field Probe	SPEAG	EX3DV4	3772	2/20/2014
E-Field Probe	SPEAG	EX3DV4	3751	11/21/2014
E-Field Probe	SPEAG	EX3DV4	3686	3/11/2014
E-Field Probe	SPEAG	EX3DV4	3901	2/13/2014
E-Field Probe	SPEAG	EX3DV4	3885	9/18/2014
Data Acquisition Electronics	SPEAG	DAE4	1239	4/9/2014
Data Acquisition Electronics	SPEAG	DAE3	427	1/9/2014
Data Acquisition Electronics	SPEAG	DAE4	1352	9/11/2014
Data Acquisition Electronics	SPEAG	DAE3	500	5/28/2014
Data Acquisition Electronics	SPEAG	DAE4	1360	2/7/2014
Data Acquisition Electronics	SPEAG	DAE4	1357	2/5/2014
Data Acquisition Electronics	SPEAG	DAE4	1343	7/24/2014
System Validation Dipole	SPEAG	D835V2	4d002	11/15/2014
System Validation Dipole	SPEAG	D1900V2	5d043	11/12/2014
System Validation Dipole	SPEAG	D2450V2	899	9/10/2014
System Validation Dipole	SPEAG	D5GHzV2	1003	9/19/2014
System Validation Dipole	SPEAG	D5GHzV2	1138	11/19/2014

Others

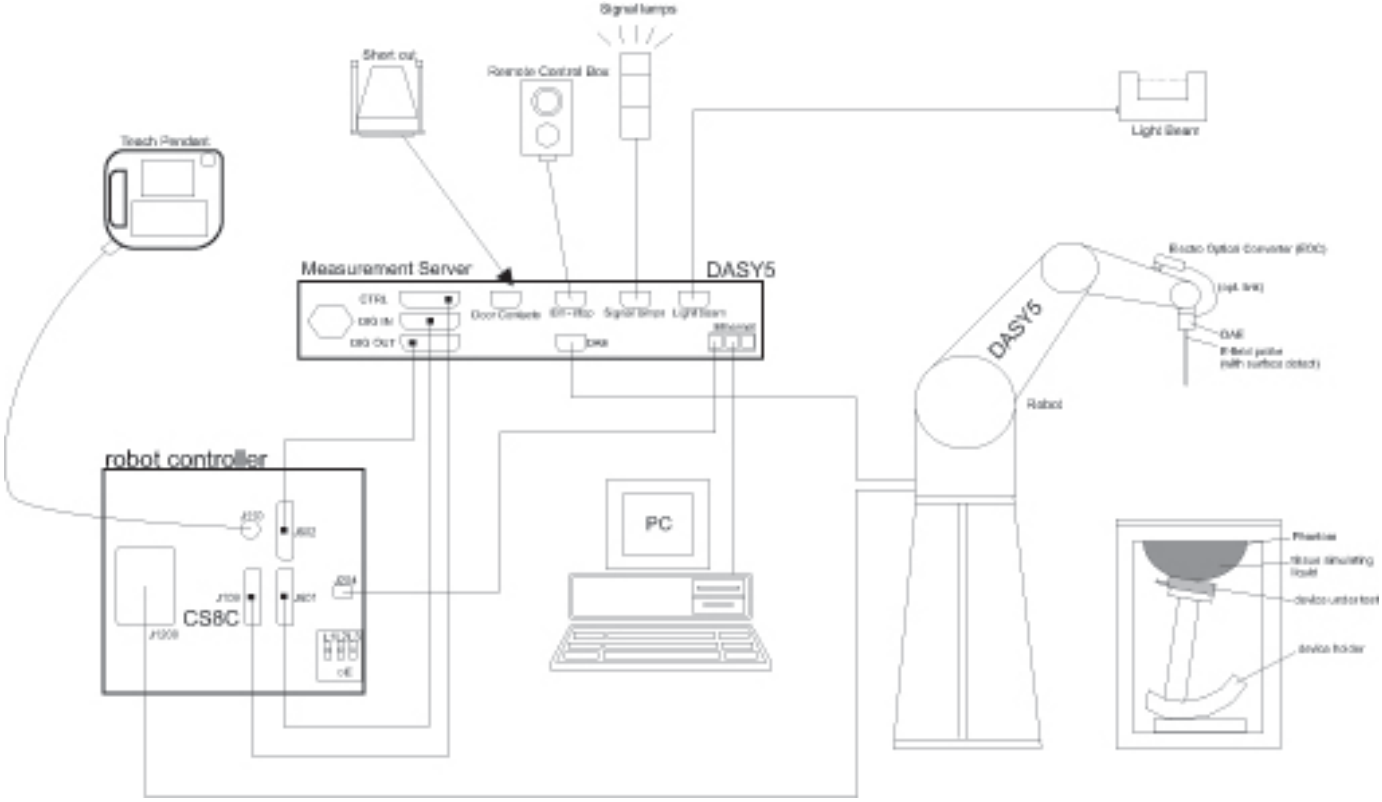
Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Base Station Simulator	Agilent	8960	MY48360200	3/20/2014
Base Station Simulator	R & S	CMU200	118342	5/19/2014
Base Station Simulator	R & S	CMU200	117455	5/20/2014
Base Station Simulator	R & S	CMU200	112018	5/21/2015
Base Station Simulator	R & S	CMU200	118715	5/20/2014
Base Station Simulator	R & S	CMW500	132909	2/19/2014
Base Station Simulator	R & S	CMW500	107510	8/10/2014
Base Station Simulator	R & S	CMW500	103766	8/19/2014
Base Station Simulator	R & S	CMW500	107513	7/26/2014
Power Meter	R & S	NRP	101053	5/23/2014
Power Meter	R & S	NRP2	100673	5/27/2015
Power Sensor	R & S	NRP - Z21	100533	5/27/2015
Power Sensor	R & S	NRP - Z23	100168	5/23/2015

4.2. Measurement Uncertainty

Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r01 Section 2.8.1., when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2003 is not required in SAR reports submitted for equipment approval.

5. Measurement System Description and Setup

The DASY5 system used for performing compliance tests consists of the following items:



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP or Win7 and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

6. SAR Measurement Procedure

6.1. Normal SAR Measurement Procedure

Step 1: Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. The minimum distance of probe sensors to surface is 2.1 mm. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

Step 2: Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maximal found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE Standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan). If only one Zoom Scan follows the Area Scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of Zoom Scans has to be increased accordingly.

Area Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r01

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

Step 3: Zoom Scan

Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. The Zoom Scan measures points (refer to table below) within a cube whose base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the Zoom Scan evaluates the averaged SAR for 1 g and 10 g and displays these values next to the job's label.

Zoom Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r01

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ 1.5·$\Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.

* When zoom scan is required and the *reported* SAR from the area scan based *1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

Step 4: Power drift measurement

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

Step 5: Z-Scan (FCC only)

The Z Scan measures points along a vertical straight line. The line runs along the Z-axis of a one-dimensional grid. In order to get a reasonable extrapolation the extrapolated distance should not be larger than the step size in Z-direction.

6.2. Volume Scan Procedures

Step 1: Repeat Step 1-4 in Section 6.1

Step 2: Volume Scan
Volume Scans are used to assess peak SAR and averaged SAR measurements in largely extended 3-dimensional volumes within any phantom. This measurement does not need any previous area scan. The grid can be anchored to a user specific point or to the current probe location.

Step 3: Power drift measurement
The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

7. Device Under Test

7.1. General Information

Model: A1476 is a tablet with cellular GSM/GPRS/EGPRS/WCDMA/HSPA+/DC-HSDPA/LTE radio, IEEE 802.11a/b/g/n radio (MIMO 2X2) and Bluetooth radio.	
AirPlay	AirPlay mode enabled devices transfer data directly between each other ☒ AirPlay (WiFi 2.4 GHz) ☒ AirPlay (WiFi 5 GHz)
RF Exposure Condition(s)	Body Exposure with all surfaces and edges. Refer to Section 9 for details.
Device dimension	Overall (Length x Width): 240mm x 169.47mm Overall Diagonal: 285.0mm Display Diagonal: 246.4mm

Notes:

There are two vendors of the WiFi/Bluetooth radio modules to support the production volumes of the device. The two variants are referenced in this report as:

BOM #1 = WiFi/BT module vendor 1

BOM #2 = WiFi/BT module vendor 2

The WiFi/Bluetooth radio modules have the same mechanical outline (e.g., the same package dimension and pin-out layout), use the same on-board antenna matching circuit, have an identical antenna structure, and are built and tested to conform to the same specifications and to operate within the same tolerances.

Complete SAR evaluation is performed on the device with one WiFi/Bluetooth radio module and then, the test is repeated on the device with the other WiFi/Bluetooth module at the highest peak SAR value.

7.2. Wireless Technologies

Wireless Technology and Frequency Bands	GSM: 850 / 1900 W-CDMA Band: 2 / 5 LTE Band 2 / 5 WiFi: 2.4 / 5 GHz Bluetooth: 2.4 GHz
Mode	GSM - ☒ GPRS (GMSK) - ☒ EGPRS (8PSK) W-CDMA - ☒ HSDPA (Rel. 7, CAT 14) - ☒ HSUPA (Rel. 6, CAT 6) - ☒ DC-HSDPA (Rel. 8, CAT 24) - ☒ HSPA+ (Rel. 6, CAT 6) LTE - ☒ QPSK - ☒ 16QAM WiFi 2.4GHz (802.11b/g/n) - ☒ 802.11b - ☒ 802.11g - ☒ 802.11n (20MHz) - ☐ 802.11n (40MHz) WiFi 5GHz - ☒ 802.11a - ☒ 802.11n (20MHz) - ☒ 802.11n (40MHz) Bluetooth Ver. 4.0 (LE)
Duty Cycle	GSM Voice: 12.5%; GPRS 1 Slot: 12.5%; 2 Slots: 25% W-CDMA: 100% LTE: 100% WiFi 802.11a/b/g/n: 100% Bluetooth: 77.52%
GPRS Multi-Slot Class	☐ Class 8 - One Up ☒ Class 10 - Two Up ☐ Class 12 - Four Up

7.3. Hotspot (Wireless Router) Function

The device is capable of personal hotspot mode. The hotspot mode can be enabled by the users by the following this sequence of soft-keys; Settings > General > Network > Enable Personal Hotspot.

WiFi Hotspot mode permits the device to share its cellular data connection with other 2.4 GHz WiFi-enabled devices (channels 1 - 11). WiFi Hotspot mode is not supported in 5.0 GHz WiFi band.

In accordance to KDB 616217 D04 SAR for laptop and tablets, as the overall diagonal dimension of the tablet is > 20 cm, SAR testing for hotspot mode is not required because the standalone and simultaneous transmission SAR tests required for tablets are more conservative than the hotspot mode use configurations.

7.4. Simultaneous Transmission Condition

RF Exposure Condition	Capable Transmit Configurations
Body (WWAN + WiFi)	GSM + WiFi / Bluetooth 1. GSM 850/1900 + Bluetooth (WiFi1) 2. GSM 850/1900 + 2.4GHz (WiFi1) 3. GSM 850/1900 + 2.4GHz (WiFi2) 4. GSM850/1900 + 5GHz (WiFi1) + Bluetooth (WiFi1) 5. GSM850/1900 + 5GHz (WiFi2) + Bluetooth (WiFi1) 6. GSM850/1900 + DTS 2.4GHz (WiFi1+ WiFi2) 7. GSM850/1900 + DTS 5GHz (WiFi1+ WiFi2) + Bluetooth (WiFi1) 8. GSM850/1900 + UNII 5GHz (WiFi1+ WiFi2) + Bluetooth (WiFi1) W-CDMA + WiFi / Bluetooth 9. W-CDMA Band 2/5 + Bluetooth (WiFi1) 10. W-CDMA Band 2/5 + 2.4GHz (WiFi1) 11. W-CDMA Band 2/5 + 2.4GHz (WiFi2) 12. W-CDMA Band 2/5 + 5GHz (WiFi1) + Bluetooth (WiFi1) 13. W-CDMA Band 2/5 + 5GHz (WiFi2) + Bluetooth (WiFi1) 14. W-CDMA Band 2/5 + DTS 2.4GHz (WiFi1+ WiFi2) 15. W-CDMA Band 2/5 + DTS 5GHz (WiFi1+ WiFi2) + Bluetooth (WiFi1) 16. W-CDMA Band 2/5 + UNII 5GHz (WiFi1+ WiFi2) + Bluetooth (WiFi1) LTE + WiFi / Bluetooth 17. LTE Band 2/5 + Bluetooth (WiFi1) 18. LTE Band 2/5 + 2.4GHz (WiFi1) 19. LTE Band 2/5 + 2.4GHz (WiFi2) 20. LTE Band 2/5 + 5GHz (WiFi1) + Bluetooth (WiFi1) 21. LTE Band 2/5 + 5GHz (WiFi2) + Bluetooth (WiFi1) 22. LTE Band 2/5 + DTS 2.4GHz (WiFi1+ WiFi2) 23. LTE Band 2/5 + DTS 5GHz (WiFi1+ WiFi2) + Bluetooth (WiFi1) 24. LTE Band 2/5 + UNII 5GHz (WiFi1+ WiFi2) + Bluetooth (WiFi1)
Body (WiFi)	SISO (1TX) 25. 5GHz (WiFi1) + Bluetooth (WiFi1) 26. 5GHz (WiFi2) + Bluetooth (WiFi1) MIMO (2TX) 27. DTS 5GHz (WiFi1+WiFi2) + Bluetooth (WiFi1) 28. UNII 5GHz (WiFi1+WiFi2) + Bluetooth (WiFi1)
Refer to Appendix for Antenna locations 2.4 GHz cannot transmit simultaneously with Bluetooth, WiFi1 shares antenna with Bluetooth	

7.5. General LTE SAR Test and Reporting Considerations

<table>
<tr><th>Item</th><th colspan="7">Description</th></tr>
<tr><td rowspan="8">Frequency range, Channel Bandwidth, Numbers and Frequencies</td><td rowspan="3">Band 2</td><td colspan="6">Frequency range: 1850 - 1910 MHz</td></tr>
<tr><td colspan="6">Channel Bandwidth</td></tr>
<tr><td>20 MHz</td><td>15 MHz</td><td>10 MHz</td><td>5 MHz</td><td>3 MHz</td><td>1.4 MHz</td></tr>
<tr><td>Low</td><td>18700 /1860</td><td>18675/ 1857.5</td><td>18650/ 1855</td><td>18625/ 1852.5</td><td>18615/ 1851.5</td><td>18607/ 1850.7</td></tr>
<tr><td>Mid</td><td>18900/ 1880</td><td>18900/ 1880</td><td>18900/ 1880</td><td>18900/ 1880</td><td>18900/ 1880</td><td>18900/ 1880</td></tr>
<tr><td>High</td><td>19100/ 1900</td><td>19125/ 1902.5</td><td>19150/ 1905</td><td>19175/ 1907.5</td><td>19185/ 1908.5</td><td>19193/ 1909.3</td></tr>
<tr><td rowspan="3">Band 5</td><td colspan="6">Frequency range: 824 - 849 MHz</td></tr>
<tr><td colspan="6">Channel Bandwidth</td></tr>
<tr><td>20 MHz</td><td>15 MHz</td><td>10 MHz</td><td>5 MHz</td><td>3 MHz</td><td>1.4 MHz</td></tr>
<tr><td>Low</td><td></td><td></td><td>20450/ 829</td><td>20425/ 826.5</td><td>20415/ 825.5</td><td>20407/ 824.7</td></tr>
<tr><td>Mid</td><td></td><td></td><td>20525/ 836.5</td><td>20525/ 836.5</td><td>20525/ 836.5</td><td>20525/ 836.5</td></tr>
<tr><td>High</td><td></td><td></td><td>20600/ 844</td><td>20625/ 846.5</td><td>20635/ 847.5</td><td>20643/ 848.3</td></tr>
<tr><td>LTE transmitter and antenna implementation</td><td colspan="7">A single antenna is used for LTE and other wireless modes (GPRS/EGPRS/UMTS) for both Transmit and Receive.
A Secondary antenna is used for LTE and other wireless modes (GPRS/EGPRS/UMTS) for Receive Only. This device does not support DTM.</td></tr>
<tr><td>Maximum power reduction (MPR)</td><td colspan="7">
Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3
<table>
<tr><th rowspan="2">Modulation</th><th colspan="6">Channel bandwidth / Transmission bandwidth (RB)</th><th rowspan="2">MPR (dB)</th></tr>
<tr><th>1.4 MHz</th><th>3.0 MHz</th><th>5 MHz</th><th>10 MHz</th><th>15 MHz</th><th>20 MHz</th></tr>
<tr><td>QPSK</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 1</td></tr>
<tr><td>16 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 1</td></tr>
<tr><td>16 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 2</td></tr>
</table>
MPR Built-in by design
A-MPR (additional MPR) was disabled during SAR testing</td></tr>
<tr><td>Power reduction</td><td colspan="7">Yes</td></tr>
<tr><td>Spectrum plots for RB configurations</td><td colspan="7">When a properly configured basestation simulator is not used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration should be included in the SAR report to demonstrate that the tested RB allocations have been correctly established at the maximum output power conditions.</td></tr>
</table>

7.6. Power Reduction by Proximity Sensing

A proximity sensor for power reduction is implemented in this device to address RF exposure compliance when the cellular antenna is positioned close to the user's body. The sensor's mechanical structure is designed to fit within the enclosure design used in this device and also extended around the edge and top of the antenna element in order to optimize sensitivity in these orientations. This design combines the antenna and proximity sensor into a single FPC (Flexible Printed Circuit).

7.6.1. Proximity Sensor Detection Area

The proximity sensor is combined with the primary antenna in a single FPC (Flexible Printed Circuit), therefore, the proximity sensor occupies the same area as the primary antenna.

A two-step power back-off mechanism is implemented in this device. For design and testing purposes Top-Edge and Rear Surface are chosen as the dimensions of interest.

The proximity sensor is triggered at the following conservative distances when:

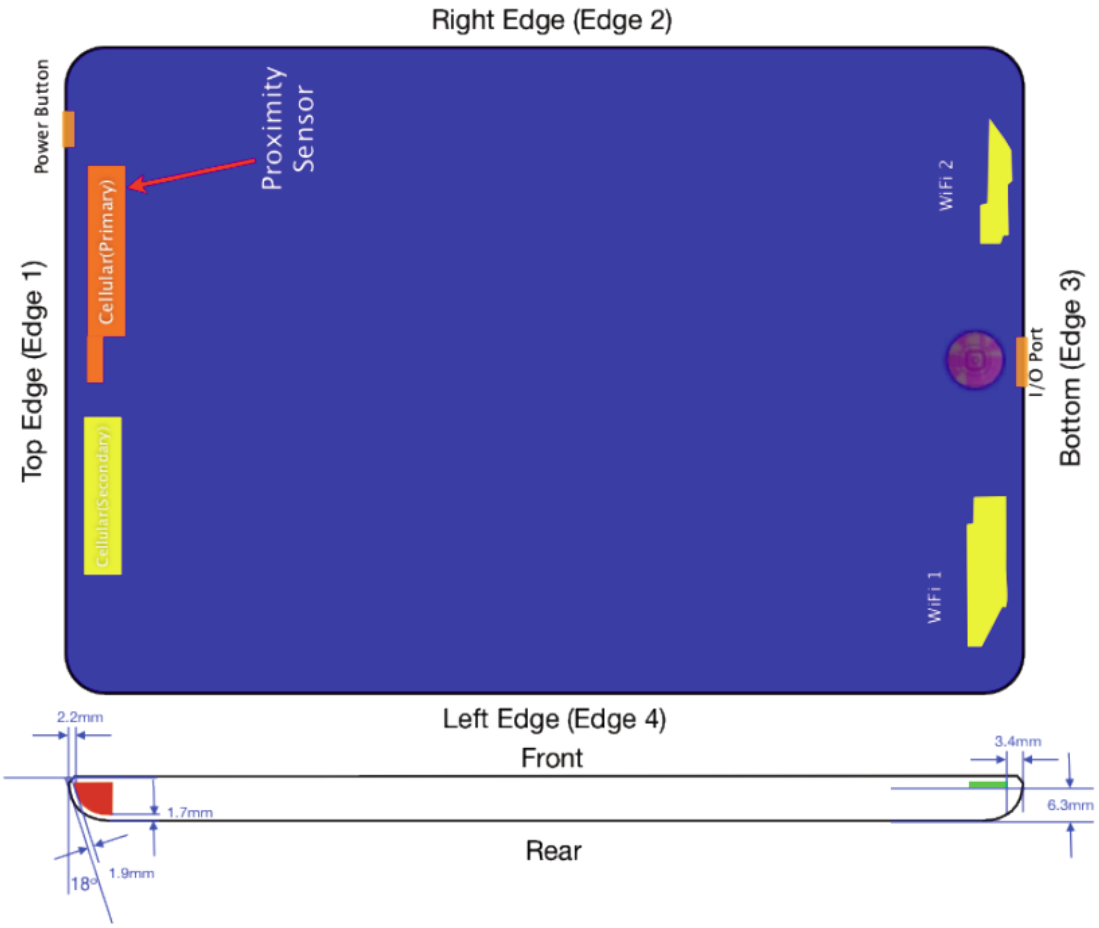
- the Top-edge of the device is 20 mm for the first-stage trigger, and 16mm for the second-stage trigger, from the phantom.
- the Rear Surface of the device is 20 mm for the first-stage trigger, and 16mm for the second-stage trigger, from the phantom.

The expected capacitance trigger values are programmed in each device for each power back-off stage. Capacitance trigger value for first stage (t1) is C1, and for second stage (t2) is C2. C1 is always smaller than C2.

When a certain object or human body approaches the DUT, if the measured capacitance is lower than C1, proximity sensor is not triggered. If the measured capacitance is higher than C1, but lower than C2, first power back-off (P1) is triggered. If the measured capacitance is higher than C2, second power back-off (P2) is triggered.

SAR evaluation is performed with power back-off disabled (at full power) at the conservative distance of the second stage. Therefore, additional SAR testing for different stages of power back-off will not be performed.

SAR evaluation of the DUT on the Front Surface with separation distance of 0 mm to the flat phantom is NOT performed because there is no use case for this configuration.



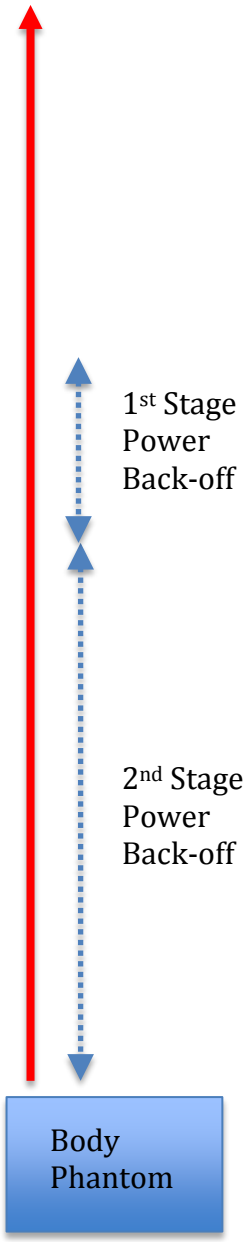
Separation Distances (mm)	Cellular (Primary)	Cellular (Secondary)	WiFi 1/ Bluetooth	WiFi 2
Cellular (Primary)		21.8	221.1	215.4
Cellular (Secondary)			215.4	223.3
WiFi 1/ Bluetooth				87.3
WiFi 2				
Top Edge (Edge 1)	2.4	2.4	227.6	227.6
Right Edge (Edge 2)	24.8	109.1	137.7	12.0
Bottom Edge (Edge 3)	227.8	227.8	3.4	3.4
Left Edge (Edge 4)	98.6	25.6	11.0	135.4
Rear Surface	1.4	1.4	6.3	6.3

As per the KDB 616217 D04 SAR for laptop and tablets v01r0, section 6.2, the following procedure is used to determine the triggering distances.

First, the DUT is moved towards the flat phantom.

Proximity Sensor Status Table when DUT is moving towards the phantom

Distance to the DUT (mm)	Proximity Sensor Status – Rear Surface	Proximity Sensor Status – Top-Edge
30	OFF	OFF
27	OFF	OFF
25	OFF	OFF
24	OFF	OFF
23	OFF	OFF
22	OFF	OFF
21	OFF	OFF
20	ON (C1, t1, P1)	ON (C1, t1, P1)
19	ON (C1, t1, P1)	ON (C1, t1, P1)
18	ON (C1, t1, P1)	ON (C1, t1, P1)
17	ON (C1, t1, P1)	ON (C1, t1, P1)
16	ON (C2, t2, P2)	ON (C2, t2, P2)
15	ON (C2, t2, P2)	ON (C2, t2, P2)
14	ON (C2, t2, P2)	ON (C2, t2, P2)
13	ON (C2, t2, P2)	ON (C2, t2, P2)
12	ON (C2, t2, P2)	ON (C2, t2, P2)
11	ON (C2, t2, P2)	ON (C2, t2, P2)
10	ON (C2, t2, P2)	ON (C2, t2, P2)
9	ON (C2, t2, P2)	ON (C2, t2, P2)
6	ON (C2, t2, P2)	ON (C2, t2, P2)
3	ON (C2, t2, P2)	ON (C2, t2, P2)
0	ON (C2, t2, P2)	ON (C2, t2, P2)



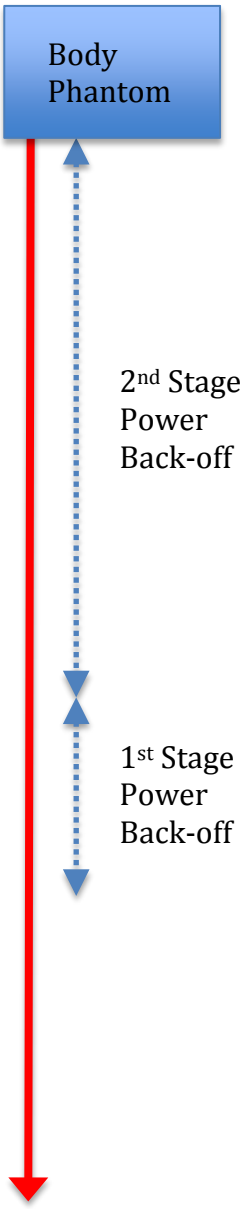
Notes:

C1: Capacitance value triggered First Stage (t1) power back-off
C2: Capacitance value triggered Second Stage (t2) power back-off
t1: 1st Stage triggered
t2: 2nd Stage triggered
P1: Power back-off at 1st Stage
P2: Power back-off at 2nd Stage
The distance at which the proximity sensor triggers is same for all cellular test frequencies.

Now, the DUT is moved away from flat phantom

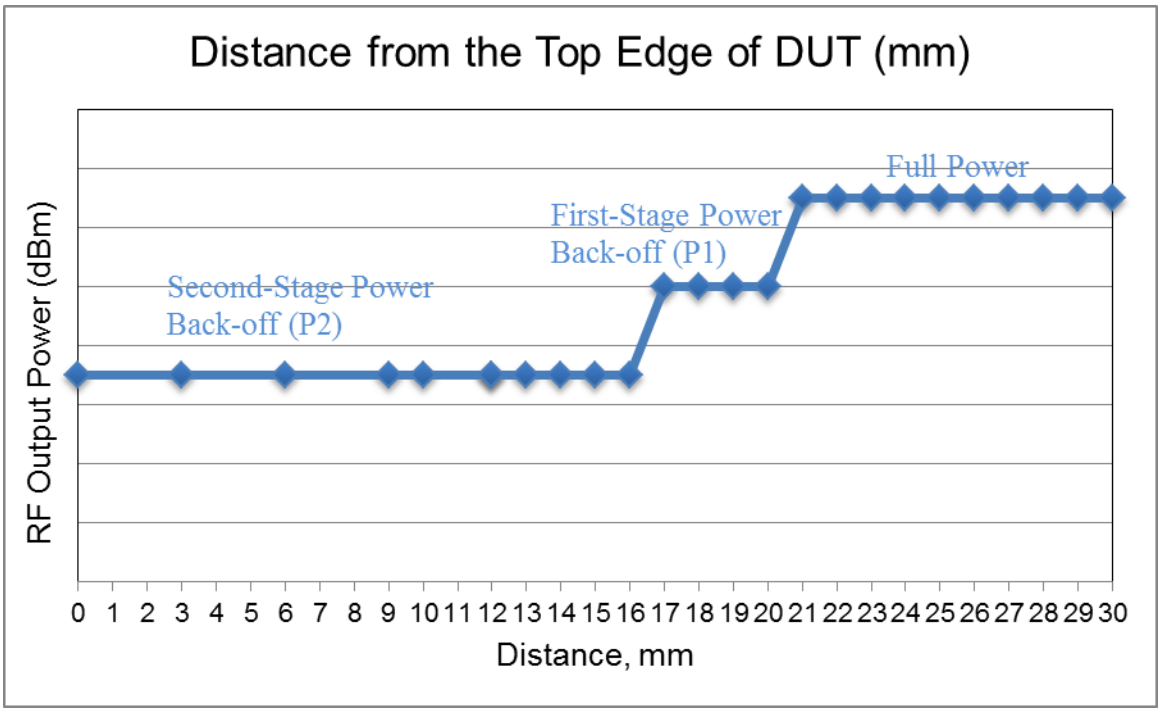
Proximity Sensor Status Table when DUT is moving away from the phantom

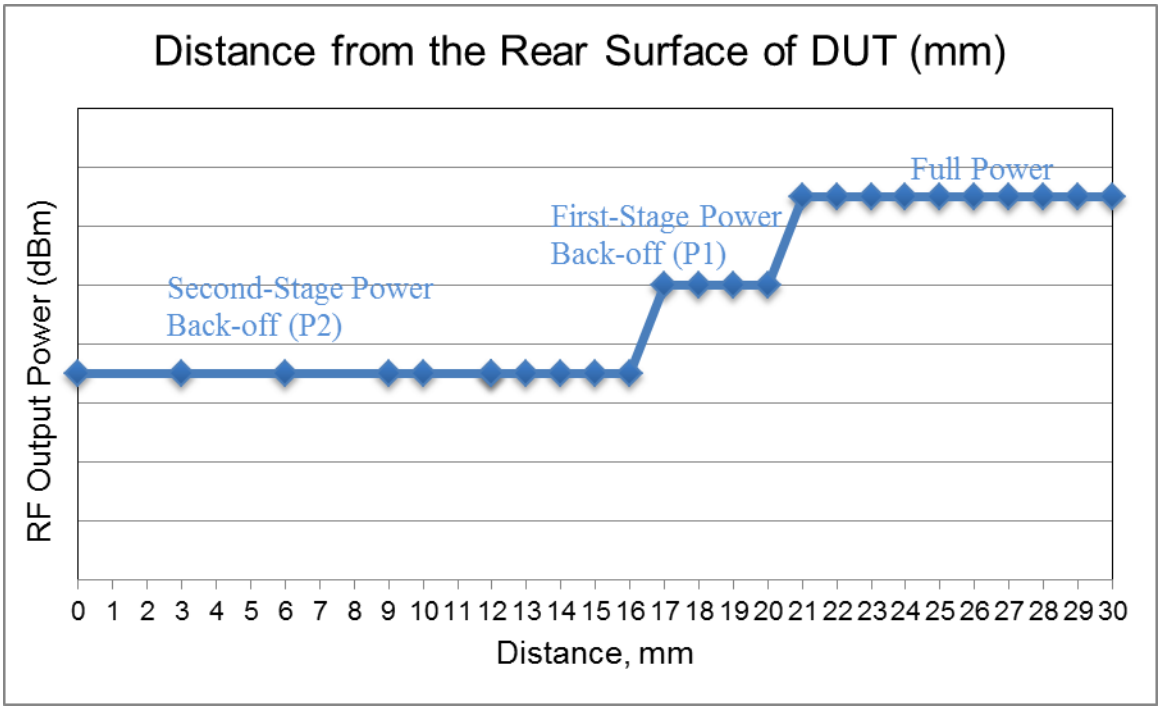
Distance to DUT (mm)	Proximity Sensor Status – Rear Surface	Proximity Sensor Status – Top-Edge
0	ON (C2, t2, P2)	ON (C2, t2, P2)
3	ON (C2, t2, P2)	ON (C2, t2, P2)
6	ON (C2, t2, P2)	ON (C2, t2, P2)
9	ON (C2, t2, P2)	ON (C2, t2, P2)
10	ON (C2, t2, P2)	ON (C2, t2, P2)
11	ON (C2, t2, P2)	ON (C2, t2, P2)
12	ON (C2, t2, P2)	ON (C2, t2, P2)
13	ON (C2, t2, P2)	ON (C2, t2, P2)
14	ON (C2, t2, P2)	ON (C2, t2, P2)
15	ON (C2, t2, P2)	ON (C2, t2, P2)
16	ON (C2, t2, P2)	ON (C2, t2, P2)
17	ON (C1, t1, P1)	ON (C1, t1, P1)
18	ON (C1, t1, P1)	ON (C1, t1, P1)
19	ON (C1, t1, P1)	ON (C1, t1, P1)
20	ON (C1, t1, P1)	ON (C1, t1, P1)
21	OFF	OFF
22	OFF	OFF
23	OFF	OFF
24	OFF	OFF
25	OFF	OFF
27	OFF	OFF
30	OFF	OFF



Notes:

C1: Capacitance value triggered First Stage (t1) power back-off
C2: Capacitance value triggered Second Stage (t2) power back-off
t1: 1st Stage triggered
t2: 2nd Stage triggered
P1: Power back-off at 1st Stage
P2: Power back-off at 2nd Stage
The distance at which the proximity sensor triggers is same for all cellular test frequencies.



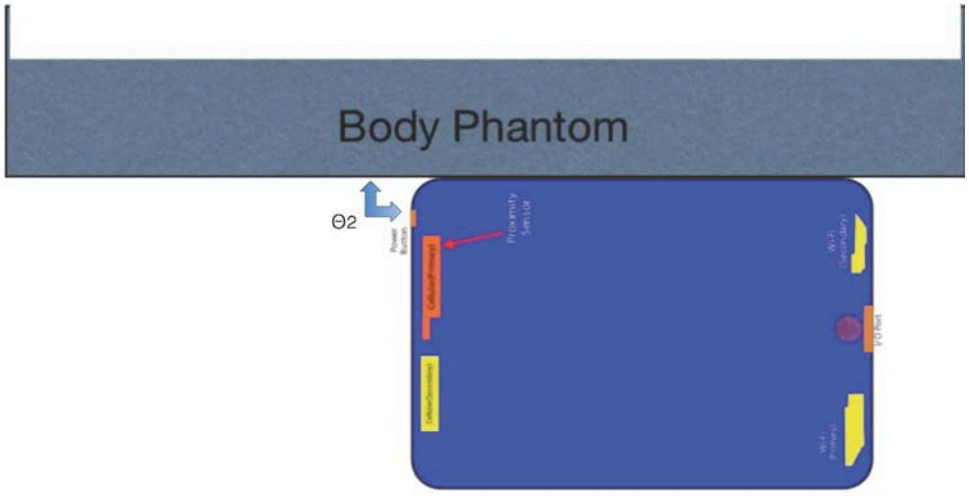


Since, the antenna and proximity sensor are not spatially offset in this implementation, the procedure in KDB 616217 D04 SAR for laptop and tablets v01r0 doesn't apply to device.

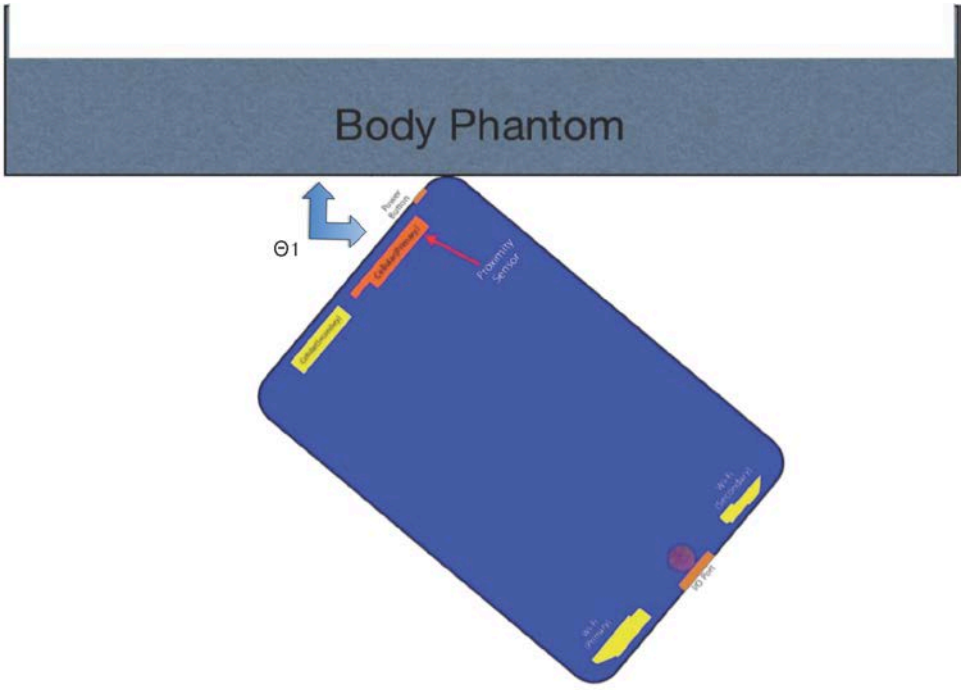
7.6.2. Coverage at the Corner of the DUT

The proximity sensor coverage at the Top Edge/Right Corner of the device is determined by changing the angle of the device relative to the phantom, and observing the angle at which the proximity sensor is triggered.

In this case, the proximity sensor remains triggered at the first-stage when the Right Edge of the device is touching the flat phantom, i.e., Top Edge/Right Corner of the device is 90° (θ2) from the phantom. The conservative angle at which the first-stage of proximity sensor is triggered is 45° (θ1).



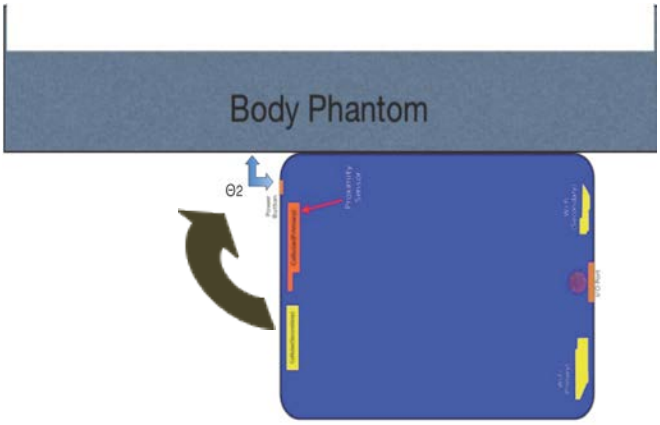
DUT angle at which first–stage is activated



DUT angle at which second–stage is activated

Proximity Sensor Status Table when DUT is moving towards the phantom

Angle to the DUT (Degrees)	Proximity Sensor Status – Top-Edge/Right Corner
90	ON (C1, t1, P1)
85	ON (C1, t1, P1)
80	ON (C1, t1, P1)
75	ON (C1, t1, P1)
70	ON (C1, t1, P1)
65	ON (C1, t1, P1)
60	ON (C1, t1, P1)
55	ON (C1, t1, P1)
50	ON (C1, t1, P1)
47	ON (C1, t1, P1)
46	ON (C1, t1, P1)
45	ON (C2, t2, P2)
44	ON (C2, t2, P2)
43	ON (C2, t2, P2)
40	ON (C2, t2, P2)
35	ON (C2, t2, P2)
30	ON (C2, t2, P2)
25	ON (C2, t2, P2)
20	ON (C2, t2, P2)
15	ON (C2, t2, P2)
10	ON (C2, t2, P2)
5	ON (C2, t2, P2)
0	ON (C2, t2, P2)

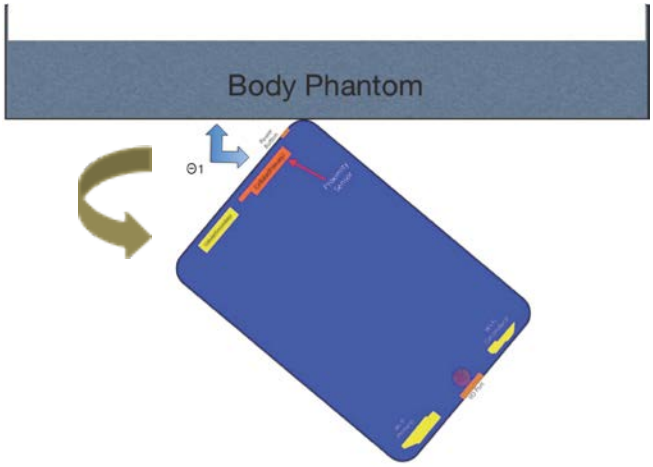


Notes:

C1: Capacitance value triggered First Stage (t1) power back-off
C2: Capacitance value triggered Second Stage (t2) power back-off
t1: 1st Stage triggered
t2: 2nd Stage triggered
P1: Power back-off at 1st Stage
P2: Power back-off at 2nd Stage
The distance at which the proximity sensor triggers is same for all cellular test frequencies.

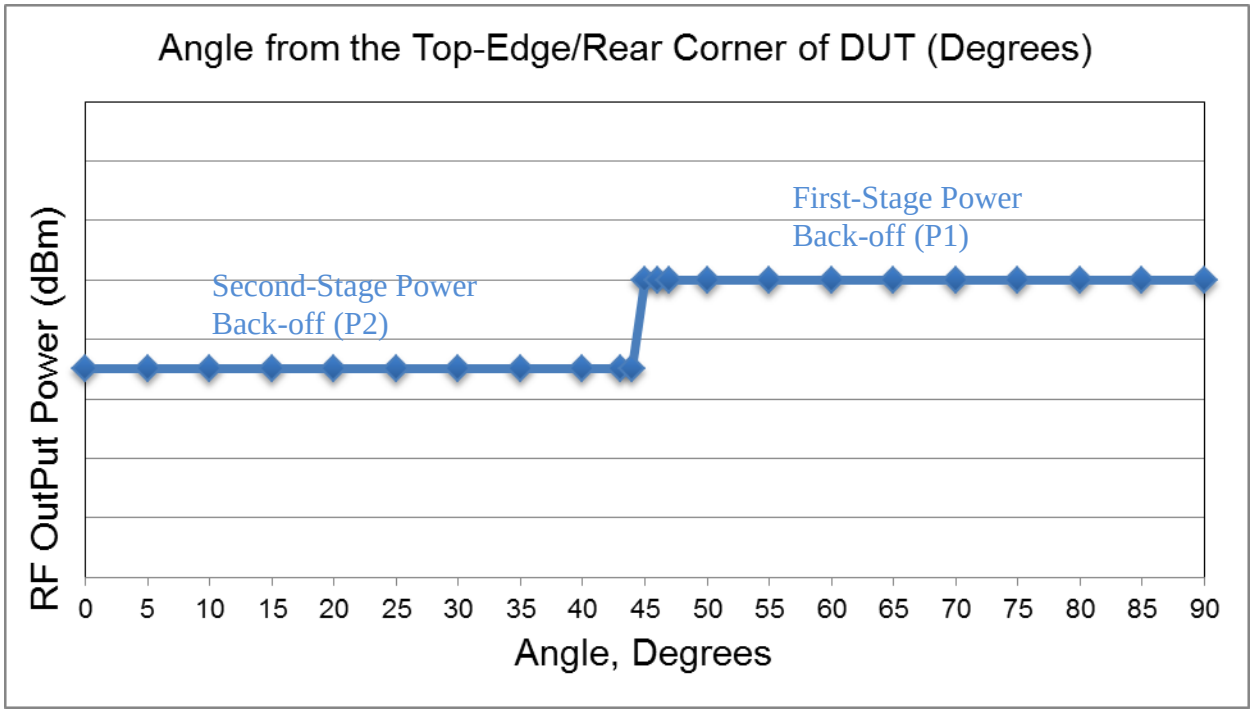
Proximity Sensor Status Table when DUT is moving away from the phantom

Angle to the DUT (Degrees)	Proximity Sensor Status – Top-Edge/Right Corner
0	ON (C2, t2, P2)
5	ON (C2, t2, P2)
10	ON (C2, t2, P2)
15	ON (C2, t2, P2)
20	ON (C2, t2, P2)
25	ON (C2, t2, P2)
30	ON (C2, t2, P2)
35	ON (C2, t2, P2)
40	ON (C2, t2, P2)
43	ON (C2, t2, P2)
44	ON (C2, t2, P2)
45	ON (C2, t2, P2)
46	ON (C1, t1, P1)
47	ON (C1, t1, P1)
50	ON (C1, t1, P1)
55	ON (C1, t1, P1)
60	ON (C1, t1, P1)
65	ON (C1, t1, P1)
70	ON (C1, t1, P1)
75	ON (C1, t1, P1)
80	ON (C1, t1, P1)
85	ON (C1, t1, P1)
90	ON (C1, t1, P1)



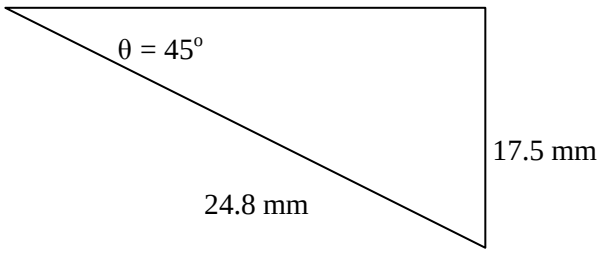
Notes:

C1: Capacitance value triggered First Stage (t1) power back-off
C2: Capacitance value triggered Second Stage (t2) power back-off
t1: 1st Stage triggered
t2: 2nd Stage triggered
P1: Power back-off at 1st Stage
P2: Power back-off at 2nd Stage
The distance at which the proximity sensor triggers is same for all cellular test frequencies.



The proximity sensor coverage at the Top Edge/Right Corner of the device is determined by changing the angle of the device relative to the phantom, and observing the angle at which the proximity sensor is triggered.

In this case, the conservative angles at which the proximity sensor is triggered are: 90° (θ_2) for the first-stage, and 45° (θ_1) for the second-stage, from the phantom. Therefore, the proximity sensor remains triggered at the first-stage when the Right Edge of the device is touching the flat phantom.



SAR evaluation for Top Edge/Right Corner Tilt is not performed because, the antenna-to-flat phantom distance, in this case, is 17.5 mm, which is more than the 16 mm for the Rear Surface (at which SAR evaluation will be performed at full power).

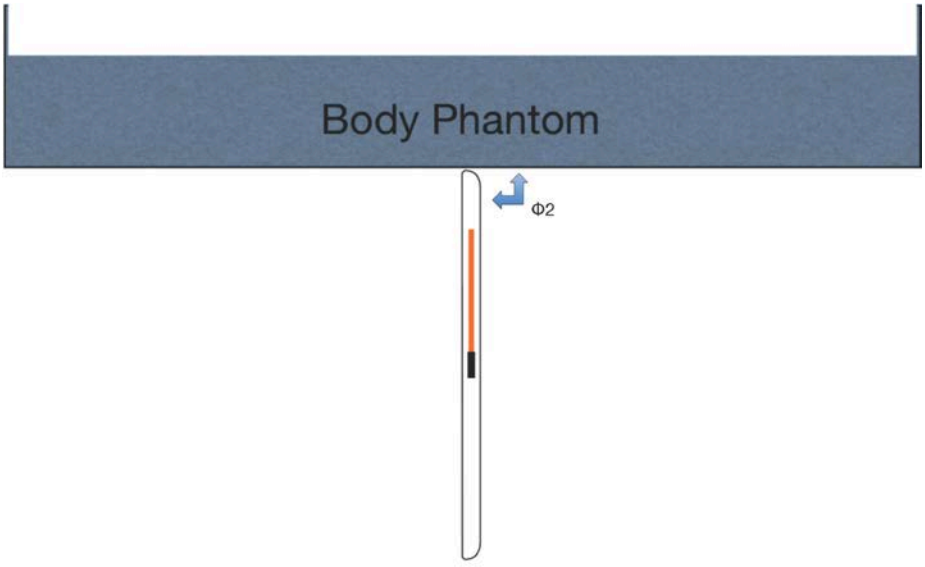
With the Top Edge of the device against the phantom, when the front of the device (LCD side) is tilted toward the phantom, the proximity sensor will remain triggered all the time.

The proximity sensor is not triggered when approaching from any other corner. Therefore, the proximity sensor coverage is only evaluated when approaching from the Top/Right Corner.

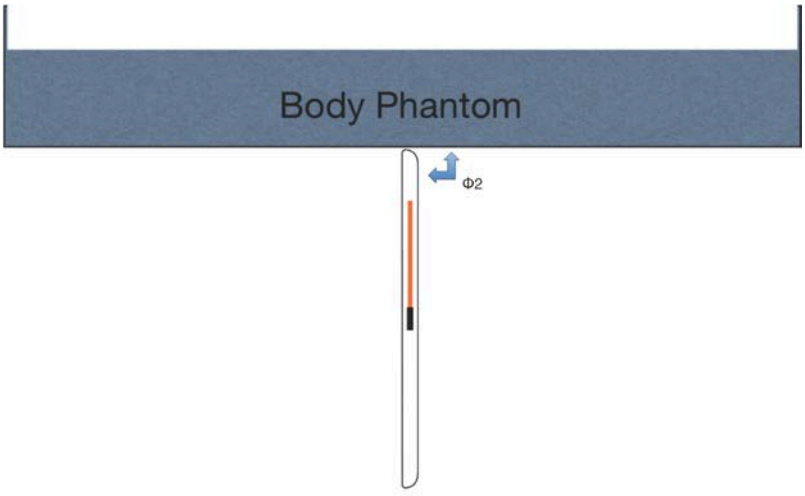
7.6.3. Coverage at the Edge of the DUT

The proximity sensor coverage at the Right Edge of the device is determined by changing the angle of the device relative to the phantom and observing the angle at which the proximity sensor is triggered.

In this case, the proximity sensor remains triggered at the first-stage when the Right Edge of the device is touching the flat phantom, i.e., Right Edge of the device is 90° (Φ_2**)** from the phantom. The conservative angle at which the first-stage of proximity sensor is triggered is 41° (Φ_1**).**



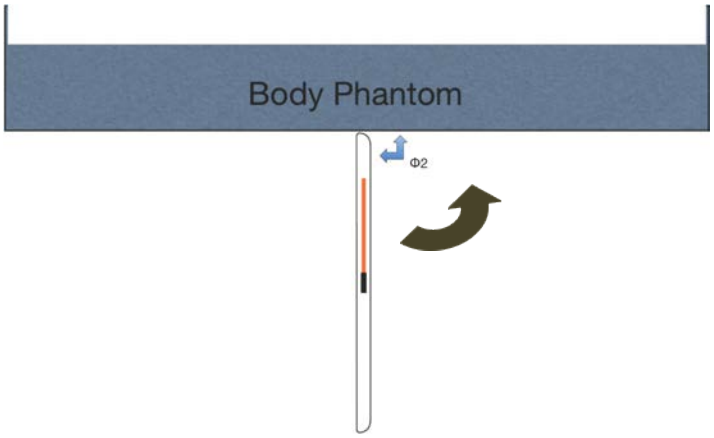
DUT angle at which first-stage is activated



DUT angle at which second-stage is activated

Proximity Sensor Status Table when DUT is moving towards the phantom

Angle to the DUT (Degrees)	Proximity Sensor Status – Rear Surface/Right Corner
90	ON (C1, t1, P1)
85	ON (C1, t1, P1)
80	ON (C1, t1, P1)
75	ON (C1, t1, P1)
70	ON (C1, t1, P1)
65	ON (C1, t1, P1)
60	ON (C1, t1, P1)
55	ON (C1, t1, P1)
50	ON (C1, t1, P1)
45	ON (C1, t1, P1)
43	ON (C1, t1, P1)
42	ON (C1, t1, P1)
41	ON (C2, t2, P2)
40	ON (C2, t2, P2))
39	ON (C2, t2, P2)
35	ON (C2, t2, P2)
30	ON (C2, t2, P2)
25	ON (C2, t2, P2)
20	ON (C2, t2, P2)
15	ON (C2, t2, P2)
10	ON (C2, t2, P2))
5	ON (C2, t2, P2)
0	ON (C2, t2, P2)

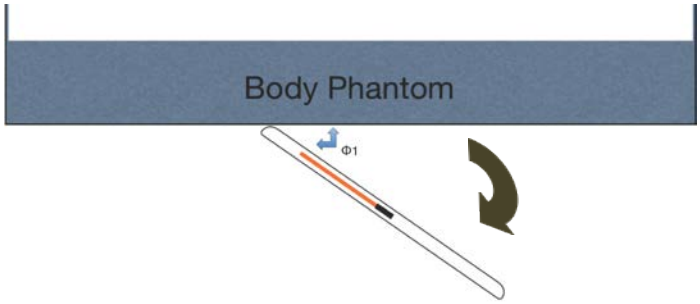


Notes:

C1: Capacitance value triggered First Stage (t1) power back-off
C2: Capacitance value triggered Second Stage (t2) power back-off
t1: 1st Stage triggered
t2: 2nd Stage triggered
P1: Power back-off at 1st Stage
P2: Power back-off at 2nd Stage
The distance at which the proximity sensor triggers is same for all cellular test frequencies.

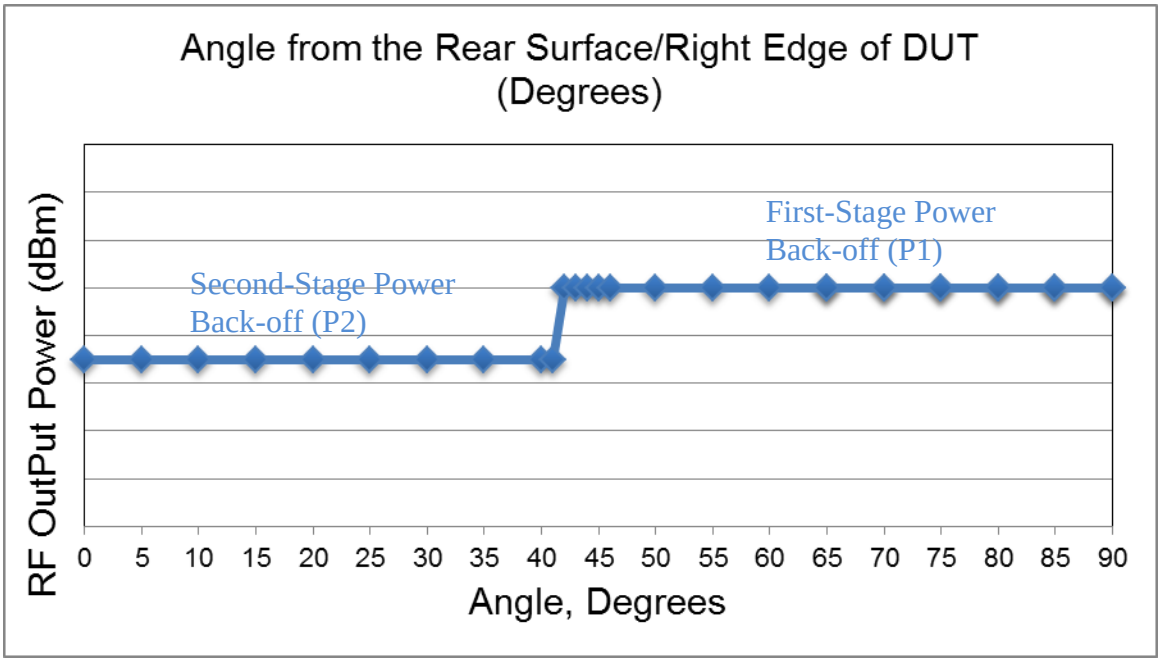
Proximity Sensor Status Table when DUT is moving away from the phantom

Angle to the DUT (Degrees)	Proximity Sensor Status – Top-Edge
0	ON (C2, t2, P2)
5	ON (C2, t2, P2)
10	ON (C2, t2, P2)
15	ON (C2, t2, P2)
20	ON (C2, t2, P2)
25	ON (C2, t2, P2)
30	ON (C2, t2, P2)
35	ON (C2, t2, P2)
39	ON (C2, t2, P2)
40	ON (C2, t2, P2)
41	ON (C2, t2, P2)
42	ON (C1, t1, P1)
43	ON (C1, t1, P1)
45	ON (C1, t1, P1)
50	ON (C1, t1, P1)
55	ON (C1, t1, P1)
60	ON (C1, t1, P1)
65	ON (C1, t1, P1)
70	ON (C1, t1, P1)
75	ON (C1, t1, P1)
80	ON (C1, t1, P1)
85	ON (C1, t1, P1)
90	ON (C1, t1, P1)



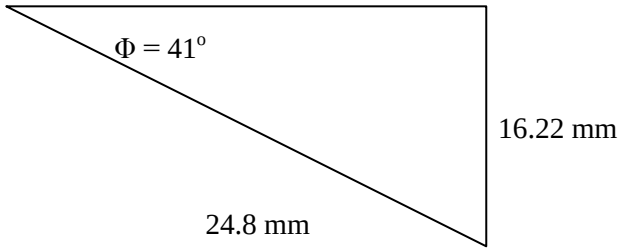
Notes:

C1: Capacitance value triggered First Stage (t1) power back-off
C2: Capacitance value triggered Second Stage (t2) power back-off
t1: 1st Stage triggered
t2: 2nd Stage triggered
P1: Power back-off at 1st Stage
P2: Power back-off at 2nd Stage
The distance at which the proximity sensor triggers is same for all cellular test frequencies.



The proximity sensor coverage at the Rear Surface/Right Edge of the device is determined by changing the angle of the device relative to the phantom and observing the angle at which the proximity sensor is triggered.

In this case, the conservative angles at which the proximity sensor is triggered are: 90° (Φ_2) for the first-stage, and 41° (Φ_1) for the second-stage, from the phantom. Therefore, the proximity sensor remains triggered at the first-stage when the Right Edge of the device is touching the flat phantom.



SAR evaluation for Rear Surface/Right Edge Tilt is not performed because, the antenna-to-flat phantom distance, in this case, is 16.22 mm, which is more than the 16 mm for the Rear Surface (at which SAR evaluation will be performed at full power).

The proximity sensor is not triggered, when approaching from the Left Edge and the Bottom Edge. Therefore, the proximity sensor coverage is not evaluated on these orientations.

7.6.4. SAR test configurations

For body exposure condition, the DUT is evaluated in the following configurations:

- Rear Surface of the DUT with separation distance of 0 mm to the flat phantom. The proximity sensor is active and triggered in this configuration, therefore, the conducted power is backed-off. SAR testing is conducted at second-stage power (P2).

- Top Edge of the DUT with separation distance of 0 mm to the flat phantom. The proximity sensor is active and triggered in this configuration, therefore, the conducted power is backed-off. SAR testing is conducted at second-stage power (P2).

- Bottom Edge of the DUT with separation distance of 0 mm to the flat phantom. The proximity sensor is active, but not triggered in this configuration. Therefore, the conducted power is NOT backed-off. SAR testing is not performed.

- Left Edge of the DUT with separation distance of 0 mm to the flat phantom. The proximity sensor is active, but not triggered in this configuration. Therefore, the conducted power is NOT backed-off. SAR testing is performed at full power only when required by *Sec. 9.1.1. SAR Test Exclusion Calculations for WWAN.*

- Right Edge of the DUT with separation distance of 0 mm to the flat phantom. The proximity sensor is active and triggered at the first-stage power back-off level (P1) in this configuration but SAR testing is conducted at first-stage power (P1).

- Rear Surface of the DUT with conservative distance of 16 mm to the flat phantom. The proximity sensor is disabled, by special development software, in this configuration. Therefore, the conducted power has NOT backed-off. SAR testing is at full power.

- Top Edge of the DUT with conservative distance of 16 mm to the flat phantom. The proximity sensor is disabled, by special development software, in this configuration. Therefore, the conducted power has NOT backed-off. SAR testing is performed at full power.

- Top Edge of the DUT with separation distance of 0 mm and 45° angle to the flat body phantom. SAR evaluation for Top Edge/Right Corner Tilt is not performed because, the antenna-to-flat phantom distance, in this case, is 17.5 mm, which is more than the 16 mm for the Rear Surface (at which SAR evaluation will be performed at full power).

- Rear-Surface of the DUT with separation distance of 0 mm and 41° angle to the flat body phantom. In this configuration. SAR evaluation for Rear Surface/Right Edge Tilt is not performed because, the antenna-to-flat phantom distance, in this case, is 16.22 mm, which is more than the 16 mm for the Rear Surface (at which SAR evaluation will be performed at full power).

SAR evaluation of the DUT on the Front Surface with separation distance of 0 mm to the flat phantom is NOT performed because there is no use case for this configuration.

7.6.5. Special Development Software

During the Top Edge (16 mm), Rear Surface (16mm), Right Edge (0mm), 45° angle from the Top Edge (0mm), and 41° angle from the Rear Surface (0mm) SAR evaluation, the power reduction due to proximity sensor was disabled using a series of test commands which are only available in development software. The proximity sensor or the power reduction cannot be intentionally or unintentionally turned-off by the user. The software provided on production units will not allow the proximity sensor or the power cap to be disabled.

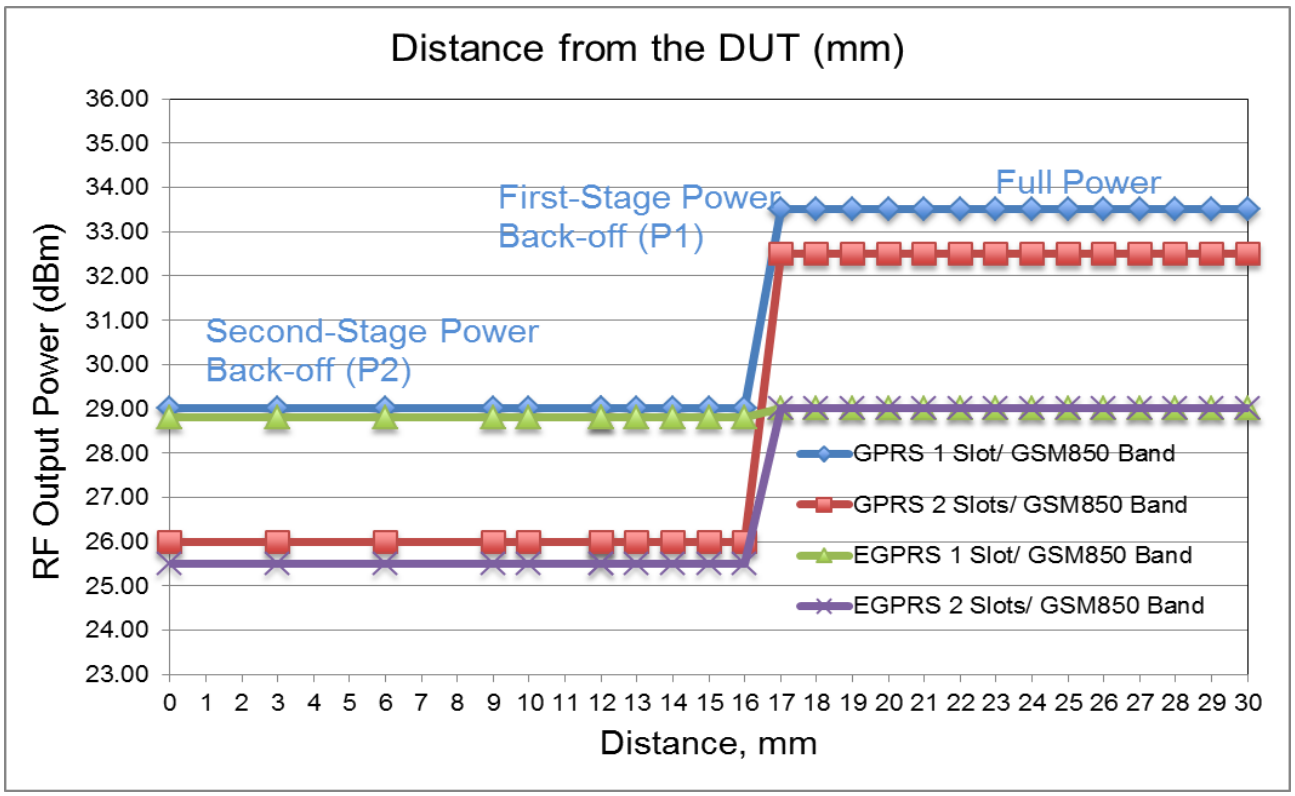
7.7. Power Reduction per Air-interface

As the proximity sensor trigger distances are the identical for both the Rear Surface and Edge 1, the following graphs showing the relation between power levels and DUT to flat phantom distances apply to both the Rear Surface and Edge 1.

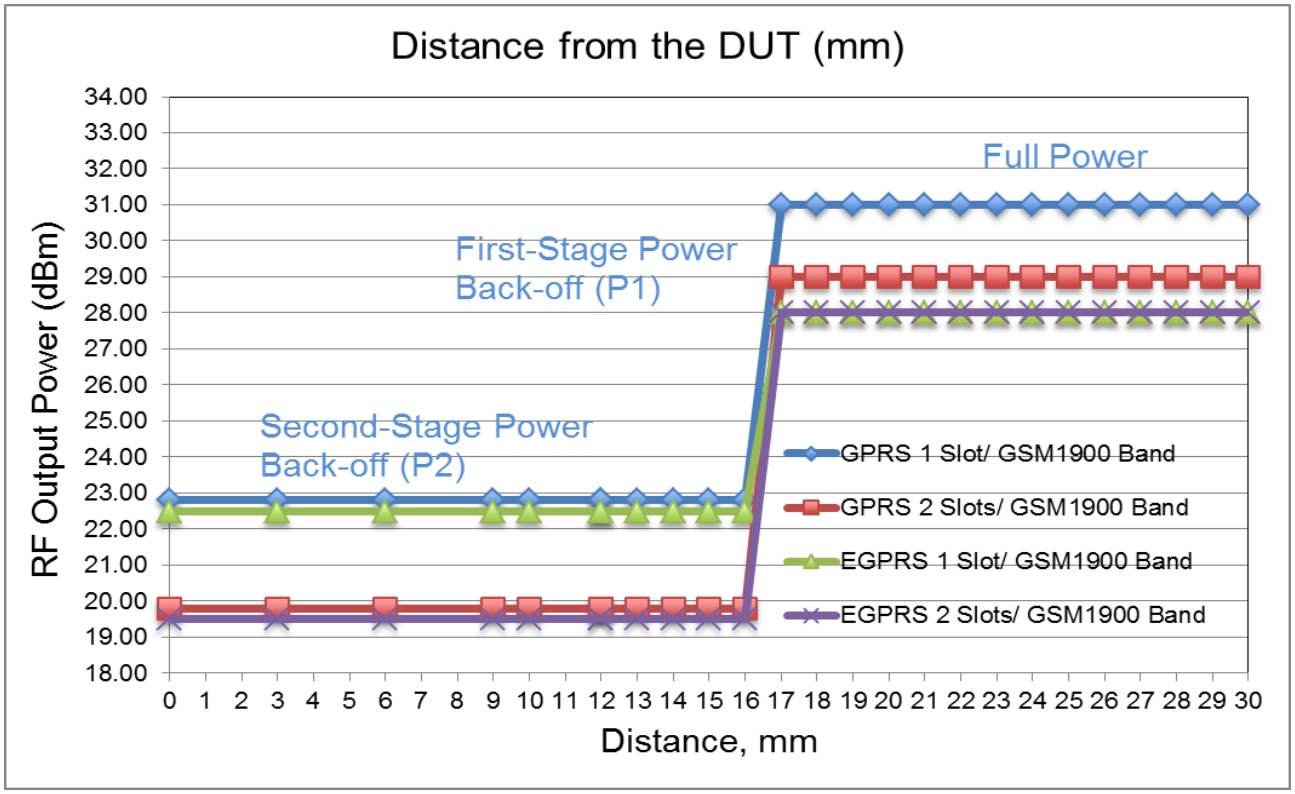
Additionally, since First Stage Back-off power levels are identical to Full Power levels, the First Stage Back-off label was removed in the graphs for clarity.

7.7.1. GSM Bands

GSM850

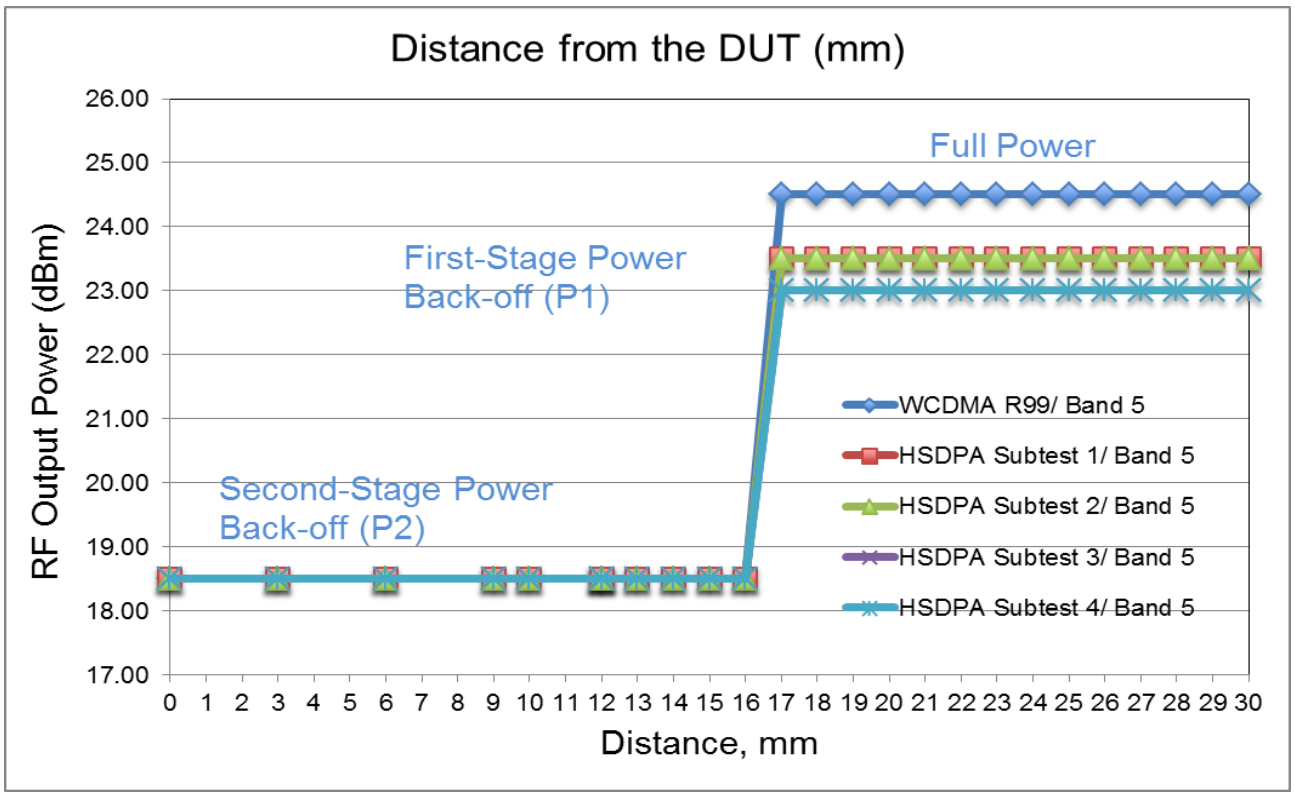


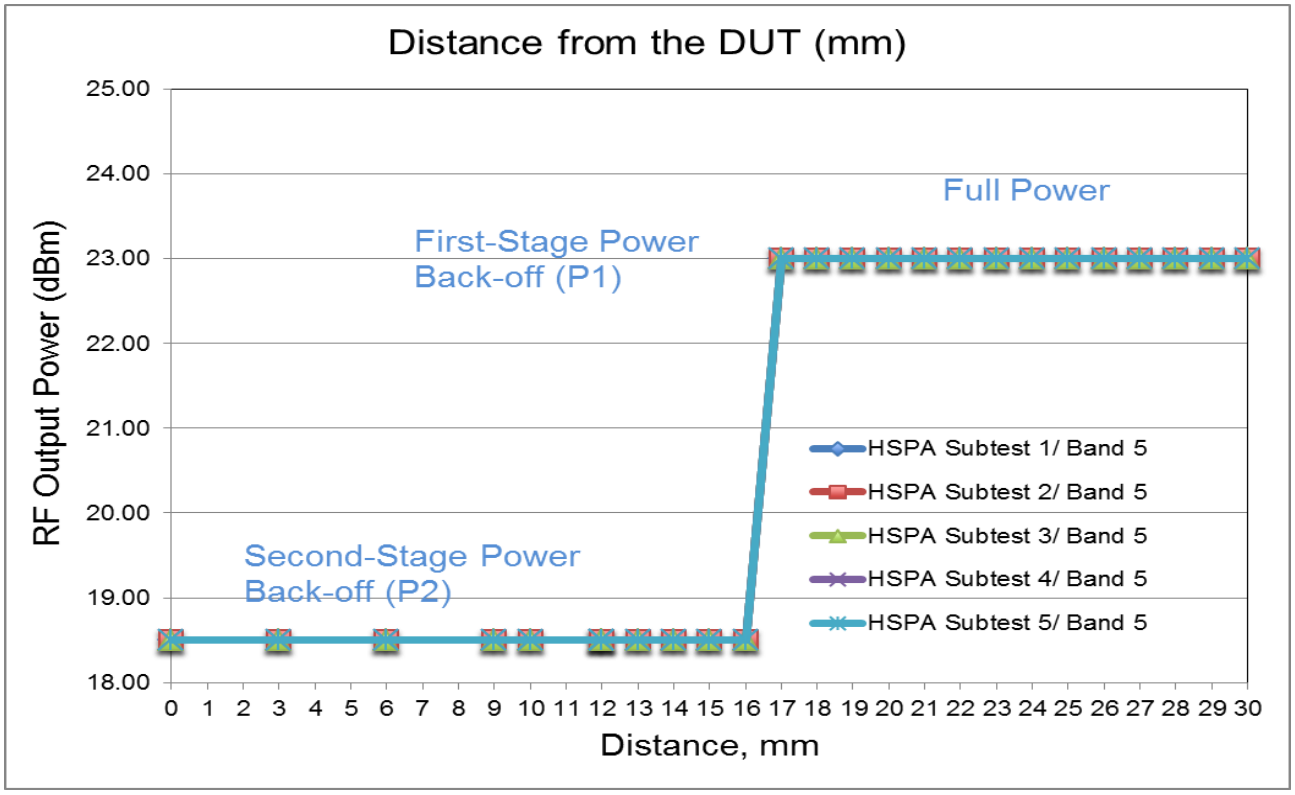
GSM1900



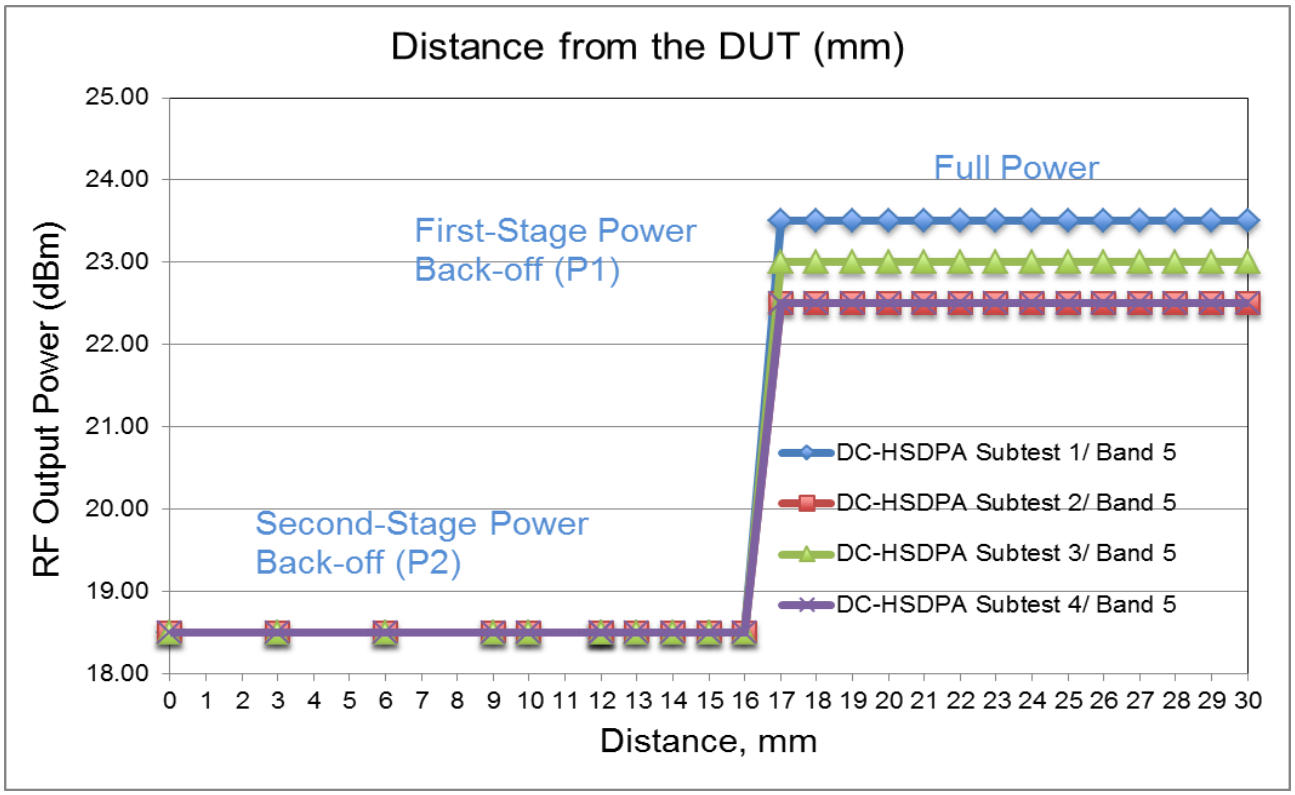
7.7.2. WCDMA Bands

W-CDMA Band 5

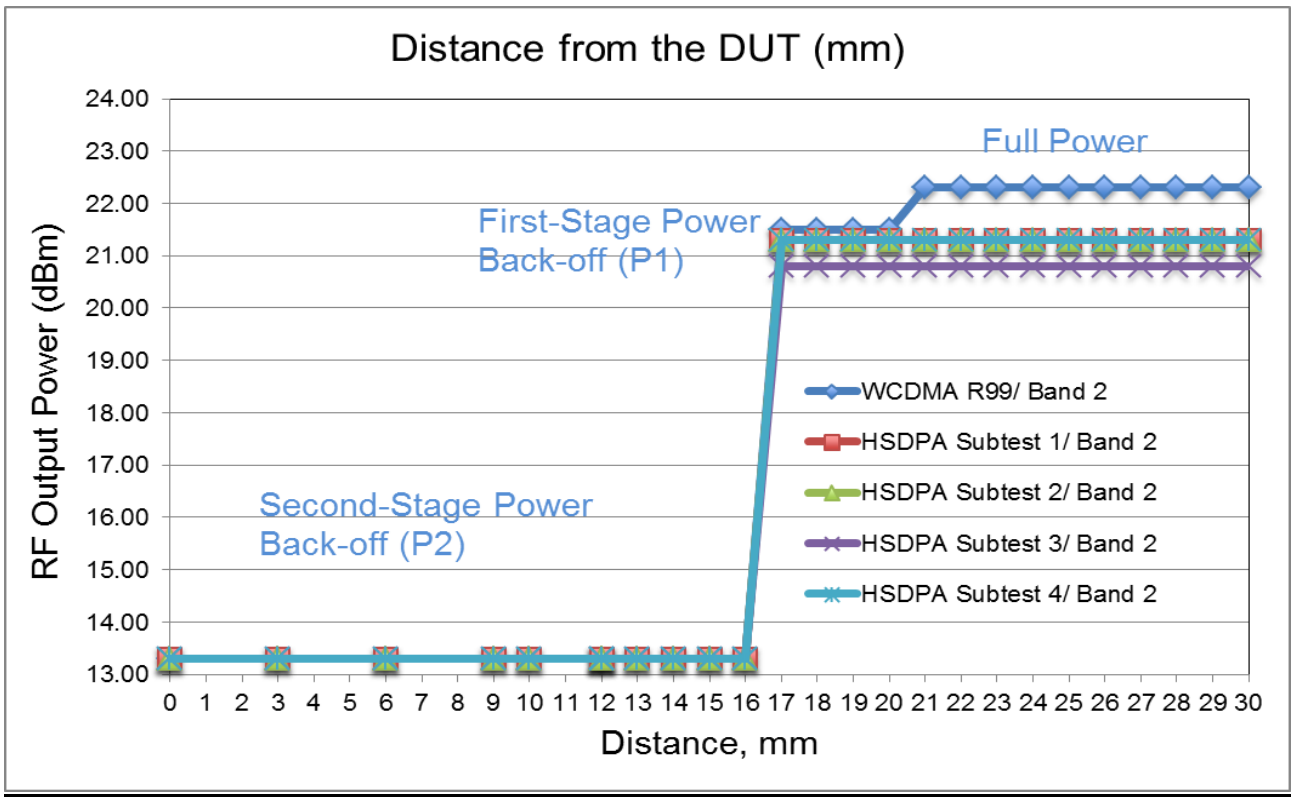


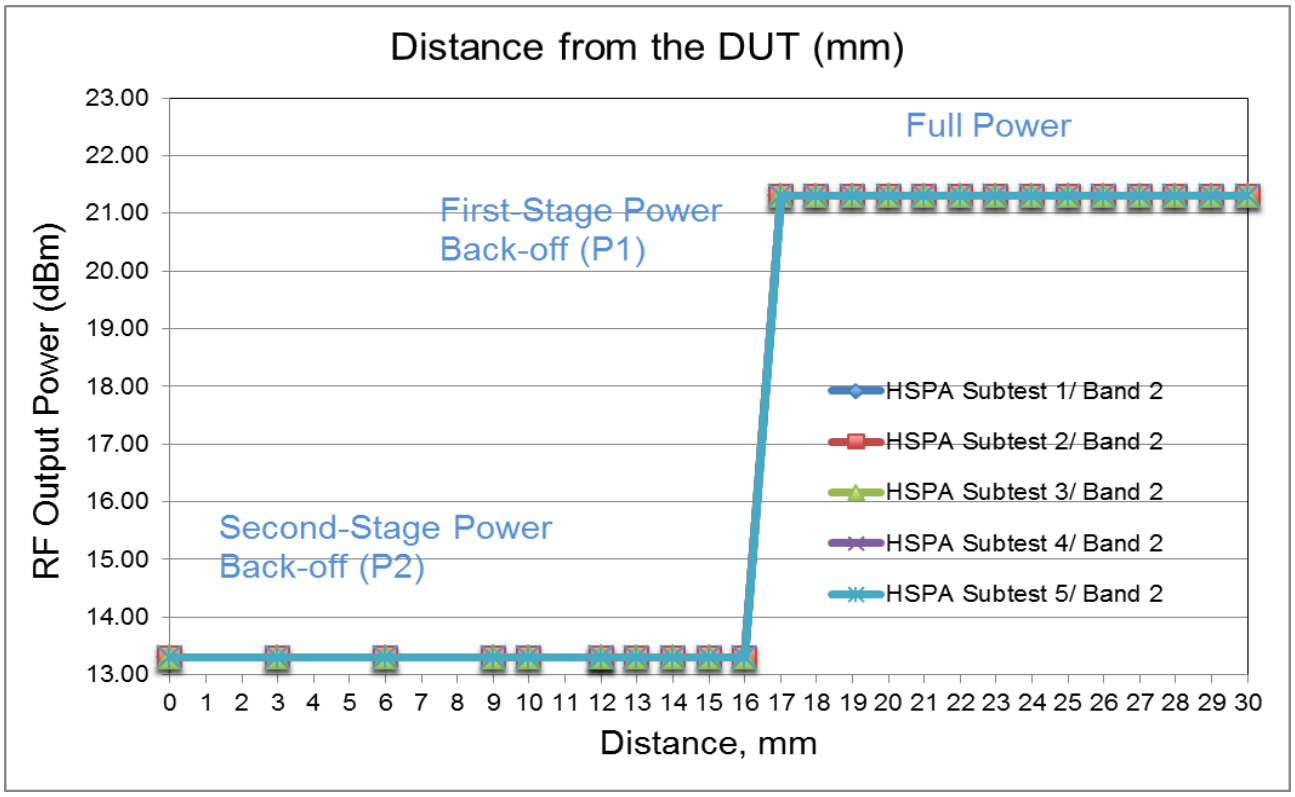


W-CDMA Band 5 continued

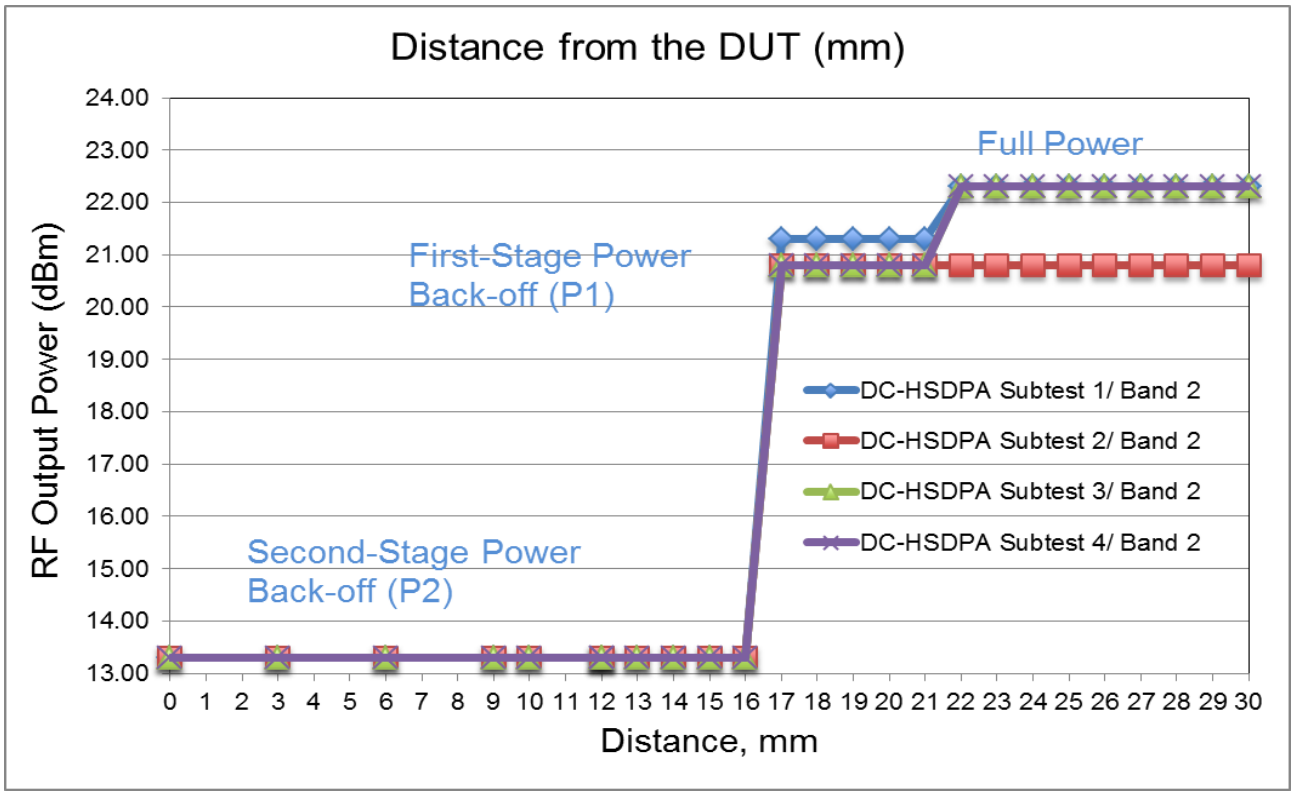


W-CDMA Band 2



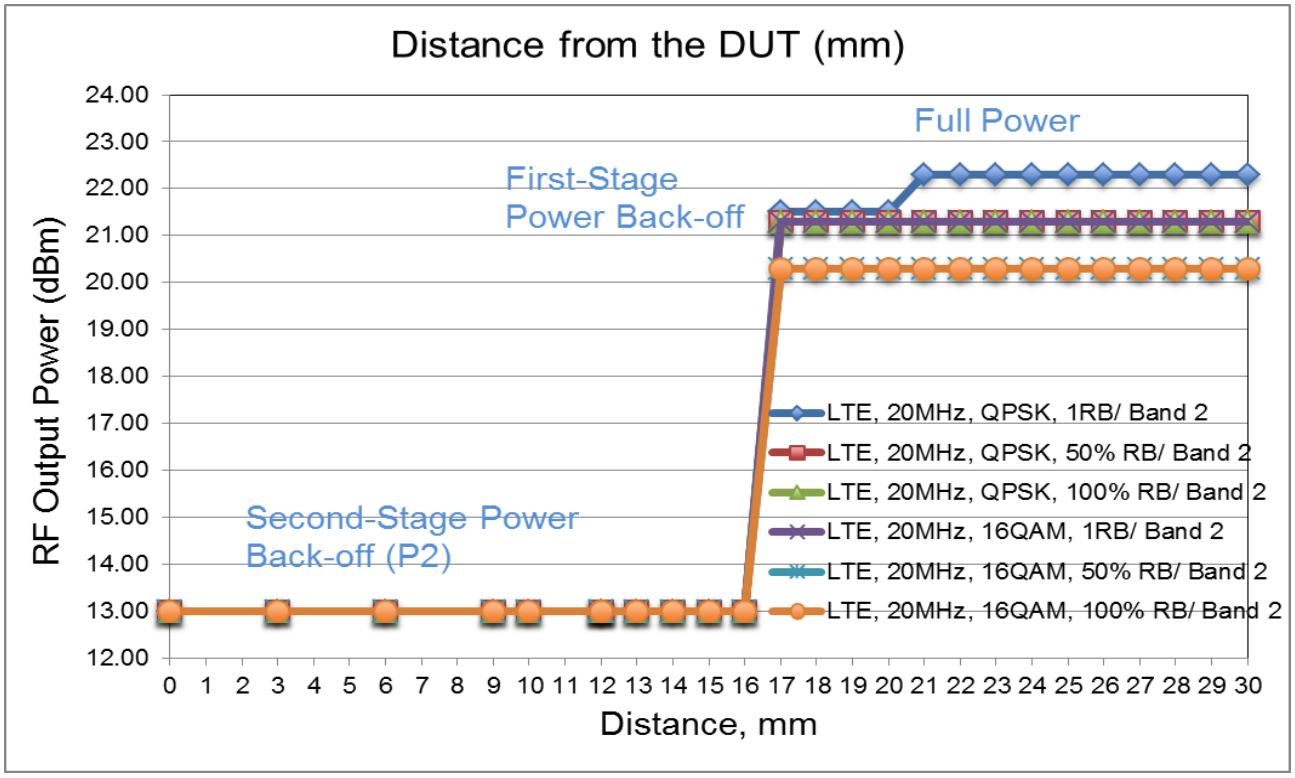


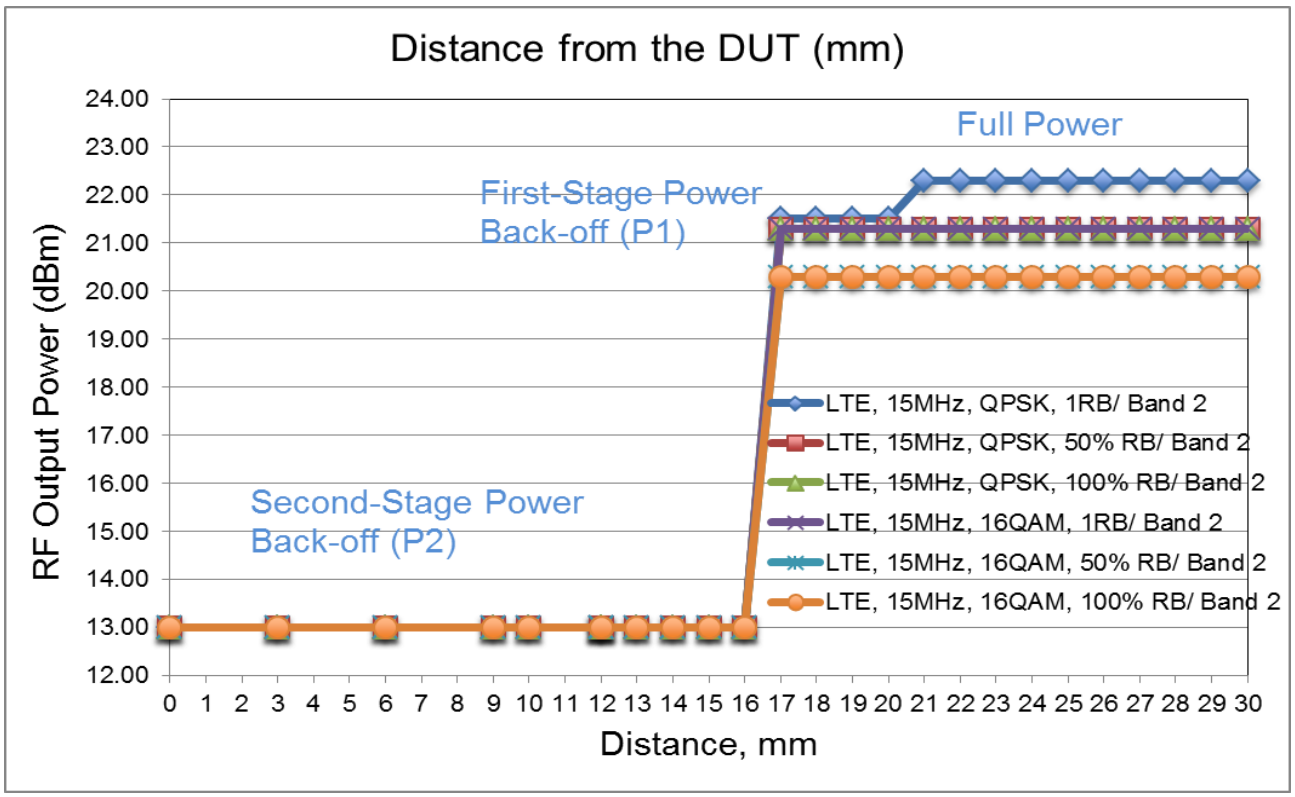
W-CDMA Band 2 continued



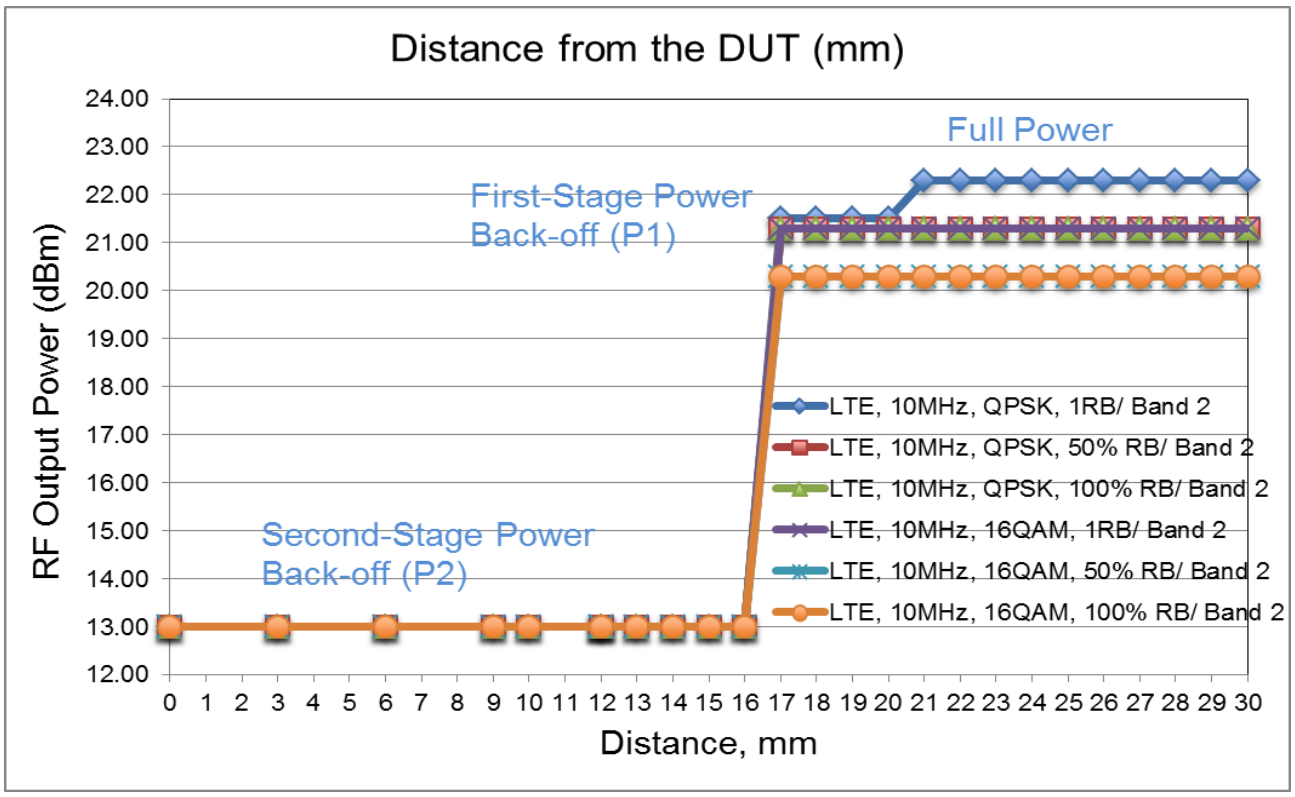
7.7.3. LTE Bands

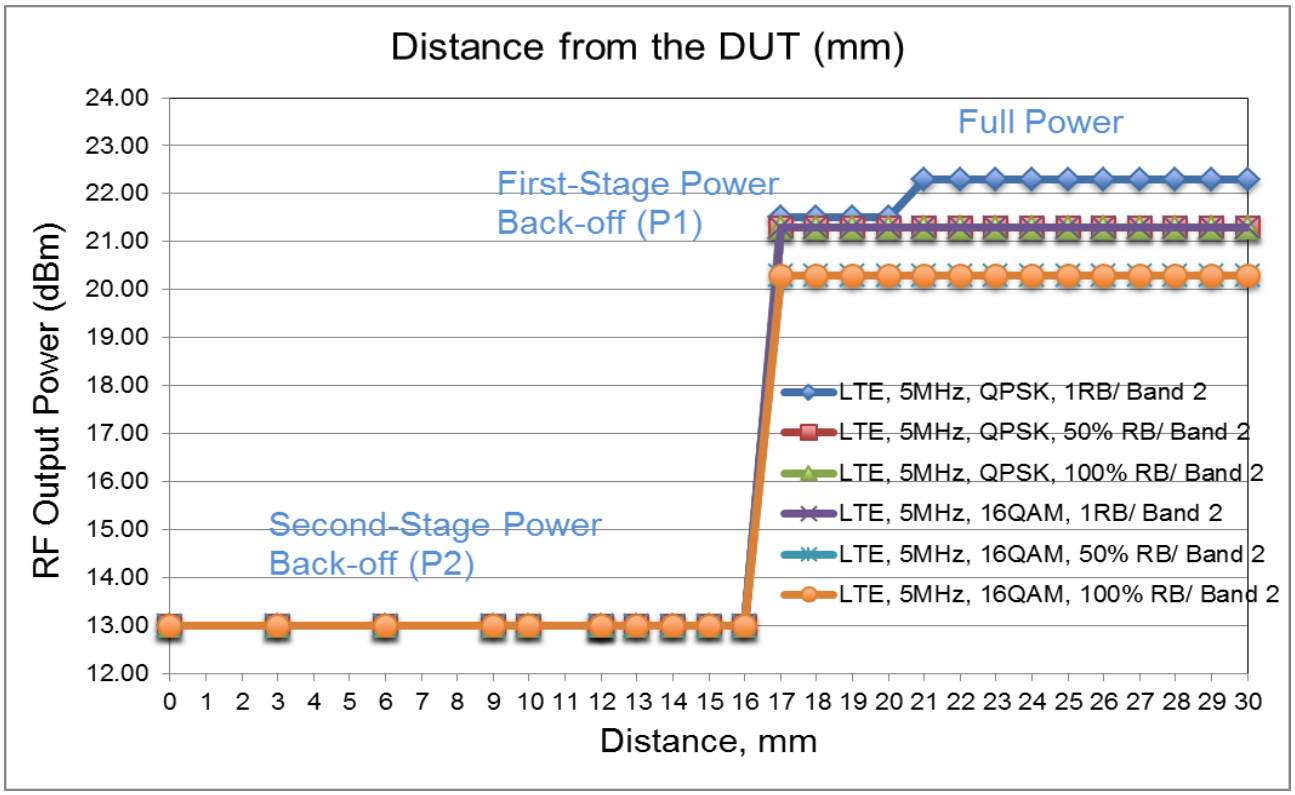
LTE Band 2



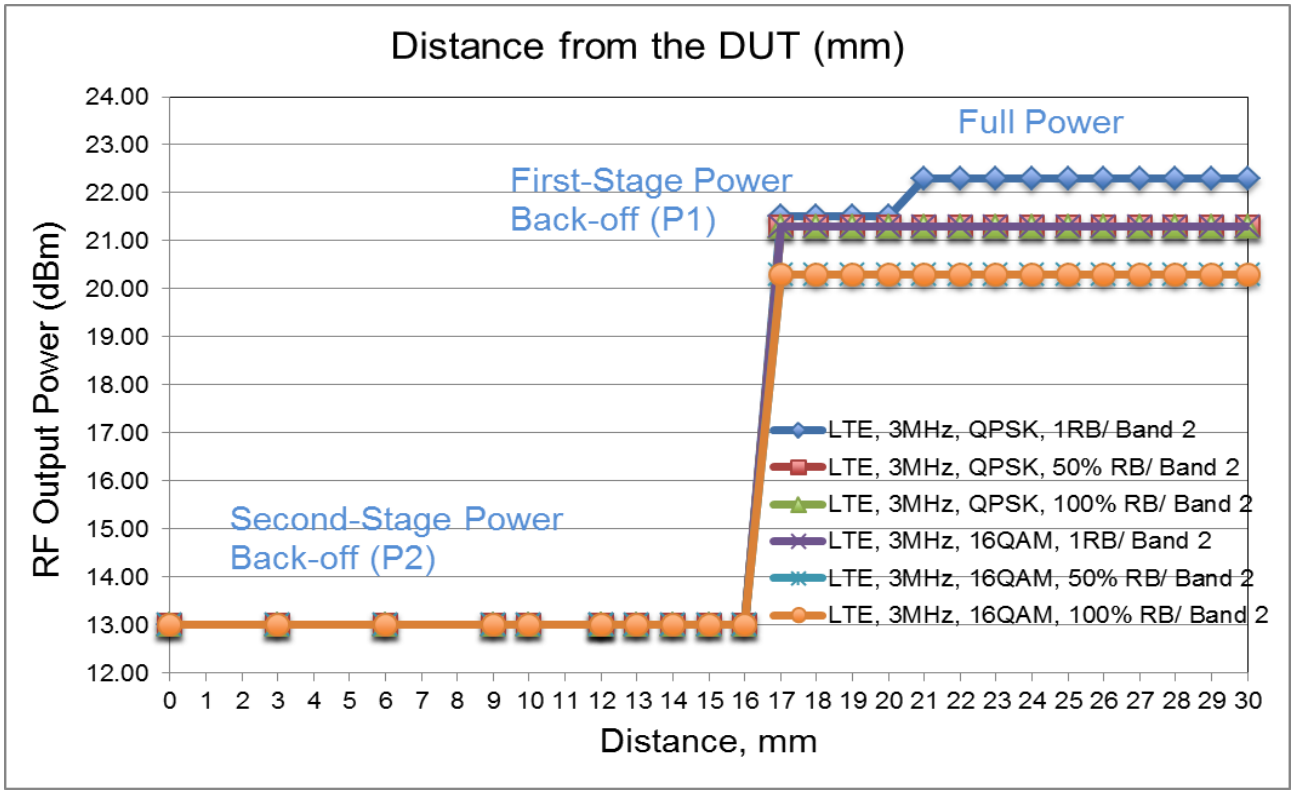


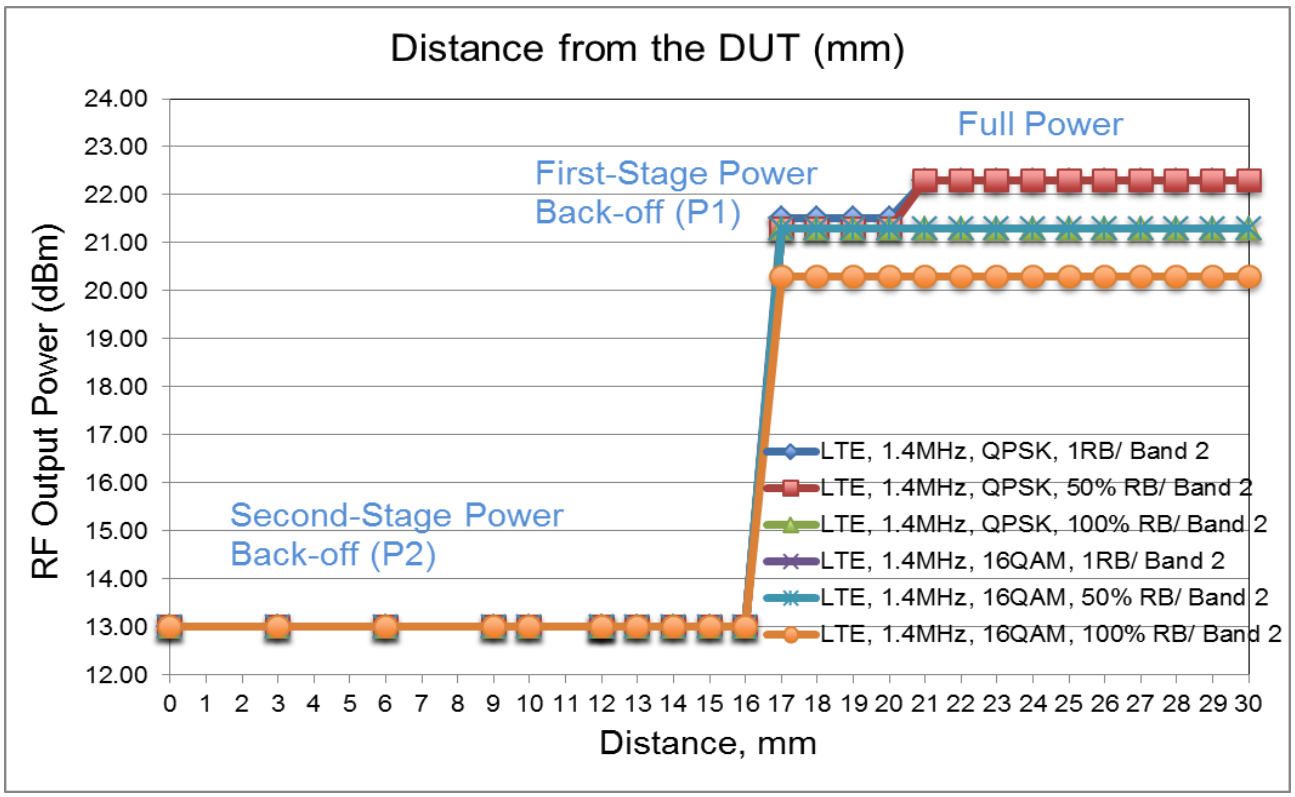
LTE Band 2 continued



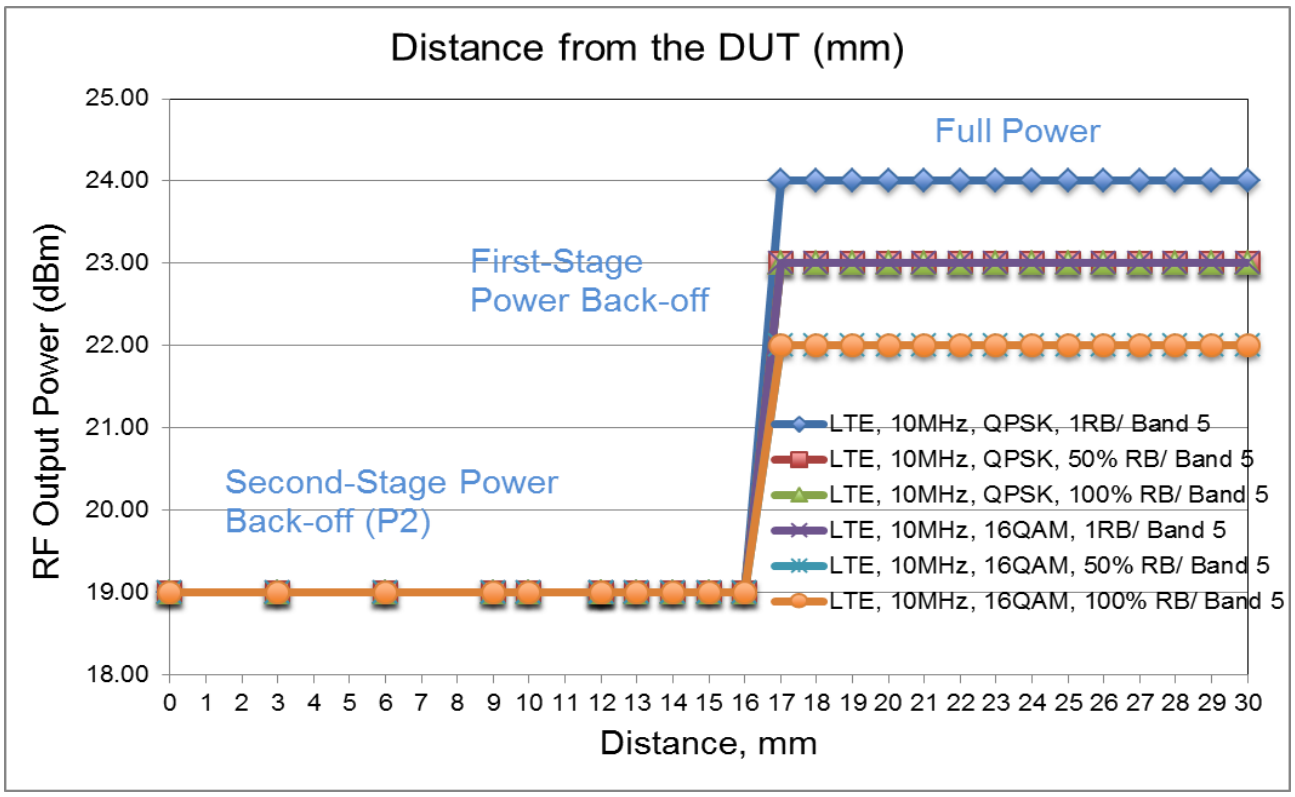


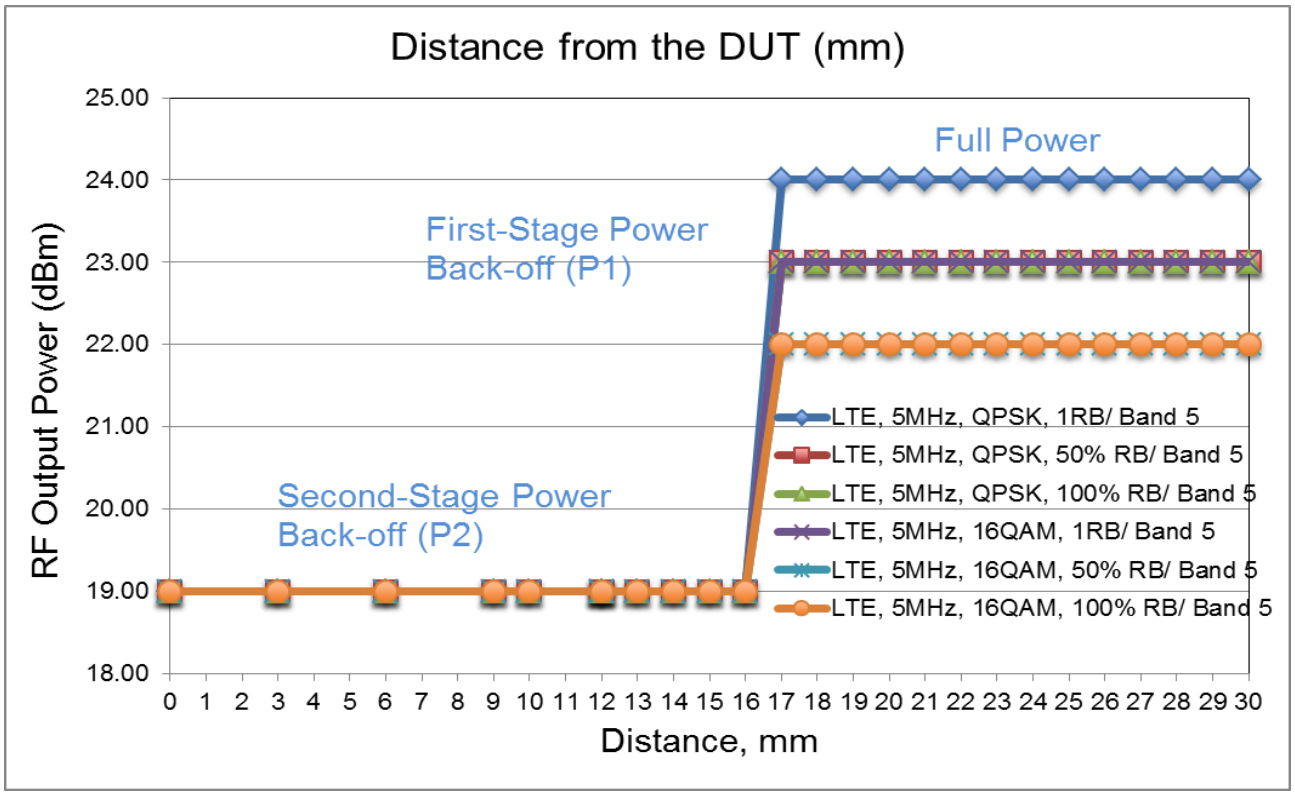
LTE Band 2 continued



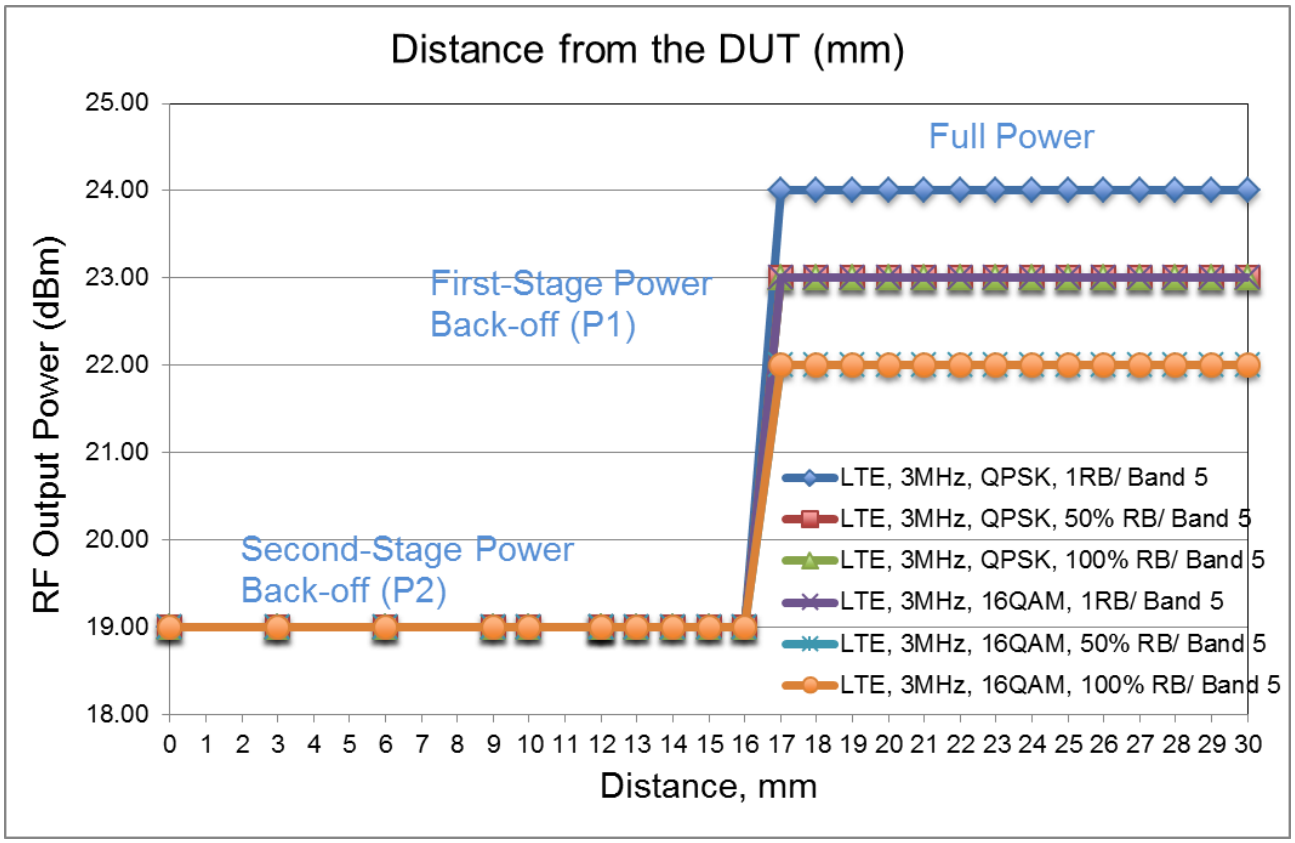


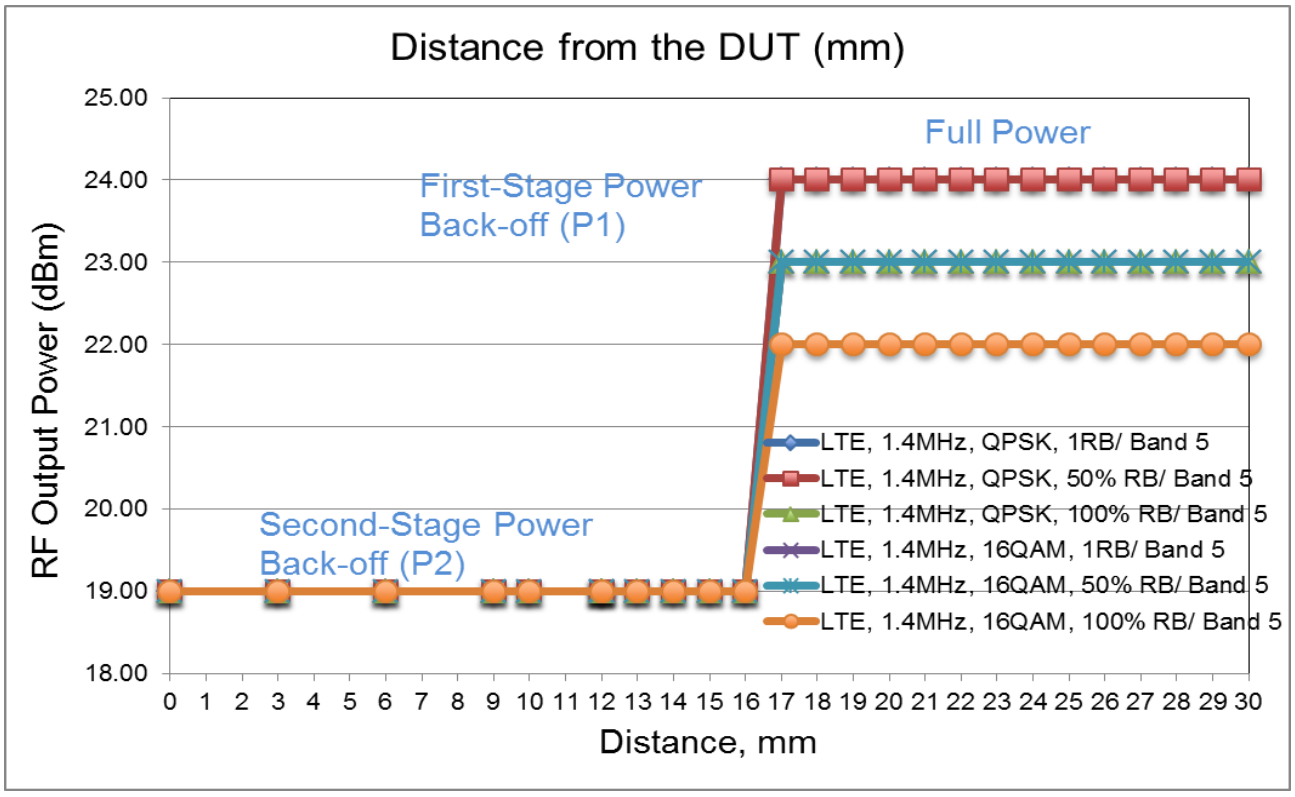
LTE Band 5





LTE Band 5 continued





8. RF Output Power Measurement

8.1. GSM

GPRS (GMSK) - Coding Scheme: CS1								
Band	Ch No.	Freq. (MHz)	Full Power		First Stage Power Back-Off		Second Stage Power Back-Off	
			1 slot	2 slots	1 slot	2 slots	1 slot	2 slots
			Burst Power (dBm)					
850	128	824.2	33.50	**32.50**	33.50	**32.50**	29.00	**25.80**
	190	836.6	33.50	**32.50**	33.50	**32.50**	29.00	**26.00**
	251	848.8	33.50	**32.50**	33.50	**32.50**	28.90	**26.00**
			Frame Power (dBm)					
850	128	824.2	24.5	**26.5**	24.5	**26.5**	20.0	**19.8**
	190	836.6	24.5	**26.5**	24.5	**26.5**	20.0	**20.0**
	251	848.8	24.5	**26.5**	24.5	**26.5**	19.9	**20.0**
EGPRS (8PSK) - Coding Scheme: MCS5								
Band	Ch No.	Freq. (MHz)	Full Power		First Stage Power Back-Off		Second Stage Power Back-Off	
			1 slot	2 slots	1 slot	2 slots	1 slot	2 slots
			Burst Power (dBm)					
850	128	824.2	28.00	27.40	28.00	29.00	27.90	25.00
	190	836.6	28.00	27.40	28.00	29.00	27.80	24.90
	251	848.8	28.00	27.40	28.00	29.00	27.80	25.00
			Frame Power (dBm)					
850	128	824.2	19.0	21.4	19.0	23.0	18.9	19.0
	190	836.6	19.0	21.4	19.0	23.0	18.8	18.9
	251	848.8	19.0	21.4	19.0	23.0	18.8	19.0

Notes:

The worst-case configuration and mode for SAR testing is determined to be as follows:

- GMSK (GPRS) mode with 2 time slots, based on the output power measurements above
- SAR is not required for EGPRS (8PSK) mode because its output power is less than that of GPRS Mode

GPRS (GMSK) - Coding Scheme: CS1								
Band	Ch No.	Freq. (MHz)	Full Power		First Stage Power Back-Off		Second Stage Power Back-Off	
			1 slot	2 slots	1 slot	2 slots	1 slot	2 slots
			Burst Power (dBm)					
1900	512	1850.2	31.00	**29.00**	31.00	**29.00**	22.75	**19.75**
	661	1880	30.60	**28.80**	30.60	**28.80**	22.70	**19.70**
	810	1909.8	30.80	**28.70**	30.80	**28.70**	22.50	**19.50**
			Frame Power (dBm)					
1900	512	1850.2	22.0	**23.0**	22.0	**23.0**	13.7	**13.7**
	661	1880	21.6	**22.8**	21.6	**22.8**	13.7	**13.7**
	810	1909.8	21.8	**22.7**	21.8	**22.7**	13.5	**13.5**
EGPRS (8PSK) - Coding Scheme: MCS5								
Band	Ch No.	Freq. (MHz)	Full Power		First Stage Power Back-Off		Second Stage Power Back-Off	
			1 slot	2 slots	1 slot	2 slots	1 slot	2 slots
			Burst Power (dBm)					
1900	512	1850.2	27.00	27.00	27.00	26.10	21.50	18.50
	661	1880	26.70	26.70	26.70	25.90	21.30	18.40
	810	1909.8	26.60	26.60	26.60	25.70	21.20	18.20
			Frame Power (dBm)					
1900	512	1850.2	18.0	21.0	18.0	20.1	12.5	12.5
	661	1880	17.7	20.7	17.7	19.9	12.3	12.4
	810	1909.8	17.6	20.6	17.6	19.7	12.2	12.2

Notes:

The worst-case configuration and mode for SAR testing is determined to be as follows:

- GMSK (GPRS) mode with 2 time slots, based on the output power measurements above
- SAR is not required for EGPRS (8PSK) mode because its output power is less than that of GPRS Mode

8.2. W-CDMA

Release 99

The following tests were completed according to the test requirements outlined in section 5.2 of the 3GPP TS34.121-1 specification. The DUT supports power Class 3, which has a nominal maximum output power of 24 dBm (+1.7/-3.7).

Mode	Subtest	Rel99
WCDMA General Settings	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	βc/βd	8/15

Measured Results

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)		
				Full Power	First Stage Power Back-Off	Second Stage Power Back-Off
W-CDMA Band 2	Rel 99 (RMC, 12.2 kbps)	9262	1852.4	22.30	21.50	13.10
		9400	1880.0	22.20	21.50	13.25
		9538	1907.6	22.30	21.50	13.25
W-CDMA Band 5	Rel 99 (RMC, 12.2 kbps)	4132	826.4	24.50	24.50	18.50
		4183	836.6	24.40	24.40	18.50
		4233	846.6	24.50	24.50	18.50

HSDPA

The following 4 Sub-tests were completed according to Release 7 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
W-CDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm 2			
	βc	2/15	12/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	βc/βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	MPR (dB)	0	1	1.5	1.5
HSDPA Specific Settings	D_{ACK}	8			
	D_{NAK}	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	Ahs =βhs/βc	30/15			

Measured Results

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)		
				Full Power	First Stage Power Back-Off	Second Stage Power Back-Off
W-CDMA Band 2	Subtest 1	9262	1852.4	21.3	21.3	13.3
		9400	1880.0	21.2	21.2	13.2
		9538	1907.6	21.3	21.3	13.2
	Subtest 2	9262	1852.4	21.3	21.3	13.2
		9400	1880.0	21.1	21.1	13.2
		9538	1907.6	21.3	21.3	13.3
	Subtest 3	9262	1852.4	20.9	20.9	13.3
		9400	1880.0	20.8	20.8	13.2
		9538	1907.6	21.1	21.1	13.3
	Subtest 4	9262	1852.4	21.0	21.0	13.2
		9400	1880.0	21.4	21.4	13.3
		9538	1907.6	21.1	21.1	13.2
W-CDMA Band 5	Subtest 1	4132	826.4	23.4	23.4	18.5
		4183	836.6	23.4	23.4	18.5
		4233	846.6	23.4	23.4	18.5
	Subtest 2	4132	826.4	23.0	23.0	18.5
		4183	836.6	23.3	23.3	18.5
		4233	846.6	23.1	23.1	18.5
	Subtest 3	4132	826.4	23.1	23.1	18.5
		4183	836.6	23.1	23.1	18.5
		4233	846.6	23.0	23.0	18.5
	Subtest 4	4132	826.4	23.0	23.0	18.5
		4183	836.6	23.0	23.0	18.5
		4233	846.6	23.1	23.1	18.5

Maximum output power levels that are possible for all subtests reported.

HSPA (HSDPA & HSUPA)

The following 5 Sub-tests were completed according to Release 6 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	HSPA	HSPA	HSPA	HSPA	HSPA
	Subtest	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2kbps RMC				
	HSDPA FRC	H-Set1				
	HSUPA Test	HSUPA Loopback				
	Power Control Algorithm	Algorithm2				
	βc	11/15	6/15	15/15	2/15	15/15
	βd	15/15	15/15	9/15	15/15	15/15
	βec	209/225	12/15	30/15	2/15	24/15
	βc/βd	11/15	6/15	15/9	2/15	15/15
	βhs	22/15	12/15	30/15	4/15	30/15
	βed	1309/225	94/75	47/15 47/15	56/75	134/15
	CM (dB)	1.0	3.0	2.0	3.0	1.0
	MPR (dB)	0	2	1	2	0
HSDPA Specific Settings	DACK	8				
	DNAK	8				
	DCQI	8				
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
	CQI Repetition Factor (Table 5.2B.4)	2				
	Ahs = βhs/βc	30/15				
HSUPA Specific Settings	D E-DPCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	21
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	81
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E_TFCIs	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27		E-TFCI 11 E-TFCI PO 4 E-TFCI 92 E-TFCI PO 18	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27	

Measured Results

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)		
				Full Power	First Stage Power Back-Off	Second Stage Power Back-Off
W-CDMA Band 2	Subtest 1	9262	1852.4	21.28	21.28	13.25
		9400	1880.0	21.24	21.24	13.25
		9538	1907.6	21.21	21.21	13.25
	Subtest 2	9262	1852.4	21.25	21.25	13.25
		9400	1880.0	21.10	21.10	13.25
		9538	1907.6	21.22	21.22	13.25
	Subtest 3	9262	1852.4	21.14	21.14	13.25
		9400	1880.0	20.82	20.82	13.25
		9538	1907.6	21.08	21.08	13.25
	Subtest 4	9262	1852.4	21.40	21.40	13.25
		9400	1880.0	21.21	21.21	13.25
		9538	1907.6	21.14	21.14	13.25
	Subtest 5	9262	1852.4	21.10	21.10	13.25
		9400	1880.0	20.90	20.90	13.25
		9538	1907.6	21.10	21.10	13.25
W-CDMA Band 5	Subtest 1	4132	826.4	22.97	22.97	18.50
		4183	836.6	22.74	22.74	18.50
		4233	846.6	23.00	23.00	18.50
	Subtest 2	4132	826.4	22.81	22.81	18.50
		4183	836.6	22.89	22.89	18.50
		4233	846.6	22.86	22.86	18.50
	Subtest 3	4132	826.4	23.10	23.10	18.50
		4183	836.6	23.00	23.00	18.50
		4233	846.6	22.92	22.92	18.50
	Subtest 4	4132	826.4	23.00	23.00	18.50
		4183	836.6	22.90	22.90	18.50
		4233	846.6	22.99	22.99	18.50
	Subtest 5	4132	826.4	23.12	23.12	18.50
		4183	836.6	23.10	23.10	18.50
		4233	846.6	22.94	22.94	18.50

DC-HSDPA

The following tests were completed according to procedures in section 7.3.13 of 3GPP TS34.108 v9.5.0. A summary of these settings are illustrated below:

Downlink Physical Channels are set as per 3GPP TS34.121-1 v9.0.0 E.5.0

Table E.5.0: Levels for HSDPA connection setup

Parameter During Connection setup	Unit	Value
P-CPICH_Ec/Ior	dB	-10
P-CCPCH and SCH_Ec/Ior	dB	-12
PICH _Ec/Ior	dB	-15
HS-PDSCH	dB	off
HS-SCCH_1	dB	off
DPCH_Ec/Ior	dB	-5
OCNS_Ec/Ior	dB	-3.1

Call is set up as per 3GPP TS34.108 v9.5.0 sub clause 7.3.13

The configurations of the fixed reference channels for HSDPA RF tests are described in 3GPP TS 34.121, annex C for FDD and 3GPP TS 34.122.

Table C.8.1.12: Fixed Reference Channel H-Set 12

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Proces ses	6
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK
Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table. Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.		

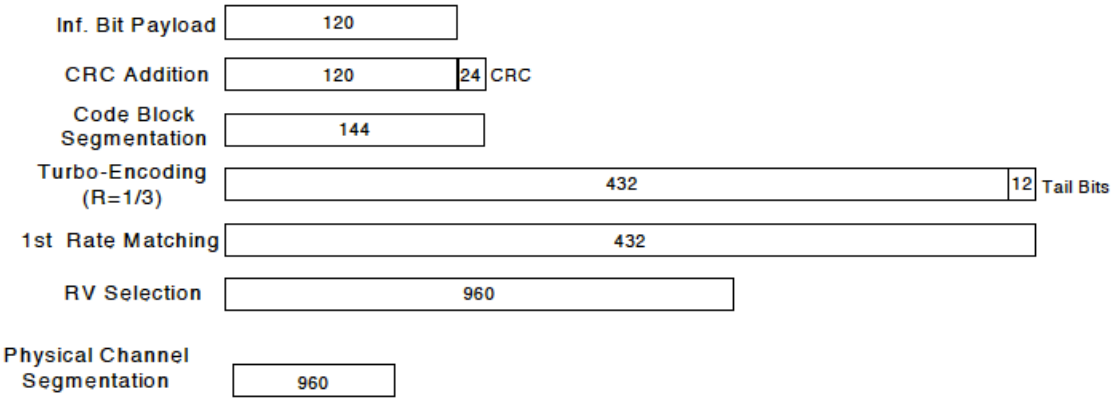


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

The following 4 Sub-tests for HSDPA were completed according to Release 8 procedures in section 5.2 of 3GPP TS34.121. A summary of subtest settings are illustrated below:

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm2			
	βc	2/15	12/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	βd (SF)	64			
	βc/βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	MPR (dB)	0	0	0.5	0.5
HSDPA Specific Settings	DACK	8			
	DNAK	8			
	DCQI	8			
	Ack-Nack Repetition factor	3			
	CQI Feedback	4ms			
	CQI Repetition Factor	2			
	Ahs = βhs/ βc	30/15			

Up commands are set continuously to set the UE to Max power.

Measured Results

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)		
				Full Power	First Stage Power Back-Off	Second Stage Power Back-Off
W-CDMA Band 2	Subtest 1	9262	1852.4	21.20	21.20	13.25
		9400	1880.0	21.17	21.17	13.25
		9538	1907.6	21.22	21.22	13.25
	Subtest 2	9262	1852.4	20.72	20.72	13.25
		9400	1880.0	20.75	20.75	13.25
		9538	1907.6	20.73	20.73	13.25
	Subtest 3	9262	1852.4	20.91	20.91	13.25
		9400	1880.0	21.02	21.02	13.25
		9538	1907.6	20.90	20.90	13.25
	Subtest 4	9262	1852.4	20.69	20.69	13.25
		9400	1880.0	20.73	20.73	13.25
		9538	1907.6	20.79	20.79	13.25
W-CDMA Band 5	Subtest 1	4132	826.4	23.18	23.18	18.50
		4183	836.6	23.23	23.23	18.50
		4233	846.6	23.17	23.17	18.50
	Subtest 2	4132	826.4	22.35	22.35	18.50
		4183	836.6	22.31	22.31	18.50
		4233	846.6	22.36	22.36	18.50
	Subtest 3	4132	826.4	23.09	23.09	18.50
		4183	836.6	23.09	23.09	18.50
		4233	846.6	23.07	23.07	18.50
	Subtest 4	4132	826.4	22.36	22.36	18.50
		4183	836.6	22.31	22.31	18.50
		4233	846.6	22.29	22.29	18.50

HSPA+

Since 16QAM is not used for uplink, the uplink Category and release is same as HSUPA, i.e., CAT 6 Rel 6. Therefore, the RF conducted power is not measured.

8.3. LTE

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signalling Value of “NS_01”.3

Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
NS_03	6.6.2.2.1	2, 4,10, 23, 25, 35, 36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2	41	5	>6	≤ 1
			10, 15, 20	See Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10,15,20	≥ 50	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS_07	6.6.2.2.3 6.6.3.3.2	13	10	Table 6.2.4-2	Table 6.2.4-2
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23[1]	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5
..					
NS_32	-	-	-	-	-
Note 1: Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region.					

8.3.1. LTE Band 2

Measured Results

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)		
							Full Power	First Stage Pwr. Back-Off	Second Stage Pwr. Back-Off
20	18700	1860.0	QPSK	1	0	0	22.3	21.5	12.90
				1	49	0	22.2	21.5	12.90
				1	99	0	22.3	21.4	12.90
				50	0	1	21.3	21.3	13.00
				50	24	1	21.2	21.2	12.80
				50	49	1	21.2	21.2	12.80
				100	0	1	21.2	21.2	12.80
			16QAM	1	0	1	21.3	21.3	12.92
				1	49	1	21.3	21.3	12.91
				1	99	1	21.3	21.3	12.87
				50	0	2	20.3	20.3	13.00
				50	24	2	20.3	20.3	12.99
				50	49	2	20.3	20.3	12.78
				100	0	2	20.3	20.3	12.77
	18900	1880.0	QPSK	1	0	0	22.3	21.3	13.00
				1	49	0	22.3	21.4	13.00
				1	99	0	22.3	21.3	12.90
				50	0	1	21.4	21.4	13.00
				50	24	1	21.4	21.4	12.90
				50	49	1	21.4	21.4	13.00
				100	0	1	21.4	21.4	12.90
			16QAM	1	0	1	21.7	21.5	13.00
				1	49	1	21.7	21.5	12.99
				1	99	1	21.5	21.5	12.91
				50	0	2	20.6	20.6	12.94
				50	24	2	20.6	20.6	12.87
				50	49	2	20.7	20.7	12.97
				100	0	2	20.6	20.6	12.90
	19100	1900.0	QPSK	1	0	0	22.3	21.3	13.00
				1	49	0	22.3	21.3	13.00
				1	99	0	22.1	21.1	12.90
				50	0	1	21.3	21.3	13.00
				50	24	1	21.3	21.3	12.80
				50	49	1	21.2	21.2	12.90
				100	0	1	21.3	21.3	12.80
			16QAM	1	0	1	21.8	21.5	12.79
				1	49	1	21.5	21.5	12.98
				1	99	1	21.7	21.5	12.88
				50	0	2	20.6	20.6	12.97
				50	24	2	20.3	20.3	12.76
				50	49	2	20.6	20.6	12.88
				100	0	2	20.5	20.5	12.76

LTE Band 2 Measured Results (continued)

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)		
							Full Power	First Stage Pwr. Back-Off	Second Stage Pwr. Back-Off
15	18675	1857.5	QPSK	1	0	0	22.3	21.4	12.90
				1	37	0	22.3	21.3	12.90
				1	74	0	22.3	21.5	12.90
				36	0	1	21.5	21.5	13.00
				36	16	1	21.5	21.4	12.80
				36	35	1	21.5	21.4	12.80
				75	0	1	21.4	21.3	12.80
			16QAM	1	0	1	21.2	21.2	12.88
				1	37	1	21.1	21.1	12.91
				1	74	1	21.0	21.0	12.87
				36	0	2	20.6	20.6	13.00
				36	16	2	20.6	20.6	12.97
				36	35	2	20.5	20.5	12.79
				75	0	2	20.6	20.6	12.80
	18900	1880.0	QPSK	1	0	0	22.3	21.5	13.00
				1	37	0	22.3	21.5	13.00
				1	74	0	22.3	21.5	12.90
				36	0	1	21.6	21.4	13.00
				36	16	1	21.6	21.5	12.90
				36	35	1	21.7	21.5	13.00
				75	0	1	21.5	21.5	12.90
			16QAM	1	0	1	21.0	21.0	13.00
				1	37	1	21.2	21.2	12.95
				1	74	1	21.2	21.2	12.90
				36	0	2	20.7	20.7	12.90
				36	16	2	20.6	20.6	12.90
				36	35	2	20.8	20.8	12.88
				75	0	2	20.5	20.5	12.89
	19125	1902.5	QPSK	1	0	0	22.3	21.5	13.00
				1	37	0	22.3	21.5	13.00
				1	74	0	22.3	21.3	12.90
				36	0	1	21.3	21.3	13.00
				36	16	1	21.4	21.2	12.80
				36	35	1	21.5	21.4	12.90
				75	0	1	21.4	21.1	12.80
			16QAM	1	0	1	21.6	21.5	12.77
				1	37	1	21.4	21.4	12.97
				1	74	1	21.7	21.5	12.88
				36	0	2	20.3	20.3	12.95
				36	16	2	20.4	20.4	12.78
				36	35	2	20.5	20.5	12.90
				75	0	2	20.5	20.5	12.85

LTE Band 2 Measured Results (continued)

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)		
							Full Power	First Stage Pwr. Back-Off	Second Stage Pwr. Back-Off
10	18650	1855.0	QPSK	1	0	0	22.3	21.4	13.00
				1	24	0	22.3	21.2	12.90
				1	49	0	22.3	21.4	12.80
				25	0	1	21.5	21.2	12.90
				25	12	1	21.4	21.2	12.80
				25	24	1	21.4	21.3	12.80
				50	0	1	21.3	21.2	12.70
			16QAM	1	0	1	21.0	21.0	12.80
				1	24	1	21.0	21.0	12.80
				1	49	1	21.0	21.0	12.80
				25	0	2	20.5	20.5	12.90
				25	12	2	20.4	20.4	12.90
				25	24	2	20.7	20.7	12.70
				50	0	2	20.4	20.4	12.70
	18900	1880.0	QPSK	1	0	0	22.3	21.4	13.00
				1	24	0	22.3	21.4	12.90
				1	49	0	22.3	21.3	13.00
				25	0	1	21.5	21.5	12.80
				25	12	1	21.4	21.4	12.90
				25	24	1	21.5	21.5	13.00
				50	0	1	21.4	21.4	12.70
			16QAM	1	0	1	21.1	21.1	12.90
				1	24	1	21.1	21.1	12.90
				1	49	1	21.2	21.2	13.00
				25	0	2	20.4	20.4	12.90
				25	12	2	20.8	20.8	12.80
				25	24	2	20.4	20.4	12.80
				50	0	2	20.2	20.2	12.89
	19150	1905.0	QPSK	1	0	0	22.3	21.5	13.00
				1	24	0	22.3	21.4	12.90
				1	49	0	22.3	21.2	12.80
				25	0	1	21.3	21.3	12.90
				25	12	1	21.3	21.3	12.80
				25	24	1	21.4	21.3	12.90
				50	0	1	21.2	21.0	12.90
			16QAM	1	0	1	21.4	21.4	13.00
				1	24	1	21.6	21.5	12.90
				1	49	1	21.6	21.5	12.80
				25	0	2	20.3	20.3	12.70
				25	12	2	20.3	20.3	12.90
				25	24	2	20.6	20.6	12.90
				50	0	2	20.2	20.2	12.90

LTE Band 2 Measured Results (continued)

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)		
							Full Power	First Stage Pwr. Back-Off	Second Stage Pwr. Back-Off
5	18625	1855.0	QPSK	1	0	0	22.3	21.5	12.90
				1	12	0	22.3	21.5	13.00
				1	24	0	22.3	21.5	12.90
				12	0	1	21.6	21.3	12.70
				12	6	1	21.7	21.1	12.70
				12	11	1	21.7	21.4	12.80
				25	0	1	21.6	21.3	13.00
			16QAM	1	0	1	21.3	21.3	12.90
				1	12	1	21.1	21.1	12.80
				1	24	1	21.2	21.2	12.80
				12	0	2	20.6	20.6	12.70
				12	6	2	20.6	20.6	12.90
				12	11	2	20.8	20.8	12.60
				25	0	2	20.8	20.8	12.70
	18900	1880.0	QPSK	1	0	0	22.3	21.4	13.00
				1	12	0	22.3	21.4	13.00
				1	24	0	22.3	21.4	12.80
				12	0	1	21.7	21.5	12.80
				12	6	1	21.7	21.3	13.00
				12	11	1	21.7	21.5	13.00
				25	0	1	21.6	21.5	12.90
			16QAM	1	0	1	21.3	21.3	13.00
				1	12	1	21.3	21.3	12.90
				1	24	1	21.2	21.2	13.00
				12	0	2	20.7	20.7	12.90
				12	6	2	20.7	20.7	13.00
				12	11	2	20.7	20.7	12.80
				25	0	2	20.7	20.7	12.89
	19175	1907.5	QPSK	1	0	0	22.3	21.5	13.00
				1	12	0	22.3	21.4	12.90
				1	24	0	22.3	21.2	13.00
				12	0	1	21.6	21.1	12.90
				12	6	1	21.7	21.1	12.80
				12	11	1	21.7	21.1	12.70
				25	0	1	21.7	21.0	12.90
			16QAM	1	0	1	21.9	21.5	13.00
				1	12	1	21.7	21.5	12.90
				1	24	1	21.7	21.5	13.00
				12	0	2	20.6	20.6	12.70
				12	6	2	20.7	20.7	12.90
				12	11	2	20.7	20.7	12.90
				25	0	2	20.6	20.6	13.00

LTE Band 2 Measured Results (continued)

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)		
							Full Power	First Stage Pwr. Back-Off	Second Stage Pwr. Back-Off
3	18615	1851.5	QPSK	1	0	0	22.3	21.5	13.00
				1	7	0	22.3	21.4	13.00
				1	14	0	22.3	21.5	12.90
				8	0	1	21.5	21.2	12.60
				8	4	1	21.6	21.0	12.70
				8	7	1	21.7	21.2	12.90
				15	0	1	21.6	21.0	12.70
			16QAM	1	0	1	21.3	21.3	12.90
				1	7	1	21.3	21.3	12.80
				1	14	1	21.1	21.1	12.70
				8	0	2	20.9	20.9	12.70
				8	4	2	20.7	20.7	12.90
				8	7	2	20.7	20.7	12.90
				15	0	2	20.6	20.6	12.90
	18900	1880.0	QPSK	1	0	0	22.3	21.5	13.00
				1	7	0	22.3	21.5	13.00
				1	14	0	22.3	21.4	12.80
				8	0	1	21.4	21.3	12.90
				8	4	1	21.5	21.1	13.00
				8	7	1	21.6	21.2	12.90
				15	0	1	21.5	21.3	12.80
			16QAM	1	0	1	21.2	21.2	12.90
				1	7	1	21.0	21.0	12.70
				1	14	1	21.0	21.0	12.80
				8	0	2	20.6	20.6	12.70
				8	4	2	20.6	20.6	12.70
				8	7	2	20.6	20.6	12.60
				15	0	2	20.5	20.5	12.80
	19185	1908.5	QPSK	1	0	0	22.3	21.5	13.00
				1	7	0	22.3	21.5	12.90
				1	14	0	22.3	21.4	12.80
				8	0	1	21.7	21.3	12.70
				8	4	1	21.7	21.2	12.60
				8	7	1	21.7	21.2	12.70
				15	0	1	21.7	21.0	12.90
			16QAM	1	0	1	21.3	21.3	13.00
				1	7	1	21.2	21.2	13.00
				1	14	1	21.2	21.2	13.00
				8	0	2	20.8	20.8	12.80
				8	4	2	20.8	20.8	12.90
				8	7	2	20.8	20.8	12.90
				15	0	2	20.7	20.7	13.00

LTE Band 2 Measured Results (continued)

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)		
							Full Power	First Stage Pwr. Back-Off	Second Stage Pwr. Back-Off
1.4	18607	1850.7	QPSK	1	0	0	22.3	21.5	13.00
				1	2	0	22.3	21.5	13.00
				1	5	0	22.3	21.4	13.00
				3	0	0	22.3	21.3	12.60
				3	1	0	22.2	21.2	12.50
				3	2	0	22.2	21.3	12.70
				6	0	1	21.3	21.3	12.70
			16QAM	1	0	1	21.2	21.2	12.90
				1	2	1	21.1	21.1	12.80
				1	5	1	21.2	21.2	12.80
				3	0	1	21.3	21.3	12.70
				3	1	1	21.3	21.3	13.00
				3	2	1	21.3	21.3	12.90
				6	0	2	20.5	20.5	12.80
	18900	1880.0	QPSK	1	0	0	22.3	21.5	12.80
				1	2	0	22.3	21.4	12.80
				1	5	0	22.3	21.3	12.80
				3	0	0	22.3	21.3	12.90
				3	1	0	22.3	21.4	13.00
				3	2	0	22.2	21.5	12.90
				6	0	1	21.3	21.3	12.80
			16QAM	1	0	1	21.3	21.3	12.90
				1	2	1	21.1	21.1	12.70
				1	5	1	21.3	21.3	12.80
				3	0	1	21.3	21.3	12.70
				3	1	1	21.3	21.3	12.80
				3	2	1	21.3	21.3	12.80
				6	0	2	20.3	20.3	12.80
	19193	1909.3	QPSK	1	0	0	22.3	21.5	13.00
				1	2	0	22.3	21.5	13.00
				1	5	0	22.3	21.0	12.80
				3	0	0	22.3	21.5	12.70
				3	1	0	22.2	21.1	12.70
				3	2	0	22.2	21.4	12.70
				6	0	1	21.3	21.2	12.80
			16QAM	1	0	1	21.3	21.3	13.00
				1	2	1	21.2	21.2	12.90
				1	5	1	21.3	21.3	13.00
				3	0	1	21.3	21.3	13.00
				3	1	1	21.2	21.2	12.90
				3	2	1	21.1	21.1	13.00
				6	0	2	20.3	20.3	13.00

8.3.2. LTE Band 5

Measured Results

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)		
							Full Power	First Stage Pwr. Back-Off	Second Stage Pwr. Back-Off
10	20450	829.0	QPSK	1	0	0	23.6	23.6	18.50
				1	24	0	23.6	23.6	18.40
				1	49	0	23.5	23.5	18.20
				25	0	1	23.1	23.1	18.50
				25	12	1	23.1	23.1	18.40
				25	24	1	23.2	23.2	18.40
				50	0	1	23.0	23.0	18.30
			16QAM	1	0	1	22.7	22.7	18.50
				1	24	1	22.6	22.6	18.50
				1	49	1	22.6	22.6	18.40
				25	0	2	22.0	22.0	18.50
				25	12	2	21.9	21.9	18.20
				25	24	2	21.9	21.9	18.20
				50	0	2	21.9	21.9	18.30
	20525	836.5	QPSK	1	0	0	23.6	23.6	18.40
				1	24	0	23.5	23.5	18.20
				1	49	0	23.7	23.7	18.50
				25	0	1	22.9	22.9	18.20
				25	12	1	23.0	23.0	18.30
				25	24	1	23.1	23.1	18.30
				50	0	1	22.9	22.9	18.20
			16QAM	1	0	1	22.7	22.7	18.50
				1	24	1	22.6	22.6	18.40
				1	49	1	22.6	22.6	18.50
				25	0	2	22.0	22.0	18.50
				25	12	2	22.0	22.0	18.40
				25	24	2	22.0	22.0	18.30
				50	0	2	21.8	21.8	18.30
	20600	844.0	QPSK	1	0	0	23.7	23.7	18.40
				1	24	0	23.8	23.8	18.50
				1	49	0	23.6	23.6	18.40
				25	0	1	23.2	23.2	18.50
				25	12	1	23.2	23.2	18.40
				25	24	1	23.1	23.1	18.40
				50	0	1	23.1	23.1	18.40
			16QAM	1	0	1	22.7	22.7	18.50
				1	24	1	22.5	22.5	18.40
				1	49	1	22.5	22.5	18.30
				25	0	2	22.0	22.0	18.40
				25	12	2	22.1	22.1	18.30
				25	24	2	22.00	22.00	18.40
				50	0	2	21.90	21.90	18.40

LTE Band 5 Measured Results (continued)

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)		
							Full Power	First Stage Pwr. Back-Off	Second Stage Pwr. Back-Off
5	20425	826.5	QPSK	1	0	0	24.0	24.0	18.50
				1	12	0	23.9	23.9	18.40
				1	24	0	23.9	23.9	18.30
				12	0	1	22.8	22.8	18.50
				12	6	1	22.9	22.9	18.40
				12	11	1	22.9	22.9	18.50
				25	0	1	22.8	22.8	18.30
			16QAM	1	0	1	22.7	22.7	18.50
				1	12	1	22.5	22.5	18.40
				1	24	1	22.5	22.5	18.30
				12	0	2	21.8	21.8	18.40
				12	6	2	21.8	21.8	18.30
				12	11	2	21.9	21.9	18.20
				25	0	2	21.9	21.9	18.30
	20525	836.5	QPSK	1	0	0	24.0	24.0	18.50
				1	12	0	24.0	24.0	18.50
				1	24	0	23.9	23.9	18.40
				12	0	1	23.0	23.0	18.30
				12	6	1	23.0	23.0	18.40
				12	11	1	23.0	23.0	18.40
				25	0	1	22.9	22.9	18.30
			16QAM	1	0	1	22.6	22.6	18.50
				1	12	1	22.6	22.6	18.50
				1	24	1	22.5	22.5	18.50
				12	0	2	22.1	22.1	18.40
				12	6	2	22.1	22.1	18.40
				12	11	2	22.1	22.1	18.40
				25	0	2	22.0	22.0	18.30
	20625	846.5	QPSK	1	0	0	24.0	24.0	18.50
				1	12	0	24.0	24.0	18.50
				1	24	0	23.9	23.9	18.40
				12	0	1	23.3	23.3	18.30
				12	6	1	23.2	23.2	18.30
				12	11	1	23.1	23.1	18.40
				25	0	1	23.0	23.0	18.40
			16QAM	1	0	1	23.6	23.6	18.50
				1	12	1	23.4	23.4	18.40
				1	24	1	23.3	23.3	18.50
				12	0	2	22.0	22.0	18.40
				12	6	2	22.0	22.0	18.40
				12	11	2	22.0	22.0	18.30
				25	0	2	21.9	21.9	18.30

LTE Band 5 Measured Results (continued)

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)		
							Full Power	First Stage Pwr. Back-Off	Second Stage Pwr. Back-Off
3	20415	825.5	QPSK	1	0	0	23.9	23.9	18.50
				1	7	0	23.8	23.8	18.40
				1	14	0	23.7	23.7	18.30
				8	0	1	22.9	22.9	18.30
				8	4	1	22.8	22.8	18.20
				8	7	1	23.0	23.0	18.30
				15	0	1	22.8	22.8	18.30
			16QAM	1	0	1	23.3	23.3	18.40
				1	7	1	22.4	22.4	18.40
				1	14	1	22.3	22.3	18.30
				8	0	2	22.0	22.0	18.30
				8	4	2	21.9	21.9	18.30
				8	7	2	21.9	21.9	18.30
				15	0	2	21.9	21.9	18.30
	20525	836.5	QPSK	1	0	0	24.0	24.0	18.50
				1	7	0	24.0	24.0	18.50
				1	14	0	23.9	23.9	18.40
				8	0	1	23.0	23.0	18.30
				8	4	1	23.0	23.0	18.40
				8	7	1	23.0	23.0	18.40
				15	0	1	22.9	22.9	18.30
			16QAM	1	0	1	22.8	22.8	18.50
				1	7	1	22.6	22.6	18.40
				1	14	1	22.5	22.5	18.50
				8	0	2	22.2	22.2	18.50
				8	4	2	22.1	22.1	18.40
				8	7	2	22.1	22.1	18.40
				15	0	2	22.0	22.0	18.40
	20635	847.5	QPSK	1	0	0	24.0	24.0	18.50
				1	7	0	24.0	24.0	18.50
				1	14	0	23.9	23.9	18.40
				8	0	1	23.1	23.1	18.30
				8	4	1	23.1	23.1	18.30
				8	7	1	23.0	23.0	18.40
				15	0	1	23.0	23.0	18.40
			16QAM	1	0	1	22.7	22.7	18.40
				1	7	1	22.7	22.7	18.50
				1	14	1	22.6	22.6	18.50
				8	0	2	22.1	22.1	18.40
				8	4	2	22.1	22.1	18.40
				8	7	2	22.0	22.0	18.40
				15	0	2	22.0	22.0	18.30

LTE Band 5 Measured Results (continued)

BW (MHz)	Ch	Freq. (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Avg Pwr (dBm)		
							Full Power	First Stage Pwr. Back-Off	Second Stage Pwr. Back-Off
1.4	20407	824.7	QPSK	1	0	0	24.0	24.0	18.50
				1	2	0	24.0	24.0	18.40
				1	5	0	23.9	23.9	18.50
				3	0	0	23.9	23.9	18.40
				3	1	0	24.0	24.0	18.40
				3	2	0	23.9	23.9	18.40
				6	0	1	22.9	22.9	18.30
			16QAM	1	0	1	22.9	22.9	18.50
				1	2	1	22.9	22.9	18.40
				1	5	1	22.7	22.7	18.50
				3	0	1	22.9	22.9	18.30
				3	1	1	22.9	22.9	18.30
				3	2	1	22.9	22.9	18.30
				6	0	2	22.0	22.0	18.30
	20525	836.5	QPSK	1	0	0	24.0	24.0	18.40
				1	2	0	24.0	24.0	18.50
				1	5	0	24.0	24.0	18.40
				3	0	0	24.0	24.0	18.30
				3	1	0	24.0	24.0	18.50
				3	2	0	24.0	24.0	18.40
				6	0	1	23.0	23.0	18.40
			16QAM	1	0	1	22.9	22.9	18.40
				1	2	1	22.5	22.5	18.40
				1	5	1	22.6	22.6	18.50
				3	0	1	22.9	22.9	18.40
				3	1	1	22.9	22.9	18.40
				3	2	1	22.9	22.9	18.30
				6	0	2	22.2	22.2	18.30
	20643	848.3	QPSK	1	0	0	24.0	24.0	18.50
				1	2	0	23.9	23.9	18.40
				1	5	0	23.9	23.9	18.40
				3	0	0	23.9	23.9	18.40
				3	1	0	23.8	23.8	18.40
				3	2	0	23.8	23.8	18.40
				6	0	1	22.9	22.9	18.40
			16QAM	1	0	1	23.4	23.4	18.50
				1	2	1	23.1	23.1	18.50
				1	5	1	23.0	23.0	18.40
				3	0	1	23.0	23.0	18.40
				3	1	1	22.9	22.9	18.30
				3	2	1	22.8	22.8	18.40
				6	0	2	21.8	21.8	18.40

8.4. WiFi (2.4 GHz Band)

Required Test Channels per KDB 248227 D01

Mode	Band	GHz	Channel	"Default Test Channels"	
				802.11b	802.11g
802.11b/g	2.4 GHz	**2.412**	1#	√	∇
		2.437	6	√	∇
		2.462	11#	√	∇

Notes:
√ = "default test channels"
∇ = possible 802.11g channels with maximum average output ¼ dB ≥ the "default test channels"
= when output power is reduced for channel 1 and /or 11 to meet restricted band requirements the highest output channels closest to each of these channels should be tested.

Measured Results

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Avg Pwr (dBm)		SAR Test (Yes/No)
					WiFi 1	WiFi 2	
2.4 (DTS)	**802.11b**	**1 Tx**	**1**	**2412**	**16.0**	**16.0**	**Yes**
			6	**2437**	**16.0**	**16.0**	
			11	**2462**	**15.9**	**16.0**	
			12	**2467**	**15.0**	**15.0**	
			13	**2472**	**14.0**	**14.0**	
	802.11g	**1 Tx**	**1**	**2412**	**16.0**	**16.0**	**No**
			2	**2417**	**16.0**	**16.0**	
			6	**2437**	**16.0**	**16.0**	
			10	**2457**	**16.0**	**16.0**	
			11	**2462**	**16.0**	**15.0**	
			12	**2467**	**15.0**	**10.5**	
			13	**2472**	**2.8**	**3.0**	
	802.11g CDD	**2 Tx**	**1**	**2412**	**14.0**	**14.0**	**Yes**
			2	**2417**	**16.0**	**16.0**	
			6	**2437**	**16.0**	**16.0**	
			10	**2457**	**16.0**	**16.0**	
			11	**2462**	**13.5**	**13.5**	
			12	**2467**	**8.9**	**9.0**	
			13	**2472**	**1.2**	**1.5**	
	802.11n HT20	1 Tx	1	2412	16.0	16.0	No
			2	2422	16.0	16.0	
			6	2437	16.0	16.0	
			10	2457	16.0	16.0	
			11	2462	15.0	15.0	
			12	2467	10.5	10.4	
			13	2472	2.9	2.7	

Note(s):

1. Per KDB 248227 D01, SAR is not required for 802.11g/HT20 channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11b channels.
2. Additionally, SAR is not required for Channels 12 and 13 because the tune-up limit and the measured output power for these two channels are no greater than those for the default test channels.

WiFi 2.4 GHz Measured Results continued

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Avg Pwr (dBm)		SAR Test (Yes/No)
					WiFi 1	WiFi 2	
2.4 (DTS)	802.11n HT20 MCS 0 CDD	2 Tx	1	2412	14.0	14.0	No
			2	2417	16.0	16.0	
			6	2437	16.0	16.0	
			10	2457	16.0	16.0	
			11	2462	13.5	13.5	
			12	2467	8.8	8.9	
			13	2472	1.2	1.5	
	802.11n HT20 MCS 0 STBC	2 Tx	1	2412	14.0	14.0	No
			2	2417	16.0	15.9	
			6	2437	16.0	16.0	
			10	2457	16.0	15.9	
			11	2462	13.5	13.4	
			12	2467	8.8	9.0	
			13	2472	1.2	1.5	
	802.11n HT20 MCS 0 STBC	2 Tx	1	2412	14.0	14.0	No
			2	2417	16.0	15.9	
			6	2437	16.0	16.0	
			10	2457	16.0	15.9	
			11	2462	13.5	13.4	
			12	2467	8.8	9.0	
			13	2472	1.2	1.5	

Note(s):

1. Per KDB 248227 D01, SAR is not required for 802.11g/HT20 channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11b channels.
2. Additionally, SAR is not required for Channels 12 and 13 because the tune-up limit and the measured output power for these two channels are no greater than those for the default test channels.

8.5. WiFi (5 GHz Bands)

Required Test Channels per KDB 248227 D01

Mode		Band	GHz	Channel	"Default Test Channels"	
					802.11a	
802.11a	UNII (15.407)	5.2 GHz	5.180	36	√	
			5.200	40		*
			2.220	44		*
			5.240	48	√	
		5.3 GHz	5.260	52	√	
			5.280	56		*
			5.300	60		*
			5.320	64	√	
		5.5 GHz	5.500	100		
			5.520	104	√	
			5.540	108		*
			5.560	112		*
			5.580	116	√	
			5.600	120		*
			5.620	124	√	
			5.640	128		*
			5.660	132		*
			5.680	136	√	
			5.700	140		*
	DTS (15.247)	5.8 GHz	5.745	149	√	
			5.765	153		*
			5.785	157	√	
			5.805	161		*
			5.825	165	√	

√ = "default test channels"

* = possible 802.11a channels with maximum average output > the "default test channels"

= when output power is reduced for channel 1 and /or 11 to meet restricted band requirements the highest output channels closest to each of these channels should be tested.

WiFi 5 GHz Bands Measured Results

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Avg Pwr (dBm)		SAR Test (Yes/No)
					WiFi 1	WiFi 2	
5.2 (UNII)	**802.11a**	**1 Tx**	**36**	**5180**	**14.0**	**14.0**	**Yes**
			40	**5200**	**14.0**	**14.0**	
			44	**5220**	**14.0**	**14.0**	
			48	**5240**	**14.0**	**14.0**	
	802.11a CDD	**2 Tx**	**36**	**5180**	**10.5**	**10.5**	**Yes**
			40	**5200**	**10.5**	**10.5**	
			44	**5220**	**10.5**	**10.5**	
			48	**5240**	**10.5**	**10.5**	
	802.11n HT20	1 Tx	36	5180	14.0	14.0	No
			40	5200	14.0	14.0	
			48	5240	14.0	14.0	
	802.11n HT40	**1 Tx**	38	5180	13.5	13.5	No
			46	**5230**	**16.0**	**16.0**	**Yes**
	802.11n HT20 CDD	2 Tx	36	5180	10.5	10.4	No
			40	5200	10.5	10.4	
			48	5240	10.5	10.4	
	802.11n HT20 STBC	2 Tx	36	5180	11.0	10.8	No
			40	5200	11.0	10.9	
			48	5240	11.0	10.9	
	802.11n HT20 SDM	2 Tx	36	5180	11.0	11.0	No
			40	5200	11.0	10.9	
			48	5240	11.0	10.9	
	802.11n HT40 CDD	2 Tx	38	5190	11.5	11.5	No
			46	5230	13.0	13.0	
	802.11n HT40 STBC	**2 Tx**	**38**	**5190**	**11.5**	**11.4**	**Yes**
			46	**5230**	**13.5**	**13.5**	
	802.11n HT40 SDM	2 Tx	38	5190	11.5	11.5	No
			46	5230	13.5	13.5	
5.3 (UNII)	**802.11a**	**1 Tx**	**52**	**5260**	**16.5**	**16.5**	**Yes**
			56	**5280**	**16.5**	**16.5**	
			60	**5300**	**16.5**	**16.5**	
			64	**5320**	**15.0**	**15.0**	
	802.11a CDD	**2 Tx**	**52**	**5260**	**16.5**	**16.4**	**Yes**
			56	**5280**	**16.5**	**16.5**	
			60	**5300**	**16.5**	**16.3**	
			64	**5320**	**14.0**	**13.6**	
	802.11n HT20	1 Tx	52	5260	16.5	16.5	No
			60	5300	16.5	16.5	
			64	5320	15.0	15.0	
	802.11n HT40	1 Tx	54	5270	16.5	16.5	No
			62	5310	13.5	13.4	
	802.11n HT20 CDD	2 Tx	52	5260	16.5	16.4	No
			56	5280	16.5	16.4	
			60	5300	16.5	16.2	
			64	5320	14.0	13.4	
	802.11n HT20 STBC	2 Tx	52	5260	16.5	16.2	No
			56	5280	16.5	16.3	
			60	5300	16.5	16.2	
			64	5320	14.0	13.4	
	802.11n HT20 SDM	2 Tx	52	5260	16.5	16.2	No
			56	5280	16.5	16.3	
			60	5300	16.5	16.3	
			64	5320	14.0	13.5	
	802.11n HT40 CDD	2 Tx	54	5270	16.5	16.2	No
			62	5310	11.5	11.3	
	802.11n HT40 STBC	2 Tx	54	5270	16.5	16.2	No
			62	5310	11.5	11.2	
	802.11n HT40 SDM	2 Tx	54	5270	16.5	16.2	No
			62	5310	11.5	11.2	

Note(s):

Per KDB 248227, SAR is not required for 802.11n HT20/HT40 channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11a/b channels.

WiFi 5 GHz Bands Measured Results continued

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Avg Pwr (dBm)		SAR Test (Yes/No)
					WiFi 1	WiFi 2	
5.5 (UNII)	**802.11a**	**1 Tx**	**100**	**5500**	**15.0**	**15.0**	**Yes**
			104	**5520**	**16.5**	**16.5**	
			108	**5540**	**16.5**	**16.5**	
			112	**5560**	**16.5**	**16.5**	
			116	**5580**	**16.5**	**16.5**	
			120	**5600**	**16.5**	**16.5**	
			124	**5620**	**16.5**	**16.5**	
			128	**5640**	**16.5**	**16.5**	
			132	**5660**	**16.5**	**16.5**	
			136	**5680**	**16.5**	**16.5**	
			140	**5700**	**14.5**	**14.5**	
	802.11a CDD	**2 Tx**	**100**	**5500**	**14.0**	**13.8**	**Yes**
			104	**5520**	**16.0**	**16.0**	
			108	**5540**	**16.0**	**15.9**	
			112	**5560**	**16.0**	**16.0**	
			116	**5580**	**16.0**	**16.0**	
			120	**5600**	**16.0**	**15.9**	
			124	**5620**	**16.0**	**15.8**	
			128	**5640**	**16.0**	**16.0**	
			132	**5660**	**16.0**	**16.0**	
			136	**5680**	**16.0**	**15.8**	
			140	**5700**	**13.0**	**12.7**	
	802.11n HT20	1 Tx	100	5500	14.9	15.0	No
			104	5520	16.5	16.5	
			120	5600	16.5	16.4	
			136	5680	16.5	16.5	
			140	5700	14.5	14.4	
	802.11n HT40	1 Tx	102	5510	14.0	14.0	No
			110	5550	16.5	16.5	
			134	5670	16.0	16.0	
	802.11n HT20 CDD	2 Tx	100	5500	14.0	13.8	No
			104	5520	16.0	15.8	
			120	5600	16.0	15.9	
			136	5680	16.0	15.7	
			140	5700	13.0	12.6	
	802.11n HT20 STBC	**2 Tx**	100	5500	14.0	13.8	No
			104	**5520**	**16.5**	**16.4**	**Yes**
			120	**5600**	**16.5**	**16.4**	
			136	**5680**	**16.5**	**16.2**	
			140	5700	13.0	12.6	No
	802.11n HT20 SDM	2 Tx	100	5500	14.0	13.8	No
			104	5520	16.5	16.4	
			120	5600	16.5	16.4	
			136	5680	16.5	16.2	
			140	5700	13.0	12.6	
	802.11n HT40 CDD	2 Tx	102	5510	12.0	11.8	No
			110	5550	16.5	16.4	
			134	5670	15.5	15.1	
	802.11n HT40 STBC	2 Tx	102	5510	12.0	11.8	No
			110	5550	16.5	16.4	
			134	5670	15.5	15.1	
	802.11n HT40 SDM	2 Tx	102	5510	12.0	11.6	No
			110	5550	16.5	16.4	
			134	5670	15.5	15.2	

Note(s):

Per KDB 248227, SAR is not required for 802.11n HT20/HT40 channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11a/b channels.

WiFi 5 GHz Bands Measured Results continued

Band (GHz)	Mode	No. of Transmitters	Ch #	Freq. (MHz)	Avg Pwr (dBm)		SAR Test (Yes/No)
					WiFi 1	WiFi 2	
5.8 (DTS)	**802.11a**	**1 Tx**	**149**	**5745**	**15.9**	**16.0**	**Yes**
			153	**5765**	**16.0**	**16.0**	
			157	**5785**	**16.0**	**15.9**	
			161	**5805**	**16.0**	**16.0**	
			165	**5825**	**16.0**	**15.9**	
	802.11a CDD	**2 Tx**	**149**	**5745**	**16.0**	**15.9**	**Yes**
			153	**5765**	**16.0**	**15.9**	
			157	**5785**	**16.0**	**15.8**	
			161	**5805**	**16.0**	**15.9**	
			165	**5825**	**16.0**	**15.8**	
	802.11n HT20	1 Tx	149	5745	16.0	16.0	No
			157	5785	15.9	15.9	
			165	5825	15.9	16.0	
	802.11n HT40	1 Tx	151	5755	16.0	16.0	No
			159	5795	16.0	16.0	
	802.11n HT20 CDD	2 Tx	149	5745	16.0	15.7	No
			157	5785	16.0	15.7	
			165	5825	16.0	15.6	
	802.11n HT20 STBC	2 Tx	149	5745	16.0	15.7	No
			157	5785	16.0	15.7	
			165	5825	16.0	15.6	
	802.11n HT20 SDM	2 Tx	149	5745	16.0	15.5	No
			157	5785	16.0	15.6	
			165	5825	16.0	15.5	
	802.11n HT40 CDD	2 Tx	151	5755	16.0	15.7	No
			159	5795	16.0	15.5	
	802.11n HT40 STBC	2 Tx	151	5755	16.0	15.6	No
			159	5795	16.0	15.5	
	802.11n HT40 SDM	2 Tx	151	5755	16.0	15.6	No
			159	5795	16.0	15.5	

Note(s):

Per KDB 248227, SAR is not required for 802.11n HT20/HT40 channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11a/b channels.

8.6. Bluetooth

Band (GHz)	Mode	Ch #	Freq. (MHz)	Avg Pwr (dBm)	SAR Test (Yes/No)
				WiFi 1	
2.4	**V3.0 + EDR, GFSK**	**0**	**2402**	**13.0**	**Yes**
		39	**2441**	**13.0**	
		78	**2480**	**12.7**	
	V3.0 + EDR, π/4 DQPSK	0	2402	10.8	No
		39	2441	11.5	
		78	2480	11.2	
	V3.0 + EDR, 8-DPSK	0	2402	11.2	No
		39	2441	11.4	
		78	2480	11.0	
	V4.0 LE, GFSK	0	2402	7.3	No
		19	2440	7.5	
		39	2480	7.4	

9. RF Exposure Conditions

9.1. Standalone SAR Test Exclusion Considerations

Since the *Dedicated Host Approach* is applied, the standalone SAR test exclusion procedure in KDB 447498 § 4.3.1 is applied in conjunction with KDB 616217 § 4.3 to determine the minimum test separation distance:

- When the separation distance from the antenna to an adjacent edge is ≤ 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.
- When the separation distance from the antenna to an adjacent edge is > 5 mm, the actual antenna-to-edge separation distance is applied to determine SAR test exclusion.

Refer to Appendix for the specific details on the antenna-to-antenna and antenna-to-edge(s) distances used for test exclusion calculations.

9.1.1. SAR Test Exclusion Calculations for WWAN

Antennas < 50mm to adjacent edges

Antenna	Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Calculated Threshold Value					
			dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
Full Power, Proximity Sensor Off. A sensor triggering of 16 mm is included for both Rear and Edge 1																
Cellular	GPRS 2 Slots	848.8	32.50	445	17.4	18.4	24.8	227.8	98.6		24.1 -MEASURE-	22.8 -MEASURE-	16.4 -MEASURE-	> 50 mm	> 50 mm	
Cellular	GPRS 2 Slots	1850.2	29.00	199	17.4	18.4	24.8	227.8	98.6		15.9 -MEASURE-	15 -MEASURE-	10.8 -MEASURE-	> 50 mm	> 50 mm	
Cellular	W-CDMA 5	846.6	24.50	282	17.4	18.4	24.8	227.8	98.6		15.3 -MEASURE-	14.4 -MEASURE-	10.4 -MEASURE-	> 50 mm	> 50 mm	
Cellular	W-CDMA 2	1907.6	22.30	170	17.4	18.4	24.8	227.8	98.6		13.8 -MEASURE-	13 -MEASURE-	9.4 -MEASURE-	> 50 mm	> 50 mm	
Cellular	LTE Band 2	1900	22.30	170	17.4	18.4	24.8	227.8	98.6		13.8 -MEASURE-	13 -MEASURE-	9.4 -MEASURE-	> 50 mm	> 50 mm	
Cellular	LTE Band 5	844	24.00	251	17.4	18.4	24.8	227.8	98.6		13.6 -MEASURE-	12.8 -MEASURE-	9.2 -MEASURE-	> 50 mm	> 50 mm	

Antenna	Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Calculated Threshold Value					
			dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
Second Stage Power Back-off, Proximity Sensor On (C2, t2, P2)																
Cellular	GPRS 2 Slots	848.8	26.00	100	5	5					18.4 -MEASURE-	18.4 -MEASURE-				
Cellular	GPRS 2 Slots	1850.2	19.75	24	5	5					6.5 -MEASURE-	6.5 -MEASURE-				
Cellular	W-CDMA 5	846.6	18.50	71	5	5					13.1 -MEASURE-	13.1 -MEASURE-				
Cellular	W-CDMA 2	1907.6	13.25	21	5	5					5.8 -MEASURE-	5.8 -MEASURE-				
Cellular	LTE Band 2	1900	13.00	20	5	5					5.5 -MEASURE-	5.5 -MEASURE-				
Cellular	LTE Band 5	844	18.50	71	5	5					13 -MEASURE-	13 -MEASURE-				

Note(s):

1. According to KDB 447498, if the calculated threshold value is >3 then SAR testing is required.

Antennas > 50mm to adjacent edges

Antenna	Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Calculated Threshold Value					
			dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
Full Power, Proximity Sensor Off. A sensor triggering of 16 mm is included for both Rear and Edge 1																
Cellular	GPRS 2 Slots	848.8	32.50	445	17.4	18.4	24.8	227.8	98.6		< 50 mm	< 50 mm	< 50 mm	1168.9 mW -EXEMPT-	437.8 mW -MEASURE-	
Cellular	GPRS 2 Slots	1850.2	29.00	199	17.4	18.4	24.8	227.8	98.6		< 50 mm	< 50 mm	< 50 mm	1888.3 mW -EXEMPT-	596.3 mW -EXEMPT-	
Cellular	W-CDMA 5	846.6	24.50	282	17.4	18.4	24.8	227.8	98.6		< 50 mm	< 50 mm	< 50 mm	1166.5 mW -EXEMPT-	437.3 mW -EXEMPT-	
Cellular	W-CDMA 2	1907.6	22.30	170	17.4	18.4	24.8	227.8	98.6		< 50 mm	< 50 mm	< 50 mm	1886.6 mW -EXEMPT-	594.6 mW -EXEMPT-	
Cellular	LTE Band 2	1900	22.30	170	17.4	18.4	24.8	227.8	98.6		< 50 mm	< 50 mm	< 50 mm	1886.8 mW -EXEMPT-	594.8 mW -EXEMPT-	
Cellular	LTE Band 5	844	24.00	251	17.4	18.4	24.8	227.8	98.6		< 50 mm	< 50 mm	< 50 mm	1163.7 mW -EXEMPT-	436.7 mW -EXEMPT-	

Note(s):

1. According to KDB 447498, if the calculated Power threshold is less than the output power then SAR testing is required.

9.1.2. SAR Test Exclusion Calculations for WiFi SISO (1 Tx) and BT Transmit Conditions

Antennas < 50mm to adjacent edges

Antenna	Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Calculated Threshold Value					
			dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
WiFi 1 / Bluetooth																
WiFi 1	Wi-Fi 2.4 GHz	2462	16.00	40	6.3	227.6	137.7	5	11		10.5 -MEASURE-	*> 50 mm*	*> 50 mm*	12.6 -MEASURE-	5.7 -MEASURE-	
WiFi 1	Wi-Fi 5.2 GHz	5230	14.00	25	6.3	227.6	137.7	5	11		9.5 -MEASURE-	*> 50 mm*	*> 50 mm*	11.4 -MEASURE-	5.2 -MEASURE-	
WiFi 1	Wi-Fi 5.3 GHz	5300	16.50	45	6.3	227.6	137.7	5	11		17.3 -MEASURE-	*> 50 mm*	*> 50 mm*	20.7 -MEASURE-	9.4 -MEASURE-	
WiFi 1	Wi-Fi 5.5 GHz	5680	16.50	45	6.3	227.6	137.7	5	11		17.9 -MEASURE-	*> 50 mm*	*> 50 mm*	21.4 -MEASURE-	9.7 -MEASURE-	
WiFi 1	Wi-Fi 5.8 GHz	5825	16.00	40	6.3	227.6	137.7	5	11		16.1 -MEASURE-	*> 50 mm*	*> 50 mm*	19.3 -MEASURE-	8.8 -MEASURE-	
WiFi 1	Bluetooth	2441	13.00	20	6.3	227.6	137.7	5	11		5.2 -MEASURE-	*> 50 mm*	*> 50 mm*	6.2 -MEASURE-	3 -EXEMPT-	
WiFi 2																
WiFi 2	Wi-Fi 2.4 GHz	2462	16.00	40	6.3	227.6	12	5	135.4		10.5 -MEASURE-	*> 50 mm*	5.2 -MEASURE-	12.6 -MEASURE-	*> 50 mm*	
WiFi 2	Wi-Fi 5.2 GHz	5230	14.00	25	6.3	227.6	12	5	135.4		9.5 -MEASURE-	*> 50 mm*	4.8 -MEASURE-	11.4 -MEASURE-	*> 50 mm*	
WiFi 2	Wi-Fi 5.3 GHz	5300	16.50	45	6.3	227.6	12	5	135.4		17.3 -MEASURE-	*> 50 mm*	8.6 -MEASURE-	20.7 -MEASURE-	*> 50 mm*	
WiFi 2	Wi-Fi 5.5 GHz	5680	16.50	45	6.3	227.6	12	5	135.4		17.9 -MEASURE-	*> 50 mm*	8.9 -MEASURE-	21.4 -MEASURE-	*> 50 mm*	
WiFi 2	Wi-Fi 5.8 GHz	5825	16.00	40	6.3	227.6	12	5	135.4		16.1 -MEASURE-	*> 50 mm*	8 -MEASURE-	19.3 -MEASURE-	*> 50 mm*	

Antennas > 50mm to adjacent edges

Antenna	Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Calculated Threshold Value					
			dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
WiFi 1 / Bluetooth																
WiFi 1	Wi-Fi 2.4 GHz	2462	16.00	40	6.3	227.6	137.7	5	11		< 50 mm	1871.6 mW -EXEMPT-	972.6 mW -EXEMPT-	< 50 mm	< 50 mm	
WiFi 1	Wi-Fi 5.2 GHz	5230	14.00	25	6.3	227.6	137.7	5	11		< 50 mm	1841.6 mW -EXEMPT-	942.6 mW -EXEMPT-	< 50 mm	< 50 mm	
WiFi 1	Wi-Fi 5.3 GHz	5300	16.50	45	6.3	227.6	137.7	5	11		< 50 mm	1841.2 mW -EXEMPT-	942.2 mW -EXEMPT-	< 50 mm	< 50 mm	
WiFi 1	Wi-Fi 5.5 GHz	5680	16.50	45	6.3	227.6	137.7	5	11		< 50 mm	1838.9 mW -EXEMPT-	939.9 mW -EXEMPT-	< 50 mm	< 50 mm	
WiFi 1	Wi-Fi 5.8 GHz	5825	16.00	40	6.3	227.6	137.7	5	11		< 50 mm	1838.2 mW -EXEMPT-	939.2 mW -EXEMPT-	< 50 mm	< 50 mm	
WiFi 1	Bluetooth	2441	13.00	20	6.3	227.6	137.7	5	11		< 50 mm	1872 mW -EXEMPT-	973 mW -EXEMPT-	< 50 mm	< 50 mm	
WiFi 2																
WiFi 2	Wi-Fi 2.4 GHz	2462	16.00	40	6.3	227.6	12	5	135.4		< 50 mm	1871.6 mW -EXEMPT-	< 50 mm	< 50 mm	949.6 mW -EXEMPT-	
WiFi 2	Wi-Fi 5.2 GHz	5230	14.00	25	6.3	227.6	12	5	135.4		< 50 mm	1841.6 mW -EXEMPT-	< 50 mm	< 50 mm	919.6 mW -EXEMPT-	
WiFi 2	Wi-Fi 5.3 GHz	5300	16.50	45	6.3	227.6	12	5	135.4		< 50 mm	1841.2 mW -EXEMPT-	< 50 mm	< 50 mm	919.2 mW -EXEMPT-	
WiFi 2	Wi-Fi 5.5 GHz	5680	16.50	45	6.3	227.6	12	5	135.4		< 50 mm	1838.9 mW -EXEMPT-	< 50 mm	< 50 mm	916.9 mW -EXEMPT-	
WiFi 2	Wi-Fi 5.8 GHz	5825	16.00	40	6.3	227.6	12	5	135.4		< 50 mm	1838.2 mW -EXEMPT-	< 50 mm	< 50 mm	916.2 mW -EXEMPT-	

Note(s):

1. According to KDB 447498, if the calculated Power threshold is less than the output power then SAR testing is required.

9.1.3. SAR Test Exclusion Calculations for WiFi MIMO (2 Tx) Transmit Conditions

Antennas < 50mm to adjacent edges

Antenna	Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Calculated Threshold Value					
			dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
WiFi 1																
WiFi 1	Wi-Fi 2.4 GHz	2457	16.00	40	6.3	227.6	137.7	5	11		10.4 -MEASURE-	*> 50 mm*	*> 50 mm*	12.5 -MEASURE-	5.7 -MEASURE-	
WiFi 1	Wi-Fi 5.2 GHz	5230	13.50	22	6.3	227.6	137.7	5	11		8.4 -MEASURE-	*> 50 mm*	*> 50 mm*	10.1 -MEASURE-	4.6 -MEASURE-	
WiFi 1	Wi-Fi 5.3 GHz	5300	16.50	45	6.3	227.6	137.7	5	11		17.3 -MEASURE-	*> 50 mm*	*> 50 mm*	20.7 -MEASURE-	9.4 -MEASURE-	
WiFi 1	Wi-Fi 5.5 GHz	5680	16.50	45	6.3	227.6	137.7	5	11		17.9 -MEASURE-	*> 50 mm*	*> 50 mm*	21.4 -MEASURE-	9.7 -MEASURE-	
WiFi 1	Wi-Fi 5.8 GHz	5825	16.00	40	6.3	227.6	137.7	5	11		16.1 -MEASURE-	*> 50 mm*	*> 50 mm*	19.3 -MEASURE-	8.8 -MEASURE-	
WiFi 2																
WiFi 2	Wi-Fi 2.4 GHz	2457	16.00	40	6.3	227.6	12	5	135.4		10.4 -MEASURE-	*> 50 mm*	5.2 -MEASURE-	12.5 -MEASURE-	*> 50 mm*	
WiFi 2	Wi-Fi 5.2 GHz	5230	13.50	22	6.3	227.6	12	5	135.4		8.4 -MEASURE-	*> 50 mm*	4.2 -MEASURE-	10.1 -MEASURE-	*> 50 mm*	
WiFi 2	Wi-Fi 5.3 GHz	5300	16.50	45	6.3	227.6	12	5	135.4		17.3 -MEASURE-	*> 50 mm*	8.6 -MEASURE-	20.7 -MEASURE-	*> 50 mm*	
WiFi 2	Wi-Fi 5.5 GHz	5680	16.00	40	6.3	227.6	12	5	135.4		15.9 -MEASURE-	*> 50 mm*	7.9 -MEASURE-	19.1 -MEASURE-	*> 50 mm*	
WiFi 2	Wi-Fi 5.8 GHz	5825	16.00	40	6.3	227.6	12	5	135.4		16.1 -MEASURE-	*> 50 mm*	8 -MEASURE-	19.3 -MEASURE-	*> 50 mm*	

Antennas > 50mm to adjacent edges

Antenna	Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Calculated Threshold Value					
			dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
WiFi 1																
WiFi 1	Wi-Fi 2.4 GHz	2457	16.00	40	6.3	227.6	137.7	5	11		< 50 mm	1871.7 mW -EXEMPT-	972.7 mW -EXEMPT-	< 50 mm	< 50 mm	
WiFi 1	Wi-Fi 5.2 GHz	5230	13.50	22	6.3	227.6	137.7	5	11		< 50 mm	1841.6 mW -EXEMPT-	942.6 mW -EXEMPT-	< 50 mm	< 50 mm	
WiFi 1	Wi-Fi 5.3 GHz	5300	16.50	45	6.3	227.6	137.7	5	11		< 50 mm	1841.2 mW -EXEMPT-	942.2 mW -EXEMPT-	< 50 mm	< 50 mm	
WiFi 1	Wi-Fi 5.5 GHz	5680	16.50	45	6.3	227.6	137.7	5	11		< 50 mm	1838.9 mW -EXEMPT-	939.9 mW -EXEMPT-	< 50 mm	< 50 mm	
WiFi 1	Wi-Fi 5.8 GHz	5825	16.00	40	6.3	227.6	137.7	5	11		< 50 mm	1838.2 mW -EXEMPT-	939.2 mW -EXEMPT-	< 50 mm	< 50 mm	
WiFi 2																
WiFi 2	Wi-Fi 2.4 GHz	2457	16.00	40	6.3	227.6	12	5	135.4		< 50 mm	1871.7 mW -EXEMPT-	< 50 mm	< 50 mm	949.7 mW -EXEMPT-	
WiFi 2	Wi-Fi 5.2 GHz	5230	13.50	22	6.3	227.6	12	5	135.4		< 50 mm	1841.6 mW -EXEMPT-	< 50 mm	< 50 mm	919.6 mW -EXEMPT-	
WiFi 2	Wi-Fi 5.3 GHz	5300	16.50	45	6.3	227.6	12	5	135.4		< 50 mm	1841.2 mW -EXEMPT-	< 50 mm	< 50 mm	919.2 mW -EXEMPT-	
WiFi 2	Wi-Fi 5.5 GHz	5680	16.00	40	6.3	227.6	12	5	135.4		< 50 mm	1838.9 mW -EXEMPT-	< 50 mm	< 50 mm	916.9 mW -EXEMPT-	
WiFi 2	Wi-Fi 5.8 GHz	5825	16.00	40	6.3	227.6	12	5	135.4		< 50 mm	1838.2 mW -EXEMPT-	< 50 mm	< 50 mm	916.2 mW -EXEMPT-	

Note(s):

1. According to KDB 447498, if the calculated Power threshold is less than the output power then SAR testing is required.

9.2. Required Test Configurations

The table below identifies the standalone test configurations required for this device according to the findings in Section 9.1:

For WWAN

Test Configurations	Rear	Edge 1 (Top Edge)	Edge 2 (Right Edge)	Edge 3[1] (Bottom Edge)	Edge 4 (Left Edge)
GSM850 Prox. Off	Yes	Yes	Yes	No	Yes
GSM850 Prox. On	Yes	Yes	No	No	No
GSM1900 Prox. Off	Yes	Yes	Yes	No	No
GSM1900 Prox. On	Yes	Yes	No	No	No
W-CDMA Band 2 Prox. Off	Yes	Yes	Yes	No	No
W-CDMA Band 2 Prox. On	Yes	Yes	No	No	No
W-CDMA Band 5 Prox. Off	Yes	Yes	Yes	No	No
W-CDMA Band 5 Prox. On	Yes	Yes	No	No	No
LTE Band 2 Prox. Off	Yes	Yes	Yes	No	No
LTE Band 2 Prox. On	Yes	Yes	No	No	No
LTE Band 5 Prox. Off	Yes	Yes	Yes	No	No
LTE Band 5 Prox. On	Yes	Yes	No	No	No

Note(s):

1. Yes = Testing is required.
2. No = Testing is not required.

For WiFi

Test Configurations	Rear	Edge 1 (Top Edge)	Edge 2 (Right Edge)	Edge 3 (Bottom Edge)	Edge 4 (Left Edge)
WiFi1 802.11a/b/g/n SISO	Yes	No	No	Yes	Yes
WiFi2 802.11a/b/g/n SISO	Yes	No	Yes	Yes	No
WiFi1 802.11a/b/g/n MIMO	Yes	No	No	Yes	Yes
WiFi2 802.11a/b/g/n MIMO	Yes	No	Yes	Yes	No
WiFi1 Bluetooth	Yes	No	No[3]	Yes	No

Note(s):

1. Yes = Testing is required.
2. No = Testing is not required.
3. Though Bluetooth qualifies for test exclusion at Edge 2, SAR was measured at this edge as the corresponding SAR estimation value was overly conservative.

10. Tissue Dielectric Properties

IEEE Std 1528-2013

Target Frequency (MHz)	Head	
	ε_r	σ (S/m)
300	45.3	0.87
450	43.5	0.87
750	41.9	0.89
835	41.5	0.90
900	41.5	0.97
1450	40.5	1.20
1500	40.4	1.23
1640	40.2	1.31
1750	40.1	1.37
1800	40.0	1.40
1900	40.0	1.40
2000	40.0	1.40
2100	39.8	1.49
2300	39.5	1.67
2450	39.2	1.80
2600	39.0	1.96
3000	38.5	2.40
3500	37.9	2.91
4000	37.4	3.43
4500	36.8	3.94
5000	36.2	4.45
5200	36.0	4.66
5400	35.8	4.86
5600	35.5	5.07
5800	35.3	5.27
600	35.1	5.48

NOTE—For convenience, permittivity and conductivity values at some frequencies that are not part of the original data from Drossos et al. [B60] or the extension to 5800 MHz are provided (i.e., the values shown in italics). These values were linearly interpolated between the values in this table that are immediately above and below these values, except the values at 6000 MHz that were linearly extrapolated from the values at 3000 MHz and 5800 MHz.

FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r01

Target Frequency (MHz)	Head		Body	
	ε_r	σ (S/m)	ε_r	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800 – 2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5000	36.2	4.45	49.3	5.07
5100	36.1	4.55	49.1	5.18
5200	36.0	4.66	49.0	5.30
5300	35.9	4.76	48.9	5.42
5400	35.8	4.86	48.7	5.53
5500	35.6	4.96	48.6	5.65
5600	35.5	5.07	48.5	5.77
5700	35.4	5.17	48.3	5.88
5800	35.3	5.27	48.2	6.00

10.1. Composition of Ingredients for the Tissue Material Used in the SAR Tests

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Ingredients (% by weight)	Frequency (MHz)									
	450		835		915		1900		2450	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	38.56	51.16	41.45	52.4	41.05	56.0	54.9	40.4	62.7	73.2
Salt (NaCl)	3.95	1.49	1.45	1.4	1.35	0.76	0.18	0.5	0.5	0.04
Sugar	56.32	46.78	56.0	45.0	56.5	41.76	0.0	58.0	0.0	0.0
HEC	0.98	0.52	1.0	1.0	1.0	1.21	0.0	1.0	0.0	0.0
Bactericide	0.19	0.05	0.1	0.1	0.1	0.27	0.0	0.1	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.8	0.0
DGBE	0.0	0.0	0.0	0.0	0.0	0.0	44.92	0.0	0.0	26.7
Dielectric Constant	43.42	58.0	42.54	56.1	42.0	56.8	39.9	54.0	39.8	52.5
Conductivity (S/m)	0.85	0.83	0.91	0.95	1.0	1.07	1.42	1.45	1.88	1.78

Salt: 99+% Pure Sodium Chloride Sugar: 98+% Pure Sucrose
Water: De-ionized, 16 MΩ+ resistivity HEC: Hydroxyethyl Cellulose
DGBE: 99+% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]
Triton X-100 (ultra pure): Polyethylene glycol mono [4-(1,1, 3, 3-tetramethylbutyl)phenyl]ether

MSL/HSL750 (Body and Head liquids for 700 – 800 MHz)

Item	Head Tissue Simulation Liquids HSL750 Muscle (body) Tissue Simulation Liquids MSL750
Type No	SL AAH 075
Manufacturer	SPEAG
The item is composed of the following ingredients:	
H^2O	Water, 35 – 58%
Sucrese	Sugar, white, refined, 40-60%
NaCl	Sodium Chloride, 0-6%
Hydroxyethel-cellulsoe	Medium Viscosity (CAS# 9004-62-0), <0.3%
Preventol-D7	Preservative: aqueous preparation, (CAS# 55965-84-9), containing 5-chloro-2-methyl-3(2H)-isothiazolone and 2-methyyl-3(2H)-isothiazolone, 0.1-0.7%

MSL/HSL1750 (Body and Head liquids for 1700 – 1800 MHz)

Item	Head Tissue Simulation Liquids HSL1750 Muscle (body) Tissue Simulation Liquids MSL1750
Type No	SL AAM 175
Manufacturer	SPEAG
-The item is composed of the following ingredients:	
H^2O	Water, 52 – 75%
C8H18O3	Diethylene glycol monobutyl ether (DGBE), 25-48%
NaCl	Sodium Chloride, <1.0%

Simulating Liquids for 5 GHz, Manufactured by SPEAG

Ingredients	(% by weight)
Water	78
Mineral oil	11
Emulsifiers	9
Additives and Salt	2

10.2. Tissue Dielectric Parameter Check Results

The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within ± 2°C of the temperature when the tissue parameters are characterized.

The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements. The parameters should be re-measured after each 3 – 4 days of use; or earlier if the dielectric parameters can become out of tolerance; for example, when the parameters are marginal at the beginning of the measurement series.

Tissue dielectric parameters were measured at the low, middle and high frequency of each operating frequency range of the test device.

SAR Lab A

Date Tested	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
1/2/2014	Body 2450	e'	50.9100	Relative Permittivity (ε_r):	50.91	52.70	-3.40	5
		e''	14.1200	Conductivity (σ):	1.92	1.95	-1.36	5
	Body 2410	e'	51.0300	Relative Permittivity (ε_r):	51.03	52.76	-3.28	5
		e''	13.9600	Conductivity (σ):	1.87	1.91	-1.93	5
	Body 2475	e'	50.8200	Relative Permittivity (ε_r):	50.82	52.67	-3.51	5
		e''	14.2200	Conductivity (σ):	1.96	1.99	-1.42	5
1/6/2014	Body 2450	e'	50.5900	Relative Permittivity (ε_r):	50.59	52.70	-4.00	5
		e''	13.8100	Conductivity (σ):	1.88	1.95	-3.52	5
	Body 2410	e'	50.7300	Relative Permittivity (ε_r):	50.73	52.76	-3.85	5
		e''	13.6300	Conductivity (σ):	1.83	1.91	-4.25	5
	Body 2475	e'	50.5000	Relative Permittivity (ε_r):	50.50	52.67	-4.12	5
		e''	13.9200	Conductivity (σ):	1.92	1.99	-3.50	5
1/9/2014	Body 2450	e'	51.1600	Relative Permittivity (ε_r):	51.16	52.70	-2.92	5
		e''	13.8900	Conductivity (σ):	1.89	1.95	-2.96	5
	Body 2410	e'	51.2600	Relative Permittivity (ε_r):	51.26	52.76	-2.84	5
		e''	13.6900	Conductivity (σ):	1.83	1.91	-3.83	5
	Body 2475	e'	51.0500	Relative Permittivity (ε_r):	51.05	52.67	-3.07	5
		e''	13.9600	Conductivity (σ):	1.92	1.99	-3.22	5
1/13/2014	Body 2450	e'	50.4300	Relative Permittivity (ε_r):	50.43	52.70	-4.31	5
		e''	13.8900	Conductivity (σ):	1.89	1.95	-2.96	5
	Body 2410	e'	50.5200	Relative Permittivity (ε_r):	50.52	52.76	-4.24	5
		e''	13.7700	Conductivity (σ):	1.85	1.91	-3.26	5
	Body 2475	e'	50.3100	Relative Permittivity (ε_r):	50.31	52.67	-4.48	5
		e''	13.9400	Conductivity (σ):	1.92	1.99	-3.36	5
1/14/2014	Body 2450	e'	52.2300	Relative Permittivity (ε_r):	52.23	52.70	-0.89	5
		e''	14.5100	Conductivity (σ):	1.98	1.95	1.37	5
	Body 2410	e'	52.3900	Relative Permittivity (ε_r):	52.39	52.76	-0.70	5
		e''	14.3400	Conductivity (σ):	1.92	1.91	0.74	5
	Body 2475	e'	52.1500	Relative Permittivity (ε_r):	52.15	52.67	-0.98	5
		e''	14.6100	Conductivity (σ):	2.01	1.99	1.28	5
1/16/2014	Body 2450	e'	50.6800	Relative Permittivity (ε_r):	50.68	52.70	-3.83	5
		e''	14.4400	Conductivity (σ):	1.97	1.95	0.88	5
	Body 2410	e'	50.7600	Relative Permittivity (ε_r):	50.76	52.76	-3.79	5
		e''	14.2700	Conductivity (σ):	1.91	1.91	0.25	5
	Body 2475	e'	50.5200	Relative Permittivity (ε_r):	50.52	52.67	-4.08	5
		e''	14.4500	Conductivity (σ):	1.99	1.99	0.17	5
1/21/2014	Body 2450	e'	50.9700	Relative Permittivity (ε_r):	50.97	52.70	-3.28	5
		e''	14.5300	Conductivity (σ):	1.98	1.95	1.51	5
	Body 2410	e'	51.1400	Relative Permittivity (ε_r):	51.14	52.76	-3.07	5
		e''	14.4000	Conductivity (σ):	1.93	1.91	1.16	5
	Body 2475	e'	50.8700	Relative Permittivity (ε_r):	50.87	52.67	-3.41	5
		e''	14.6600	Conductivity (σ):	2.02	1.99	1.63	5

Tissue Dielectric Parameter Check Results (continued)
SAR Lab B

Date Tested	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
1/2/2014	Body 5180	e'	49.9500	Relative Permittivity (ϵ_r):	49.95	49.05	1.84	5
		e''	17.9400	Conductivity (σ):	5.17	5.27	-1.98	5
	Body 5200	e'	49.9400	Relative Permittivity (ϵ_r):	49.94	49.02	1.88	5
		e''	17.9300	Conductivity (σ):	5.18	5.29	-2.09	5
	Body 5600	e'	49.4100	Relative Permittivity (ϵ_r):	49.41	48.48	1.92	5
		e''	18.4500	Conductivity (σ):	5.74	5.76	-0.28	5
	Body 5800	e'	49.1200	Relative Permittivity (ϵ_r):	49.12	48.20	1.91	5
		e''	18.6900	Conductivity (σ):	6.03	6.00	0.46	5
	Body 5825	e'	49.0900	Relative Permittivity (ϵ_r):	49.09	48.20	1.85	5
		e''	18.7400	Conductivity (σ):	6.07	6.00	1.16	5
1/6/2014	Body 5180	e'	48.4600	Relative Permittivity (ϵ_r):	48.46	49.05	-1.20	5
		e''	18.3100	Conductivity (σ):	5.27	5.27	0.04	5
	Body 5200	e'	48.4900	Relative Permittivity (ϵ_r):	48.49	49.02	-1.08	5
		e''	18.4000	Conductivity (σ):	5.32	5.29	0.48	5
	Body 5600	e'	48.0700	Relative Permittivity (ϵ_r):	48.07	48.48	-0.84	5
		e''	18.7400	Conductivity (σ):	5.84	5.76	1.29	5
	Body 5800	e'	47.7600	Relative Permittivity (ϵ_r):	47.76	48.20	-0.91	5
		e''	18.9300	Conductivity (σ):	6.10	6.00	1.75	5
	Body 5825	e'	47.7400	Relative Permittivity (ϵ_r):	47.74	48.20	-0.95	5
		e''	19.0000	Conductivity (σ):	6.15	6.00	2.56	5
1/9/2014	Body 5180	e'	49.1000	Relative Permittivity (ϵ_r):	49.10	49.05	0.11	5
		e''	18.5500	Conductivity (σ):	5.34	5.27	1.36	5
	Body 5200	e'	49.1900	Relative Permittivity (ϵ_r):	49.19	49.02	0.35	5
		e''	18.6800	Conductivity (σ):	5.40	5.29	2.01	5
	Body 5600	e'	48.6200	Relative Permittivity (ϵ_r):	48.62	48.48	0.29	5
		e''	19.0300	Conductivity (σ):	5.93	5.76	2.86	5
	Body 5800	e'	48.3000	Relative Permittivity (ϵ_r):	48.30	48.20	0.21	5
		e''	19.2200	Conductivity (σ):	6.20	6.00	3.31	5
	Body 5825	e'	48.3600	Relative Permittivity (ϵ_r):	48.36	48.20	0.33	5
		e''	19.3300	Conductivity (σ):	6.26	6.00	4.35	5
1/16/2014	Body 835	e'	53.8000	Relative Permittivity (ϵ_r):	53.80	55.20	-2.54	5
		e''	20.1800	Conductivity (σ):	0.94	0.97	-3.41	5
	Body 820	e'	53.9300	Relative Permittivity (ϵ_r):	53.93	55.28	-2.44	5
		e''	20.2700	Conductivity (σ):	0.92	0.97	-4.57	5
	Body 850	e'	53.7000	Relative Permittivity (ϵ_r):	53.70	55.16	-2.64	5
		e''	20.1200	Conductivity (σ):	0.95	0.99	-3.67	5
1/21/2014	Body 835	e'	54.4300	Relative Permittivity (ϵ_r):	54.43	55.20	-1.39	5
		e''	21.7400	Conductivity (σ):	1.01	0.97	4.06	5
	Body 820	e'	54.6000	Relative Permittivity (ϵ_r):	54.60	55.28	-1.22	5
		e''	21.8300	Conductivity (σ):	1.00	0.97	2.77	5
	Body 850	e'	54.2900	Relative Permittivity (ϵ_r):	54.29	55.16	-1.57	5
		e''	21.7100	Conductivity (σ):	1.03	0.99	3.94	5

Tissue Dielectric Parameter Check Results (continued)
SAR Lab C

Date Tested	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
1/13/2014	Body 1900	e'	53.0300	Relative Permittivity (ϵ_r):	53.03	53.30	-0.51	5
		e''	14.4800	Conductivity (σ):	1.53	1.52	0.64	5
	Body 1850	e'	53.1300	Relative Permittivity (ϵ_r):	53.13	53.30	-0.32	5
		e''	14.3600	Conductivity (σ):	1.48	1.52	-2.82	5
	Body 1910	e'	53.0200	Relative Permittivity (ϵ_r):	53.02	53.30	-0.53	5
		e''	14.4700	Conductivity (σ):	1.54	1.52	1.10	5
1/15/2014	Body 835	e'	53.0700	Relative Permittivity (ϵ_r):	53.07	55.20	-3.86	5
		e''	21.5400	Conductivity (σ):	1.00	0.97	3.10	5
	Body 820	e'	53.2800	Relative Permittivity (ϵ_r):	53.28	55.28	-3.61	5
		e''	21.5700	Conductivity (σ):	0.98	0.97	1.55	5
	Body 850	e'	52.8900	Relative Permittivity (ϵ_r):	52.89	55.16	-4.11	5
		e''	21.4900	Conductivity (σ):	1.02	0.99	2.89	5

Tissue Dielectric Parameter Check Results (continued)
SAR Lab D

Date Tested	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
1/2/2014	Body 5180	e'	48.1600	Relative Permittivity (ϵ_r):	48.16	49.05	-1.81	5
		e''	17.8500	Conductivity (σ):	5.14	5.27	-2.47	5
	Body 5200	e'	48.1600	Relative Permittivity (ϵ_r):	48.16	49.02	-1.75	5
		e''	17.9100	Conductivity (σ):	5.18	5.29	-2.20	5
	Body 5600	e'	47.5800	Relative Permittivity (ϵ_r):	47.58	48.48	-1.85	5
		e''	18.2900	Conductivity (σ):	5.70	5.76	-1.14	5
	Body 5800	e'	47.3100	Relative Permittivity (ϵ_r):	47.31	48.20	-1.85	5
		e''	18.4900	Conductivity (σ):	5.96	6.00	-0.62	5
	Body 5825	e'	47.2500	Relative Permittivity (ϵ_r):	47.25	48.20	-1.97	5
		e''	18.5400	Conductivity (σ):	6.00	6.00	0.08	5
1/6/2014	Body 5180	e'	49.2500	Relative Permittivity (ϵ_r):	49.25	49.05	0.41	5
		e''	17.8400	Conductivity (σ):	5.14	5.27	-2.52	5
	Body 5200	e'	49.3000	Relative Permittivity (ϵ_r):	49.30	49.02	0.57	5
		e''	17.9100	Conductivity (σ):	5.18	5.29	-2.20	5
	Body 5600	e'	48.6600	Relative Permittivity (ϵ_r):	48.66	48.48	0.38	5
		e''	18.3300	Conductivity (σ):	5.71	5.76	-0.93	5
	Body 5800	e'	48.3700	Relative Permittivity (ϵ_r):	48.37	48.20	0.35	5
		e''	18.5700	Conductivity (σ):	5.99	6.00	-0.19	5
	Body 5825	e'	48.3500	Relative Permittivity (ϵ_r):	48.35	48.20	0.31	5
		e''	18.6300	Conductivity (σ):	6.03	6.00	0.57	5
1/9/2014	Body 5180	e'	49.3600	Relative Permittivity (ϵ_r):	49.36	49.05	0.64	5
		e''	17.7300	Conductivity (σ):	5.11	5.27	-3.12	5
	Body 5200	e'	49.4500	Relative Permittivity (ϵ_r):	49.45	49.02	0.88	5
		e''	17.8800	Conductivity (σ):	5.17	5.29	-2.36	5
	Body 5600	e'	49.0400	Relative Permittivity (ϵ_r):	49.04	48.48	1.16	5
		e''	18.2500	Conductivity (σ):	5.68	5.76	-1.36	5
	Body 5800	e'	48.7600	Relative Permittivity (ϵ_r):	48.76	48.20	1.16	5
		e''	18.4400	Conductivity (σ):	5.95	6.00	-0.89	5
	Body 5825	e'	48.8400	Relative Permittivity (ϵ_r):	48.84	48.20	1.33	5
		e''	18.5500	Conductivity (σ):	6.01	6.00	0.14	5
1/10/2014	Body 835	e'	54.0600	Relative Permittivity (ϵ_r):	54.06	55.20	-2.07	5
		e''	21.7900	Conductivity (σ):	1.01	0.97	4.30	5
	Body 820	e'	54.2000	Relative Permittivity (ϵ_r):	54.20	55.28	-1.95	5
		e''	21.8600	Conductivity (σ):	1.00	0.97	2.92	5
	Body 850	e'	53.9100	Relative Permittivity (ϵ_r):	53.91	55.16	-2.26	5
		e''	21.7000	Conductivity (σ):	1.03	0.99	3.90	5
1/13/2014	Body 5180	e'	48.4000	Relative Permittivity (ϵ_r):	48.40	49.05	-1.32	5
		e''	18.0200	Conductivity (σ):	5.19	5.27	-1.54	5
	Body 5200	e'	48.5000	Relative Permittivity (ϵ_r):	48.50	49.02	-1.06	5
		e''	18.2000	Conductivity (σ):	5.26	5.29	-0.61	5
	Body 5600	e'	48.1600	Relative Permittivity (ϵ_r):	48.16	48.48	-0.66	5
		e''	18.6300	Conductivity (σ):	5.80	5.76	0.69	5
	Body 5800	e'	47.8200	Relative Permittivity (ϵ_r):	47.82	48.20	-0.79	5
		e''	18.7000	Conductivity (σ):	6.03	6.00	0.51	5
	Body 5825	e'	47.9800	Relative Permittivity (ϵ_r):	47.98	48.20	-0.46	5
		e''	18.9700	Conductivity (σ):	6.14	6.00	2.40	5
1/16/2014	Body 1900	e'	54.3400	Relative Permittivity (ϵ_r):	54.34	53.30	1.95	5
		e''	14.2600	Conductivity (σ):	1.51	1.52	-0.89	5
	Body 1850	e'	54.4600	Relative Permittivity (ϵ_r):	54.46	53.30	2.18	5
		e''	14.1700	Conductivity (σ):	1.46	1.52	-4.10	5
	Body 1910	e'	54.3300	Relative Permittivity (ϵ_r):	54.33	53.30	1.93	5
		e''	14.2900	Conductivity (σ):	1.52	1.52	-0.16	5

Tissue Dielectric Parameter Check Results (continued)
SAR Lab E

Date Tested	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
1/2/2014	Body 5180	e'	49.0200	Relative Permittivity (ϵ_r):	49.02	49.05	-0.05	5
		e''	17.4900	Conductivity (σ):	5.04	5.27	-4.44	5
	Body 5200	e'	49.0100	Relative Permittivity (ϵ_r):	49.01	49.02	-0.02	5
		e''	17.5200	Conductivity (σ):	5.07	5.29	-4.33	5
	Body 5600	e'	48.5400	Relative Permittivity (ϵ_r):	48.54	48.48	0.13	5
		e''	17.9200	Conductivity (σ):	5.58	5.76	-3.14	5
	Body 5800	e'	48.2800	Relative Permittivity (ϵ_r):	48.28	48.20	0.17	5
		e''	18.1000	Conductivity (σ):	5.84	6.00	-2.71	5
	Body 5825	e'	48.2500	Relative Permittivity (ϵ_r):	48.25	48.20	0.10	5
		e''	18.1600	Conductivity (σ):	5.88	6.00	-1.97	5
1/6/2014	Body 5180	e'	48.7400	Relative Permittivity (ϵ_r):	48.74	49.05	-0.63	5
		e''	17.9100	Conductivity (σ):	5.16	5.27	-2.14	5
	Body 5200	e'	48.7600	Relative Permittivity (ϵ_r):	48.76	49.02	-0.53	5
		e''	17.9900	Conductivity (σ):	5.20	5.29	-1.76	5
	Body 5600	e'	48.1300	Relative Permittivity (ϵ_r):	48.13	48.48	-0.72	5
		e''	18.3700	Conductivity (σ):	5.72	5.76	-0.71	5
	Body 5800	e'	47.8400	Relative Permittivity (ϵ_r):	47.84	48.20	-0.75	5
		e''	18.6300	Conductivity (σ):	6.01	6.00	0.14	5
	Body 5825	e'	47.8100	Relative Permittivity (ϵ_r):	47.81	48.20	-0.81	5
		e''	18.7000	Conductivity (σ):	6.06	6.00	0.95	5
1/9/2014	Body 5180	e'	49.2800	Relative Permittivity (ϵ_r):	49.28	49.05	0.48	5
		e''	17.4000	Conductivity (σ):	5.01	5.27	-4.93	5
	Body 5200	e'	49.3600	Relative Permittivity (ϵ_r):	49.36	49.02	0.69	5
		e''	17.5200	Conductivity (σ):	5.07	5.29	-4.33	5
	Body 5600	e'	48.9200	Relative Permittivity (ϵ_r):	48.92	48.48	0.91	5
		e''	17.9000	Conductivity (σ):	5.57	5.76	-3.25	5
	Body 5800	e'	48.6600	Relative Permittivity (ϵ_r):	48.66	48.20	0.95	5
		e''	18.0900	Conductivity (σ):	5.83	6.00	-2.77	5
	Body 5825	e'	48.7100	Relative Permittivity (ϵ_r):	48.71	48.20	1.06	5
		e''	18.1900	Conductivity (σ):	5.89	6.00	-1.81	5
1/13/2014	Body 5180	e'	49.3600	Relative Permittivity (ϵ_r):	49.09	49.05	0.09	5
		e''	18.3400	Conductivity (σ):	5.17	5.27	-1.92	5
	Body 5200	e'	49.5600	Relative Permittivity (ϵ_r):	49.25	49.02	0.47	5
		e''	18.6200	Conductivity (σ):	5.26	5.29	-0.67	5
	Body 5600	e'	49.1700	Relative Permittivity (ϵ_r):	48.91	48.48	0.89	5
		e''	18.9800	Conductivity (σ):	5.75	5.76	-0.19	5
	Body 5800	e'	48.8900	Relative Permittivity (ϵ_r):	48.67	48.20	0.98	5
		e''	19.0700	Conductivity (σ):	6.02	6.00	0.25	5
	Body 5825	e'	49.0700	Relative Permittivity (ϵ_r):	48.86	48.20	1.37	5
		e''	19.4300	Conductivity (σ):	6.11	6.00	1.88	5

Tissue Dielectric Parameter Check Results (continued)
SAR Lab F

Date Tested	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
1/2/2014	Body 5180	e'	50.6600	Relative Permittivity (ϵ_r):	50.66	49.05	3.29	5
		e''	18.2800	Conductivity (σ):	5.27	5.27	-0.12	5
	Body 5200	e'	50.6600	Relative Permittivity (ϵ_r):	50.66	49.02	3.35	5
		e''	18.3600	Conductivity (σ):	5.31	5.29	0.26	5
	Body 5600	e'	50.0600	Relative Permittivity (ϵ_r):	50.06	48.48	3.26	5
		e''	18.8700	Conductivity (σ):	5.88	5.76	1.99	5
	Body 5800	e'	49.7600	Relative Permittivity (ϵ_r):	49.76	48.20	3.24	5
		e''	19.1600	Conductivity (σ):	6.18	6.00	2.98	5
	Body 5825	e'	49.6900	Relative Permittivity (ϵ_r):	49.69	48.20	3.09	5
		e''	19.2100	Conductivity (σ):	6.22	6.00	3.70	5
1/6/2014	Body 5180	e'	48.9700	Relative Permittivity (ϵ_r):	48.97	49.05	-0.16	5
		e''	17.7700	Conductivity (σ):	5.12	5.27	-2.91	5
	Body 5200	e'	49.0000	Relative Permittivity (ϵ_r):	49.00	49.02	-0.04	5
		e''	17.7900	Conductivity (σ):	5.14	5.29	-2.85	5
	Body 5600	e'	48.4200	Relative Permittivity (ϵ_r):	48.42	48.48	-0.12	5
		e''	18.2400	Conductivity (σ):	5.68	5.76	-1.41	5
	Body 5800	e'	48.1500	Relative Permittivity (ϵ_r):	48.15	48.20	-0.10	5
		e''	18.5300	Conductivity (σ):	5.98	6.00	-0.40	5
	Body 5825	e'	48.1400	Relative Permittivity (ϵ_r):	48.14	48.20	-0.12	5
		e''	18.5600	Conductivity (σ):	6.01	6.00	0.19	5
1/9/2014	Body 5180	e'	49.2000	Relative Permittivity (ϵ_r):	49.20	49.05	0.31	5
		e''	17.6700	Conductivity (σ):	5.09	5.27	-3.45	5
	Body 5200	e'	49.2800	Relative Permittivity (ϵ_r):	49.28	49.02	0.53	5
		e''	17.8200	Conductivity (σ):	5.15	5.29	-2.69	5
	Body 5600	e'	48.8600	Relative Permittivity (ϵ_r):	48.86	48.48	0.79	5
		e''	18.1500	Conductivity (σ):	5.65	5.76	-1.90	5
	Body 5800	e'	48.6000	Relative Permittivity (ϵ_r):	48.60	48.20	0.83	5
		e''	18.3700	Conductivity (σ):	5.92	6.00	-1.26	5
	Body 5825	e'	48.6500	Relative Permittivity (ϵ_r):	48.65	48.20	0.93	5
		e''	18.4600	Conductivity (σ):	5.98	6.00	-0.35	5
1/10/2014	Body 1900	e'	52.7400	Relative Permittivity (ϵ_r):	52.74	53.30	-1.05	5
		e''	14.5100	Conductivity (σ):	1.53	1.52	0.85	5
	Body 1850	e'	52.8500	Relative Permittivity (ϵ_r):	52.85	53.30	-0.84	5
		e''	14.4000	Conductivity (σ):	1.48	1.52	-2.55	5
	Body 1910	e'	52.6900	Relative Permittivity (ϵ_r):	52.69	53.30	-1.14	5
		e''	14.5200	Conductivity (σ):	1.54	1.52	1.45	5
1/13/2014	Body 1900	e'	53.1200	Relative Permittivity (ϵ_r):	53.12	53.30	-0.34	5
		e''	14.3200	Conductivity (σ):	1.51	1.52	-0.47	5
	Body 1850	e'	53.2500	Relative Permittivity (ϵ_r):	53.25	53.30	-0.09	5
		e''	14.2400	Conductivity (σ):	1.46	1.52	-3.63	5
	Body 1910	e'	53.1300	Relative Permittivity (ϵ_r):	53.13	53.30	-0.32	5
		e''	14.3100	Conductivity (σ):	1.52	1.52	-0.02	5
1/16/2014	Body 1900	e'	54.4100	Relative Permittivity (ϵ_r):	54.41	53.30	2.08	5
		e''	14.4000	Conductivity (σ):	1.52	1.52	0.09	5
	Body 1850	e'	54.5200	Relative Permittivity (ϵ_r):	54.52	53.30	2.29	5
		e''	14.2900	Conductivity (σ):	1.47	1.52	-3.29	5
	Body 1910	e'	54.3900	Relative Permittivity (ϵ_r):	54.39	53.30	2.05	5
		e''	14.4400	Conductivity (σ):	1.53	1.52	0.89	5

11. System Performance Check

SAR system verification is required to confirm measurement accuracy, according to the tissue dielectric media, probe calibration points and other system operating parameters required for measuring the SAR of a test device. The system verification must be performed for each frequency band and within the valid range of each probe calibration point required for testing the device. The same SAR probe(s) and tissue-equivalent media combinations used with each specific SAR system for system verification must be used for device testing. When multiple probe calibration points are required to cover substantially large transmission bands, independent system verifications are required for each probe calibration point. A system verification must be performed before each series of SAR measurements using the same probe calibration point and tissue-equivalent medium. Additional system verification should be considered according to the conditions of the tissue-equivalent medium and measured tissue dielectric parameters, typically every three to four days when the liquid parameters are remeasured or sooner when marginal liquid parameters are used at the beginning of a series of measurements.

11.1. System Performance Check Measurement Conditions

- The measurements were performed in the flat section of the TWIN SAM or ELI phantom, shell thickness: 2.0 ±0.2 mm (bottom plate) filled with Body or Head simulating liquid of the following parameters.
- The depth of tissue-equivalent liquid in a phantom must be ≥ 15.0 cm ± 0.5 cm for SAR measurements ≤ 3 GHz and ≥ 10.0 cm ± 0.5 cm for measurements > 3 GHz.
- The DASY system with an E-Field Probe was used for the measurements.
- The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10 mm (above 1 GHz) and 15 mm (below 1 GHz) from dipole center to the simulating liquid surface.
- The coarse grid with a grid spacing of 15 mm was aligned with the dipole.
  For 5 GHz band - The coarse grid with a grid spacing of 10 mm was aligned with the dipole.
- Special 7x7x7 (below 3 GHz) and/or 8x8x7 (above 3 GHz) fine cube was chosen for the cube.
- Distance between probe sensors and phantom surface was set to 3 mm.
  For 5 GHz band - Distance between probe sensors and phantom surface was set to 2.5 mm
- The dipole input power (forward power) was 100 mW.
- The results are normalized to 1 W input power.

11.2. Reference SAR Values for System Performance Check

The reference SAR values can be obtained from the calibration certificate of system validation dipoles

System Dipole	Serial No.	Cal. Date	Freq. (MHz)	Target SAR Values (mW/g)		
				1g/10g	Head	Body
D835V2	4d002	11/15/2013	835	1g	9.49	9.43
				10g	6.18	6.21
D1900V2	5d043	11/12/2013	1900	1g	40.1	39.0
				10g	21.1	20.8
D2450V2	899	9/10/2013	2450	1g	51.3	49.7
				10g	23.9	23.3
D5GHzv2	1003	9/19/2013	5200	1g	78.5	73.3
				10g	22.4	20.5
			5600	1g	81.0	78.6
				10g	23.0	21.8
			5800	1g	76.4	72.7
				10g	21.7	20.1
D5GHzv2	1138	11/19/2013	5200	1g	78.5	72.9
				10g	22.5	20.4
			5600	1g	82.7	78.3
				10g	23.5	21.7
			5800	1g	78.3	72.8
				10g	22.4	20.1

11.3. System Performance Check Results

The 1-g and 10-g SAR measured with a reference dipole, using the required tissue-equivalent medium at the test frequency, must be within 10% of the manufacturer calibrated dipole SAR target.

SAR Room A

Date Tested	System Dipole		T.S. Liquid		Measured Results			Target (Ref. Value)	Delta ±10 %	Est./Zoom Ratio ±3 %	Plot No.
	Type	Serial #			Area Scan	Zoom Scan	Normalize to 1 W				
1/2/2014	D2450V2	899	Body	1g	5.05	4.98	49.8	49.70	0.20	1.39	
				10g	2.20	2.25	22.5	23.30	-3.43		
1/6/2014	D2450V2	899	Body	1g	5.39	5.33	53.3	49.70	7.24	1.11	
				10g	2.34	2.44	24.4	23.30	4.72		
1/9/2014	D2450V2	899	Body	1g	5.30	5.36	53.6	49.70	7.85	-1.13	1,2
				10g	2.32	2.44	24.4	23.30	4.72		
1/13/2014	D2450V2	899	Body	1g	5.13	5.10	51.0	49.70	2.62	0.58	
				10g	2.24	2.27	22.7	23.30	-2.58		
1/14/2014	D2450V2	899	Body	1g	5.28	5.12	51.2	49.70	3.02	3.03	
				10g	2.31	2.32	23.2	23.30	-0.43		
1/16/2014	D2450V2	899	Body	1g	4.82	4.83	48.3	49.70	-2.82	-0.21	3,4
				10g	2.11	2.20	22.0	23.30	-5.58		
1/21/2014	D2450V2	899	Body	1g	4.83	4.97	49.7	49.7	0.00	-2.90	
				10g	2.12	2.26	22.6	23.3	-3.00		

SAR Room B

Date Tested	System Dipole		T.S. Liquid		Measured Results			Target (Ref. Value)	Delta ±10 %	Est./Zoom Ratio ±3 %	Plot No.
	Type	Serial #			Area Scan	Zoom Scan	Normalize to 1 W				
1/2/2014	D5GHzV2 (5.2GHz)	1138	Body	1g	6.70	7.09	70.9	72.9	-2.74	-5.82	
				10g	1.830	2.000	20.0	20.4	-1.96		
1/6/2014	D5GHzV2 (5.2GHz)	1138	Body	1g	7.19	7.53	75.3	72.9	3.29	-4.73	
				10g	1.970	2.140	21.4	20.4	4.90		
1/9/2014	D5GHzV2 (5.2GHz)	1138	Body	1g	7.38	7.63	76.3	72.9	4.66	-3.39	5,6
				10g	2.010	2.160	21.6	20.4	5.88		
1/13/2014	D835V2	4d002	Body	1g	0.962	0.944	9.44	9.43	0.11	1.87	7,8
				10g	0.643	0.619	6.19	6.21	-0.32		
1/16/2014	D835V2	4d002	Body	1g	0.968	0.962	9.62	9.43	2.01	0.62	
				10g	0.653	0.632	6.32	6.21	1.77		
1/21/2014	D835V2	4d002	Body	1g	1.000	0.990	9.90	9.43	4.98	1.00	9,10
				10g	0.676	0.652	6.52	6.21	4.99		

SAR Room C

Date Tested	System Dipole		T.S. Liquid		Measured Results			Target (Ref. Value)	Delta ±10 %	Est./Zoom Ratio ±3 %	Plot No.
	Type	Serial #			Area Scan	Zoom Scan	Normalize to 1 W				
1/13/2014	D1900V2	5d043	Body	1g	4.200	4.150	41.5	39.0	6.41	1.19	11,12
				10g	2.100	2.160	21.6	20.8	3.85		
1/15/2014	D835V2	4d002	Body	1g	0.959	0.933	9.3	9.43	-1.06	2.71	13,14
				10g	0.639	0.614	6.1	6.21	-1.13		

SAR Room D

Date Tested	System Dipole		T.S. Liquid		Measured Results			Target (Ref. Value)	Delta ±10 %	Est./Zoom Ratio ±3 %	Plot No.
	Type	Serial #			Area Scan	Zoom Scan	Normalize to 1 W				
1/2/2014	D5GHzV2 (5.8GHz)	1138	Body	1g	6.48	6.97	69.7	72.8	-4.26	-7.56	
				10g	1.78	1.94	19.4	20.1	-3.48		
1/6/2014	D5GHzV2 (5.8GHz)	1003	Body	1g	6.68	7.09	70.9	72.7	-2.48	-6.14	
				10g	1.81	1.98	19.8	20.1	-1.49		
1/9/2014	D5GHzV2 (5.8GHz)	1003	Body	1g	6.22	6.90	69.0	72.7	-5.09	-10.93	15,16
				10g	1.73	1.90	19.0	20.1	-5.47		
1/10/2014	D835V2	4d002	Body	1g	1.01	0.99	9.9	9.43	4.77	2.18	17,18
				10g	0.68	0.65	6.5	6.21	4.67		
1/13/2014	D5GHzV2 (5.2GHz)	1138	Body	1g	6.63	6.93	69.3	72.9	-4.94	-4.52	19,20
				10g	1.84	1.95	19.5	20.4	-4.41		
1/13/2014	D5GHzV2 (5.6GHz)	1138	Body	1g	7.31	7.84	78.4	78.3	0.13	-7.25	
				10g	1.98	2.19	21.9	21.7	0.92		
1/13/2014	D5GHzV2 (5.8GHz)	1138	Body	1g	6.73	7.19	71.9	72.8	-1.24	-6.84	
				10g	1.84	2.00	20.0	20.1	-0.50		
1/16/2014	D1900V2	5d043	Body	1g	4.20	4.10	41.0	39.0	5.13	2.38	21,22
				10g	2.14	2.09	20.9	20.8	0.48		

SAR Room E

Date Tested	System Dipole		T.S. Liquid		Measured Results			Target (Ref. Value)	Delta ±10 %	Est./Zoom Ratio ±3 %	Plot No.
	Type	Serial #			Area Scan	Zoom Scan	Normalize to 1 W				
1/2/2014	D5GHzV2 (5.6GHz)	1138	Body	1g	7.55	8.00	80.0	78.3	2.17	-5.96	
				10g	2.06	2.25	22.5	21.7	3.69		
1/6/2014	D5GHzV2 (5.6GHz)	1138	Body	1g	7.55	8.19	81.9	78.3	4.60	-8.48	
				10g	2.07	2.29	22.9	21.7	5.53		
1/6/2014	D5GHzV2 (5.2GHz)	1138	Body	1g	6.76	7.11	71.1	72.9	-2.47	-5.18	
				10g	1.930	2.030	20.3	20.4	-0.49		
1/9/2014	D5GHzV2 (5.6GHz)	1138	Body	1g	7.09	7.52	75.2	78.3	-3.96	-6.06	
				10g	1.96	2.13	21.3	21.7	-1.84		
1/13/2014	D5GHzV2 (5.2GHz)	1138	Body	1g	7.08	7.72	77.2	72.9	5.90	-9.04	23,24
				10g	2.02	2.19	21.9	20.4	7.35		

SAR Room F

Date Tested	System Dipole		T.S. Liquid		Measured Results			Target (Ref. Value)	Delta ±10 %	Est./Zoom Ratio ±3 %	Plot No.
	Type	Serial #			Area Scan	Zoom Scan	Normalize to 1 W				
1/2/2014	D5GHzV2 (5.6GHz)	1138	Body	1g	6.88	7.29	72.9	78.3	-6.90	-5.96	
				10g	1.88	2.04	20.4	21.7	-5.99		
1/6/2014	D5GHzV2 (5.6GHz)	1138	Body	1g	6.80	7.23	72.3	78.3	-7.66	-6.32	25,26
				10g	1.85	2.03	20.3	21.7	-6.45		
1/6/2014	D5GHzV2 (5.2GHz)	1138	Body	1g	7.14	7.04	70.4	72.9	-3.43	1.40	
				10g	1.96	1.980	19.8	20.4	-2.94		
1/9/2014	D5GHzV2 (5.2GHz)	1138	Body	1g	7.30	7.66	76.6	72.9	5.08	-4.93	
				10g	2.01	2.160	21.6	20.4	5.88		
1/10/2014	D1900MHzV2	5d043	Body	1g	4.05	4.07	40.7	39.0	4.36	-0.49	
				10g	2.04	2.140	21.4	20.8	2.88		
1/13/2014	D1900MHzV2	5d043	Body	1g	3.83	3.77	37.7	39.0	-3.33	1.57	
				10g	1.93	1.960	19.6	20.8	-5.77		
1/16/2014	D1900MHzV2	5d043	Body	1g	3.71	3.68	36.8	39.0	-5.64	0.81	27,28
				10g	1.88	1.930	19.3	20.8	-7.21		

12. SAR Test Results

12.1. GSM850

Proximity Sensor State	Mode	Test Position	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
Off	GPRS 2 slots	Rear	16	190	836.6	32.50	32.50	0.669	0.669	0.448	0.448	
		Edge 1	16	190	836.6	32.50	32.50	0.478	0.478	0.319	0.319	
		Edge 4	0	190	836.6	32.50	32.50	0.218	0.218	0.124	0.124	
On (First Stage)	GPRS 2 slots	Edge 2	0	190	836.6	32.50	32.50	0.696	0.696	0.381	0.381	
On (Second Stage)	GPRS 2 slots	Rear	0	128	824.2	26.00	25.80	1.090	1.141	0.581	0.608	1
				190	836.6	26.00	26.00	1.050	1.050	0.559	0.559	
				251	848.8	26.00	26.00	1.020	1.020	0.536	0.536	
		Edge 1	0	128	824.4	26.00	25.80	0.807	0.845	0.444	0.465	
				190	836.6	26.00	26.00	0.824	0.824	0.451	0.451	
				251	848.8	26.00	26.00	0.727	0.727	0.394	0.394	

12.2. GSM1900

Proximity Sensor State	Mode	Test Position	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
Off	GPRS 2 slots	Rear	16	512	1850.2	29.00	29.00	0.832	0.832	0.489	0.489	
				661	1880.0	29.00	28.80	0.832	0.871	0.484	0.507	
				810	1909.8	29.00	28.70	0.843	0.903	0.489	0.524	
		Edge 1	16	512	1850.2	29.00	29.00	1.020	1.020	0.619	0.619	
				661	1880.0	29.00	28.80	0.935	0.979	0.566	0.593	
				810	1909.8	29.00	28.70	0.959	1.028	0.580	0.621	
On (First Stage)	GPRS 2 slots	Edge 2	0	661	1880.0	29.00	28.80	0.754	0.790	0.361	0.378	
On (Second Stage)	GPRS 2 slots	Rear	0	512	1850.2	19.75	19.75	1.070	1.070	0.508	0.508	
				661	1880.0	19.75	19.70	1.110	1.123	0.531	0.537	
				810	1909.8	19.75	19.50	1.120	1.186	0.540	0.572	2
		Edge 1	0	512	1850.2	19.75	19.75	1.020	1.020	0.496	0.496	
				661	1880.0	19.75	19.70	1.100	1.113	0.531	0.537	
				810	1909.8	19.75	19.50	1.090	1.155	0.523	0.554	

Note(s):

1. Testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:
   - ☐ ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   - ☐ ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
   - ☐ ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz

12.3. W-CDMA Band 2

Proximity Sensor State	Mode	Test Position	Dist. (mm)	Ch #.	Freq. (MHz)	Power		1-g SAR		10-g SAR		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
Off	Rel 99 RMC 12.2kbps	Rear	16	9400	1880.0	22.30	22.20	0.721	0.738	0.422	0.432	
		Edge 1	16	9262	1852.4	22.30	22.30	0.884	0.884	0.914	0.914	
			16	9400	1880.0	22.30	22.20	0.993	1.016	0.843	0.863	
			16	9538	1907.6	22.30	22.30	1.030	1.030	0.837	0.837	
On (First Stage)	Rel 99 RMC 12.2kbps	Edge 2	0	9400	1880.0	21.50	21.50	0.653	0.653	0.653	0.653	
On (Second Stage)	Rel 99 RMC 12.2kbps	Rear	0	9262	1852.4	13.25	13.10	1.100	1.139	0.511	0.529	3
				9400	1880.0	13.25	13.25	0.997	0.997	0.464	0.464	
				9538	1907.6	13.25	13.25	0.997	0.997	0.461	0.461	
		Edge 1	0	9262	1852.4	13.25	13.10	0.883	0.914	0.432	0.447	
				9400	1880.0	13.25	13.25	0.843	0.843	0.41	0.410	
				9538	1907.6	13.25	13.25	0.837	0.837	0.412	0.412	

12.4. W-CDMA Band 5

Proximity Sensor State	Mode	Test Position	Dist. (mm)	Ch #.	Freq. (MHz)	Power		1-g SAR		10-g SAR		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
Off	Rel 99 RMC 12.2kbps	Rear	16	4183	836.6	24.50	24.40	0.586	0.600	0.393	0.402	
		Edge 1	16	4183	836.6	24.50	24.40	0.331	0.339	0.222	0.227	
On (First Stage)	Rel 99 RMC 12.2kbps	Edge 2	0	4183	836.6	24.50	24.40	0.583	0.597	0.321	0.328	
On (Second Stage)	Rel 99 RMC 12.2kbps	Rear	0	4132	826.4	18.50	18.50	1.010	1.010	0.533	0.533	
				4183	836.6	18.50	18.50	1.190	1.190	0.630	0.630	4
				4233	846.6	18.50	18.50	0.988	0.988	0.522	0.522	
		Edge 1	0	4183	836.6	18.50	18.50	0.638	0.638	0.347	0.347	

Note(s):

1. Testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:
   - ☐ ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   - ☐ ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
   - ☐ ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz

12.5. LTE Band 2

Proximity Sensor State	Mode	Test Position	Dist. (mm)	Ch #.	Freq. (MHz)	UL RB Allocation	UL RB Start	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
Off	QPSK	Rear	16	18900	1880.0	1	0	22.3	22.3	0.759	0.759	0.445	0.445	
						50	0	22.3	21.3	0.629	0.792	0.365	0.460	
		Edge 1	16	18700	1860.0	1	0	22.3	22.3	0.897	0.897	0.539	0.539	
						50	0	22.3	21.3	0.718	0.904	0.431	0.543	
			16	18900	1880.0	1	0	22.3	22.3	1.020	1.020	0.606	0.606	
						50	0	22.3	21.3	0.820	1.032	0.490	0.617	
						100	0	22.3	21.3	0.805	1.013	0.481	0.606	
			16	19100	1900.0	1	0	22.3	22.3	1.010	1.010	0.600	0.600	
						50	0	22.3	21.3	0.807	1.016	0.481	0.606	
On (First Stage)	QPSK	Edge 2	0	18900	1880.0	1	0	21.5	21.5	0.602	0.602	0.298	0.298	
						50	0	21.5	21.5	0.581	0.581	0.287	0.287	
On (Second Stage)	QPSK	Rear	0	18700	1860.0	1	0	13.0	12.9	1.140	1.167	0.548	0.561	
						50	0	13.0	13.0	1.180	1.180	0.572	0.572	
				18900	1880.0	1	0	13.0	13.0	1.170	1.170	0.561	0.561	
						50	0	13.0	13.0	1.180	1.180	0.563	0.563	
						100	0	13.0	12.9	1.130	1.156	0.545	0.558	
				19100	1900.0	1	0	13.0	13.0	1.180	1.180	0.571	0.571	
						50	0	13.0	13.0	1.190	1.190	0.570	0.570	5
		Edge 1	0	18700	1860.0	1	0	13.0	12.9	0.988	1.011	0.483	0.494	
						50	0	13.0	13.0	0.987	0.987	0.481	0.481	
				18900	1880.0	1	0	13.0	13.0	0.910	0.910	0.443	0.443	
						50	0	13.0	13.0	0.965	0.965	0.466	0.466	
						100	0	13.0	12.9	0.953	0.975	0.463	0.474	
				19100	1900.0	1	0	13.0	13.0	1.020	1.020	0.499	0.499	
						50	0	13.0	13.0	0.979	0.979	0.475	0.475	

Note(s):

1. Testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:
   - ☐ ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   - ☐ ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
   - ☐ ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
2. Per KDB 941225 D05 SAR for LTE Devices, SAR test reduction is applied using the following criteria:
   - Testing for Low and High Channel is performed at the highest output power level for 1RB, and 50% RB configuration for that channel.
   - Testing for 100% RB configuration is performed at the highest output power level for 100% RB configuration across the Low, Mid and High Channel when the highest reported SAR for 1 RB and 50% RB are ≥ 0.8 W/kg. Testing for the remaining required channels is not needed because the reported SAR for 100% RB Allocation < 1.45 W/kg.
   - Testing for 16-QAM modulation is not required because the reported SAR for QPSK is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of QPSK.
   - Testing for the other channel bandwidths is not required because the reported SAR for the highest channel bandwidth is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of the highest channel bandwidth.

12.6. LTE Band 5

Proximity Sensor State	Mode	Test Position	Dist. (mm)	Ch #.	Freq. (MHz)	UL RB Allocation	UL RB Start	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
Off	QPSK	Rear	16	20525	836.5	1	49	24.00	23.70	0.561	0.601	0.378	0.405	
						25	24	24.00	23.10	0.449	0.552	0.303	0.373	
		Edge 1	16	20525	836.5	1	49	24.00	23.70	0.364	0.390	0.245	0.263	
						25	24	24.00	23.10	0.290	0.357	0.195	0.240	
		Edge 2	0	20525	836.5	1	49	24.00	23.70	0.616	0.660	0.328	0.351	
						25	24	24.00	23.10	0.460	0.566	0.242	0.298	
On (Second Stage)	QPSK	Rear	0	20450	829.0	1	0	18.50	18.50	1.060	1.060	0.564	0.564	
						25	0	18.50	18.50	0.978	0.978	0.516	0.516	
				20525	836.5	1	49	18.50	18.50	1.130	1.130	0.599	0.599	
						25	24	18.50	18.30	1.140	1.194	0.600	0.628	
				20600	844.0	1	24	18.50	18.50	1.030	1.030	0.543	0.543	
						25	0	18.50	18.50	1.190	1.190	0.631	0.631	6
						50	0	18.50	18.40	1.040	1.064	0.547	0.560	
		Edge 1	0	20450	829.0	1	0	18.50	18.50	0.820	0.820	0.459	0.459	
						25	0	18.50	18.50	0.791	0.791	0.438	0.438	
				20525	836.5	1	49	18.50	18.50	0.956	0.956	0.534	0.534	
						25	24	18.50	18.30	0.807	0.845	0.444	0.465	
				20600	844.0	1	24	18.50	18.50	0.730	0.730	0.402	0.402	
						25	0	18.50	18.50	0.767	0.767	0.421	0.421	
						50	0	18.50	18.40	0.829	0.848	0.459	0.470	

Note(s):

1. Testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:
   - ☐ ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   - ☐ ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
   - ☐ ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
2. Per KDB 941225 D05 SAR for LTE Devices, SAR test reduction is applied using the following criteria:
   - Testing for Low and High Channel is performed at the highest output power level for 1RB, and 50% RB configuration for that channel.
   - Testing for 100% RB configuration is performed at the highest output power level for 100% RB configuration across the Low, Mid and High Channel when the highest reported SAR for 1 RB and 50% RB are ≥ 0.8 W/kg. Testing for the remaining required channels is not needed because the reported SAR for 100% RB Allocation < 1.45 W/kg.
   - Testing for 16-QAM modulation is not required because the reported SAR for QPSK is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of QPSK.
   - Testing for the other channel bandwidths is not required because the reported SAR for the highest channel bandwidth is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of the highest channel bandwidth.

12.7. WiFi DTS Bands

12.7.1. 2.4 GHz Band

BOM #1

Band	Mode	Tx Condition/ Tx Antenna	Test Position	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)				SAR (W/kg)								Plot No.
							WiFi 1		WiFi 2		WiFi 1				WiFi 2				
							Tune-up Limit	Measured	Tune-up Limit	Measured	Measured		Scaled		Measured		Scaled		
											1-g	10-g	1-g	10-g	1-g	10-g	1-g	10-g	
2.4 GHz	802.11b	1 Tx	Rear	0	6	2437	16.0	16.0			0.066	0.032	0.066	0.032					
			Edge 3	0	1	2412	16.0	16.0			0.578	0.182	0.578	0.182					
					6	2437	16.0	16.0			0.722	0.227	0.722	0.227					
					11	2462	16.0	15.9			1.140	0.345	1.167	0.353					
			Edge 4	0	6	2437	16.0	16.0			0.126	0.059	0.126	0.059					
		1 Tx	Rear	0	6	2437			16.0	16.0					0.087	0.043	0.087	0.043	
			Edge 2	0	6	2437			16.0	16.0					0.187	0.087	0.187	0.087	
			Edge 3	0	1	2412			16.0	16.0					0.803	0.256	0.803	0.256	
					6	2437			16.0	16.0					1.190	0.381	1.190	0.381	7
					11	2462			16.0	16.0					1.170	0.372	1.170	0.372	
	802.11g CDD MIMO	2 Tx	Rear	0	6	2437	16.0	16.0	16.0	16.0	0.076	0.037	0.076	0.037	0.073	0.035	0.073	0.035	
			Edge 2	0	6	2437	16.0	16.0	16.0	16.0					0.181	0.082	0.181	0.082	
			Edge 3	0	2	2417	16.0	16.0	16.0	16.0	0.570	0.179	0.570	0.179	0.946	0.301	0.946	0.301	
					6	2437	16.0	16.0	16.0	16.0	0.712	0.225	0.712	0.225	1.180	0.372	1.180	0.372	
					10	2457	16.0	16.0	16.0	16.0	0.985	0.310	0.985	0.310	1.150	0.367	1.150	0.367	
			Edge 4	0	6	2437	16.0	16.0	16.0	16.0	0.121	0.056	0.121	0.056					

BOM #2

Band	Mode	Tx Condition/ Tx Antenna	Test Position	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)				SAR (W/kg)								Plot No.
							WiFi 1		WiFi 2		WiFi 1				WiFi 2				
							Tune-up Limit	Measured	Tune-up Limit	Measured	Measured		Scaled		Measured		Scaled		
											1-g	10-g	1-g	10-g	1-g	10-g	1-g	10-g	
2.4 GHz	802.11b	1 Tx	Edge 3	0	6	2437			16.0	16.0	1.150	0.365	1.150	0.365					

Note(s):

1. Testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:
   ☐ ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   ☐ ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
   ☐ ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz

12.7.2. 5.8 GHz Band

BOM #1

Band	Mode	Tx Condition/ Tx Antenna	Test Position	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)				SAR (W/kg)								Plot No.
							WiFi 1		WiFi 2		WiFi 1				WiFi 2				
							Tune-up Limit	Measured	Tune-up Limit	Measured	Measured		Scaled		Measured		Scaled		
											1-g	10-g	1-g	10-g	1-g	10-g	1-g	10-g	
5.8 GHz	802.11a	1 Tx	Rear	0	157	5785	16.0	16.0			0.042	0.010	0.042	0.010					
			Edge 3	0	149	5745	16.0	15.9			0.902	0.261	0.923	0.267					
					157	5785	16.0	16.0			0.775	0.234	0.775	0.234					
					165	5825	16.0	16.0			0.785	0.259	0.785	0.259					
			Edge 4	0	157	5785	16.0	16.0			0.103	0.034	0.103	0.034					
		1 Tx	Rear	0	165	5825			16.0	16.0					0.057	0.019	0.057	0.019	
			Edge 2	0	165	5825			16.0	16.0					0.088	0.027	0.088	0.027	
			Edge 3	0	149	5745			16.0	16.0					0.839	0.263	0.839	0.263	
					157	5785			16.0	15.9					0.922	0.306	0.943	0.313	
					165	5825			16.0	15.9					0.994	0.335	1.017	0.343	8
	802.11a CDD MIMO	2 Tx	Rear	0	149	5745	16.0	16.0	16.0	15.9	0.035	0.012	0.035	0.012	0.063	0.020	0.064	0.020	
			Edge 2	0	149	5745	16.0	16.0	16.0	15.9					0.085	0.029	0.087	0.030	
			Edge 3	0	149	5745	16.0	16.0	16.0	15.9	0.807	0.250	0.807	0.250	0.819	0.270	0.838	0.276	
					157	5785	16.0	16.0	16.0	15.8	0.836	0.261	0.836	0.261	0.891	0.294	0.933	0.308	
					165	5825	16.0	16.0	16.0	15.9	0.861	0.278	0.861	0.278	0.962	0.316	0.984	0.323	
			Edge 4	0	149	5745	16.0	16.0	16.0	15.9	0.110	0.038	0.110	0.038					

BOM #2

Band	Mode	Tx Condition/ Tx Antenna	Test Position	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)				SAR (W/kg)								Plot No.
							WiFi 1		WiFi 2		WiFi 1				WiFi 2				
							Tune-up Limit	Measured	Tune-up Limit	Measured	Measured		Scaled		Measured		Scaled		
											1-g	10-g	1-g	10-g	1-g	10-g	1-g	10-g	
5.8 GHz	802.11a	1 Tx	Edge 3	0	165	5825			16.0	15.8					0.854	0.254	0.894	0.266	

Note(s):

1. Testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:
   - ☐ ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   - ☐ ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
   - ☐ ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz

12.8. WiFi UNII Bands

12.8.1. 5.2 GHz Band

BOM #1

Band	Mode	Tx Condition/ Tx Antenna	Test Position	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)				SAR (W/kg)								Plot No.
							WiFi 1		WiFi 2		WiFi 1				WiFi 2				
							Tune-up Limit	Measured	Tune-up Limit	Measured	Measured		Scaled		Measured		Scaled		
											1-g	10-g	1-g	10-g	1-g	10-g	1-g	10-g	
5.2 GHz	802.11a	1 Tx	Rear	0	48	5240	14.0	14.0			0.035	0.011	0.035	0.011					
			Edge 3	0	48	5240	14.0	14.0			0.478	0.155	0.478	0.155					
			Edge 4	0	48	5240	14.0	14.0			0.063	0.022	0.063	0.022					
		1 Tx	Rear	0	48	5240			14.0	14.0					0.026	0.009	0.026	0.009	
			Edge 2	0	36	5180			14.0	14.0					0.042	0.016	0.042	0.016	
			Edge 3	0	36	5180			14.0	14.0					0.488	0.164	0.488	0.164	
	802.11n HT40 SISO	1 Tx	Rear	0	46	5230	16.0	16.0			0.034	0.013	0.034	0.013					
			Edge 3	0	38	5190	13.5	13.5			0.401	0.130	0.401	0.130					
				0	46	5230	13.5	13.5			0.726	0.217	0.726	0.217					
			Edge 4	0	46	5230	16.0	16.0			0.092	0.032	0.092	0.032					
		1 Tx	Rear	0	46	5230			16.0	16.0					0.053	0.019	0.053	0.019	
			Edge 2	0	46	5230			16.0	16.0					0.075	0.027	0.075	0.027	
			Edge 3	0	38	5190			13.5	13.5					0.424	0.142	0.424	0.142	
				0	46	5230			16.0	16.0					0.851	0.270	0.851	0.270	9
	802.11a CDD MIMO	2 Tx	Rear	0	48	5240	10.5	10.5	10.5	10.5	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	
			Edge 2	0	48	5240	10.5	10.5	10.5	10.5					0.023	0.009	0.023	0.009	
			Edge 3	0	36	5180	10.5	10.5	10.5	10.5	0.193	0.063	0.193	0.063	0.184	0.064	0.184	0.064	
			Edge 4	0	48	5240	10.5	10.5	10.5	10.5	0.029	0.011	0.029	0.011					
	802.11n HT40 STBC MIMO	2 Tx	Rear	0	46	5230	13.5	13.5	13.5	13.5	0.023	0.010	0.023	0.010	0.031	0.011	0.031	0.011	
			Edge 2	0	46	5230	13.5	13.5	13.5	13.5					0.041	0.015	0.041	0.015	
			Edge 3	0	46	5230	13.5	13.5	13.5	13.5	0.463	0.149	0.463	0.149	0.453	0.134	0.453	0.134	
			Edge 4	0	46	5230	13.5	13.5	13.5	13.5	0.067	0.024	0.067	0.024					

BOM #2

Band	Mode	Tx Condition/ Tx Antenna	Test Position	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)				SAR (W/kg)								Plot No.
							WiFi 1		WiFi 2		WiFi 1				WiFi 2				
							Tune-up Limit	Measured	Tune-up Limit	Measured	Measured		Scaled		Measured		Scaled		
											1-g	10-g	1-g	10-g	1-g	10-g	1-g	10-g	
5.2 GHz	802.11n HT40 SISO	1 Tx	Edge 3	0	46	5230	16.0	16.0							0.842	0.284	0.842	0.284	

12.8.2. 5.3 GHz Band

BOM #1

Band	Mode	Tx Condition/ Tx Antenna	Test Position	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)				SAR (W/kg)								Plot No.
							WiFi 1		WiFi 2		WiFi 1				WiFi 2				
							Tune-up Limit	Measured	Tune-up Limit	Measured	Measured		Scaled		Measured		Scaled		
											1-g	10-g	1-g	10-g	1-g	10-g	1-g	10-g	
5.3 GHz	802.11a	1 Tx	Rear	0	52	5260	16.5	16.5			0.054	0.019	0.054	0.019					
			Edge 3	0	52	5260	16.5	16.5			0.815	0.267	0.815	0.267					
					60	5300	16.5	16.5			0.904	0.296	0.904	0.296					
			Edge 4	0	52	5260	16.5	16.5			0.110	0.043	0.110	0.043					
		1 Tx	Rear	0	52	5260			16.5	16.5					0.082	0.031	0.082	0.031	
			Edge 2	0	52	5260			16.5	16.5					0.095	0.035	0.095	0.035	
			Edge 3	0	52	5260			16.5	16.5					1.060	0.360	1.060	0.360	10
					60	5300			16.5	16.5					0.938	0.307	0.938	0.307	
	802.11a CDD MIMO	2 Tx	Rear	0	52	5260	16.5	16.5	16.5	16.4	0.047	0.018	0.047	0.018	0.057	0.023	0.058	0.024	
			Edge 2	0	52	5260	16.5	16.5	16.5	16.4					0.116	0.041	0.119	0.042	
			Edge 3	0	52	5260	16.5	16.5	16.5	16.4	0.874	0.285	0.874	0.285	1.010	0.346	1.034	0.354	
					60	5300	16.5	16.5	16.5	16.3	0.904	0.293	0.904	0.293	0.961	0.331	1.006	0.347	
			Edge 4	0	60	5300	16.5	16.5	16.5	16.3	0.131	0.046	0.131	0.046					

BOM #2

Band	Mode	Tx Condition/ Tx Antenna	Test Position	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)				SAR (W/kg)								Plot No.
							WiFi 1		WiFi 2		WiFi 1				WiFi 2				
							Tune-up Limit	Measured	Tune-up Limit	Measured	Measured		Scaled		Measured		Scaled		
											1-g	10-g	1-g	10-g	1-g	10-g	1-g	10-g	
5.3 GHz	802.11a	1 Tx	Edge 3	0	52	5260			16.5	16.5					0.960	0.328	0.960	0.328	

12.8.3. 5.5 GHz Band

BOM #1

Band	Mode	Tx Condition/ Tx Antenna	Test Position	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)				SAR (W/kg)								Plot No.
							WiFi 1		WiFi 2		WiFi 1				WiFi 2				
							Tune-up Limit	Measured	Tune-up Limit	Measured	Measured		Scaled		Measured		Scaled		
											1-g	10-g	1-g	10-g	1-g	10-g	1-g	10-g	
5.5 GHz	802.11a	1 Tx	Rear	0	116	5580	16.5	16.5			0.070	0.020	0.070	0.020					
			Edge 3	0	104	5520	16.5	16.5			0.746	0.232	0.746	0.232					
					116	5580	16.5	16.5			0.762	0.233	0.762	0.233					
					124	5620	16.5	16.5			0.838	0.256	0.838	0.256					
					136	5680	16.5	16.5			1.060	0.306	1.060	0.306					
			Edge 4	0	136	5620	16.5	16.5			0.167	0.058	0.167	0.058					
		1 Tx	Rear	0	136	5680			16.5	16.5					0.080	0.025	0.080	0.025	
			Edge 2	0	116	5580			16.5	16.5					0.092	0.030	0.092	0.030	
			Edge 3	0	104	5520			16.5	16.5					0.931	0.310	0.931	0.310	
					116	5580			16.5	16.5					1.090	0.359	1.090	0.359	11
					124	5620			16.5	16.5					1.000	0.327	1.000	0.327	
					136	5680			16.5	16.5					1.020	0.331	1.020	0.331	
	802.11a CDD MIMO	2 Tx	Rear	0	116	5580	16.0	16.0	16.0	16.0	0.060	0.021	0.060	0.021	0.053	0.021	0.053	0.021	
			Edge 2	0	116	5580	16.0	16.0	16.0	16.0					0.098	0.031	0.098	0.031	
			Edge 3	0	104	5520	16.0	16.0	16.0	16.0	0.677	0.208	0.677	0.208	0.841	0.276	0.841	0.276	
					116	5580	16.0	16.0	16.0	16.0	0.765	0.218	0.765	0.218	0.952	0.310	0.952	0.310	
					124	5620	16.0	16.0	16.0	15.8	0.742	0.231	0.742	0.231	0.857	0.276	0.897	0.289	
					136	5680	16.0	16.0	16.0	15.8	0.845	0.252	0.845	0.252	0.911	0.293	0.954	0.307	
			Edge 4	0	116	5580	16.0	16.0	16.0	16.0	0.143	0.050	0.143	0.050					
	802.11n HT20 STBC MIMO	2 Tx	Rear	0	120	5600	16.5	16.5	16.5	16.4	0.055	0.020	0.055	0.020	0.068	0.020	0.070	0.020	
			Edge 2	0	120	5600	16.5	16.5	16.5	16.4					0.083	0.028	0.085	0.029	
			Edge 3	0	104	5520	16.5	16.5	16.5	16.4	0.789	0.237	0.789	0.237	0.959	0.309	0.981	0.316	
					120	5600	16.5	16.5	16.5	16.4	0.888	0.262	0.888	0.262	0.996	0.322	1.019	0.330	
					136	5680	16.5	16.5	16.5	16.2	1.050	0.312	1.050	0.312	0.971	0.318	1.040	0.341	
			Edge 4	0	120	5600	16.5	16.5	16.5	16.4	0.165	0.052	0.165	0.052					

SAR Test Results for 5.5 GHz Band (continued)
BOM #2

Band	Mode	Tx Condition/ Tx Antenna	Test Position	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)				SAR (W/kg)								Plot No.
							WiFi 1		WiFi 2		WiFi 1				WiFi 2				
							Tune-up Limit	Measured	Tune-up Limit	Measured	Measured		Scaled		Measured		Scaled		
											1-g	10-g	1-g	10-g	1-g	10-g	1-g	10-g	
5.5 GHz	802.11a	1 Tx	Edge 3	0	116	5580			16.5	16.5					1.060	0.354	1.060	0.354	

Note(s):

1. Testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:
   ☐ ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   ☐ ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
   ☐ ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz

12.9. Bluetooth (DTS Band)

BOM #1

Mode	Tx Condition/ Tx Antenna	Test Position	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
GFSK	1 Tx	Rear	0	39	2441	13.0	13.0	0.029	0.029	0.012	0.012	
		Edge 2	0	39	2441	13.0	13.0	<.001	<.001	<.001	<.001	
		Edge 3	0	39	2441	13.0	13.0	0.361	0.361	0.107	0.107	12
		Edge 4	0	39	2441	13.0	13.0	0.057	0.057	0.025	0.025	

BOM #2

Mode	Tx Condition/ Tx Antenna	Test Position	Dist. (mm)	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
GFSK	1 Tx	Edge 3	0	39	2441	13.0	13.0	0.293	0.293	0.089	0.089	

Note(s):

1. Testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:
   - ☐ ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   - ☐ ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
   - ☐ ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz

13. SAR Measurement Variability

In accordance with published RF Exposure KDB procedure 865664 D01 SAR measurement 100 MHz to 6 GHz v01. These additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

13.1. The Highest Measured SAR Configuration in Each Frequency Band

Frequency Band (MHz)	Air Interface	Body
850	GSM 850	1.090 W/kg
	W-CDMA Band 5	1.190 W/kg
	LTE Band 5	1.190 W/kg
1900	GSM 1900	1.120 W/kg
	W-CDMA Band 2	1.100 W/kg
	LTE Band 2	1.190 W/kg
2400	WiFi 802.11b/g/n	1.190 W/kg
	Bluetooth	<0.800 W/kg
5200	WiFi 802.11a/n	0.851 W/kg
5300	WiFi 802.11a/n	1.060 W/kg
5500	WiFi 802.11a/n	1.090 W/kg
5800	WiFi 802.11a/n	0.994 W/kg

13.2. Repeated Measurement Results

Frequency band	Test Position	Proximity Sensor State	Mode	Ch #.	Freq. (MHz)	Meas. SAR (W/kg)		Largest to Smallest SAR Ratio	Note
						Original	Repeated		
W-CDMA Band 5	Rear	On	Rel 99 RMC 12.2kbps	4183	836.6	1.190	1.180	1.01	1
LTE Band 2	Rear	On	QPSK RB50,0	19100	1900.0	1.190	1.130	1.05	1

Band	Test Position	Mode	No. of Transmitters	Ch. #	Freq. (MHz)	1-g SAR (W/kg) Original		1-g SAR (W/kg) Repeated		Largest to Smallest SAR Ratio		Note
						WiFi 1	WiFi 2	WiFi 1	WiFi 2	WiFi 1	WiFi 2	
2.4GHz	Edge 3	802.11g CDD	1 Tx	6	2437		1.190		1.190		1.00	1
5.3GHz	Edge 3	802.11n HT40	1 Tx	46	5230		0.851		0.848		1.00	1
5.3GHz	Edge 3	802.11a CDD	1 Tx	52	5260		1.060		1.010		1.05	1
5.5GHz	Edge 3	802.11a CDD	1 Tx	116	5580		1.090		1.040		1.05	1
5.8GHz	Edge 3	802.11a CDD	1 Tx	165	5825		0.994		0.952		1.04	1

Note(s):

1. Second Repeated Measurement is not required since the ratio of the largest to smallest SAR for the original and first repeated measurement is not > 1.20.

14. Simultaneous Transmission SAR Analysis

KDB 447498 D01 General RF Exposure Guidance v05, introduces a new formula for calculating the SAR to Peak Location Ratio (SPLSR) between pairs of simultaneously transmitting antennas:

$$SPLSR = (SAR_1 + SAR_2)^{1.5} / Ri$$

Where:

SAR_1 is the highest measured or estimated SAR for the first of a pair of simultaneous transmitting antennas, in a specific test operating mode and exposure condition

SAR_2 is the highest measured or estimated SAR for the second of a pair of simultaneous transmitting antennas, in the same test operating mode and exposure condition as the first

Ri is the separation distance between the pair of simultaneous transmitting antennas. When the SAR is measured, for both antennas in the pair, it is determined by the actual x, y and z coordinates in the 1-g SAR for each SAR peak location, based on the extrapolated and interpolated result in the zoom scan measurement, using the formula of $[(x_1-x_2)^2 + (y_1-y_2)^2 + (z_1-z_2)^2]$

A new threshold of 0.04 is also introduced in the draft KDB. Thus, in order for a pair of simultaneous transmitting antennas with the sum of 1-g SAR > 1.6 W/kg to qualify for exemption from Simultaneous Transmission SAR measurements, it has to satisfy the condition of:

$$(SAR_1 + SAR_2)^{1.5} / Ri < 0.04$$

14.1. Estimated SAR for Simultaneous Transmission SAR Analysis

Considerations for SAR estimation

1. When standalone SAR test exclusion applies, standalone SAR must also be estimated to determine simultaneous transmission SAR test exclusion.
2. Dedicated Host Approach criteria for SAR test exclusion is likewise applied to SAR estimation, with certain distinctions between test exclusion and SAR estimation:
   - When the separation distance from the antenna to an adjacent edge is ≤ 5 mm, a distance of 5 mm is applied for SAR estimation; this is the same between test exclusion and SAR estimation calculations.
   - When the separation distance from the antenna to an adjacent edge is > 5 mm but ≤ 50 mm, the actual antenna-to-edge separation distance is applied for SAR estimation.
   - When the minimum test separation distance is > 50 mm, the estimated SAR value is 0.4 W/kg

14.1.1. Estimated SAR for WWAN

Antenna	Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Estimated 1-g SAR Value (W/kg)					
			dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
Full Power, Proximity Sensor Off. A sensor triggering of 16 mm is included for both Rear and Edge 1																
Cellular	GPRS 2 Slots	848.8	32.50	445	17.4	18.4	24.8	227.8	98.6		-MEASURE-	-MEASURE-	-MEASURE-	0.400	-MEASURE-	
Cellular	GPRS 2 Slots	1850.2	29.00	199	17.4	18.4	24.8	227.8	98.6		-MEASURE-	-MEASURE-	-MEASURE-	0.400	0.400	
Cellular	W-CDMA 5	846.6	24.50	282	17.4	18.4	24.8	227.8	98.6		-MEASURE-	-MEASURE-	-MEASURE-	0.400	0.400	
Cellular	W-CDMA 2	1907.6	22.30	170	17.4	18.4	24.8	227.8	98.6		-MEASURE-	-MEASURE-	-MEASURE-	0.400	0.400	
Cellular	LTE Band 2	1900	22.30	170	17.4	18.4	24.8	227.8	98.6		-MEASURE-	-MEASURE-	-MEASURE-	0.400	0.400	
Cellular	LTE Band 5	844	24.00	251	17.4	18.4	24.8	227.8	98.6		-MEASURE-	-MEASURE-	-MEASURE-	0.400	0.400	
Cellular	LTE Band 7	2560	22.30	170	17.4	18.4	24.8	227.8	98.6		-MEASURE-	-MEASURE-	-MEASURE-	0.400	0.400	

Use of WWAN estimated SAR in simultaneous transmission SAR analysis

- Edge 4: For wireless technologies and bands that qualify for SAR test exclusion and estimation, the value of **0.400** W/kg from the table above is used in simultaneous transmission analysis, and distinguished from measured SAR values with green text.

14.1.2. Estimated SAR for WiFi and Bluetooth

Antenna	Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Estimated 1-g SAR Value (W/kg)					
			dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
WiFi 1 / Bluetooth																
WiFi1	WiFi 2.4 GHz	2462	16.00	40	6.3	227.6	137.7	5	11		-MEASURE-	0.400	0.400	-MEASURE-	-MEASURE-	
WiFi1	WiFi 5.2 GHz	5230	14.00	25	6.3	227.6	137.7	5	11		-MEASURE-	0.400	0.400	-MEASURE-	-MEASURE-	
WiFi1	WiFi 5.3 GHz	5300	16.50	45	6.3	227.6	137.7	5	11		-MEASURE-	0.400	0.400	-MEASURE-	-MEASURE-	
WiFi1	WiFi 5.5 GHz	5680	16.50	45	6.3	227.6	137.7	5	11		-MEASURE-	0.400	0.400	-MEASURE-	-MEASURE-	
WiFi1	WiFi 5.8 GHz	5825	16.00	40	6.3	227.6	137.7	5	11		-MEASURE-	0.400	0.400	-MEASURE-	-MEASURE-	
WiFi1	Bluetooth	2402	13.00	20	6.3	227.6	137.7	5	11		-MEASURE-	0.400	0.400	-MEASURE-	0.376	
WiFi 2																
WiFi2	WiFi 2.4 GHz	2462	16.00	40	6.3	227.6	12	5	135.4		-MEASURE-	0.400	-MEASURE-	-MEASURE-	0.400	
WiFi2	WiFi 5.2 GHz	5230	14.00	25	6.3	227.6	12	5	135.4		-MEASURE-	0.400	-MEASURE-	-MEASURE-	0.400	
WiFi2	WiFi 5.3 GHz	5300	16.50	45	6.3	227.6	12	5	135.4		-MEASURE-	0.400	-MEASURE-	-MEASURE-	0.400	
WiFi2	WiFi 5.5 GHz	5680	16.50	45	6.3	227.6	12	5	135.4		-MEASURE-	0.400	-MEASURE-	-MEASURE-	0.400	
WiFi2	WiFi 5.8 GHz	5825	16.00	40	6.3	227.6	12	5	135.4		-MEASURE-	0.400	-MEASURE-	-MEASURE-	0.400	

Use of WiFi estimated SAR in simultaneous transmission SAR analysis

- Edge 2 for Bluetooth: Even though Bluetooth qualifies for test exclusion and SAR estimation at Edge 2, the estimated values were deemed too conservative. SAR measurement was subsequently made, with the resultant value of therefore made, with the resultant reported SAR value of **0.001 W/kg** used to Bluetooth in simultaneous transmission analysis.

14.2. Sum of the SAR for GSM850 + WiFi + Bluetooth

14.2.1. GSM 850 + 2.4GHz Band + Bluetooth

RF Exposure condition	Test Position	Simultaneous Transmission Scenario					∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		GSM 850	DTS Band			Bluetooth		
			WiFi 1	WiFi 2	WiFi 1 + 2			
Body	Rear	1.090	0.066				1.156	No
		1.090		0.087			1.177	No
		1.090			0.076		1.166	No
		1.090				0.029	1.119	No
	Edge 2	0.696		0.187			0.883	No
		0.696			0.181		0.877	No
		0.696				0.001	0.697	No
	Edge 4	0.218	0.126				0.344	No
		0.218			0.121		0.339	No
		0.218				0.057	0.275	No

14.2.2. GSM 850 + 5GHz Bands + Bluetooth

RF Exposure condition	Test Position	Simultaneous Transmission Scenario							∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		GSM850	DTS Band			UNII Band			Bluetooth		
			WiFi 1	WiFi 2	WiFi 1 + 2	WiFi 1	WiFi 2	WiFi 1 + 2			
Body	Rear	1.090	0.042						0.048	1.180	No
		1.090		0.057					0.048	1.195	No
		1.090			0.063				0.048	1.201	No
		1.090				0.070			0.048	1.208	No
		1.090					0.082		0.048	1.220	No
		1.090						0.070	0.048	1.208	No
	Edge 2	0.696		0.088					0.001	0.785	No
		0.696			0.085				0.001	0.782	No
		0.696					0.095		0.001	0.792	No
		0.696						0.119	0.001	0.816	No
	Edge 4	0.218	0.103						0.061	0.382	No
		0.218			0.110				0.061	0.389	No
		0.218				0.167			0.061	0.446	No
		0.218						0.165	0.061	0.444	No

SAR to Peak Location Separation Ratio (SPLSR)

As the Sum of the SAR is not greater than 1.6 W/kg SPLSR assessment is not required.

14.3. Sum of the SAR for GSM1900 + WiFi + Bluetooth

14.3.1. GSM 1900 + 2.4GHz Band + Bluetooth

RF Exposure condition	Test Position	Simultaneous Transmission Scenario					∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		GSM 1900	DTS Band			Bluetooth		
			WiFi 1	WiFi 2	WiFi 1 + 2			
Body	Rear	1.186	0.066				1.252	No
		1.186		0.087			1.273	No
		1.186			0.076		1.262	No
		1.186				0.029	1.215	No
	Edge 2	0.790		0.187			0.977	No
		0.790			0.181		0.971	No
		0.790				0.001	0.791	No
	Edge 4	0.400	0.126				0.526	No
		0.400			0.121		0.521	No
		0.400				0.057	0.457	No

14.3.2. GSM 1900 + 5GHz Bands + Bluetooth

RF Exposure condition	Test Position	Simultaneous Transmission Scenario							∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		GSM1900	DTS Band			UNII Band			Bluetooth		
			WiFi 1	WiFi 2	WiFi 1 + 2	WiFi 1	WiFi 2	WiFi 1 + 2			
Body	Rear	1.186	0.042						0.029	1.257	No
		1.186		0.057					0.029	1.272	No
		1.186			0.063				0.029	1.278	No
		1.186				0.070			0.029	1.285	No
		1.186					0.082		0.029	1.297	No
		1.186						0.070	0.029	1.285	No
	Edge 2	0.790		0.088					0.001	0.879	No
		0.790			0.085				0.001	0.876	No
		0.790					0.095		0.001	0.886	No
		0.790						0.119	0.001	0.910	No
	Edge 4	0.400	0.103						0.057	0.560	No
		0.400			0.110				0.057	0.567	No
		0.400				0.167			0.057	0.624	No
		0.400						0.165	0.057	0.622	No

SAR to Peak Location Separation Ratio (SPLSR)

As the Sum of the SAR is not greater than 1.6 W/kg SPLSR assessment is not required.

14.4. Sum of the SAR for W-CDMA Band 2 + WiFi + Bluetooth

14.4.1. W-CDMA Band 2 + 2.4GHz Band + Bluetooth

RF Exposure condition	Test Position	Simultaneous Transmission Scenario					∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		W-CDMA Band 2	DTS Band			Bluetooth		
			WiFi 1	WiFi 2	WiFi 1 + 2			
Body	Rear	1.100	0.066				1.166	No
		1.100		0.087			1.187	No
		1.100			0.076		1.176	No
		1.100				0.029	1.129	No
	Edge 2	0.653		0.187			0.840	No
		0.653			0.181		0.834	No
		0.653				0.001	0.654	No
	Edge 4	0.400	0.126				0.526	No
		0.400			0.121		0.521	No
		0.400				0.057	0.457	No

14.4.2. W-CDMA Band 2 + 5GHz Bands + Bluetooth

RF Exposure condition	Test Position	Simultaneous Transmission Scenario							∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		W-CDMA Band 2	DTS Band			UNII Band			Bluetooth		
			WiFi 1	WiFi 2	WiFi 1 + 2	WiFi 1	WiFi 2	WiFi 1 + 2			
Body	Rear	1.100	0.042						0.029	1.171	No
		1.100		0.057					0.029	1.186	No
		1.100			0.063				0.029	1.192	No
		1.100				0.070			0.029	1.199	No
		1.100					0.082		0.029	1.211	No
		1.100						0.070	0.029	1.199	No
	Edge 2	0.653		0.088					0.001	0.742	No
		0.653			0.085				0.001	0.739	No
		0.653					0.095		0.001	0.749	No
		0.653						0.119	0.001	0.773	No
	Edge 4	0.400	0.103						0.057	0.560	No
		0.400			0.110				0.057	0.567	No
		0.400				0.167			0.057	0.624	No
		0.400						0.165	0.057	0.622	No

SAR to Peak Location Separation Ratio (SPLSR)

As the Sum of the SAR is not greater than 1.6 W/kg SPLSR assessment is not required.

14.5. Sum of the SAR for W-CDMA Band 5 + WiFi + Bluetooth

14.5.1. W-CDMA Band 5 + 2.4GHz Band + Bluetooth

RF Exposure condition	Test Position	Simultaneous Transmission Scenario					∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		W-CDMA Band 5	DTS Band			Bluetooth		
			WiFi 1	WiFi 2	WiFi 1 + 2			
Body	Rear	1.190	0.066				1.256	No
		1.190		0.087			1.277	No
		1.190			0.076		1.266	No
		1.190				0.029	1.219	No
	Edge 2	0.583		0.187			0.770	No
		0.583			0.181		0.764	No
		0.583				0.001	0.584	No
	Edge 4	0.400	0.126				0.526	No
		0.400			0.121		0.521	No
		0.400				0.057	0.457	No

14.5.2. W-CDMA Band 5 + 5GHz Bands + Bluetooth

RF Exposure condition	Test Position	Simultaneous Transmission Scenario							∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		W-CDMA Band 5	DTS Band			UNII Band			Bluetooth		
			WiFi 1	WiFi 2	WiFi 1 + 2	WiFi 1	WiFi 2	WiFi 1 + 2			
Body	Rear	1.190	0.042						0.029	1.261	No
		1.190		0.057					0.029	1.276	No
		1.190			0.063				0.029	1.282	No
		1.190				0.070			0.029	1.289	No
		1.190					0.082		0.029	**1.301**	No
		1.190						0.070	0.029	1.289	No
	Edge 2	0.583		0.088					0.001	0.672	No
		0.583			0.085				0.001	0.669	No
		0.583					0.095		0.001	0.679	No
		0.583						0.119	0.001	0.703	No
	Edge 4	0.400	0.103						0.057	0.560	No
		0.400			0.110				0.057	0.567	No
		0.400				0.167			0.057	0.624	No
		0.400						0.165	0.057	0.622	No

SAR to Peak Location Separation Ratio (SPLSR)

As the Sum of the SAR is not greater than 1.6 W/kg SPLSR assessment is not required.

14.6. Sum of the SAR for LTE Band 2 + WiFi + Bluetooth

14.6.1. LTE Band 2 + 2.4GHz Band + Bluetooth

RF Exposure condition	Test Position	Simultaneous Transmission Scenario					∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		LTE Band 2	DTS Band			Bluetooth		
			WiFi 1	WiFi 2	WiFi 1 + 2			
Body	Rear	1.190	0.066				1.256	No
		1.190		0.087			1.277	No
		1.190			0.076		1.266	No
		1.190				0.029	1.219	No
	Edge 2	0.602		0.187			0.789	No
		0.602			0.181		0.783	No
		0.602				0.001	0.603	No
	Edge 4	0.400	0.126				0.526	No
		0.400			0.121		0.521	No
		0.400				0.057	0.457	No

14.6.2. LTE Band 2 + 5GHz Bands + Bluetooth

RF Exposure condition	Test Position	Simultaneous Transmission Scenario							∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		LTE Band 2	DTS Band			UNII Band			Bluetooth		
			WiFi 1	WiFi 2	WiFi 1 + 2	WiFi 1	WiFi 2	WiFi 1 + 2			
Body	Rear	1.190	0.042						0.029	1.261	No
		1.190		0.057					0.029	1.276	No
		1.190			0.063				0.029	1.282	No
		1.190				0.070			0.029	1.289	No
		1.190					0.082		0.029	1.301	No
		1.190						0.070	0.029	1.289	No
	Edge 2	0.602		0.088					0.001	0.691	No
		0.602			0.085				0.001	0.688	No
		0.602					0.095		0.001	0.698	No
		0.602						0.119	0.001	0.722	No
	Edge 4	0.400	0.103						0.057	0.560	No
		0.400			0.110				0.057	0.567	No
		0.400				0.167			0.057	0.624	No
		0.400						0.165	0.057	0.622	No

SAR to Peak Location Separation Ratio (SPLSR)

As the Sum of the SAR is not greater than 1.6 W/kg SPLSR assessment is not required.

14.7. Sum of the SAR for LTE Band 5 + WiFi + Bluetooth

14.7.1. LTE Band 5 + 2.4GHz Band + Bluetooth

RF Exposure condition	Test Position	Simultaneous Transmission Scenario					∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		LTE Band 5	DTS Band			Bluetooth		
			WiFi 1	WiFi 2	WiFi 1 + 2			
Body	Rear	1.190	0.066				1.256	No
		1.190		0.087			1.277	No
		1.190			0.076		1.266	No
		1.190				0.029	1.219	No
	Edge 2	0.660		0.187			0.847	No
		0.660			0.181		0.841	No
		0.660				0.001	0.661	No
	Edge 4	0.400	0.126				0.526	No
		0.400			0.121		0.521	No
		0.400				0.057	0.457	No

14.7.2. LTE Band 5 + 5GHz Bands + Bluetooth

RF Exposure condition	Test Position	Simultaneous Transmission Scenario							∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		LTE Band 5	DTS Band			UNII Band			Bluetooth		
			WiFi 1	WiFi 2	WiFi 1 + 2	WiFi 1	WiFi 2	WiFi 1 + 2			
Body	Rear	1.190	0.042						0.029	1.261	No
		1.190		0.057					0.029	1.276	No
		1.190			0.063				0.029	1.282	No
		1.190				0.070			0.029	1.289	No
		1.190					0.082		0.029	1.301	No
		1.190						0.070	0.029	1.289	No
	Edge 2	0.660		0.088					0.001	0.749	No
		0.660			0.085				0.001	0.746	No
		0.660					0.095		0.001	0.756	No
		0.660						0.119	0.001	0.780	No
	Edge 4	0.400	0.103						0.057	0.560	No
		0.400			0.110				0.057	0.567	No
		0.400				0.167			0.057	0.624	No
		0.400						0.165	0.057	0.622	No

SAR to Peak Location Separation Ratio (SPLSR)

As the Sum of the SAR is not greater than 1.6 W/kg SPLSR assessment is not required.

14.8. Sum of the SAR for WiFi DTS Bands+ Bluetooth

14.8.1. 5.8 GHz Bands

RF Exposure condition	Test Position	Simultaneous Transmission Scenario				∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		DTS Band			Bluetooth		
		WiFi 1	WiFi 2	WiFi 1 + 2			
Body	Rear	0.042			0.029	0.071	No
			0.057		0.029	0.086	No
				0.063	0.029	0.092	No
	Edge 2		0.088		0.001	0.089	No
				0.085	0.001	0.086	No
	Edge 3	0.902			0.361	1.263	No
			0.994		0.361	**1.355**	No
				0.962	0.361	1.323	No
	Edge 4	0.103			0.057	0.160	No
				0.110	0.057	0.167	No

SAR to Peak Location Separation Ratio (SPLSR)
As the Sum of the SAR is not greater than 1.6 W/kg SPLSR assessment is not required.

14.9. Sum of the SAR for WiFi UNII Bands + Bluetooth

RF Exposure condition	Test Position	Simultaneous Transmission Scenario				∑ 1-g SAR (mW/g)	SPLSR (Yes/ No)
		UNII Band			Bluetooth		
		WiFi 1	WiFi 2	WiFi 1 + 2			
Body	Rear	0.070			0.029	0.099	No
			0.082		0.029	0.111	No
				0.070	0.029	0.099	No
	Edge 2		0.095		0.001	0.096	No
				0.119	0.001	0.120	No
	Edge 3	1.060			0.361	1.421	No
			1.090		0.361	**1.451**	No
				1.050	0.361	1.411	No
	Edge 4	0.167			0.057	0.224	No
				0.165	0.057	0.222	No

SAR to Peak Location Separation Ratio (SPLSR)
As the Sum of the SAR is not greater than 1.6 W/kg SPLSR assessment is not required.

15. Appendixes

Refer to separated files for the following appendixes.

15.1. DUT and SAR setup Photos (STC)

15.2. Antenna Location and Separation Distances (STC)

15.3. System Performance Check Plots

15.4. Highest SAR Test Plots

15.5. Calibration Certificate for E-Field Probe EX3DV4 - SN 3749

15.6. Calibration Certificate for E-Field Probe EX3DV4 - SN 3871

15.7. Calibration Certificate for E-Field Probe EX3DV4 - SN 3772

15.8. Calibration Certificate for E-Field Probe EX3DV4 - SN 3751

15.9. Calibration Certificate for E-Field Probe EX3DV4 - SN 3686

15.10. Calibration Certificate for E-Field Probe EX3DV4 - SN 3901

15.11. Calibration Certificate for E-Field Probe EX3DV4 - SN 3885

15.12. Calibration Certificate for D835V2 - SN 4d002

15.13. Calibration Certificate for D1900V2 - SN 5d043

15.14. Calibration Certificate for D2450V2 - SN 899

15.15. Calibration Certificate for D5GHzV2 - SN 1003

15.16. Calibration Certificate for D5GHzV2 - SN 1138

END OF REPORT