



**SAR EVALUATION REPORT**

**FCC 47 CFR § 2.1093  
IEEE Std 1528-2013**

*For*  
**GSM/WCDMA/LTE + BLUETOOTH, DTS/UNII a/b/g/n/ac & ANT+**

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**Revision History**

Rev.	Date	Revisions	Revised By
--	4/14/2015	Initial Issue	--
A	4/16/2015	Updated Section 12 with correct the data	Nathan Sousa
B	4/17/2015	Updated Section 6.2 CA Information	Coltyce Sanders
C	4/23/2015	Updated SPLSR plots	Nathan Sousa
D	5/6/2015	Section 1: Corrected Highest Reported SAR Table Section 6.3: Updated Target Power for 2.4GHz	Coltyce Sanders

## Table of Contents

<b>1.</b>	<b>Attestation of Test Results .....</b>	<b>5</b>
<b>2.</b>	<b>Test Specification, Methods and Procedures.....</b>	<b>6</b>
<b>3.</b>	<b>Facilities and Accreditation.....</b>	<b>6</b>
<b>4.</b>	<b>SAR Measurement System &amp; Test Equipment .....</b>	<b>7</b>
4.1.	<i>SAR Measurement System.....</i>	7
4.2.	<i>SAR Scan Procedures.....</i>	8
4.3.	<i>Test Equipment.....</i>	10
<b>5.</b>	<b>Measurement Uncertainty.....</b>	<b>11</b>
<b>6.</b>	<b>Device Under Test (DUT) Information .....</b>	<b>12</b>
6.1.	<i>DUT Description .....</i>	12
6.2.	<i>Wireless Technologies.....</i>	12
6.3.	<i>Nominal and Maximum Output Power.....</i>	13
6.4.	<i>General LTE SAR Test and Reporting Considerations.....</i>	16
6.6.	<i>Power Reduction by Proximity Sensing .....</i>	18
6.6.1.	<i>Proximity Sensor Triggering Distance (KDB 616217 §6.2).....</i>	19
6.6.2.	<i>Proximity Sensor Coverage (KDB 616217 §6.3) .....</i>	20
6.6.3.	<i>Proximity Sensor Tilt Angle Assessment (KDB 616217 §6.4).....</i>	21
6.6.4.	<i>Resulting test positions for SAR measurements .....</i>	21
<b>7.</b>	<b>RF Exposure Conditions (Test Configurations).....</b>	<b>22</b>
7.1.	<i>Standalone SAR Test Exclusion Considerations.....</i>	22
7.2.	<i>Required Test Configurations .....</i>	25
<b>8.</b>	<b>Dielectric Property Measurements &amp; System Check .....</b>	<b>26</b>
8.1.	<i>Dielectric Property Measurements .....</i>	26
8.2.	<i>System Check.....</i>	30
<b>9.</b>	<b>Conducted Output Power Measurements.....</b>	<b>34</b>
9.1.	<i>GSM .....</i>	34
9.2.	<i>W-CDMA .....</i>	37
9.3.	<i>LTE.....</i>	42
9.4.	<i>Wi-Fi 2.4GHz (DTS Band) .....</i>	53
9.5.	<i>Wi-Fi 5GHz (U-NII Bands).....</i>	54
9.6.	<i>Bluetooth .....</i>	58
<b>10.</b>	<b>Measured and Reported (Scaled) SAR Results.....</b>	<b>59</b>
10.1.	<i>GSM850.....</i>	61

10.2.	GSM1900.....	61
10.3.	W-CDMA Band V .....	62
10.4.	W-CDMA Band II.....	62
10.5.	LTE Band 2 (20MHz Bandwidth) .....	62
10.6.	LTE Band 4 (20MHz Bandwidth) .....	63
10.7.	LTE Band 5 (10MHz Bandwidth) .....	63
10.8.	LTE Band 7 (20MHz Bandwidth) .....	64
10.9.	LTE Band 12 (10MHz Bandwidth) .....	64
10.10.	LTE Band 17 (10MHz Bandwidth) .....	64
10.11.	Wi-Fi (DTS Band).....	65
10.12.	Wi-Fi (U-NII Band).....	65
10.13.	Bluetooth.....	66
<b>11.</b>	<b>SAR Measurement Variability.....</b>	<b>67</b>
<b>12.</b>	<b>Simultaneous Transmission SAR Analysis.....</b>	<b>68</b>
12.1.	Sum of the SAR for GSM850 & Wi-Fi & BT .....	70
12.2.	Sum of the SAR for GSM1900 & Wi-Fi & BT .....	70
12.3.	Sum of the SAR for WCDMA Band V & Wi-Fi & BT .....	71
12.4.	Sum of the SAR for WCDMA Band II & Wi-Fi & BT .....	71
12.5.	Sum of the SAR for LTE Band 2 & Wi-Fi & BT .....	72
12.6.	Sum of the SAR for LTE Band 4 & Wi-Fi & BT .....	72
12.7.	Sum of the SAR for LTE Band 5 & Wi-Fi & BT .....	73
12.8.	Sum of the SAR for LTE Band 7 & Wi-Fi & BT .....	73
12.9.	Sum of the SAR for LTE Band 12 & Wi-Fi & BT .....	74
12.10.	Sum of the SAR for LTE Band 17 & Wi-Fi & BT .....	74
<b>Appendixes .....</b>	<b>83</b>	
A_	15U20030v0 SAR Photos & Ant. Locations.....	83
B_	15U20030v0 SAR System Check Plots.....	83
C_	15U20030v0 SAR Highest Test Plots.....	83
D_	15U20030v0 SAR Tissue Ingredients .....	83
E_	15U20030v0 SAR Probe Cal. Certificates .....	83
F_	15U20030v0 SAR Dipole Cal. Certificates.....	83

# 1. Attestation of Test Results

Applicant Name	SONY MOBILE COMMUNICATIONS, INC.			
FCC ID	PY7-TM0061			
Applicable Standards	FCC 47 CFR § 2.1093 Published RF exposure KDB procedures IEEE Std 1528-2013			
<b>SAR Limits (W/Kg)</b>				
Exposure Category	Peak spatial-average(1g of tissue)			
General population / Uncontrolled exposure	1.6			
<b>The Highest Reported SAR (W/kg)</b>				
<b>RF Exposure Conditions</b>	<b>Equipment Class</b>			
	<b>Licensed</b>	<b>DTS</b>	<b>U-NII</b>	<b>DSS (BT)</b>
Standalone	1.184	0.789	0.820	0.354
Simultaneous Tx	1.544		1.517	1.538
Date Tested	3/2/2015 to 4/6/2015			
Test Results	Pass			
<p>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.</p> <p><b>Note:</b> 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.</p>				
Approved & Released By:		Prepared By:		
				
Devin Chang Senior Engineer UL Verification Services Inc.		Nathan Sousa Laboratory Engineer UL Verification Services Inc.		

## 2. Test Specification, Methods and Procedures

The tests documented in this report were performed in accordance with FCC 47 CFR § 2.1093, IEEE STD 1528-2013, the following FCC Published RF exposure [KDB](#) procedures:

- 248227 D01 802.11 Wi-Fi SAR v02
- 447498 D01 General RF Exposure Guidance v05r02
- 616217 D04 SAR for laptop and tablets v01r01
- 690783 D01 SAR Listings on Grants v01r03
- 865664 D01 SAR measurement 100 MHz to 6 GHz v01r03
- 865664 D02 RF Exposure Reporting v01r01
- 941225 D01 3G SAR Procedures v03
- 941225 D05 SAR for LTE Devices v02r03
- 941225 D06 Hotspot Mode v02

## 3. Facilities and Accreditation

The test sites and measurement facilities used to collect data are located at

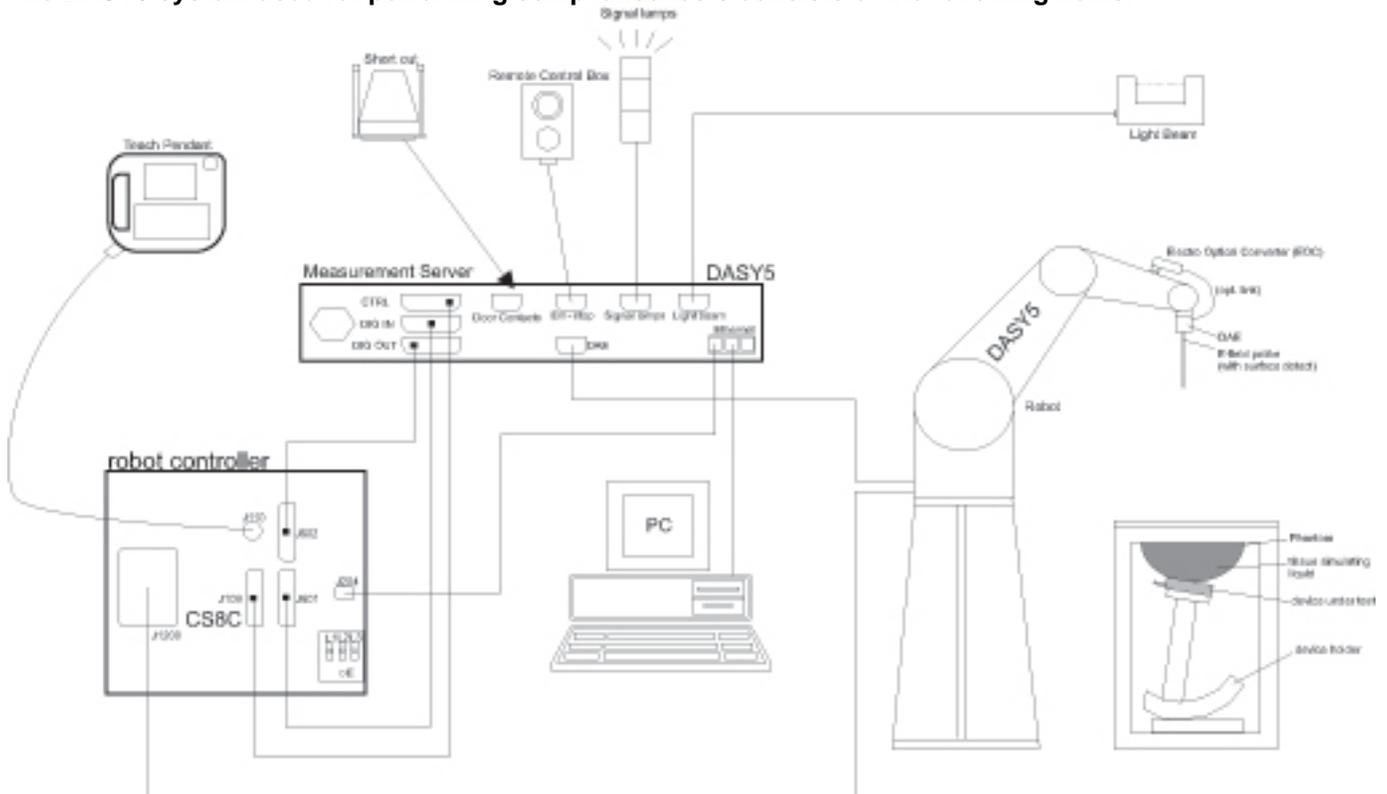
47173 Benicia Street	47266 Benicia Street
SAR Lab A	SAR Lab 1
SAR Lab B	SAR Lab 2
SAR Lab C	SAR Lab 3
SAR Lab D	SAR Lab 4
SAR Lab E	SAR Lab 5
SAR Lab F	
SAR Lab G	
SAR Lab H	

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://ts.nist.gov/standards/scopes/2000650.htm>

## 4. SAR Measurement System & Test Equipment

### 4.1. SAR Measurement System

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.

## 4.2. SAR Scan Procedures

### 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

	$\leq 3$ GHz	$> 3$ GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	$5 \pm 1$ mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
Maximum area scan spatial resolution: $\Delta x_{Area}$ , $\Delta y_{Area}$	$\leq 2$ GHz: $\leq 15$ mm 2 – 3 GHz: $\leq 12$ mm	3 – 4 GHz: $\leq 12$ mm 4 – 6 GHz: $\leq 10$ 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 $\leq$ 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

		$\leq 3$ GHz	$> 3$ GHz	
Maximum zoom scan spatial resolution: $\Delta x_{\text{Zoom}}, \Delta y_{\text{Zoom}}$		$\leq 2$ GHz: $\leq 8$ mm 2 – 3 GHz: $\leq 5$ mm *	3 – 4 GHz: $\leq 5$ mm* 4 – 6 GHz: $\leq 4$ mm*	
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{\text{Zoom}}(n)$	$\leq 5$ mm	3 – 4 GHz: $\leq 4$ mm 4 – 5 GHz: $\leq 3$ mm 5 – 6 GHz: $\leq 2$ mm	
	graded grid	$\Delta z_{\text{Zoom}}(1)$ : between 1 <sup>st</sup> two points closest to phantom surface	$\leq 4$ mm	3 – 4 GHz: $\leq 3$ mm 4 – 5 GHz: $\leq 2.5$ mm 5 – 6 GHz: $\leq 2$ mm
		$\Delta z_{\text{Zoom}}(n>1)$ : between subsequent points	$\leq 1.5 \cdot \Delta z_{\text{Zoom}}(n-1)$	
Minimum zoom scan volume	x, y, z	$\geq 30$ mm	3 – 4 GHz: $\geq 28$ mm 4 – 5 GHz: $\geq 25$ mm 5 – 6 GHz: $\geq 22$ mm	
Note: $\delta$ 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 <i>reported</i> SAR from the area scan based <i>1-g SAR estimation</i> procedures of KDB 447498 is $\leq 1.4$ W/kg, $\leq 8$ mm, $\leq 7$ mm and $\leq 5$ 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.

### 4.3. Test Equipment

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.

#### Dielectric Property Measurements

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Network Analyzer	Agilent	E753ES	MY40000980	4/7/2015
Dielectronic Probe kit	SPEAG	DAK-3.5	1082	9/16/2015
Dielectronic Probe kit	SPEAG	DAK-3.5 Short	SM DAK 200 BA	N/A
Thermometer	Control Company	Traceable	122529163	10/8/2015

#### System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
HP Signal Generator	HP	8665B	3546A00784	6/23/2015
Power Meter	HP	437B	3125U09516	10/6/2015
Power Meter	Agilent	N1911A	MY53060016	8/7/2015
Power Sensor	Agilent	E9323A	MY53070003	5/1/2015
Power Sensor	Agilent	8481A	3318A95392	10/6/2015
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1622052	N/A
Bi-directional coupler	Werlatone, Inc.	C8060-102	2711	N/A
DC Power Supply	Sorensen Ametek	XT20-3	1318A00530	N/A
Synthesized Signal Generator	Agilent	8665B	3438A00633	7/10/2015
Power Meter	HP	437B	3125U11347	8/27/2015
Power Meter	HP	437B	3125U16345	6/16/2015
Power Sensor	HP	8481A	2702A60780	6/16/2015
Power Sensor	HP	8481A	1926A16917	10/10/2015
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1808938	N/A
Bi-directional coupler	Werlatone, Inc.	C8060-102	2710	N/A
DC Power Supply	HP	6296A	2841A-05955	N/A
E-Field Probe (SAR Lab 1)	SPEAG	EX3DV4	3902	5/19/2015
E-Field Probe (SAR Lab 2)	SPEAG	EX3DV3	3773	4/22/2015
E-Field Probe (SAR Lab 3)	SPEAG	EX3DV4	3749	1/26/2016
E-Field Probe (SAR Lab 4)	SPEAG	EX3DV4	3929	5/9/2015
E-Field Probe (SAR Lab 5)	SPEAG	EX3DV4	3991	5/16/2015
Data Acquisition Electronics (SAR Lab 1)	SPEAG	DAE4	1352	11/7/2015
Data Acquisition Electronics (SAR Lab 2)	SPEAG	DAE4	1259	1/14/2016
Data Acquisition Electronics (SAR Lab 3)	SPEAG	DAE4	1380	7/23/2015
Data Acquisition Electronics (SAR Lab 4)	SPEAG	DAE4	1377	8/27/2015
Data Acquisition Electronics (SAR Lab 5)	SPEAG	DAE4	1439	5/14/2015
System Validation Dipole	SPEAG	D750V3	1024	5/16/2015
System Validation Dipole	SPEAG	D835V2	4d142	9/9/2015
System Validation Dipole	SPEAG	D1750V2	1077	9/11/2015
System Validation Dipole	SPEAG	D1900V2	5d163	9/11/2015
System Validation Dipole	SPEAG	D2450V2	706	9/10/2015
System Validation Dipole	SPEAG	D2450V2	748	2/20/2016
System Validation Dipole	SPEAG	D2600V2	1006	9/10/2015
System Validation Dipole	SPEAG	D5GHzV2	1168	12/4/2015
Thermometer (SAR Lab 1)	EXTECH	445703	CCS-205	3/20/2016
Thermometer (SAR Lab 2)	EXTECH	445703	CCS-203	3/19/2016
Thermometer (SAR Lab 3)	EXTECH	445703	CCS-237	6/3/2015
Thermometer (SAR Lab 4)	EXTECH	445703	CCS-238	6/3/2015
Thermometer (SAR Lab 5)	EXTECH	445703	CCS-239	6/3/2015

**Other**

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Power Meter	Agilent	N1912A	MY52310061	12/6/2015
Power Sensor	Agilent	N1921A	MY52020011	5/6/2015
Power Sensor	Agilent	N1921A	MY53020038	3/6/2016
Base Station Simulator	R & S	CMW500	132910-cp	10/16/2015
Base Station Simulator	R & S	CMW500	137873-WG	7/14/2015
Base Station Simulator	R & S	CMW500	125236-ES	1/19/2016
Base Station Simulator	R & S	CMW500	135384-pJ	7/15/2015
Base Station Simulator	R & S	CMW500	135393-VQ	3/17/2016
Base Station Simulator	R & S	CMW500	124594-HX	10/15/2015
Base Station Simulator	R & S	CMW500	135387-nG	7/8/2015
Base Station Simulator	R & S	CBT	100900-ac	7/8/2015
Base Station Simulator	Agilent	8960	MY53211024	9/19/2015

**5. Measurement Uncertainty**

Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz, 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 1528-2013 is not required in SAR reports submitted for equipment approval.

## 6. Device Under Test (DUT) Information

### 6.1. DUT Description

Back Cover	<input checked="" type="checkbox"/> The rechargeable battery is not user accessible.
Battery Options	<input checked="" type="checkbox"/> The rechargeable battery is not user accessible.
Wireless Router (Hotspot)	Wi-Fi Hotspot mode permits the device to share its cellular data connection with other Wi-Fi-enabled devices. <input checked="" type="checkbox"/> Mobile Hotspot (Wi-Fi 2.4 GHz) <input checked="" type="checkbox"/> Mobile Hotspot (Wi-Fi 5 GHz UNII 1 and UNII 3 only)
Wi-Fi Direct	Wi-Fi Direct enabled devices transfer data directly between each other <input checked="" type="checkbox"/> Wi-Fi Direct (Wi-Fi 2.4 GHz) <input checked="" type="checkbox"/> Wi-Fi Direct (Wi-Fi 5 GHz)
Accessory/ies	FCC ID: PY7-RD0101

### 6.2. Wireless Technologies

Wireless technologies	Frequency bands	Operating mode		Duty Cycle used for SAR testing
GSM	850 1900	GPRS (GMSK)	GPRS Multi-Slot Class: <input type="checkbox"/> Class 8 - One Up <input type="checkbox"/> Class 10 - Two Up <input type="checkbox"/> Class 12 - Four Up <input checked="" type="checkbox"/> Class 33 - Four Up	(E)GPRS: 1 Slot: 12.5% 2 Slots: 25% 3 Slots: 37.5% 4 Slots: 50%
		EGPRS (8PSK)		
Does this device support DTM (Dual Transfer Mode)? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No				
W-CDMA (UMTS)	Band II Band V	UMTS Rel. 99 (Voice & Data) HSDPA (Rel. 5) HSUPA (Rel. 6) DC-HSDPA (Rel. 8) HSPA+ (Rel. 7)		100%
LTE (FDD)	Band 2 Band 4 Band 5 Band 7 Band 12 Band 17	QPSK 16QAM <input type="checkbox"/> Rel. 10 Does not support Carrier Aggregation (CA) <input checked="" type="checkbox"/> Rel. 10 Carrier Aggregation (Downlink Only) (Non-US operations supported for CA) <input type="checkbox"/> Rel. 11 Carrier Aggregation (2 Uplink and 2 Downlinks)		100%
		Does this device support SV-LTE (1xRTT-LTE)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
Wi-Fi	2.4 GHz	802.11b 802.11g 802.11n (HT20)		100%
	5 GHz	802.11a 802.11n (HT20) 802.11n (HT40) 802.11ac (VHT20) 802.11ac (VHT40) 802.11ac (VHT80)		100%
	Does this device support bands 5.60 ~ 5.65 GHz (TDWR disabled)? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
Does this device support Band gap channels? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No				
Bluetooth	2.4 GHz	Version 4.1 LE		77.5% (DH5)

### 6.3. Nominal and Maximum Output Power

KDB 447498 sec.4.1.(3) at the maximum rated output power and within the tune-up tolerance range specified for the product, but not more than 2 dB lower than the maximum tune-up tolerance limit

RF Air interface	Mode		Full Power			Reduce Power		
			Target (dBm)	Tolerance (dB)	Max. Tune-up Limit (dBm)	Target (dBm)	Tolerance (dB)	Max. Tune-up Limit (dBm)
GSM850	GSM	Voice	33.0	-1.0 ~ 0.7	<b>33.7</b>	26.0	-2.0 ~ 1.7	<b>27.7</b>
		GPRS GMSK	Tx Slot 1	33.0	-1.0 ~ 0.7	<b>33.7</b>	26.0	-2.0 ~ 1.7
	Tx Slot 2		31.5	-1.3 ~ 0.7	<b>32.2</b>	24.5	-2.3 ~ 1.7	<b>26.2</b>
	Tx Slot 3		29.5	-1.3 ~ 0.7	<b>30.2</b>	22.5	-2.3 ~ 1.7	<b>24.2</b>
	Tx Slot 4		28.5	-1.3 ~ 0.7	<b>29.2</b>	21.5	-2.3 ~ 1.7	<b>23.2</b>
	EGPRS 8PSK	Tx Slot 1	27.0	-1.5 ~ 1.0	<b>28.0</b>	27.0	-1.5 ~ 1.0	<b>28.0</b>
		Tx Slot 2	25.0	-1.5 ~ 1.0	<b>26.0</b>	25.0	-1.5 ~ 1.0	<b>26.0</b>
		Tx Slot 3	23.0	-1.5 ~ 1.0	<b>24.0</b>	23.0	-1.5 ~ 1.0	<b>24.0</b>
Tx Slot 4		21.5	-1.5 ~ 1.0	<b>22.5</b>	21.5	-1.5 ~ 1.0	<b>22.5</b>	
GSM1900	GSM	Voice	30.0	-1.0 ~ 0.7	<b>30.7</b>	16.5	-2.0 ~ 1.7	<b>18.2</b>
		GPRS GMSK	Tx Slot 1	30.0	-1.0 ~ 0.7	<b>30.7</b>	16.5	-2.0 ~ 1.7
	Tx Slot 2		28.5	-1.3 ~ 0.7	<b>29.2</b>	15.0	-2.3 ~ 1.7	<b>16.7</b>
	Tx Slot 3		26.5	-1.3 ~ 0.7	<b>27.2</b>	14.0	-2.3 ~ 1.7	<b>15.7</b>
	Tx Slot 4		25.5	-1.3 ~ 0.7	<b>26.2</b>	12.0	-2.3 ~ 1.7	<b>13.7</b>
	EGPRS 8PSK	Tx Slot 1	26.0	-1.5 ~ 1.0	<b>27.0</b>	16.2	-2.5 ~ 2.0	<b>18.2</b>
		Tx Slot 2	24.0	-1.5 ~ 1.0	<b>25.0</b>	14.7	-2.5 ~ 2.0	<b>16.7</b>
		Tx Slot 3	22.0	-1.5 ~ 1.0	<b>23.0</b>	13.7	-2.5 ~ 2.0	<b>15.7</b>
Tx Slot 4		21.0	-1.5 ~ 1.0	<b>22.0</b>	11.7	-2.5 ~ 2.0	<b>13.7</b>	

#### Dual Transfer Mode

RF Air interface	Mode		Full Power			Reduce Power			
			Target (dBm)	Tolerance (dB)	Max. Tune-up Limit (dBm)	Target (dBm)	Tolerance (dB)	Max. Tune-up Limit (dBm)	
GSM850	GSM (Voice) + GPRS(Data)	Tx Slot 1	CS	33.0	-1.0 ~ 0.7	<b>33.7</b>	26.0	-2.0 ~ 1.7	<b>27.7</b>
		Tx Slot 2	CS	31.5	-1.3 ~ 0.7	<b>32.2</b>	24.5	-2.3 ~ 1.7	<b>26.2</b>
			PS	31.5	-1.3 ~ 0.7	<b>32.2</b>	24.5	-2.3 ~ 1.7	<b>26.2</b>
		Tx Slot 3	CS	29.5	-1.3 ~ 0.7	<b>30.2</b>	22.5	-2.3 ~ 1.7	<b>24.2</b>
	PS		29.5	-1.3 ~ 0.7	<b>30.2</b>	22.5	-2.3 ~ 1.7	<b>24.2</b>	
	GSM (Voice) + EGPRS(Data) MCS5-9	Tx Slot 1	CS	33.0	-1.0 ~ 0.7	<b>33.7</b>	26.0	-2.0 ~ 1.7	<b>27.7</b>
		Tx Slot 2	CS	31.5	-1.3 ~ 0.7	<b>32.2</b>	24.5	-2.3 ~ 1.7	<b>26.2</b>
			PS	25.0	-1.5 ~ 1.0	<b>26.0</b>	25.0	-1.5 ~ 1.0	<b>26.0</b>
Tx Slot 3		CS	29.5	-1.3 ~ 0.7	<b>30.2</b>	22.5	-2.3 ~ 1.7	<b>24.2</b>	
	PS	23.0	-1.5 ~ 1.0	<b>24.0</b>	23.0	-1.5 ~ 1.0	<b>24.0</b>		
GSM1900	GSM (Voice) + GPRS(Data)	Tx Slot 1	CS	30.0	-1.0 ~ 0.7	<b>30.7</b>	16.5	-2.0 ~ 1.7	<b>18.2</b>
		Tx Slot 2	CS	28.5	-1.3 ~ 0.7	<b>29.2</b>	15.0	-2.3 ~ 1.7	<b>16.7</b>
			PS	28.5	-1.3 ~ 0.7	<b>29.2</b>	15.0	-2.3 ~ 1.7	<b>16.7</b>
		Tx Slot 3	CS	26.5	-1.3 ~ 0.7	<b>27.2</b>	14.0	-2.3 ~ 1.7	<b>15.7</b>
	PS		26.5	-1.3 ~ 0.7	<b>27.2</b>	14.0	-2.3 ~ 1.7	<b>15.7</b>	
	GSM (Voice) + EGPRS(Data) MCS5-9	Tx Slot 1	CS	30.0	-1.0 ~ 0.7	<b>30.7</b>	16.5	-2.0 ~ 1.7	<b>18.2</b>
		Tx Slot 2	CS	28.5	-1.3 ~ 0.7	<b>29.2</b>	15.0	-2.3 ~ 1.7	<b>16.7</b>
			PS	24.0	-1.5 ~ 1.0	<b>25.0</b>	14.7	-2.5 ~ 2.0	<b>16.7</b>
Tx Slot 3		CS	26.5	-1.3 ~ 0.7	<b>27.2</b>	14.0	-2.3 ~ 1.7	<b>15.7</b>	
	PS	22.0	-1.5 ~ 1.0	<b>23.0</b>	13.7	-2.5 ~ 2.0	<b>15.7</b>		

Note: CS : circuid sw itched PS : packet sw itched

RF Air interface	Mode		Full Power			Reduce Power		
			Target (dBm)	Tolerance (dB)	Max. Tune-up Limit (dBm)	Target (dBm)	Tolerance (dB)	Max. Tune-up Limit (dBm)
WCDMA Band II	R99		22.6	-1.1 ~ 0.8	23.4	9.0	-2.0 ~ 2.0	11.0
	HSDPA	Subtest 1	20.1	-2.0 ~ 1.5	21.6	9.0	-2.0 ~ 2.0	11.0
		Subtest 2	20.1	-2.0 ~ 1.5	21.6	9.0	-2.0 ~ 2.0	11.0
		Subtest 3	19.5	-2.0 ~ 1.5	21.0	9.0	-2.0 ~ 2.0	11.0
		Subtest 4	19.5	-2.0 ~ 1.5	21.0	9.0	-2.0 ~ 2.0	11.0
	HSUPA	Subtest 1	21.8	-2.0 ~ 1.5	23.3	9.0	-3.0 ~ 2.0	11.0
		Subtest 2	21.5	-2.0 ~ 1.5	23.0	9.0	-3.0 ~ 2.0	11.0
		Subtest 3	20.9	-2.0 ~ 1.5	22.4	9.0	-3.0 ~ 2.0	11.0
		Subtest 4	21.5	-2.0 ~ 1.5	23.0	9.0	-3.0 ~ 2.0	11.0
		Subtest 5	21.8	-2.0 ~ 1.5	23.3	9.0	-3.0 ~ 2.0	11.0
	DC-HSDPA	Subtest 1	20.1	-2.0 ~ 1.5	21.6	9.0	-2.0 ~ 2.0	11.0
		Subtest 2	20.1	-2.0 ~ 1.5	21.6	9.0	-2.0 ~ 2.0	11.0
		Subtest 3	19.5	-2.0 ~ 1.5	21.0	9.0	-2.0 ~ 2.0	11.0
Subtest 4		19.5	-2.0 ~ 1.5	21.0	9.0	-2.0 ~ 2.0	11.0	
WCDMA Band V	R99		24.1	-1.3 ~ 0.7	24.8	19.0	-1.0 ~ 1.0	20.0
	HSDPA	Subtest 1	20.6	-2.0 ~ 1.5	22.1	18.4	-2.0 ~ 1.6	20.0
		Subtest 2	20.6	-2.0 ~ 1.5	22.1	18.4	-2.0 ~ 1.6	20.0
		Subtest 3	20.0	-2.0 ~ 1.5	21.5	17.8	-2.0 ~ 2.0	19.8
		Subtest 4	20.0	-2.0 ~ 1.5	21.5	17.8	-2.0 ~ 2.0	19.8
	HSUPA	Subtest 1	22.6	-2.0 ~ 1.5	24.1	18.3	-2.0 ~ 1.7	20.0
		Subtest 2	21.8	-2.0 ~ 1.5	23.3	17.8	-2.0 ~ 2.0	19.8
		Subtest 3	21.8	-2.0 ~ 1.5	23.3	17.4	-2.0 ~ 2.0	19.4
		Subtest 4	21.8	-2.0 ~ 1.5	23.3	17.8	-2.0 ~ 2.0	19.8
		Subtest 5	22.6	-2.0 ~ 1.5	24.1	18.3	-2.0 ~ 1.7	20.0
	DC-HSDPA	Subtest 1	20.6	-2.0 ~ 1.5	22.1	18.4	-2.0 ~ 1.6	20.0
		Subtest 2	20.6	-2.0 ~ 1.5	22.1	18.4	-2.0 ~ 1.6	20.0
		Subtest 3	20.0	-2.0 ~ 1.5	21.5	17.8	-2.0 ~ 2.0	19.8
Subtest 4		20.0	-2.0 ~ 1.5	21.5	17.8	-2.0 ~ 2.0	19.8	
RF Air interface	Mode		Full Power			Reduce Power		
			Target (dBm)	Tolerance (dB)	Max. Tune-up Limit (dBm)	Target (dBm)	Tolerance (dB)	Max. Tune-up Limit (dBm)
LTE B2	QPSK		22.2	-1.2 ~ 1.0	23.2	9.0	-2.0 ~ 2.0	11.0
	16QAM		21.2	-1.2 ~ 1.0	22.2	9.0	-2.0 ~ 2.0	11.0
LTE B4	QPSK		22.2	-1.2 ~ 1.0	23.2	10.2	-2.0 ~ 2.0	12.2
	16QAM		21.2	-1.2 ~ 1.0	22.2	10.2	-2.0 ~ 2.0	12.2
LTE B5	QPSK		23.0	-1.5 ~ 1.1	24.1	19.0	-1.0 ~ 1.0	20.0
	16QAM		22.0	-1.5 ~ 1.1	23.1	19.0	-1.0 ~ 1.0	20.0
LTE B7	QPSK		23.0	-2.0 ~ 0.7	23.7	9.5	-2.0 ~ 2.0	11.5
	16QAM		22.0	-2.0 ~ 0.7	22.7	9.5	-2.0 ~ 2.0	11.5
LTE B12	QPSK		23.0	-1.5 ~ 1.1	24.1	19.0	-1.0 ~ 1.0	20.0
	16QAM		22.0	-1.5 ~ 1.1	23.1	19.0	-1.0 ~ 1.0	20.0
LTE B17	QPSK		23.0	-1.5 ~ 1.1	24.1	19.0	-1.0 ~ 1.0	20.0
	16QAM		22.0	-1.5 ~ 1.1	23.1	19.0	-1.0 ~ 1.0	20.0

RF Air interface	Mode	Channel	Main Ant	Sub Ant
			Max. Tune-up Limit (dBm)	
Wi-Fi 2.4 GHz	802.11b	1 ~ 11	11.5	10.0
		12	11.5	10.0
		13	11.5	10.0
	802.11g	1 ~ 11	11.5	10.0
		12	11.5	10.0
		13	7.0	7.2
	802.11n HT20	1 ~ 11	11.5	10.0
		12	9.4	9.4
		13	6.5	6.5
Wi-Fi 5 GHz	802.11a	All	9.8	9.0
	802.11n HT20	All	9.8	9.0
	802.11n HT40	All	9.8	9.0
	802.11ac VHT20	All	9.8	9.0
	802.11ac VHT40	All	9.8	9.0
	802.11ac VHT80	All	9.7	8.9
Bluetooth	BDR	Low	6.5	N/A
		Mid	10.0	N/A
		High	7.5	N/A
	EDR	Low	5.0	N/A
		Mid	7.3	N/A
		High	4.5	N/A
	BLE	Low	3.5	N/A
		Mid	5.9	N/A
		High	4.5	N/A

### 6.4. General LTE SAR Test and Reporting Considerations

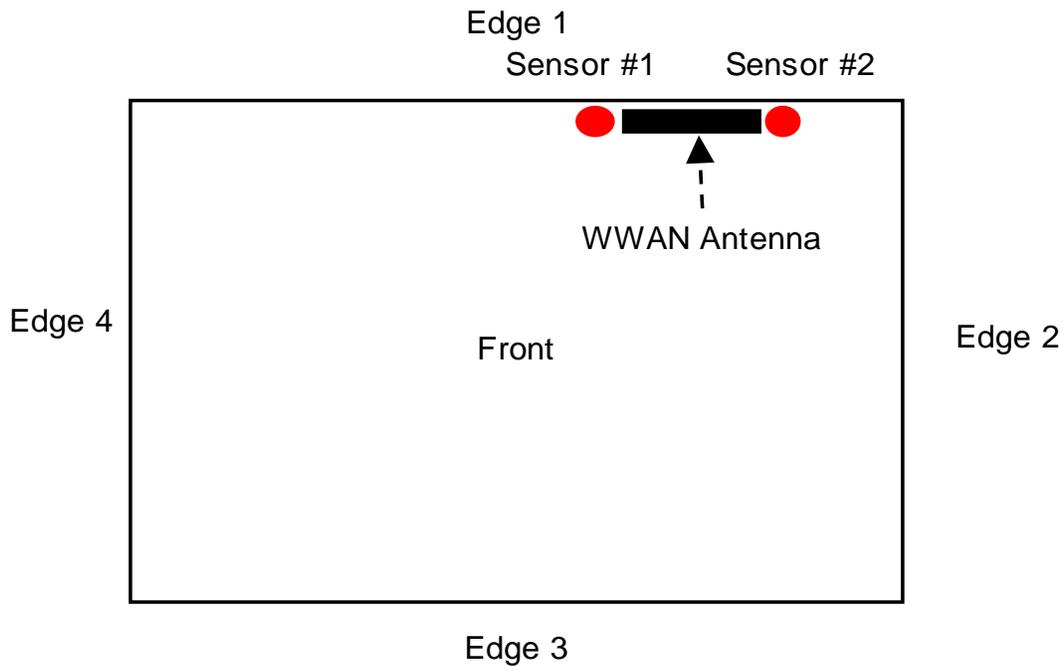
Item	Description						
Frequency range, Channel Bandwidth, Numbers and Frequencies	Band 2	Frequency range: 1850 - 1910 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low	18700 /1860	18675/ 1857.5	18650/ 1855	18625/ 1852.5	18615/ 1851.5	18607/ 1850.7
	Mid	18900/ 1880	18900/ 1880	18900/ 1880	18900/ 1880	18900/ 1880	18900/ 1880
	High	19100/ 1900	19125/ 1902.5	19150/ 1905	19175/ 1907.5	19185/ 1908.5	19193/ 1909.3
	Band 4	Frequency range: 1710 - 1755 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low	20050/ 1720	20025/ 1717.5	20000/ 1715	19975/ 1712.5	19965/ 1711.5	19957/ 1710.7
	Mid	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5
	High	20300/ 1745	20325/ 1747.5	20350/ 1750	20375/ 1752.5	20385/ 1753.5	20393/ 1754.3
	Band 5	Frequency range: 824 - 849 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low			20450/ 829	20425/ 826.5	20415/ 825.5	20407/ 824.7
	Mid			20525/ 836.5	20525/ 836.5	20525/ 836.5	20525/ 836.5
	High			20600/ 844	20625/ 846.5	20635/ 847.5	20643/ 848.3
	Band 7	Frequency range: 2500 - 2570 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low	20850 2510	20825 2507.5	20800 2505	20775 2502.5		
	Mid	21100 2535	21100 2535	21100 2535	21100 2535		
	High	21350 2560	21375 2562.5	21400 2565	21425 2567.5		
	Band 12	Frequency range: 699 – 716 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
Low			23060/ 704	23035/ 701.5	23025/ 700.5	23017/ 699.7	
Mid			23095/ 707.5	23095/ 707.5	23095/ 707.5	23095/ 707.5	
High			23130/ 711	23155/ 713.5	23165/ 714.5	23173/ 715.3	
Band 17	Frequency range: 704 - 716 MHz						
	Channel Bandwidth						
	20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz	
Low				23755/ 706.5			
Mid			23790/ 710	23790/ 710			
High				23825/ 713.5			

**General LTE SAR Test and Reporting Considerations (Continued)**

Carrier Aggregation Combinations	Band 7	Channel Bandwidth				Band 7	Channel Bandwidth																																									
	Primary	20 MHz	15 MHz	10 MHz	5 MHz	Secondary	20 MHz	15 MHz	10 MHz	5 MHz																																						
Low	20850	20825	20800	20775	Secondary Cell is Downlink only																																											
	2510	2507.5	2505	2502.5																																												
	21100	21100	21100	21100																																												
2535	2535	2535	2535																																													
21350	21375	21400	21425																																													
2560	2562.5	2565	2567.5																																													
LTE transmitter and antenna implementation	LTE has one (1) TX/RX antennas and one (1) RX antennas Refer to Appendix A.																																															
Maximum power reduction (MPR)	<p align="center"><b>Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3</b></p> <table border="1"> <thead> <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> </thead> <tbody> <tr> <td>QPSK</td> <td>&gt; 5</td> <td>&gt; 4</td> <td>&gt; 8</td> <td>&gt; 12</td> <td>&gt; 16</td> <td>&gt; 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>&gt; 5</td> <td>&gt; 4</td> <td>&gt; 8</td> <td>&gt; 12</td> <td>&gt; 16</td> <td>&gt; 18</td> <td>≤ 2</td> </tr> </tbody> </table> <p>MPR Built-in by design A-MPR (additional MPR) was disabled during SAR testing</p>										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
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																																									
Power reduction	Yes																																															
Spectrum plots for RB configurations	A properly configured base station simulator was used for the SAR and power measurements; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.																																															

## 6.6. Power Reduction by Proximity Sensing

The DUT has two proximity sensors to reduce the output power. The position of the sensors and antenna are as shown in the graphic.



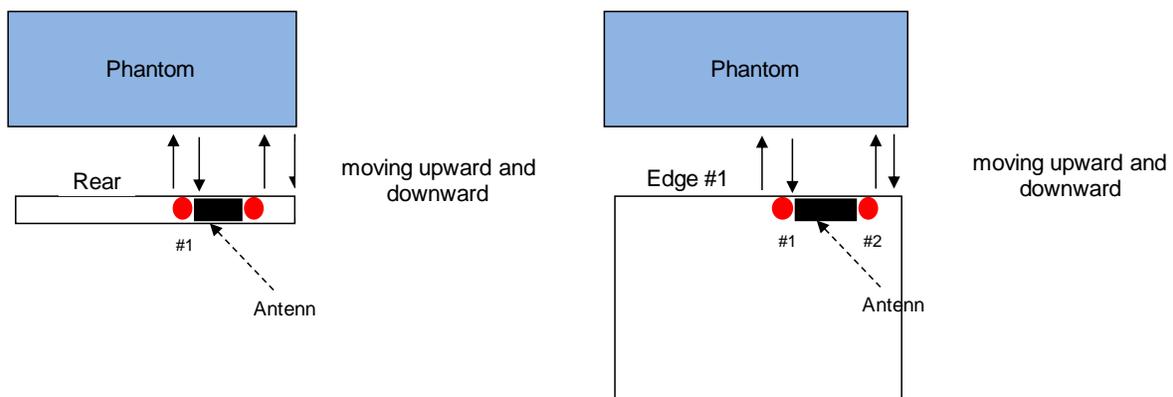
### 6.6.1. Proximity Sensor Triggering Distance (KDB 616217 §6.2)

Edge 1 of the DUT was placed directly below the flat phantom. The DUT was moved toward the phantom in accordance with the steps outlined in KDB 616217 §6.2 to determine the trigger distance for enabling power reduction. The DUT was moved away from the phantom to determine the trigger distance for resuming full power.

The measurement was then repeated for the Rear surface.

The DUT featured a visual indicator on its display that showed the status of the proximity sensor (Triggered or not triggered). This was used to determine the status of the sensor during the proximity sensor assessment as monitoring the output power directly was not practical without affecting the measurement.

It was confirmed separately that the output power was altered according to the proximity sensor status indication. This was achieved by observing the proximity sensor status at the same time as monitoring the conducted power. Section 9 contains both the full and reduced conducted power measurements.



### Summary of Trigger Distances

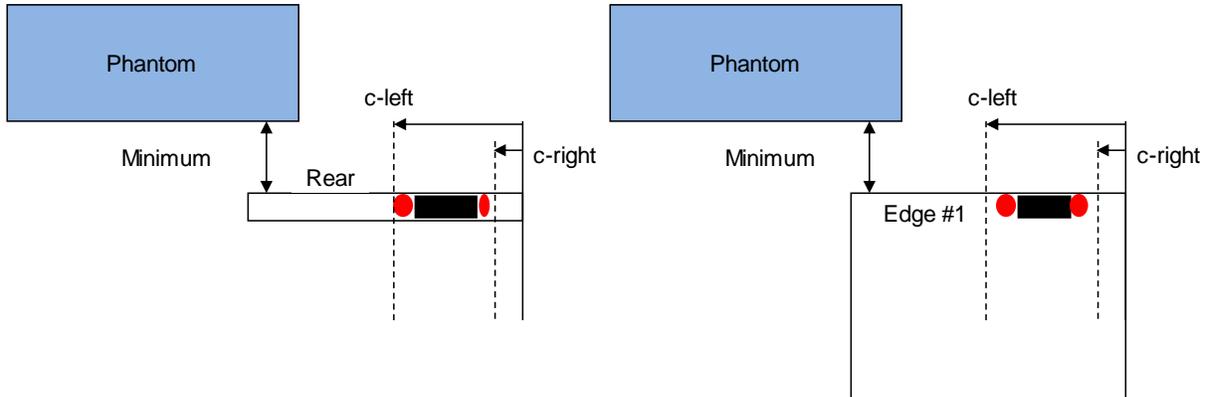
Band		Rear				Edge 1			
		#1		#2		#1		#2	
		upward	downward	upward	downward	upward	downward	upward	downward
LTE	2	24	23	24	24	24	25	26	26
	4	24	25	25	26	24	24	27	27
	5	23	24	25	25	26	26	27	26
	7	23	24	24	25	23	23	26	27
	12	23	24	23	24	24	25	26	26
UMTS	17	23	23	25	25	24	23	26	27
	II	23	24	24	25	25	24	26	26
GSM	V	23	24	24	24	24	24	26	26
	1900	23	23	24	26	23	24	26	26
	850	24	24	25	25	24	24	26	27

### 6.6.2. Proximity Sensor Coverage (KDB 616217 §6.3)

The rear surface or edge of the tablet is positioned at a test separation distance less than or equal to the distance required for rear surface or edge triggering, with both the antenna and sensor pad located at least 20 mm laterally outside the edge (boundary) of the phantom, along the direction of maximum antenna and sensor offset.

For the rear surface, if the direction of maximum offset is not aligned with the tablet coordinates (physical edges) the tablet test position would not be aligned with the phantom coordinates (orientations).

Each applicable tablet edge should be positioned perpendicularly to the phantom to determine sensor coverage. For antennas and/or sensors located near the corner of a tablet, both adjacent edges must be considered.



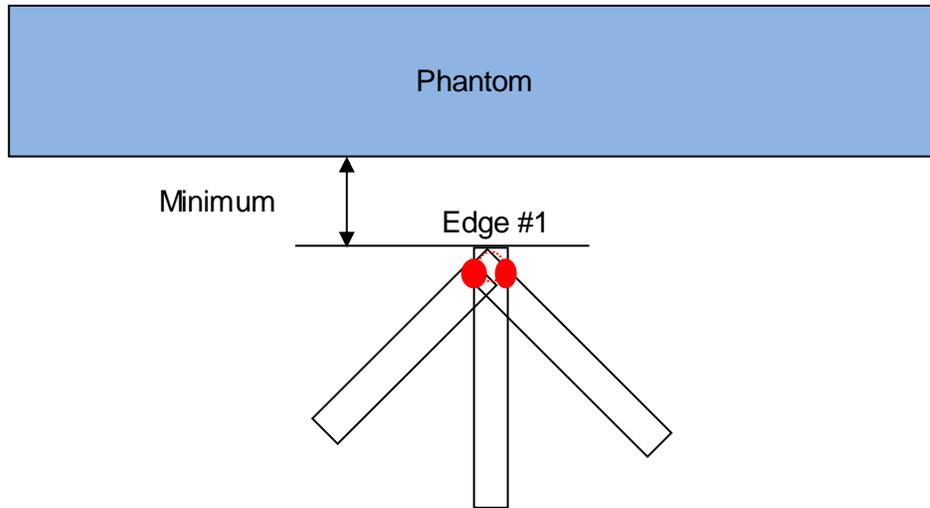
**Summary of Tablet Sensor coverage to Proximity Sensor Triggering**

Band		Rear (mm)		Minimum Distance (mm)		Edge 1 (mm)		Minimum Distance (mm)	
		#1	#2			#1	#2		
		c-left	c-right	#1	#2	c-left	c-right	#1	#2
LTE	2	155	28	24	23	156	28	23	26
	4	156	29			157	32		
	5	157	26			154	28		
	7	156	28			154	29		
	12	157	29			156	29		
	17	154	29			155	28		
UMTS	II	155	29	23	24	24	26	24	26
	V	154	31			156	25		
GSM	1900	156	30	23	24	158	31	23	26
	850	154	30			155	31		

### 6.6.3. Proximity Sensor Tilt Angle Assessment (KDB 616217 §6.4)

The DUT was positioned directly below the flat phantom at the minimum measured trigger distance with Edge 1 and Edge 4 parallel to the base of the flat phantom for each band.

The EUT was rotated about Edge 1 and Edge 4 for angles up to +/- 45°. If the output power increased during the rotation the DUT was moved 1mm toward the phantom and the rotation repeated. This procedure was repeated until the power remained reduced for all angles up to +/- 45°.



Proximity sensor tilt angle assessment (Edge 1) KDB 616217 §6.4

### Summary of Tablet Tilt Angle Influence to Proximity Sensor Triggering

Band		Minimum Distance (mm)			
		Edge 1			
		#1	#2	#1	#2
LTE	2	23	28	26	27
	4	26	28	26	28
	5	26	29	26	29
	7	24	28	25	26
	12	25	28	25	29
UMTS	II	24	29	24	29
	V	26	28	24	28
GSM	1900	28	29	26	28
	850	27	28	25	29

### 6.6.4. Resulting test positions for SAR measurements

Position	§6.2 Triggering Distance	§6.3 Coverage	§6.4 Tilt Angle	Worst case distance for SAR
Rear	23	23	23	22
Edge 1	23	23	23	

## 7. RF Exposure Conditions (Test Configurations)

Refer to “SAR Photos and Ant locations” Appendix for the specific details of the antenna-to-antenna and antenna-to-edge(s) distances.

### 7.1. 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.

### 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
<b>Full Power, Proximity Sensor Off</b>																
Cellular	GPRS 4 Slots	848.8	29.20	416	5	5.2	26.75	154.6	160.85		76.7	76.7	14.2	> 50 mm	> 50 mm	
Cellular	GPRS 4 Slots	1909.8	26.20	208	5	5.2	26.75	154.6	160.85		-MEASURE-	-MEASURE-	-MEASURE-	> 50 mm	> 50 mm	
Cellular	W-CDMA 2	1907.6	23.40	219	5	5.2	26.75	154.6	160.85		60.5	60.5	11.2	> 50 mm	> 50 mm	
Cellular	W-CDMA 5	846.6	24.80	302	5	5.2	26.75	154.6	160.85		55.6	55.6	10.3	> 50 mm	> 50 mm	
Cellular	LTE Band 2	1900	23.20	209	5	5.2	26.75	154.6	160.85		57.6	57.6	10.7	> 50 mm	> 50 mm	
Cellular	LTE Band 4	1754.3	23.20	209	5	5.2	26.75	154.6	160.85		55.4	55.4	10.3	> 50 mm	> 50 mm	
Cellular	LTE Band 5	844	24.10	257	5	5.2	26.75	154.6	160.85		47.2	47.2	8.7	> 50 mm	> 50 mm	
Cellular	LTE Band 7	2560	23.70	234	5	5.2	26.75	154.6	160.85		74.9	74.9	13.9	> 50 mm	> 50 mm	
Cellular	LTE Band 12	711	24.10	257	5	5.2	26.75	154.6	160.85		-MEASURE-	-MEASURE-	-MEASURE-	> 50 mm	> 50 mm	
Cellular	LTE Band 17	710	24.10	257	5	5.2	26.75	154.6	160.85		43.3	43.3	8	> 50 mm	> 50 mm	
<b>Power Back-off, Proximity Sensor On</b>																
Cellular	GPRS 4 Slots	848.8	23.20	104	5	5.2	26.75	154.6	160.85		19.2	19.2	3.5	> 50 mm	> 50 mm	
Cellular	GPRS 3 Slots	1909.8	15.70	14	5	5.2	26.75	154.6	160.85		-MEASURE-	-MEASURE-	-MEASURE-	> 50 mm	> 50 mm	
Cellular	W-CDMA 2	1907.6	11.00	13	5	5.2	26.75	154.6	160.85		3.9	3.9	1	> 50 mm	> 50 mm	
Cellular	W-CDMA 5	846.6	20.00	100	5	5.2	26.75	154.6	160.85		-MEASURE-	-MEASURE-	-EXEMPT-	> 50 mm	> 50 mm	
Cellular	LTE Band 2	1900	11.00	13	5	5.2	26.75	154.6	160.85		3.6	3.6	1	> 50 mm	> 50 mm	
Cellular	LTE Band 4	1754.3	12.20	17	5	5.2	26.75	154.6	160.85		-MEASURE-	-MEASURE-	-EXEMPT-	> 50 mm	> 50 mm	
Cellular	LTE Band 5	844	20.00	100	5	5.2	26.75	154.6	160.85		18.4	18.4	3.4	> 50 mm	> 50 mm	
Cellular	LTE Band 7	2560	11.50	14	5	5.2	26.75	154.6	160.85		-MEASURE-	-MEASURE-	-MEASURE-	> 50 mm	> 50 mm	
Cellular	LTE Band 12	711	20.00	100	5	5.2	26.75	154.6	160.85		3.6	3.6	1	> 50 mm	> 50 mm	
Cellular	LTE Band 17	710	20.00	100	5	5.2	26.75	154.6	160.85		4.5	4.5	1	> 50 mm	> 50 mm	
Cellular	LTE Band 17	710	20.00	100	5	5.2	26.75	154.6	160.85		-MEASURE-	-MEASURE-	-MEASURE-	> 50 mm	> 50 mm	

#### 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
<b>Full Power, Proximity Sensor Off</b>																
Cellular	GPRS 4 Slots	848.8	29.20	416	5	5.2	26.75	154.6	160.85		< 50 mm	< 50 mm	< 50 mm	754.7 mW -EXEMPT-	790.1mW -EXEMPT-	
Cellular	GPRS 4 Slots	1909.8	26.20	208	5	5.2	26.75	154.6	160.85		< 50 mm	< 50 mm	< 50 mm	164.5 mW -EXEMPT-	127 mW -EXEMPT-	
Cellular	W-CDMA 2	1907.6	23.40	219	5	5.2	26.75	154.6	160.85		< 50 mm	< 50 mm	< 50 mm	164.6 mW -EXEMPT-	127.1mW -EXEMPT-	
Cellular	W-CDMA 5	846.6	24.80	302	5	5.2	26.75	154.6	160.85		< 50 mm	< 50 mm	< 50 mm	753.4 mW -EXEMPT-	788.7 mW -EXEMPT-	
Cellular	LTE Band 2	1900	23.20	209	5	5.2	26.75	154.6	160.85		< 50 mm	< 50 mm	< 50 mm	164.8 mW -EXEMPT-	127.3 mW -EXEMPT-	
Cellular	LTE Band 4	1754.3	23.20	209	5	5.2	26.75	154.6	160.85		< 50 mm	< 50 mm	< 50 mm	169.3 mW -EXEMPT-	12218 mW -EXEMPT-	
Cellular	LTE Band 5	844	24.10	257	5	5.2	26.75	154.6	160.85		< 50 mm	< 50 mm	< 50 mm	7518 mW -EXEMPT-	787 mW -EXEMPT-	
Cellular	LTE Band 7	2560	23.70	234	5	5.2	26.75	154.6	160.85		< 50 mm	< 50 mm	< 50 mm	139.8 mW -EXEMPT-	102.3 mW -EXEMPT-	
Cellular	LTE Band 12	711	24.10	257	5	5.2	26.75	154.6	160.85		< 50 mm	< 50 mm	< 50 mm	673.7 mW -EXEMPT-	703.3 mW -EXEMPT-	
Cellular	LTE Band 17	710	24.10	257	5	5.2	26.75	154.6	160.85		< 50 mm	< 50 mm	< 50 mm	673.1mW -EXEMPT-	702.7 mW -EXEMPT-	
<b>Power Back-off, Proximity Sensor On</b>																
Cellular	GPRS 3 Slots	848.8	23.20	78	5	5.2	26.75	154.6	160.85		< 50 mm	< 50 mm	< 50 mm	754.7 mW -EXEMPT-	790.1mW -EXEMPT-	
Cellular	GPRS 2 Slots	1909.8	15.70	9	5	5.2	26.75	154.6	160.85		< 50 mm	< 50 mm	< 50 mm	164.5 mW -EXEMPT-	127 mW -EXEMPT-	
Cellular	W-CDMA 2	1907.6	11.00	13	5	5.2	26.75	154.6	160.85		< 50 mm	< 50 mm	< 50 mm	164.6 mW -EXEMPT-	127.1mW -EXEMPT-	
Cellular	W-CDMA 5	846.6	20.00	100	5	5.2	26.75	154.6	160.85		< 50 mm	< 50 mm	< 50 mm	753.4 mW -EXEMPT-	788.7 mW -EXEMPT-	
Cellular	LTE Band 2	1900	11.00	13	5	5.2	26.75	154.6	160.85		< 50 mm	< 50 mm	< 50 mm	164.8 mW -EXEMPT-	127.3 mW -EXEMPT-	
Cellular	LTE Band 4	1754.3	12.20	17	5	5.2	26.75	154.6	160.85		< 50 mm	< 50 mm	< 50 mm	169.3 mW -EXEMPT-	12218 mW -EXEMPT-	
Cellular	LTE Band 5	844	20.00	100	5	5.2	26.75	154.6	160.85		< 50 mm	< 50 mm	< 50 mm	7518 mW -EXEMPT-	787 mW -EXEMPT-	
Cellular	LTE Band 7	2560	11.50	14	5	5.2	26.75	154.6	160.85		< 50 mm	< 50 mm	< 50 mm	139.8 mW -EXEMPT-	102.3 mW -EXEMPT-	
Cellular	LTE Band 12	711	20.00	100	5	5.2	26.75	154.6	160.85		< 50 mm	< 50 mm	< 50 mm	673.7 mW -EXEMPT-	703.3 mW -EXEMPT-	
Cellular	LTE Band 17	710	20.00	100	5	5.2	26.75	154.6	160.85		< 50 mm	< 50 mm	< 50 mm	673.1mW -EXEMPT-	702.7 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.

### SAR Test Exclusion Calculations for WLAN

#### Antennas < 50mm to adjacent edges

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
<b>Wi-Fi Main Antenna</b>															
Wi-Fi 2.4 GHz	2462	11.50	14	3.165	5.2	203.2	155.25	30.35		4.4 -MEASURE-	4.4 -MEASURE-	> 50 mm	> 50 mm	0.7 -EXEMPT-	
Wi-Fi 5.2 GHz	5240	9.80	10	3.165	5.2	203.2	155.25	30.35		4.6 -MEASURE-	4.6 -MEASURE-	> 50 mm	> 50 mm	0.8 -EXEMPT-	
Wi-Fi 5.3 GHz	5320	9.80	10	3.165	5.2	203.2	155.25	30.35		4.6 -MEASURE-	4.6 -MEASURE-	> 50 mm	> 50 mm	0.8 -EXEMPT-	
Wi-Fi 5.5 GHz	5700	9.80	10	3.165	5.2	203.2	155.25	30.35		4.8 -MEASURE-	4.8 -MEASURE-	> 50 mm	> 50 mm	0.8 -EXEMPT-	
Wi-Fi 5.8 GHz	5825	9.80	10	3.165	5.2	203.2	155.25	30.35		4.8 -MEASURE-	4.8 -MEASURE-	> 50 mm	> 50 mm	0.8 -EXEMPT-	
Bluetooth	2480	10.00	10	3.165	5.2	203.2	155.25	30.35		3.1 -MEASURE-	3.1 -MEASURE-	> 50 mm	> 50 mm	0.5 -EXEMPT-	
<b>Wi-Fi Sub Antenna</b>															
Wi-Fi 2.4 GHz	2462	10.00	10	3.165	5.2	148.55	155.25	89.3		3.1 -MEASURE-	3.1 -MEASURE-	> 50 mm	> 50 mm	> 50 mm	
Wi-Fi 5.2 GHz	5240	9.00	8	3.165	5.2	148.55	155.25	89.3		3.7 -MEASURE-	3.7 -MEASURE-	> 50 mm	> 50 mm	> 50 mm	
Wi-Fi 5.3 GHz	5320	9.00	8	3.165	5.2	148.55	155.25	89.3		3.7 -MEASURE-	3.7 -MEASURE-	> 50 mm	> 50 mm	> 50 mm	
Wi-Fi 5.5 GHz	5700	9.00	8	3.165	5.2	148.55	155.25	89.3		3.8 -MEASURE-	3.8 -MEASURE-	> 50 mm	> 50 mm	> 50 mm	
Wi-Fi 5.8 GHz	5825	9.00	8	3.165	5.2	148.55	155.25	89.3		3.9 -MEASURE-	3.9 -MEASURE-	> 50 mm	> 50 mm	> 50 mm	

**Note(s):**

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

#### Antennas > 50mm to adjacent edges

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
<b>Wi-Fi Main Antenna</b>															
Wi-Fi 2.4 GHz	2462	11.50	14	3.165	5.2	203.2	155.25	30.35		< 50 mm	< 50 mm	627.6 mW -EXEMPT-	148.1 mW -EXEMPT-	< 50 mm	
Wi-Fi 5.2 GHz	5240	9.80	10	3.165	5.2	203.2	155.25	30.35		< 50 mm	< 50 mm	597.5 mW -EXEMPT-	118 mW -EXEMPT-	< 50 mm	
Wi-Fi 5.3 GHz	5320	9.80	10	3.165	5.2	203.2	155.25	30.35		< 50 mm	< 50 mm	597 mW -EXEMPT-	117.5 mW -EXEMPT-	< 50 mm	
Wi-Fi 5.5 GHz	5700	9.80	10	3.165	5.2	203.2	155.25	30.35		< 50 mm	< 50 mm	594.8 mW -EXEMPT-	115.3 mW -EXEMPT-	< 50 mm	
Wi-Fi 5.8 GHz	5825	9.80	10	3.165	5.2	203.2	155.25	30.35		< 50 mm	< 50 mm	594.2 mW -EXEMPT-	114.7 mW -EXEMPT-	< 50 mm	
Bluetooth	2480	10.00	10	3.165	5.2	203.2	155.25	30.35		< 50 mm	< 50 mm	627.3 mW -EXEMPT-	147.8 mW -EXEMPT-	< 50 mm	
<b>Wi-Fi Sub Antenna</b>															
Wi-Fi 2.4 GHz	2462	10.00	10	3.165	5.2	203.2	155.25	30.35		< 50 mm	< 50 mm	627.6 mW -EXEMPT-	148.1 mW -EXEMPT-	< 50 mm	
Wi-Fi 5.2 GHz	5240	9.00	8	3.165	5.2	203.2	155.25	30.35		< 50 mm	< 50 mm	597.5 mW -EXEMPT-	118 mW -EXEMPT-	< 50 mm	
Wi-Fi 5.3 GHz	5320	9.00	8	3.165	5.2	203.2	155.25	30.35		< 50 mm	< 50 mm	597 mW -EXEMPT-	117.5 mW -EXEMPT-	< 50 mm	
Wi-Fi 5.5 GHz	5700	9.00	8	3.165	5.2	203.2	155.25	30.35		< 50 mm	< 50 mm	594.8 mW -EXEMPT-	115.3 mW -EXEMPT-	< 50 mm	
Wi-Fi 5.8 GHz	5825	9.00	8	3.165	5.2	203.2	155.25	30.35		< 50 mm	< 50 mm	594.2 mW -EXEMPT-	114.7 mW -EXEMPT-	< 50 mm	

**Note(s):**

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

## 7.2. Required Test Configurations

The table below identifies the standalone test configurations required for this device according to the findings in Section 7.1:

Test Configurations	Rear	Edge 1	Edge 2	Edge 3	Edge 4
		(Top Edge)	(Right Edge )	(Bottom Edge)	(Left Edge)
GSM850 Full Pow er	Yes	Yes	Yes	No	No
GSM850 w / Pow er Reduction	Yes	Yes	Yes	No	No
GSM1900 Full Pow er	Yes	Yes	Yes	No	No
GSM1900 w / Pow er Reduction	Yes	Yes	No	No	No
W-CDMA Band 2 Full Pow er	Yes	Yes	Yes	No	No
W-CDMA Band 2 w / Pow er Reduction	Yes	Yes	No	No	No
W-CDMA Band 5 Full Pow er	Yes	Yes	Yes	No	No
W-CDMA Band 5 w / Pow er Reduction	Yes	Yes	Yes	No	No
LTE Band 2 Full Pow er	Yes	Yes	Yes	No	No
LTE Band 2 w / Pow er Reduction	Yes	Yes	No	No	No
LTE Band 4 Full Pow er	Yes	Yes	Yes	No	No
LTE Band 4 w / Pow er Reduction	Yes	Yes	No	No	No
LTE Band 5 Full Pow er	Yes	Yes	Yes	No	No
LTE Band 5 w / Pow er Reduction	Yes	Yes	Yes	No	No
LTE Band 7 Full Pow er	Yes	Yes	Yes	No	No
LTE Band 7 w / Pow er Reduction	Yes	Yes	No	No	No
LTE Band 12 Full Pow er	Yes	Yes	Yes	No	No
LTE Band 12 w / Pow er Reduction	Yes	Yes	Yes	No	No
LTE Band 17 Full Pow er	Yes	Yes	Yes	No	No
LTE Band 17 w / Pow er Reduction	Yes	Yes	Yes	No	No
Wi-Fi 2.4 GHz SISO (Main Antenna)	Yes	Yes	No	No	No
Wi-Fi 2.4 GHz SISO (Sub Antenna)	Yes	Yes	No	No	No
Wi-Fi 2.4 GHz MIMO	Yes	Yes	No	No	No
Wi-Fi 5 GHz SISO (Main Antenna)	Yes	Yes	No	No	No
Wi-Fi 5 GHz SISO (Sub Antenna)	Yes	Yes	No	No	No
Wi-Fi 5 GHz MIMO	Yes	Yes	No	No	No
Bluetooth	Yes	Yes	No	No	No

### Note(s):

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

## 8. Dielectric Property Measurements & System Check

### 8.1. Dielectric Property Measurements

The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within  $\pm 2^\circ\text{C}$  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.

#### Tissue Dielectric Parameters

FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

Target Frequency (MHz)	Head		Body	
	$\epsilon_r$	$\sigma$ (S/m)	$\epsilon_r$	$\sigma$ (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

#### IEEE Std 1528-2013

Refer to Table 3 within the IEEE Std 1528-2013

**Dielectric Property Measurements Results:**

**SAR Lab 1**

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
3/5/3015	Body 2450	e'	51.1200	Relative Permittivity ( $\epsilon_r$ ):	51.12	52.70	-3.00	5
		e"	14.5700	Conductivity ( $\sigma$ ):	1.98	1.95	1.79	5
	Body 2410	e'	51.3200	Relative Permittivity ( $\epsilon_r$ ):	51.32	52.76	-2.73	5
		e"	14.3500	Conductivity ( $\sigma$ ):	1.92	1.91	0.81	5
	Body 2475	e'	51.0300	Relative Permittivity ( $\epsilon_r$ ):	51.03	52.67	-3.11	5
		e"	14.6600	Conductivity ( $\sigma$ ):	2.02	1.99	1.63	5
4/3/2015	Body 2600	e'	51.5000	Relative Permittivity ( $\epsilon_r$ ):	51.50	52.51	-1.92	5
		e"	15.4000	Conductivity ( $\sigma$ ):	2.23	2.16	3.03	5
	Body 2500	e'	51.7800	Relative Permittivity ( $\epsilon_r$ ):	51.78	52.64	-1.63	5
		e"	14.9600	Conductivity ( $\sigma$ ):	2.08	2.02	2.93	5
	Body 2700	e'	51.2300	Relative Permittivity ( $\epsilon_r$ ):	51.23	52.38	-2.20	5
		e"	15.5300	Conductivity ( $\sigma$ ):	2.33	2.30	1.31	5

**SAR Lab 2**

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
3/13/2015	Body 1750	e'	53.1300	Relative Permittivity ( $\epsilon_r$ ):	53.13	53.44	-0.58	5
		e"	15.2300	Conductivity ( $\sigma$ ):	1.48	1.49	-0.28	5
	Body 1710	e'	53.2000	Relative Permittivity ( $\epsilon_r$ ):	53.20	53.54	-0.64	5
		e"	15.2100	Conductivity ( $\sigma$ ):	1.45	1.46	-1.05	5
	Body 1755	e'	53.0200	Relative Permittivity ( $\epsilon_r$ ):	53.02	53.43	-0.76	5
		e"	15.1800	Conductivity ( $\sigma$ ):	1.48	1.49	-0.53	5

**SAR Lab 3**

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
3/2/2015	Body 835	e'	53.5200	Relative Permittivity ( $\epsilon_r$ ):	53.52	55.20	-3.04	5
		e"	21.7100	Conductivity ( $\sigma$ ):	1.01	0.97	3.91	5
	Body 820	e'	53.7400	Relative Permittivity ( $\epsilon_r$ ):	53.74	55.28	-2.78	5
		e"	21.8500	Conductivity ( $\sigma$ ):	1.00	0.97	2.87	5
	Body 850	e'	53.4500	Relative Permittivity ( $\epsilon_r$ ):	53.45	55.16	-3.10	5
		e"	21.7400	Conductivity ( $\sigma$ ):	1.03	0.99	4.09	5
3/12/2015	Body 835	e'	53.3000	Relative Permittivity ( $\epsilon_r$ ):	53.30	55.20	-3.44	5
		e"	21.7900	Conductivity ( $\sigma$ ):	1.01	0.97	4.30	5
	Body 820	e'	53.4300	Relative Permittivity ( $\epsilon_r$ ):	53.43	55.28	-3.34	5
		e"	21.9300	Conductivity ( $\sigma$ ):	1.00	0.97	3.25	5
	Body 850	e'	53.1000	Relative Permittivity ( $\epsilon_r$ ):	53.10	55.16	-3.73	5
		e"	21.9100	Conductivity ( $\sigma$ ):	1.04	0.99	4.90	5
3/16/2015	Body 835	e'	53.1500	Relative Permittivity ( $\epsilon_r$ ):	53.15	55.20	-3.71	5
		e"	21.9000	Conductivity ( $\sigma$ ):	1.02	0.97	4.82	5
	Body 820	e'	53.2100	Relative Permittivity ( $\epsilon_r$ ):	53.21	55.28	-3.74	5
		e"	21.7700	Conductivity ( $\sigma$ ):	0.99	0.97	2.49	5
	Body 850	e'	52.9300	Relative Permittivity ( $\epsilon_r$ ):	52.93	55.16	-4.04	5
		e"	21.5900	Conductivity ( $\sigma$ ):	1.02	0.99	3.37	5
3/16/2015	Body 1900	e'	52.2600	Relative Permittivity ( $\epsilon_r$ ):	52.26	53.30	-1.95	5
		e"	14.3400	Conductivity ( $\sigma$ ):	1.51	1.52	-0.33	5
	Body 1850	e'	52.4500	Relative Permittivity ( $\epsilon_r$ ):	52.45	53.30	-1.59	5
		e"	14.2100	Conductivity ( $\sigma$ ):	1.46	1.52	-3.83	5
	Body 1910	e'	52.1900	Relative Permittivity ( $\epsilon_r$ ):	52.19	53.30	-2.08	5
		e"	14.4000	Conductivity ( $\sigma$ ):	1.53	1.52	0.61	5
3/17/2015	Body 750	e'	53.3400	Relative Permittivity ( $\epsilon_r$ ):	53.34	55.55	-3.97	5
		e"	22.8600	Conductivity ( $\sigma$ ):	0.95	0.96	-1.01	5
	Body 700	e'	53.6400	Relative Permittivity ( $\epsilon_r$ ):	53.64	55.74	-3.76	5
		e"	23.5000	Conductivity ( $\sigma$ ):	0.91	0.96	-4.65	5
	Body 790	e'	52.7700	Relative Permittivity ( $\epsilon_r$ ):	52.77	55.39	-4.73	5
		e"	22.6900	Conductivity ( $\sigma$ ):	1.00	0.97	3.16	5

**SAR Lab 4**

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
3/5/2015	Body 1900	e'	52.1600	Relative Permittivity ( $\epsilon_r$ ):	52.16	53.30	-2.14	5
		e"	14.6300	Conductivity ( $\sigma$ ):	1.55	1.52	1.68	5
	Body 1850	e'	52.4700	Relative Permittivity ( $\epsilon_r$ ):	52.47	53.30	-1.56	5
		e"	14.3200	Conductivity ( $\sigma$ ):	1.47	1.52	-3.09	5
	Body 1910	e'	52.1600	Relative Permittivity ( $\epsilon_r$ ):	52.16	53.30	-2.14	5
		e"	14.5900	Conductivity ( $\sigma$ ):	1.55	1.52	1.94	5
3/6/2015	Body 835	e'	53.9000	Relative Permittivity ( $\epsilon_r$ ):	53.90	55.20	-2.36	5
		e"	21.6900	Conductivity ( $\sigma$ ):	1.01	0.97	3.82	5
	Body 820	e'	54.1000	Relative Permittivity ( $\epsilon_r$ ):	54.10	55.28	-2.13	5
		e"	21.6600	Conductivity ( $\sigma$ ):	0.99	0.97	1.97	5
	Body 850	e'	53.7100	Relative Permittivity ( $\epsilon_r$ ):	53.71	55.16	-2.62	5
		e"	21.6400	Conductivity ( $\sigma$ ):	1.02	0.99	3.61	5
3/9/2015	Body 750	e'	54.5000	Relative Permittivity ( $\epsilon_r$ ):	54.50	55.55	-1.88	5
		e"	23.2400	Conductivity ( $\sigma$ ):	0.97	0.96	0.63	5
	Body 700	e'	55.2200	Relative Permittivity ( $\epsilon_r$ ):	55.22	55.74	-0.93	5
		e"	23.5800	Conductivity ( $\sigma$ ):	0.92	0.96	-4.32	5
	Body 790	e'	54.0900	Relative Permittivity ( $\epsilon_r$ ):	54.09	55.39	-2.35	5
		e"	23.0000	Conductivity ( $\sigma$ ):	1.01	0.97	4.57	5
3/11/2015	Body 1900	e'	53.4700	Relative Permittivity ( $\epsilon_r$ ):	53.47	53.30	0.32	5
		e"	14.5800	Conductivity ( $\sigma$ ):	1.54	1.52	1.34	5
	Body 1850	e'	53.6200	Relative Permittivity ( $\epsilon_r$ ):	53.62	53.30	0.60	5
		e"	14.4500	Conductivity ( $\sigma$ ):	1.49	1.52	-2.21	5
	Body 1910	e'	53.3500	Relative Permittivity ( $\epsilon_r$ ):	53.35	53.30	0.09	5
		e"	14.5000	Conductivity ( $\sigma$ ):	1.54	1.52	1.31	5
3/14/2015	Body 5180	e'	49.1100	Relative Permittivity ( $\epsilon_r$ ):	49.11	49.05	-1.30	5
		e"	17.9100	Conductivity ( $\sigma$ ):	5.16	5.27	1.08	5
	Body 5200	e'	48.9800	Relative Permittivity ( $\epsilon_r$ ):	48.98	49.02	-1.08	5
		e"	18.0800	Conductivity ( $\sigma$ ):	5.23	5.29	0.43	5
	Body 5600	e'	48.4200	Relative Permittivity ( $\epsilon_r$ ):	48.42	48.48	-1.50	5
		e"	18.5400	Conductivity ( $\sigma$ ):	5.77	5.76	0.75	5
	Body 5800	e'	48.1800	Relative Permittivity ( $\epsilon_r$ ):	48.18	48.20	-1.99	5
		e"	18.3300	Conductivity ( $\sigma$ ):	5.91	6.00	0.30	5
	Body 5825	e'	48.3000	Relative Permittivity ( $\epsilon_r$ ):	48.30	48.20	-1.76	5
		e"	18.5300	Conductivity ( $\sigma$ ):	6.00	6.00	1.38	5
3/16/2015	Body 2450	e'	53.3600	Relative Permittivity ( $\epsilon_r$ ):	53.36	52.70	1.25	5
		e"	14.8500	Conductivity ( $\sigma$ ):	2.02	1.95	3.74	5
	Body 2410	e'	53.5400	Relative Permittivity ( $\epsilon_r$ ):	53.54	52.76	1.48	5
		e"	14.7200	Conductivity ( $\sigma$ ):	1.97	1.91	3.41	5
	Body 2475	e'	53.4600	Relative Permittivity ( $\epsilon_r$ ):	53.46	52.67	1.50	5
		e"	15.0500	Conductivity ( $\sigma$ ):	2.07	1.99	4.33	5
3/18/2015	Body 5180	e'	48.4100	Relative Permittivity ( $\epsilon_r$ ):	48.41	49.05	-1.30	5
		e"	18.5000	Conductivity ( $\sigma$ ):	5.33	5.27	1.08	5
	Body 5200	e'	48.4900	Relative Permittivity ( $\epsilon_r$ ):	48.49	49.02	-1.08	5
		e"	18.3900	Conductivity ( $\sigma$ ):	5.32	5.29	0.43	5
	Body 5600	e'	47.7500	Relative Permittivity ( $\epsilon_r$ ):	47.75	48.48	-1.50	5
		e"	18.6400	Conductivity ( $\sigma$ ):	5.80	5.76	0.75	5
	Body 5800	e'	47.2400	Relative Permittivity ( $\epsilon_r$ ):	47.24	48.20	-1.99	5
		e"	18.6600	Conductivity ( $\sigma$ ):	6.02	6.00	0.30	5
	Body 5825	e'	47.3500	Relative Permittivity ( $\epsilon_r$ ):	47.35	48.20	-1.76	5
		e"	18.7800	Conductivity ( $\sigma$ ):	6.08	6.00	1.38	5

**SAR Lab 5**

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
3/3/2015	Body 1750	e'	52.2100	Relative Permittivity ( $\epsilon_r$ ):	52.21	53.44	-2.30	5
		e"	14.9900	Conductivity ( $\sigma$ ):	1.46	1.49	-1.85	5
	Body 1710	e'	52.2300	Relative Permittivity ( $\epsilon_r$ ):	52.23	53.54	-2.45	5
		e"	15.0000	Conductivity ( $\sigma$ ):	1.43	1.46	-2.42	5
	Body 1755	e'	52.1200	Relative Permittivity ( $\epsilon_r$ ):	52.12	53.43	-2.45	5
		e"	15.0400	Conductivity ( $\sigma$ ):	1.47	1.49	-1.45	5

## 8.2. System 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 re-measured or sooner when marginal liquid parameters are used at the beginning of a series of measurements.

### System Performance Check Measurement Conditions:

- The measurements were performed in the flat section of the TWIN SAM or ELI phantom, shell thickness: 2.0  $\pm$ 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  $\geq$  15.0 cm for SAR measurements  $\leq$  3 GHz and  $\geq$  10.0 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.

**Reference Target SAR Values**

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 (W/kg)		
				1g/10g	Head	Body
D750V3	1024	5/16/2014	750	1g	8.12	8.77
				10g	5.26	5.79
D835V2	4d142	9/9/2014	835	1g	8.91	9.22
				10g	5.77	6.05
D1750V2	1077	9/11/2014	1750	1g	36.5	36.9
				10g	19.4	19.8
D1900V2	5d163	9/11/2014	1900	1g	40.8	40.6
				10g	21.2	21.4
D1750V2	1053	8/18/2014	1750	1g	36.9	38.0
				10g	19.6	20.4
D2450V2	706	9/10/2014	2450	1g	53.0	50.2
				10g	24.5	23.4
D2450V2	748	2/20/2015	2450	1g	52.7	50.3
				10g	24.6	23.5
D2600V2	1006	9/10/2014	2600	1g	58.6	56.3
				10g	26.1	25.1
D5GHzV2	1168	12/4/2014	5200	1g	79.3	76.0
				10g	22.5	21.1
			5600	1g	81.7	82.0
				10g	23.2	22.7
			5800	1g	78.0	76.2
				10g	22.1	21.0

**System 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 Lab 1**

Date Tested	System Dipole		T.S. Liquid	Measured Results		Target (Ref. Value)	Delta $\pm 10\%$	Plot No.	
	Type	Serial #		Zoom Scan to 100 mW	Normalize to 1 W				
3/5/2015	D2450V2	706	Body	1g	4.97	49.7	50.2	-1.00	1,2
				10g	2.29	22.9	23.4	-2.14	
4/3/2015	D2600V2	1006	Body	1g	5.81	58.10	56.30	3.20	3,4
				10g	2.56	25.60	25.10	1.99	

**SAR Lab 2**

Date Tested	System Dipole		T.S. Liquid	Measured Results		Target (Ref. Value)	Delta $\pm 10\%$	Plot No.	
	Type	Serial #		Zoom Scan to 100 mW	Normalize to 1 W				
3/13/2015	D1750V2	1053	Body	1g	3.76	37.6	38.00	-1.05	5,6
				10g	2.01	20.1	20.4	-1.47	

**SAR Lab 3**

Date Tested	System Dipole		T.S. Liquid	Measured Results		Target (Ref. Value)	Delta $\pm 10\%$	Plot No.	
	Type	Serial #		Zoom Scan to 100 mW	Normalize to 1 W				
3/2/2015	D835V2	4d142	Body	1g	0.955	9.6	9.22	3.58	
				10g	0.629	6.3	6.05	3.97	
3/12/2015	D835V2	4d142	Body	1g	1.00	10.0	9.22	8.46	7,8
				10g	0.661	6.6	6.05	9.26	
3/16/2015	D835V2	4d142	Body	1g	0.989	9.9	9.22	7.27	
				10g	0.652	6.5	6.05	7.77	
3/16/2015	D1900V2	5d163	Body	1g	3.98	39.8	40.60	-1.97	9,10
				10g	2.06	20.6	21.4	-3.74	
3/17/2015	D750V3	1024	Body	1g	0.826	8.3	8.77	-5.82	11,12
				10g	0.549	5.5	5.79	-5.18	

**SAR Lab 4**

Date Tested	System Dipole		T.S. Liquid	Measured Results		Target (Ref. Value)	Delta $\pm 10\%$	Plot No.	
	Type	Serial #		Zoom Scan to 100 mW	Normalize to 1 W				
3/5/2015	D1900V2	5d163	Body	1g	3.83	38.3	40.60	-5.67	13,14
				10g	1.98	19.8	21.4	-7.48	
3/6/2015	D835V2	4d142	Body	1g	0.952	9.52	9.22	3.25	15,16
				10g	0.625	6.25	6.05	3.31	
3/9/2015	D750V3	1024	Body	1g	0.854	8.54	8.77	-2.62	17,18
				10g	0.571	5.71	5.79	-1.38	
3/11/2015	D1900V2	5d163	Body	1g	3.99	39.9	40.60	-1.72	
				10g	2.11	21.1	21.4	-1.40	
3/14/2015	D5GHzV2 (5.2 GHz)	1168	Body	1g	7.75	77.5	76.00	1.97	
				10g	2.20	22.0	21.10	4.27	
3/14/2015	D5GHzV2 (5.6 GHz)	1168	Body	1g	8.64	86.4	82.00	5.37	19,20
				10g	2.43	24.3	22.70	7.05	
3/14/2015	D5GHzV2 (5.8 GHz)	1168	Body	1g	7.73	77.3	76.20	1.44	
				10g	2.18	21.8	21.00	3.81	
3/16/2015	D2450V2	748	Body	1g	5.50	55.0	50.3	9.34	21,22
				10g	2.52	25.2	23.5	7.23	
3/18/2015	D5GHzV2 (5.2 GHz)	1168	Body	1g	7.61	76.1	76.00	0.13	
				10g	2.17	21.7	21.10	2.84	
3/18/2015	D5GHzV2 (5.6 GHz)	1168	Body	1g	7.98	79.8	82.00	-2.68	
				10g	2.24	22.4	22.70	-1.32	

**SAR Lab 5**

Date Tested	System Dipole		T.S. Liquid	Measured Results		Target (Ref. Value)	Delta $\pm 10\%$	Plot No.	
	Type	Serial #		Zoom Scan to 100 mW	Normalize to 1 W				
3/3/2015	D1750V2	1077	Body	1g	3.82	38.2	36.90	3.52	23,24
				10g	2.04	20.4	19.80	3.03	

## 9. Conducted Output Power Measurements

### 9.1. GSM

#### GSM850 Measured Results

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Max Power		Reduced Power	
						Burst Pwr (dBm)	Frame Pwr (dBm)	Burst Pwr (dBm)	Frame Pwr (dBm)
850	GSM (Voice)	CS1	1	128	824.2	32.9	23.9	27.3	18.2
				190	836.6	32.9	23.9	27.3	18.2
				251	848.8	33.0	24.0	27.3	18.2
	GPRS (GMSK)	CS1	1	128	824.2	32.9	23.9	27.3	18.2
				190	836.6	32.9	23.9	27.3	18.2
				251	848.8	33.0	24.0	27.3	18.2
			2	128	824.2	31.0	25.0	25.8	19.8
				190	836.6	31.1	25.1	25.8	19.8
				251	848.8	31.2	25.2	25.8	19.8
			3	128	824.2	29.8	25.5	23.6	19.3
				190	836.6	29.9	25.6	23.6	19.3
				251	848.8	30.0	25.7	23.6	19.3
			4	128	824.2	28.7	25.7	23.2	20.2
				190	836.6	28.7	25.7	23.2	20.2
				251	848.8	28.8	25.8	23.2	20.2
	EGPRS (8PSK)	MCS5	1	128	824.2	26.2	17.2	27.3	18.3
				190	836.6	26.4	17.4	27.3	18.3
				251	848.8	26.5	17.5	27.4	18.4
			2	128	824.2	24.5	18.5	26.0	20.0
				190	836.6	24.5	18.5	26.0	20.0
				251	848.8	24.5	18.5	26.0	20.0
			3	128	824.2	22.5	18.2	23.7	19.4
				190	836.6	22.5	18.2	23.7	19.4
				251	848.8	22.6	18.3	23.7	19.4
4			128	824.2	21.4	18.4	22.5	19.5	
			190	836.6	21.5	18.5	22.4	19.4	
			251	848.8	21.7	18.7	22.3	19.3	

#### Notes:

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

- Standalone: GMSK (GPRS) mode with 4 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

**GSM1900 Measured Results**

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Max Power		Reduced Power	
						Burst Pwr (dBm)	Frame Pwr (dBm)	Burst Pwr (dBm)	Frame Pwr (dBm)
1900	GSM (Voice)	CS1	1	512	1850.2	29.7	20.7	17.7	8.7
				661	1880.0	29.7	20.7	16.9	7.9
				810	1909.8	29.9	20.9	17.0	8.0
	GPRS (GMSK)	CS1	1	512	1850.2	29.7	20.7	17.7	8.7
				661	1880.0	29.7	20.7	16.9	7.9
				810	1909.8	29.9	20.9	17.0	8.0
			2	512	1850.2	28.5	22.5	15.6	9.6
				661	1880.0	27.9	21.9	15.8	9.8
				810	1909.8	28.1	22.1	15.9	9.9
			3	512	1850.2	26.8	22.5	14.5	10.2
				661	1880.0	25.9	21.6	14.7	10.4
				810	1909.8	26.1	21.8	14.8	10.5
			4	512	1850.2	25.5	22.5	13.5	10.5
				661	1880.0	25.8	22.8	13.5	10.5
				810	1909.8	25.9	22.9	13.5	10.5
	EGPRS (8PSK)	MCS5	1	512	1850.2	25.4	16.4	17.7	8.7
				661	1880.0	25.6	16.6	17.0	8.0
				810	1909.8	25.8	16.8	17.0	8.0
			2	512	1850.2	24.3	18.3	15.6	9.6
				661	1880.0	24.3	18.3	15.8	9.8
				810	1909.8	24.5	18.5	16.0	10.0
			3	512	1850.2	21.7	17.4	14.5	10.2
				661	1880.0	21.7	17.4	14.7	10.4
				810	1909.8	21.8	17.5	14.8	10.5
4			512	1850.2	20.5	17.5	13.5	10.5	
			661	1880.0	20.6	17.6	13.6	10.6	
			810	1909.8	20.6	17.6	13.6	10.6	

**Notes:**

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

- Standalone: GMSK (GPRS) mode with 4 time slots and 3 time slots for Max and Reduced power respectively, 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

**GSM850 DTM Measured Results**

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Max Pwr				Reduce Pwr			
						CS		PS		CS		PS	
						Burst (dBm)	Frame (dBm)						
850	GSM(Voice) + GPRS(GMSK)	CS1	1	128	824.2	32.8	23.8			27.3	18.2		
				190	836.6	32.8	23.8			27.3	18.2		
				251	848.8	32.5	23.5			27.3	18.2		
			2	128	824.2	31.1	25.1	31.1	25.1	26.2	20.2	26.2	20.2
				190	836.6	31.0	25.0	31.0	25.0	26.0	20.0	25.9	19.9
				251	848.8	31.1	25.1	31.0	25.0	26.0	20.0	25.9	19.9
			3	128	824.2	29.8	25.5	29.8	25.5	23.8	19.5	23.7	19.4
				190	836.6	29.9	25.6	29.7	25.4	23.8	19.5	23.7	19.4
				251	848.8	29.8	25.5	29.7	25.4	23.8	19.5	23.7	19.4
	GSM(Voice) + EGPRS(8PSK)	MCS5	1	128	824.2	32.8	23.8			18.2	9.2		
				190	836.6	32.8	23.8			18.2	9.2		
				251	848.8	32.8	23.8			18.2	9.2		
			2	128	824.2	31.0	25.0	25.5	19.5	20.0	14.0	25.9	19.9
				190	836.6	31.0	25.0	25.3	19.3	20.0	14.0	25.9	19.9
				251	848.8	31.0	25.0	25.4	19.4	20.0	14.0	25.9	19.9
			3	128	824.2	29.8	25.5	23.0	18.7	19.5	15.3	23.7	19.4
				190	836.6	29.8	25.5	23.0	18.7	19.4	15.2	23.6	19.3
				251	848.8	29.9	25.6	23.1	18.8	19.5	15.3	23.7	19.4

**Notes:**

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

- Standalone: GMSK (GPRS) mode with 2 time slots, based on the output power measurements above

**GSM1900 DTM Measured Results**

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Max Pwr				Reduce Pwr			
						CS		PS		CS		PS	
						Burst (dBm)	Frame (dBm)						
1900	GSM(Voice) + GPRS(GMSK)	CS1	1	512	1850.2	20.8	11.7			17.7	8.7		
				661	1880.0	20.8	11.7			16.9	7.9		
				810	1909.8	20.9	11.8			17.0	8.0		
			2	512	1850.2	22.5	16.5	28.5	22.5	15.6	9.6	15.6	9.6
				661	1880.0	22.0	16.0	28.0	22.0	15.8	9.8	15.8	9.8
				810	1909.8	22.2	16.2	28.1	22.1	15.9	9.9	15.9	9.9
			3	512	1850.2	22.5	18.3	26.8	22.5	14.5	10.2	14.5	10.2
				661	1880.0	22.7	18.5	26.9	22.6	14.7	10.4	14.7	10.4
				810	1909.8	22.8	18.6	27.1	22.8	14.8	10.5	14.8	10.5
	GSM(Voice) + EGPRS(8PSK)	MCS5	1	512	1850.2	29.8	20.8			17.7	8.7		
				661	1880.0	29.8	20.8			16.9	7.9		
				810	1909.8	29.8	20.8			17.0	8.0		
			2	512	1850.2	28.5	22.5	24.3	18.3	15.5	9.5	15.5	9.5
				661	1880.0	27.9	21.9	24.3	18.3	15.7	9.7	15.7	9.7
				810	1909.8	28.2	22.2	24.5	18.5	15.9	9.9	15.7	9.7
			3	512	1850.2	26.9	22.6	21.8	17.5	14.4	10.1	14.4	10.1
				661	1880.0	27.0	22.7	21.9	17.6	14.6	10.3	14.6	10.3
				810	1909.8	27.1	22.8	22.0	17.7	14.7	10.4	14.7	10.4

**Notes:**

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

- Standalone: GMSK (GPRS) mode with 2 time slots and 3 time slots for Max and Reduced power respectively, based on the output power measurements above

## 9.2. W-CDMA

### Release 99 Setup Procedures used to establish the test signals

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 2
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	$\beta_c/\beta_d$	8/15

### HSDPA Setup Procedures used to establish the test signals

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-Set 1			
	Power Control Algorithm	Algorithm 2			
	$\beta_c$	2/15	11/15	15/15	15/15
	$\beta_d$	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	$\beta_c/\beta_d$	2/15	11/15	15/8	15/4
	$\beta_{hs}$	4/15	24/15	30/15	30/15
MPR (dB)	0	0	0.5	0.5	
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			
	$A_{hs}=\beta_{hs}/\beta_c$	30/15			

**HSPA (HSDPA & HSUPA) Setup Procedures used to establish the test signals**

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				
	Subtest	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2 kbps RMC				
	HSDPA FRC	H-Set 1				
	HSUPA Test	HSPA				
	Power Control Algorithm	Algorithm 2				Algorithm 1
	$\beta_c$	11/15	6/15	15/15	2/15	15/15
	$\beta_d$	15/15	15/15	9/15	15/15	0
	$\beta_{ec}$	209/225	12/15	30/15	2/15	5/15
	$\beta_c/\beta_d$	11/15	6/15	15/9	2/15	15/1
	$\beta_{hs}$	22/15	12/15	30/15	4/15	5/15
	$\beta_{ed}$	1309/225	94/75	47/15	56/75	47/15
CM (dB)	1	3	2	3	1	
MPR (dB)	0	2	1	2	0	
HSDPA Specific Settings	DACK	8				0
	DNAK	8				0
	DCQI	8				0
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
	CQI Repetition Factor (Table 5.2B.4)	2				
A <sub>hs</sub> = $\beta_{hs}/\beta_c$	30/15					
HSUPA Specific Settings	E-DPDCCH	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	5	5	2	5	1
	Reference E-TFCI	11	11	11	11	67
	Reference E-TFCI PO	4	4	4	4	18
	Reference E-TFCI	67	67	92	67	67
	Reference E-TFCI PO	18	18	18	18	18
	Reference E-TFCI	71	71	71	71	71
	Reference E-TFCI PO	23	23	23	23	23
	Reference E-TFCI	75	75	75	75	75
	Reference E-TFCI PO	26	26	26	26	26
	Reference E-TFCI	81	81	81	81	81
Reference E-TFCI PO	27	27	27	27	27	
Maximum Channelisation Codes	2xSF2				SF4	

**DC-HSDPA Setup Procedures used to establish the test signals**

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**

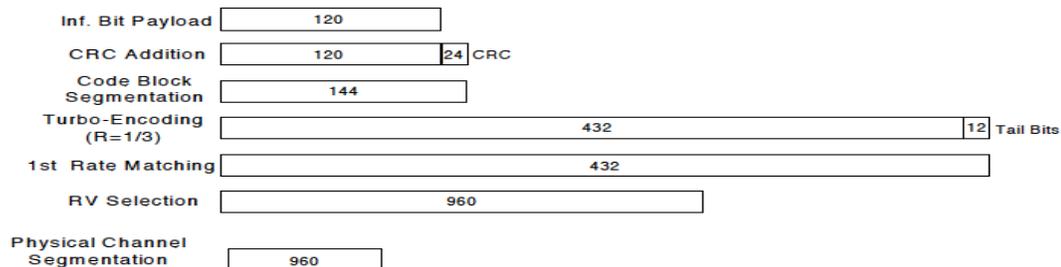
Parameter During Connection setup	Unit	Value
P-CPICH_Ec/Ior	dB	-10
P-CCPCH and SCH_Ec/Ior	dB	-12
PICH_Ec/Ior	dB	-15
HS-PDSCH	dB	off
HS-SCCH_1	dB	off
DPCH_Ec/Ior	dB	-5
OCNS_Ec/Ior	dB	-3.1

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-Set 1			
	Power Control Algorithm	Algorithm2			
	$\beta_c$	2/15	11/15	15/15	15/15
	$\beta_d$	15/15	15/15	8/15	4/15
	$\beta_d$ (SF)	64			
	$\beta_c/\beta_d$	2/15	11/15	15/8	15/4
	$\beta_{hs}$	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			
	A <sub>hs</sub> = $\beta_{hs}/\beta_c$	30/15			

**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.

**Measured Results**

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Max Avg Pwr (dBm)	Reduced Avg Pwr (dBm)
W-CDMA Band II	Rel 99	RMC, 12.2 kbps	9262	1852.4	N/A	23.0	10.4
			9400	1880.0	N/A	23.1	10.8
			9538	1907.6	N/A	23.1	11.0
	HSDPA	Subtest 1	9262	1852.4	0	20.0	9.4
			9400	1880.0	0	20.0	9.8
			9538	1907.6	0	19.5	10.0
		Subtest 2	9262	1852.4	0	20.0	9.4
			9400	1880.0	0	20.1	9.8
			9538	1907.6	0	19.5	10.0
		Subtest 3	9262	1852.4	0.5	19.4	8.9
			9400	1880.0	0.5	19.5	9.1
			9538	1907.6	0.5	18.9	9.5
		Subtest 4	9262	1852.4	0.5	18.6	8.9
			9400	1880.0	0.5	18.6	9.1
			9538	1907.6	0.5	18.6	9.5
	HSUPA	Subtest 1	9262	1852.4	0	21.8	8.6
			9400	1880.0	0	21.5	9.8
			9538	1907.6	0	21.5	9.9
		Subtest 2	9262	1852.4	2	20.4	8.7
			9400	1880.0	2	20.5	8.9
			9538	1907.6	2	20.7	8.9
		Subtest 3	9262	1852.4	1	20.9	8.9
			9400	1880.0	1	20.7	9.1
			9538	1907.6	1	20.8	9.1
		Subtest 4	9262	1852.4	2	20.6	9.0
			9400	1880.0	2	21.2	9.3
			9538	1907.6	2	21.5	9.3
		Subtest 5	9262	1852.4	0	21.5	9.8
			9400	1880.0	0	21.7	10.0
			9538	1907.6	0	21.8	10.0
	DC-HSPA	Subtest 1	9262	1852.4	0	20.0	9.4
			9400	1880.0	0	20.1	9.9
			9538	1907.6	0	19.5	10.0
		Subtest 2	9262	1852.4	0	20.1	9.4
			9400	1880.0	0	20.1	9.8
			9538	1907.6	0	19.5	10.0
		Subtest 3	9262	1852.4	0.5	19.4	8.9
			9400	1880.0	0.5	19.5	9.1
			9538	1907.6	0.5	19.0	9.5
		Subtest 4	9262	1852.4	0.5	18.6	8.9
			9400	1880.0	0.5	18.7	9.1
			9538	1907.6	0.5	18.6	9.5

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Max Avg Pwr (dBm)	Reduced Avg Pwr (dBm)
W-CDMA Band V	Rel 99	RMC, 12.2 kbps	4132	826.4	N/A	24.6	19.7
			4183	836.6	N/A	24.5	19.5
			4233	846.6	N/A	24.6	19.6
	HSDPA	Subtest 1	4132	826.4	0	19.5	18.5
			4183	836.6	0	20.1	18.2
			4233	846.6	0	20.5	18.4
		Subtest 2	4132	826.4	0	19.6	18.5
			4183	836.6	0	20.2	18.2
			4233	846.6	0	20.6	18.4
		Subtest 3	4132	826.4	0.5	19.0	18.0
			4183	836.6	0.5	19.7	17.8
			4233	846.6	0.5	20.0	17.9
		Subtest 4	4132	826.4	0.5	19.0	18.0
			4183	836.6	0.5	19.7	17.8
			4233	846.6	0.5	20.0	17.9
	HSUPA	Subtest 1	4132	826.4	0	22.6	18.3
			4183	836.6	0	22.0	17.7
			4233	846.6	0	22.1	17.7
		Subtest 2	4132	826.4	2	21.6	17.3
			4183	836.6	2	21.6	17.2
			4233	846.6	2	21.7	17.4
		Subtest 3	4132	826.4	1	21.8	16.7
			4183	836.6	1	21.7	17.2
			4233	846.6	1	21.8	17.4
		Subtest 4	4132	826.4	2	21.8	17.7
			4183	836.6	2	21.8	17.6
			4233	846.6	2	21.8	17.8
		Subtest 5	4132	826.4	0	22.3	17.9
			4183	836.6	0	22.2	17.9
			4233	846.6	0	22.3	18.0
	DC-HSPA	Subtest 1	4132	826.4	0	19.5	18.5
			4183	836.6	0	20.1	18.2
			4233	846.6	0	20.5	18.4
		Subtest 2	4132	826.4	0	19.6	18.5
			4183	836.6	0	20.5	18.2
			4233	846.6	0	20.6	18.5
		Subtest 3	4132	826.4	0.5	19.1	18.1
			4183	836.6	0.5	20.0	17.9
			4233	846.6	0.5	20.0	17.9
		Subtest 4	4132	826.4	0.5	19.0	18.0
			4183	836.6	0.5	20.0	17.8
			4233	846.6	0.5	20.0	17.9

### 9.3. 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
64 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".

**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	13	10	Table 6.2.4-2	Table 6.2.4-2
	6.6.3.3.2				
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
				> 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 <sup>1</sup>	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.

**LTE Band 2 Measured Results**

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						1860 MHz	1880 MHz	1900 MHz		1860 MHz	1880 MHz	1900 MHz
LTE Band 2	20	QPSK	1	0	0	22.9	22.9	22.8	0	10.3	10.3	10.1
			1	50	0	22.6	22.5	22.5	0	9.5	9.5	9.5
			1	99	0	22.5	22.5	22.2	0	9.7	9.7	9.6
			50	0	1	21.5	21.5	21.5	0	10.0	10.1	9.9
			50	25	1	21.2	21.2	21.3	0	9.7	9.7	9.6
			50	50	1	21.2	21.2	21.2	0	9.7	9.7	9.7
		16QAM	100	0	1	21.3	21.3	21.4	0	9.9	9.9	9.7
			1	0	1	22.0	21.9	22.1	0	10.7	10.7	10.7
			1	50	1	22.0	21.6	21.4	0	9.9	9.9	9.8
			1	99	1	21.3	21.3	21.4	0	10.1	10.1	10.0
			50	0	2	20.5	20.5	20.6	0	10.1	10.1	9.9
			50	25	2	20.2	20.2	20.4	0	9.8	9.8	9.6
			50	50	2	20.2	20.2	20.2	0	9.7	9.7	9.6
			100	0	2	20.4	20.4	20.4	0	9.9	9.9	9.7

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						1857.5 MHz	1880 MHz	1902.5 MHz		1857.5 MHz	1880 MHz	1902.5 MHz
LTE Band 2	15	QPSK	1	0	0	22.9	22.9	22.8	0	10.2	10.1	10.0
			1	36	0	22.6	22.5	22.5	0	9.4	9.4	9.5
			1	74	0	22.5	22.5	22.2	0	9.6	9.6	9.5
			36	0	1	21.5	21.5	21.5	0	9.9	9.9	9.8
			36	18	1	21.2	21.2	21.3	0	9.8	9.8	9.6
			36	37	1	21.2	21.2	21.2	0	9.7	9.7	9.6
		16QAM	75	0	1	21.3	21.3	21.4	0	9.8	9.8	9.7
			1	0	1	22.0	21.9	22.1	0	10.4	10.4	10.3
			1	36	1	22.0	21.6	21.4	0	9.1	9.1	9.6
			1	74	1	21.3	21.3	21.4	0	9.8	9.8	9.9
			36	0	2	20.5	20.5	20.6	0	9.9	9.9	9.8
			36	18	2	20.2	20.2	20.4	0	9.7	9.7	9.7
			36	37	2	20.2	20.2	20.2	0	9.6	9.6	9.6
			75	0	2	20.4	20.4	20.4	0	9.8	9.8	9.7

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						1855 MHz	1880 MHz	1905 MHz		1855 MHz	1880 MHz	1905 MHz
LTE Band 2	10	QPSK	1	0	0	22.9	22.8	23.1	0	10.6	10.5	10.8
			1	25	0	22.6	22.8	22.8	0	10.2	10.2	10.8
			1	49	0	22.5	22.4	22.6	0	10.1	10.1	10.4
			25	0	1	21.7	21.7	21.9	0	10.3	10.3	10.6
			25	12	1	21.6	21.5	21.7	0	10.2	10.2	10.4
			25	25	1	21.6	21.5	21.8	0	10.1	10.1	10.5
		16QAM	50	0	1	21.7	21.7	21.8	0	10.2	10.2	10.5
			1	0	1	21.9	22.2	22.2	0	10.6	10.7	11.0
			1	25	1	21.9	21.8	22.0	0	10.7	10.8	10.8
			1	49	1	21.6	21.7	21.7	0	10.3	10.3	10.6
			25	0	2	20.7	20.7	21.0	0	10.3	10.3	10.6
			25	12	2	20.7	20.7	20.8	0	10.2	10.2	10.5
			25	25	2	20.7	20.6	20.8	0	10.0	10.0	10.5
			50	0	2	20.7	20.6	20.8	0	10.1	10.1	10.5

**LTE Band 2 Measured Results (continued)**

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						1852.5 MHz	1880 MHz	1907.5 MHz		1852.5 MHz	1880 MHz	1907.5 MHz
LTE Band 2	5	QPSK	1	0	0	22.7	22.7	22.9	0	10.3	10.3	10.8
			1	12	0	22.7	22.7	22.8	0	10.4	10.3	10.7
			1	24	0	22.5	22.5	22.6	0	10.1	10.1	10.7
			12	0	1	21.5	21.5	21.8	0	10.3	10.2	10.4
			12	6	1	21.6	21.6	21.8	0	10.3	10.3	10.5
			12	11	1	21.6	21.5	21.8	0	10.2	10.2	10.5
			25	0	1	21.6	21.5	21.7	0	10.2	10.2	10.5
		16QAM	1	0	1	21.7	21.7	22.0	0	10.7	10.7	10.7
			1	12	1	21.8	21.7	21.9	0	10.8	10.8	10.8
			1	24	1	21.6	21.6	21.8	0	10.5	10.5	10.6
			12	0	2	20.7	20.7	20.8	0	10.2	10.2	10.5
			12	6	2	20.6	20.6	20.9	0	10.2	10.2	10.6
			12	11	2	20.6	20.6	20.8	0	10.2	10.2	10.4
			25	0	2	20.7	20.7	20.8	0	10.3	10.3	10.5
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						1851.5 MHz	1880 MHz	1908.5 MHz		1851.5 MHz	1880 MHz	1908.5 MHz
LTE Band 2	3	QPSK	1	0	0	22.5	22.6	22.9	0	10.3	10.2	10.8
			1	7	0	23.1	22.6	22.8	0	10.8	10.4	11.0
			1	14	0	22.4	22.4	22.6	0	10.2	10.0	10.6
			8	0	1	21.5	21.7	21.8	0	10.2	10.3	10.5
			8	4	1	21.5	21.6	21.8	0	10.2	10.3	10.5
			8	7	1	21.5	21.6	21.8	0	10.2	10.3	10.5
			15	0	1	21.5	21.5	21.8	0	10.2	10.2	10.5
		16QAM	1	0	1	21.5	22.1	22.0	0	10.3	10.9	11.0
			1	7	1	21.4	21.9	21.9	0	10.1	10.7	10.8
			1	14	1	21.5	22.0	21.7	0	10.2	10.7	10.9
			8	0	2	20.7	20.4	20.9	0	10.3	10.1	10.7
			8	4	2	20.6	20.5	20.9	0	10.3	10.1	10.7
			8	7	2	20.7	20.6	21.0	0	10.3	10.1	10.7
			15	0	2	20.5	20.6	20.7	0	10.2	10.2	10.4
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						1850.7 MHz	1880 MHz	1909.3 MHz		1850.7 MHz	1880 MHz	1909.3 MHz
LTE Band 2	1.4	QPSK	1	0	0	22.4	22.8	22.7	0	10.2	10.5	10.3
			1	2	0	22.4	22.2	22.5	0	10.2	10.2	10.3
			1	5	0	22.3	22.5	22.5	0	10.2	10.3	10.3
			3	0	0	22.4	22.5	22.6	0	10.1	10.4	11.0
			3	1	0	22.4	22.6	22.6	0	10.1	10.4	11.0
			3	2	0	22.4	22.6	22.6	0	10.1	10.4	10.8
			6	0	1	21.6	21.7	21.7	0	10.2	10.3	10.8
		16QAM	1	0	1	21.6	22.1	21.7	0	10.6	11.0	10.6
			1	2	1	21.6	22.1	21.7	0	10.5	11.0	10.7
			1	5	1	21.7	22.2	21.6	0	10.5	11.0	10.7
			3	0	1	21.6	22.0	21.8	0	10.3	10.9	11.0
			3	1	1	21.7	22.1	21.9	0	10.2	11.0	11.0
			3	2	1	21.7	22.1	21.8	0	10.2	11.0	11.0
			6	0	2	20.9	20.9	20.9	0	10.3	10.8	11.0

**LTE Band 4 Measured Results**

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						1720 MHz	1732.5 MHz	1745 MHz		1720 MHz	1732.5 MHz	1745 MHz
LTE Band 4	20	QPSK	1	0	0	22.7	22.7	23.1	0	11.7	11.7	11.7
			1	50	0	22.3	22.6	22.7	0	11.0	11.0	11.0
			1	99	0	22.4	22.4	22.9	0	11.2	11.2	11.1
			50	0	1	21.4	21.4	21.7	0	11.4	11.4	11.5
			50	25	1	21.4	21.3	21.6	0	11.2	11.2	11.3
			50	50	1	21.3	21.3	21.5	0	11.2	11.2	11.3
		16QAM	100	0	1	21.4	21.4	21.6	0	11.4	11.4	11.4
			1	0	1	21.9	22.1	21.5	0	11.3	11.3	11.4
			1	50	1	21.9	21.8	22.1	0	11.6	11.6	11.7
			1	99	1	21.6	21.8	21.9	0	11.8	11.8	11.8
			50	0	2	20.5	20.5	20.8	0	11.5	11.5	11.5
			50	25	2	20.5	20.4	20.7	0	11.3	11.2	11.3
			50	50	2	20.5	20.4	20.6	0	11.2	11.2	11.2
			100	0	2	20.5	20.5	20.7	0	11.4	11.4	11.3
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						1717.5 MHz	1732.5 MHz	1747.5 MHz		1717.5 MHz	1732.5 MHz	1747.5 MHz
LTE Band 4	15	QPSK	1	0	0	22.5	22.6	22.8	0	11.6	11.6	11.6
			1	36	0	22.7	22.6	22.7	0	11.1	11.1	11.1
			1	74	0	22.5	22.5	22.7	0	11.3	11.2	11.1
			36	0	1	21.5	21.4	21.7	0	11.4	11.3	11.4
			36	18	1	21.4	21.4	21.5	0	11.2	11.2	11.3
			36	37	1	21.4	21.4	21.5	0	11.2	11.2	11.2
		16QAM	75	0	1	21.4	21.4	21.6	0	11.2	11.2	11.3
			1	0	1	21.8	21.8	21.4	0	11.2	11.1	11.8
			1	36	1	21.6	21.8	21.4	0	11.2	11.0	10.9
			1	74	1	21.5	21.6	21.4	0	12.1	12.1	11.3
			36	0	2	20.5	20.5	20.7	0	11.3	11.3	11.4
			36	18	2	20.4	20.5	20.6	0	11.1	11.2	11.2
			36	37	2	20.4	20.5	20.6	0	11.1	11.1	11.1
			75	0	2	20.5	20.4	20.5	0	11.2	11.2	11.2
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						1715 MHz	1732.5 MHz	1750 MHz		1715 MHz	1732.5 MHz	1750 MHz
LTE Band 4	10	QPSK	1	0	0	22.7	22.7	23.1	0	11.5	11.4	11.6
			1	25	0	22.3	22.6	22.7	0	11.2	11.2	11.6
			1	49	0	22.4	22.4	22.9	0	11.1	11.1	11.4
			25	0	1	21.4	21.4	21.7	0	11.3	11.3	11.5
			25	12	1	21.4	21.3	21.6	0	11.2	11.2	11.5
			25	25	1	21.3	21.3	21.5	0	11.2	11.2	11.4
		16QAM	50	0	1	21.4	21.4	21.6	0	11.2	11.2	11.4
			1	0	1	21.9	22.1	21.5	0	11.7	11.6	12.0
			1	25	1	21.9	21.8	22.1	0	11.7	11.7	11.9
			1	49	1	21.6	21.8	21.9	0	11.4	11.4	11.7
			25	0	2	20.5	20.5	20.8	0	11.3	11.3	11.5
			25	12	2	20.5	20.4	20.7	0	11.2	11.2	11.5
			25	25	2	20.5	20.4	20.6	0	11.2	11.2	11.4
			50	0	2	20.5	20.5	20.7	0	11.2	11.2	11.4

**LTE Band 4 Measured Results (continued)**

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						1712.5 MHz	1732.5 MHz	1752.5 MHz		1712.5 MHz	1732.5 MHz	1752.5 MHz
LTE Band 4	5	QPSK	1	0	0	22.5	22.6	22.8	0	11.3	11.3	11.6
			1	12	0	22.7	22.6	22.7	0	11.9	12.0	11.6
			1	24	0	22.5	22.5	22.7	0	11.2	11.2	11.6
			12	0	1	21.5	21.4	21.7	0	11.3	11.3	11.5
			12	6	1	21.4	21.4	21.5	0	11.2	11.2	11.4
			12	11	1	21.4	21.4	21.5	0	11.3	11.3	11.4
			25	0	1	21.4	21.4	21.6	0	11.3	11.3	11.5
		16QAM	1	0	1	21.8	21.8	21.4	0	11.6	11.6	11.9
			1	12	1	21.6	21.8	21.4	0	11.6	11.7	11.9
			1	24	1	21.5	21.6	21.4	0	11.6	11.6	11.7
			12	0	2	20.5	20.5	20.7	0	11.2	11.2	11.6
			12	6	2	20.4	20.5	20.6	0	11.2	11.2	11.4
			12	11	2	20.4	20.5	20.6	0	11.2	11.2	11.4
			25	0	2	20.5	20.4	20.5	0	11.4	11.4	11.4
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						1711.5 MHz	1732.5 MHz	1753.5 MHz		1711.5 MHz	1732.5 MHz	1753.5 MHz
LTE Band 4	3	QPSK	1	0	0	22.6	22.5	22.8	0	11.3	11.3	11.3
			1	7	0	22.8	22.6	23.2	0	11.7	11.7	11.8
			1	14	0	22.4	22.4	22.7	0	11.2	11.2	11.2
			8	0	1	21.5	21.4	21.6	0	11.2	11.2	11.2
			8	4	1	21.4	21.4	21.5	0	11.2	11.3	11.2
			8	7	1	21.4	21.4	21.6	0	11.3	11.3	11.3
			15	0	1	21.4	21.4	21.6	0	11.3	11.3	11.3
		16QAM	1	0	1	21.5	22.0	21.8	0	11.3	11.4	11.3
			1	7	1	21.3	21.9	21.9	0	11.3	11.1	11.2
			1	14	1	21.5	21.9	21.8	0	11.3	11.3	11.3
			8	0	2	20.7	20.3	20.8	0	11.3	11.3	11.3
			8	4	2	20.6	20.3	20.7	0	11.2	11.2	11.2
			8	7	2	20.6	20.3	20.8	0	11.4	11.3	11.3
			15	0	2	20.5	20.5	20.6	0	11.2	11.3	11.2
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						1710.7 MHz	1732.5 MHz	1754.3 MHz		1710.7 MHz	1732.5 MHz	1754.3 MHz
LTE Band 4	1.4	QPSK	1	0	0	22.7	22.3	23.2	0	11.2	11.3	11.3
			1	2	0	22.6	22.4	23.2	0	11.2	11.3	11.2
			1	5	0	22.6	22.4	23.2	0	11.3	11.2	11.2
			3	0	0	22.4	22.3	23.2	0	11.0	11.0	11.0
			3	1	0	22.5	23.2	23.2	0	11.1	11.1	11.1
			3	2	0	22.4	22.6	23.2	0	11.2	11.2	11.2
			6	0	1	21.4	21.7	22.2	0	11.1	11.1	11.1
		16QAM	1	0	1	21.7	21.4	22.1	0	11.7	11.6	11.5
			1	2	1	21.9	21.3	22.1	0	11.5	11.5	11.6
			1	5	1	21.8	21.4	22.2	0	11.7	11.6	11.6
			3	0	1	21.5	21.9	22.2	0	11.2	11.2	11.2
			3	1	1	21.5	22.1	22.2	0	11.3	11.3	11.3
			3	2	1	21.4	22.0	22.2	0	11.4	11.4	11.4
			6	0	2	20.6	21.2	21.2	0	11.2	11.2	11.2

**LTE Band 5 Measured Results**

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						829 MHz	836.5 MHz	844 MHz		829 MHz	836.5 MHz	844 MHz
LTE Band 5	10	QPSK	1	0	0	23.3	23.5	23.7	0	19.1	19.2	19.2
			1	25	0	23.3	23.7	23.7	0	19.0	19.5	19.3
			1	49	0	23.3	23.5	23.4	0	19.0	19.1	19.3
			25	0	1	22.3	22.4	22.5	0	19.1	19.1	19.2
			25	12	1	22.3	22.4	22.4	0	19.2	19.1	19.1
			25	25	1	22.3	22.5	22.5	0	19.1	19.1	19.1
		16QAM	1	0	1	22.7	22.9	23.0	0	19.4	19.5	19.4
			1	25	1	22.8	22.9	22.2	0	19.7	19.6	19.7
			1	49	1	22.6	22.8	22.5	0	19.3	19.6	19.2
			25	0	2	21.3	21.4	21.6	0	19.2	19.2	19.3
			25	12	2	21.3	21.5	21.5	0	19.2	19.2	19.2
			25	25	2	21.3	21.5	21.6	0	19.2	19.2	19.2
			50	0	2	21.3	21.5	21.5	0	19.1	19.1	19.1
			50	0	2	21.3	21.5	21.5	0	19.1	19.1	19.1
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						826.5 MHz	836.5 MHz	846.5 MHz		826.5 MHz	836.5 MHz	846.5 MHz
LTE Band 5	5	QPSK	1	0	0	23.3	23.6	23.7	0	19.0	19.2	19.2
			1	12	0	23.6	23.5	23.7	0	19.3	19.2	19.3
			1	24	0	23.4	23.7	23.4	0	19.1	19.2	19.2
			12	0	1	22.3	22.4	22.6	0	19.0	19.0	19.2
			12	6	1	22.3	22.5	22.5	0	19.0	19.1	19.1
			12	11	1	22.3	22.4	22.5	0	19.0	19.1	19.1
		16QAM	25	0	1	22.2	22.4	22.5	0	19.0	19.1	19.1
			1	0	1	22.4	23.0	22.5	0	19.1	19.5	19.0
			1	12	1	22.6	23.0	22.6	0	19.2	19.7	19.0
			1	24	1	22.5	23.0	22.2	0	19.1	19.5	19.0
			12	0	2	21.3	21.5	21.6	0	19.0	19.1	19.2
			12	6	2	21.3	21.5	21.5	0	19.0	19.3	19.1
			12	11	2	21.3	21.5	21.5	0	19.1	19.2	19.1
			25	0	2	21.3	21.4	21.4	0	19.1	19.1	19.1
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						825.5 MHz	836.5 MHz	847.5 MHz		825.5 MHz	836.5 MHz	847.5 MHz
LTE Band 5	3	QPSK	1	0	0	23.4	23.5	23.5	0	19.1	19.1	19.2
			1	7	0	23.7	23.6	23.9	0	19.8	19.3	19.9
			1	14	0	23.3	23.5	23.5	0	19.1	19.2	19.3
			8	0	1	22.3	22.5	22.4	0	19.0	19.1	19.1
			8	4	1	22.3	22.5	22.4	0	19.1	19.1	19.1
			8	7	1	22.3	22.5	22.4	0	19.1	19.2	19.1
		16QAM	15	0	1	22.3	22.4	22.4	0	19.1	19.1	19.1
			1	0	1	22.3	23.0	22.6	0	19.2	19.7	19.4
			1	7	1	22.2	23.0	22.3	0	19.1	19.6	19.1
			1	14	1	22.4	23.0	22.6	0	19.2	19.8	19.3
			8	0	2	21.4	21.4	21.6	0	19.2	19.0	19.3
			8	4	2	21.4	21.4	21.5	0	19.2	19.1	19.3
			8	7	2	21.5	21.4	21.6	0	19.3	19.1	19.4
			15	0	2	21.3	21.5	21.5	0	19.2	19.2	19.1

**LTE Band 5 Measured Results (continued)**

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						824.7 MHz	836.5 MHz	848.3 MHz		824.7 MHz	836.5 MHz	848.3 MHz
LTE Band 5	1.4	QPSK	1	0	0	23.2	23.8	23.5	0	19.0	19.0	19.1
			1	2	0	23.2	23.1	23.4	0	19.1	19.3	18.9
			1	5	0	23.2	23.1	23.3	0	19.0	19.0	19.1
			3	0	0	23.2	23.1	23.4	0	19.0	19.0	19.5
			3	1	0	23.2	23.1	23.5	0	19.0	19.2	19.5
			3	2	0	23.4	23.1	23.4	0	19.0	19.1	19.5
			6	0	1	22.6	22.1	22.4	0	19.0	19.2	19.4
		16QAM	1	0	1	22.4	22.2	22.6	0	19.3	19.1	19.3
			1	2	1	22.5	23.0	22.6	0	19.3	19.1	19.6
			1	5	1	22.5	23.0	22.4	0	19.3	19.2	19.1
			3	0	1	22.6	22.7	22.6	0	19.1	19.2	19.1
			3	1	1	22.4	22.7	22.7	0	19.1	19.3	19.1
			3	2	1	22.4	22.7	22.6	0	19.1	19.3	19.1
			6	0	2	21.3	21.3	21.6	0	19.1	19.2	19.2

**LTE Band 7 Measured Results**

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						2510 MHz	2535 MHz	2560 MHz		2510 MHz	2535 MHz	2560 MHz
LTE Band 7	20	QPSK	1	0	0	22.6	22.8	22.7	0	10.4	10.7	10.7
			1	49	0	22.2	22.5	22.1	0	10.4	10.6	10.6
			1	99	0	22.6	22.8	22.5	0	10.0	10.2	10.1
			50	0	1	21.3	21.7	21.4	0	10.7	10.8	10.8
			50	24	1	21.3	21.7	21.3	0	10.6	10.8	10.7
			50	50	1	21.5	21.9	21.6	0	10.5	10.6	10.4
			100	0	1	21.4	21.8	21.5	0	10.5	10.6	10.6
		16QAM	1	0	1	22.1	22.3	22.1	0	11.0	11.0	10.9
			1	49	1	21.8	22.0	21.5	0	11.0	11.1	11.0
			1	99	1	22.2	22.3	22.0	0	10.5	10.4	10.4
			50	0	2	20.5	20.9	20.6	0	10.8	11.0	10.9
			50	24	2	20.5	20.9	20.4	0	10.8	11.0	10.9
			50	50	2	20.7	21.0	20.8	0	10.7	10.7	10.6
			100	0	2	20.6	21.0	20.7	0	10.7	10.8	10.8
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						2507.5 MHz	2535 MHz	2562.5 MHz		2507.5 MHz	2535 MHz	2562.5 MHz
LTE Band 7	15	QPSK	1	0	0	22.7	22.8	22.6	0	10.5	10.7	10.7
			1	37	0	22.2	22.5	22.2	0	10.0	10.4	10.6
			1	74	0	22.7	22.9	22.5	0	10.3	10.4	10.4
			36	0	1	21.5	21.7	21.4	0	10.5	10.7	10.6
			36	20	1	21.2	21.6	21.3	0	10.5	10.7	10.5
			36	39	1	21.3	21.8	21.7	0	10.4	10.5	10.5
			75	0	1	21.4	21.8	21.5	0	10.4	10.6	10.6
		16QAM	1	0	1	21.6	22.2	21.6	0	10.8	11.0	10.9
			1	37	1	21.1	21.9	21.2	0	10.6	10.8	10.9
			1	74	1	21.7	22.2	21.6	0	10.5	10.7	11.3
			36	0	2	20.5	20.9	20.5	0	10.7	11.0	10.9
			36	20	2	20.5	20.8	20.5	0	10.8	11.1	10.9
			36	39	2	20.5	20.9	21.0	0	10.6	10.9	10.8
			75	0	2	20.6	20.9	20.7	0	10.7	11.0	10.9
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						2505 MHz	2535 MHz	2565 MHz		2505 MHz	2535 MHz	2565 MHz
LTE Band 7	10	QPSK	1	0	0	22.4	22.6	22.3	0	10.3	10.4	10.5
			1	25	0	22.3	22.5	22.6	0	10.4	10.6	10.3
			1	49	0	22.0	22.6	22.3	0	10.3	10.6	10.1
			25	0	1	21.3	21.7	21.5	0	10.3	10.5	10.3
			25	12	1	21.4	21.7	21.9	0	10.4	10.5	10.3
			25	25	1	21.2	21.7	21.8	0	10.2	10.4	10.1
			50	0	1	21.2	21.7	21.7	0	10.3	10.4	10.3
		16QAM	1	0	1	21.3	22.0	21.4	0	10.7	11.4	10.8
			1	25	1	21.1	22.0	21.7	0	11.0	11.4	10.8
			1	49	1	21.0	22.1	21.5	0	10.6	11.0	10.4
			25	0	2	20.6	20.9	20.8	0	10.5	10.8	10.5
			25	12	2	20.5	20.9	21.1	0	10.6	10.8	10.6
			25	25	2	20.4	20.8	21.2	0	10.5	10.7	10.5
			50	0	2	20.4	20.8	21.0	0	10.5	10.7	10.5

**LTE Band 7 Measured Results (continued)**

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						2502.5 MHz	2535 MHz	2567.5 MHz		2502.5 MHz	2535 MHz	2567.5 MHz
LTE Band 7	5	QPSK	1	0	0	22.4	22.7	22.7	0	10.2	10.7	10.5
			1	12	0	22.3	22.6	22.6	0	10.7	10.7	10.4
			1	24	0	22.2	22.6	22.4	0	10.4	10.6	10.4
			12	0	1	21.5	21.7	21.9	0	10.2	10.5	10.3
			12	7	1	21.3	21.7	21.9	0	10.4	10.4	10.3
			12	13	1	21.2	21.7	21.8	0	10.2	10.4	10.2
			25	0	1	21.3	21.7	21.8	0	10.3	10.4	10.2
		16QAM	1	0	1	21.4	21.9	22.4	0	10.7	10.8	11.1
			1	12	1	21.3	21.9	22.4	0	10.7	11.0	11.1
			1	24	1	21.2	21.9	22.2	0	10.7	10.6	10.9
			12	0	2	20.6	20.9	21.1	0	10.5	10.7	10.6
			12	7	2	20.5	20.9	21.1	0	10.6	10.7	10.6
			12	13	2	20.4	20.9	21.0	0	10.4	10.7	10.6
			25	0	2	20.6	20.8	21.0	0	10.5	10.6	10.5

**LTE Band 12 Measured Results**

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						704 MHz	707.5 MHz	711 MHz		704 MHz	707.5 MHz	711 MHz
LTE Band 12	10	QPSK	1	0	0	23.2	23.1	23.5	0	18.7	18.8	18.9
			1	25	0	23.2	23.4	23.2	0	18.7	18.7	19.1
			1	49	0	23.2	23.0	23.4	0	18.7	18.7	18.8
			25	0	1	22.2	22.1	22.0	0	18.8	18.7	18.8
			25	12	1	22.2	22.1	22.1	0	18.8	18.8	18.8
			25	25	1	22.2	22.1	22.1	0	18.7	18.7	18.8
		16QAM	50	0	1	22.3	22.1	22.2	0	18.7	18.7	18.8
			1	0	1	22.3	22.5	22.6	0	18.9	19.0	19.2
			1	25	1	23.0	22.5	22.9	0	18.3	18.4	18.2
			1	49	1	22.4	22.4	22.6	0	18.9	18.9	18.1
			25	0	2	21.2	21.0	21.2	0	18.7	18.7	18.9
			25	12	2	21.2	21.1	21.2	0	18.8	18.8	18.9
			25	25	2	21.2	21.0	21.2	0	18.8	18.8	18.8
			50	0	2	21.2	21.1	21.1	0	18.7	18.7	18.8

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						701.5 MHz	707.5 MHz	713.5 MHz		701.5 MHz	707.5 MHz	713.5 MHz
LTE Band 12	5	QPSK	1	0	0	23.0	23.2	23.1	0	18.6	18.8	18.8
			1	12	0	23.3	23.3	24.0	0	19.1	18.8	19.3
			1	24	0	23.1	23.2	23.3	0	18.7	18.8	19.0
			12	0	1	21.9	22.1	22.1	0	18.6	18.7	18.7
			12	7	1	22.0	22.1	22.2	0	18.7	18.7	18.7
			12	13	1	21.9	22.1	22.2	0	18.6	18.7	18.8
		16QAM	25	0	1	22.0	22.0	22.1	0	18.6	18.7	18.7
			1	0	1	22.1	22.9	22.2	0	18.6	19.5	18.8
			1	12	1	22.1	23.0	22.5	0	18.7	19.7	18.8
			1	24	1	22.1	22.9	22.5	0	18.7	19.6	19.1
			12	0	2	20.9	21.1	21.1	0	18.6	18.8	18.7
			12	7	2	20.9	21.1	21.2	0	18.7	18.7	18.8
			12	13	2	20.8	21.1	21.2	0	18.6	18.7	18.8
			25	0	2	21.1	21.0	21.2	0	18.8	18.7	18.9

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						700.5 MHz	707.5 MHz	714.5 MHz		700.5 MHz	707.5 MHz	714.5 MHz
LTE Band 12	3	QPSK	1	0	0	23.0	23.1	23.4	0	18.7	18.8	18.8
			1	8	0	23.3	23.4	23.7	0	19.0	19.5	19.0
			1	14	0	23.0	23.1	23.4	0	18.9	18.8	18.9
			8	0	1	22.0	22.1	22.2	0	18.5	18.7	18.8
			8	4	1	22.0	22.1	22.1	0	18.5	18.7	18.8
			8	7	1	21.8	22.2	22.2	0	18.7	18.8	18.9
		16QAM	15	0	1	22.0	22.1	22.2	0	18.6	18.8	18.7
			1	0	1	22.1	22.7	22.6	0	18.8	18.9	19.3
			1	8	1	22.0	22.6	22.7	0	18.7	18.9	19.2
			1	14	1	22.1	22.7	22.6	0	18.9	19.0	19.5
			8	0	2	21.1	21.0	21.3	0	18.8	18.9	18.7
			8	4	2	21.1	20.9	21.2	0	18.8	18.8	18.7
			8	7	2	21.0	21.0	21.4	0	18.9	18.9	18.8
			15	0	2	21.0	21.1	21.1	0	18.6	18.8	18.8

**LTE Band 12 Measured Results (continued)**

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Full Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						699.7 MHz	707.5 MHz	715.3 MHz		699.7 MHz	707.5 MHz	715.3 MHz
LTE Band 12	1.4	QPSK	1	0	0	22.9	23.1	23.1	0	18.7	18.8	19.0
			1	3	0	22.9	23.1	23.3	0	18.6	18.8	18.9
			1	5	0	22.8	23.2	23.3	0	18.6	18.8	19.0
			3	0	1	22.6	23.1	23.1	0	18.5	18.6	18.7
			3	1	1	22.7	23.1	23.2	0	18.5	18.7	18.8
			3	3	1	22.7	23.2	23.1	0	18.5	18.8	18.8
			6	0	1	21.7	22.0	22.0	0	18.5	18.6	18.6
		16QAM	1	0	1	22.2	22.5	22.3	0	18.8	19.0	19.0
			1	3	1	22.4	22.6	22.6	0	18.9	19.3	19.1
			1	5	1	22.4	22.5	22.3	0	18.9	19.1	19.1
			3	0	2	21.7	22.2	22.3	0	18.6	18.9	18.8
			3	1	2	21.8	22.2	22.4	0	18.7	19.0	18.9
			3	3	2	21.9	22.3	22.4	0	18.7	19.0	18.9
			6	0	2	20.9	20.9	21.2	0	18.7	18.6	18.8

**LTE Band 17 Measured Results**

SAR for LTE Band 17 is covered by LTE Band 12 due to similar frequency range, same maximum tune-up limit and same channel bandwidth

## 9.4. Wi-Fi 2.4GHz (DTS Band)

The initial test configuration for 2.4 GHz and 5 GHz OFDM transmission modes is determined by the 802.11 configuration with the highest maximum output power specified for production units, including tune-up tolerance, in each standalone and aggregated frequency band. SAR for the initial test configuration is measured using the highest maximum output power channel determined by the default power measurement procedures (section 4). When multiple configurations in a frequency band have the same specified maximum output power, the initial test configuration is determined according to the following steps applied sequentially.

- 1) The largest channel bandwidth configuration is selected among the multiple configurations with the same specified maximum output power.
- 2) If multiple configurations have the same specified maximum output power and largest channel bandwidth, the lowest order modulation among the largest channel bandwidth configurations is selected.
- 3) If multiple configurations have the same specified maximum output power, largest channel bandwidth and lowest order modulation, the lowest data rate configuration among these configurations is selected.
- 4) When multiple transmission modes (802.11a/g/n/ac) have the same specified maximum output power, largest channel bandwidth, lowest order modulation and lowest data rate, the lowest order 802.11 mode is selected; i.e., 802.11a is chosen over 802.11n then 802.11ac or 802.11g is chosen over 802.11n.

### SISO

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Main Ant Avg Pwr (dBm)	Sub Ant Avg Pwr (dBm)	Max Output Power (dBm)		SAR Test (Yes/No)	Note(s)
							Main Ant	Sub Ant		
2.4	802.11b	1 Mbps	1	2412	11.0	9.4	11.5	10.0	Yes	
			6	2437	10.8	9.0				
			11	2462	10.7	9.0				
	802.11g	6 Mbps	1	2412	10.5	9.0	11.5	10.0	No	1
			6	2437	10.7	9.0				
			11	2462	10.3	9.0				
	802.11n (HT20)	6.5 Mbps	1	2412	10.1	9.0	11.5	10.0	No	1
			6	2437	10.9	8.7				
			11	2462	10.6	9.0				

### MIMO

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Main Ant Avg Pwr (dBm)	Sub Ant Avg Pwr (dBm)	Max Output Power (dBm)		SAR Test (Yes/No)	Note(s)
							Main Ant	Sub Ant		
2.4	802.11g	6 Mbps	1	2412	10.5	9.5	11.5	10.0	Yes	
			6	2437	10.6	9.0				
			11	2462	10.3	9.1				
	802.11n (HT20)	6.5 Mbps	1	2412	10.3	8.7	11.5	10.0	No	1
			6	2437	10.7	9.0				
			11	2462	10.5	9.0				

### Note(s):

1. SAR is not required for 802.11g/n HT20 channels when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is  $\leq 1.2$  W/kg.

### 9.5. Wi-Fi 5GHz (U-NII Bands)

#### SISO

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Main Ant Avg Pwr (dBm)	Sub Ant Avg Pwr (dBm)	Max Output Power (dBm)		SAR Test (Yes/No)
							Main Ant	Sub Ant	
5.3 (U-NII 2A)	802.11a	6 Mbps	52	5260	Not Required		9.8	9.0	No
			56	5280					
			60	5300					
			64	5320					
	802.11n (HT20)	6.5 Mbps	52	5260	Not Required		9.8	9.0	No
			56	5280					
			60	5300					
	802.11n (HT40)	13.5 Mbps	54	5270	9.1	8.6	9.8	9.0	No
			62	5310	9.0	8.7			
	802.11ac (VHT20)	6.5 Mbps	52	5260	Not Required		9.8	9.0	No
			56	5280					
			60	5300					
64			5320						
802.11ac (VHT40)	13.5 Mbps	54	5270	Not Required		9.8	9.0	No	
		62	5310						
802.11ac (VHT80)	29.3 Mbps	58	5290	Not Required		9.7	8.9	No	
5.5 (UNII-2C)	802.11a	6 Mbps	100	5500	Not Required		9.8	9.0	No
			104	5520					
			108	5540					
			112	5560					
			116	5580					
			120	5600					
			124	5620					
			128	5640					
	802.11n (HT20)	6.5 Mbps	100	5500	Not Required		9.8	9.0	No
			104	5520					
			108	5540					
			112	5560					
			120	5600					
			128	5640					
	802.11n (HT40)	13.5 Mbps	102	5510	8.9	8.3	9.8	9.0	No
			110	5550	8.8	8.3			
			118	5590	9.0	8.3			
			126	5630	8.9	8.2			
	802.11ac (VHT20)	6.5 Mbps	100	5500	Not Required		9.8	9.0	No
			104	5520					
			108	5540					
			112	5560					
			116	5580					
			120	5600					
802.11ac (VHT40)	13.5 Mbps	102	5510	Not Required		9.8	9.0	Mo	
		110	5550						
		118	5590						
		126	5630						
802.11ac (VHT80)	29.3 Mbps	106	5530	Not Required		9.7	8.9	No	
		122	5610						

**SISO (continued)**

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Main Ant Avg Pwr (dBm)		Sub Ant Avg Pwr (dBm)		Max Output Power (dBm)		SAR Test (Yes/No)
									Main Ant	Sub Ant	
5.8 (UNII-3)	802.11a	6 Mbps	132	5660	Not Required		9.8		9.0		No
			136	5680							
			140	5700							
			144	5720							
			149	5745							
			153	5765							
			157	5785							
			161	5805							
	802.11n (HT20)	6.5 Mbps	132	5660	Not Required		9.8		9.0		No
			136	5680							
			140	5700							
			144	5720							
			149	5745							
			153	5765							
			157	5785							
			161	5805							
	802.11n (HT40)	13.5 Mbps	134	5670	8.6	8.3	9.8		9.0		No
			142	5710	8.7	8.3					
			151	5755	8.7	8.2					
			159	5795	9.0	8.0					
	802.11ac (VHT20)	6.5 Mbps	132	5660	Not Required		9.8		9.0		No
			136	5680							
			140	5700							
			144	5720							
			149	5745							
			153	5765							
			157	5785							
			161	5805							
	802.11ac (VHT40)	13.5 Mbps	134	5670	Not Required		9.8		9.0		No
			142	5710							
151			5755								
159			5795								
802.11ac (VHT80)	29.3 Mbps	138	5690	Not required		9.7		8.9		No	
		155	5775								

**Note(s):**

1. Output Power and SAR measurement is not required for 802.11a and 802.11n HT20 channels because the specified tune-up tolerances for 802.11a and 802.11n HT20 are lower than or equal to 802.11n HT40 and the measured SAR is  $\leq 1.2$  W/Kg.
2. When the same transmission mode configurations have the same maximum output power on the same channel for the 802.11 a/g/n/ac modes, the channel in the lower order/sequence 802.11 mode (i.e. a, g, n then ac) is selected.
3. When the specified maximum output power is the same for both UNII band I and UNII band 2A, begin SAR measurement in UNII band 2A; and if the highest *reported* SAR for UNII band 2A is
  - o  $\leq 1.2$  W/kg, SAR is not required for UNII band I
  - o  $> 1.2$  W/kg, both bands should be tested independently for SAR.

**MIMO**

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Main Ant Avg Pwr (dBm)	Sub Ant Avg Pwr (dBm)	Max Output Power (dBm)		SAR Test (Yes/No)	Note(s)
							Main Ant	Sub Ant		
5.3 (U-NII 2A)	802.11a	6 Mbps	52	5260	Not Required		9.8	9.0	No	1
			56	5280						
			60	5300						
			64	5320						
	802.11n (HT20)	6.5 Mbps	52	5260	Not Required		9.8	9.0	No	1
			56	5280						
			60	5300						
	802.11n (HT40)	13.5 Mbps	54	5270	9.3	8.2	9.8	9.0	Yes	
			62	5310	9.2	8.2				
	802.11ac (VHT20)	6.5 Mbps	52	5260	Not Required		9.8	9.0	No	1
			56	5280						
			60	5300						
802.11ac (VHT40)	13.5 Mbps	54	5270	Not Required		9.8	9.0	No	1	
		62	5310							
802.11ac (VHT80)	29.3 Mbps	58	5290	Not Required		9.7	8.9	No	1	
5.5 (UNII-2C)	802.11a	6 Mbps	100	5500	Not Required		9.8	9.0	No	1
			104	5520						
			108	5540						
			112	5560						
			116	5580						
			120	5600						
			124	5620						
			128	5640						
	802.11n (HT20)	6.5 Mbps	100	5500	Not Required		9.8	9.0	No	1
			104	5520						
			108	5540						
			112	5560						
			116	5580						
			120	5600						
			124	5620						
	802.11n (HT40)	13.5 Mbps	102	5510	8.8	7.8	9.8	9.0	Yes	
			110	5550	8.8	8.0				
			118	5590	9.0	8.1				
			126	5630	9.2	8.1				
	802.11ac (VHT20)	6.5 Mbps	100	5500	Not Required		9.8	9.0	No	1
			104	5520						
			108	5540						
			112	5560						
			116	5580						
120			5600							
124			5620							
802.11ac (VHT40)	13.5 Mbps	102	5510	Not Required		9.8	9.0	No		
		110	5550							
		118	5590							
		126	5630							
802.11ac (VHT80)	29.3 Mbps	106	5530	Not Required		9.7	8.9	No	1	
		112	5610							
		122	5610							

**MIMO (continued)**

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Main Ant Avg Pwr (dBm)	Sub Ant Avg Pwr (dBm)	Max Output Power (dBm)		SAR Test (Yes/No)	Note(s)	
							Main Ant	Sub Ant			
5.8 (UNII-3)	802.11a	6 Mbps	132	5660	Not Required		9.8	9.0	No	1	
			136	5680							
			140	5700							
			144	5720							
			149	5745							
			153	5765							
			157	5785							
			161	5805							
	165	5825									
	802.11n (HT20)	6.5 Mbps	6.5 Mbps	132	5660	Not Required		9.8	9.0	No	1
				136	5680						
				140	5700						
				144	5720						
				149	5745						
				153	5765						
				157	5785						
				161	5805						
	165	5825									
	802.11n (HT40)	13.5 Mbps	13.5 Mbps	134	5670	9.2	8.2	9.8	9.0	Yes	
				142	5710	8.9	7.9				
				151	5755	9.3	8.3				
				159	5795	9.2	8.2				
	802.11ac (VHT20)	6.5 Mbps	6.5 Mbps	132	5660	Not Required		9.8	9.0	No	1
				136	5680						
				140	5700						
				144	5720						
				149	5745						
				153	5765						
157				5785							
161				5805							
165	5825										
802.11ac (VHT40)	13.5 Mbps	13.5 Mbps	134	5670	Not Required		9.8	9.0	No	1	
			142	5710							
			151	5755							
			159	5795							
802.11ac (VHT80)	29.3 Mbps	29.3 Mbps	138	5690	Not required		9.7	8.9	No	1	
			155	5775							

**Note(s):**

1. Output Power and SAR measurement is not required for 802.11a and 802.11n HT20 channels because the specified tune-up tolerances for 802.11a and 802.11n HT20 are lower than or equal to 802.11n HT40 and the measured SAR is  $\leq 1.2$  W/Kg.
2. When the same transmission mode configurations have the same maximum output power on the same channel for the 802.11 a/g/n/ac modes, the channel in the lower order/sequence 802.11 mode (i.e. a, g, n then ac) is selected.
3. When the specified maximum output power is the same for both UNII band I and UNII band 2A, begin SAR measurement in UNII band 2A; and if the highest reported SAR for UNII band 2A is
  - o  $\leq 1.2$  W/kg, SAR is not required for UNII band I
  - o  $> 1.2$  W/kg, both bands should be tested independently for SAR.

**9.6. Bluetooth**

Band (GHz)	Mode	Ch #	Freq. (MHz)	Avg Pwr (dBm)
2.4	V3.0 + EDR, GFSK	0	2402	6.4
		39	2441	8.9
		78	2480	6.1
	V3.0 + EDR, $\pi/4$ DQPSK	0	2402	4.7
		39	2441	5.9
		78	2480	2.9
	V3.0 + EDR, 8-DPSK	0	2402	4.7
		39	2441	5.8
		78	2480	2.9
	V4.0 LE, GFSK	0	2402	2.7
		19	2440	5.4
		39	2480	3.4

## 10. Measured and Reported (Scaled) SAR Results

SAR Test Reduction criteria are as follows:

### KDB 447498 D01 General RF Exposure Guidance:

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:

- $\leq 0.8$  W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is  $\leq 100$  MHz
- $\leq 0.6$  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
- $\leq 0.4$  W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is  $\geq 200$  MHz

### KDB 941225 D01 SAR test for 3G devices:

When the maximum output power and tune-up tolerance specified for production units in a secondary mode is  $\leq \frac{1}{4}$  dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is  $\leq 1.2$  W/kg, SAR measurement is not required for the secondary mode

### KDB 941225 D05 SAR for LTE Devices:

SAR test reduction is applied using the following criteria:

- Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB, and 50% RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel.
- When the reported SAR is  $> 0.8$  W/kg, testing for other Channels 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.

**KDB 248227 D01 SAR meas for 802.11 v02:**

SAR test reduction for 802.11 Wi-Fi transmission mode configurations are considered separately for DSSS and OFDM. An initial test position is determined to reduce the number of tests required for certain exposure configurations with multiple test positions. An initial test configuration is determined for each frequency band and aggregated band according to maximum output power, channel bandwidth, wireless mode configurations and other operating parameters to streamline the measurement requirements. For 2.4 GHz DSSS, either the initial test position or DSSS procedure is applied to reduce the number of SAR tests; these are mutually exclusive. For OFDM, an initial test position is only applicable to next to the ear, UMPC mini-tablet and hotspot mode configurations, which is tested using the initial test configuration to facilitate test reduction. For other exposure conditions with a fixed test position, SAR test reduction is determined using only the initial test configuration.

The multiple test positions require SAR measurements in head, hotspot mode or UMPC mini-tablet configurations may be reduced according to the highest reported SAR determined using the initial test position(s) by applying the DSSS or OFDM SAR measurement procedures in the required wireless mode test configuration(s). The initial test position(s) is measured using the highest measured maximum output power channel in the required wireless mode test configuration(s). When the reported SAR for the initial test position is:

- $\leq 0.4$  W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and wireless mode combination within the frequency band or aggregated band. DSSS and OFDM configurations are considered separately according to the required SAR procedures.
- $> 0.4$  W/kg, SAR is repeated using the same wireless mode test configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position, on the highest maximum output power channel, until the reported SAR is  $\leq 0.8$  W/kg or all required test positions are tested.
  - For subsequent test positions with equivalent test separation distance or when exposure is dominated by coupling conditions, the position for maximum coupling condition should be tested.
  - When it is unclear, all equivalent conditions must be tested.
- For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is  $> 0.8$  W/kg, measure the SAR for these positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is  $\leq 1.2$  W/kg or all required test channels are considered.
  - The additional power measurements required for this step should be limited to those necessary for identifying subsequent highest output power channels to apply the test reduction.
- When the specified maximum output power is the same for both UNII 1 and UNII 2A, begin SAR measurements in UNII 2A with the channel with the highest measured output power. If the reported SAR for UNII 2A is  $\leq 1.2$  W/kg, SAR is not required for UNII 1; otherwise treat the remaining bands separately and test them independently for SAR.
- When the specified maximum output power is different between UNII 1 and UNII 2A, begin SAR with the band that has the higher specified maximum output. If the highest reported SAR for the band with the highest specified power is  $\leq 1.2$  W/kg, testing for the band with the lower specified output power is not required; otherwise test the remaining bands independently for SAR.

To determine the initial test position, Area Scans were performed to determine the position with the *Maximum Value of SAR (measured)*. The position that produced the highest *Maximum Value of SAR* is considered the worst case position; thus used as the initial test position.

### 10.1. GSM850

Mode	Pwr Back-off	Dist. (mm)	Test Position	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	
GPRS 4 Slots	ON	0	Rear	190	836.6	23.2	23.2	0.643	<b>0.643</b>	0.349	0.349	1
			Edge 1	190	836.6	23.2	23.2	0.130	0.130	0.061	0.061	
			Edge 2	190	836.6	23.2	23.2	0.091	0.091	0.062	0.062	
GPRS 4 Slots	OFF	22	Rear	190	836.6	29.2	28.7	0.293	0.329	0.212	0.238	
			Edge 1	190	836.6	29.2	28.7	0.070	0.079	0.052	0.058	
			Edge 2	190	836.6	29.2	28.7	0.082	0.092	0.061	0.069	

#### Additional Tests for GSM850 DTM

Mode	Pwr Back-off	Dist. (mm)	Test Position	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	
DTM GPRS 2 Slots	ON	0	Rear	128	824.2	26.2	26.2	1.090	<b>1.090</b>	0.606	0.606	2
				190	836.6	26.2	26.0	0.960	1.005	0.533	0.558	
				251	848.8	26.2	26.0	0.773	0.809	0.430	0.450	
			Edge 1	190	836.6	26.2	26.0	0.201	0.210	0.096	0.100	
			Edge 2	190	836.6	26.2	26.0	0.076	0.080	0.051	0.054	
DTM GPRS 2 slots	OFF	22	Rear	190	836.6	32.2	31.0	0.225	0.297	0.164	0.216	

#### Additional Tests with Keyboard Accessory

Mode	Pwr Back-off	Dist. (mm)	Test Position	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	
GPRS 4 Slots	ON	0	Rear	190	836.6	23.2	23.2	0.546	<b>0.546</b>	0.323	0.323	
			Edge 1	190	836.6	23.2	23.2	0.048	0.048	0.025	0.025	
DTM GPRS 2 slots	ON	0	Rear	190	836.6	26.2	26.0	0.485	0.508	0.288	0.302	
			Edge 1	190	836.6	26.2	26.0	0.047	0.049	0.024	0.025	

### 10.2. GSM1900

Mode	Pwr Back-off	Dist. (mm)	Test Position	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	
GPRS 3 Slots	ON	0	Rear	661	1880.0	15.7	14.7	0.375	0.472	0.161	0.203	
			Edge 1	661	1880.0	15.7	14.7	0.308	0.388	0.135	0.170	
GPRS 4 Slots	OFF	22	Rear	661	1880.0	26.2	25.8	0.463	0.508	0.281	0.308	
			Edge 1	661	1880.0	26.2	25.8	0.602	<b>0.660</b>	0.371	0.407	3
			Edge 2	661	1880.0	26.2	25.8	<0.001	<0.001	<0.001	<0.001	

#### Additional Tests for GSM1900 DTM

Mode	Pwr Back-off	Dist. (mm)	Test Position	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	
DTM GPRS 3 slots	ON	0	Rear	661	1880.0	15.7	14.7	0.395	0.497	0.173	0.218	
DTM GPRS 2 slots	OFF	22	Rear	661	1880.0	29.2	28.0	0.440	0.580	0.260	0.343	
				512	1850.2	29.2	28.5	0.683	0.802	0.422	0.496	
			Edge 1	661	1880.0	29.2	28.0	0.660	<b>0.870</b>	0.406	0.535	4
				810	1909.8	29.2	28.2	0.572	0.720	0.349	0.439	

#### Additional Tests with Keyboard Accessory

Mode	Pwr Back-off	Dist. (mm)	Test Position	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	
GPRS 3 slots	ON	0	Rear	661	1880	15.7	14.7	0.194	0.244	0.091	0.115	
			Edge 1	661	1880	15.7	14.7	0.022	0.028	0.010	0.013	
DTM GPRS 3 slots	ON	0	Rear	661	1880	15.7	14.7	0.196	0.247	0.091	0.115	
			Edge 1	661	1880	15.7	14.7	0.035	0.044	0.015	0.018	

### 10.3. W-CDMA Band V

Mode	Pwr Back-off	Dist. (mm)	Test Position	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	
Rel 99 RMC	ON	0	Rear	4183	836.6	20.0	19.5	0.448	<b>0.503</b>	0.247	0.277	5
			Edge 1	4183	836.6	20.0	19.5	0.124	0.139	0.060	0.067	
			Edge 2	4183	836.6	20.0	19.5	0.103	0.116	0.070	0.079	
Rel 99 RMC	OFF	22	Rear	4183	836.6	24.8	24.5	0.270	0.289	0.195	0.209	
			Edge 1	4183	836.6	24.8	24.5	0.072	0.077	0.053	0.057	
			Edge 2	4183	836.6	24.8	24.5	0.080	0.086	0.060	0.064	

#### Additional Tests with Keyboard Accessory

Mode	Pwr Back-off	Dist. (mm)	Test Position	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	
Rel 99 RMC	ON	0	Rear	4183	836.6	20.0	19.5	0.304	0.341	0.181	0.203	
			Edge 1	4183	836.6	20.0	19.5	0.042	0.047	0.022	0.024	

### 10.4. W-CDMA Band II

Mode	Pwr Back-off	Dist. (mm)	Test Position	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	
Rel 99 RMC	ON	0	Rear	9400	1880	11.0	10.8	0.641	<b>0.671</b>	0.269	0.282	6
			Edge 1	9400	1880	11.0	10.8	0.530	0.555	0.229	0.240	
Rel 99 RMC	OFF	22	Rear	9400	1880	23.4	23.1	0.482	0.516	0.290	0.311	
			Edge 1	9400	1880	23.4	23.1	0.601	0.644	0.368	0.394	
			Edge 2	9400	1880	23.4	23.1	<0.001	<0.001	<0.001	<0.001	

#### Additional Tests with Keyboard Accessory

Mode	Pwr Back-off	Dist. (mm)	Test Position	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	
Rel 99 RMC	ON	0	Rear	9400	1880	11.0	10.8	0.329	0.345	0.155	0.162	
			Edge 1	9400	1880	11.0	10.8	0.024	0.025	0.009	0.010	

### 10.5. LTE Band 2 (20MHz Bandwidth)

Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
QPSK	ON	0	Rear	18900	1880.0	1	0	11.0	10.3	0.557	<b>0.649</b>	0.240	0.280	7
								11.0	10.1	0.507	0.630	0.217	0.270	
			Edge 1	18900	1880.0	1	0	11.0	10.3	0.426	0.496	0.185	0.216	
								11.0	10.1	0.389	0.484	0.169	0.210	
QPSK	OFF	22	Rear	18900	1880.0	1	0	23.2	22.9	0.448	0.483	0.270	0.291	
								22.2	21.5	0.319	0.373	0.192	0.224	
			Edge 1	18900	1880.0	1	0	23.2	22.9	0.524	0.564	0.321	0.346	
								22.2	21.5	0.377	0.441	0.231	0.270	
			Edge 2	18900	1880.0	1	0	23.2	22.9	<0.001	<0.001	<0.001	<0.001	
								22.2	21.5	<0.001	<0.001	<0.001	<0.001	

#### Additional Tests with Keyboard Accessory

Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
QPSK	ON	0	Rear	18900	1880.0	1	0	11.0	10.3	0.282	0.329	0.135	0.157	
			Edge 1	18900	1880.0	1	0	11.0	10.3	0.102	0.119	0.004	0.005	

### 10.6. LTE Band 4 (20MHz Bandwidth)

Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
QPSK	ON	0	Rear	20175	1732.5	1	0	12.2	11.7	0.299	0.332	0.149	0.166	
						50	0	12.2	11.4	0.288	0.343	0.143	0.170	
			Edge 1	20175	1732.5	1	0	12.2	11.7	0.320	0.356	0.142	0.158	
						50	0	12.2	11.4	0.301	<b>0.359</b>	0.134	0.160	8
QPSK	OFF	22	Rear	20175	1732.5	1	0	23.2	22.7	0.269	0.302	0.165	0.185	
						50	0	22.2	21.4	0.165	0.198	0.101	0.121	
			Edge 1	20175	1732.5	1	0	23.2	22.7	0.303	0.340	0.187	0.210	
						50	0	22.2	21.4	0.191	0.230	0.118	0.142	
			Edge 2	20175	1732.5	1	0	23.2	22.7	0.018	0.021	0.012	0.013	
						50	0	22.2	21.4	0.013	0.016	0.008	0.010	

#### Additional Tests with Keyboard Accessory

Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
QPSK	ON	0	Rear	20175	1732.5	1	0	12.2	11.7	0.198	0.220	0.105	0.117	
			Edge 1	20175	1732.5	1	0	12.2	11.7	0.023	0.026	0.011	0.012	

### 10.7. LTE Band 5 (10MHz Bandwidth)

Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
QPSK	ON	0	Rear	20450	826.0	1	0	20.0	19.1	0.742	<b>0.918</b>	0.417	0.516	9
						25	12	20.0	19.2	0.723	0.879	0.408	0.496	
						50	0	20.0	19.2	0.712	0.866	0.400	0.486	
				20525	836.5	1	25	20.0	19.5	0.723	0.812	0.402	0.452	
						25	0	20.0	19.1	0.699	0.864	0.393	0.486	
						20600	844.0	1	25	20.0	19.3	0.637	0.756	0.357
			25	0	20.0	19.2		0.658	0.794	0.368	0.444			
			Edge 1	20525	836.5	1	25	20.0	19.5	0.199	0.224	0.101	0.113	
						25	0	20.0	19.1	0.179	0.221	0.091	0.113	
			Edge 2	20525	836.5	1	25	20.0	19.5	0.047	0.053	0.029	0.033	
						25	0	20.0	19.1	0.048	0.059	0.031	0.038	
			QPSK	OFF	22	Rear	20525	836.5	1	25	24.1	23.7	0.143	0.158
25	25	23.1							22.5	0.107	0.123	0.080	0.092	
Edge 1	20525	836.5				1	25	24.1	23.7	0.060	0.067	0.044	0.049	
						25	25	23.1	22.5	0.044	0.051	0.032	0.037	
Edge 2	20525	836.5				1	25	24.1	23.7	0.081	0.090	0.060	0.066	
						25	25	23.1	22.5	0.061	0.070	0.045	0.052	

#### Additional Tests with Keyboard Accessory

Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
QPSK	ON	0	Rear	20450	829.0	1	0	20.0	19.1	0.561	0.694	0.332	0.411	
			Edge 1	20525	836.5	1	25	20.0	19.5	0.030	0.034	0.015	0.017	

### 10.8. LTE Band 7 (20MHz Bandwidth)

Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
QPSK	ON	0	Rear	21100	2535.0	1	0	11.5	10.7	0.485	<b>0.586</b>	0.167	0.202	10
						50	0	11.5	10.8	0.501	0.584	0.172	0.201	
			Edge 1	21100	2535.0	1	0	11.5	10.7	0.239	0.289	0.094	0.114	
						50	0	11.5	10.8	0.240	0.280	0.095	0.111	
QPSK	OFF	22	Rear	21100	2535.0	1	0	23.7	22.8	0.276	0.337	0.146	0.178	
						50	50	22.7	21.9	0.221	0.267	0.117	0.142	
			Edge 1	21100	2535.0	1	0	23.7	22.8	0.337	0.412	0.189	0.231	
						50	50	22.7	21.9	0.282	0.341	0.158	0.191	
			Edge 2	21100	2535.0	1	0	23.7	22.8	0.036	0.044	0.021	0.026	
						50	50	22.7	21.9	0.030	0.036	0.017	0.021	

#### Additional Tests with Keyboard Accessory

Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
QPSK	ON	0	Rear	21100	2535.0	1	0	23.7	22.8	0.024	0.029	0.011	0.013	
			Edge 1	21100	2535.0	1	0	23.7	21.9	0.029	0.044	0.011	0.017	

### 10.9. LTE Band 12 (10MHz Bandwidth)

Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Plot No.			
								Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled				
QPSK	ON	0	Rear	23060	704.0	1	0	20.0	18.7	0.885	<b>1.184</b>	0.477	0.638	11			
						25	0	20.0	18.8	0.867	1.147	0.465	0.615				
				23095	707.5	1	0	20.0	18.8	0.838	1.112	0.456	0.605				
						25	12	20.0	18.8	0.799	1.058	0.432	0.572				
				23130	711.0	1	25	20.0	19.1	0.797	0.979	0.430	0.528				
						25	0	20.0	18.8	0.800	1.050	0.433	0.568				
			Edge 1	23130	711.0	1	25	20.0	19.1	0.161	0.198	0.072	0.088				
						25	0	20.0	18.8	0.150	0.197	0.067	0.088				
			Edge 2	23130	711.0	1	25	20.0	19.1	0.027	0.033	0.018	0.022				
						25	0	20.0	18.8	0.022	0.029	0.012	0.016				
			QPSK	OFF	22	Rear	23130	711.0	1	0	24.1	23.5	0.060	0.069	0.041	0.047	
									25	12	23.1	22.1	0.052	0.066	0.035	0.044	
Edge 1	23130	711.0				1	0	24.1	23.5	0.033	0.038	0.025	0.029				
						25	12	23.1	22.1	0.027	0.034	0.020	0.025				
Edge 2	23130	711.0				1	0	24.1	23.5	0.037	0.043	0.028	0.032				
						25	12	23.1	22.1	0.028	0.036	0.021	0.026				

#### Additional Tests with Keyboard Accessory

Mode	Pwr Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
QPSK	ON	0	Rear	23060	704.0	1	0	20.0	18.7	0.442	0.591	0.259	0.346	
			Edge 1	23130	711.0	1	25	20.0	19.1	0.012	0.014	0.007	0.008	

### 10.10. LTE Band 17 (10MHz Bandwidth)

SAR for LTE Band 17 is covered by LTE Band 12 due to similar frequency range, same maximum tune-up limit and same channel bandwidth.

### 10.11. Wi-Fi (DTS Band)

Frequency Band	Mode	Dist. (mm)	Antenna	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
2.4GHz	802.11b 1 Mbps	0	SISO Main	Rear	1	2412	0.658	11.5	11.0	0.410	0.460	0.147	0.165	
				Edge 1	1	2412	0.059	11.5	11.0	0.067	0.075	0.025	0.028	
			SISO Aux	Rear	1	2412	0.290	10.0	9.4	0.249	0.286	0.082	0.094	
				Edge 1	1	2412	0.069	10.0	9.4	0.055	0.063	0.021	0.024	
	802.11g 6 Mbps	0	MIMO (Main)	Rear	6	2437	1.020	11.5	10.6	0.641	<b>0.789</b>	0.238	0.293	12
				Edge 1	6	2437	0.121	11.5	10.6	0.094	0.115	0.038	0.047	
			MIMO (Aux)	Rear	6	2437	0.508	10.0	9.0	0.286	0.360	0.103	0.130	12
				Edge 1	6	2437	0.177	10.0	9.0	0.123	0.155	0.038	0.048	

#### Additional Tests with Keyboard Accessory

Frequency Band	Mode	Dist. (mm)	Antenna	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
2.4 GHz	802.11g 6 Mbps	0	MIMO (Main)	Rear	6	2437	0.275	11.5	10.6	0.186	0.229	0.076	0.094	
				Edge 1	6	2437	0.018	11.5	10.6	0.016	0.020	0.004	0.005	
			MIMO (Aux)	Rear	6	2437	0.275	10.0	9.0	0.064	0.081	0.028	0.035	
				Edge 1	6	2437	0.018	10.0	9.0	<0.001	<0.001	<0.001	<0.001	

### 10.12. Wi-Fi (U-NII Band)

Frequency Band	Mode	Dist. (mm)	Antenna	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Plot No.			
								Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled				
5.3 GHz U-NII 2A	802.11n (HT40) 13.5 Mbps	0	MIMO (Main)	Rear	54	5270	0.649	9.8	9.3	0.457	0.513	0.104	0.117				
				Edge 1	54	5270	0.757	9.8	9.3	0.566	<b>0.635</b>	0.146	0.164	13			
			MIMO (Aux)	Rear	54	5270	0.649	9.0	8.2	0.332	0.399	0.083	0.100				
				Edge 1	54	5270	0.757	9.0	8.2	0.184	0.221	0.047	0.057	13			
5.5 GHz U-NII 2C	802.11n (HT40) 13.5 Mbps	0	MIMO (Main)	Rear	126	5630	0.756	9.8	9.2	0.455	<b>0.522</b>	0.096	0.110	14			
				Edge 1	126	5630	0.553	9.8	9.2	0.385	0.442	0.095	0.109				
			MIMO (Aux)	Rear	126	5630	0.756	9.0	8.1	0.349	0.433	0.082	0.102	14			
				Edge 1	126	5630	0.553	9.0	8.1	0.158	0.194	0.041	0.050				
5.8 GHz U-NII 3	802.11n (HT40) 13.5 Mbps	0	MIMO (Main)	Rear	151	5755		9.8	9.3	0.420	0.471	0.094	0.105				
				Edge 1	159	5795	0.943	9.8	9.2	0.380	0.434	0.084	0.096	15			
			MIMO (Aux)	Rear	151	5755		9.0	8.3	0.652	0.766	0.150	0.176				
				Edge 1	159	5795	0.943	9.0	8.2	0.682	<b>0.820</b>	0.163	0.196	15			
							Rear	159	5795	0.598	9.0	8.2	0.317	0.381	0.091	0.110	
							Edge 1	159	5795	0.598	9.0	8.2	0.317	0.381	0.091	0.110	

#### Additional Tests with Keyboard Accessory

Frequency Band	Mode	Dist. (mm)	Antenna	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
5.3 GHz U-NII 2A	802.11n (HT40) 13.5 Mbps	0	MIMO (Main)	Rear	54	5270	0.239	9.8	9.3	0.108	0.121	0.028	0.032	
				Edge 1	54	5270	0.000	9.8	9.3	<0.001	<0.001	<0.001	<0.001	
			MIMO (Aux)	Rear	54	5270	0.239	9.0	8.2	0.118	0.142	0.033	0.039	
				Edge 1	54	5270	0.000	9.0	8.2	<0.001	<0.001	<0.001	<0.001	
5.5 GHz U-NII 2C	802.11n (HT40) 13.5 Mbps	0	MIMO (Main)	Rear	126	5630	0.216	9.8	9.2	0.099	0.114	0.025	0.029	
				Edge 1	126	5630	<0.001	9.8	9.2	<0.001	<0.001	<0.001	<0.001	
			MIMO (Aux)	Rear	126	5630	0.216	9.0	8.1	0.055	0.069	0.015	0.019	
				Edge 1	126	5630	<0.001	9.0	8.1	<0.001	<0.001	<0.001	<0.001	
5.8 GHz U-NII 3	802.11n (HT40) 13.5 Mbps	0	MIMO (Main)	Rear	159	5795	0.258	9.8	9.2	0.143	0.163	0.040	0.045	
				Edge 1	159	5795	<0.001	9.8	9.2	<0.001	<0.001	<0.001	<0.001	
			MIMO (Aux)	Rear	159	5795	0.258	9.0	7.9	0.149	0.192	0.042	0.054	
				Edge 1	159	5795	<0.001	9.0	7.9	<0.001	<0.001	<0.001	<0.001	

**10.13. Bluetooth**

Frequency Band	Mode	Dist. (mm)	Test Position	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	
2.4 GHz	GFSK	0	Rear	39	2441	10.0	8.9	0.275	<b>0.354</b>	0.100	0.129	16
			Edge 1	39	2441	10.0	8.9	0.041	0.053	0.015	0.019	

**Additional Tests with Keyboard Accessory**

Frequency Band	Mode	Dist. (mm)	Test Position	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	
2.4 GHz	GFSK	0	Rear	39	2441	10.0	8.9	0.086	0.111	0.027	0.035	
			Edge 1	39	2441	10.0	8.9	<0.001	<0.001	<0.001	<0.001	

## 11. SAR Measurement Variability

In accordance with published RF Exposure KDB 865664 D01 SAR measurement 100 MHz to 6 GHz. 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  $\geq 0.80$  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  $\geq 1.45$  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  $\geq 1.5$  W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

Frequency Band	Air Interface	RF Exposure Conditions	Test Position	Repeated SAR	Highest Measured SAR	Repeated Measured SAR	Largest to Smallest
700	LTE Band 12	Standalone	Rear	Yes	0.885	0.874	1.01
850	GSM 850	Standalone	Rear	Yes	1.090	0.944	1.15
	WCDMA Band V	Standalone	Rear	No	0.503	N/A	N/A
	LTE Band 5	Standalone	Rear	No	0.742	N/A	N/A
1900	GSM 1900	Standalone	Edge 1	No	0.683	N/A	N/A
	WCDMA Band II	Standalone	Rear	No	0.641	N/A	N/A
	LTE Band 2	Standalone	Rear	No	0.557	N/A	N/A
1700	LTE Band 4	Standalone	Edge 1	No	0.320	N/A	N/A
2400	Wi-Fi 802.11b/g/n	Standalone	Rear	No	0.641	N/A	N/A
2400	BT	Standalone	Rear	No	0.275	N/A	N/A
2600	LTE Band 7	Standalone	Rear	No	0.501	N/A	N/A
5300	Wi-Fi 802.11a/n/ac	Standalone	Edge 1	No	0.566	N/A	N/A
5500	Wi-Fi 802.11a/n/ac	Standalone	Rear	No	0.455	N/A	N/A
5800	Wi-Fi 802.11a/n/ac	Standalone	Rear	No	0.682	N/A	N/A

### Note(s):

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.

## 12. Simultaneous Transmission SAR Analysis

KDB 447498 D01 General RF Exposure Guidance 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<sub>1</sub>** 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<sub>2</sub>** 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  $[(x_1-x_2)^2 + (y_1-y_2)^2 + (z_1-z_2)^2]$

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:

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

### Simultaneous Transmission Condition

RF Exposure Condition	Item	Capable Transmit Configurations				
Standalone	1	GSM(GPRS/EDGE)	+	DTS		
	2	GSM(GPRS/EDGE)	+	U-NII		
	3	GSM(GPRS/EDGE)	+	BT		
	4	GSM(GPRS/EDGE)	+	U-NII	+	BT
	5	W-CDMA	+	DTS		
	6	W-CDMA	+	U-NII		
	7	W-CDMA	+	BT		
	8	W-CDMA	+	U-NII	+	BT
	9	LTE	+	DTS		
	10	LTE	+	U-NII		
	11	LTE	+	BT		
	12	LTE	+	U-NII	+	BT
	13			U-NII	+	BT

Notes:

1. DTS and U-NII 1 and U-NII 3 support Hotspot.
2. GPRS/EDGE, W-CDMA, and LTE support Hotspot.
3. VoIP is supported in GPRS/EDGE, W-CDMA, and LTE.
4. DTS Radio cannot transmit simultaneously with Bluetooth Radio.
5. U-NII Radio can transmit simultaneously with Bluetooth Radio.

### 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:
  - o When the separation distance from the antenna to an adjacent edge is  $\leq 5$  mm, a distance of 5 mm is applied for SAR estimation; this is the same between test exclusion and SAR estimation calculations.
  - o When the separation distance from the antenna to an adjacent edge is  $> 5$  mm but  $\leq 50$  mm, the actual antenna-to-edge separation distance is applied for SAR estimation.
  - o When the minimum test separation distance is  $> 50$  mm, the estimated SAR value is 0.4 W/kg
3. Please refer to Estimated SAR Tables to see which test positions are inherently compliant as they consist of only estimated SAR values for all applicable transmitters and consequently will always have sum of SAR values  $< 1.2$  W/kg. Simultaneous transmission SAR analysis was therefore not performed for these test positions.

#### 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
<b>Full Power, Proximity Sensor Off</b>																
Cellular	GPRS 4 Slots	848.8	29.20	416	5	5.2	26.75	154.6	160.85		-MEASURE	-MEASURE	-MEASURE	0.400	0.400	
Cellular	GPRS 4 Slots	1909.8	26.20	208	5	5.2	26.75	154.6	160.85		-MEASURE	-MEASURE	-MEASURE	0.400	0.400	
Cellular	W-CDMA 2	1907.6	23.40	219	5	5.2	26.75	154.6	160.85		-MEASURE	-MEASURE	-MEASURE	0.400	0.400	
Cellular	W-CDMA 5	846.6	24.80	302	5	5.2	26.75	154.6	160.85		-MEASURE	-MEASURE	-MEASURE	0.400	0.400	
Cellular	LTE Band 2	1900	23.20	209	5	5.2	26.75	154.6	160.85		-MEASURE	-MEASURE	-MEASURE	0.400	0.400	
Cellular	LTE Band 4	1754.3	23.20	209	5	5.2	26.75	154.6	160.85		-MEASURE	-MEASURE	-MEASURE	0.400	0.400	
Cellular	LTE Band 5	844	24.10	257	5	5.2	26.75	154.6	160.85		-MEASURE	-MEASURE	-MEASURE	0.400	0.400	
Cellular	LTE Band 7	2560	23.70	234	5	5.2	26.75	154.6	160.85		-MEASURE	-MEASURE	-MEASURE	0.400	0.400	
Cellular	LTE Band 12	711	24.10	257	5	5.2	26.75	154.6	160.85		-MEASURE	-MEASURE	-MEASURE	0.400	0.400	
Cellular	LTE Band 17	710	24.10	257	5	5.2	26.75	154.6	160.85		-MEASURE	-MEASURE	-MEASURE	0.400	0.400	
<b>Second Stage Power Back-off, Proximity Sensor On</b>																
Cellular	GPRS 4 Slots	848.8	23.20	104	5	5.2	26.75	154.6	160.85		-MEASURE	-MEASURE	-MEASURE	0.400	0.400	
Cellular	GPRS 3 Slots	1909.8	15.70	14	5	5.2	26.75	154.6	160.85		-MEASURE	-MEASURE	0.096	0.400	0.400	
Cellular	W-CDMA 2	1907.6	11.00	13	5	5.2	26.75	154.6	160.85		-MEASURE	-MEASURE	0.089	0.400	0.400	
Cellular	W-CDMA 5	846.6	20.00	100	5	5.2	26.75	154.6	160.85		-MEASURE	-MEASURE	-MEASURE	0.400	0.400	
Cellular	LTE Band 2	1900	11.00	13	5	5.2	26.75	154.6	160.85		-MEASURE	-MEASURE	0.088	0.400	0.400	
Cellular	LTE Band 4	1754.3	12.20	17	5	5.2	26.75	154.6	160.85		-MEASURE	-MEASURE	0.111	0.400	0.400	
Cellular	LTE Band 5	844	20.00	100	5	5.2	26.75	154.6	160.85		-MEASURE	-MEASURE	-MEASURE	0.400	0.400	
Cellular	LTE Band 7	2560	11.50	14	5	5.2	26.75	154.6	160.85		-MEASURE	-MEASURE	0.111	0.400	0.400	
Cellular	LTE Band 12	711	20.00	100	5	5.2	26.75	154.6	160.85		-MEASURE	-MEASURE	-MEASURE	0.400	0.400	
Cellular	LTE Band 17	710	20.00	100	5	5.2	26.75	154.6	160.85		-MEASURE	-MEASURE	-MEASURE	0.400	0.400	

#### Estimated SAR for WLAN

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	
<b>Wi-Fi Main Antenna</b>																
Wi-Fi 2.4 GHz	2462	11.50	14	3.165	5.2	203.2	155.25	30.35		-MEASURE	-MEASURE	0.400	0.400	0.098		
Wi-Fi 5.2 GHz	5240	9.80	10	3.165	5.2	203.2	155.25	30.35		-MEASURE	-MEASURE	0.400	0.400	0.102		
Wi-Fi 5.3 GHz	5320	9.80	10	3.165	5.2	203.2	155.25	30.35		-MEASURE	-MEASURE	0.400	0.400	0.103		
Wi-Fi 5.5 GHz	5700	9.80	10	3.165	5.2	203.2	155.25	30.35		-MEASURE	-MEASURE	0.400	0.400	0.106		
Wi-Fi 5.8 GHz	5825	9.80	10	3.165	5.2	203.2	155.25	30.35		-MEASURE	-MEASURE	0.400	0.400	0.107		
Bluetooth	2480	10.00	10	3.165	5.2	203.2	155.25	30.35		-MEASURE	-MEASURE	0.400	0.400	0.070		
<b>Wi-Fi Sub Antenna</b>																
Wi-Fi 2.4 GHz	2462	10.00	10	3.165	5.2	148.55	155.25	89.3		-MEASURE	-MEASURE	0.400	0.400	0.400		
Wi-Fi 5.2 GHz	5240	9.00	8	3.165	5.2	148.55	155.25	89.3		-MEASURE	-MEASURE	0.400	0.400	0.400		
Wi-Fi 5.3 GHz	5320	9.00	8	3.165	5.2	148.55	155.25	89.3		-MEASURE	-MEASURE	0.400	0.400	0.400		
Wi-Fi 5.5 GHz	5700	9.00	8	3.165	5.2	148.55	155.25	89.3		-MEASURE	-MEASURE	0.400	0.400	0.400		
Wi-Fi 5.8 GHz	5825	9.00	8	3.165	5.2	148.55	155.25	89.3		-MEASURE	-MEASURE	0.400	0.400	0.400		

### 12.1. Sum of the SAR for GSM850 & Wi-Fi & BT

Test Position	① WWAN	② DTS (Main Ant)	③ U-NII (Main Ant)	④ BT (Main Ant)	①+② WWAN+DTS		①+③ WWAN+U-NII		①+④ WWAN+BT	
					∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)
Rear	1.090	0.789	0.522	0.354	1.879	Yes	1.612	Yes	1.444	No
Edge 1	0.210	0.115	0.635	0.053	0.325	No	0.845	No	0.263	No
Test Position	① WWAN	② DTS (Aux Ant)	③ U-NII (Aux Ant)	④ BT (Main Ant)	①+② WWAN+DTS		①+③ WWAN+U-NII		①+③+④ WWAN+U-NII+BT	
					∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)
Rear	1.090	0.360	0.820	0.354	1.450	No	1.910	Yes	2.264	Yes
Edge 1	0.210	0.155	0.381	0.053	0.365	No	0.591	No	0.644	No

#### SAR to Peak Location Separation Ratio (SPLSR)

Test Position	① WWAN	② DTS (Main Ant)	③ U-NII (Main Ant)	④ BT (Main Ant)	∑ 1g SAR (mW/g)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
Rear	1.090	0.789			①+②	1.879	164.0	0.016	No	1
	1.090		0.522		①+③	1.612	163.1	0.013	No	2
Rear	1.090		0.820		①+③	1.910	106.0	0.025	No	3
Rear	1.090		0.820	0.354	①+③+④	2.264				4
	1.090		0.820		①+③	1.910	106.0	0.025	No	
	1.090			0.354	①+④	1.444	164.0	0.011	No	
			0.820	0.354	③+④	1.174	58.1	0.022	No	

### 12.2. Sum of the SAR for GSM1900 & Wi-Fi & BT

Test Position	① WWAN	② DTS (Main Ant)	③ U-NII (Main Ant)	④ BT (Main Ant)	①+② WWAN+DTS		①+③ WWAN+U-NII		①+④ WWAN+BT	
					∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)
Rear	0.580	0.789	0.522	0.354	1.369	No	1.102	No	0.934	No
Edge 1	0.870	0.115	0.635	0.053	0.985	No	1.505	No	0.923	No
Test Position	① WWAN	② DTS (Aux Ant)	③ U-NII (Aux Ant)	④ BT (Main Ant)	①+② WWAN+DTS		①+③ WWAN+U-NII		①+③+④ WWAN+U-NII+BT	
					∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)
Rear	0.580	0.360	0.820	0.354	0.940	No	1.400	No	1.754	Yes
Edge 1	0.870	0.155	0.381	0.053	1.025	No	1.251	No	1.304	No

#### SAR to Peak Location Separation Ratio (SPLSR)

Test Position	① WWAN	② DTS (Aux Ant)	③ U-NII (Aux Ant)	④ BT (Main Ant)	∑ 1g SAR (mW/g)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
Rear	0.580		0.820	0.354	①+③+④	1.754				5
	0.580		0.820		①+③	1.400	103.7	0.016	No	
	0.580			0.354	①+④	0.934	161.7	0.006	No	
			0.820	0.354	③+④	1.174	58.1	0.022	No	

### 12.3. Sum of the SAR for WCDMA Band V & Wi-Fi & BT

Test Position	① WWAN	② DTS (Main Ant)	③ U-NII (Main Ant)	④ BT (Main Ant)	①+② WWAN+DTS		①+③ WWAN+U-NII		①+④ WWAN+BT	
					∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)
Rear	0.503	0.789	0.522	0.354	1292	No	1025	No	0.857	No
Edge 1	0.139	0.115	0.635	0.053	0.254	No	0.774	No	0.192	No
Test Position	① WWAN	② DTS (Aux Ant)	③ U-NII (Aux Ant)	④ BT (Main Ant)	①+② WWAN+DTS		①+③ WWAN+U-NII		①+③+④ WWAN+U-NII+BT	
					∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)
Rear	0.503	0.360	0.820	0.354	0.863	No	1323	No	1677	Yes
Edge 1	0.139	0.155	0.381	0.053	0.294	No	0.520	No	0.573	No

#### SAR to Peak Location Separation Ratio (SPLSR)

Test Position	① WWAN	② DTS (Aux Ant)	③ U-NII (Aux Ant)	④ BT (Main Ant)	∑ 1g SAR (mW/g)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
Rear	0.503		0.820	0.354	①+③+④	1677				6
	0.503		0.820		①+③	1323	95.1	0.016	No	
	0.503			0.354	①+④	0.857	153.0	0.005	No	
			0.820	0.354	③+④	1.174	58.1	0.022	No	

### 12.4. Sum of the SAR for WCDMA Band II & Wi-Fi & BT

Test Position	① WWAN	② DTS (Main Ant)	③ U-NII (Main Ant)	④ BT (Main Ant)	①+② WWAN+DTS		①+③ WWAN+U-NII		①+④ WWAN+BT	
					∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)
Rear	0.671	0.789	0.522	0.354	1460	No	1193	No	1025	No
Edge 1	0.659	0.115	0.635	0.053	0.774	No	1294	No	0.712	No
Test Position	① WWAN	② DTS (Aux Ant)	③ U-NII (Aux Ant)	④ BT (Main Ant)	①+② WWAN+DTS		①+③ WWAN+U-NII		①+③+④ WWAN+U-NII+BT	
					∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)
Rear	0.671	0.360	0.820	0.354	1031	No	1491	No	1845	Yes
Edge 1	0.659	0.155	0.381	0.053	0.814	No	1040	No	1093	No

#### SAR to Peak Location Separation Ratio (SPLSR)

Test Position	① WWAN	② DTS (Aux Ant)	③ U-NII (Aux Ant)	④ BT (Main Ant)	∑ 1g SAR (mW/g)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
Rear	0.671		0.820	0.354	①+③+④	1845				7
	0.671		0.820		①+③	1491	99.7	0.018	No	
	0.671			0.354	①+④	1025	157.7	0.007	No	
			0.820	0.354	③+④	1.174	58.1	0.022	No	

### 12.5. Sum of the SAR for LTE Band 2 & Wi-Fi & BT

Test Position	① WWAN	② DTS (Main Ant)	③ U-NII (Main Ant)	④ BT (Main Ant)	①+② WWAN+DTS		①+③ WWAN+U-NII		①+④ WWAN+BT			
					∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)		
Rear	0.649	0.789	0.522	0.354	1.438	No	1.171	No	1.003	No		
Edge 1	0.564	0.115	0.635	0.053	0.679	No	0.199	No	0.617	No		
Test Position	① WWAN	② DTS (Aux Ant)	③ U-NII (Aux Ant)	④ BT (Main Ant)	①+② WWAN+DTS		①+③ WWAN+U-NII		①+④ WWAN+BT		①+③+④ WWAN+U-NII+BT	
					∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)
Rear	0.649	0.360	0.820	0.354	1.009	No	1.469	No			1823	Yes
Edge 1	0.564	0.155	0.381	0.053	0.719	No	0.945	No			0.998	No

### SAR to Peak Location Separation Ratio (SPLSR)

Test Position	① WWAN	② DTS (Aux Ant)	③ U-NII (Aux Ant)	④ BT (Main Ant)	∑ 1g SAR (mW/g)	Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure	
Rear	0.649		0.820	0.354	①+③+④	1823			8	
	0.649		0.820		①+③	1469	98.2	0.018		No
	0.649			0.354	①+④	1003	156.2	0.006		No
			0.820	0.354	③+④	1174	58.1	0.022		No

### 12.6. Sum of the SAR for LTE Band 4 & Wi-Fi & BT

Test Position	① WWAN	② DTS (Main Ant)	③ U-NII (Main Ant)	④ BT (Main Ant)	①+② WWAN+DTS		①+③ WWAN+U-NII		①+④ WWAN+BT			
					∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)		
Rear	0.343	0.789	0.522	0.354	1.132	No	0.865	No	0.697	No		
Edge 1	0.359	0.115	0.635	0.053	0.474	No	0.994	No	0.412	No		
Test Position	① WWAN	② DTS (Aux Ant)	③ U-NII (Aux Ant)	④ BT (Main Ant)	①+② WWAN+DTS		①+③ WWAN+U-NII		①+④ WWAN+BT		①+③+④ WWAN+U-NII+BT	
					∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)
Rear	0.343	0.360	0.820	0.354	0.703	No	1.163	No			1.517	No
Edge 1	0.359	0.155	0.381	0.053	0.514	No	0.740	No			0.793	No

### 12.7. Sum of the SAR for LTE Band 5 & Wi-Fi & BT

Test Position	① WWAN	② DTS (Main Ant)	③ U-NII (Main Ant)	④ BT (Main Ant)	①+② WWAN+DTS		①+③ WWAN+U-NII		①+④ WWAN+BT	
					∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)
Rear	0.918	0.789	0.522	0.354	1.707	Yes	1.440	No	1.272	No
Edge 1	0.224	0.115	0.635	0.053	0.339	No	0.859	No	0.277	No
Test Position	① WWAN	② DTS (Aux Ant)	③ U-NII (Aux Ant)	④ BT (Main Ant)	①+② WWAN+DTS		①+③ WWAN+U-NII		①+③+④ WWAN+U-NII+BT	
					∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)
Rear	0.918	0.360	0.820	0.354	1.278	No	1.738	Yes	2.092	Yes
Edge 1	0.224	0.155	0.381	0.053	0.379	No	0.605	No	0.658	No

#### SAR to Peak Location Separation Ratio (SPLSR)

Test Position	① WWAN	② DTS (Main Ant)	③ U-NII (Main Ant)	④ BT (Main Ant)	∑ 1g SAR (mW/g)	Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
Rear	0.918	0.789			①+② 1.707	157.6	0.014	No	9
Test Position	① WWAN	② DTS (Aux Ant)	③ U-NII (Aux Ant)	④ BT (Main Ant)	∑ 1g SAR (mW/g)	Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
Rear	0.918		0.820		①+③ 1.738	99.5	0.023	No	10
Rear	0.918		0.820	0.354	①+③+④ 2.092				11
	0.918		0.820		①+③ 1.738	99.5	0.023	No	
	0.918			0.354	①+④ 1.272	157.5	0.009	No	
			0.820	0.354	③+④ 1.174	58.1	0.022	No	

### 12.8. Sum of the SAR for LTE Band 7 & Wi-Fi & BT

Test Position	① WWAN	② DTS (Main Ant)	③ U-NII (Main Ant)	④ BT (Main Ant)	①+② WWAN+DTS		①+③ WWAN+U-NII		①+④ WWAN+BT	
					∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)
Rear	0.586	0.789	0.522	0.354	1.375	No	1.108	No	0.940	No
Edge 1	0.412	0.115	0.635	0.053	0.527	No	1.047	No	0.465	No
Test Position	① WWAN	② DTS (Aux Ant)	③ U-NII (Aux Ant)	④ BT (Main Ant)	①+② WWAN+DTS		①+③ WWAN+U-NII		①+③+④ WWAN+U-NII+BT	
					∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)
Rear	0.586	0.360	0.820	0.354	0.946	No	1.406	No	1.760	Yes
Edge 1	0.412	0.155	0.381	0.053	0.567	No	0.793	No	0.846	No

#### SAR to Peak Location Separation Ratio (SPLSR)

Test Position	① WWAN	② DTS (Aux Ant)	③ U-NII (Aux Ant)	④ BT (Main Ant)	∑ 1g SAR (mW/g)	Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
Rear	0.586		0.820	0.354	①+③+④ 1.760				12
	0.586		0.820		①+③ 1.406	104.0	0.016	No	
	0.586			0.354	①+④ 0.940	162.1	0.006	No	
			0.820	0.354	③+④ 1.174	58.1	0.022	No	

### 12.9. Sum of the SAR for LTE Band 12 & Wi-Fi & BT

Test Position	① WWAN	② DTS (Main Ant)	③ U-NII (Main Ant)	④ BT (Main Ant)	①+② WWAN +DTS		①+③ WWAN + U-NII		①+④ WWAN +BT	
					∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)
Rear	1.184	0.789	0.522	0.354	1.973	Yes	1.706	Yes	1.538	No
Edge 1	0.198	0.115	0.635	0.053	0.313	No	0.833	No	0.251	No
Test Position	① WWAN	② DTS (Aux Ant)	③ U-NII (Aux Ant)	④ BT (Main Ant)	①+② WWAN +DTS		①+③ WWAN + U-NII		①+③+④ WWAN +U-NII +BT	
					∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)	∑ 1g SAR (mW/g)	SPLSR (Yes/ No)
Rear	1.184	0.360	0.820	0.354	1.544	No	2.004	Yes	2.358	Yes
Edge 1	0.198	0.155	0.381	0.053	0.353	No	0.579	No	0.632	No

### SAR to Peak Location Separation Ratio (SPLSR)

Test Position	① WWAN	② DTS (Main Ant)	③ U-NII (Main Ant)	④ BT (Main Ant)	∑ 1g SAR (mW/g)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
					①+②	①+③				
Rear	1.184	0.789			①+②	1.973	160.6	0.017	No	13
	1.184		0.635		①+③	1.819	159.5	0.015	No	14
Test Position	① WWAN	② DTS (Aux Ant)	③ U-NII (Aux Ant)	④ BT (Main Ant)	∑ 1g SAR (mW/g)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
Rear	1.184		0.820		①+③	2.004				
Rear	1.184		0.820	0.354	①+③+④	2.358				16
	1.184		0.820		①+③	2.004	102.5	0.028	No	
	1.184			0.354	①+④	1.538	160.6	0.012	No	
			0.820	0.354	③+④	1.174	58.1	0.022	No	

### 12.10. Sum of the SAR for LTE Band 17 & Wi-Fi & BT

SAR for LTE Band 17 is covered by LTE Band 12 due to similar frequency range, same maximum tune-up limit and same channel bandwidth.

#### Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is not required because either the sum of the 1-g SAR is < 1.6 W/kg or the SPLSR is < 0.04 for all circumstances that require SPLSR calculation.

Figure (1)

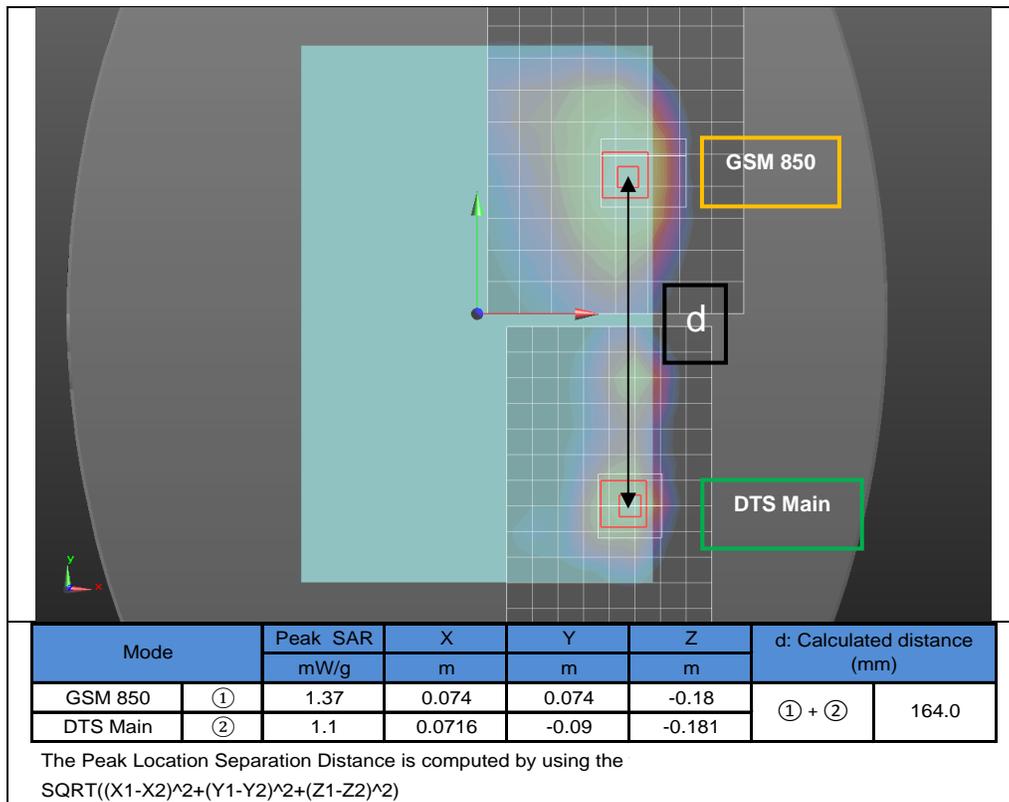


Figure (2)

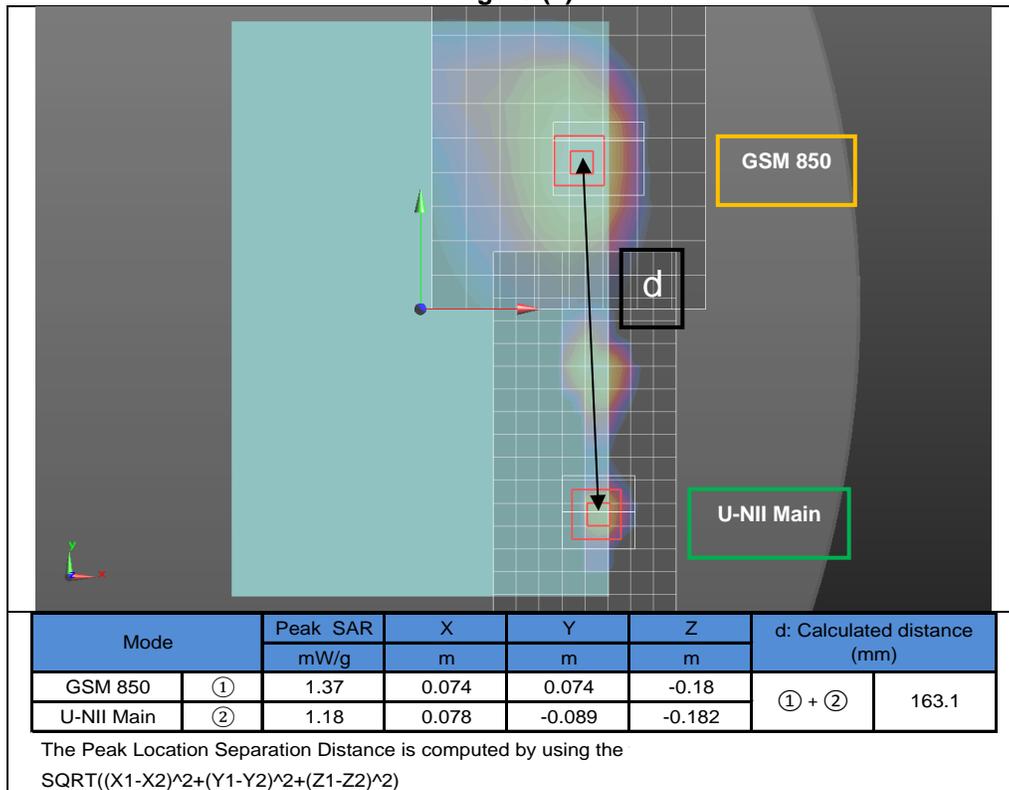


Figure (3)

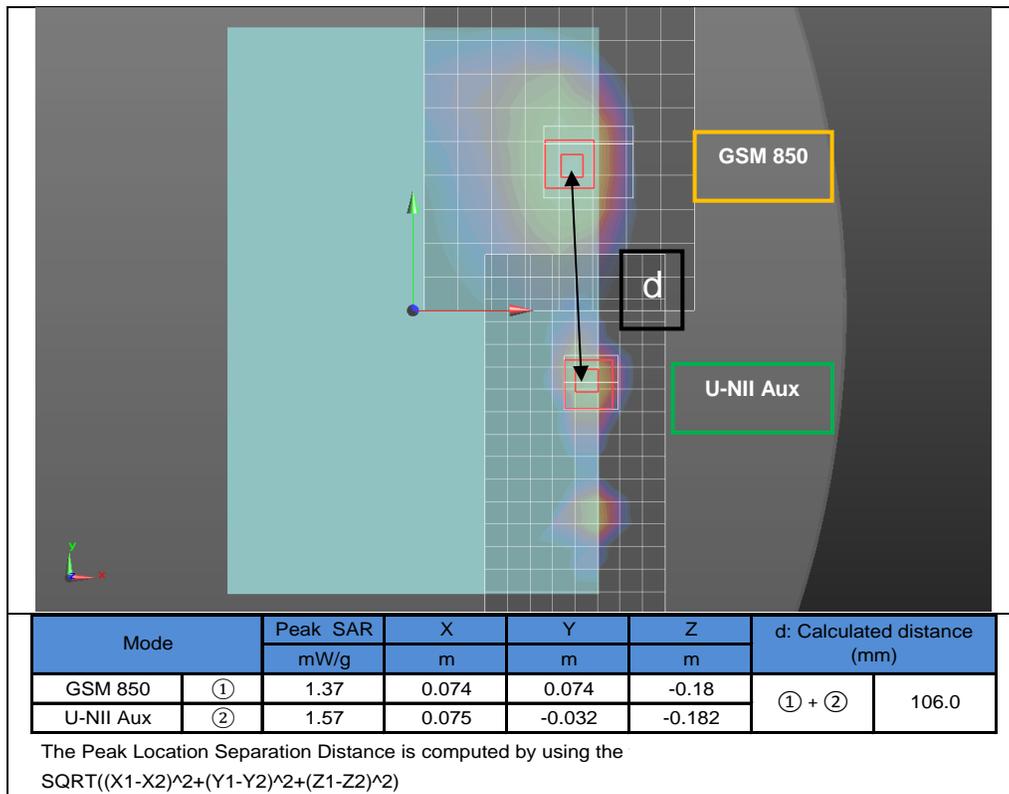


Figure (4)

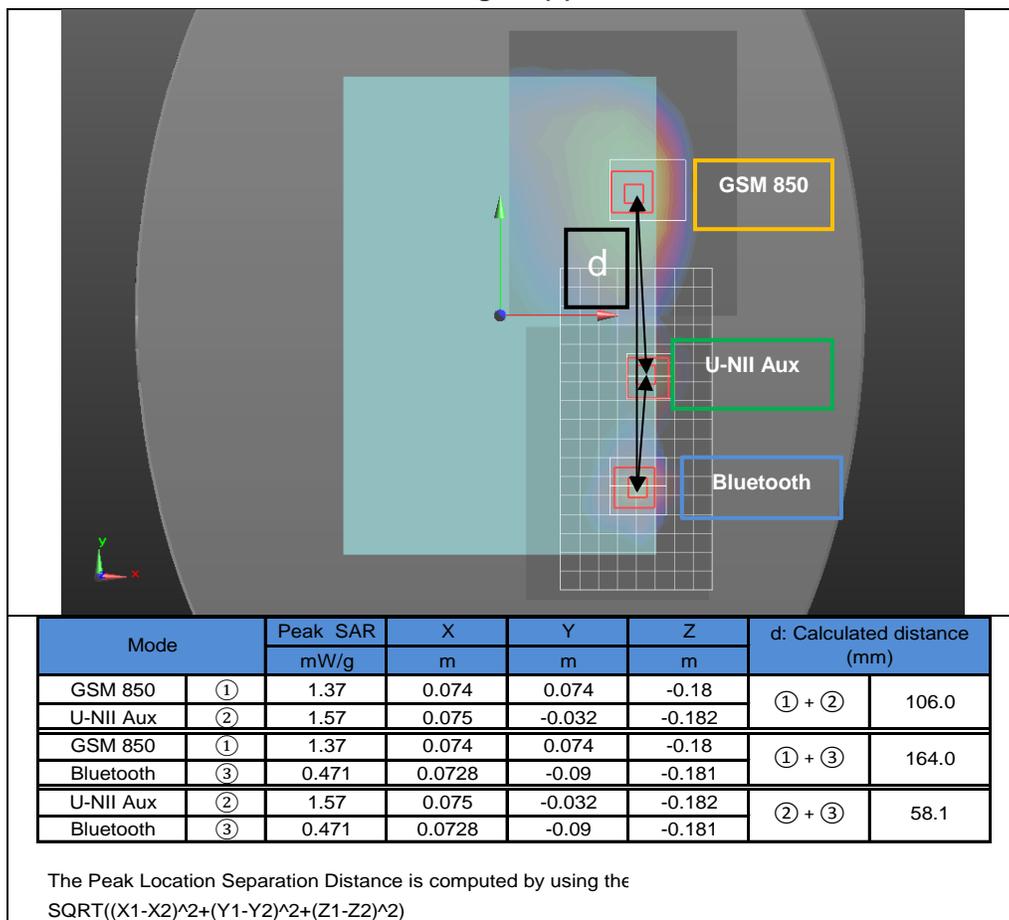


Figure (5)

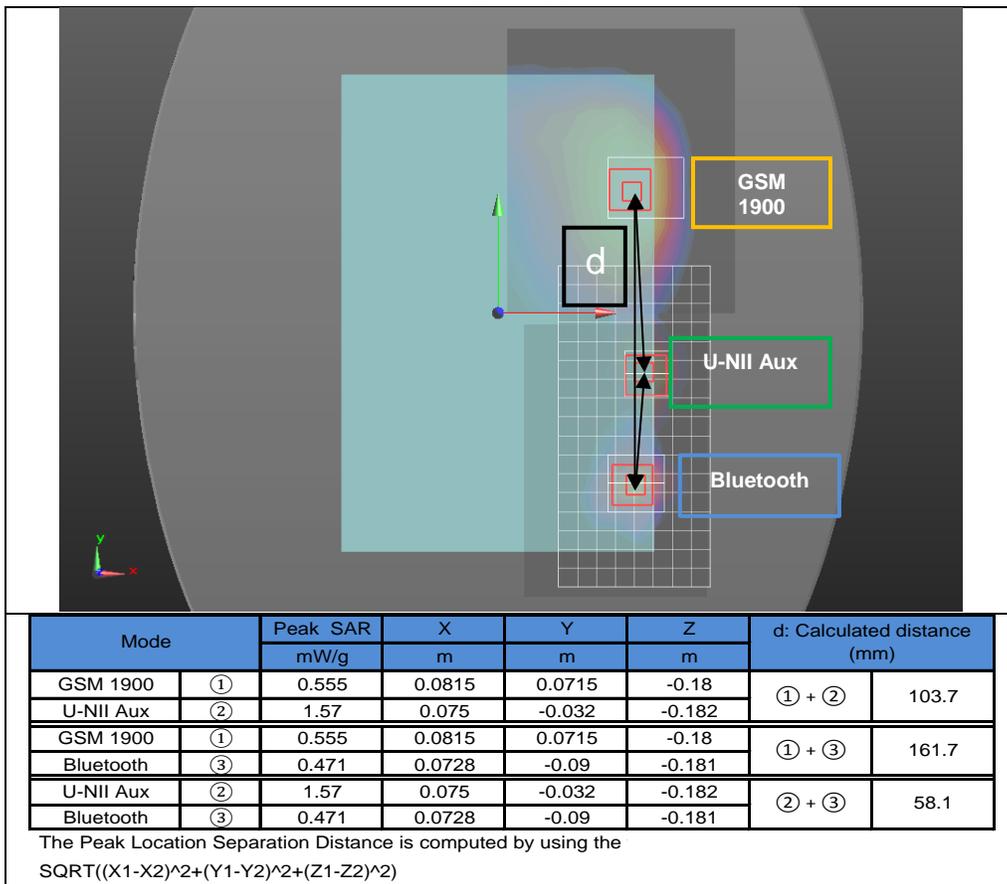


Figure (6)

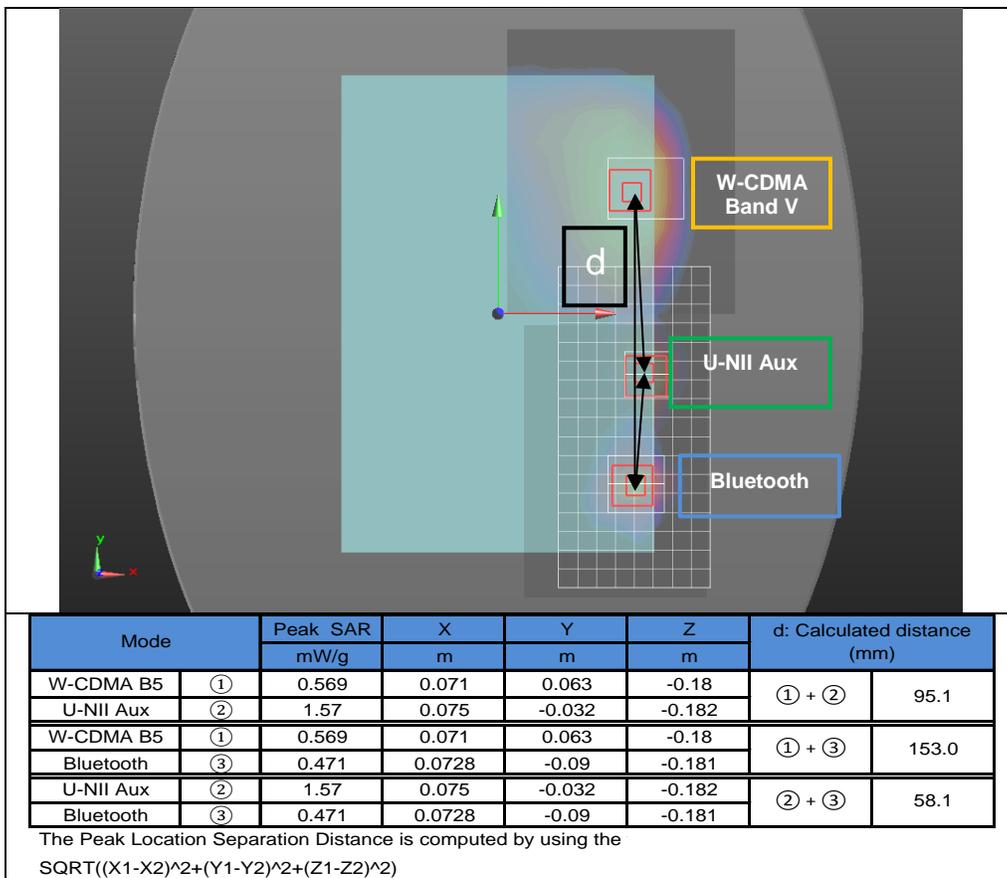


Figure (7)

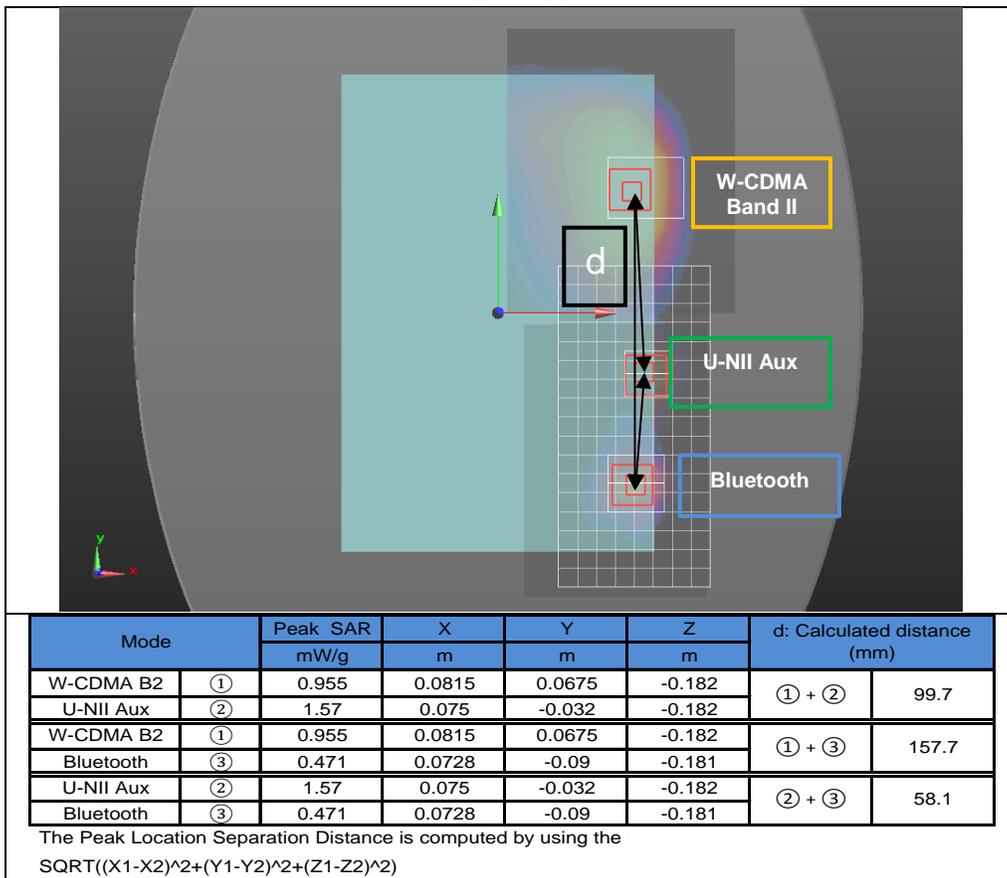


Figure (8)

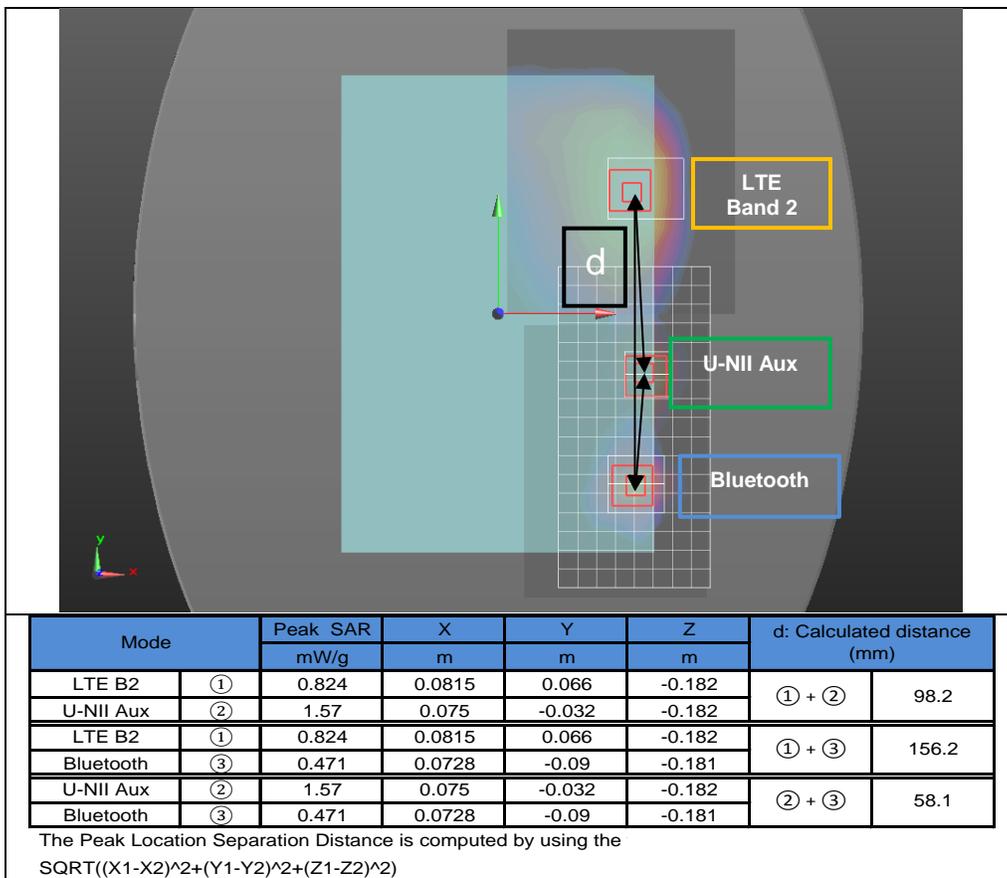


Figure (9)

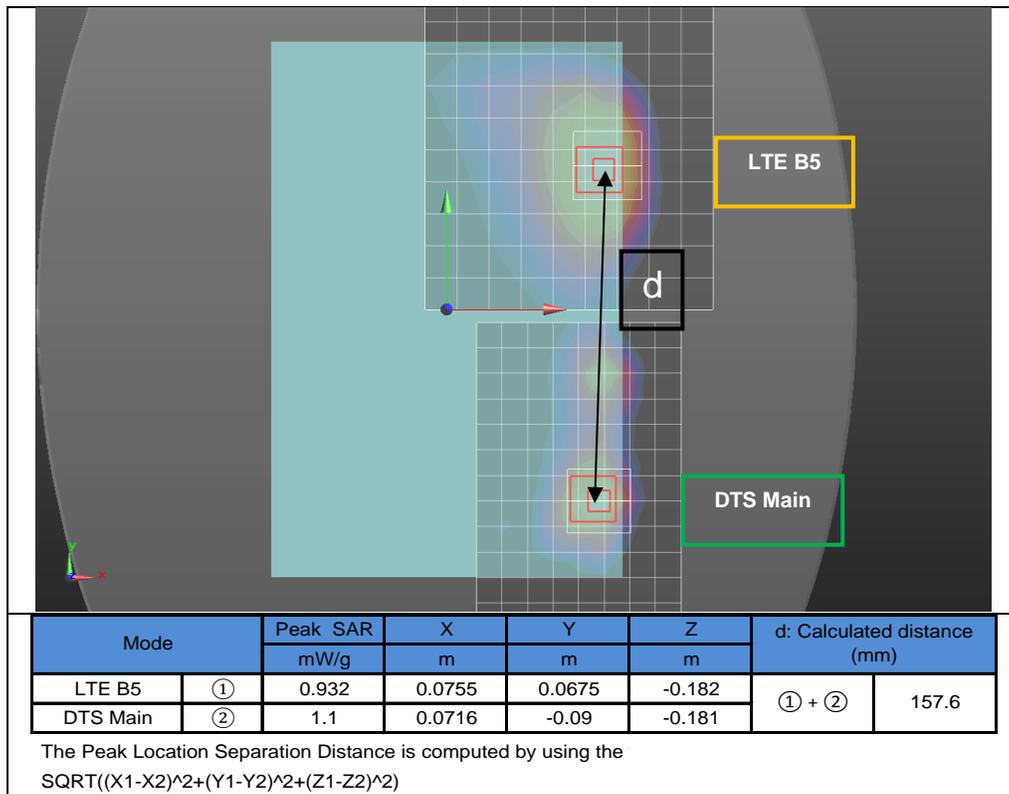


Figure (10)

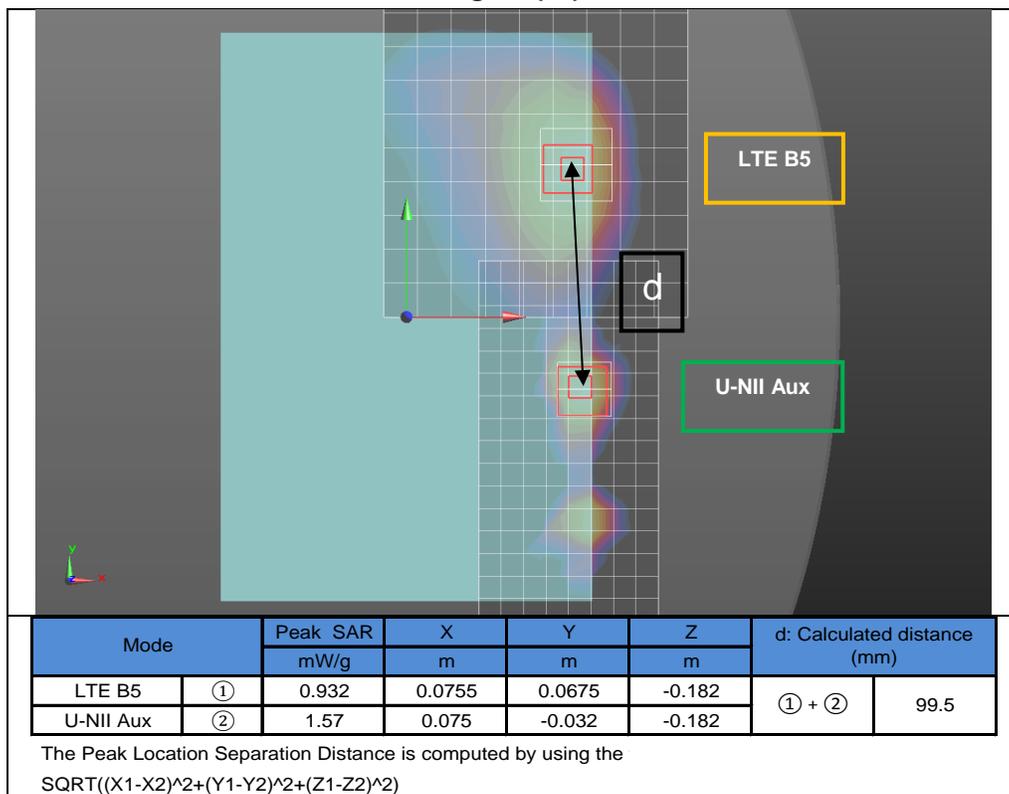


Figure (11)

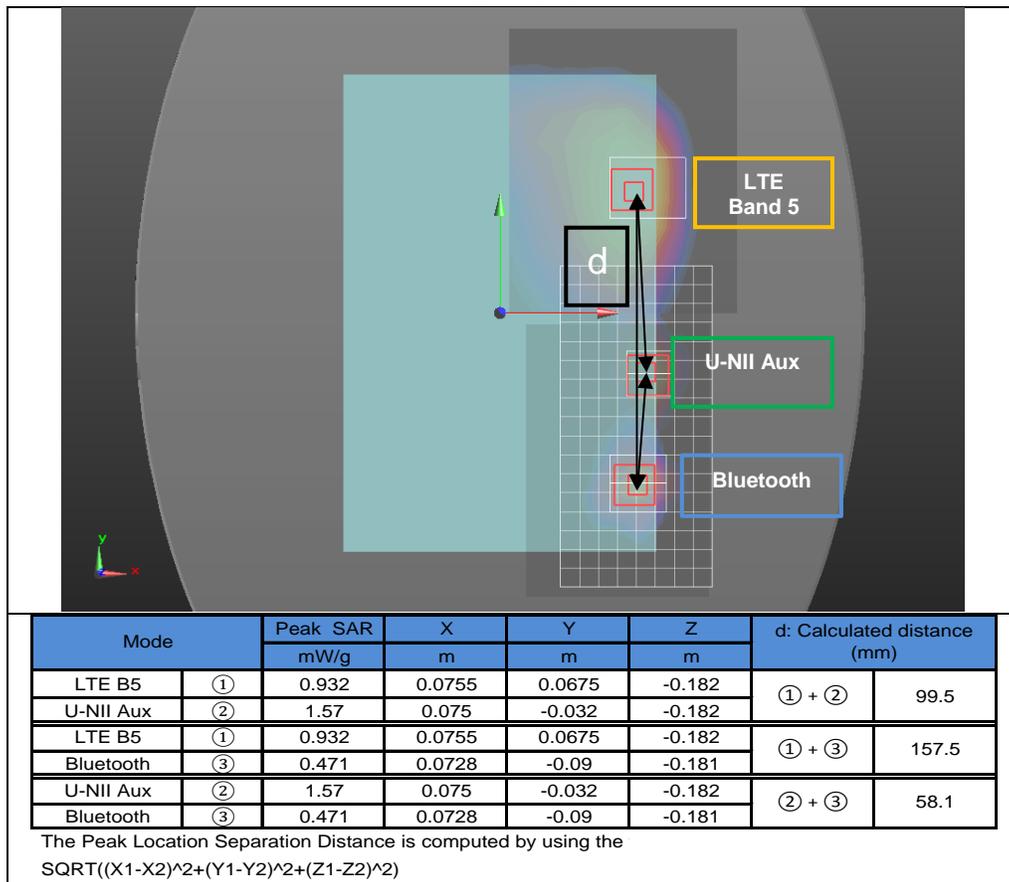


Figure (12)

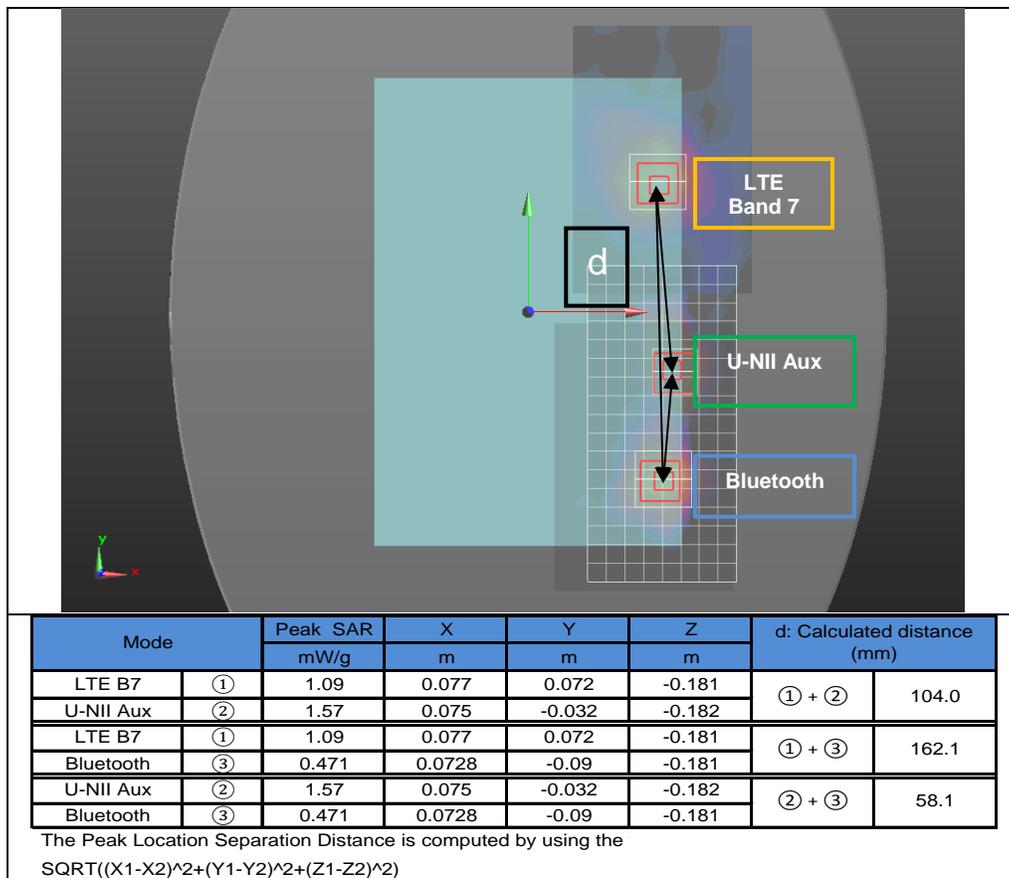


Figure (13)

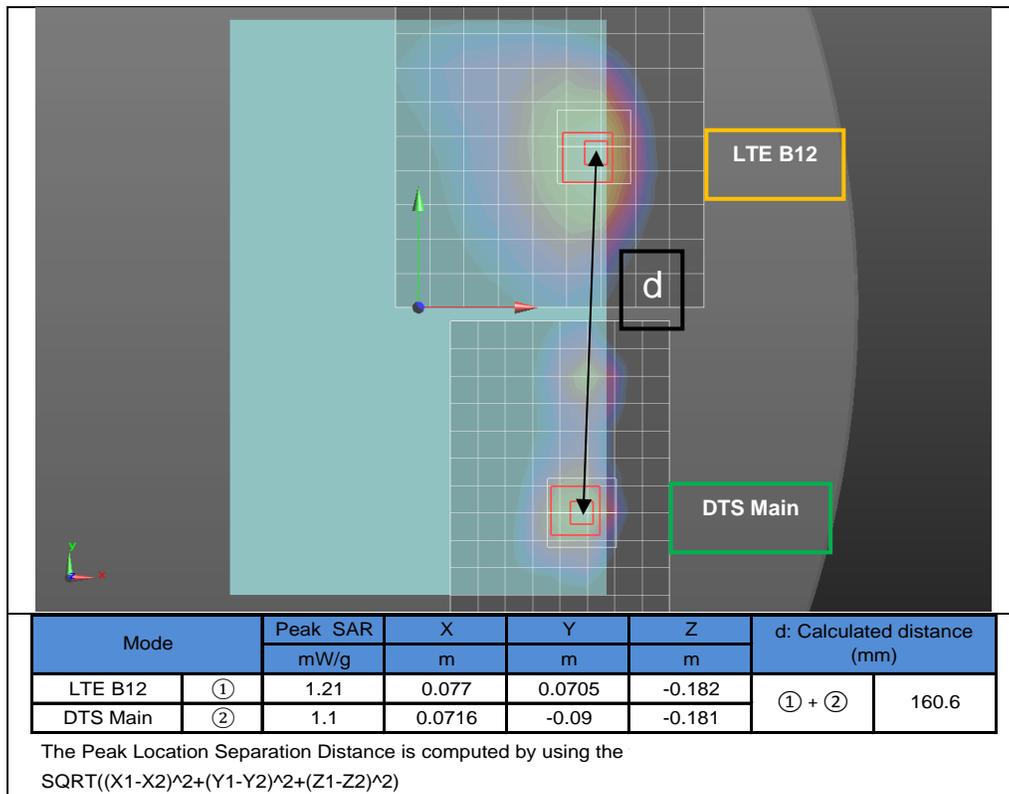


Figure (14)

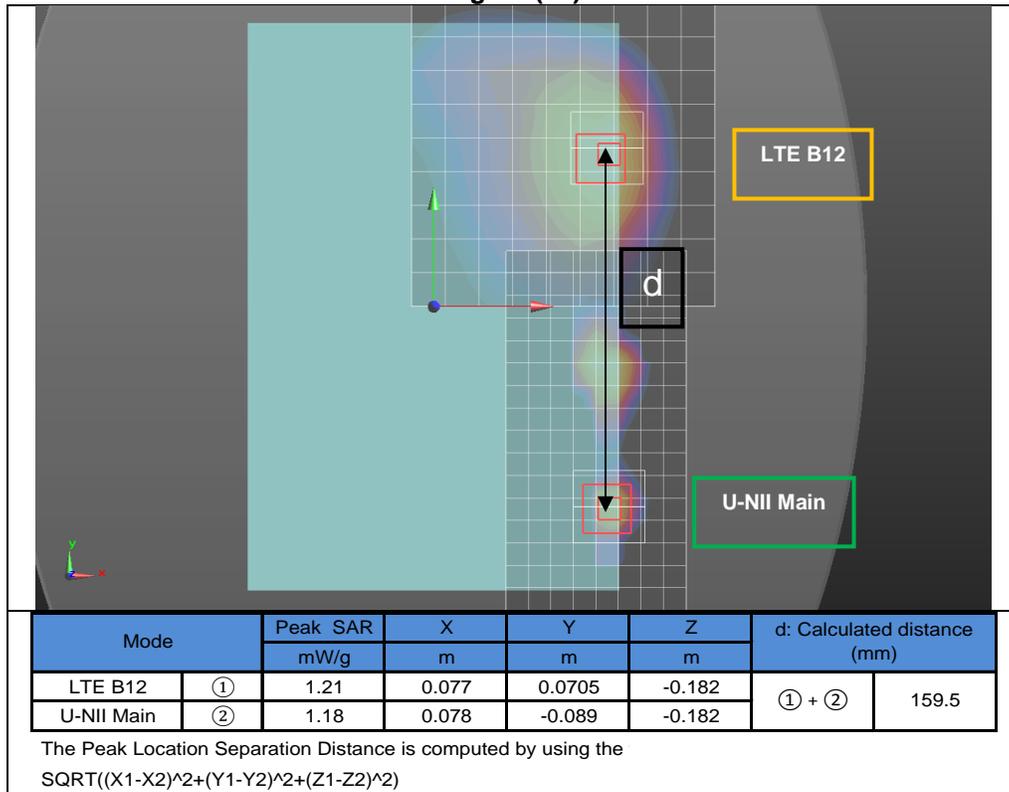


Figure (15)

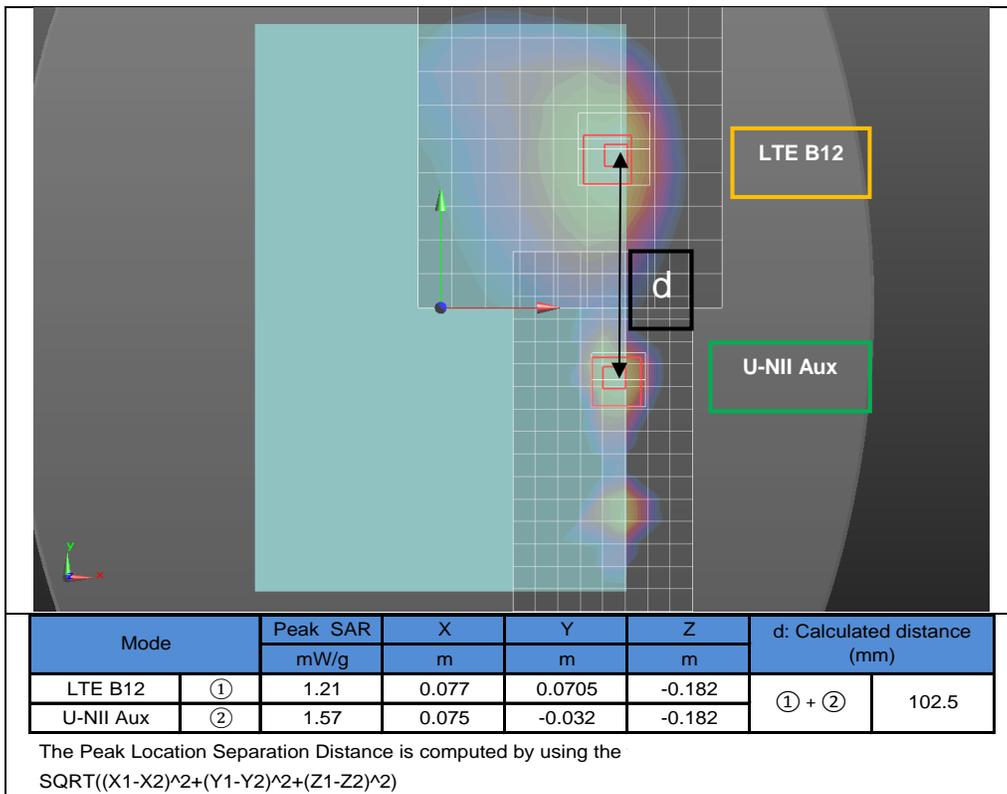
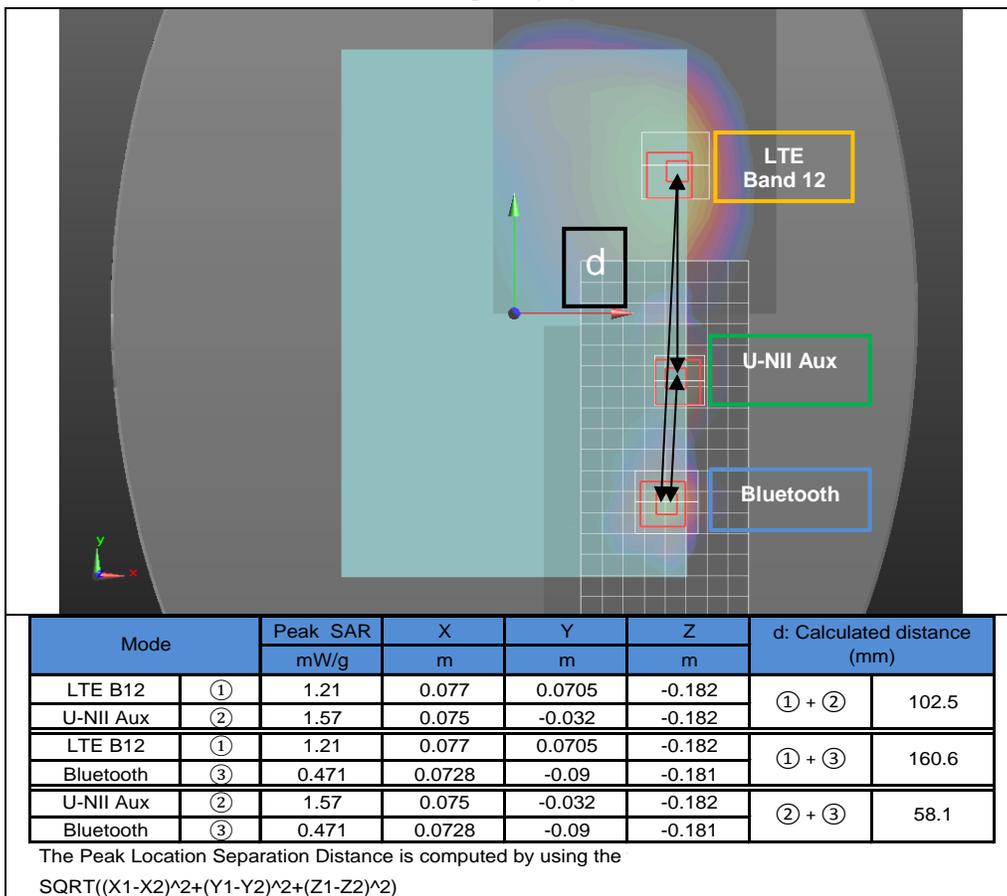


Figure (16)



## **Appendixes**

**Refer to separated files for the following appendixes.**

**A\_15U20030v0 SAR Photos & Ant. Locations**

**B\_15U20030v0 SAR System Check Plots**

**C\_15U20030v0 SAR Highest Test Plots**

**D\_15U20030v0 SAR Tissue Ingredients**

**E\_15U20030v0 SAR Probe Cal. Certificates**

**F\_15U20030v0 SAR Dipole Cal. Certificates**

**END OF REPORT**