



SAR EVALUATION REPORT

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

For
CDMA/GSM/WCDMA/LTE PHONE + BLUETOOTH, DTS/UNII a/b/g/n/ac & NFC

**FCC ID: ZNFH790
Model Name: LG-H790, LGH790, H790**

**Report Number: 15I21235-S1
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Prepared for
**LG ELECTRONICS MOBILECOMM USA, INC.
1000 SYLVAN AVENUE
ENGLEWOOD CLIFFS, NEW JERSEY 07632, USA**

Prepared by
**UL VERIFICATION SERVICES INC.
47173 BENICIA STREET
FREMONT, CA 94538, U.S.A.
TEL: (510) 771-1000
FAX: (510) 661-0888**



NVLAP LAB CODE 200065-0

Revision History

Rev.	Date	Revisions	Revised By
--	8/12/2015	Initial Issue	--

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1. Attestation of Test Results

Applicant Name	LG ELECTRONICS MOBILECOMM USA, INC.			
FCC ID	ZNFH790			
Model Name	LG-H790, LGH790, H790			
Applicable Standards	FCC 47 CFR § 2.1093 Published RF exposure KDB procedures IEEE Std 1528-2013			
SAR Limits (W/Kg)				
Exposure Category	Peak spatial-average(1g of tissue)			
General population / Uncontrolled exposure	1.6			
The Highest Reported SAR (W/kg)				
RF Exposure Conditions	Equipment Class			
	Licensed	DTS	U-NII	DSS (BT)
Head	1.251	0.787	0.769	0.182
Body-worn*	1.280	0.315	0.365	0.064
Hotspot/Wi-Fi Direct			0.368	N/A
Simultaneous Tx	1.539	1.489	1.539	1.539
Date Tested	7/8/2015 to 7/17/2015			
Test Results	Pass			
UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report. Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government (NIST Handbook 150, Annex A). This report is written to support regulatory compliance of the applicable standards stated above.				
Approved & Released By:		Prepared By:		
				
Devin Chang Senior Engineer UL Verification Services Inc.		Coltyce Sanders 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
- 648474 D04 Handset SAR v01r02
- 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 D02: HSPA and 1x Advanced v02r02
- 941225 D03: SAR Test Reduction GSM GPRS EDGE v01
- 941225 D05 SAR for LTE Devices v02r03
- 941225 D05A LTE Rel.10 KDB Inquiry Sheet v01r01
- 941225 D06 Hotspot Mode v02

In addition to the above, the following information was used:

- [TCB workshop](#) October, 2014; Page 36, RF Exposure Procedures Update

3. Facilities and Accreditation

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

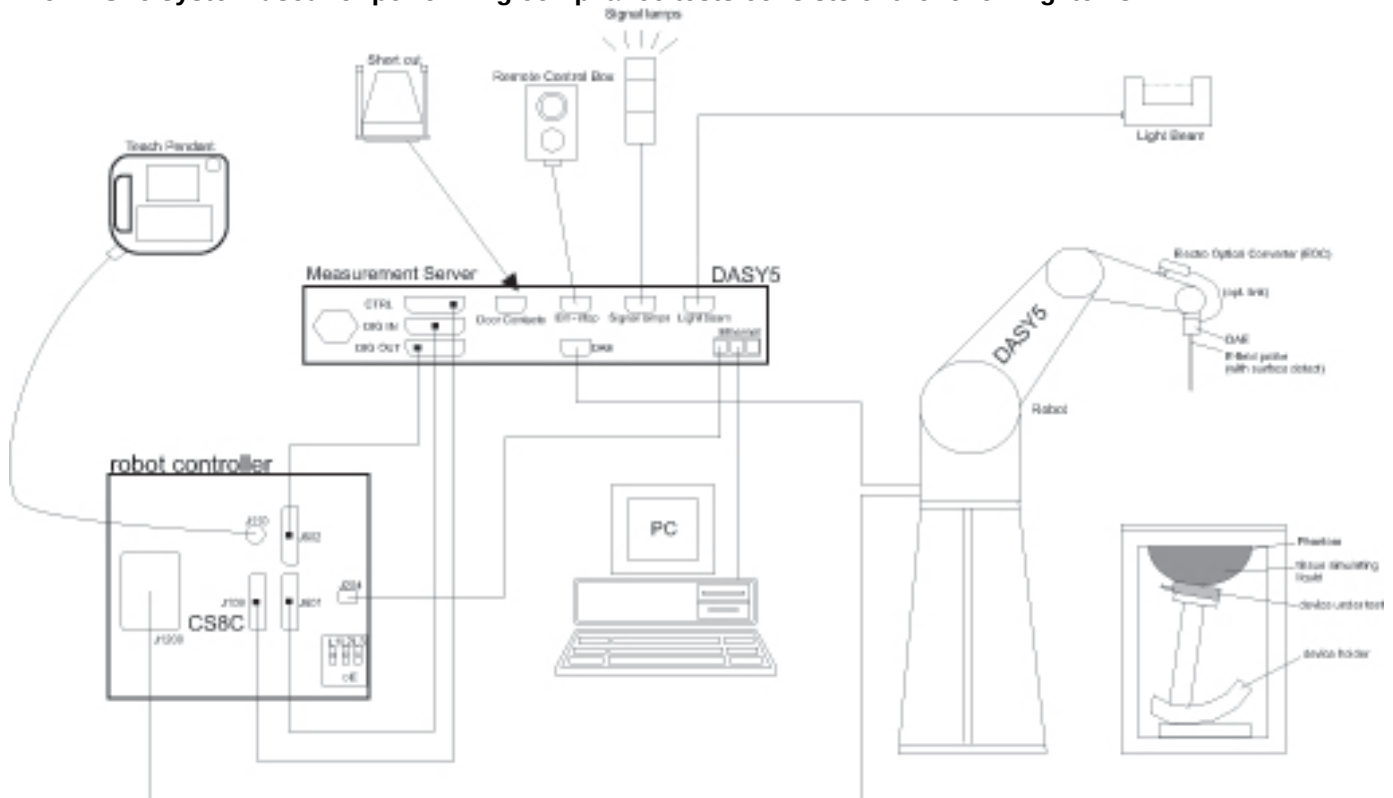
47173 Benicia Street	47266 Benicia Street
SAR Lab A	SAR Lab 1
SAR Lab B	SAR Lab 2
SAR Lab C	SAR Lab 3
SAR Lab D	SAR Lab 4
SAR Lab E	SAR Lab 5
SAR Lab F	
SAR Lab G	
SAR Lab H	

UL Verification Services Inc. is accredited by [NVLAP](#), Laboratory Code 200065-0.

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

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 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: $\Delta x_{\text{Area}}, \Delta y_{\text{Area}}$	≤ 2 GHz: ≤ 15 mm $2 - 3$ GHz: ≤ 12 mm	$3 - 4$ GHz: ≤ 12 mm $4 - 6$ GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\leq$ 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

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: $\Delta x_{\text{Zoom}}, \Delta y_{\text{Zoom}}$			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{\text{Zoom}}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{\text{Zoom}}(1)$: between 1 st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{\text{Zoom}}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{\text{Zoom}}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm
Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.				
* When zoom scan is required and the <i>reported</i> SAR from the area scan based <i>1-g SAR estimation</i> procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.				

Step 4: Power drift measurement

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

Step 5: Z-Scan (FCC only)

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

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	4/17/2016
Dielectric Probe kit	SPEAG	DAK-3.5	1082	9/16/2015
Shorting block	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
Synthesized Signal Generator	Agilent	8665B	3438A00633	8/29/2015
Power Meter	HP	437B	3125U09516	8/27/2015
Power Meter	HP	437B	3125U11347	10/6/2015
Power Sensor	HP	8481A	3318A95392	10/6/2015
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	3929	4/22/2016
E-Field Probe (SAR Lab 1)	SPEAG	EX3DV4	7356	4/22/2016
E-Field Probe (SAR Lab 2)	SPEAG	EX3DV4	3990	3/18/2016
E-Field Probe (SAR Lab 3)	SPEAG	EX3DV4	3749	1/26/2016
E-Field Probe (SAR Lab 4)	SPEAG	EX3DV4	3989	3/17/2016
E-Field Probe (SAR Lab 5)	SPEAG	EX3DV4	3773	4/22/2016
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	1434	4/16/2016
Data Acquisition Electronics (SAR Lab 4)	SPEAG	DAE4	1377	8/27/2015
Data Acquisition Electronics (SAR Lab 5)	SPEAG	DAE4	1239	4/16/2016
System Validation Dipole	SPEAG	D750V3	1071	11/13/2015
System Validation Dipole	SPEAG	D835V2	4d142	9/9/2015
System Validation Dipole	SPEAG	D835V2	4d117	5/18/2016
System Validation Dipole	SPEAG	D1750V2	1077	9/11/2015
System Validation Dipole	SPEAG	D1900V2	5d163	9/11/2015
System Validation Dipole	SPEAG	D2450V2	706	5/11/2016
System Validation Dipole	SPEAG	D2600V2	1036	3/13/2016
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	6/5/2016
Thermometer (SAR Lab 4)	EXTECH	445703	CCS-238	6/5/2016
Thermometer (SAR Lab 5)	EXTECH	445703	CCS-239	6/5/2016

Other

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Power Meter	Agilent	N1912A	MY53060007	9/15/2015
Power Meter	Agilent	N1912A	MY53060002	4/7/2016
Power Sensor	Agilent	N1921A	MY53260011	6/1/2016
Power Sensor	Agilent	N1921A	MY52260009	12/12/2015
Base Station Simulator	R & S	CMW500	132910	10/16/2015
Base Station Simulator	R & S	CMW500	135384	6/18/2016
Base Station Simulator	R & S	CBT	100900	6/30/2016
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

Device Dimension	Overall (Length x Width): 146.9 mm x 72.5 mm Overall Diagonal: 156 mm Display Diagonal: 133 mm		
Back Cover	☒ The rechargeable battery is not user accessible.		
Battery Options	☒ The rechargeable battery is not user accessible.		
Accessory	Headset		
Wireless Router (Hotspot)	Wi-Fi Hotspot mode permits the device to share its cellular data connection with other Wi-Fi-enabled devices. ☒ Mobile Hotspot (Wi-Fi 2.4 GHz) ☒ Mobile Hotspot (Wi-Fi 5.8 GHz)		
Wi-Fi Direct	Wi-Fi Direct enabled devices transfer data directly between each other ☒ Wi-Fi Direct (Wi-Fi 2.4 GHz) ☒ Wi-Fi Direct (Wi-Fi 5.2 and 5.8 GHz)		
Test sample information	S/N	IMEI	Notes
	1ZC4X	353626-07-000575-1	LTE SAR SAMPLE
	1ZC4W	353626-07-000574-4	LTE SAR SAMPLE
	1ZC4U	353626-07-000572-8	2G/3G SAR SAMPLE
	1ZC4V	353626-07-000573-6	2G/3G SAR SAMPLE
	1ZC4S	353626-07-000570-2	WLAN SAR SAMPLE
	1ZC4T	353626-07-000571-0	WLAN SAR SAMPLE
	1ZC4Y	353626-07-000567-8	WLAN CONDUCTED SAMPLE
	1ZC4Z	353626-07-000566-0	WLAN CONDUCTED SAMPLE
Hardware Version	LG-H790, LGH790, H790		
Software Version	N/A		

6.2. Wireless Technologies

Wireless technologies	Frequency bands	Operating mode		Duty Cycle used for SAR testing
GSM	850 1900	Voice (GMSK) GPRS (GMSK) EGPRS (8PSK)	GPRS Multi-Slot Class: ☐ Class 8 - 1 Up, 4 Down ☐ Class 10 - 2 Up, 4 Down ☒ Class 12 - 4 Up, 4 Down ☐ Class 33 - 4 Up, 5 Down	GSM Voice: 12.5% (E)GPRS: 1 Slot: 12.5% 2 Slots: 25% 3 Slots: 37.5% 4 Slots: 50%
	☐ Class A = Can be connected to GPRS service and GSM service (voice, SMS), using both at the same time. Does this device support DTM (Dual Transfer Mode)? ☐ Yes ☐ No ☒ Class B = GPRS connection interrupted during a GSM call, automatically resumed at end of call. ☐ Class C = manual GSM / GPRS mode switching.			
CDMA (CDMA2000)	BC0 BC1 BC10	1xRTT (Voice & Data) 1xEV-DO Rel. 0 1xEV-DO Rev. A 1xAdvanced		100%
	Does this device support SV-DO (1xRTT-1xEVDO)? ☐ Yes ☒ No			
W-CDMA (UMTS)	Band II Band IV 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 FDD Band 4 FDD Band 5 FDD Band 7 FDD Band 12 FDD Band 13 FDD Band 17 FDD Band 25 FDD Band 26 FDD Band 29 (Rx Only) TDD Band 41	QPSK 16QAM ☐ Rel. 10 Does not support Carrier Aggregation (CA) ☒ Rel. 10 Carrier Aggregation (1 Uplink and 2 Downlinks) ☐ Rel. 11 Carrier Aggregation (2 Uplink and 2 Downlinks)		100% (FDD) 63.3% (TDD)
	Does this device support SV-LTE (1xRTT-LTE)? ☐ Yes ☒ No			
Wi-Fi	2.4 GHz	802.11b 802.11g 802.11n (HT20) 802.11ac (VHT20)		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? ☐ Yes ☒ No			
	Does this device support Band gap channel(s)? ☒ Yes ☐ No			
Bluetooth	2.4 GHz	Version 4.2 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

Upper limit (dB): -1.5 ~ 0.5		Max. RF Output Power (dBm)		
RF Air interface	Mode	Target	Max. tune-up tolerance limit	
			Burst	Frame
GSM850	Voice (1 slot)	32.7	33.2	24.2
	GPRS 1 slot	32.7	33.2	24.2
	GPRS 2 slots	30.7	31.2	25.2
	GPRS 3 slots	28.7	29.2	24.9
	GPRS 4 slots	27.7	28.2	25.2
	EGPRS 1 slot	26.7	27.2	18.2
	EGPRS 2 slots	25.7	26.2	20.2
	EGPRS 3 slots	24.7	25.2	20.9
	EGPRS 4 slots	23.7	24.2	21.2
GSM1900	Voice (1 slot)	29.2	29.7	20.7
	GPRS 1 slot	29.2	29.7	20.7
	GPRS 2 slots	27.2	27.7	21.7
	GPRS 3 slots	25.2	25.7	21.4
	GPRS 4 slots	24.2	24.7	21.7
	EGPRS 1 slot	25.2	25.7	16.7
	EGPRS 2 slots	24.2	24.7	18.7
	EGPRS 3 slots	23.2	23.7	19.4
	EGPRS 4 slots	22.2	22.7	19.7

Upper limit (dB): -1.5 ~ 0.5		Max. RF Output Power (dBm)	
RF Air interface	Mode	Target	Max. tune-up tolerance limit
W-CDMA Band II	R99	23.4	23.9
	HSDPA	23.4	23.9
	HSUPA	23.4	23.9
	DC-HSDPA	23.4	23.9
W-CDMA Band IV	R99	23.4	23.9
	HSDPA	23.4	23.9
	HSUPA	23.4	23.9
	DC-HSDPA	23.4	23.9
W-CDMA Band V	R99	24.2	24.7
	HSDPA	24.2	24.7
	HSUPA	24.2	24.7
	DC-HSDPA	24.2	24.7

Upper limit (dB): -1.5 ~ 0.5		Max. RF Output Power (dBm)	
RF Air interface	Mode	Target	Max. tune-up tolerance limit
CDMA BC0	1xRTT	24.2	24.7
	1xAdvanced	24.2	24.7
	1xEVDO Rel. 0	24.2	24.7
	1xEVDO Rev. A	24.2	24.7
CDMA BC1	1xRTT	24.2	24.7
	1xAdvanced	24.2	24.7
	1xEVDO Rel. 0	23.2	23.7
	1xEVDO Rev. A	23.2	23.7
CDMA BC10	1xRTT	24.2	24.7
	1xAdvanced	24.2	24.7
	1xEVDO Rel. 0	24.2	24.7
	1xEVDO Rev. A	24.2	24.7
LTE Band 2	QPSK	22.9	23.4
	16QAM	21.9	22.4
LTE Band 4	QPSK	22.9	23.4
	16QAM	21.9	22.4
LTE Band 5	QPSK	23.7	24.2
	16QAM	22.7	23.2
LTE Band 7	QPSK	23.2	23.7
	16QAM	22.2	22.7
LTE Band 12	QPSK	23.7	24.2
	16QAM	22.7	23.2
LTE Band 13	QPSK	23.7	24.2
	16QAM	22.7	23.2
LTE Band 17	QPSK	23.7	24.2
	16QAM	22.7	23.2
LTE Band 25	QPSK	22.9	23.4
	16QAM	21.9	22.4
LTE Band 26	QPSK	23.7	24.2
	16QAM	22.7	23.2
LTE Band 41	QPSK	22.7	23.2
	16QAM	21.7	22.2

*LTE Carrier Aggregation shares identical target power and tune-up tolerance as noted above

Upper limit (dB): 1.0		Max. RF Output Power (dBm)		
RF Air interface	Mode	CH.	Target	Max. tune-up tolerance limit
WiFi 2.4 GHz	802.11b	All	17.0	18.0
	802.11g	1 and 11	14.5	15.5
		2-10	15.5	16.5
	802.11n HT20	1 and 11	14.5	15.5
		2-10	15.5	16.5
	802.11ac VHT20	1 and 11	14.5	15.5
		2-10	15.5	16.5
WiFi 5 GHz	802.11a	All	14.0	15.0
	802.11n HT20	All	13.5	14.5
	802.11n HT40	All	11.5	12.5
	802.11ac VHT20	All	13.5	14.5
	802.11ac VHT40	All	11.5	12.5
	802.11ac VHT80	All	10.5	11.5
Bluetooth		All	8.9	9.9
Bluetooth LE		All	1.0	2.0

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				23035/ 701.5	23025/ 700.5	23017/ 699.7
	Mid			23095/ 707.5	23095/ 707.5	23095/ 707.5	23095/ 707.5
	High				23155/ 713.5	23165/ 714.5	23173/ 715.3
	Band 13	Frequency range: 777 - 787 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low				23205/ 779.5		
	Mid			23230/ 782	23230/ 782		
	High				23255/ 784.5		

General LTE SAR Test and Reporting Considerations (Continued)

Frequency range, Channel Bandwidth, Numbers and Frequencies	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		
	Band 25	Frequency range: 1850 - 1915 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low	26140/ 1860	26115/ 1857.5	26090/ 1855	26065/ 1852.5	26055/ 1851.5	26047/ 1850.7
	Mid	26365/ 1882.5	26365/ 1882.5	26365/ 1882.5	26365/ 1882.5	26365/ 1882.5	26365/ 1882.5
	High	26590/ 1905	26615/ 1907.5	26640/ 1910	26665/ 1912.5	26675/ 1913.5	26683/ 1914.3
	Band 26	Frequency range: 814 - 849 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low		26765/ 821.5	26740/ 819	26715/ 816.5	26705/ 815.5	26697/ 814.7
	Mid		26865/ 831.5	26865/ 831.5	26865/ 831.5	26865/ 831.5	26865/ 831.5
	High		26965/ 841.5	26990/ 844	27015/ 846.5	27025/ 847.5	27033/ 848.3
	Band 41	Frequency range: 2496 - 2690 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low	39750/ 2506.0	39725/ 2503.5	39700/ 2501	39675/ 2498.5		
	Low-Mid	40185/ 2549.5	40173/ 2548.3	40160/ 2547.0	40148/ 2545.8		
	Mid	40620/ 2593.0	40620/ 2593.0	40620/ 2593.0	40620/ 2593.0		
	Mid-High	41055/ 2636.5	41068/ 2547.8	41080/ 2639.0	41093/ 2640.3		
	High	41490/ 2680.0	41515/ 2682.5	41540/ 2685.0	41565/ 2687.5		

General LTE SAR Test and Reporting Considerations (Continued)

	Primary Channel Bandwidth (MHz)		Secondary Channel Bandwidth (MHz)	
	Band	Channel Bandwidth (MHz)	Band	Channel Bandwidth (MHz)
Carrier Aggregation Combinations (For supported channels, please refer to the tables above)	Band 2	20, 15, 10, 5	Band 13	10
	Band 4	20, 15, 10, 5	Band 13	10
	Band 13	10	Band 2	20, 15, 10, 5
	Band 13	10	Band 4	20, 15, 10, 5
	Band 2	20, 15, 10, 5, 3, 1.4	Band 4	20, 15, 10, 5
	Band 4	20, 15, 10, 5	Band 2	20, 15, 10, 5, 3, 1.4
	Band 2	10, 5	Band 17	10, 5
	Band 17	10, 5	Band 2	10, 5
	Band 4	10, 5	Band 17	10, 5
	Band 17	10, 5	Band 4	10, 5
	Band 2	20, 15, 10, 5	Band 29	10, 5, 3
	Band 4	20, 15, 10, 5	Band 29	10, 5, 3
	Band 2	20, 15, 10, 5	Band 5	10, 5
	Band 5	10, 5	Band 2	20, 15, 10, 5
	Band 4	20, 15, 10, 5	Band 5	10, 5
	Band 5	10, 5	Band 4	20, 15, 10, 5
	Band 2	20, 15, 10, 5	Band 12	10, 5, 3
	Band 12	10, 5, 3	Band 2	20, 15, 10, 5
	Band 4	20, 15, 10, 5, 3, 1.4	Band 12	10, 5, 3
	Band 12	10, 5, 3	Band 4	20, 15, 10, 5, 3, 1.4
	Band 4	10, 5	Band 7	20, 15, 10, 5
	Band 7	20, 15, 10, 5	Band 4	10, 5
	Band 2	20, 15, 10, 5	Band 2	20, 15, 10, 5
	Band 4	20, 15, 10, 5	Band 4	20, 15, 10, 5
	Band 41	20, 15, 10, 5	Band 41	20, 15, 10, 5

General LTE SAR Test and Reporting Considerations (Continued)

LTE transmitter and antenna implementation	LTE Bands 2/4/25/41 have one (1) Tx/Rx antenna LTE Bands 5/7/12/13/17/26 have one (1) Tx/Rx antenna LTE Bands 2/4/5/12/13/17/25/26 have one (1) Rx antenna LTE Bands 7/41 have one (1) Rx antenna Refer to Appendix A																																														
Maximum power reduction (MPR)	<table><tr><th colspan="8">Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3</th></tr><tr><th rowspan="2">Modulation</th><th colspan="6">Channel bandwidth / Transmission bandwidth (RB)</th><th rowspan="2">MPR (dB)</th></tr><tr><th>1.4 MHz</th><th>3.0 MHz</th><th>5 MHz</th><th>10 MHz</th><th>15 MHz</th><th>20 MHz</th></tr><tr><td>QPSK</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 1</td></tr><tr><td>16 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 1</td></tr><tr><td>16 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 2</td></tr></table> MPR Built-in by design A-MPR (additional MPR) was disabled during SAR testing	Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3								Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1	16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1	16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2
Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3																																															
Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)																																								
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz																																									
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1																																								
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1																																								
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2																																								
Power reduction	No																																														
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.																																														

6.5. LTE (TDD) Considerations

According to KDB 941225 D05 SAR for LTE Devices, for Time-Division Duplex (TDD) systems, SAR must be tested using a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by the defined 3GPP LTE TDD configurations.

SAR was tested with the highest transmission duty factor (63.33%) using Uplink-downlink configuration 0 and Special subframe configuration 7.

LTE TDD Band 41 supports 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations and Table 4.2-1 for Special subframe configurations.

Table 4.2-1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS).

Special subframe configuration	Normal cyclic prefix in downlink			Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	$6592 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$	$7680 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$
1	$19760 \cdot T_s$			$20480 \cdot T_s$		
2	$21952 \cdot T_s$			$23040 \cdot T_s$		
3	$24144 \cdot T_s$			$25600 \cdot T_s$		
4	$26336 \cdot T_s$			$7680 \cdot T_s$		
5	$6592 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$20480 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$		
8	$24144 \cdot T_s$			-	-	-
9	$13168 \cdot T_s$			-	-	-

Calculated Duty Cycle

Uplink-Downlink Configuration	Downlink-to-Uplink Switch-point Periodicity	Subframe Number										Calculated Duty Cycle (%)
		0	1	2	3	4	5	6	7	8	9	
0	5 ms	D	S	U	U	U	D	S	U	U	U	63.33
1	5 ms	D	S	U	U	D	D	S	U	U	D	43.33
2	5 ms	D	S	U	D	D	D	S	U	D	D	23.33
3	10 ms	D	S	U	U	U	D	D	D	D	D	31.67
4	10 ms	D	S	U	U	D	D	D	D	D	D	21.67
5	10 ms	D	S	U	D	D	D	D	D	D	D	11.67
6	5 ms	D	S	U	U	U	D	S	U	U	D	53.33

Calculated Duty Cycle = Extended cyclic prefix in uplink $\times (T_s) \times \#$ of S + $\#$ of U

Example for Calculated Duty Cycle for Uplink-Downlink Configuration 0:

Calculated Duty Cycle = $5120 \times [1/(15000 \times 2048)] \times 2 + 6 \text{ ms} = 63.33\%$

where

$T_s = 1/(15000 \times 2048)$ seconds

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.

Wireless technologies	RF Exposure Conditions	DUT-to-User Separation	Test Position	Antenna-to-edge/surface	SAR Required	Note
WWAN (Antenna 1)	Head	0 mm	Left Touch	N/A	Yes	
			Left Tilt (15°)	N/A	Yes	
			Right Touch	N/A	Yes	
			Right Tilt (15°)	N/A	Yes	
	Body	10 mm	Rear	N/A	Yes	
			Front	N/A	Yes	
	Hotspot	10 mm	Rear	< 25 mm	Yes	
			Front	< 25 mm	Yes	
			Edge 1 (Top)	> 25 mm	No	1
			Edge 2 (Right)	< 25 mm	Yes	
			Edge 3 (Bottom)	< 25 mm	Yes	
			Edge 4 (Left)	> 25 mm	No	1
WWAN (Antenna 2)	Head	0 mm	Left Touch	N/A	Yes	
			Left Tilt (15°)	N/A	Yes	
			Right Touch	N/A	Yes	
			Right Tilt (15°)	N/A	Yes	
	Body	10 mm	Rear	N/A	Yes	
			Front	N/A	Yes	
	Hotspot	10 mm	Rear	< 25 mm	Yes	
			Front	< 25 mm	Yes	
			Edge 1 (Top)	> 25 mm	No	1
			Edge 2 (Right)	< 25 mm	Yes	
			Edge 3 (Bottom)	< 25 mm	Yes	
			Edge 4 (Left)	< 25 mm	Yes	
WLAN (Antenna 3)	Head	0 mm	Left Touch	N/A	Yes	
			Left Tilt (15°)	N/A	Yes	
			Right Touch	N/A	Yes	
			Right Tilt (15°)	N/A	Yes	
	Body	10 mm	Rear	N/A	Yes	
			Front	N/A	Yes	
	Hotspot / Wi-Fi Direct	10 mm	Rear	< 25 mm	Yes	
			Front	< 25 mm	Yes	
			Edge 1 (Top)	< 25 mm	Yes	
			Edge 2 (Right)	> 25 mm	No	1
			Edge 3 (Bottom)	> 25 mm	No	1
			Edge 4 (Left)	< 25 mm	Yes	
WLAN (Antenna 4)	Head	0 mm	Left Touch	N/A	Yes	
			Left Tilt (15°)	N/A	Yes	
			Right Touch	N/A	Yes	
			Right Tilt (15°)	N/A	Yes	
	Body	10 mm	Rear	N/A	Yes	
			Front	N/A	Yes	
	Hotspot / Wi-Fi Direct	10 mm	Rear	< 25 mm	Yes	
			Front	< 25 mm	Yes	
			Edge 1 (Top)	< 25 mm	Yes	
			Edge 2 (Right)	> 25 mm	No	1
			Edge 3 (Bottom)	> 25 mm	No	1
			Edge 4 (Left)	< 25 mm	Yes	

Notes:

1. SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hot Spot SAR.

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

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 ±(%)
7/8/2015	Body 2450	e'	52.2300	Relative Permittivity (ε _r):	52.23	52.70	-0.89	5
		e"	14.8300	Conductivity (σ):	2.02	1.95	3.60	5
	Body 2410	e'	52.3900	Relative Permittivity (ε _r):	52.39	52.76	-0.70	5
		e"	14.7500	Conductivity (σ):	1.98	1.91	3.62	5
	Body 2475	e'	52.1600	Relative Permittivity (ε _r):	52.16	52.67	-0.97	5
		e"	15.0300	Conductivity (σ):	2.07	1.99	4.19	5
7/8/2015	Body 2600	e'	51.8500	Relative Permittivity (ε _r):	51.85	52.51	-1.26	5
		e"	15.2900	Conductivity (σ):	2.21	2.16	2.30	5
	Body 2500	e'	52.0700	Relative Permittivity (ε _r):	52.07	52.64	-1.08	5
		e"	14.9800	Conductivity (σ):	2.08	2.02	3.07	5
	Body 2700	e'	51.5500	Relative Permittivity (ε _r):	51.55	52.38	-1.59	5
		e"	15.5500	Conductivity (σ):	2.33	2.30	1.44	5
7/8/2015	Head 2600	e'	38.6400	Relative Permittivity (ε _r):	38.64	39.01	-0.95	5
		e"	14.0100	Conductivity (σ):	2.03	1.96	3.22	5
	Head 2500	e'	38.9800	Relative Permittivity (ε _r):	38.98	39.14	-0.40	5
		e"	13.7700	Conductivity (σ):	1.91	1.85	3.24	5
	Head 2700	e'	38.2900	Relative Permittivity (ε _r):	38.29	38.88	-1.53	5
		e"	14.2800	Conductivity (σ):	2.14	2.07	3.55	5
7/8/2015	Head 2450	e'	39.1400	Relative Permittivity (ε _r):	39.14	39.20	-0.15	5
		e"	13.6200	Conductivity (σ):	1.86	1.80	3.08	5
	Head 2410	e'	39.3300	Relative Permittivity (ε _r):	39.33	39.28	0.13	5
		e"	13.5200	Conductivity (σ):	1.81	1.76	2.91	5
	Head 2475	e'	39.0400	Relative Permittivity (ε _r):	39.04	39.17	-0.33	5
		e"	13.7800	Conductivity (σ):	1.90	1.83	3.80	5
7/12/2015	Head 2450	e'	40.5500	Relative Permittivity (ε _r):	40.55	39.20	3.44	5
		e"	13.8500	Conductivity (σ):	1.89	1.80	4.82	5
	Head 2410	e'	40.7800	Relative Permittivity (ε _r):	40.78	39.28	3.82	5
		e"	13.7100	Conductivity (σ):	1.84	1.76	4.36	5
	Head 2475	e'	40.5000	Relative Permittivity (ε _r):	40.50	39.17	3.40	5
		e"	13.8200	Conductivity (σ):	1.90	1.83	4.10	5
7/12/2015	Body 2450	e'	51.5200	Relative Permittivity (ε _r):	51.52	52.70	-2.24	5
		e"	14.7000	Conductivity (σ):	2.00	1.95	2.69	5
	Body 2410	e'	51.6600	Relative Permittivity (ε _r):	51.66	52.76	-2.08	5
		e"	14.5800	Conductivity (σ):	1.95	1.91	2.43	5
	Body 2475	e'	51.5000	Relative Permittivity (ε _r):	51.50	52.67	-2.22	5
		e"	14.8300	Conductivity (σ):	2.04	1.99	2.81	5
7/15/2015	Head 2600	e'	37.3400	Relative Permittivity (ε _r):	37.34	39.01	-4.28	5
		e"	14.0000	Conductivity (σ):	2.02	1.96	3.15	5
	Head 2500	e'	37.8000	Relative Permittivity (ε _r):	37.80	39.14	-3.42	5
		e"	13.8100	Conductivity (σ):	1.92	1.85	3.54	5
	Head 2700	e'	37.0100	Relative Permittivity (ε _r):	37.01	38.88	-4.82	5
		e"	14.2100	Conductivity (σ):	2.13	2.07	3.05	5
7/15/2015	Body 2600	e'	50.6700	Relative Permittivity (ε _r):	50.67	52.51	-3.51	5
		e"	15.3000	Conductivity (σ):	2.21	2.16	2.36	5
	Body 2500	e'	50.9500	Relative Permittivity (ε _r):	50.95	52.64	-3.20	5
		e"	14.9100	Conductivity (σ):	2.07	2.02	2.59	5
	Body 2700	e'	50.3500	Relative Permittivity (ε _r):	50.35	52.38	-3.88	5
		e"	15.4500	Conductivity (σ):	2.32	2.30	0.79	5

SAR Lab 1 (continued)

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
7/17/2015	Body 2450	e'	51.0000	Relative Permittivity (ϵ_r):	51.00	52.70	-3.23	5
		e"	14.6700	Conductivity (σ):	2.00	1.95	2.49	5
	Body 2410	e'	51.0700	Relative Permittivity (ϵ_r):	51.07	52.76	-3.20	5
		e"	14.4900	Conductivity (σ):	1.94	1.91	1.79	5
	Body 2475	e'	50.8900	Relative Permittivity (ϵ_r):	50.89	52.67	-3.38	5
		e"	14.7200	Conductivity (σ):	2.03	1.99	2.05	5

SAR Lab 2

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
7/11/2015	Head 1750	e'	38.9400	Relative Permittivity (ϵ_r):	38.94	40.08	-2.86	5
		e''	13.9000	Conductivity (σ):	1.35	1.37	-1.20	5
	Head 1710	e'	39.1700	Relative Permittivity (ϵ_r):	39.17	40.15	-2.43	5
		e''	13.7700	Conductivity (σ):	1.31	1.35	-2.76	5
	Head 1755	e'	38.9300	Relative Permittivity (ϵ_r):	38.93	40.08	-2.86	5
		e''	13.9600	Conductivity (σ):	1.36	1.37	-0.69	5
7/11/2015	Body 1750	e'	51.4500	Relative Permittivity (ϵ_r):	51.45	53.44	-3.73	5
		e''	15.2100	Conductivity (σ):	1.48	1.49	-0.41	5
	Body 1710	e'	51.6800	Relative Permittivity (ϵ_r):	51.68	53.54	-3.48	5
		e''	15.0500	Conductivity (σ):	1.43	1.46	-2.09	5
	Body 1755	e'	51.4900	Relative Permittivity (ϵ_r):	51.49	53.43	-3.63	5
		e''	15.2100	Conductivity (σ):	1.48	1.49	-0.33	5
7/15/2015	Head 1750	e'	39.0400	Relative Permittivity (ϵ_r):	39.04	40.08	-2.61	5
		e''	14.0800	Conductivity (σ):	1.37	1.37	0.08	5
	Head 1710	e'	39.2100	Relative Permittivity (ϵ_r):	39.21	40.15	-2.33	5
		e''	14.0100	Conductivity (σ):	1.33	1.35	-1.06	5
	Head 1755	e'	38.9700	Relative Permittivity (ϵ_r):	38.97	40.08	-2.76	5
		e''	14.1800	Conductivity (σ):	1.38	1.37	0.87	5
7/15/2015	Body 1750	e'	51.4100	Relative Permittivity (ϵ_r):	51.41	53.44	-3.80	5
		e''	15.5400	Conductivity (σ):	1.51	1.49	1.75	5
	Body 1710	e'	51.5000	Relative Permittivity (ϵ_r):	51.50	53.54	-3.82	5
		e''	15.4800	Conductivity (σ):	1.47	1.46	0.71	5
	Body 1755	e'	51.4100	Relative Permittivity (ϵ_r):	51.41	53.43	-3.78	5
		e''	15.5400	Conductivity (σ):	1.52	1.49	1.83	5

SAR Lab 3

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
7/10/2015	Body 1900	e'	51.1100	Relative Permittivity (ϵ_r):	51.11	53.30	-4.11	5
		e''	14.5000	Conductivity (σ):	1.53	1.52	0.78	5
	Body 1850	e'	51.2100	Relative Permittivity (ϵ_r):	51.21	53.30	-3.92	5
		e''	14.3300	Conductivity (σ):	1.47	1.52	-3.02	5
	Body 1910	e'	51.1200	Relative Permittivity (ϵ_r):	51.12	53.30	-4.09	5
		e''	14.4000	Conductivity (σ):	1.53	1.52	0.61	5
7/10/2015	Head 1900	e'	38.1200	Relative Permittivity (ϵ_r):	38.12	40.00	-4.70	5
		e''	13.5500	Conductivity (σ):	1.43	1.40	2.25	5
	Head 1850	e'	38.1000	Relative Permittivity (ϵ_r):	38.10	40.00	-4.75	5
		e''	13.4200	Conductivity (σ):	1.38	1.40	-1.40	5
	Head 1910	e'	38.1100	Relative Permittivity (ϵ_r):	38.11	40.00	-4.73	5
		e''	13.4300	Conductivity (σ):	1.43	1.40	1.88	5
7/14/2015	Body 1900	e'	50.7000	Relative Permittivity (ϵ_r):	50.70	53.30	-4.88	5
		e''	14.3900	Conductivity (σ):	1.52	1.52	0.02	5
	Body 1850	e'	50.8700	Relative Permittivity (ϵ_r):	50.87	53.30	-4.56	5
		e''	14.3100	Conductivity (σ):	1.47	1.52	-3.16	5
	Body 1910	e'	50.6800	Relative Permittivity (ϵ_r):	50.68	53.30	-4.92	5
		e''	14.3400	Conductivity (σ):	1.52	1.52	0.19	5
7/14/2015	Head 1900	e'	39.3300	Relative Permittivity (ϵ_r):	39.33	40.00	-1.68	5
		e''	13.4900	Conductivity (σ):	1.43	1.40	1.80	5
	Head 1850	e'	39.4900	Relative Permittivity (ϵ_r):	39.49	40.00	-1.28	5
		e''	13.3700	Conductivity (σ):	1.38	1.40	-1.76	5
	Head 1910	e'	39.2100	Relative Permittivity (ϵ_r):	39.21	40.00	-1.98	5
		e''	13.4900	Conductivity (σ):	1.43	1.40	2.33	5

SAR Lab 4

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
7/13/2015	Head 5180	e'	35.9400	Relative Permittivity (ϵ_r):	35.94	36.01	-0.20	5
		e"	15.6100	Conductivity (σ):	4.50	4.63	-2.90	5
	Head 5200	e'	35.7700	Relative Permittivity (ϵ_r):	35.77	35.99	-0.61	5
		e"	15.6700	Conductivity (σ):	4.53	4.65	-2.58	5
	Head 5600	e'	35.2600	Relative Permittivity (ϵ_r):	35.26	35.53	-0.77	5
		e"	15.8500	Conductivity (σ):	4.94	5.06	-2.47	5
	Head 5800	e'	35.2000	Relative Permittivity (ϵ_r):	35.20	35.30	-0.28	5
		e"	15.8300	Conductivity (σ):	5.11	5.27	-3.13	5
	Head 5825	e'	35.0700	Relative Permittivity (ϵ_r):	35.07	35.30	-0.65	5
		e"	15.9800	Conductivity (σ):	5.18	5.27	-1.79	5
7/13/2015	Body 5180	e'	48.7400	Relative Permittivity (ϵ_r):	48.74	49.05	-0.63	5
		e"	18.6400	Conductivity (σ):	5.37	5.27	1.85	5
	Body 5200	e'	48.6600	Relative Permittivity (ϵ_r):	48.66	49.02	-0.73	5
		e"	18.9900	Conductivity (σ):	5.49	5.29	3.70	5
	Body 5600	e'	48.0900	Relative Permittivity (ϵ_r):	48.09	48.48	-0.80	5
		e"	19.0300	Conductivity (σ):	5.93	5.76	2.86	5
	Body 5800	e'	47.9600	Relative Permittivity (ϵ_r):	47.96	48.20	-0.50	5
		e"	19.1200	Conductivity (σ):	6.17	6.00	2.77	5
	Body 5825	e'	47.7700	Relative Permittivity (ϵ_r):	47.77	48.20	-0.89	5
		e"	19.2600	Conductivity (σ):	6.24	6.00	3.97	5
7/17/2015	Body 5180	e'	47.7000	Relative Permittivity (ϵ_r):	47.70	49.05	-2.75	5
		e"	18.3600	Conductivity (σ):	5.29	5.27	0.32	5
	Body 5200	e'	47.7000	Relative Permittivity (ϵ_r):	47.70	49.02	-2.69	5
		e"	18.0500	Conductivity (σ):	5.22	5.29	-1.43	5
	Body 5600	e'	47.0300	Relative Permittivity (ϵ_r):	47.03	48.48	-2.99	5
		e"	18.5400	Conductivity (σ):	5.77	5.76	0.21	5
	Body 5800	e'	46.5000	Relative Permittivity (ϵ_r):	46.50	48.20	-3.53	5
		e"	18.5400	Conductivity (σ):	5.98	6.00	-0.35	5
	Body 5825	e'	46.8300	Relative Permittivity (ϵ_r):	46.83	48.20	-2.84	5
		e"	18.7700	Conductivity (σ):	6.08	6.00	1.32	5
7/20/2015	Head 2450	e'	38.2900	Relative Permittivity (ϵ_r):	38.29	39.20	-2.32	5
		e"	13.6200	Conductivity (σ):	1.86	1.80	3.08	5
	Head 2410	e'	38.4900	Relative Permittivity (ϵ_r):	38.49	39.28	-2.01	5
		e"	13.5000	Conductivity (σ):	1.81	1.76	2.76	5
	Head 2475	e'	38.2500	Relative Permittivity (ϵ_r):	38.25	39.17	-2.34	5
		e"	13.7200	Conductivity (σ):	1.89	1.83	3.34	5

SAR Lab 5

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
7/8/2015	Head 835	e'	41.4100	Relative Permittivity (ϵ_r):	41.41	41.50	-0.22	5
		e''	19.0100	Conductivity (σ):	0.88	0.90	-1.93	5
	Head 820	e'	41.4100	Relative Permittivity (ϵ_r):	41.41	41.60	-0.46	5
		e''	19.1300	Conductivity (σ):	0.87	0.90	-2.92	5
	Head 850	e'	41.1100	Relative Permittivity (ϵ_r):	41.11	41.50	-0.94	5
		e''	19.0400	Conductivity (σ):	0.90	0.92	-1.65	5
7/8/2015	Body 835	e'	53.9100	Relative Permittivity (ϵ_r):	53.91	55.20	-2.34	5
		e''	21.9000	Conductivity (σ):	1.02	0.97	4.82	5
	Body 820	e'	54.1300	Relative Permittivity (ϵ_r):	54.13	55.28	-2.07	5
		e''	21.9700	Conductivity (σ):	1.00	0.97	3.43	5
	Body 850	e'	53.7100	Relative Permittivity (ϵ_r):	53.71	55.16	-2.62	5
		e''	21.6700	Conductivity (σ):	1.02	0.99	3.75	5
7/13/2015	Head 750	e'	40.7700	Relative Permittivity (ϵ_r):	40.77	41.96	-2.84	5
		e''	21.4200	Conductivity (σ):	0.89	0.89	0.02	5
	Head 700	e'	41.4000	Relative Permittivity (ϵ_r):	41.40	42.22	-1.94	5
		e''	21.8200	Conductivity (σ):	0.85	0.89	-4.49	5
	Head 790	e'	40.3000	Relative Permittivity (ϵ_r):	40.30	41.76	-3.49	5
		e''	21.1300	Conductivity (σ):	0.93	0.90	3.57	5
7/13/2015	Body 750	e'	53.9700	Relative Permittivity (ϵ_r):	53.97	55.55	-2.84	5
		e''	23.2400	Conductivity (σ):	0.97	0.96	0.63	5
	Body 700	e'	54.3300	Relative Permittivity (ϵ_r):	54.33	55.74	-2.53	5
		e''	23.6400	Conductivity (σ):	0.92	0.96	-4.08	5
	Body 790	e'	53.5300	Relative Permittivity (ϵ_r):	53.53	55.39	-3.36	5
		e''	22.8200	Conductivity (σ):	1.00	0.97	3.75	5
7/14/2015	Head 835	e'	41.6200	Relative Permittivity (ϵ_r):	41.62	41.50	0.29	5
		e''	19.1100	Conductivity (σ):	0.89	0.90	-1.42	5
	Head 820	e'	41.8100	Relative Permittivity (ϵ_r):	41.81	41.60	0.50	5
		e''	19.2800	Conductivity (σ):	0.88	0.90	-2.16	5
	Head 850	e'	41.4800	Relative Permittivity (ϵ_r):	41.48	41.50	-0.05	5
		e''	19.0800	Conductivity (σ):	0.90	0.92	-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 ± 0.2 mm (bottom plate) filled with Body or Head simulating liquid of the following parameters.
- The depth of tissue-equivalent liquid in a phantom must be ≥ 15.0 cm for SAR measurements ≤ 3 GHz and ≥ 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	1071	11/13/2014	750	1g	8.22	8.52
				10g	5.39	5.64
D835V2	4d142	9/9/2014	835	1g	8.91	9.22
				10g	5.77	6.05
D835V2	4d117	5/18/2015	835	1g	9.08	9.38
				10g	5.93	6.20
D1750V2	1077	9/11/2014	1750	1g	36.5	36.90
				10g	19.4	19.8
D1900V2	5d163	9/11/2014	1900	1g	40.8	40.6
				10g	21.2	21.4
D2450V2	706	5/11/2015	2450	1g	52.6	51.3
				10g	24.6	24.0
D2600V2	1036	3/13/2015	2600	1g	56.1	56.2
				10g	25.0	25.0
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			
7/8/2015	D2450V2	706	Body	1g	5.03	50.3	51.3	-1.95	
				10g	2.33	23.3	24.0	-2.92	
7/8/2015	D2600V2	1036	Body	1g	5.62	56.2	56.2	0.00	
				10g	2.46	24.6	25.0	-1.60	
7/8/2015	D2600V2	1036	Head	1g	6.08	60.8	56.1	8.38	1,2
				10g	2.66	26.6	25.0	6.40	
7/8/2015	D2450V2	706	Head	1g	5.46	54.6	52.6	3.80	
				10g	2.49	24.9	24.6	1.22	
7/12/2015	D2450V2	706	Head	1g	5.36	53.6	52.6	1.90	
				10g	2.43	24.3	24.6	-1.22	
7/12/2015	D2450V2	706	Body	1g	5.01	50.1	51.3	-2.34	
				10g	2.31	23.1	24.0	-3.75	
7/15/2015	D2600V2	1036	Head	1g	5.57	55.7	56.1	-0.71	
				10g	2.44	24.4	25.0	-2.40	
7/15/2015	D2600V2	1036	Body	1g	5.68	56.8	56.2	1.07	
				10g	2.48	24.8	25.0	-0.80	
7/17/2015	D2450V2	706	Body	1g	5.37	53.7	51.3	4.68	3,4
				10g	2.47	24.7	24.0	2.92	

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			
7/11/2015	D1750V2	1077	Head	1g	3.67	36.7	36.50	0.55	
				10g	1.94	19.4	19.40	0.00	
7/11/2015	D1750V2	1077	Body	1g	3.93	39.3	36.90	6.50	5,6
				10g	2.11	21.1	19.8	6.57	
7/15/2015	D1750V2	1077	Head	1g	3.63	36.3	36.50	-0.55	
				10g	1.91	19.1	19.40	-1.55	
7/15/2015	D1750V2	1077	Body	1g	3.83	38.3	36.90	3.79	
				10g	2.04	20.4	19.8	3.03	

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			
7/10/2015	D1900V2	5d163	Body	1g	4.04	40.4	40.6	-0.49	
				10g	2.11	21.1	21.4	-1.40	
7/10/2015	D1900V2	5d163	Head	1g	4.10	41.0	40.8	0.49	
				10g	2.12	21.2	21.2	0.00	
7/14/2015	D1900V2	5d163	Body	1g	4.08	40.8	40.6	0.49	
				10g	2.12	21.2	21.4	-0.93	
7/14/2015	D1900V2	5d163	Head	1g	4.12	41.2	40.8	0.98	7,8
				10g	2.13	21.3	21.2	0.47	

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			
7/13/2015	D5GHzV2 (5.2)	1168	Head	1g	7.81	78.1	-1.51	
				10g	2.24	22.4	-0.44	
7/13/2015	D5GHzV2 (5.2)	1168	Body	1g	7.36	73.6	-3.16	
				10g	2.08	20.8	-1.42	
7/13/2015	D5GHzV2 (5.6)	1168	Head	1g	8.66	86.6	6.00	9,10
				10g	2.48	24.8	6.90	
7/13/2015	D5GHzV2 (5.6)	1168	Body	1g	8.54	85.4	4.15	
				10g	2.38	23.8	4.85	
7/13/2015	D5GHzV2 (5.8)	1168	Head	1g	8.18	81.8	4.87	
				10g	2.33	23.3	5.43	
7/13/2015	D5GHzV2 (5.8)	1168	Body	1g	7.69	76.9	0.92	
				10g	2.14	21.4	1.90	
7/17/2015	D5GHzV2 (5.2GHz)	1168	Body	1g	7.54	75.4	-0.79	
				10g	2.12	21.2	0.47	
7/17/2015	D5GHzV2 (5.6GHz)	1168	Body	1g	8.04	80.4	-1.95	
				10g	2.24	22.4	-1.32	
7/17/2015	D5GHzV2 (5.8GHz)	1168	Body	1g	7.49	74.9	-1.71	
				10g	2.08	20.8	-0.95	
7/20/2015	D2450V2	706	Head	1g	5.60	51.30	9.16	11,12
				10g	2.53	25.3	5.42	

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			
7/8/2015	D835V2	4d142	Head	1g	0.90	9.0	1.12	
				10g	0.59	5.9	2.60	
7/8/2015	D835V2	4d142	Body	1g	0.98	9.8	6.51	13,14
				10g	0.65	6.5	6.61	
7/13/2015	D750V3	1071	Head	1g	0.79	7.9	-4.26	15,16
				10g	0.52	5.2	-4.27	
7/13/2015	D750V3	1071	Body	1g	0.86	8.6	1.06	
				10g	0.58	5.8	1.95	
7/14/2015	D835V2	4d117	Head	1g	0.96	9.6	5.73	17,18
				10g	0.63	6.3	6.75	

9. Conducted Output Power Measurements

9.1. GSM

Per KDB 941225 D01 3G SAR Procedures:

SAR test reduction for GPRS and EDGE modes is determined by the source-based time-averaged output power specified for production units, including tune-up tolerance. The data mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested.

GSM850 Measured Results

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Max. Pwr		Frame Pwr Maximum
						Burst (dBm)	Frame (dBm)	
850	GSM (Voice)	CS1	1	128	824.2	33.2	24.2	24.17
				190	836.6	33.1	24.1	
				251	848.8	33.1	24.1	
	GPRS (GMSK)	CS1	1	128	824.2	33.2	24.2	24.17
				190	836.6	33.1	24.1	
				251	848.8	33.2	24.2	
			2	128	824.2	31.1	25.1	25.18
				190	836.6	31.0	25.0	
				251	848.8	31.1	25.1	
			3	128	824.2	28.9	24.6	24.94
				190	836.6	28.9	24.6	
				251	848.8	28.9	24.6	
			4	128	824.2	27.8	24.8	25.19
				190	836.6	27.6	24.6	
				251	848.8	28.1	25.1	
	EGPRS (8PSK)	MCS5	1	128	824.2	27.2	18.2	18.17
				190	836.6	27.0	18.0	
				251	848.8	27.0	18.0	
			2	128	824.2	26.1	20.1	20.18
				190	836.6	26.0	20.0	
				251	848.8	26.0	20.0	
			3	128	824.2	25.0	20.7	20.94
				190	836.6	24.9	20.6	
				251	848.8	25.0	20.7	
			4	128	824.2	24.1	21.1	21.19
				190	836.6	24.1	21.1	
				251	848.8	24.2	21.2	

Notes:

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

- Head & Body-worn: GMSK Voice Mode
- Hotspot mode: GMSK (GPRS) mode with 4 time slots for Max power, 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. Pwr		Frame Pwr Maximum
						Burst (dBm)	Frame (dBm)	
1900	GSM (Voice)	CS1	1	512	1850.2	29.6	20.6	20.67
				661	1880	29.3	20.3	
				810	1909.8	29.4	20.4	
	GPRS (GMSK)	CS1	1	512	1850.2	29.7	20.7	20.67
				661	1880	29.4	20.4	
				810	1909.8	29.4	20.4	
			2	512	1850.2	27.6	21.6	21.68
				661	1880	27.5	21.5	
				810	1909.8	27.6	21.6	
			3	512	1850.2	25.3	21.0	21.46
				661	1880	25.3	21.0	
				810	1909.8	25.4	21.1	
			4	512	1850.2	24.6	21.6	21.69
				661	1880	24.5	21.5	
				810	1909.8	24.7	21.7	
	EGPRS (8PSK)	MCS5	1	512	1850.2	25.6	16.6	16.67
				661	1880	25.5	16.5	
				810	1909.8	25.7	16.7	
			2	512	1850.2	24.5	18.5	18.68
				661	1880	24.3	18.3	
				810	1909.8	24.5	18.5	
			3	512	1850.2	23.3	19.0	19.44
				661	1880	23.2	18.9	
				810	1909.8	23.4	19.1	
			4	512	1850.2	22.5	19.5	19.69
				661	1880	22.4	19.4	
				810	1909.8	22.6	19.6	

Notes:

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

- Head & Body-worn: GMSK Voice Mode
- Hotspot mode: GMSK (GPRS) mode with 4 time slots for Max power, 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

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
	β_c/β_d	8/15

HSDPA Setup Procedures used to establish the test signals

The following 4 Sub-tests were completed according to Release 5 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			
	β_c	2/15	11/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	β_c/β_d	2/15	11/15	15/8	15/4
	β_{hs}	4/15	24/15	30/15	30/15
HSDPA Specific Settings	MPR (dB)	0	0	0.5	0.5
	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
	β_c	11/15	6/15	15/15	2/15	15/15
	β_d	15/15	15/15	9/15	15/15	0
	β_{ec}	209/225	12/15	30/15	2/15	5/15
	β_c/β_d	11/15	6/15	15/9	2/15	15/1
	β_{hs}	22/15	12/15	30/15	4/15	5/15
	β_{ed}	1309/225	94/75	47/15	56/75	47/15
HSDPA Specific Settings	CM (dB)	1	3	2	3	1
	MPR (dB)	0	2	1	2	0
	DACK	8				0
	DNAK	8				0
	DCQI	8				0
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
HSUPA Specific Settings	CQI Repetition Factor (Table 5.2B.4)	2				
	$A_{hs} = \beta_{hs}/\beta_c$	30/15				
	E-DPDCCCH	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 Channelization 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

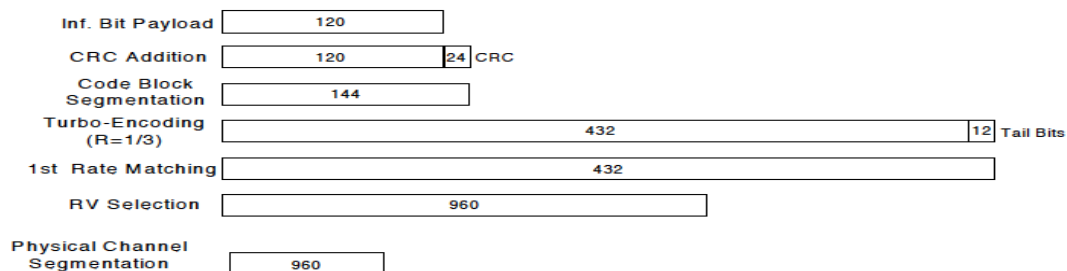
Parameter During Connection setup	Unit	Value
P-CPICH_Ec/Ior	dB	-10
P-CCPCH and SCH_Ec/Ior	dB	-12
PICH_Ec/Ior	dB	-15
HS-PDSCH	dB	off
HS-SCCH_1	dB	off
DPCH_Ec/Ior	dB	-5
OCNS_Ec/Ior	dB	-3.1

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			
	β_c	2/15	11/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	β_d (SF)	64			
	β_c/β_d	2/15	11/15	15/8	15/4
	β_{hs}	4/15	24/15	30/15	30/15
HSDPA Specific Settings	MPR (dB)	0	0	0.5	0.5
	DACK	8			
	DNAK	8			
	DCQI	8			
	Ack-Nack Repetition factor	3			
	CQI Feedback	4ms			
	CQI Repetition Factor	2			
	$A_{hs} = \beta_{hs}/\beta_c$	30/15			

HSPA+

Since 16QAM is not used for uplink, the uplink Category and release is same as HSUPA, i.e., Rel. 7 Therefore, the RF conducted power is not measured.

W-CDMA Band II Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Max. Pwr (dBm)
W-CDMA Band II	Rel 99	RMC, 12.2 kbps	9262	1852.4	N/A	23.8
			9400	1880.0	N/A	23.8
			9538	1907.6	N/A	23.8
	HSDPA	Subtest 1	9262	1852.4	0	23.8
			9400	1880.0	0	23.7
			9538	1907.6	0	23.8
		Subtest 2	9262	1852.4	0	23.7
			9400	1880.0	0	23.8
			9538	1907.6	0	23.8
		Subtest 3	9262	1852.4	0.5	23.3
			9400	1880.0	0.5	23.4
			9538	1907.6	0.5	23.4
		Subtest 4	9262	1852.4	0.5	23.2
			9400	1880.0	0.5	23.3
			9538	1907.6	0.5	23.2
	HSUPA	Subtest 1	9262	1852.4	0	22.2
			9400	1880.0	0	23.0
			9538	1907.6	0	22.2
		Subtest 2	9262	1852.4	2	21.5
			9400	1880.0	2	21.9
			9538	1907.6	2	21.6
		Subtest 3	9262	1852.4	1	22.6
			9400	1880.0	1	22.5
			9538	1907.6	1	21.8
		Subtest 4	9262	1852.4	2	21.8
			9400	1880.0	2	21.9
			9538	1907.6	2	21.8
		Subtest 5	9262	1852.4	0	23.9
			9400	1880.0	0	23.8
			9538	1907.6	0	23.8
	DC-HSDPA	Subtest 1	9262	1852.4	0	23.9
			9400	1880.0	0	23.9
			9538	1907.6	0	23.9
		Subtest 2	9262	1852.4	0	23.9
			9400	1880.0	0	23.9
			9538	1907.6	0	23.9
		Subtest 3	9262	1852.4	0.5	23.4
			9400	1880.0	0.5	23.3
			9538	1907.6	0.5	23.3
		Subtest 4	9262	1852.4	0.5	23.4
			9400	1880.0	0.5	23.3
			9538	1907.6	0.5	23.4

W-CDMA Band IV Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Max. Pwr (dBm)
W-CDMA Band IV	Rel 99	RMC, 12.2 kbps	1312	1712.4	N/A	23.8
			1413	1732.6	N/A	23.8
			1513	1752.6	N/A	23.8
	HSDPA	Subtest 1	1312	1712.4	0	23.8
			1413	1732.6	0	23.8
			1513	1752.6	0	23.9
		Subtest 2	1312	1712.4	0	23.5
			1413	1732.6	0	23.4
			1513	1752.6	0	23.4
		Subtest 3	1312	1712.4	0.5	23.2
			1413	1732.6	0.5	23.1
			1513	1752.6	0.5	23.2
		Subtest 4	1312	1712.4	0.5	23.2
			1413	1732.6	0.5	23.1
			1513	1752.6	0.5	23.2
	HSUPA	Subtest 1	1312	1712.4	0	22.9
			1413	1732.6	0	22.9
			1513	1752.6	0	22.9
		Subtest 2	1312	1712.4	2	21.8
			1413	1732.6	2	21.8
			1513	1752.6	2	21.8
		Subtest 3	1312	1712.4	1	22.1
			1413	1732.6	1	22.1
			1513	1752.6	1	22.0
		Subtest 4	1312	1712.4	2	21.9
			1413	1732.6	2	21.9
			1513	1752.6	2	21.9
		Subtest 5	1312	1712.4	0	23.9
			1413	1732.6	0	23.8
			1513	1752.6	0	23.9
	DC-HSDPA	Subtest 1	1312	1712.4	0	23.9
			1413	1732.6	0	23.8
			1513	1752.6	0	23.8
		Subtest 2	1312	1712.4	0	23.9
			1413	1732.6	0	23.9
			1513	1752.6	0	23.9
		Subtest 3	1312	1712.4	0.5	23.2
			1413	1732.6	0.5	23.1
			1513	1752.6	0.5	23.1
		Subtest 4	1312	1712.4	0.5	23.2
			1413	1732.6	0.5	23.2
			1513	1752.6	0.5	23.2

W-CDMA Band V Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Max. Pwr (dBm)
W-CDMA Band V	Rel 99	RMC, 12.2 kbps	4132	826.4	N/A	24.6
			4183	836.6	N/A	24.5
			4233	846.6	N/A	24.5
	HSDPA	Subtest 1	4132	826.4	0	24.3
			4183	836.6	0	24.2
			4233	846.6	0	24.2
		Subtest 2	4132	826.4	0	24.4
			4183	836.6	0	24.2
			4233	846.6	0	24.3
		Subtest 3	4132	826.4	0.5	23.8
			4183	836.6	0.5	23.8
			4233	846.6	0.5	23.8
		Subtest 4	4132	826.4	0.5	23.9
			4183	836.6	0.5	23.7
			4233	846.6	0.5	23.8
	HSUPA	Subtest 1	4132	826.4	0	23.2
			4183	836.6	0	23.1
			4233	846.6	0	23.3
		Subtest 2	4132	826.4	2	22.2
			4183	836.6	2	22.2
			4233	846.6	2	21.8
		Subtest 3	4132	826.4	1	22.2
			4183	836.6	1	22.1
			4233	846.6	1	22.1
		Subtest 4	4132	826.4	2	22.7
			4183	836.6	2	22.7
			4233	846.6	2	22.6
		Subtest 5	4132	826.4	0	24.4
			4183	836.6	0	24.2
			4233	846.6	0	24.3
	DC-HSDPA	Subtest 1	4132	826.4	0	24.4
			4183	836.6	0	24.5
			4233	846.6	0	24.4
		Subtest 2	4132	826.4	0	24.4
			4183	836.6	0	24.4
			4233	846.6	0	24.4
		Subtest 3	4132	826.4	0.5	23.9
			4183	836.6	0.5	23.8
			4233	846.6	0.5	23.8
		Subtest 4	4132	826.4	0.5	23.9
			4183	836.6	0.5	23.8
			4233	846.6	0.5	23.8

9.3. CDMA

1x Advanced Setup Procedures used to establish the test signals

Call box setup procedure

- Protocol Rev > 6 (IS-2000-0)
- System ID: 331; NID: 65535, Reg. Ch. #.:
- Radio Config (RC) > Fwd11,Rvs8
- Service Option (SO) Setup > SO75 (Loopback)
- Traffic Data Rate > Full
- Rvs Power Ctrl > All Up bits (Maximum TxPout)
- Reverse Power Control Mode: 00-200 to 400 bps
- Smart blanking was disabled.

CDMA BC0 Measured Results

Band	Mode		Ch No.	Freq. (MHz)	Max. Pwr (dBm)
BC 0	1xRTT	RC1 SO55 (Loopback)	1013	824.70	24.7
			384	836.52	24.6
			777	848.31	24.7
		RC3 SO55 (Loopback)	1013	824.70	24.6
			384	836.52	24.6
			777	848.31	24.6
		RC3 SO32 (+F-SCH)	1013	824.70	24.6
			384	836.52	24.6
			777	848.31	24.6
	1xAdvanced	Fwd11/Rvs8 SO75 (Loopback)	1013	824.70	24.7
			384	836.52	24.6
			777	848.31	24.5
	1xEVDO Rel. 0	FTAP Rate: 307.2 kbps(2 slot, QPSK) RTAP Rate: 153.6 kbps	1013	824.70	24.5
			384	836.52	24.4
			777	848.31	24.4
	1xEVDO Rev. A	FETAP: 307.2k, QPSK/ ACK RETAP: 4096	1013	824.70	24.5
			384	836.52	24.4
			777	848.31	24.4

CDMA BC1 Measured Results

Band	Mode		Ch No.	Freq. (MHz)	Max. Pwr (dBm)
BC 1	1xRTT	RC1 SO55 (Loopback)	25	1851.25	24.7
			600	1880.00	24.7
			1175	1908.75	24.7
		RC3 SO55 (Loopback)	25	1851.25	24.6
			600	1880.00	24.6
			1175	1908.75	24.6
		RC3 SO32 (+F-SCH)	25	1851.25	24.7
			600	1880.00	24.6
			1175	1908.75	24.5
	1xAdvanced	Fwd11/Rvs8 SO75 (Loopback)	25	1851.25	24.7
			600	1880.00	24.5
			1175	1908.75	24.6
	1xEVDO Rel. 0	FTAP Rate: 307.2 kbps(2 slot, QPSK) RTAP Rate: 153.6 kbps	25	1851.25	23.7
			600	1880.00	23.7
			1175	1908.75	23.7
	1xEVDO Rev. A	FETAP: 307.2k, QPSK/ ACK RETAP: 4096	25	1851.25	23.6
			600	1880.00	23.7
			1175	1908.75	23.7

CDMA BC10 Measured Results

Band	Mode		Ch No.	Freq. (MHz)	Max. Pwr (dBm)
BC 10	1xRTT	RC1 SO55 (Loopback)	476	817.9	24.6
			580	820.5	24.6
			684	823.1	24.6
		RC3 SO55 (Loopback)	476	817.9	24.6
			580	820.5	24.6
			684	823.1	24.5
		RC3 SO32 (+F-SCH)	476	817.9	24.6
			580	820.5	24.6
			684	823.1	24.6
	1xAdvanced	Fwd11/Rvs8 SO75 (Loopback)	476	817.9	24.6
			580	820.5	24.6
			684	823.1	24.6
	1xEVDO Rel. 0	FTAP Rate: 307.2 kbps(2 slot, QPSK) RTAP Rate: 153.6 kbps	476	817.9	24.5
			580	820.5	24.5
			684	823.1	24.5
	1xEVDO Rev. A	FETAP: 307.2k, QPSK/ ACK RETAP: 4096	476	817.9	24.5
			580	820.5	24.5
			684	823.1	24.4

9.4. 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 Signaling 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 6.6.3.3.2	13	10	Table 6.2.4-2	Table 6.2.4-2
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23 ¹	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5
..					
NS_32	-	-	-	-	-

Note 1: Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region.

LTE Band 2 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1860 MHz	1880 MHz	1900 MHz
LTE Band 2	20	QPSK	1	0	0	23.4	23.4	23.4
			1	49	0	23.2	23.4	23.4
			1	99	0	23.1	23.4	23.4
			50	0	1	22.4	22.2	22.3
			50	24	1	22.3	22.2	22.4
			50	50	1	22.3	22.3	22.4
		16QAM	100	0	1	22.3	22.3	22.4
			1	0	1	22.4	22.4	22.4
			1	49	1	22.4	22.2	22.4
			1	99	1	22.1	22.2	22.4
			50	0	2	21.2	21.0	21.2
			50	24	2	21.2	21.0	21.3
			50	50	2	21.2	21.2	21.2
			100	0	2	21.2	21.2	21.3
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1857.5 MHz	1880 MHz	1902.5 MHz
LTE Band 2	15	QPSK	1	0	0	23.4	23.4	23.4
			1	37	0	23.2	23.4	23.4
			1	74	0	23.2	23.3	23.3
			36	0	1	22.1	22.1	22.3
			36	20	1	22.1	22.3	22.3
			36	39	1	22.2	22.2	22.2
		16QAM	75	0	1	22.2	22.2	22.4
			1	0	1	22.4	22.4	22.4
			1	37	1	22.1	22.4	22.3
			1	74	1	22.1	22.3	22.3
			36	0	2	21.0	21.0	21.2
			36	20	2	21.0	21.1	21.2
			36	39	2	21.0	21.1	21.1
			75	0	2	21.0	21.0	21.2
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1855 MHz	1880 MHz	1905 MHz
LTE Band 2	10	QPSK	1	0	0	23.3	23.3	23.4
			1	25	0	23.4	23.1	23.3
			1	49	0	23.3	23.1	23.1
			25	0	1	22.0	22.0	21.9
			25	12	1	22.2	22.2	21.9
			25	25	1	22.0	22.0	21.9
		16QAM	50	0	1	22.1	22.0	22.0
			1	0	1	22.4	22.3	22.3
			1	25	1	22.2	22.2	22.2
			1	49	1	22.3	22.2	22.3
			25	0	2	20.8	20.9	20.7
			25	12	2	21.0	20.9	20.8
			25	25	2	20.8	20.8	20.9
			50	0	2	20.9	20.8	20.9

LTE Band 2 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1852.5 MHz	1880 MHz	1907.5 MHz
LTE Band 2	5	QPSK	1	0	0	23.4	23.4	23.2
			1	12	0	23.2	23.1	23.2
			1	24	0	23.4	23.3	23.0
			12	0	1	22.0	22.0	22.0
			12	7	1	22.0	22.0	22.0
			12	13	1	22.0	22.1	22.0
		16QAM	25	0	1	22.0	22.0	22.1
			1	0	1	22.4	22.1	21.9
			1	12	1	22.4	22.1	22.0
			1	24	1	22.4	22.0	21.9
			12	0	2	21.0	20.9	20.8
			12	7	2	21.0	21.0	20.8
			12	13	2	21.0	21.0	20.9
			25	0	2	20.9	20.9	20.9
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1851.5 MHz	1880 MHz	1908.5 MHz
LTE Band 2	3	QPSK	1	0	0	23.3	23.2	23.2
			1	8	0	23.3	23.3	23.4
			1	14	0	23.2	23.2	23.1
			8	0	1	22.0	22.1	22.0
			8	4	1	22.2	22.0	22.0
			8	7	1	22.1	22.0	21.9
		16QAM	15	0	1	22.1	22.0	22.0
			1	0	1	22.3	22.2	22.3
			1	8	1	22.4	22.2	22.4
			1	14	1	22.4	22.4	22.2
			8	0	2	20.9	20.9	20.7
			8	4	2	21.0	20.9	20.7
			8	7	2	20.9	20.8	20.7
			15	0	2	20.9	20.9	20.7
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1850.7 MHz	1880 MHz	1909.3 MHz
LTE Band 2	1.4	QPSK	1	0	0	23.4	23.3	23.0
			1	3	0	23.4	23.3	23.2
			1	5	0	23.4	23.2	23.0
			3	0	0	23.2	23.2	22.9
			3	1	0	23.2	23.3	23.0
			3	3	0	23.2	23.2	23.0
		16QAM	6	0	1	22.0	22.0	22.0
			1	0	1	22.3	22.3	21.9
			1	3	1	22.2	22.4	22.1
			1	5	1	22.3	22.3	21.8
			3	0	1	21.8	22.0	21.8
			3	1	1	21.9	22.0	21.8
			3	3	1	21.9	21.9	21.9
			6	0	2	20.8	20.8	20.8

LTE Band 4 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1732.5 MHz		
LTE Band 4	20	QPSK	1	0	0	23.4		
			1	49	0	23.2		
			1	99	0	23.1		
			50	0	1	22.2		
			50	24	1	22.1		
			50	50	1	22.0		
			100	0	1	22.1		
		16QAM	1	0	1	22.2		
			1	49	1	22.0		
			1	99	1	21.9		
			50	0	2	21.1		
			50	24	2	21.0		
			50	50	2	20.9		
			100	0	2	21.0		
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1717.5 MHz	1732.5 MHz	1747.5 MHz
LTE Band 4	15	QPSK	1	0	0	23.4	23.4	23.3
			1	37	0	23.2	23.4	23.4
			1	74	0	23.1	23.3	23.4
			36	0	1	22.1	22.1	22.3
			36	20	1	22.1	22.1	22.3
			36	39	1	22.0	22.0	22.3
			75	0	1	22.0	22.0	22.3
		16QAM	1	0	1	22.0	22.1	22.3
			1	37	1	22.0	22.1	22.3
			1	74	1	21.7	22.0	22.3
			36	0	2	20.9	21.0	21.1
			36	20	2	21.0	21.1	21.1
			36	39	2	20.9	21.0	21.1
			75	0	2	20.9	21.0	21.1
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1715 MHz	1732.5 MHz	1750 MHz
LTE Band 4	10	QPSK	1	0	0	23.4	23.3	23.2
			1	25	0	23.4	23.0	23.3
			1	49	0	23.1	23.1	23.1
			25	0	1	22.1	22.0	22.0
			25	12	1	22.0	22.0	22.0
			25	25	1	22.1	21.9	22.0
			50	0	1	22.2	21.9	22.0
		16QAM	1	0	1	22.3	22.3	22.1
			1	25	1	22.2	21.7	22.0
			1	49	1	22.1	22.0	22.1
			25	0	2	21.1	20.8	20.9
			25	12	2	21.0	20.9	21.0
			25	25	2	21.0	20.7	21.0
			50	0	2	21.0	20.8	20.9

Note(s):

20 MHz Bandwidth does not support at least three non-overlapping channels in certain channel bandwidths. When a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing per KDB 941225 D05 SAR for LTE Devices

LTE Band 4 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1712.5 MHz	1732.5 MHz	1752.5 MHz
LTE Band 4	5	QPSK	1	0	0	23.4	23.4	23.4
			1	12	0	23.2	23.3	23.0
			1	24	0	23.3	23.4	23.4
			12	0	1	22.0	21.9	22.1
			12	7	1	22.1	21.9	22.1
			12	13	1	22.1	22.0	22.1
			25	0	1	22.1	22.0	22.1
		16QAM	1	0	1	22.2	22.3	22.1
			1	12	1	21.8	21.6	22.1
			1	24	1	22.1	22.3	22.3
			12	0	2	20.9	21.0	21.0
			12	7	2	21.0	20.9	21.1
			12	13	2	21.0	20.9	21.0
			25	0	2	21.0	20.9	21.0
LTE Band 4	3	QPSK	1	0	0	23.2	23.2	23.4
			1	8	0	23.4	23.2	23.3
			1	14	0	23.1	23.0	23.4
			8	0	1	22.1	22.0	22.0
			8	4	1	22.1	21.9	22.2
			8	7	1	22.0	21.9	22.1
			15	0	1	22.1	21.9	22.1
		16QAM	1	0	1	22.4	21.7	22.4
			1	8	1	22.4	22.0	22.2
			1	14	1	22.2	21.7	22.4
			8	0	2	21.0	20.8	20.9
			8	4	2	20.9	20.9	21.0
			8	7	2	20.9	20.9	20.9
			15	0	2	21.0	20.7	21.1
LTE Band 4	1.4	QPSK	1	0	0	23.4	23.2	23.2
			1	3	0	23.3	23.1	23.3
			1	5	0	23.3	23.0	23.4
			3	0	0	23.2	23.1	23.1
			3	1	0	23.3	23.0	23.3
			3	3	0	23.3	23.0	23.1
			6	0	1	22.0	21.8	22.1
		16QAM	1	0	1	22.4	21.7	22.1
			1	3	1	22.2	21.8	22.3
			1	5	1	22.2	21.7	22.1
			3	0	1	21.9	21.8	21.9
			3	1	1	21.9	21.7	22.0
			3	3	1	21.9	21.7	21.9
			6	0	2	21.0	20.7	21.0

LTE Band 5 Measured Results

SAR for LTE Band 5 is covered by LTE Band 26 due to similar frequency range, same maximum tune-up limit and same channel bandwidth.

LTE Band 7 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						2510 MHz	2535 MHz	2560 MHz
LTE Band 7	20	QPSK	1	0	0	23.5	23.5	22.8
			1	49	0	23.5	23.4	23.0
			1	99	0	23.2	23.3	22.8
			50	0	1	22.5	22.3	22.1
			50	24	1	22.4	22.3	22.1
			50	50	1	22.3	22.2	22.0
			100	0	1	22.5	22.3	22.0
		16QAM	1	0	1	22.4	22.0	21.9
			1	49	1	22.3	22.0	22.2
			1	99	1	22.1	21.8	21.9
			50	0	2	21.6	21.3	21.1
			50	24	2	21.4	21.3	21.1
			50	50	2	21.6	21.2	20.8
			100	0	2	21.4	21.2	21.1
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						2507.5 MHz	2535 MHz	2562.5 MHz
LTE Band 7	15	QPSK	1	0	0	23.2	23.4	23.2
			1	37	0	23.4	23.4	23.3
			1	74	0	23.3	23.1	23.1
			36	0	1	22.5	22.4	22.1
			36	20	1	22.6	22.4	22.2
			36	39	1	22.4	22.3	22.0
			75	0	1	22.5	22.3	22.2
		16QAM	1	0	1	22.4	21.9	21.7
			1	37	1	22.3	22.0	21.9
			1	74	1	22.4	21.7	21.7
			36	0	2	21.5	21.3	21.1
			36	20	2	21.5	21.3	21.3
			36	39	2	21.4	21.2	21.1
			75	0	2	21.4	21.3	21.1
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						2505 MHz	2535 MHz	2565 MHz
LTE Band 7	10	QPSK	1	0	0	23.4	23.3	23.4
			1	25	0	23.5	23.4	23.7
			1	49	0	23.0	23.1	23.3
			25	0	1	22.4	22.3	22.2
			25	12	1	22.4	22.3	22.2
			25	25	1	22.4	22.3	22.2
			50	0	1	22.4	22.3	22.2
		16QAM	1	0	1	22.3	22.4	22.0
			1	25	1	22.2	21.9	22.0
			1	49	1	22.3	22.0	21.9
			25	0	2	21.3	21.2	21.3
			25	12	2	21.4	21.3	21.3
			25	25	2	21.4	21.3	21.2
			50	0	2	21.3	21.2	21.2

LTE Band 7 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						2502.5 MHz	2535 MHz	2567.5 MHz
LTE Band 7	5	QPSK	1	0	0	23.5	23.3	23.4
			1	12	0	23.4	23.1	23.1
			1	24	0	23.3	23.1	23.1
			12	0	1	22.4	22.2	22.3
			12	7	1	22.3	22.3	22.3
			12	13	1	22.3	22.2	22.2
			25	0	1	22.3	22.2	22.2
		16QAM	1	0	1	22.4	21.9	22.4
			1	12	1	22.5	22.0	22.0
			1	24	1	22.4	21.9	22.3
			12	0	2	21.3	21.1	21.3
			12	7	2	21.2	21.2	21.3
			12	13	2	21.3	21.1	21.2
			25	0	2	21.2	21.3	21.2

LTE Band 12 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						707.5 MHz		
LTE Band 12	10	QPSK	1	0	0		24.0	
			1	25	0		24.2	
			1	49	0		23.8	
			25	0	1		22.8	
			25	12	1		22.8	
			25	25	1		22.8	
		16QAM	50	0	1		22.8	
			1	0	1		22.4	
			1	25	1		22.5	
			1	49	1		22.3	
			25	0	2		21.9	
			25	12	2		21.9	
			25	25	2		21.8	
			50	0	2		21.8	
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						701.5 MHz	707.5 MHz	713.5 MHz
LTE Band 12	5	QPSK	1	0	0	23.7	23.7	23.9
			1	12	0	23.9	23.8	23.6
			1	24	0	23.7	23.7	23.7
			12	0	1	22.6	22.7	22.8
			12	7	1	22.7	22.8	22.8
			12	13	1	22.7	22.7	22.7
			25	0	1	22.6	22.7	22.7
		16QAM	1	0	1	22.4	22.2	22.9
			1	12	1	22.7	22.5	22.3
			1	24	1	22.6	22.2	22.7
			12	0	2	21.6	21.7	21.8
			12	7	2	21.7	21.8	21.7
			12	13	2	21.7	21.7	21.7
			25	0	2	21.6	21.8	21.7
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						700.5 MHz	707.5 MHz	714.5 MHz
LTE Band 12	3	QPSK	1	0	0	23.7	23.8	23.7
			1	8	0	24.0	24.1	23.8
			1	14	0	23.8	23.8	23.8
			8	0	1	22.7	22.9	22.6
			8	4	1	22.8	22.9	22.7
			8	7	1	22.8	22.8	22.6
			15	0	1	22.7	22.8	22.6
		16QAM	1	0	1	22.5	22.3	22.7
			1	8	1	22.8	22.4	22.2
			1	14	1	22.5	22.2	22.8
			8	0	2	21.7	21.9	21.5
			8	4	2	21.7	21.9	21.6
			8	7	2	21.8	21.8	21.5
			15	0	2	21.7	21.7	21.7

Note(s):

10 MHz Bandwidth does not support at least three non-overlapping channels in certain channel bandwidths. When a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing per KDB 941225 D05 SAR for LTE Devices

LTE Band 12 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						699.7 MHz	707.5 MHz	715.3 MHz
LTE Band 12	1.4	QPSK	1	0	0	24.0	23.9	23.7
			1	3	0	23.9	23.7	23.8
			1	5	0	24.0	23.9	23.7
			3	0	0	23.9	23.8	23.6
			3	1	0	23.8	23.9	23.7
			3	3	0	23.7	23.8	23.5
			6	0	1	22.8	22.7	22.5
		16QAM	1	0	1	22.7	22.2	22.3
			1	3	1	22.5	22.3	22.6
			1	5	1	22.5	22.2	22.4
			3	0	1	22.3	22.3	22.2
			3	1	1	22.2	22.3	22.2
			3	3	1	22.2	22.3	22.3
			6	0	2	21.8	21.8	21.7

LTE Band 13 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)
						782 MHz
LTE Band 13	10	QPSK	1	0	0	24.2
			1	25	0	24.2
			1	49	0	24.0
			25	0	1	22.8
			25	12	1	22.8
			25	25	1	22.9
			50	0	1	22.9
		16QAM	1	0	1	22.7
			1	25	1	22.6
			1	49	1	22.6
			25	0	2	21.7
			25	12	2	21.7
			25	25	2	21.7
			50	0	2	21.6
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)
						782 MHz
LTE Band 13	5	QPSK	1	0	0	24.0
			1	12	0	24.0
			1	24	0	24.0
			12	0	1	22.7
			12	7	1	22.8
			12	13	1	22.8
			25	0	1	22.7
		16QAM	1	0	1	22.7
			1	12	1	23.0
			1	24	1	22.9
			12	0	2	21.5
			12	7	2	21.6
			12	13	2	21.6
			25	0	2	21.4

Note(s):

10/5 MHz Bandwidths does not support at least three non-overlapping channels in certain channel bandwidths. When a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing per KDB 941225 D05 SAR for LTE Devices

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.

LTE Band 25 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1860 MHz	1882.5 MHz	1905 MHz
LTE Band 25	20	QPSK	1	0	0	23.4	23.4	23.4
			1	49	0	23.2	23.4	23.4
			1	99	0	23.1	23.4	23.4
			50	0	1	22.4	22.2	22.3
			50	24	1	22.3	22.2	22.4
			50	50	1	22.3	22.3	22.4
			100	0	1	22.3	22.3	22.4
		16QAM	1	0	1	22.4	22.4	22.4
			1	49	1	22.4	22.2	22.4
			1	99	1	22.1	22.2	22.4
			50	0	2	21.2	21.0	21.2
			50	24	2	21.2	21.0	21.3
			50	50	2	21.2	21.2	21.2
			100	0	2	21.2	21.2	21.3
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1857.5 MHz	1882.5 MHz	1907.5 MHz
LTE Band 25	15	QPSK	1	0	0	23.4	23.4	23.4
			1	37	0	23.2	23.4	23.4
			1	74	0	23.2	23.3	23.3
			36	0	1	22.1	22.1	22.3
			36	20	1	22.1	22.3	22.3
			36	39	1	22.2	22.2	22.2
			75	0	1	22.2	22.2	22.4
		16QAM	1	0	1	22.4	22.4	22.4
			1	37	1	22.1	22.4	22.3
			1	74	1	22.1	22.3	22.3
			36	0	2	21.0	21.0	21.2
			36	20	2	21.0	21.1	21.2
			36	39	2	21.0	21.1	21.1
			75	0	2	21.0	21.0	21.2
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1855 MHz	1882.5 MHz	1910 MHz
LTE Band 25	10	QPSK	1	0	0	23.3	23.3	23.4
			1	25	0	23.4	23.1	23.3
			1	49	0	23.3	23.1	23.1
			25	0	1	22.0	22.0	21.9
			25	12	1	22.2	22.2	21.9
			25	25	1	22.0	22.0	21.9
			50	0	1	22.1	22.0	22.0
		16QAM	1	0	1	22.4	22.3	22.3
			1	25	1	22.2	22.2	22.2
			1	49	1	22.3	22.2	22.3
			25	0	2	20.8	20.9	20.7
			25	12	2	21.0	20.9	20.8
			25	25	2	20.8	20.8	20.9
			50	0	2	20.9	20.8	20.9

LTE Band 25 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1852.5 MHz	1882.5 MHz	1912.5 MHz
LTE Band 25	5	QPSK	1	0	0	23.4	23.4	23.2
			1	12	0	23.2	23.1	23.2
			1	24	0	23.4	23.3	23.0
			12	0	1	22.0	22.0	22.0
			12	7	1	22.0	22.0	22.0
			12	13	1	22.0	22.1	22.0
			25	0	1	22.0	22.0	22.1
		16QAM	1	0	1	22.4	22.1	21.9
			1	12	1	22.4	22.1	22.0
			1	24	1	22.4	22.0	21.9
			12	0	2	21.0	20.9	20.8
			12	7	2	21.0	21.0	20.8
			12	13	2	21.0	21.0	20.9
			25	0	2	20.9	20.9	20.9
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1851.5 MHz	1882.5 MHz	1913.5 MHz
LTE Band 25	3	QPSK	1	0	0	23.3	23.2	23.2
			1	8	0	23.3	23.3	23.4
			1	14	0	23.2	23.2	23.1
			8	0	1	22.0	22.1	22.0
			8	4	1	22.2	22.0	22.0
			8	7	1	22.1	22.0	21.9
			15	0	1	22.1	22.0	22.0
		16QAM	1	0	1	22.3	22.2	22.3
			1	8	1	22.4	22.2	22.4
			1	14	1	22.4	22.4	22.2
			8	0	2	20.9	20.9	20.7
			8	4	2	21.0	20.9	20.7
			8	7	2	20.9	20.8	20.7
			15	0	2	20.9	20.9	20.7
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1850.7 MHz	1882.5 MHz	1914.3 MHz
LTE Band 25	1.4	QPSK	1	0	0	23.4	23.3	23.0
			1	3	0	23.4	23.3	23.2
			1	5	0	23.4	23.2	23.0
			3	0	0	23.2	23.2	22.9
			3	1	0	23.2	23.3	23.0
			3	3	0	23.2	23.2	23.0
			6	0	1	22.0	22.0	22.0
		16QAM	1	0	1	22.3	22.3	21.9
			1	3	1	22.2	22.4	22.1
			1	5	1	22.3	22.3	21.8
			3	0	1	21.8	22.0	21.8
			3	1	1	21.9	22.0	21.8
			3	3	1	21.9	21.9	21.9
			6	0	2	20.8	20.8	20.8

LTE Band 26 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						831.5 MHz		
LTE Band 26	15	QPSK	1	0	0		23.8	
			1	37	0		24.1	
			1	74	0		23.6	
			36	0	1		22.8	
			36	20	1		22.8	
			36	39	1		22.8	
			75	0	1		22.7	
		16QAM	1	0	1		22.6	
			1	37	1		22.6	
			1	74	1		22.4	
			36	0	2		21.7	
			36	20	2		21.7	
			36	39	2		21.7	
			75	0	2		21.7	
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						819 MHz	831.5 MHz	844 MHz
LTE Band 26	10	QPSK	1	0	0	23.8	23.8	23.6
			1	25	0	23.9	23.6	23.7
			1	49	0	23.7	23.6	23.4
			25	0	1	22.6	22.6	22.3
			25	12	1	22.6	22.6	22.3
			25	25	1	22.5	22.5	22.2
			50	0	1	22.5	22.6	22.4
		16QAM	1	0	1	22.7	22.8	22.3
			1	25	1	22.6	22.2	22.7
			1	49	1	22.6	22.4	22.7
			25	0	2	21.5	21.5	21.4
			25	12	2	21.6	21.5	21.4
			25	25	2	21.4	21.4	21.4
			50	0	2	21.4	21.4	21.4
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						816.5 MHz	831.5 MHz	846.5 MHz
LTE Band 26	5	QPSK	1	0	0	23.8	23.7	23.8
			1	12	0	23.7	23.7	23.7
			1	24	0	23.6	23.5	23.7
			12	0	1	22.7	22.5	22.8
			12	7	1	22.7	22.5	22.8
			12	13	1	22.5	22.6	22.7
			25	0	1	22.5	22.6	22.7
		16QAM	1	0	1	22.7	22.3	22.8
			1	12	1	23.2	22.4	23.1
			1	24	1	22.6	22.3	22.7
			12	0	2	21.6	21.4	21.7
			12	7	2	21.6	21.4	21.7
			12	13	2	21.3	21.4	21.7
			25	0	2	21.4	21.5	21.6

Note(s):

15 MHz Bandwidth does not support at least three non-overlapping channels in certain channel bandwidths. When a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing per KDB 941225 D05 SAR for LTE Devices

LTE Band 26 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						815.5 MHz	831.5 MHz	847.5 MHz
LTE Band 26	3	QPSK	1	0	0	23.9	23.8	23.4
			1	8	0	23.9	24.0	23.7
			1	14	0	23.6	23.7	23.3
			8	0	1	22.8	22.8	22.4
			8	4	1	22.9	22.8	22.4
			8	7	1	22.7	22.8	22.4
			15	0	1	22.8	22.7	22.4
		16QAM	1	0	1	23.0	22.7	22.8
			1	8	1	23.0	22.7	22.3
			1	14	1	22.8	22.5	22.6
			8	0	2	21.8	21.8	21.3
			8	4	2	21.8	21.8	21.3
			8	7	2	21.8	21.8	21.3
			15	0	2	21.9	21.7	21.4
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						814.7 MHz	831.5 MHz	848.3 MHz
LTE Band 26	1.4	QPSK	1	0	0	24.0	23.7	23.6
			1	3	0	24.0	23.7	23.5
			1	5	0	23.9	23.7	23.5
			3	0	0	23.8	23.7	23.3
			3	1	0	23.8	23.7	23.3
			3	3	0	23.7	23.7	23.3
			6	0	1	22.8	22.7	22.4
		16QAM	1	0	1	23.0	22.4	22.7
			1	3	1	22.9	22.7	22.5
			1	5	1	23.0	22.4	22.5
			3	0	1	22.6	22.5	22.3
			3	1	1	22.5	22.6	22.2
			3	3	1	22.4	22.5	22.2
			6	0	2	21.9	21.8	21.4

LTE Band 41 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)				
						2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz
LTE Band 41	20	QPSK	1	0	0	22.8	23.2	23.2	23.1	23.1
			1	49	0	22.9	23.1	23.0	22.9	23.0
			1	99	0	22.8	22.9	23.1	23.1	22.8
			50	0	1	21.8	21.8	21.7	21.6	21.7
			50	24	1	21.8	21.8	21.7	21.6	21.7
			50	50	1	21.7	21.7	21.7	21.6	21.7
			100	0	1	21.8	21.8	21.6	21.6	21.7
		16QAM	1	0	1	22.1	22.1	21.7	21.6	21.7
			1	49	1	22.0	21.9	21.6	21.6	21.6
			1	99	1	21.8	22.0	21.5	21.3	21.4
			50	0	2	20.7	20.8	20.7	20.7	20.8
			50	24	2	20.7	21.0	20.7	20.6	20.7
			50	50	2	20.7	20.7	20.7	20.6	20.6
			100	0	2	20.8	20.9	20.8	20.7	20.7
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)				
						2503.5 MHz	2548.3 MHz	2593 MHz	2637.8 MHz	2682.5 MHz
LTE Band 41	15	QPSK	1	0	0	22.9	22.9	22.6	23.0	23.0
			1	37	0	22.8	22.9	22.7	22.9	22.8
			1	74	0	22.9	22.8	22.6	22.8	22.7
			36	0	1	21.7	21.7	21.7	21.6	21.7
			36	20	1	21.8	21.9	21.7	21.6	21.7
			36	39	1	21.7	21.7	21.6	21.5	21.5
			75	0	1	21.7	21.7	21.6	21.5	21.6
		16QAM	1	0	1	22.0	21.7	21.6	22.2	21.6
			1	37	1	21.8	21.8	21.4	21.9	21.5
			1	74	1	21.7	21.6	21.4	21.7	21.3
			36	0	2	20.7	20.7	20.8	20.6	20.7
			36	20	2	20.8	20.8	20.7	20.6	20.6
			36	39	2	20.7	20.7	20.6	20.6	20.5
			75	0	2	20.6	20.8	20.6	20.5	20.6
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)				
						2501 MHz	2547 MHz	2593 MHz	2639 MHz	2685 MHz
LTE Band 41	10	QPSK	1	0	0	23.1	23.1	22.8	22.8	22.8
			1	25	0	22.9	22.9	22.7	22.6	22.6
			1	49	0	23.1	23.1	22.6	22.6	22.6
			25	0	1	21.7	21.6	21.4	21.4	21.4
			25	12	1	21.7	21.7	21.5	21.4	21.5
			25	25	1	21.7	21.7	21.6	21.4	21.3
			50	0	1	21.7	21.8	21.5	21.3	21.4
		16QAM	1	0	1	21.5	21.8	21.6	21.3	21.6
			1	25	1	21.4	21.8	21.8	21.2	21.8
			1	49	1	21.7	21.8	21.7	21.2	21.6
			25	0	2	20.5	20.8	20.5	20.4	20.5
			25	12	2	20.7	20.8	20.7	20.6	20.5
			25	25	2	20.8	20.9	20.6	20.4	20.3
			50	0	2	20.7	20.8	20.5	20.5	20.4

LTE Band 41 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)				
						2498.5 MHz	2545.8 MHz	2593 MHz	2640.3 MHz	2687.5 MHz
LTE Band 41	5	QPSK	1	0	0	23.0	22.9	22.6	22.8	23.2
			1	12	0	22.6	22.7	22.7	22.6	22.7
			1	24	0	23.0	23.2	22.9	22.8	22.9
			12	0	1	21.5	21.7	21.5	21.5	21.5
			12	7	1	21.6	21.6	21.5	21.5	21.4
			12	13	1	21.6	21.7	21.5	21.4	21.4
			25	0	1	21.5	21.6	21.5	21.3	21.3
		16QAM	1	0	1	21.6	22.0	21.6	21.4	21.7
			1	12	1	21.4	21.7	21.7	21.5	21.5
			1	24	1	21.6	22.0	21.6	21.5	21.7
			12	0	2	20.7	20.7	20.5	20.5	20.5
			12	7	2	20.6	20.7	20.4	20.5	20.5
			12	13	2	20.5	20.7	20.5	20.4	20.4
			25	0	2	20.7	20.7	20.4	20.5	20.3

LTE Release 10 Carrier Aggregation

The following power measurements were performed with a single carrier uplink; CA for this particular project only supports one (1) uplink and two (2) downlinks.

LTE CA combinations			PCC (UL)				SCC (DL)			LTE Rel 10 Tx. Power [dBm]
PCC	+	SCC	Bandwidth (MHz)	Frequency (MHz)	Channel	RB/Offset	Bandwidth (MHz)	Frequency (MHz)	Channel	
2	+	13	20	1880	18900	1/0	10	751	5230	23.40
4	+	13	20	1732.5	20175	1/0	10	751	5230	23.40
13	+	2	10	782	23230	1/0	20	1960	900	24.15
13	+	4	10	782	23230	1/0	20	2132.5	2175	24.11
2	+	4	20	1880	18900	1/0	20	2132.5	2175	23.40
4	+	2	20	1732.5	20175	1/0	20	1960	900	23.40
2	+	17	10	1880	18900	1/0	10	740	5790	23.35
17	+	2	10	710	23790	1/25	20	1960	900	24.13
4	+	17	10	1732.5	20175	1/0	10	740	5790	23.35
17	+	4	10	710	23790	1/25	20	2132.5	2175	24.18
2	+	29	20	1880	18900	1/0	10	722.5	9715	23.34
4	+	29	20	1732.5	20175	1/0	10	722.5	9715	23.40
2	+	5	20	1880	18900	1/0	10	881.5	2525	23.36
5	+	2	10	836.5	20525	1/0	20	1960	900	24.19
4	+	5	20	1732.5	20175	1/0	10	881.5	2525	23.40
5	+	4	10	836.5	20525	1/0	20	2132.5	2175	24.20
2	+	12	20	1880	18900	1/0	10	737.5	5095	23.35
12	+	2	10	707.5	23095	1/25	20	1960	900	24.19
4	+	12	20	1732.5	20175	1/0	10	737.5	5095	23.38
12	+	4	10	707.5	23095	1/25	20	2132.5	2175	24.20
4	+	7	10	1732.5	20175	1/0	20	2655	3100	23.40
7	+	4	20	2535	21100	1/0	20	2132.5	2175	23.62
2	+	2	20	1880	18900	1/0	20	1960	900	23.40
4	+	4	20	1732.5	20175	1/0	20	2132.5	2175	23.40
41	+	41	20	2549.5	40185	1/0	20MHz	2593	40620	23.14

Note:

SAR is excluded for Carrier Aggregation when measured power does not exceed LTE Release 8 by more than a $\frac{1}{4}$ dB.

9.5. Wi-Fi 2.4GHz (DTS Band)

Measured Results

Antenna	Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)	Note(s)
SISO Core 0 (Main)	2.4	802.11b	1 Mbps	1	2412	18.0	18	Yes	
				6	2437	17.5			
				11	2462	17.5			
		802.11g	6 Mbps	1	2412	Not Required	15.5	No	1
				6	2437		16.5		
				11	2462		15.5		
		802.11n (HT20)	6.5 Mbps	1	2412		15.5	No	1
				6	2437		16.5		
				11	2462		15.5		
		802.11ac (VHT20)	6.5 Mbps	1	2412		15.5	No	1
				6	2437		16.5		
				11	2462		15.5		
SISO Core 1 (Diversity)	2.4	802.11b	1 Mbps	1	2412	17.9	18	Yes	
				6	2437	17.5			
				11	2462	17.7			
		802.11g	6 Mbps	1	2412	Not Required	15.5	No	1
				6	2437		16.5		
				11	2462		15.5		
		802.11n (HT20)	6.5 Mbps	1	2412		15.5	No	1
				6	2437		16.5		
				11	2462		15.5		
		802.11n (HT20)	6.5 Mbps	1	2412		15.5	No	1
				6	2437		16.5		
				11	2462		15.5		

Note(s):

- Output Power and SAR is not required for 802.11g/n HT20/ac VHT20 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 ≤ 1.2 W/kg.

9.6. Wi-Fi 5GHz (U-NII Bands)

MIMO Measured Results

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Avg Pwr (dBm)		Max Output Power (dBm)	SAR Test (Yes/No)	Note(s)
					Core 0	Core 1			
5.3 UNII-2A	802.11a	6 Mbps	52	5260	14.3	14.5	15.0	Yes	2
			56	5280	14.3	14.8			
			60	5300	14.3	14.6			
			64	5320	14.2	14.6			
	802.11n/ac (HT20/VHT20)	6.5 Mbps	52	5260	Not Required	Not Required	14.5	No	1
			56	5280					
			60	5300					
			64	5320					
	802.11n/ac (HT40/VHT40)	13.5 Mbps	54	5270			12.5	No	1
			62	5310					
	802.11ac (VHT80)	29.3 Mbps	58	5290			11.5	No	1
5.5 UNII-2C	802.11a	6 Mbps	100	5500	14.7	15.0	15.0	Yes	
			104	5520	14.6	15.0			
			108	5540	14.3	14.6			
			112	5560	14.3	14.6			
			116	5580	14.4	14.6			
	802.11n/ac (HT20/VHT20)	6.5 Mbps	100	5500	Not Required	Not Required	14.5	No	1
			116	5580					
	802.11n/ac (HT40/VHT40)	13.5 Mbps	102	5510			12.5	No	1
			110	5550					
	802.11ac (VHT80)	29.3 Mbps	106	5530			11.5	No	1
5.8 UNII-3	802.11a	6 Mbps	132	5660	14.5	14.9	15.0	Yes	
			136	5680	14.6	14.9			
			140	5700	14.5	14.9			
			144	5720	14.4	14.6			
			149	5745	14.5	14.6			
			153	5765	14.5	14.5			
			157	5785	14.5	14.9			
			161	5805	14.4	14.9			
			165	5825	14.4	14.9			
	802.11n/ac (HT20/VHT20)	6.5 Mbps	140	5700	Not Required	Not Required	14.5	No	1
			144	5720					
			149	5745					
			157	5785					
			161	5805					
	802.11n/ac (HT40/VHT40)	13.5 Mbps	134	5670			12.5	No	1
			142	5710					
			151	5755					
			159	5795					
	802.11ac (VHT80)	29.3 Mbps	138	5690			11.5	No	1
			155	5775					

Note(s):

- Output Power and SAR measurement is not required for 802.11n HT20/HT40 and 802.11acVHT20/40/80 channels when the specified tune-up tolerances for 802.11n HT20/HT40 and 802.11acVHT20/40/80 are lower than 802.11a by more than ½ dB and the measured SAR is ≤ 1.2 W/Kg.
- 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
 - ≤ 1.2 W/kg, SAR is not required for UNII band I
 - > 1.2 W/kg, both bands should be tested independently for SAR.

9.7. Bluetooth

Band (GHz)	Mode	Ch #	Freq. (MHz)	Avg Pwr (dBm)	Avg Pwr (mW)
2.4	V3.0 + EDR, GFSK	0	2402	6.90	4.90
		39	2441	8.80	7.59
		78	2480	7.30	5.37
	V3.0 + EDR, $\pi/4$ DQPSK	0	2402	3.00	2.00
		39	2441	5.30	3.39
		78	2480	3.70	2.34
	V3.0 + EDR, 8-DPSK	0	2402	3.10	2.04
		39	2441	5.50	3.55
		78	2480	3.90	2.45
	V4.0 LE, GFSK	0	2402	-1.47	0.71
		19	2440	1.24	1.33
		39	2480	-0.11	0.97

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:

- ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
- ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
- ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz

KDB 648474 D04 Handset SAR:

With headset attached, when the reported SAR for body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

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 ≤ 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.
- For LTE bands that do not support at least three non-overlapping channels in certain channel bandwidths, test the available non-overlapping channels instead. When a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing; therefore, the requirement for H, M and L channels may not fully apply.

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:

- ≤ 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 ≤ 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 ≤ 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 ≤ 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 ≤ 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

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	Voice	0	Left Touch	190	836.6	33.2	33.1	0.426	0.440	1
			Left Tilt	190	836.6	33.2	33.1	0.232	0.240	
			Right Touch	190	836.6	33.2	33.1	0.337	0.348	
			Right Tilt	190	836.6	33.2	33.1	0.223	0.230	
Head VoIP	GPRS 4 Slots	0	Left Touch	190	836.6	28.2	27.6	0.536	0.610	2
			Left Tilt	190	836.6	28.2	27.6	0.314	0.357	
			Right Touch	190	836.6	28.2	27.6	0.444	0.505	
			Right Tilt	190	836.6	28.2	27.6	0.301	0.342	
Body-worn	Voice	10	Rear	190	836.6	33.2	33.1	0.456	0.471	
			Front	190	836.6	33.2	33.1	0.516	0.533	3
Body-worn(VoIP) & Hotspot	GPRS 4 Slots	10	Rear	190	836.6	28.2	27.6	0.662	0.753	
			Front	128	824.2	28.2	27.8	0.788	0.868	
				190	836.6	28.2	27.6	0.780	0.887	4
				251	848.8	28.2	28.1	0.632	0.651	
Hotspot	GPRS 4 Slots	10	Edge 2	190	836.6	28.2	27.6	0.342	0.389	
			Edge 3	190	836.6	28.2	27.6	0.539	0.613	
			Edge 4	190	836.6	28.2	27.6	0.649	0.738	

10.2. GSM1900

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	Voice	0	Left Touch	661	1880.0	29.7	29.3	0.253	0.276	
			Left Tilt	661	1880.0	29.7	29.3	0.120	0.131	
			Right Touch	661	1880.0	29.7	29.3	0.456	0.498	5
			Right Tilt	661	1880.0	29.7	29.3	0.165	0.180	
Head VoIP	GPRS 4 Slots	0	Left Touch	661	1880.0	24.7	24.5	0.259	0.269	
			Left Tilt	661	1880.0	24.7	24.5	0.141	0.147	
			Right Touch	661	1880.0	24.7	24.5	0.498	0.518	6
			Right Tilt	661	1880.0	24.7	24.5	0.176	0.183	
Body-worn	Voice	10	Rear	661	1880.0	29.7	29.3	0.334	0.365	
			Front	661	1880.0	29.7	29.3	0.421	0.459	7
Body-worn(VoIP) & Hotspot	GPRS 4 Slots	10	Rear	661	1880.0	24.7	24.5	0.379	0.394	
			Front	661	1880.0	24.7	24.5	0.482	0.501	8
Hotspot	GPRS 4 Slots	10	Edge 2	661	1880.0	24.7	24.5	0.476	0.495	
			Edge 3	661	1880.0	24.7	24.5	0.284	0.295	
			Edge 4	661	1880.0	24.7	24.5	0.082	0.085	

10.4. W-CDMA Band II

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	Rel 99 RMC	0	Left Touch	9400	1880.0	23.9	23.8	0.607	0.621	9
			Left Tilt	9400	1880.0	23.9	23.8	0.249	0.255	
			Right Touch	9262	1852.4	23.9	23.8	0.995	1.018	
				9400	1880.0	23.9	23.8	0.967	0.990	
				9538	1907.6	23.9	23.8	0.886	0.907	
			Right Tilt	9400	1880.0	23.9	23.8	0.374	0.383	
Body-worn & Hotspot	Rel 99 RMC	10	Rear	9262	1852.4	23.9	23.8	0.976	0.999	10
				9400	1880.0	23.9	23.8	0.945	0.967	
				9538	1907.6	23.9	23.8	0.924	0.946	
			Front	9262	1852.4	23.9	23.8	1.030	1.054	
				9400	1880.0	23.9	23.8	0.937	0.959	
				9538	1907.6	23.9	23.8	0.898	0.919	
Hotspot	Rel 99 RMC	10	Edge 2	9262	1852.4	23.9	23.8	0.939	0.961	
				9400	1880.0	23.9	23.8	0.948	0.970	
				9538	1907.6	23.9	23.8	1.010	1.034	
			Edge 3	9400	1880.0	23.9	23.8	0.546	0.559	

10.5. W-CDMA Band IV

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	Rel 99 RMC	0	Left Touch	1413	1732.6	23.9	23.8	0.443	0.456	11
			Left Tilt	1413	1732.6	23.9	23.8	0.299	0.308	
			Right Touch	1312	1712.4	23.9	23.8	0.741	0.758	
				1413	1732.6	23.9	23.8	0.861	0.887	
				1513	1752.6	23.9	23.8	1.010	1.026	
			Right Tilt	1413	1732.6	23.9	23.8	0.367	0.378	
Body-worn & Hotspot	Rel 99 RMC	10	Rear	1312	1712.4	23.9	23.8	0.729	0.746	12
				1413	1732.6	23.9	23.8	0.809	0.834	
				1513	1752.6	23.9	23.8	0.868	0.882	
			Front	1312	1712.4	23.9	23.8	0.830	0.849	
				1413	1732.6	23.9	23.8	0.922	0.950	
				1513	1752.6	23.9	23.8	1.050	1.067	
Hotspot	Rel 99 RMC	10	Edge 2	1413	1732.6	23.9	23.8	0.617	0.636	
			Edge 3	1413	1732.6	23.9	23.8	0.613	0.632	

10.6. W-CDMA Band V

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	Rel 99 RMC	0	Left Touch	4183	836.6	24.7	24.5	0.547	0.573	13
			Left Tilt	4183	836.6	24.7	24.5	0.344	0.360	
			Right Touch	4183	836.6	24.7	24.5	0.427	0.447	
			Right Tilt	4183	836.6	24.7	24.5	0.293	0.307	
Body-worn & Hotspot	Rel 99 RMC	10	Rear	4183	836.6	24.7	24.5	0.682	0.714	14
			Front	4183	836.6	24.7	24.5	0.713	0.747	
Hotspot	Rel 99 RMC	10	Edge 2	4183	836.6	24.7	24.5	0.278	0.291	
			Edge 3	4183	836.6	24.7	24.5	0.515	0.539	
			Edge 4	4183	836.6	24.7	24.5	0.690	0.723	

10.7. CDMA BC0

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	1xRTT (RC3 SO55)	0	Left Touch	384	836.5	24.7	24.6	0.527	0.539	15
			Left Tilt	384	836.5	24.7	24.6	0.299	0.306	
			Right Touch	384	836.5	24.7	24.6	0.424	0.434	
			Right Tilt	384	836.5	24.7	24.6	0.272	0.278	
	1xEVDO (Rel. 0)	0	Left Touch	384	836.5	24.7	24.4	0.487	0.522	
			Left Tilt	384	836.5	24.7	24.4	0.281	0.301	
			Right Touch	384	836.5	24.7	24.4	0.408	0.437	
			Right Tilt	384	836.5	24.7	24.4	0.246	0.264	
Body-worn & Hotspot	1xRTT (RC3 SO32)	10	Rear	384	836.5	24.7	24.6	0.697	0.713	16
			Front	384	836.5	24.7	24.6	0.669	0.685	
Hotspot	1xRTT (RC3 SO32)	10	Edge 2	384	836.5	24.7	24.6	0.441	0.451	
			Edge 3	384	836.5	24.7	24.6	0.537	0.550	
			Edge 4	384	836.5	24.7	24.6	0.686	0.702	

10.8. CDMA BC1

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	1xRTT (RC3 SO55)	0	Left Touch	600	1880.0	24.7	24.6	0.554	0.567	
			Left Tilt	600	1880.0	24.7	24.6	0.277	0.283	
			Right Touch	25	1851.3	24.7	24.6	1.070	1.095	
				600	1880.0	24.7	24.6	1.060	1.085	
			Right Tilt	1175	1908.8	24.7	24.6	0.952	0.974	
				600	1880.0	24.7	24.6	0.376	0.385	
	1xEVDO (Rel. 0)	0	Left Touch	600	1880.0	23.7	23.7	0.589	0.590	
			Left Tilt	600	1880.0	23.7	23.7	0.245	0.246	
			Right Touch	25	1851.3	23.7	23.7	1.240	1.251	17
				600	1880.0	23.7	23.7	1.200	1.203	
				1175	1908.8	23.7	23.7	1.120	1.125	
			Right Tilt	600	1880.0	23.7	23.7	0.369	0.370	
Body-worn & Hotspot	1xRTT (RC3 SO32)	10	Rear	25	1851.3	24.7	24.7	1.110	1.110	
				600	1880.0	24.7	24.6	1.040	1.064	
				1175	1908.8	24.7	24.5	0.944	0.988	
			Front	25	1851.3	24.7	24.7	1.280	1.280	18
				600	1880.0	24.7	24.6	1.190	1.218	
				1175	1908.8	24.7	24.5	1.100	1.152	
	1xEVDO (Rel. 0)	10	Front	25	1851.3	23.7	23.7	1.130	1.140	
				600	1880.0	23.7	23.7	1.180	1.183	
				1175	1908.8	23.7	23.7	1.200	1.206	
	1xEVDO (Rel. A)	10	Front	25	1851.3	23.7	23.6	1.180	1.207	
				600	1880.0	23.7	23.7	0.945	0.956	
				1175	1908.8	23.7	23.7	0.970	0.981	
Hotspot	1xRTT (RC3 SO32)	10	Edge 2	25	1851.3	24.7	24.7	1.150	1.150	
				600	1880.0	24.7	24.6	1.180	1.207	
				1175	1908.8	24.7	24.5	1.060	1.110	
			Edge 3	600	1880.0	24.7	24.6	0.679	0.695	

10.9. CDMA BC10

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	1xRTT (RC3 SO55)	0	Left Touch	580	820.5	24.7	24.6	0.534	0.549	
			Left Tilt	580	820.5	24.7	24.6	0.288	0.296	
			Right Touch	580	820.5	24.7	24.6	0.411	0.423	
			Right Tilt	580	820.5	24.7	24.6	0.266	0.273	
	1xEVDO (Rel. 0)	0	Left Touch	580	820.5	24.7	24.5	0.524	0.551	19
			Left Tilt	580	820.5	24.7	24.5	0.292	0.307	
			Right Touch	580	820.5	24.7	24.5	0.416	0.438	
			Right Tilt	580	820.5	24.7	24.5	0.269	0.283	
Body-worn & Hotspot	1xRTT (RC3 SO32)	10	Rear	580	820.5	24.7	24.6	0.722	0.747	
			Front	580	820.5	24.7	24.6	0.729	0.755	20
Hotspot	1xRTT (RC3 SO32)	10	Edge 2	580	820.5	24.7	24.6	0.326	0.337	
			Edge 3	580	820.5	24.7	24.6	0.465	0.481	
			Edge 4	580	820.5	24.7	24.6	0.699	0.724	

10.10. LTE Band 2 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	18900	1880.0	1	0	23.4	23.4	0.621	0.621	
						50	0	22.4	22.2	0.481	0.505	
			Left Tilt	18900	1880.0	1	0	23.4	23.4	0.325	0.325	
						50	0	22.4	22.2	0.238	0.250	
			Right Touch	18700	1860.0	1	0	23.4	23.4	0.983	0.983	21
						50	0	22.4	22.4	0.854	0.864	
				18900	1880.0	1	0	23.4	23.4	0.966	0.966	
						50	0	22.4	22.2	0.815	0.855	
						100	0	22.4	22.3	0.804	0.830	
				19100	1900.0	1	0	23.4	23.4	0.930	0.934	
						50	0	22.4	22.3	0.818	0.833	
			Right Tilt	18900	1880.0	1	0	23.4	23.4	0.354	0.354	
						50	0	22.4	22.2	0.263	0.276	
Body-worn & Hotspot	QPSK	10	Rear	18900	1880.0	1	0	23.4	23.4	0.744	0.744	
						50	0	22.4	22.2	0.640	0.672	
			Front	18700	1860.0	1	0	23.4	23.4	1.140	1.140	22
						50	0	22.4	22.4	0.933	0.944	
				18900	1880.0	1	0	23.4	23.4	1.050	1.050	
						50	0	22.4	22.2	0.930	0.976	
						100	0	22.4	22.3	0.886	0.915	
				19100	1900.0	1	0	23.4	23.4	0.100	0.100	
						50	0	22.4	22.3	0.872	0.888	
Hotspot	QPSK	10	Edge 2	18900	1880.0	1	0	23.4	23.4	0.764	0.764	
						50	0	22.4	22.2	0.670	0.703	
			Edge 3	18900	1880.0	1	0	23.4	23.4	0.593	0.593	
						50	0	22.4	22.2	0.516	0.542	

10.11. LTE Band 4 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	20175	1732.5	1	0	23.4	23.4	0.447	0.447	
						50	0	22.4	22.2	0.342	0.357	
			Left Tilt	20175	1732.5	1	0	23.4	23.4	0.315	0.315	
						50	0	22.4	22.2	0.252	0.263	
			Right Touch	20025	1717.5	1	0	23.4	23.4	0.761	0.761	
				20175	1732.5	1	0	23.4	23.4	0.829	0.829	
						50	0	22.4	22.2	0.646	0.675	
				20325	1747.5	1	37	23.4	23.4	0.966	0.977	23
			Right Tilt	20175	1732.5	1	0	23.4	23.4	0.315	0.315	
						50	0	22.4	22.2	0.246	0.257	
Body & Hotspot	QPSK	10	Rear	20025	1717.5	1	0	23.4	23.4	1.090	1.090	
						36	20	22.4	22.1	0.891	0.959	
				20175	1732.5	1	0	23.4	23.4	1.050	1.050	
						50	0	22.4	22.2	0.831	0.868	
						100	0	22.4	22.1	0.839	0.895	
				20325	1747.5	1	37	23.4	23.4	1.160	1.173	24
			Front	20025	1717.5	36	20	22.4	22.3	1.040	1.074	
						1	0	23.4	23.4	0.866	0.866	
				20175	1732.5	36	20	22.4	22.1	0.798	0.859	
						1	0	23.4	23.4	1.030	1.030	
						50	0	22.4	22.2	0.792	0.827	
						100	0	22.4	22.1	0.839	0.895	
				20325	1747.5	1	37	23.4	23.4	1.100	1.113	
						36	20	22.4	22.3	0.957	0.988	
						75	0	22.4	22.3	0.960	0.994	
Hotspot	QPSK	10	Edge 2	20175	1732.5	1	0	23.4	23.4	0.752	0.752	
						50	0	22.4	22.2	0.585	0.611	
			Edge 3	20175	1732.5	1	0	23.4	23.4	0.698	0.698	
						50	0	22.4	22.2	0.542	0.566	

10.12. LTE Band 5 (10MHz Bandwidth)

SAR for LTE Band 5 is covered by LTE Band 26 due to similar frequency range, same maximum tune-up limit and same channel bandwidth.

10.13. LTE Band 7 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	21100	2535.0	1	0	23.7	23.5	0.594	0.622	25
						50	0	22.7	22.3	0.458	0.502	
			Left Tilt	21100	2535.0	1	0	23.7	23.5	0.195	0.204	
						50	0	22.7	22.3	0.149	0.163	
			Right Touch	21100	2535.0	1	0	23.7	23.5	0.201	0.210	
						50	0	22.7	22.3	0.136	0.149	
Body-worn & Hotspot	QPSK	10	Rear	21100	2535.0	1	0	23.7	23.5	0.498	0.521	
						50	0	22.7	22.3	0.399	0.437	
			Front	20850	2535.0	1	0	23.7	23.5	0.754	0.790	
				21100	2535.0	1	0	23.7	23.5	0.805	0.843	
				21350	2560.0	50	0	22.7	22.3	0.611	0.670	
						1	49	23.7	23.0	0.829	0.974	26
Hotspot	QPSK	10	Edge 2	21100	2535.0	1	0	23.7	23.5	0.053	0.056	
						50	0	22.7	22.3	0.045	0.050	
			Edge 3	21100	2535.0	1	0	23.7	23.5	0.516	0.540	
						50	0	22.7	22.3	0.445	0.488	

10.14. LTE Band 12 (10MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	23095	707.5	1	25	24.2	24.2	0.215	0.215	27
						25	0	23.2	22.8	0.178	0.195	
			Left Tilt	23095	707.5	1	25	24.2	24.2	0.122	0.122	
						25	0	23.2	22.8	0.100	0.109	
			Right Touch	23095	707.5	1	25	24.2	24.2	0.179	0.179	
						25	0	23.2	22.8	0.147	0.161	
Body-worn & Hotspot	QPSK	10	Rear	23095	707.5	1	25	24.2	24.2	0.403	0.403	28
						25	0	23.2	22.8	0.334	0.366	
			Front	23095	707.5	1	25	24.2	24.2	0.301	0.301	
						25	0	23.2	22.8	0.250	0.274	
Hotspot	QPSK	10	Edge 2	23095	707.5	1	25	24.2	24.2	0.275	0.275	
						25	0	23.2	22.8	0.228	0.250	
			Edge 3	23095	707.5	1	25	24.2	24.2	0.184	0.184	
						25	0	23.2	22.8	0.155	0.170	
			Edge 4	23095	707.5	1	25	24.2	24.2	0.479	0.479	29
						25	0	23.2	22.8	0.402	0.441	

10.15. LTE Band 13 (10MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	23230	782.0	1	0	24.2	24.2	0.306	0.306	30
						25	25	23.2	22.9	0.218	0.234	
			Left Tilt	23230	782.0	1	0	24.2	24.2	0.174	0.174	
						25	25	23.2	22.9	0.124	0.133	
			Right Touch	23230	782.0	1	0	24.2	24.2	0.224	0.224	
						25	25	23.2	22.9	0.163	0.175	
			Right Tilt	23230	782.0	1	0	24.2	24.2	0.150	0.150	
						25	25	23.2	22.9	0.107	0.115	
Body-worn & Hotspot	QPSK	10	Rear	23230	782.0	1	0	24.2	24.2	0.453	0.453	31
						25	25	23.2	22.9	0.380	0.407	
			Front	23230	782.0	1	0	24.2	24.2	0.368	0.368	
						25	25	23.2	22.9	0.304	0.326	
Hotspot	QPSK	10	Edge 2	23230	782.0	1	0	24.2	24.2	0.302	0.302	
						25	25	23.2	22.9	0.269	0.288	
			Edge 3	23230	782.0	1	0	24.2	24.2	0.198	0.198	
						25	25	23.2	22.9	0.177	0.190	
			Edge 4	23230	782.0	1	0	24.2	24.2	0.551	0.551	32
						25	25	23.2	22.9	0.479	0.513	

10.16. 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.

10.17. LTE Band 25 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	26365	1882.5	1	0	23.4	23.4	0.623	0.623	
						50	0	22.4	22.2	0.441	0.463	
			Left Tilt	26365	1882.5	1	0	23.4	23.4	0.309	0.309	
						50	0	22.4	22.2	0.218	0.229	
			Right Touch	26140	1860.0	1	49	23.4	23.2	1.170	1.214	
						50	0	22.4	22.4	0.857	0.867	
				26365	1882.5	1	0	23.4	23.4	1.190	1.190	33
						50	0	22.4	22.2	0.829	0.870	
				26590	1905.0	1	99	23.4	23.4	1.110	1.123	
						50	0	22.4	22.3	0.845	0.861	
			Right Tilt	26365	1882.5	100	0	22.4	22.4	0.838	0.844	
						1	0	23.4	23.4	0.321	0.321	
						50	0	22.4	22.2	0.233	0.245	
Body-worn & Hotspot	QPSK	10	Rear	26140	1860.0	1	49	23.4	23.2	1.020	1.058	34
				26365	1882.5	1	0	23.4	23.4	0.873	0.873	
						50	0	22.4	22.2	0.670	0.703	
				26590	1905.0	1	99	23.4	23.4	0.869	0.879	
			Front	26140	1860.0	1	49	23.4	23.2	0.997	1.034	
						50	0	22.4	22.4	0.824	0.834	
				26365	1882.5	1	0	23.4	23.4	0.963	0.963	
						50	0	22.4	22.2	0.736	0.772	
				26590	1905.0	1	99	23.4	23.4	1.000	1.012	
						50	0	22.4	22.3	0.772	0.786	
						100	0	22.4	22.4	0.792	0.797	
Hotspot	QPSK	10	Edge 2	26140	1860.0	1	49	23.4	23.2	1.050	1.089	35
						50	0	22.4	22.4	0.781	0.790	
				26365	1882.5	1	0	23.4	23.4	1.030	1.030	
						50	0	22.4	22.2	0.758	0.796	
				26590	1905.0	1	49	23.4	23.4	0.996	1.008	
						50	0	22.4	22.3	0.769	0.783	
						100	0	22.4	22.4	0.907	0.913	
			Edge 3	26365	1882.5	1	49	23.4	23.4	0.662	0.662	
						50	0	22.4	22.2	0.506	0.531	

10.18. LTE Band 26 (15MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	26865	831.5	1	37	24.2	24.1	0.498	0.510	36
						36	0	23.2	22.8	0.359	0.394	
			Left Tilt	26865	831.5	1	37	24.2	24.1	0.299	0.306	
						36	0	23.2	22.8	0.216	0.237	
			Right Touch	26865	831.5	1	37	24.2	24.1	0.390	0.399	
						36	0	23.2	22.8	0.286	0.314	
			Right Tilt	26865	831.5	1	37	24.2	24.1	0.276	0.282	
						36	0	23.2	22.8	0.197	0.216	
Body-worn & Hotspot	QPSK	10	Rear	26865	831.5	1	37	24.2	24.1	0.632	0.647	37
						36	0	23.2	22.8	0.469	0.514	
			Front	26865	831.5	1	37	24.2	24.1	0.489	0.500	
						36	0	23.2	22.8	0.351	0.385	
Hotspot	QPSK	10	Edge 2	26865	831.5	1	37	24.2	24.1	0.285	0.292	
						36	0	23.2	22.8	0.206	0.226	
			Edge 3	26865	831.5	1	37	24.2	24.1	0.468	0.479	
						36	0	23.2	22.8	0.338	0.371	
			Edge 4	26865	831.5	1	37	24.2	24.1	0.633	0.648	38
						36	0	23.2	22.8	0.458	0.502	

10.19. LTE Band 41 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	40620	2593.0	1	0	23.2	23.2	0.259	0.259	39
						50	0	22.2	21.7	0.203	0.228	
			Left Tilt	40620	2593.0	1	0	23.2	23.2	0.068	0.068	
						50	0	22.2	21.7	0.050	0.056	
			Right Touch	40620	2593.0	1	0	23.2	23.2	0.100	0.100	
						50	0	22.2	21.7	0.073	0.082	
			Right Tilt	40620	2593.0	1	0	23.2	23.2	0.075	0.075	
						50	0	22.2	21.7	0.058	0.066	
Body-worn & Hotspot	QPSK	10	Rear	40620	2593.0	1	0	23.2	23.2	0.173	0.173	
						50	0	22.2	21.7	0.135	0.151	
			Front	40620	2593.0	1	0	23.2	23.2	0.366	0.366	40
						50	0	22.2	21.7	0.280	0.314	
Hotspot	QPSK	10	Edge 2	40620	2593.0	1	0	23.2	23.2	0.031	0.031	
						50	0	22.2	21.7	0.022	0.024	
			Edge 3	40620	2593.0	1	0	23.2	23.2	0.254	0.254	
						50	0	22.2	21.7	0.198	0.222	

10.20. Wi-Fi (DTS Band)

RF Exposure Conditions	Mode	Dist. (mm)	ANT	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Note(s)	Plot
								Tune-up limit	Meas.	Meas.	Scaled		
Head	802.11b 1 Mbps	0	Core 0	Left Touch	6	2437	0.30	18.0	17.5				
				Left Tilt	6	2437	0.26	18.0	17.5				
				Right Touch	6	2437	0.72	18.0	17.5	0.706	0.787	2	41
				Right Tilt	6	2437	0.59	18.0	17.5	0.591	0.659		
			Core 1	Left Touch	6	2437	0.02	18.0	17.5				
				Left Tilt	6	2437	0.01	18.0	17.5				
				Right Touch	6	2437	0.07	18.0	17.5	0.050	0.056	1	
				Right Tilt	6	2437	0.04	18.0	17.5				
Body & Hotspot	802.11b 1 Mbps	10	Core 0	Rear	6	2437	0.21	18.0	17.5	0.283	0.315	1	42
				Front	6	2437	0.18	18.0	17.5				
			Core 1	Rear	6	2437	0.07	18.0	17.5	0.080	0.089	1	
				Front	6	2437	0.03	18.0	17.5				
Hotspot	802.11b 1 Mbps	10	Core 0	Edge 1	6	2437	0.17	18.0	17.5				
				Edge 4	6	2437	0.16	18.0	17.5				
			Core 1	Edge 1	6	2437	0.01	18.0	17.5				
				Edge 4	6	2437	0.04	18.0	17.5				

Note(s):

- Highest reported SAR is ≤ 0.4 W/kg. Therefore, further SAR measurements within this exposure condition are not required.
- Highest reported SAR is > 0.4 W/kg. Due to the highest reported SAR for this test position, other test positions in Head exposure condition were evaluated until a SAR ≤ 0.8 W/kg was reported.

10.21. Wi-Fi (U-NII Band)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Core 0 Power (dBm)		Core 1 Power (dBm)		Core 0 1-g SAR (W/kg)		Core 1 1-g SAR (W/kg)		Note(s)	Plot
							Tune-up limit	Meas.	Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled		
Head	802.11a 6 Mbps	0	Left Touch	56	5280	0.281	15.0	14.3	15.0	14.8						
				100	5500	0.356	15.0	14.7	15.0	15.0						
				157	5785	0.627	15.0	14.5	15.0	14.9						
			Left Tilt	56	5280	0.277	15.0	14.3	15.0	14.8						
				100	5500	0.278	15.0	14.7	15.0	15.0						
				157	5785	0.468	15.0	14.5	15.0	14.9						
			Right Touch	56	5280	1.250	15.0	14.3	15.0	14.8	0.653	0.769			2,3	43
				100	5500	0.894	15.0	14.7	15.0	15.0	0.483	0.522			2,3	
				157	5785	1.480	15.0	14.5	15.0	14.9	0.618	0.693			2,3	
			Right Tilt	56	5280	0.712	15.0	14.3	15.0	14.8	0.411	0.484				
				100	5500	0.513	15.0	14.7	15.0	15.0	0.308	0.333				
				157	5785	0.715	15.0	14.5	15.0	14.9	0.418	0.469				
Body & Hotspot	802.11a 6 Mbps	10	Rear	56	5280	0.631	15.0	14.3	15.0	14.8	0.310	0.365				44
				100	5500	0.492	15.0	14.7	15.0	15.0	0.270	0.292				
				157	5785	0.571	15.0	14.5	15.0	14.9						
			Front	56	5280	0.305	15.0	14.3	15.0	14.8	0.127	0.150			4	
				100	5500	0.263	15.0	14.7	15.0	15.0	0.133	0.144			4	
				157	5785	0.290	15.0	14.5	15.0	14.9	0.161	0.181			4	
Hotspot	802.11a 6 Mbps	10	Edge 1	157	5785	0.232	15.0	14.5	15.0	14.9						
			Edge 4	157	5785	0.588	15.0	14.5	15.0	14.9	0.328	0.368			1,3	45

Note(s):

- Highest reported SAR is ≤ 0.4 W/kg. Therefore, further SAR measurements within this exposure condition are not required.
- Highest reported SAR is > 0.4 W/kg. Due to the highest reported SAR for this test position, other test positions in Head exposure condition were evaluated until a SAR ≤ 0.8 W/kg was reported.
- For 802.11a SAR testing, MIMO measurements were performed. The Antennas are right next to each other therefore the resulting measurement cubes were right on top of one another. Because of this, there is only one 1g/10g cube for the MIMO scans. The highest 1g cube measured for the MIMO scans was from the main antenna (Core 0). The results are illustrated in the table above.
- Additional testing required in order satisfying FCC simultaneous transmission limit criteria.

10.22. Bluetooth

Frequency Band	RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
							Tune-up limit	Meas.	Meas.	Scaled	
2.4 GHz	Head	GFSK	0	Left Touch	39	2441.0	9.9	8.8	0.061	0.079	
				Left Tilt	39	2441.0	9.9	8.8	0.041	0.053	
				Right Touch	39	2441.0	9.9	8.8	0.141	0.182	46
				Right Tilt	39	2441.0	9.9	8.8	0.105	0.135	
	Body-worn	GFSK	10	Rear	39	2441.0	9.9	8.8	0.050	0.064	47
				Front	39	2441.0	9.9	8.8	0.032	0.041	

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 < 1.6 or 2 W/kg (1-g or 10-g respectively); steps 2) through 4) do not apply.
- 2) When the original highest measured SAR is ≥ 0.8 or 2 W/kg (1-g or 10-g respectively), 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 3 (1-g or 10-g respectively) or when the original or repeated measurement is ≥ 1.45 or 3.6 W/kg ($\sim 10\%$ from the 1-g or 10-g respective SAR limit).
- 4) Perform a third repeated measurement only if the original, first, or second repeated measurement is ≥ 1.5 or 3.75 W/kg (1-g or 10-g respectively) and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 or 3 (1-g or 10-g respectively).

Frequency Band (MHz)	Air Interface	RF Exposure Conditions	Test Position	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)	First Repeated		Second Repeated		Third Repeated
						Measured SAR (W/kg)	Largest to Smallest SAR Ratio	Measured SAR (W/kg)	Largest to Smallest SAR Ratio	Measured SAR (W/kg)
700	LTE Band 12	Hotspot	Edge 4	No	0.479	N/A	N/A	N/A	N/A	N/A
	LTE Band 13	Hotspot	Edge 4	No	0.551	N/A	N/A	N/A	N/A	N/A
850	GSM 850	Body & Hotspot	Front	No	0.780	N/A	N/A	N/A	N/A	N/A
	CDMA BC0	Body & Hotspot	Rear	No	0.697	N/A	N/A	N/A	N/A	N/A
	CDMA BC10	Body & Hotspot	Front	No	0.729	N/A	N/A	N/A	N/A	N/A
	WCDMA Band V	Body & Hotspot	Front	No	0.713	N/A	N/A	N/A	N/A	N/A
	LTE Band 26	Hotspot	Edge 4	No	0.633	N/A	N/A	N/A	N/A	N/A
1900	GSM 1900	Head	Right Touch	No	0.498	N/A	N/A	N/A	N/A	N/A
	CDMA BC1	Body & Hotspot	Front	Yes	1.280	1.240	1.03	N/A	N/A	N/A
	WCDMA Band II	Body & Hotspot	Front	No	1.030	N/A	N/A	N/A	N/A	N/A
	LTE Band 2	Body & Hotspot	Front	No	1.140	N/A	N/A	N/A	N/A	N/A
	LTE Band 25	Head	Right Touch	No	1.190	N/A	N/A	N/A	N/A	N/A
1700	LTE Band 4	Body & Hotspot	Rear	Yes	1.160	1.030	1.13	N/A	N/A	N/A
	WCDMA Band IV	Body & Hotspot	Front	No	1.050	N/A	N/A	N/A	N/A	N/A
2400	Wi-Fi 802.11b/g/n/ac	Head	Right Touch	No	0.706	N/A	N/A	N/A	N/A	N/A
	BT	Head	Right Touch	No	0.141	N/A	N/A	N/A	N/A	N/A
2600	LTE Band 7	Body & Hotspot	Front	Yes	0.829	0.824	1.01	N/A	N/A	N/A
	LTE Band 41	Body & Hotspot	Front	No	0.366	N/A	N/A	N/A	N/A	N/A
5300	Wi-Fi 802.11a/n/ac	Head	Right Touch	No	0.653	N/A	N/A	N/A	N/A	N/A
5500	Wi-Fi 802.11a/n/ac	Head	Right Touch	No	0.483	N/A	N/A	N/A	N/A	N/A
5800	Wi-Fi 802.11a/n/ac	Head	Right Touch	No	0.618	N/A	N/A	N/A	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 or 3 (1-g or 10-g respectively).

12. Simultaneous Transmission SAR Analysis

Simultaneous Transmission Condition

RF Exposure Condition	Item	Capable Transmit Configurations			
Head & Body-worn	1	GSM(Voice)	+	DTS	
	2	GSM(Voice)	+	U-NII	
	3	GSM(Voice)	+	BT	
	4	GSM(Voice)	+	U-NII	+ BT
	5	GSM(GPRS/EDGE)	+	DTS	
	6	GSM(GPRS/EDGE)	+	U-NII	
	7	GSM(GPRS/EDGE)	+	BT	
	8	GSM(GPRS/EDGE)	+	U-NII	+ BT
	9	W-CDMA	+	DTS	
	10	W-CDMA	+	U-NII	
	11	W-CDMA	+	BT	
	12	W-CDMA	+	U-NII	+ BT
	13	CDMA	+	DTS	
	14	CDMA	+	U-NII	
	15	CDMA	+	BT	
	16	CDMA	+	U-NII	+ BT
	17	LTE	+	DTS	
	18	LTE	+	U-NII	
	19	LTE	+	BT	
	20	LTE	+	U-NII	+ BT
Hotspot & Wi-Fi Direct	21	GSM(GPRS/EDGE)	+	DTS	
	22	GSM(GPRS/EDGE)	+	U-NII	
	23	W-CDMA	+	DTS	
	24	W-CDMA	+	U-NII	
	25	CDMA	+	DTS	
	26	CDMA	+	U-NII	
	27	LTE	+	DTS	
	28	LTE	+	U-NII	

Notes:

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

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

RF Exposure conditions	Test Position	① WWAN	② DTS	③ U-NII	④ BT	①+② WWAN + DTS		①+③ WWAN + U-NII		①+③+④ WWAN + U-NII + BT	
						Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.610	0.787	0.769	0.079	1.396	No	1.379	No	1.458	No
	Left Tilt	0.357	0.787	0.769	0.053	1.144	No	1.126	No	1.180	No
	Right Touch	0.505	0.787	0.769	0.182	1.292	No	1.274	No	1.456	No
	Right Tilt	0.342	0.659	0.484	0.135	1.001	No	0.826	No	0.962	No
Body-worn & Hotspot	Rear	0.684	0.315	0.365	0.064	0.999	No	1.049	No	1.113	No
	Front	0.887	0.315	0.181	0.041	1.203	No	1.068	No	1.110	No
Hotspot	Edge 1		0.315	0.368		0.315	No	0.368	No		
	Edge 2	0.389				0.389	No	0.389	No		
	Edge 3	0.613				0.613	No	0.613	No		
	Edge 4	0.738	0.315	0.368		1.054	No	1.106	No		

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

RF Exposure conditions	Test Position	① WWAN	② DTS	③ U-NII	④ BT	①+② WWAN + DTS		①+③ WWAN + U-NII		①+③+④ WWAN + U-NII + BT	
						Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.276	0.787	0.769	0.079	1.063	No	1.045	No	1.124	No
	Left Tilt	0.147	0.787	0.769	0.053	0.933	No	0.916	No	0.969	No
	Right Touch	0.518	0.787	0.769	0.182	1.305	No	1.287	No	1.469	No
	Right Tilt	0.183	0.659	0.484	0.135	0.842	No	0.667	No	0.802	No
Body-worn & Hotspot	Rear	0.394	0.315	0.365	0.064	0.709	No	0.759	No	0.824	No
	Front	0.501	0.315	0.181	0.041	0.817	No	0.682	No	0.723	No
Hotspot	Edge 1		0.315	0.368		0.315	No	0.368	No		
	Edge 2	0.495				0.495	No	0.495	No		
	Edge 3	0.295				0.295	No	0.295	No		
	Edge 4	0.000	0.315	0.368		0.315	No	0.368	No		

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

RF Exposure conditions	Test Position	① WWAN	② DTS	③ U-NII	④ BT	①+② WWAN + DTS		①+③ WWAN + U-NII		①+③+④ WWAN + U-NII + BT	
						Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.621	0.787	0.769	0.079	1.408	No	1.390	No	1.469	No
	Left Tilt	0.255	0.787	0.769	0.053	1.041	No	1.024	No	1.077	No
	Right Touch	1.018	0.787	0.769	0.182	1.805	Yes	1.787	Yes	1.969	Yes
	Right Tilt	0.383	0.659	0.484	0.135	1.042	No	0.867	No	1.002	No
Body-worn & Hotspot	Rear	0.999	0.315	0.365	0.064	1.314	No	1.364	No	1.428	No
	Front	1.054	0.315	0.181	0.041	1.369	No	1.235	No	1.276	No
Hotspot	Edge 1		0.315	0.368		0.315	No	0.368	No		
	Edge 2	1.034				1.034	No	1.034	No		
	Edge 3	0.559				0.559	No	0.559	No		
	Edge 4	0.000	0.315	0.368		0.315	No	0.368	No		

SAR to Peak Location Separation Ratio (SPLSR)

Test Position	Worst-case combination			Σ 1-g SAR (mW/g)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
	① WWAN	② DTS	③ U-NII						
Right Touch	1.018	0.787		① + ②	1.805	84.1	0.03	No	1
	1.018		0.769	① + ③	1.787	92.8	0.03	No	2
Test Position	Worst-case combination			Σ 1-g SAR (mW/g)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
	① WWAN	②+③ U-NII + BT							
Right Touch	1.018	0.951		① + ② + ③	1.969	84.0	0.03	No	3

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

RF Exposure conditions	Test Position	① WWAN	② DTS	③ U-NII	④ BT	①+② WWAN + DTS		①+③ WWAN + U-NII		①+③+④ WWAN + U-NII + BT	
						Σ 1g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.456	0.787	0.769	0.079	1.243	No	1.225	No	1.305	No
	Left Tilt	0.308	0.787	0.769	0.053	1.095	No	1.077	No	1.130	No
	Right Touch	1.026	0.787	0.769	0.182	1.813	Yes	1.795	Yes	1.977	Yes
	Right Tilt	0.378	0.659	0.484	0.135	1.037	No	0.862	No	0.997	No
Body-worn & Hotspot	Rear	0.882	0.315	0.365	0.064	1.197	No	1.247	No	1.312	No
	Front	1.067	0.315	0.181	0.041	1.382	No	1.248	No	1.289	No
Hotspot	Edge 1		0.315	0.368		0.315	No	0.368	No		
	Edge 2	0.636				0.636	No	0.636	No		
	Edge 3	0.632				0.632	No	0.632	No		
	Edge 4	0.000	0.315	0.368		0.315	No	0.368	No		

SAR to Peak Location Separation Ratio (SPLSR)

Test Position	Worst-case combination			Σ 1-g SAR (mW/g)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
	① WWAN	② DTS	③ U-NII						
Right Touch	1.026	0.787		① + ②	1.813	86.8	0.03	No	4
	1.026		0.769	① + ③	1.795	95.5	0.03	No	5
Test Position	Worst-case combination			Σ 1-g SAR (mW/g)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
	① WWAN	②+③ U-NII + BT							
Right Touch	1.026	0.951		① + ② + ③	1.977	87.1	0.03	No	6

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

RF Exposure conditions	Test Position	① WWAN	② DTS	③ U-NII	④ BT	①+② WWAN + DTS		①+③ WWAN + U-NII		①+③+④ WWAN + U-NII + BT	
						Σ 1g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.573	0.787	0.769	0.079	1.359	No	1.342	No	1.421	No
	Left Tilt	0.360	0.787	0.769	0.053	1.147	No	1.129	No	1.183	No
	Right Touch	0.447	0.787	0.769	0.182	1.234	No	1.216	No	1.398	No
	Right Tilt	0.307	0.659	0.484	0.135	0.966	No	0.791	No	0.926	No
Body-worn & Hotspot	Rear	0.714	0.315	0.365	0.064	1.029	No	1.079	No	1.144	No
	Front	0.747	0.315	0.181	0.041	1.062	No	0.928	No	0.969	No
Hotspot	Edge 1		0.315	0.368		0.315	No	0.368	No		
	Edge 2	0.291				0.291	No	0.291	No		
	Edge 3	0.539				0.539	No	0.539	No		
	Edge 4	0.723	0.315	0.368		1.038	No	1.091	No		

12.6. Sum of the SAR for CDMA BC0 & Wi-Fi & BT

RF Exposure conditions	Test Position	① WWAN	② DTS	③ U-NII	④ BT	①+② WWAN + DTS		①+③ WWAN + U-NII		①+③+④ WWAN + U-NII + BT	
						Σ 1g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.539	0.787	0.769	0.079	1.326	No	1.308	No	1.387	No
	Left Tilt	0.306	0.787	0.769	0.053	1.093	No	1.075	No	1.128	No
	Right Touch	0.437	0.787	0.769	0.182	1.224	No	1.206	No	1.388	No
	Right Tilt	0.278	0.659	0.484	0.135	0.937	No	0.762	No	0.898	No
Body-worn & Hotspot	Rear	0.713	0.315	0.365	0.064	1.029	No	1.078	No	1.143	No
	Front	0.685	0.315	0.181	0.041	1.000	No	0.865	No	0.906	No
Hotspot	Edge 1		0.315	0.368		0.315	No	0.368	No		
	Edge 2	0.451				0.451	No	0.451	No		
	Edge 3	0.550				0.550	No	0.550	No		
	Edge 4	0.702	0.315	0.368		1.017	No	1.070	No		

12.7. Sum of the SAR for CDMA BC1 & Wi-Fi & BT

RF Exposure conditions	Test Position	① WWAN	② DTS	③ U-NII	④ BT	①+② WWAN + DTS		①+③ WWAN + U-NII		①+③+④ WWAN + U-NII + BT	
						Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.590	0.787	0.769	0.079	1.377	No	1.359	No	1.438	No
	Left Tilt	0.283	0.787	0.769	0.053	1.070	No	1.052	No	1.106	No
	Right Touch	1.251	0.787	0.769	0.182	2.038	Yes	2.020	Yes	2.202	Yes
	Right Tilt	0.385	0.659	0.484	0.135	1.044	No	0.869	No	1.004	No
Body-worn & Hotspot	Rear	1.110	0.315	0.365	0.064	1.425	No	1.475	No	1.539	No
	Front	1.280	0.315	0.181	0.041	1.595	Yes	1.461	No	1.502	No
Hotspot	Edge 1		0.315	0.368		0.315	No	0.368	No		
	Edge 2	1.207				1.207	No	1.207	No		
	Edge 3	0.695				0.695	No	0.695	No		
	Edge 4		0.315	0.368		0.315	No	0.368	No		

SAR to Peak Location Separation Ratio (SPLSR)

Test Position	Worst-case combination			Σ 1-g SAR (mW/g)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
	① WWAN	② DTS	③ U-NII						
Right Touch	1.251	0.787		① + ②	2.038	79.5	0.04	No	7
	1.251		0.769	① + ③	2.020	88.3	0.03	No	8
Front	1.280	0.315		① + ②	1.595	121	0.02	No	9
Test Position	Worst-case combination		Σ 1-g SAR (mW/g)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure	
	① WWAN	② + ③ U-NII +BT							
Right Touch	1.251	0.951	① + ② + ③	2.202	79.7	0.04	No	10	

12.8. Sum of the SAR for CDMA BC10 & Wi-Fi & BT

RF Exposure conditions	Test Position	① WWAN	② DTS	③ U-NII	④ BT	①+② WWAN + DTS		①+③ WWAN + U-NII		①+③+④ WWAN + U-NII + BT	
						Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.551	0.787	0.769	0.079	1.338	No	1.320	No	1.399	No
	Left Tilt	0.307	0.787	0.769	0.053	1.094	No	1.076	No	1.129	No
	Right Touch	0.438	0.787	0.769	0.182	1.224	No	1.207	No	1.388	No
	Right Tilt	0.283	0.659	0.484	0.135	0.942	No	0.767	No	0.902	No
Body-worn & Hotspot	Rear	0.747	0.315	0.365	0.064	1.063	No	1.112	No	1.177	No
	Front	0.755	0.315	0.181	0.041	1.070	No	0.936	No	0.977	No
Hotspot	Edge 1		0.315	0.368		0.315	No	0.368	No		
	Edge 2	0.337				0.337	No	0.337	No		
	Edge 3	0.481				0.481	No	0.481	No		
	Edge 4	0.724	0.315	0.368		1.039	No	1.092	No		

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

RF Exposure conditions	Test Position	① WWAN	② DTS	③ U-NII	④ BT	①+② WWAN + DTS		①+③ WWAN + U-NII		①+③+④ WWAN + U-NII + BT	
						Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.621	0.787	0.769	0.079	1.408	No	1.390	No	1.469	No
	Left Tilt	0.325	0.787	0.769	0.053	1.112	No	1.094	No	1.147	No
	Right Touch	0.983	0.787	0.769	0.182	1.770	Yes	1.752	Yes	1.934	Yes
	Right Tilt	0.354	0.659	0.484	0.135	1.013	No	0.838	No	0.973	No
Body-worn & Hotspot	Rear	0.744	0.315	0.365	0.064	1.059	No	1.109	No	1.173	No
	Front	1.140	0.315	0.181	0.041	1.455	No	1.321	No	1.362	No
Hotspot	Edge 1		0.315	0.368		0.315	No	0.368	No		
	Edge 2	0.764				0.764	No	0.764	No		
	Edge 3	0.593				0.593	No	0.593	No		
	Edge 4		0.315	0.368		0.315	No	0.368	No		

SAR to Peak Location Separation Ratio (SPLSR)

Test Position	Worst-case combination			Σ 1-g SAR (mW/g)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
	① WWAN	② DTS	③ U-NII						
Right Touch	0.983	0.787		① + ②	1.770	79.5	0.03	No	11
	0.983		0.769	① + ③	1.752	88.3	0.03	No	12
Test Position	Worst-case combination			Σ 1-g SAR (mW/g)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
	① WWAN	②+③ U-NII + BT							
Right Touch	0.983	0.951		① + ② + ③	1.934	79.7	0.03	No	13

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

RF Exposure conditions	Test Position	① WWAN	② DTS	③ U-NII	④ BT	①+② WWAN + DTS		①+③ WWAN + U-NII		①+③+④ WWAN + U-NII + BT	
						Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.447	0.787	0.769	0.079	1.234	No	1.216	No	1.295	No
	Left Tilt	0.315	0.787	0.769	0.053	1.102	No	1.084	No	1.137	No
	Right Touch	0.977	0.787	0.769	0.182	1.764	Yes	1.746	Yes	1.928	Yes
	Right Tilt	0.315	0.659	0.484	0.135	0.974	No	0.799	No	0.934	No
Body-worn & Hotspot	Rear	1.173	0.315	0.365	0.064	1.489	No	1.538	No	1.603	Yes
	Front	1.113	0.315	0.181	0.041	1.428	No	1.294	No	1.335	No
Hotspot	Edge 1		0.315	0.368		0.315	No	0.368	No		
	Edge 2	0.752				0.752	No	0.752	No		
	Edge 3	0.698				0.698	No	0.698	No		
	Edge 4		0.315	0.368		0.315	No	0.368	No		

SAR to Peak Location Separation Ratio (SPLSR)

Test Position	Worst-case combination			Σ 1-g SAR (mW/g)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
	① WWAN	② DTS	③ U-NII						
Right Touch	0.977	0.787		① + ②	1.764	87.4	0.03	No	14
	0.977		0.769	① + ③	1.746	96.1	0.02	No	15
Test Position	Worst-case combination			Σ 1-g SAR (mW/g)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
	① WWAN	②+③ U-NII + BT							
Right Touch	0.977	0.951		① + ② + ③	1.928	87.6	0.03	No	16
Rear	1.173	0.429		① + ② + ③	1.602	113.9	0.02	No	17

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

Covered by LTE Band 26 due to similar frequency range, same maximum tune-up limit and same channel bandwidth.

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

RF Exposure conditions	Test Position	① WWAN	② DTS	③ U-NII	④ BT	①+② WWAN + DTS		①+③ WWAN + U-NII		①+③+④ WWAN + U-NII + BT	
						Σ 1g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.622	0.787	0.769	0.079	1.409	No	1.391	No	1.470	No
	Left Tilt	0.204	0.787	0.769	0.053	0.991	No	0.973	No	1.027	No
	Right Touch	0.210	0.787	0.769	0.182	0.997	No	0.979	No	1.161	No
	Right Tilt	0.194	0.659	0.484	0.135	0.853	No	0.678	No	0.813	No
Body-worn & Hotspot	Rear	0.521	0.315	0.365	0.064	0.837	No	0.887	No	0.951	No
	Front	0.974	0.315	0.181	0.041	1.289	No	1.155	No	1.196	No
Hotspot	Edge 1		0.315	0.368		0.315	No	0.368	No		
	Edge 2	0.056				0.056	No	0.056	No		
	Edge 3	0.540				0.540	No	0.540	No		
	Edge 4		0.315	0.368		0.315	No	0.368	No		

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

RF Exposure conditions	Test Position	① WWAN	② DTS	③ U-NII	④ BT	①+② WWAN + DTS		①+③ WWAN + U-NII		①+③+④ WWAN + U-NII + BT	
						Σ 1g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.215	0.787	0.769	0.079	1.002	No	0.984	No	1.063	No
	Left Tilt	0.122	0.787	0.769	0.053	0.909	No	0.891	No	0.944	No
	Right Touch	0.179	0.787	0.769	0.182	0.966	No	0.948	No	1.130	No
	Right Tilt	0.118	0.659	0.484	0.135	0.777	No	0.602	No	0.737	No
Body-worn & Hotspot	Rear	0.403	0.315	0.365	0.064	0.718	No	0.768	No	0.832	No
	Front	0.301	0.315	0.181	0.041	0.616	No	0.482	No	0.523	No
Hotspot	Edge 1		0.315	0.368		0.315	No	0.368	No		
	Edge 2	0.275				0.275	No	0.275	No		
	Edge 3	0.184				0.184	No	0.184	No		
	Edge 4	0.479	0.315	0.368		0.794	No	0.847	No		

12.14. Sum of the SAR for LTE Band 13 & Wi-Fi & BT

RF Exposure conditions	Test Position	① WWAN	② DTS	③ U-NII	④ BT	①+② WWAN + DTS		①+③ WWAN + U-NII		①+③+④ WWAN + U-NII + BT	
						Σ 1g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.306	0.787	0.769	0.079	1.093	No	1.075	No	1.154	No
	Left Tilt	0.174	0.787	0.769	0.053	0.961	No	0.943	No	0.996	No
	Right Touch	0.224	0.787	0.769	0.182	1.011	No	0.993	No	1.175	No
	Right Tilt	0.150	0.659	0.484	0.135	0.809	No	0.634	No	0.769	No
Body-worn & Hotspot	Rear	0.453	0.315	0.365	0.064	0.768	No	0.818	No	0.882	No
	Front	0.368	0.315	0.181	0.041	0.683	No	0.549	No	0.590	No
Hotspot	Edge 1		0.315	0.368		0.315	No	0.368	No		
	Edge 2	0.302				0.302	No	0.302	No		
	Edge 3	0.198				0.198	No	0.198	No		
	Edge 4	0.551	0.315	0.368		0.866	No	0.919	No		

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

Covered by LTE Band 12 due to similar frequency range, same maximum tune-up limit and same channel bandwidth.

12.16. Sum of the SAR for LTE Band 25 & Wi-Fi & BT

RF Exposure conditions	Test Position	① WWAN	② DTS	③ U-NII	④ BT	①+② WWAN + DTS		①+③ WWAN + U-NII		①+③+④ WWAN + U-NII + BT	
						Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.623	0.787	0.769	0.079	1.410	No	1.392	No	1.471	No
	Left Tilt	0.309	0.787	0.769	0.053	1.096	No	1.078	No	1.131	No
	Right Touch	1.214	0.787	0.769	0.182	2.001	Yes	1.983	Yes	2.165	Yes
	Right Tilt	0.321	0.659	0.484	0.135	0.980	No	0.805	No	0.940	No
Body-worn & Hotspot	Rear	1.058	0.315	0.365	0.064	1.374	No	1.423	No	1.488	No
	Front	1.034	0.315	0.181	0.041	1.350	No	1.215	No	1.257	No
Hotspot	Edge 1		0.315	0.368		0.315	No	0.368	No		
	Edge 2	1.089				1.089	No	1.089	No		
	Edge 3	0.662				0.662	No	0.662	No		
	Edge 4		0.315	0.368		0.315	No	0.368	No		

SAR to Peak Location Separation Ratio (SPLSR)

Test Position	Worst-case combination			Σ 1-g SAR (mW/g)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure
	① WWAN	② DTS	③ U-NII						
Right Touch	1.214	0.787		① + ②	2.001	76.0	0.04	No	18
	1.214		0.769	① + ③	1.983	84.8	0.03	No	19
Test Position	Worst-case combination		Σ 1-g SAR (mW/g)		Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No)	Figure	
	① WWAN	② + ③ U-NII +BT							
Right Touch	1.214	0.951	① + ② + ③	2.165	76.4	0.04	No	20	

12.17. Sum of the SAR for LTE Band 26 & Wi-Fi & BT

RF Exposure conditions	Test Position	① WWAN	② DTS	③ U-NII	④ BT	①+② WWAN + DTS		①+③ WWAN + U-NII		①+③+④ WWAN + U-NII + BT	
						Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.510	0.787	0.769	0.079	1.296	No	1.279	No	1.358	No
	Left Tilt	0.306	0.787	0.769	0.053	1.093	No	1.075	No	1.128	No
	Right Touch	0.399	0.787	0.769	0.182	1.186	No	1.168	No	1.350	No
	Right Tilt	0.282	0.659	0.484	0.135	0.941	No	0.766	No	0.902	No
Body-worn & Hotspot	Rear	0.647	0.315	0.365	0.064	0.962	No	1.012	No	1.076	No
	Front	0.500	0.315	0.181	0.041	0.816	No	0.681	No	0.723	No
Hotspot	Edge 1		0.315	0.368		0.315	No	0.368	No		
	Edge 2	0.292				0.292	No	0.292	No		
	Edge 3	0.479				0.479	No	0.479	No		
	Edge 4	0.648	0.315	0.368		0.963	No	1.016	No		

12.18. Sum of the SAR for LTE Band 41 & Wi-Fi & BT

RF Exposure conditions	Test Position	① WWAN	② DTS	③ U-NII	④ BT	①+② WWAN + DTS		①+③ WWAN + U-NII		①+③+④ WWAN + U-NII + BT	
						Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	Left Touch	0.259	0.787	0.769	0.079	1.046	No	1.028	No	1.107	No
	Left Tilt	0.068	0.787	0.769	0.053	0.855	No	0.837	No	0.891	No
	Right Touch	0.100	0.787	0.769	0.182	0.886	No	0.869	No	1.050	No
	Right Tilt	0.075	0.659	0.484	0.135	0.734	No	0.559	No	0.695	No
Body-worn & Hotspot	Rear	0.173	0.315	0.365	0.064	0.488	No	0.538	No	0.602	No
	Front	0.366	0.315	0.181	0.041	0.681	No	0.547	No	0.588	No
Hotspot	Edge 1		0.315	0.368		0.315	No	0.368	No		
	Edge 2	0.031				0.031	No	0.031	No		
	Edge 3	0.254				0.254	No	0.254	No		
	Edge 4		0.315	0.368		0.315	No	0.368	No		

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)

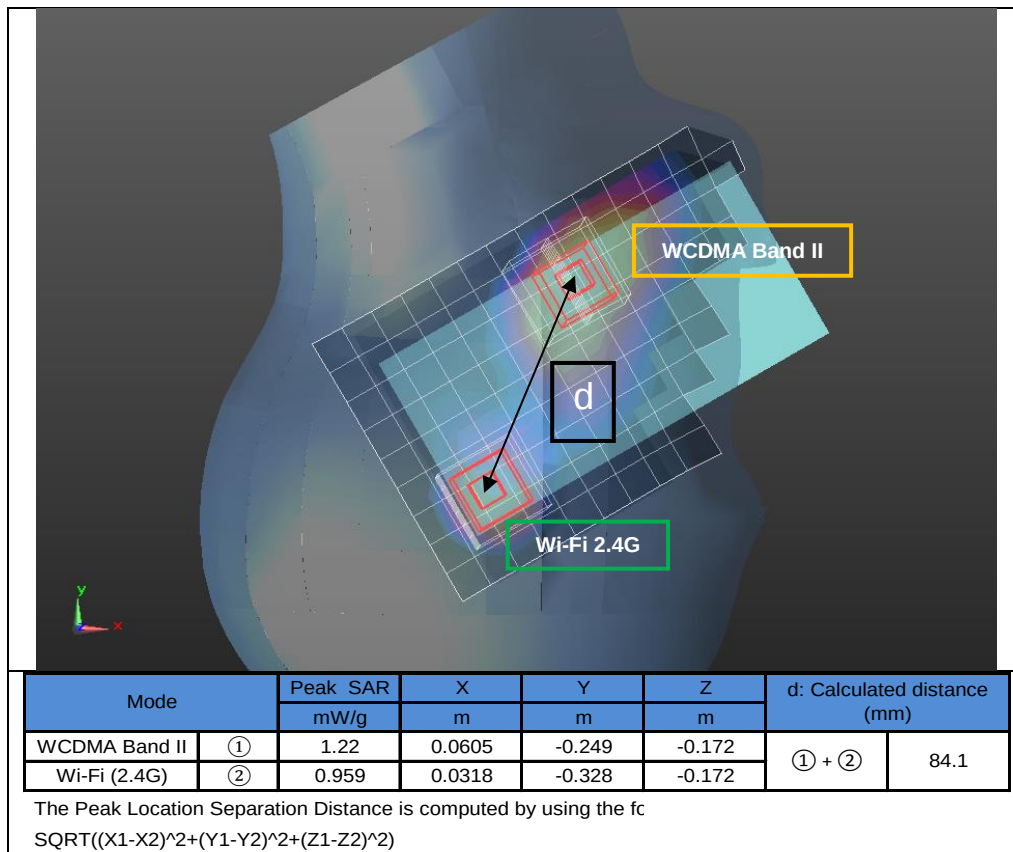


Figure (2)

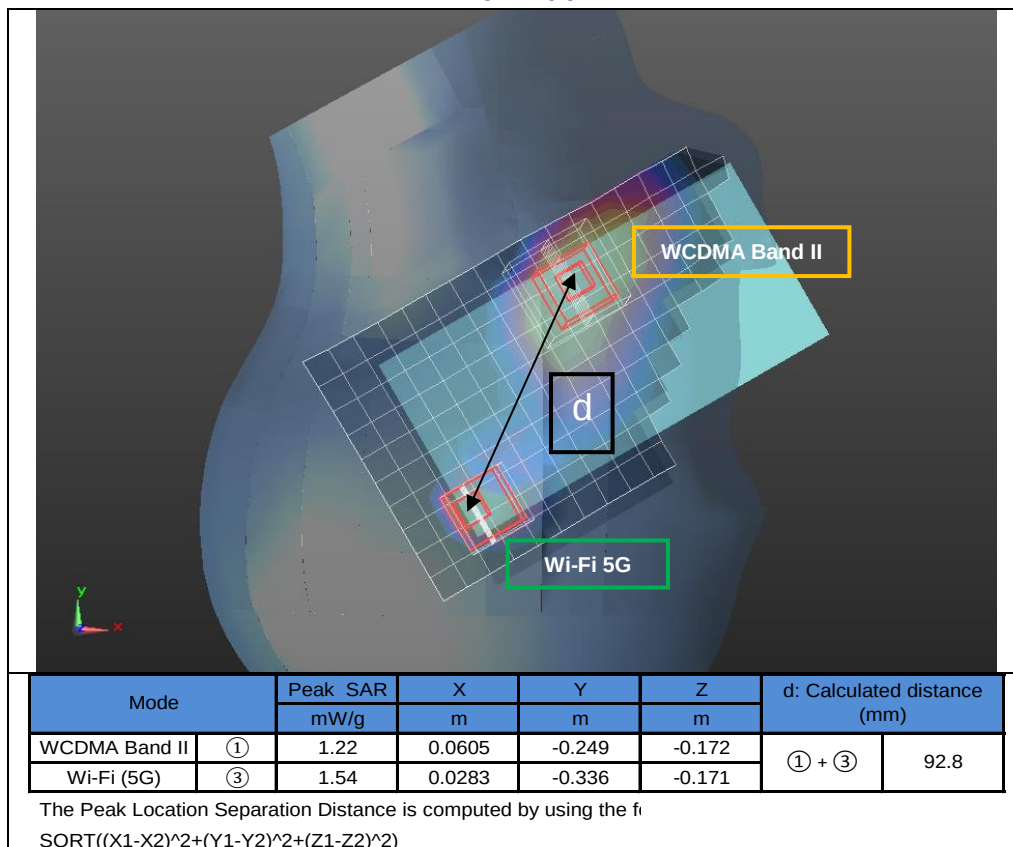


Figure (3)

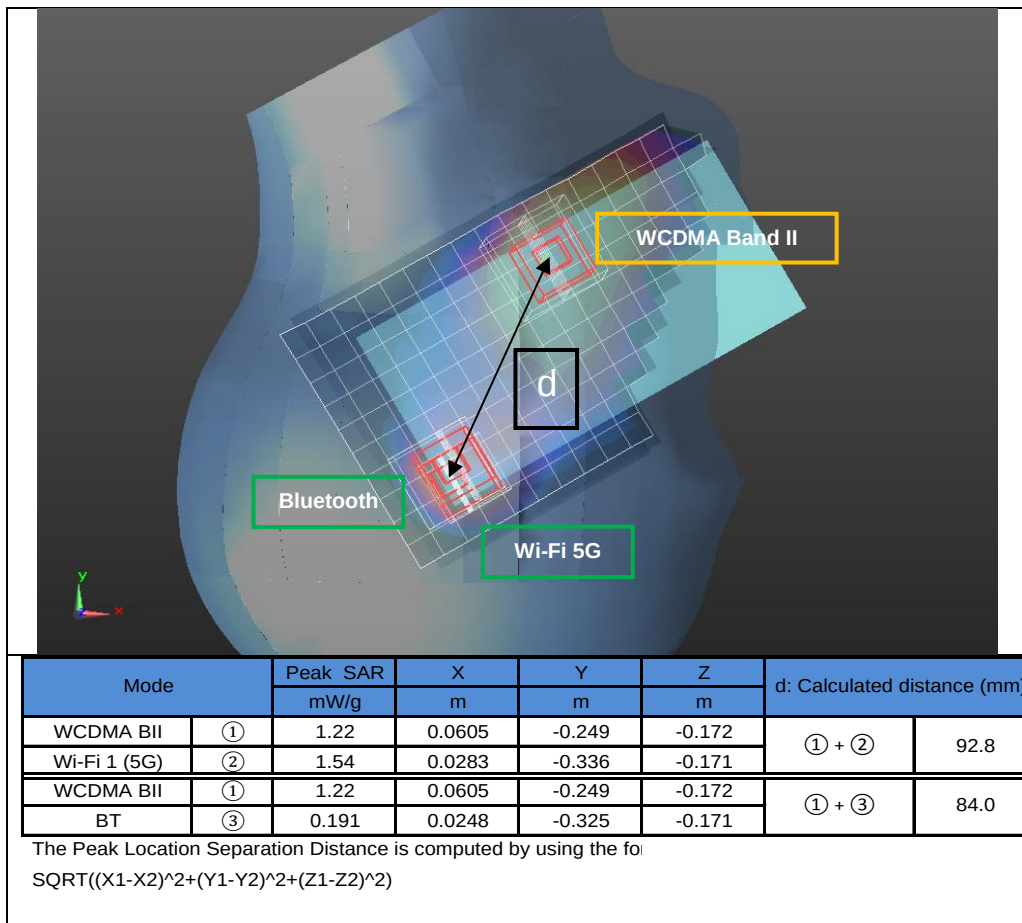


Figure (4)

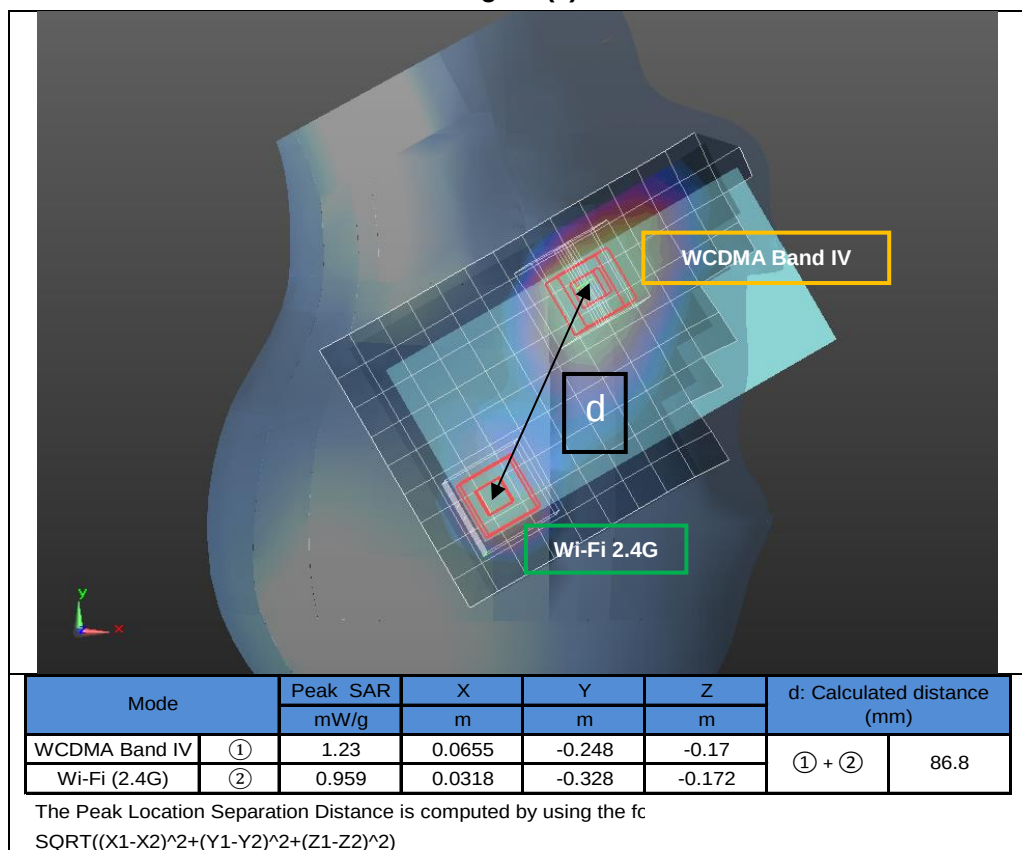


Figure (5)

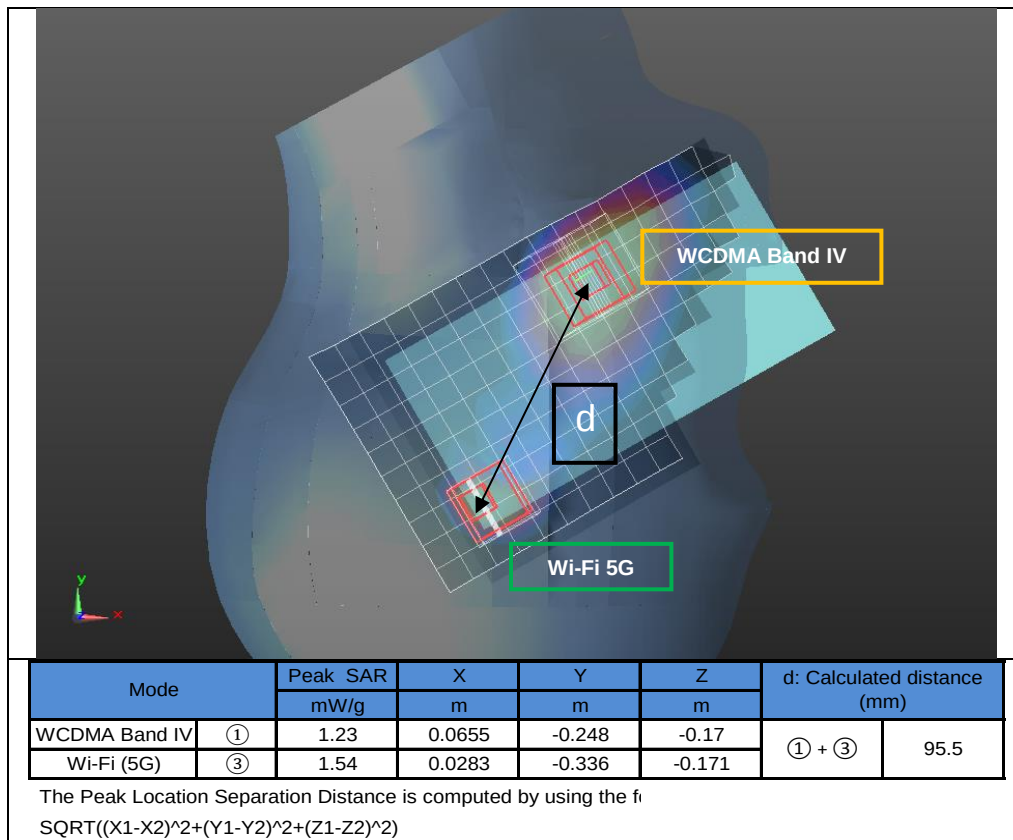


Figure (6)

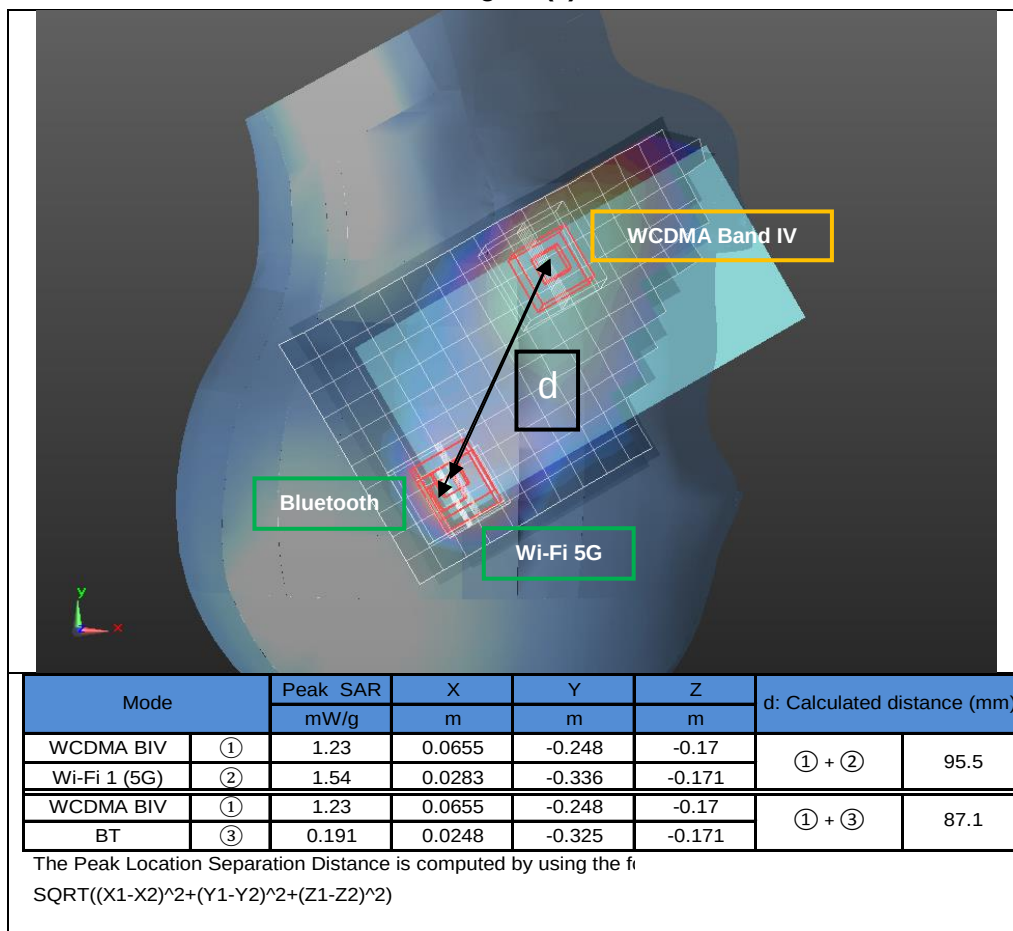


Figure (7)

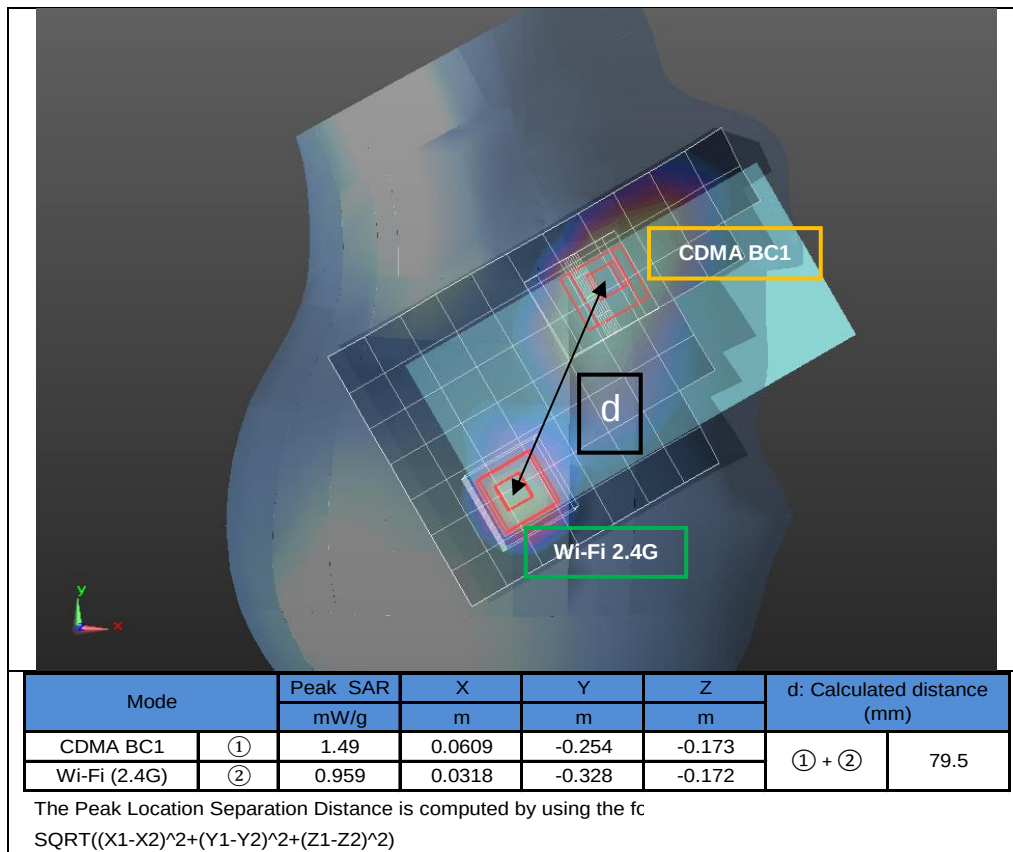


Figure (8)

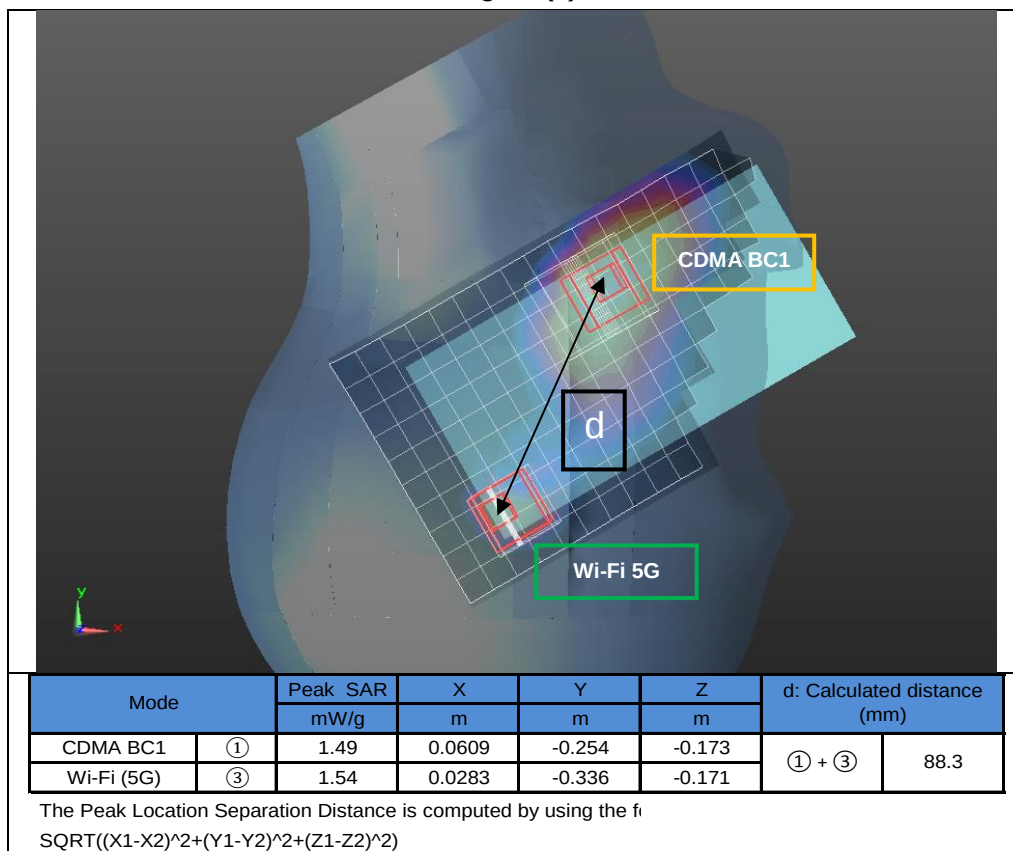


Figure (9)

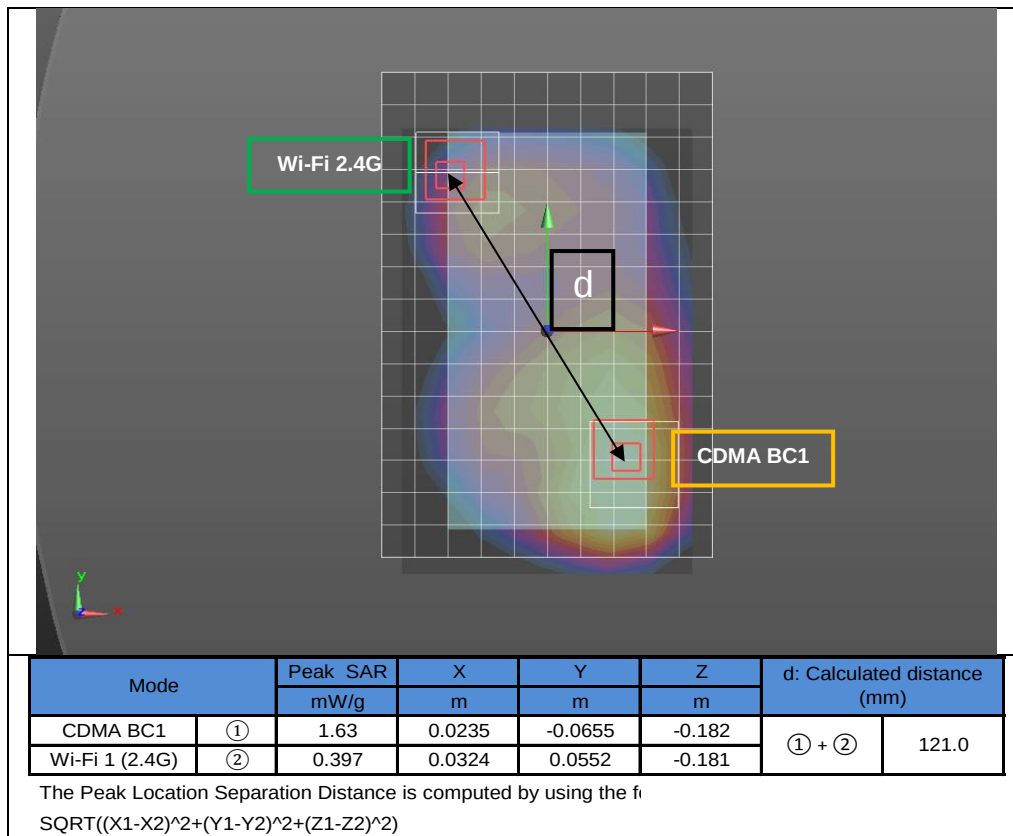


Figure (10)

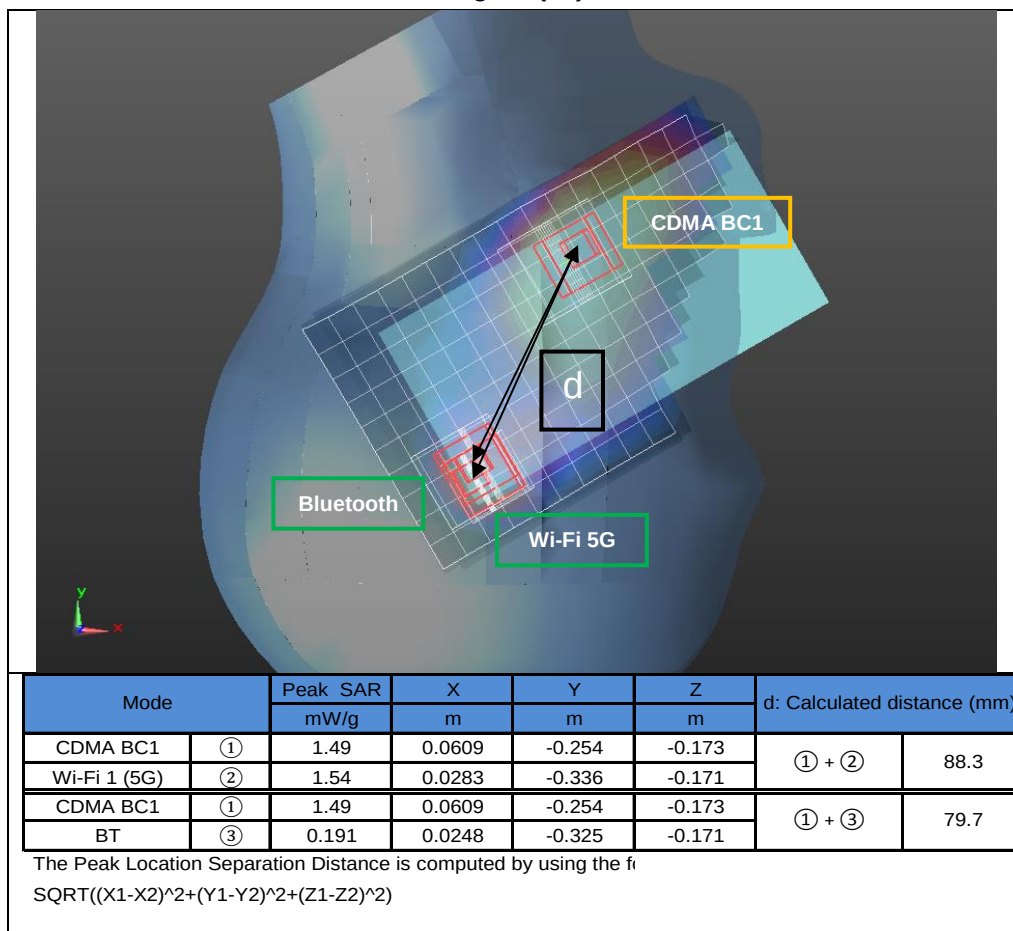


Figure (11)

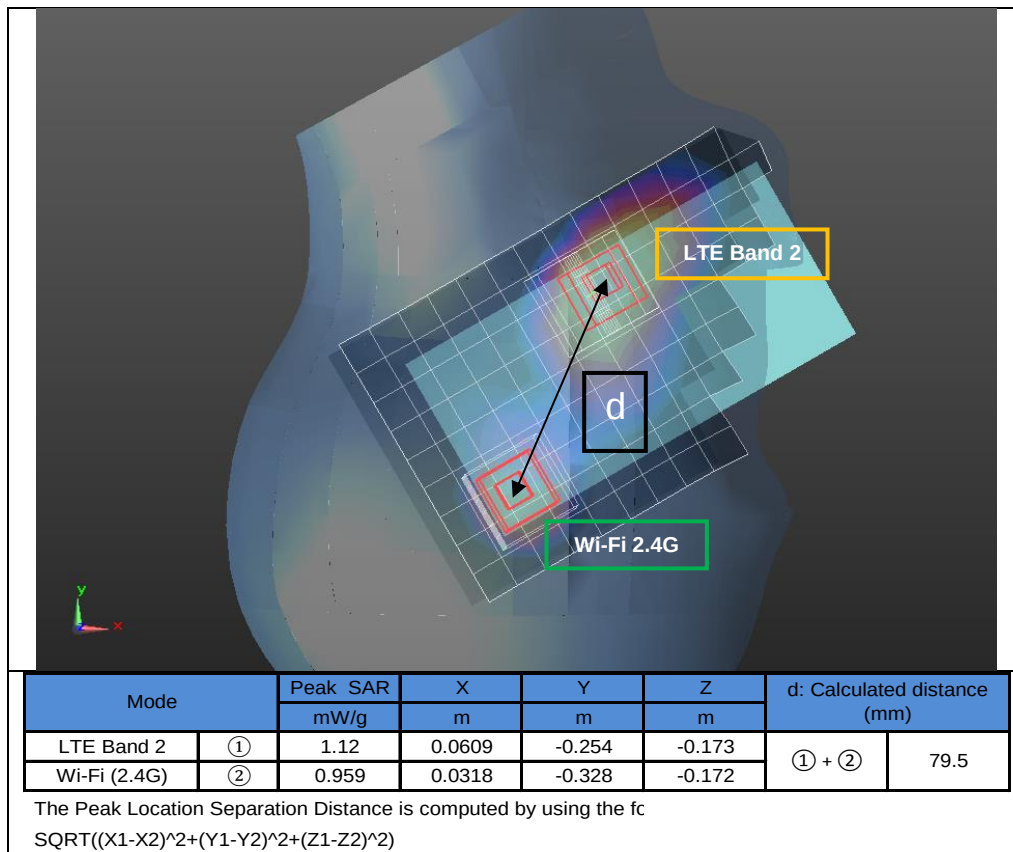


Figure (12)

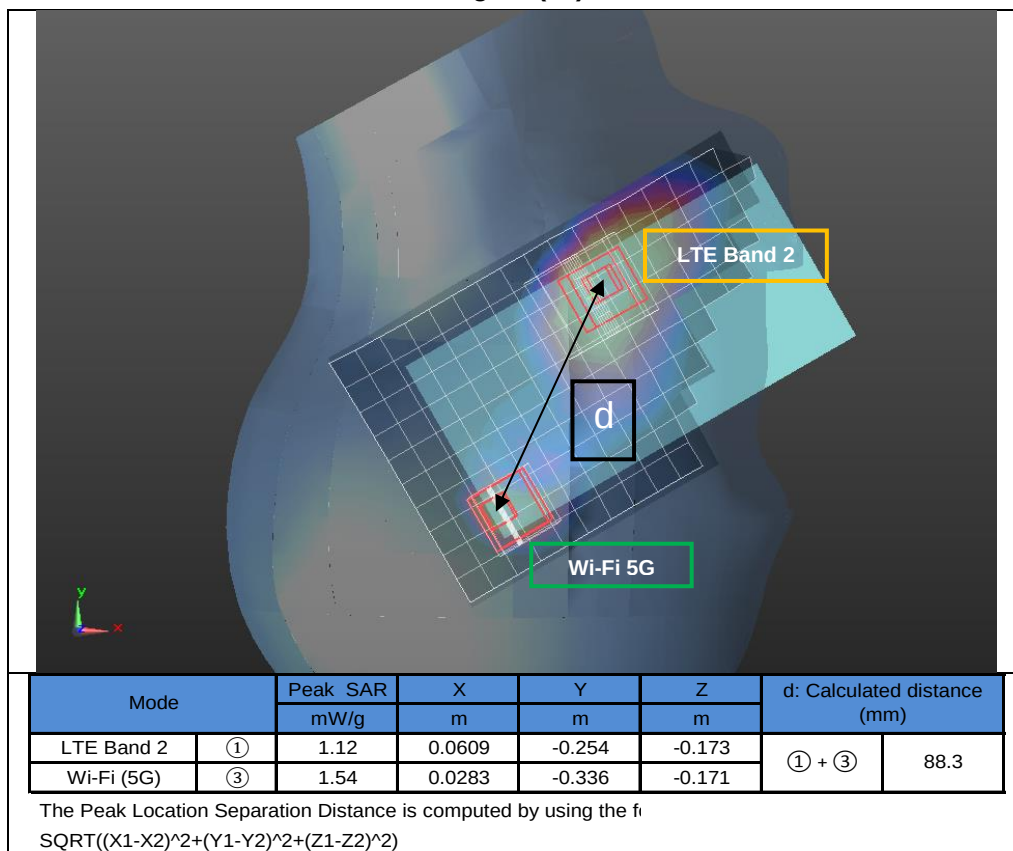


Figure (13)

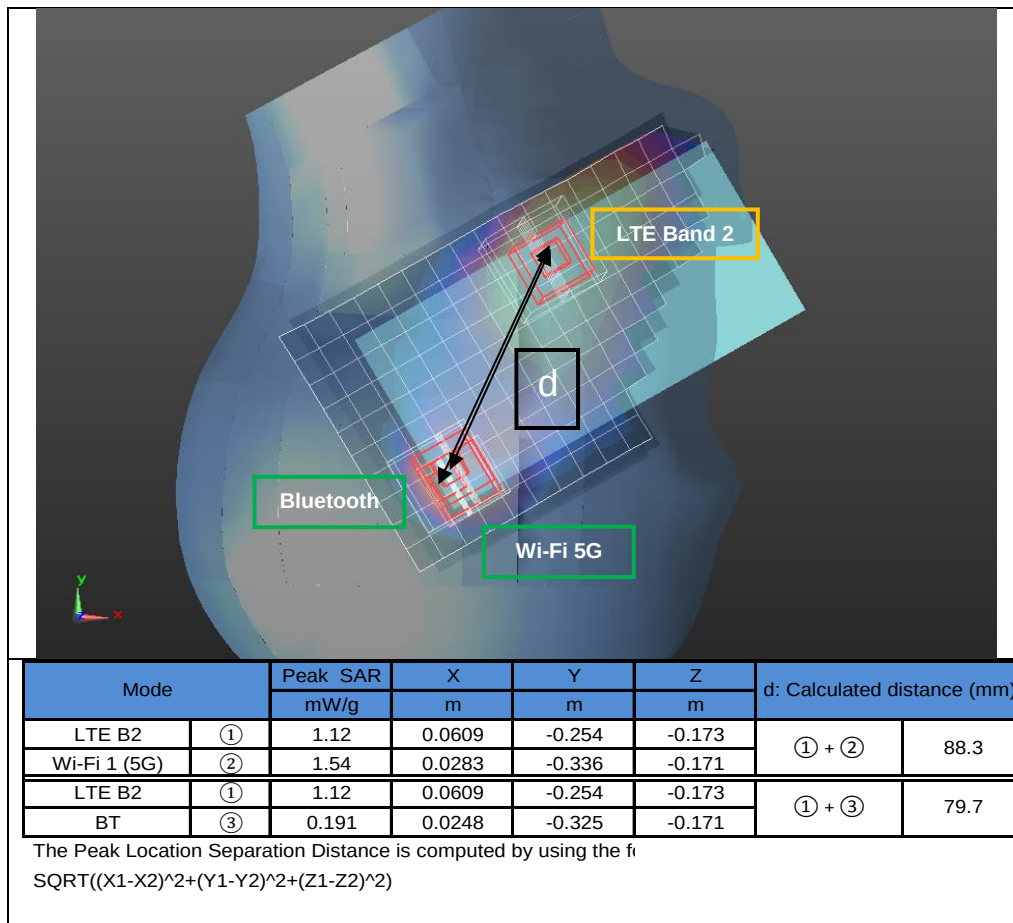


Figure (14)

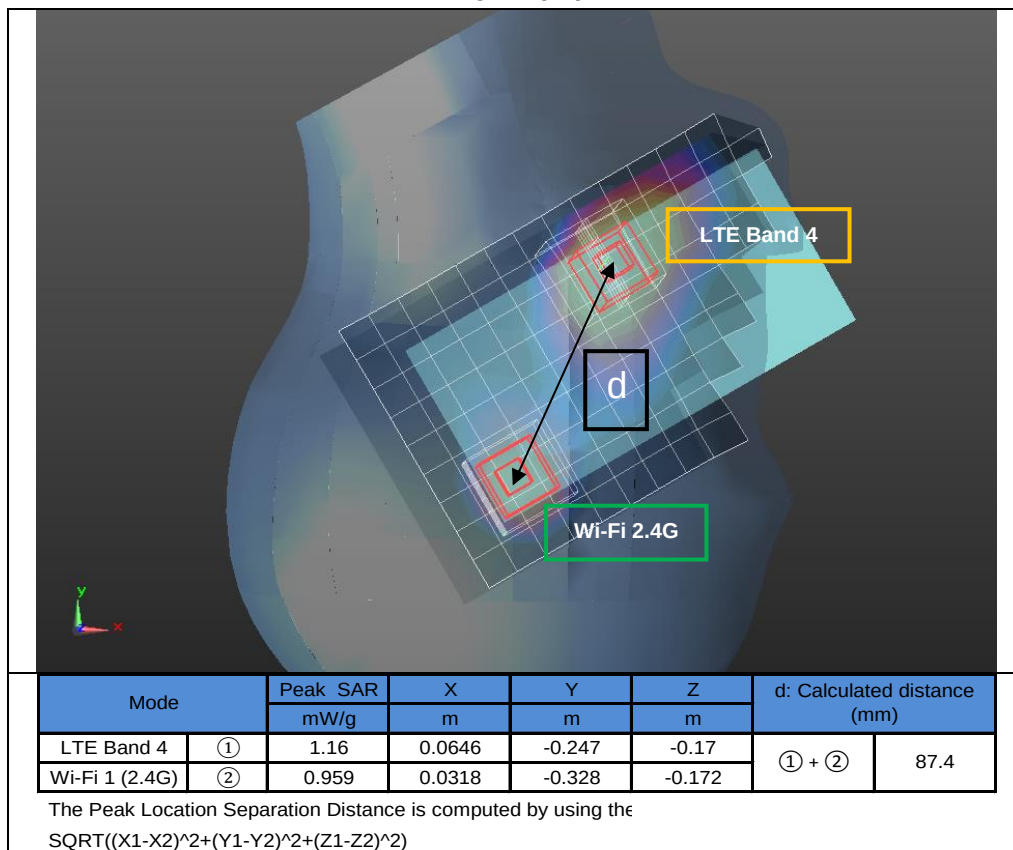


Figure (15)

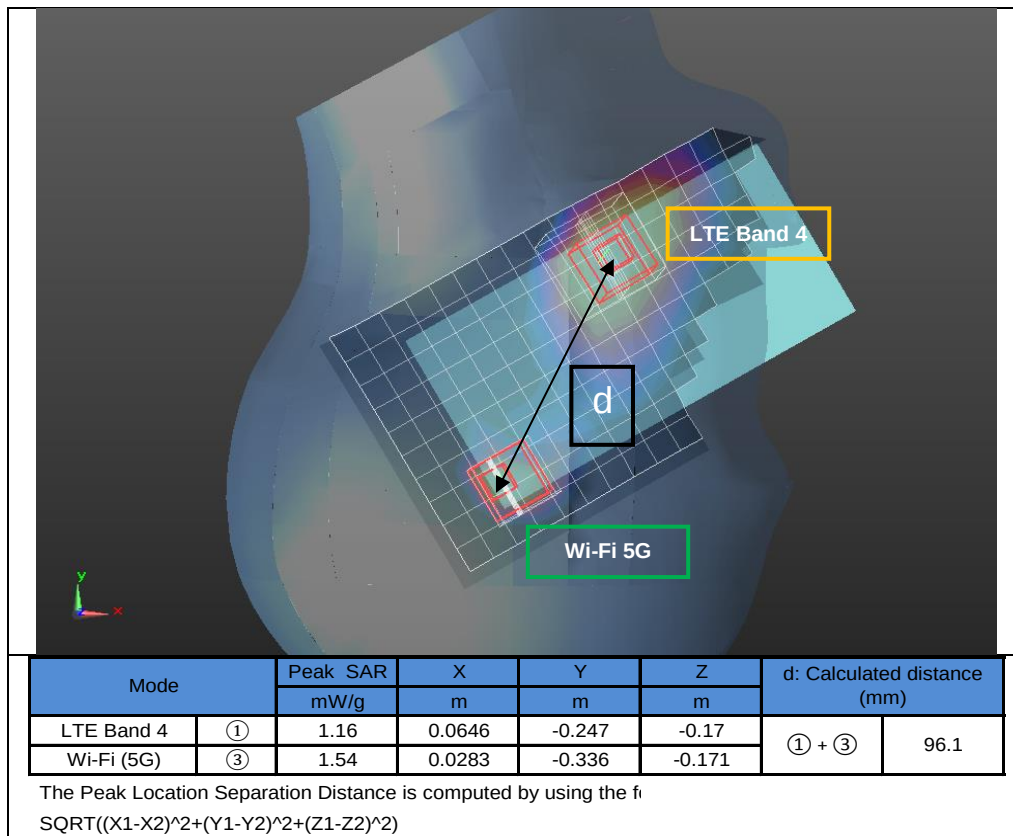


Figure (16)

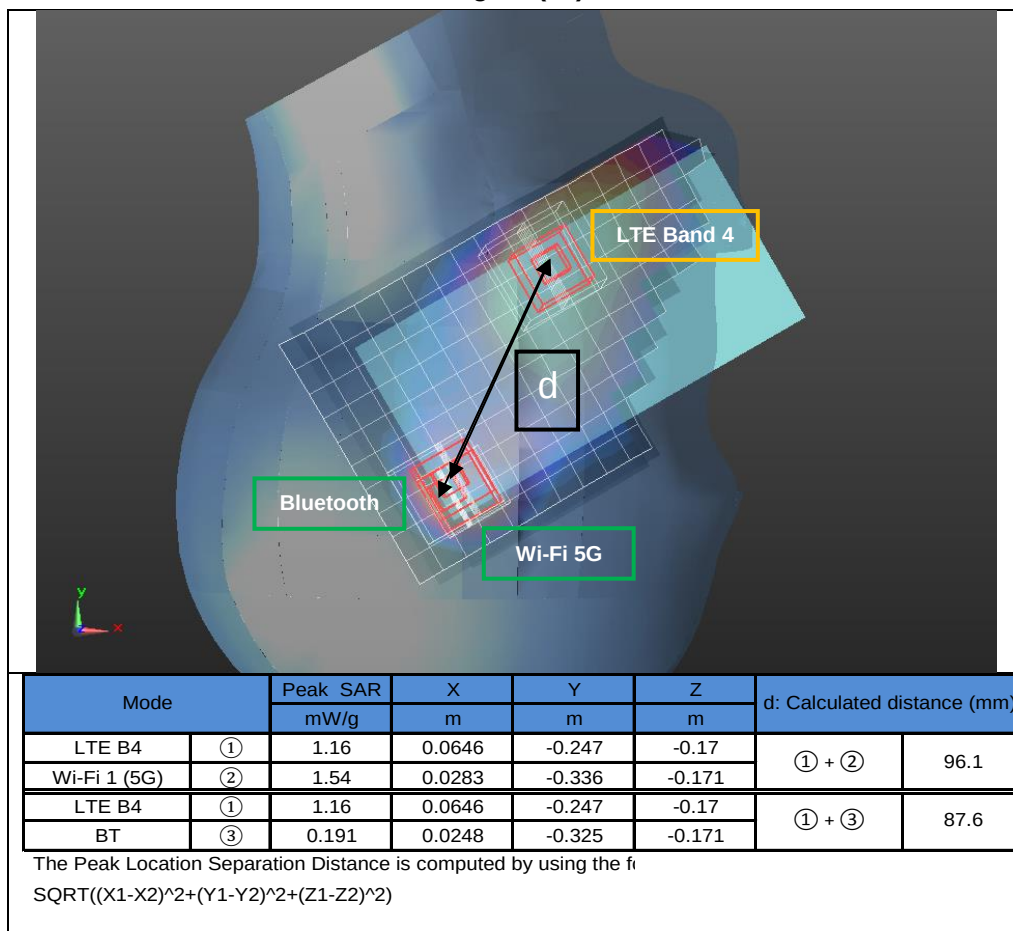


Figure (17)

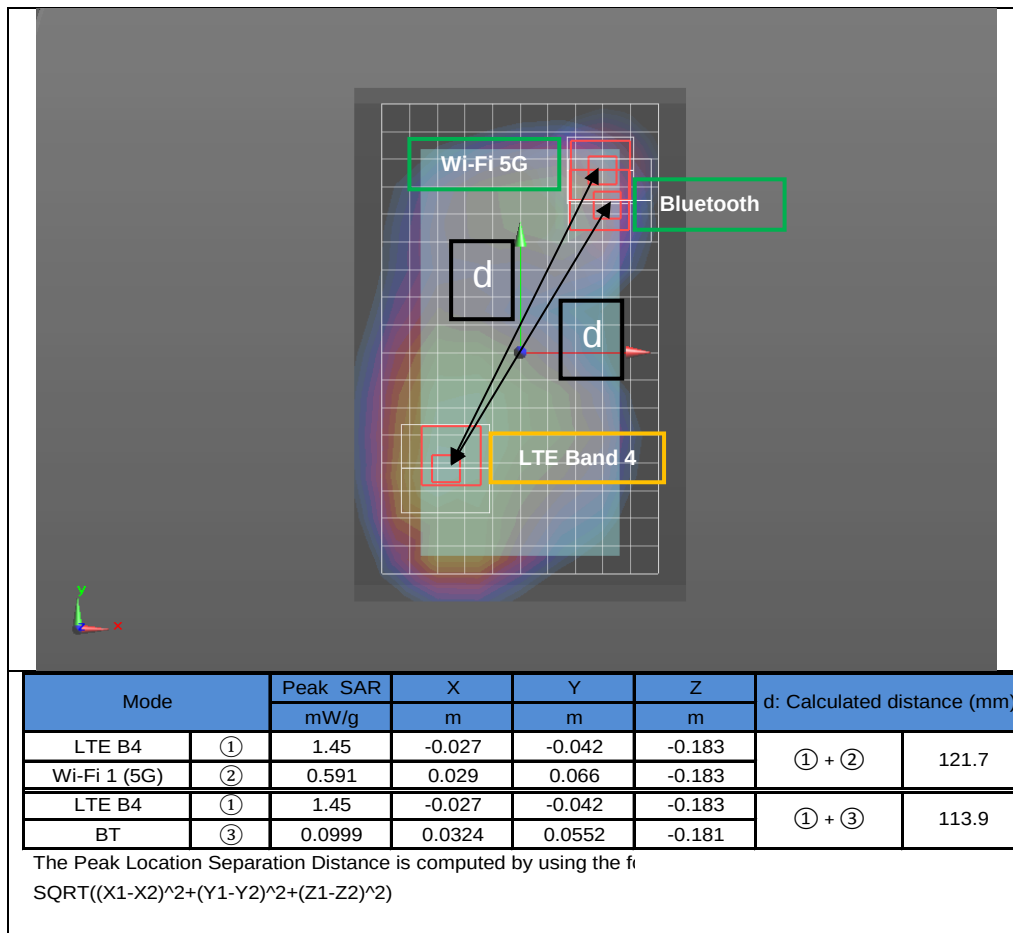


Figure (18)

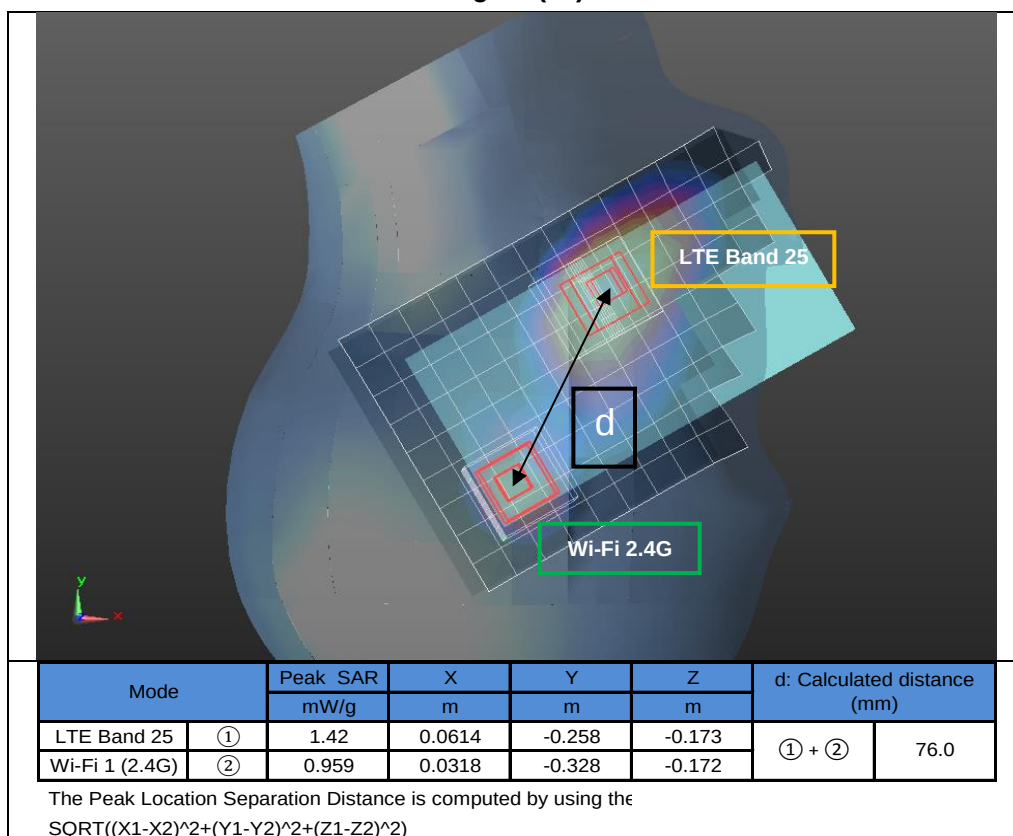


Figure (19)

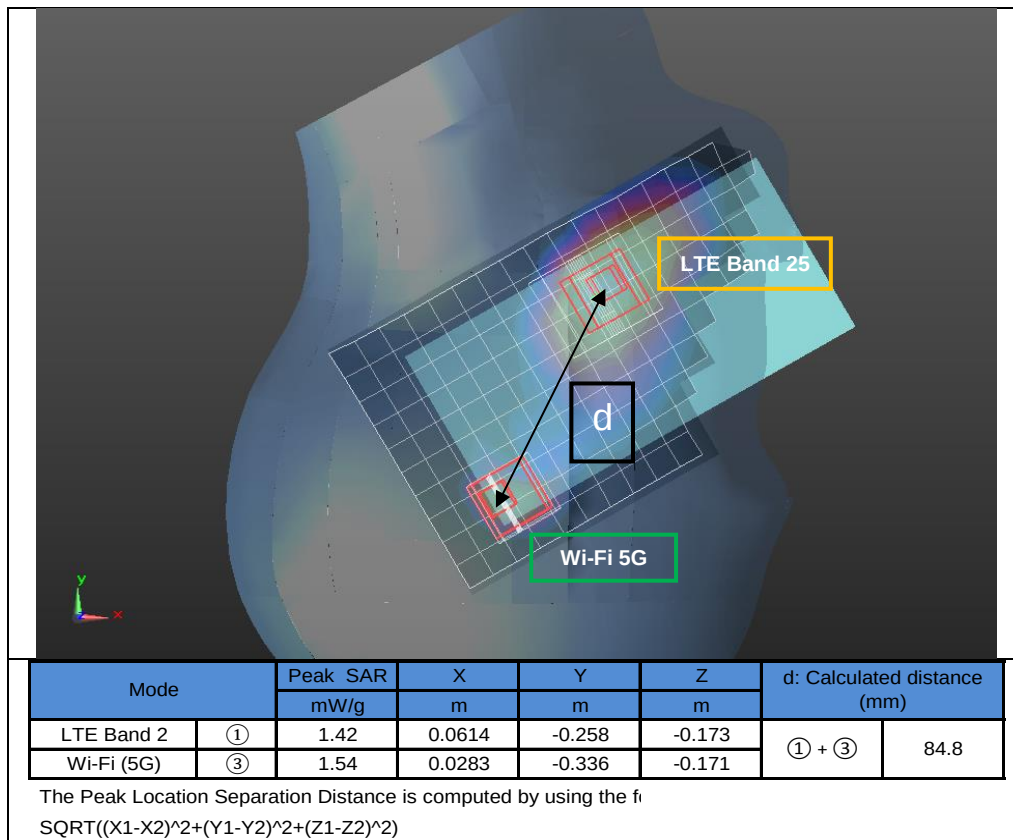
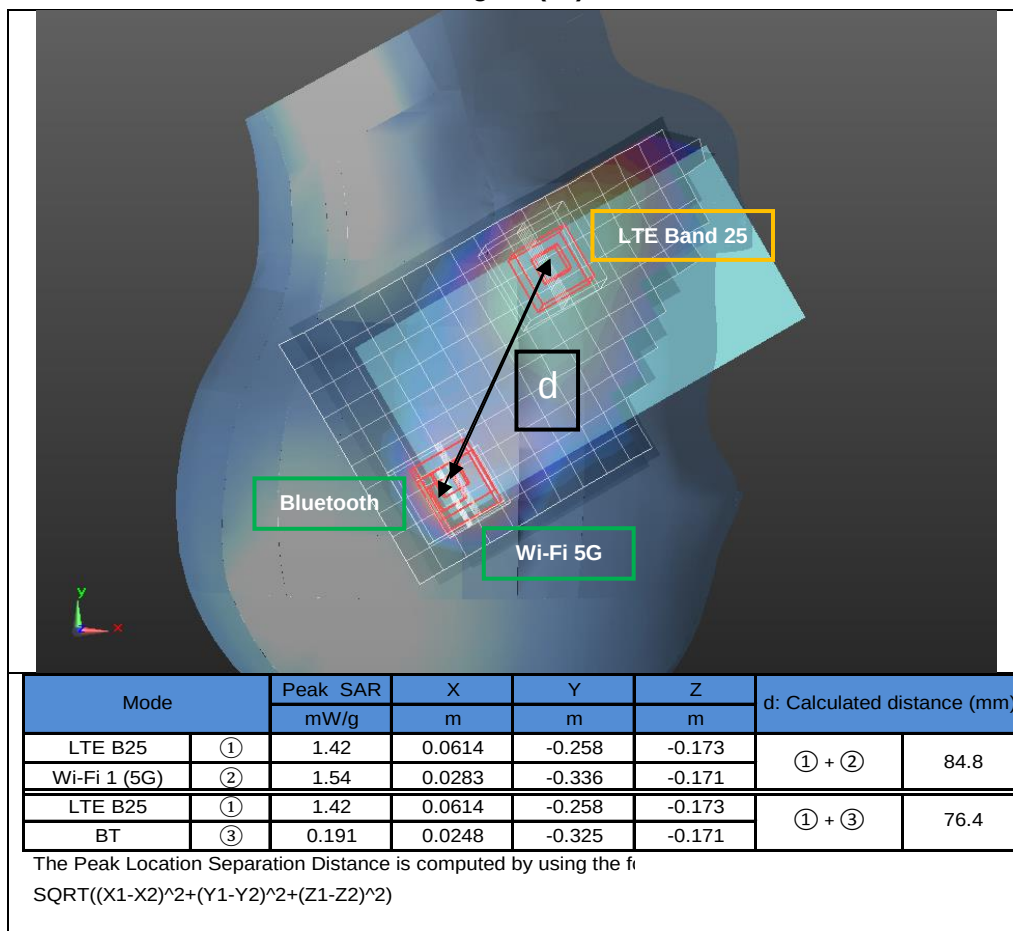


Figure (20)



Appendixes

Refer to separated files for the following appendixes.

A_15I21235v0 SAR Photos & Ant. Locations

B_15I21235v0 SAR System Check Plots

C_15I21235v0 SAR Highest Test Plots

D_15I21235v0 SAR Tissue Ingredients

E_15I21235v0 SAR Probe Cal. Certificates

F_15I21235v0 SAR Dipole Cal. Certificates

END OF REPORT