FCC 47 CFR § 2.1093
IEEE Std 1528-2013

SAR EVALUATION REPORT

FOR

GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac and NFC

MODEL NUMBER: SM-A525F/DS, SM-A525F

FCC ID: A3LSMA525F

REPORT NUMBER: 4789746865-S1V3

ISSUE DATE: 2/5/2021

Prepared for
SAMSUNG ELECTRONICS CO., LTD.
129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI,
GYEONGGI-DO, 16677, KOREA

Prepared by

UL Korea, Ltd.

26th floor, 152, Teheran-ro, Gangnam-gu Seoul, 06236, Korea

Suwon Test Site: UL Korea, Ltd. Suwon Laboratory
218 Maeyeong-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16675, Korea
TEL: (031) 337-9902
FAX: (031) 213-5433

IAS ACCREDITED

Testing Laboratory

TL-637

Revision History

Rev.	Date	Revisions	Revised By
V1	1/28/2021	Initial Issue	--
V2	2/2/2021	Revised Sec.6.1, Sec.6.3, Sec.9.4 & 9.5 and Appendix A.	Sunghoon kim
V3	2/5/2021	Revised Sec.10.	Sunghoon kim

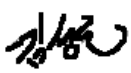
Table of Contents

1. Attestation of Test Results

Applicant Name		SAMSUNG ELECTRONICS CO.,LTD.			
FCC ID		A3LSMA525F			
Model Number		SM-A525F/DS, SM-A525F			
Applicable Standards		FCC 47 CFR § 2.1093 IEEE Std 1528-2013 Published RF exposure KDB procedures			
Exposure Category		SAR Limits (W/Kg)			
		Peak spatial-average (1g of tissue)		Product Specific 10g (10g of tissue)	
General population / Uncontrolled exposure		1.6		4.0	
RF Exposure Conditions		Equipment Class - The Highest Reported SAR (W/kg)			
		PCE	DTS	NII	DSS
Head		0.38	0.22	0.52	0.95
Body-worn		0.49	0.33	0.48	0.24
Hotspot		1.03	0.74	0.79	0.45
Product Specific 10g		N/A	N/A	2.62	N/A
Simultaneous TX	Head	1.58	0.59	1.58	1.58
	Body-worn	1.21	0.82	1.21	1.21
	Hotspot	1.55	1.31	1.55	1.55
	Product Specific 10g	N/A	N/A	N/A	N/A
Date Tested		Reference model (FCC ID : A3LSMA525M) : 12/7/2020 to 1/26/2021 Variant model (FCC ID : A3LSMA525F): 12/15/2020 to 1/28/2021			
Test Results		Pass			

UL Korea, Ltd. 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 Korea, Ltd. 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 Korea, Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Korea, Ltd. 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 IAS, any agency of the Federal Government, or any agency of any government.

Approved & Released By:	Prepared By:
	
Justin Park Operations Leader UL Korea, Ltd. Suwon Laboratory	Sunghoon Kim Test Engineer UL Korea, Ltd. Suwon Laboratory

1.1. The Highest Reported SAR for RF exposure conditions for each bands

Equipment Class	Band	The Highest Reported SAR (W/kg)			
		1g of tissue			10g of tissue
		Head Exposure condition	Body-worn Exposure condition	Hotspot Exposure condition	Product Specific Exposure condition
PCE	GSM 850	**0.375**	0.448	0.478	N/A
	GSM 1900	0.131	0.156	0.388	N/A
	WCDMA Band II	0.282	0.267	0.643	N/A
	WCDMA Band IV	0.246	0.451	0.908	N/A
	WCDMA Band V	0.328	0.346	0.372	N/A
	LTE Band 2	0.226	0.266	0.477	N/A
	LTE Band 4	N/A	N/A	N/A	N/A
	LTE Band 5	0.327	0.388	0.424	N/A
	LTE Band 12	0.340	**0.490**	0.508	N/A
	LTE Band 17	N/A	N/A	N/A	N/A
	LTE Band 26	0.362	0.447	0.483	N/A
	LTE Band 41	0.232	0.185	0.345	N/A
	LTE Band 66	0.349	0.406	**1.033**	N/A
DTS	2.4GHz WLAN	**0.217**	**0.325**	**0.741**	N/A
UNII	5GHz WLAN	**0.523**	**0.479**	**0.794**	**2.619**
DSS	Bluetooth	**0.947**	**0.240**	**0.451**	N/A

Note(s):

The Highest Reported SAR value are determined to be the higher of both Reference model and Variant model.

1.2. Introduction Of Test Data Reuse

This report referenced from the FCC ID: A3LSMA525M SAR (FCC 47 CFR § 2.1093, IEEE 1528-2013).

And the applicant takes full responsibility that the test data as referenced in this report represent compliance for this FCC ID..

1.3. Difference

The FCC ID: A3LSMA525F shares the same enclosure and circuit board as FCC ID:

A3LSMA525M. The antennas (WWAN & WLAN & BT) and surrounding circuitry and layout are identical between these two units.

After confirming through Spot-check SAR evaluation that the performance of the FCC ID: A3LSMA525M remains representative of FCC ID: A3LSMA525F. The test data of FCC ID: A3LSMA525M being submitted for this application to cover WWAN & WLAN & BT features.

1.4. Spot-Check Verification Data

Band		Antenna	RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Reference Model (FCC ID : A3LSMA525M) Highest configuration Reported SAR (W/kg)	Variant Model (FCC ID : A3LSMA525F) Spot check Reported SAR (W/kg)	Diviation (%)	Note
GSM	850	Main 1 Ant.	Head	GPRS 4 slots	0	Right Touch	0.375	0.342	-8.8	
			Body-worn	GPRS 4 slots	15	Rear	0.448	0.435	-2.9	
			Hotspot	GPRS 4 slots	10	Rear	0.473	0.478	1.1	
GSM	1900	Main 2 Ant.	Head	GPRS 4 slots	0	Right Touch	0.131	0.120	-8.4	
			Body-worn	GPRS 4 slots	15	Rear	0.156	0.155	-0.6	
			Hotspot	GPRS 4 slots	10	Rear	0.341	0.388	13.8	
WCDMA	Band II	Main 2 Ant.	Head	Rel 99 RMC	0	Left Touch	0.161	0.282	75.2	1
			Body-worn	Rel 99 RMC	15	Rear	0.267	0.248	-7.1	
			Hotspot	Rel 99 RMC	10	Rear	0.539	0.643	19.3	
WCDMA	Band IV	Main 2 Ant.	Head	Rel 99 RMC	0	Right Touch	0.271	0.223	-17.7	
			Body-worn	Rel 99 RMC	15	Front	0.451	0.306	-32.2	
			Hotspot	Rel 99 RMC	10	Edge 3	0.907	0.908	0.1	
WCDMA	Band V	Main 1 Ant.	Head	Rel 99 RMC	0	Right Touch	0.281	0.328	16.7	
			Body-worn	Rel 99 RMC	15	Rear	0.322	0.346	7.5	
			Hotspot	Rel 99 RMC	10	Rear	0.362	0.372	2.8	
LTE	Band 2	Main 2 Ant.	Head	QPSK	0	Left Touch	0.131	0.226	72.5	1
			Body-worn	QPSK	15	Rear	0.164	0.266	62.2	1
			Hotspot	QPSK	10	Edge 3	0.457	0.477	4.4	
LTE	Band 12	Main 1 Ant.	Head	QPSK	0	Right Touch	0.289	0.340	17.6	
			Body-worn	QPSK	15	Rear	0.441	0.490	11.1	
			Hotspot	QPSK	10	Rear	0.478	0.499	4.4	
LTE	Band 26	Main 1 Ant.	Head	QPSK	0	Left Touch	0.316	0.362	14.6	
			Body-worn	QPSK	15	Rear	0.400	0.447	11.8	
			Hotspot	QPSK	10	Rear	0.474	0.483	1.9	
LTE	Band 41	Main 2 Ant.	Head	QPSK	0	Left Touch	0.232	0.175	-24.6	
			Body-worn	QPSK	15	Front	0.185	0.142	-23.2	
			Hotspot	QPSK	10	Front	0.345	0.301	-12.8	
LTE	Band 66	Main 2 Ant.	Head	QPSK	0	Left Touch	0.349	0.325	-6.9	
			Body-worn	QPSK	15	Front	0.406	0.327	-19.5	
			Hotspot	QPSK	10	Edge 3	1.033	0.975	-5.6	
Wi-Fi	DTS	WiFi/BT 2.4G Ant.	Head	802.11b	0	Left Tilt	0.217	0.198	-8.8	
			Body-worn	802.11b	15	Rear	0.316	0.325	2.8	
			Hotspot	802.11b	10	Edge 1	0.741	0.638	-13.9	
Wi-Fi	U-NII 2A	WiFi/BT 5G Ant.	Head	802.11n HT40	0	Right Touch	0.218	0.125	-42.7	
			Body-worn	802.11a	15	Rear	0.287	0.204	-28.9	
			Product Specific 10-g	802.11a	0	Edge 4	1.381	1.025	-25.8	
Wi-Fi	U-NII 2C	WiFi/BT 5G Ant.	Head	802.11n HT40	0	Right Touch	0.523	0.390	-25.4	
			Body-worn	802.11a	15	Rear	0.460	0.334	-27.4	
			Product Specific 10-g	802.11a	0	Edge 4	2.619	1.822	-30.4	
Wi-Fi	U-NII 3	WiFi/BT 5G Ant.	Head	802.11n HT40	0	Right Touch	0.370	0.217	-41.4	
			Body-worn	802.11a	15	Rear	0.479	0.316	-34.0	
			Hotspot	802.11a	10	Edge 4	0.780	0.794	1.8	
Wi-Fi	Bluetooth	WiFi/BT 2.4G Ant.	Head	GFSK	0	Left Tilt	0.730	0.947	29.7	
			Body-worn	GFSK	15	Rear	0.210	0.240	14.3	
			Hotspot	GFSK	10	Edge 1	0.366	0.451	23.2	

Note(s):

1. According to Spot-check procedures of manufacturer, If SAR measured value was less than 0.4 W/kg, no further tests were performed even if the deviation was more than 30%. For Spot-check procedures and Full test results, please see Section.10.

1.5. Reference Detail

Reference application that contains the reused reference data.

Equipment Class	Reference FCC ID (Parent)	Application Type	Reference Test report number	Exhibit Type	Varient Test report number	Data Re-used
PCE	A3LSMA525M	Original Grant	4789746830-S1	Test Report	4789746865-S1	All (SAR results)
DTS	A3LSMA525M	Original Grant	4789746830-S1	Test Report	4789746865-S1	All (SAR results)
DSS	A3LSMA525M	Original Grant	4789746830-S1	Test Report	4789746865-S1	All (SAR results)
NII	A3LSMA525M	Original Grant	4789746830-S1	Test Report	4789746865-S1	All (SAR results)

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, ANSI C63.26-2015 the following FCC Published RF exposure KDB procedures:

- 248227 D01 802.11 Wi-Fi SAR v02r02
- 447498 D01 General RF Exposure Guidance v06
- 648474 D04 Handset SAR v01r03
- 690783 D01 SAR Listings on Grants v01r03
- 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04
- 865664 D02 RF Exposure Reporting v01r02
- 941225 D01 3G SAR Procedures v03r01
- 941225 D05 SAR for LTE Devices v02r05
- 941225 D05A LTE Rel.10 KDB Inquiry Sheet v01r02
- 941225 D06 Hotspot Mode v02r01
- 941225 D07 UMPC Mini Tablet v01r02
- 971168 D01 Power Meas License Digital System v03r01

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

- TCB workshop October, 2014; Page 36, RF Exposure Procedures Update (Overlapping LTE Bands)
- TCB workshop October, 2014; Page 37, RF Exposure Procedures Update (Other LTE Considerations)
- TCB workshop October, 2016; Page 7, RF Exposure Procedures (Bluetooth Duty Factor)
- TCB workshop October, 2016; Page 18, RF Exposure Procedures (DUT Holder Perturbations)
- TCB workshop May, 2017; Page 6, RF Exposure Procedures (LTE Test Conditions)
- TCB workshop April, 2018; Page 3, RF Exposure Procedures (LTE DL CA SAR Test Exclusion Update)
- TCB workshop April, 2019 Page 19, RF Exposure Procedures (Tissue Simulating Liquids (TSL))
- TCB workshop October, 2020 Page 1, Test Reductions via Data Referencing for Closely Related Products

3. Facilities and Accreditation

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

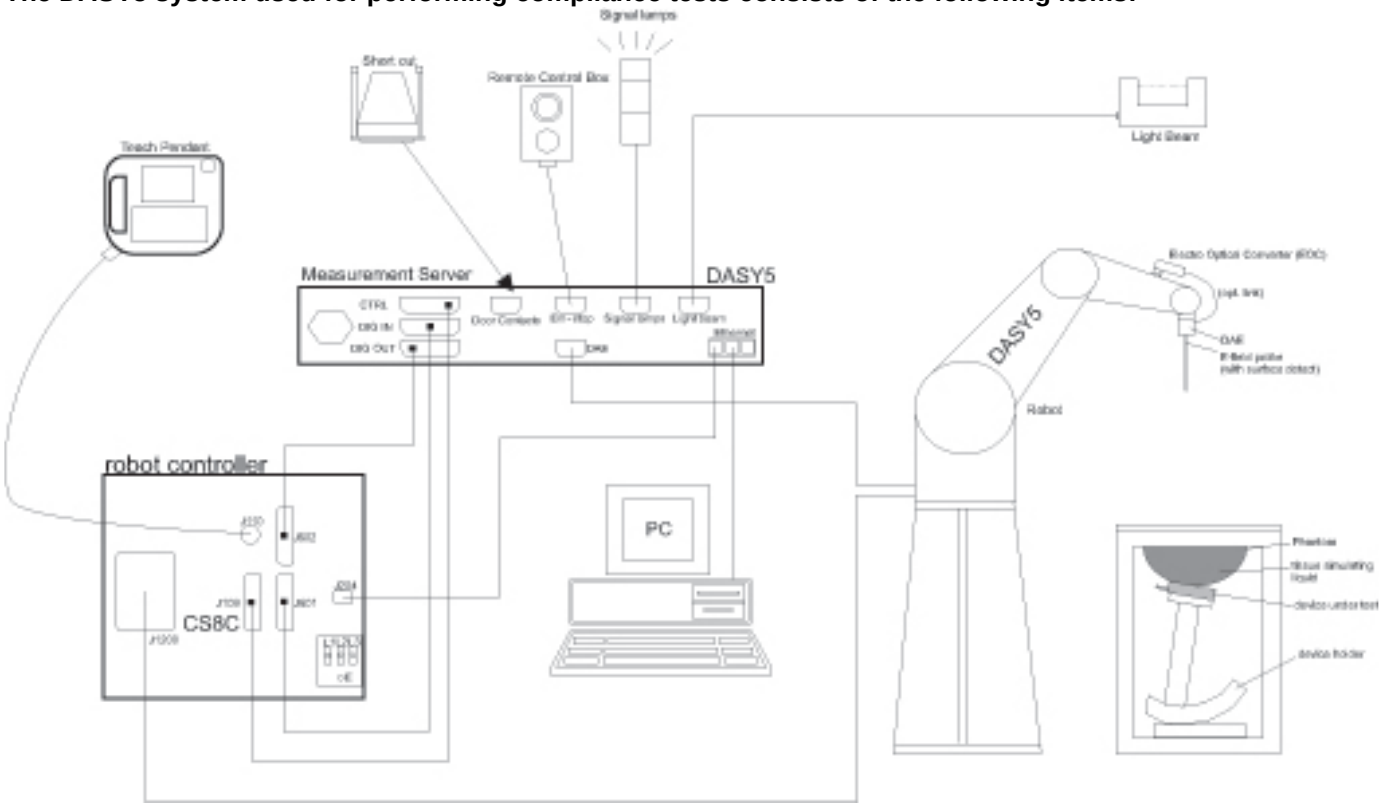
Suwon
SAR 1 Room
SAR 3 Room
SAR 4 Room
SAR 5 Room

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637.
The full scope of accreditation can be viewed at https://www.iasonline.org/wp-content/uploads/2017/05/TL-637-cert-New.pdf.

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

Step 3: Zoom Scan

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

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

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

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

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

Step 4: Power drift measurement

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

Step 5: Z-Scan (FCC only)

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

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	E5071C	MY46522054	8-4-2021
Dielectric Assessment Kit	SPEAG	DAK-3.5	1196	7-17-2021
Shorting block	SPEAG	DAK-3.5 Short	SMDAK 200 BA	N/A
Thermometer	LKM	DTM3000	3424	8-11-2021

System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
MXG Analog Signal Generator	Agilent	N5181A	MY50145882	8-4-2021
Power Sensor	Agilent	U2000A	MY60180020	9-9-2021
Power Sensor	Agilent	U2000A	MY54260007	8-7-2021
Power Amplifier	EXODUS	1410025-AMP2027-10003	10003	8-4-2021
Directional Coupler	Agilent	772D	MY52180193	8-4-2021
Directional Coupler	Agilent	778D	MY52180432	8-4-2021
Low Pass Filter	MICROLAB	LA-15N	3943	8-4-2021
Low Pass Filter	FILTRON	L14012FL	1410003S	8-4-2021
Low Pass Filter	MICROLAB	LA-60N	3942	8-4-2021
Attenuator	Agilent	8491B/003	MY39271969	12-3-2021
Attenuator	Agilent	8491B/010	MY39271981	9-9-2021
Attenuator	Agilent	8491B/020	MY39271973	9-9-2021
E-Field Probe (SAR1)	SPEAG	EX3DV4	7376	7-31-2021
E-Field Probe (SAR3)	SPEAG	EX3DV4	7313	2-25-2021
E-Field Probe (SAR4)	SPEAG	EX3DV4	7330	2-21-2021
E-Field Probe (SAR4)	SPEAG	EX3DV4	7314	5-29-2021
E-Field Probe (SAR5)	SPEAG	EX3DV4	3871	8-28-2021
Data Acquisition Electronics (SAR1)	SPEAG	DAE4	1468	8-25-2021
Data Acquisition Electronics (SAR3)	SPEAG	DAE4	1494	7-23-2021
Data Acquisition Electronics (SAR4)	SPEAG	DAE4	1591	8-25-2021
Data Acquisition Electronics (SAR5)	SPEAG	DAE4	1343	8-25-2021
System Validation Dipole	SPEAG	D750V3	1122	2-24-2022
System Validation Dipole	SPEAG	D835V2	4d174	2-24-2022
System Validation Dipole	SPEAG	D1750V2	1125	2-21-2022
System Validation Dipole	SPEAG	D1900V2	5d199	3-19-2022
System Validation Dipole	SPEAG	D2450V2	939	7-25-2021
System Validation Dipole	SPEAG	D2600V2	1097	9-19-2021
System Validation Dipole	SPEAG	D5GHzV2	1209	2-27-2022
Thermometer (SAR1)	Lutron	MHB-382SD	AH.50215	8-11-2021
Thermometer (SAR3)	Lutron	MHB-382SD	AH.50213	8-11-2021
Thermometer (SAR4),(SAR5)	Lutron	MHB-382SD	AH.91463	8-11-2021

Others

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Base Station Simulator	R & S	CMW500	150313	8-4-2021
Base Station Simulator	R & S	CMW500	150314	8-4-2021
Base Station Simulator	R & S	CMW500	162790	8-4-2021
Wireless Connectivity Tester	R & S	CMW270	100982	8-3-2021

Note(s):

Refer to Appendix F that mentioned about justification for Extended SAR Dipole Calibrations. (D2450V2 (SN : 939), D2600V2 (SN : 1097))

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 and the measured 10-g SAR within a frequency band is < 3.75 W/kg. The expanded SAR measurement uncertainty must be ≤ 30%, for a confidence interval of k = 2. If these conditions are met, extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval.

5.1. DECISION RULE

Decision rule for statement(s) of conformity is based on Procedures 1, Clause 4.4.2 in IEC Guide 115:2007.

6. Device Under Test (DUT) Information

6.1. DUT Description

Device Dimension	Refer to Appendix A.		
Back Cover	☒ The Back Cover is not removable.		
Battery Options	☒ The rechargeable battery is not user accessible		
Wireless Router (Hotspot)	Wi-Fi Hotspot mode permits the device to share its cellular data connection with other Wi-Fi-enabled devices. ☒ Mobile Hotspot (Wi-Fi 2.4 GHz) ☒ Mobile Hotspot (Wi-Fi 5.8 GHz_UNII-3 (Ch.149(20MHz)/Ch.151(40MHz)/Ch.155(80MHz)))		
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 GHz_UNII-1, Wi-Fi 5.8 GHz_UNII-3)		
Test Sample Information	**No.**	**S/N**	**Notes**
	1	R38N9002JJK	Main Conducted
	2	R38NB00W3LF	Wi-Fi & BT Conducted
	4	R38N9002JPP	SAR
	5	R38N9002JMR	SAR
	6	R38N9002JLM	SAR
	7	R38NC03HE7M	SAR
	8	R38NC03HD1X	SAR
	9	R38NC03HETF	SAR

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%
	Does this device support DTM (Dual Transfer Mode)? ☐ Yes ☒ No			
W-CDMA (UMTS)	Band II Band IV Band V	UMTS Rel. 99 (Voice & Data) HSDPA (Category 24) HSUPA (Category 6) DC-HSDPA (Category 24) HSPA+ (DL only)		100%
LTE	FDD Band 2 FDD Band 4 FDD Band 5 FDD Band 12 FDD Band 17 FDD Band 26 FDD Band 66 TDD Band 41	QPSK 16QAM 64QAM Rel. 12 Carrier Aggregation (1 Uplink and 3 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)		SISO mode : 98.8% (802.11b)
	5 GHz	802.11a 802.11n (HT20) 802.11n (HT40) 802.11ac (VHT20) 802.11ac (VHT40) 802.11ac (VHT80)		SISO mode: 98.7% (802.11a) 98.5% (802.11n (HT40))
	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 5.0 LE		76.9% (DH5)
NFC	13.56 MHz	Type A/B/F		N/A[3]

Notes:

1. The Bluetooth protocol is considered source-based averaging. Bluetooth GFSK (DH5) was verified to have the highest duty cycle of 76.9% and was considered and used for SAR Testing.
2. Duty cycle for Wi-Fi is referenced from the DTS and UNII report.
3. Measured Duty Cycle is not required due to SAR test exemption.

6.3. Nominal and Maximum Output Power

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

RF Air interface	Antenna	Mode	Time Slots	Max. RF Output Power (dBm)	
				Tune-up Limit	Frame Pwr
GSM850	Main 1 Ant.	Voice	1	**33.5**	**24.5**
		GPRS	1	**33.5**	**24.5**
		GPRS	2	**31.5**	**25.5**
		GPRS	3	**30.0**	**25.7**
		GPRS	4	**29.0**	**26.0**
		EGPRS	1	**26.5**	**17.5**
		EGPRS	2	**24.5**	**18.5**
		EGPRS	3	**22.5**	**18.2**
		EGPRS	4	**21.5**	**18.5**
GSM1900	Main 2 Ant.	Voice	1	**31.5**	**22.5**
		GPRS	1	**31.5**	**22.5**
		GPRS	2	**29.5**	**23.5**
		GPRS	3	**27.5**	**23.2**
		GPRS	4	**26.5**	**23.5**
		EGPRS	1	**26.0**	**17.0**
		EGPRS	2	**23.5**	**17.5**
		EGPRS	3	**22.0**	**17.7**
		EGPRS	4	**20.5**	**17.5**

RF Air interface	Antenna	Mode	Max. RF Output Power (dBm)
W-CDMA Band Ⅱ	Main 2 Ant.	R99	**25.5**
		HSDPA	**22.5**
		HSUPA	**22.5**
		DC-HSDPA	**22.5**
W-CDMA Band Ⅳ	Main 2 Ant.	R99	**24.5**
		HSDPA	**23.5**
		HSUPA	**23.5**
		DC-HSDPA	**23.5**
W-CDMA Band Ⅴ	Main 1 Ant.	R99	**25.5**
		HSDPA	**24.0**
		HSUPA	**24.0**
		DC-HSDPA	**24.0**

RF Air interface	Antenna	Mode	Max. RF Output Power (dBm)
LTE Band 2	Main 2 Ant.	QPSK	**25.5**
LTE Band 4	Main 2 Ant.	QPSK	**24.5**
LTE Band 5	Main 1 Ant.	QPSK	**25.5**
LTE Band 12	Main 1 Ant.	QPSK	**25.5**
LTE Band 17	Main 1 Ant.	QPSK	**25.5**
LTE Band 26	Main 1 Ant.	QPSK	**25.5**
LTE Band 66	Main 2 Ant.	QPSK	**25.0**
LTE Band 41	Main 2 Ant.	QPSK	**24.8**

RF Air interface	Mode	Max. RF Output Power (dBm)	Reduced RF Output Power (dBm)
WiFi 2.4 GHz (Ch.1 - Ch.10)	802.11b	**20.0**	**12.0**
	802.11g	**18.0**	**12.0**
	802.11n HT20	**18.0**	**12.0**
WiFi 2.4 GHz (Ch.11)	802.11b	**20.0**	**12.0**
	802.11g	**15.0**	**12.0**
	802.11n HT20	**15.0**	**12.0**
WiFi 2.4 GHz (Ch.12)	802.11b	**18.0**	**12.0**
	802.11g	**13.0**	**8.0**
	802.11n HT20	**13.0**	**8.0**
WiFi 2.4 GHz (Ch.13)	802.11b	**14.0**	**12.0**
	802.11g	**8.0**	**6.0**
	802.11n HT20	**6.0**	**6.0**
WiFi 5 GHz (UNII-1)	802.11a	**18.0**	**12.0**
	802.11n HT20	**18.0**	**12.0**
	802.11n HT40	**14.0**	**12.0**
	802.11ac VHT20	**17.0**	**12.0**
	802.11ac VHT40	**14.0**	**12.0**
	802.11ac VHT80	**13.0**	**11.0**
WiFi 5 GHz (UNII-2A)	802.11a	**18.0**	**12.0**
	802.11n HT20	**18.0**	**12.0**
	802.11n HT40	**14.0**	**12.0**
	802.11ac VHT20	**17.0**	**12.0**
	802.11ac VHT40	**14.0**	**12.0**
	802.11ac VHT80	**13.0**	**11.0**
WiFi 5 GHz (UNII-2C)	802.11a	**18 (ch.140: 12)**	**12.0**
	802.11n HT20	**18 (ch.140: 14)**	**12.0**
	802.11n HT40	**14.0**	**12.0**
	802.11ac VHT20	**17 (ch.140: 14)**	**12.0**
	802.11ac VHT40	**14.0**	**12.0**
	802.11ac VHT80	**13.0**	**11.0**
WiFi 5 GHz (UNII-3)	802.11a	**18.0**	**12.0**
	802.11n HT20	**18.0**	**12.0**
	802.11n HT40	**16.0**	**12.0**
	802.11ac VHT20	**17.0**	**12.0**
	802.11ac VHT40	**15.0**	**12.0**
	802.11ac VHT80	**13.0**	**11.0**
Bluetooth (Ch.0 - Ch.78)		**18.0**	
Bluetooth-EDR (Ch.0 - Ch.78)		**13.0**	
Bluetooth-LE		**7.0**	

Note(s):.

1. This device uses an independent fixed level power reduction mechanism for WLAN mode operations during RCV operation. Detailed descriptions of the power reduction mechanism are included in the operational description.

6.4. Power Back-off Operation

This device supports power back-off mode: WLAN (RCV).
For full details on how power back-off mode operates, refer to the Operational Description.

Power Back-off mode	Technologies Supported	Exposure Conditions Active			
		Head	Body-worn	Hotspot	Product Specific 10-g
WLAN (RCV)	Wi-Fi 2.4GHz Wi-Fi 5GHz	✓	N/A	N/A	N/A

6.5. 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 12	Frequency range: 699 – 716 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low			23060/ 704	23035/ 701.5	23025/ 700.5	23017/ 699.7
	Mid			23095/ 707.5	23095/ 707.5	23095/ 707.5	23095/ 707.5
	High			23130/ 711	23155/ 713.5	23165/ 714.5	23173/ 715.3
	Band 17	Frequency range: 704 - 716 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low			23780/ 709	23755/ 706.5		
	Mid			23790/ 710	23790/ 710		
	High			23800/ 711	23825/ 713.5		
	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

General LTE SAR Test and Reporting Considerations (Continued)

<table>
<tr><td rowspan="11">Frequency range, Channel Bandwidth, Numbers and Frequencies</td><td rowspan="3">Band 66</td><td colspan="6">Frequency range: 1710 - 1780 MHz</td></tr>
<tr><td colspan="6">Channel Bandwidth</td></tr>
<tr><td>20 MHz</td><td>15 MHz</td><td>10 MHz</td><td>5 MHz</td><td>3 MHz</td><td>1.4 MHz</td></tr>
<tr><td>Low</td><td>132072/ 1720</td><td>132047/ 1717.5</td><td>132022/ 1715</td><td>131997/ 1712.5</td><td>131987/ 1711.5</td><td>131979/ 1710.7</td></tr>
<tr><td>Mid</td><td>132322/ 1745</td><td>132322/ 1745</td><td>132322/ 1745</td><td>132322/ 1745</td><td>132322/ 1745</td><td>132322/ 1745</td></tr>
<tr><td>High</td><td>132572/ 1770</td><td>132597/ 1772.5</td><td>132622/ 1775</td><td>132647/ 1777.5</td><td>132657/ 1778.5</td><td>132665/ 1779.3</td></tr>
<tr><td rowspan="3">Band 41</td><td colspan="6">Frequency range: 2496 - 2690 MHz</td></tr>
<tr><td colspan="6">Channel Bandwidth</td></tr>
<tr><td>20 MHz</td><td>15 MHz</td><td>10 MHz</td><td>5 MHz</td><td>3 MHz</td><td>1.4 MHz</td></tr>
<tr><td>Low</td><td colspan="4">39750 / 2506.0</td><td colspan="2"></td></tr>
<tr><td>Low-Mid</td><td colspan="4">40185 / 2549.5</td><td colspan="2"></td></tr>
<tr><td>Mid</td><td colspan="4">40620 / 2593.0</td><td colspan="2"></td></tr>
<tr><td>Mid-High</td><td colspan="4">41055 / 2636.5</td><td colspan="2"></td></tr>
<tr><td>High</td><td colspan="4">41490 / 2680.0</td><td colspan="2"></td></tr>
<tr><td>LTE transmitter and antenna implementation</td><td colspan="7">Refer to Appendix A.</td></tr>
<tr><td>Maximum power reduction (MPR)</td><td colspan="7">
Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3
<table>
<tr><th rowspan="2">Modulation</th><th colspan="6">Channel bandwidth / Transmission bandwidth (N_{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>
<tr><td>64 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 2</td></tr>
<tr><td>64 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 3</td></tr>
<tr><td>256 QAM</td><td colspan="6">≥ 1</td><td>≤ 5</td></tr>
</table>
MPR Built-in by design
The manufacturer MPR values are always within the 3GPP maximum MPR allowance but may not follow the default MPR values.
A-MPR (additional MPR) was disabled during SAR testing
</td></tr>
<tr><td>Power reduction</td><td colspan="7">No</td></tr>
<tr><td>Spectrum plots for RB configurations</td><td colspan="7">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.</td></tr>
</table>

Notes:

1. Maximum 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.
2. LTE Band 41 test channels in accordance with October 2014 TCB workshop for all channels bandwidths.
3. SAR Testing for LTE was performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).

6.6. 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.

LTE TDD Bands support 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	$26336 \cdot T_s$			$7680 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$
5	$6592 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$20480 \cdot T_s$		
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 x (T_s) x # of S + # of U

Example for Calculated Duty Cycle for Uplink-Downlink Configuration 0:
Calculated Duty Cycle = 5120 x [1/(15000 x 2048)] x 2 + 6 ms = 63.33%
where
T_s = 1/(15000 x 2048) seconds

Note(s):
This device supports uplink-downlink configurations 0-6. The configuration with highest duty cycle was used for SAR Testing: configuration 0 at 63.3% duty cycle.

6.7. LTE Carrier Aggregation

DL Inter-Band

E-UTRA CA configuration (BCS)	E-UTRA Band	Bandwidth						Max Aggregated BW
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
CA_2A-4A(0)(1)(2)	Band 2	Yes	Yes	Yes	Yes	Yes	Yes	40 MHz
	Band 4			Yes	Yes	Yes	Yes	
	Band 2			Yes	Yes			20 MHz
	Band 4			Yes	Yes			
	Band 2			Yes	Yes	Yes	Yes	40 MHz
	Band 4			Yes	Yes	Yes	Yes	
CA_2A-5A(0)(1)	Band 2			Yes	Yes	Yes	Yes	30 MHz
	Band 5			Yes	Yes			
	Band 2			Yes	Yes			20 MHz
	Band 5			Yes	Yes			
CA_2A-12A (0)(1)(2)	Band 2			Yes	Yes	Yes	Yes	30 MHz
	Band 12			Yes	Yes			
	Band 2			Yes	Yes	Yes	Yes	30 MHz
	Band 12		Yes	Yes	Yes			
	Band 2			Yes	Yes			20 MHz
	Band 12			Yes	Yes			
CA_2A-66A (0)(1)(2)	Band 2	Yes	Yes	Yes	Yes	Yes	Yes	40 MHz
	Band 66			Yes	Yes	Yes	Yes	
	Band 2			Yes	Yes			20 MHz
	Band 66			Yes	Yes			
	Band 2			Yes	Yes	Yes	Yes	40 MHz
	Band 66			Yes	Yes	Yes	Yes	
CA_4A-5A (0)(1)	Band 4			Yes	Yes			20 MHz
	Band 5			Yes	Yes			
	Band 4			Yes	Yes	Yes	Yes	30 MHz
	Band 5			Yes	Yes			
CA_4A-12A (0)(1)(2)(3)(4)(5)	Band 4	Yes	Yes	Yes	Yes			20 MHz
	Band 12			Yes	Yes			
	Band 4	Yes	Yes	Yes	Yes	Yes	Yes	30 MHz
	Band 12			Yes	Yes			
	Band 4			Yes	Yes	Yes	Yes	30 MHz
	Band 12		Yes	Yes	Yes			
	Band 4			Yes	Yes			20 MHz
	Band 12			Yes	Yes			
	Band 4			Yes	Yes	Yes	Yes	30 MHz
	Band 12			Yes	Yes			
	Band 4			Yes	Yes	Yes		20 MHz
	Band 12			Yes				

DL Inter-Band (Continued)

E-UTRA CA configuration (BCS)	E-UTRA Band	Bandwidth						Max Aggregated BW
		1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
CA_5A-41A(0)	Band 5			Yes	Yes			30 MHz
	Band 41						Yes	
CA_5A-66A(0)	Band 5			Yes	Yes			30 MHz
	Band 66			Yes	Yes	Yes	Yes	
CA_12A-66A(0)(1)(2)(3)(4)(5)	Band 12			Yes	Yes			20 MHz
	Band 66	Yes	Yes	Yes	Yes			
	Band 12			Yes	Yes			30 MHz
	Band 66	Yes	Yes	Yes	Yes	Yes	Yes	
	Band 12		Yes	Yes	Yes			30 MHz
	Band 66			Yes	Yes	Yes	Yes	
	Band 12			Yes	Yes			20 MHz
	Band 66			Yes	Yes			
	Band 12			Yes	Yes			30 MHz
	Band 66			Yes	Yes	Yes	Yes	
	Band 12			Yes				20 MHz
	Band 66			Yes	Yes	Yes		
CA_26A-41A(0)	Band 26			Yes	Yes	Yes		35 MHz
	Band 41			Yes	Yes	Yes	Yes	
CA_2A-4A-5A(0)	Band 2			Yes	Yes	Yes	Yes	50 MHz
	Band 4			Yes	Yes	Yes	Yes	
	Band 5			Yes	Yes			
CA_4A-4A-12A(0)	Band 4	4A-4A BCS 0						50 MHz
	Band 12			Yes	Yes			
CA_5A-66A-66A(0)	Band 5			Yes	Yes			50 MHz
	Band 66	66A-66A BCS 0						
CA_12A-66A-66A(0)	Band 12			Yes	Yes			50 MHz
	Band 66	66A-66A BCS 0						
CA_2A-4A-12A(0)	Band 2			Yes	Yes	Yes	Yes	50 MHz
	Band 4			Yes	Yes	Yes	Yes	
	Band 12			Yes	Yes			
CA_2A-12A-66A(0)	Band 2			Yes	Yes	Yes	Yes	50 MHz
	Band 12			Yes	Yes			
	Band 66			Yes	Yes	Yes	Yes	

DL Inter-Band (Non-Contiguous)

E-UTRA CA configuration (BCS)	E-UTRA Band	Allowed Channel BW Per Carrier (MHz)					Max Aggregated BW
		1st Carrier	2nd Carrier	3rd Carrier	4th Carrier	5th Carrier	
CA_2A-2A (0)	Band 2	5, 10, 15. 20	5, 10, 15. 20				40 MHz
CA_4A-4A (0)(1)	Band 4	5, 10, 15, 20	5, 10, 15, 20				40 MHz
		5, 10	5, 10				20 MHz
CA_41A-41A (0)(1)	Band 41	10, 15, 20	10, 15, 20				40 MHz
		5, 10, 15. 20	5, 10, 15. 20				
CA_66A-66A (0)	Band 66	5, 10, 15, 20	5, 10, 15, 20				40 MHz
CA_41A-41C	Band 41	5, 10, 15. 20	41C BCS 1				60 MHz
		41C BCS 1	5, 10, 15. 20				

DL Intra-Band (Contiguous)

E-UTRA CA configuration (BCS)	E-UTRA Band	Allowed Channel BW Per Carrier (MHz)					Max Aggregated BW
		1st Carrier	2nd Carrier	3rd Carrier	4th Carrier	5th Carrier	
CA_2C	Band 2	5	20				40 MHz
		10	15, 20				
		15	10, 15, 20				
		20	5, 10, 15, 20				
CA_66B (0)	Band 66	5	5, 10, 15				20 MHz
		10	5, 10				
		15	5				
CA_66C (0)	Band 66	5	20				40 MHz
		10	15, 20				
		15	10, 15, 20				
		20	5, 10, 15, 20				
CA_41C (0),(1),(2),(3)	Band 41	10	20				40 MHz
		15	15,20				
		20	10,15,20				
	Band 41	5,10	20				40 MHz
		15	15,20				
		20	5,10,15,20				
	Band 41	10	15,20				40 MHz
		15	10,15,20				
		20	10,15,20				
	Band 41	10	20				40 MHz
		20	20				
CA_41D	Band 41	10	20	15			60 MHz
		10	15,20	20			
		15	20	10,15			
		15	10,15,20	20			
		20	15,20	10			
		20	10,15,20	15,20			

Note(s):

1. For supported channels, please refer to §6.5.

7. RF Exposure Conditions (Test Configurations)

Refer to Appendix A for the specific details of the antenna-to-antenna and antenna-to-edge(s) distances.

Wireless technologies	RF Exposure Conditions	Antenaa	DUT-to-User Separation	Test Position	Antenna-to-edge/surface	SAR Required	Note
WWAN	Head	Main 1 Ant. & Main 2 Ant.	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	Main 1 Ant. & Main 2 Ant.	15 mm	Rear	N/A	Yes	
				Front	N/A	Yes	
	Hotspot	Main 1 Ant.	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	
	Hotspot	Main 2 Ant.	10 mm	Rear	< 25 mm	Yes	
				Front	< 25 mm	Yes	
				Edge 1 (Top)	> 25 mm	No	1
				Edge 2 (Right)	> 25 mm	No	1
				Edge 3 (Bottom)	< 25 mm	Yes	
				Edge 4 (Left)	< 25 mm	Yes	
	Product Specific 10-g	Main 1 Ant. & Main 2 Ant.	0 mm	Rear	Refer to notes 2 & 3		
				Front			
				Edge 1 (Top)			
				Edge 2 (Right)			
				Edge 3 (Bottom)			
				Edge 4 (Left)			
2.4GHz WLAN & 5GHz WLAN	Head	WiFi/BT 2.4G Ant. & WiFi 5G Ant.	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		15 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	Yes	
				Edge 2 (Right)	> 25 mm	No	1
				Edge 3 (Bottom)	> 25 mm	No	1
				Edge 4 (Left)	< 25 mm	Yes	
	Product Specific 10-g		0 mm	Rear	Refer to notes 2 & 4		
				Front			
				Edge 1 (Top)			
				Edge 2 (Right)			
				Edge 3 (Bottom)			
				Edge 4 (Left)			

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.
2. For Phablet devices: When hotspot mode applies, Product specific 10-g SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg.
3. For Phablet devices: When hotspot mode applies and power reduction applies to hotspot mode, Product specific 10-g SAR is required for each test position that has and adjusted SAR to maximum power that is > 1.2 W/kg.
4. For Phablet devices: When hotspot mode is not supported, Product specific 10-g SAR is required for all surfaces and edges with an antenna located at ≤ 25mm from that surface or edge in direct contact with a flat phantom, to address interactive hand use exposure conditions.

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 ± 2°C of the temperature when the tissue parameters are characterized.
The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements. The parameters should be re-measured after each 3 – 4 days of use; or earlier if the dielectric parameters can become out of tolerance; for example, when the parameters are marginal at the beginning of the measurement series.
Tissue dielectric parameters were measured at the low, middle and high frequency of each operating frequency range of the test device.

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

SAR test were performed in All RF exposure conditions using Head tissue according to TCB workshop note of April. 2019.

IEEE Std 1528-2013

Refer to Table 3 within the IEEE Std 1528-2013

Dielectric Property Measurements Results:
SAR 1 Room

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
12-16-2020	Head 5250	e'	35.5400	Relative Permittivity (ϵ_r):	35.54	35.93	-1.09	5
		e"	16.1500	Conductivity (σ):	4.71	4.70	0.26	5
	Head 5260	e'	35.5200	Relative Permittivity (ϵ_r):	35.52	35.92	-1.12	5
		e"	16.1600	Conductivity (σ):	4.73	4.71	0.30	5
	Head 5600	e'	34.9600	Relative Permittivity (ϵ_r):	34.96	35.53	-1.61	5
		e"	16.2900	Conductivity (σ):	5.07	5.06	0.24	5
	Head 5750	e'	34.7300	Relative Permittivity (ϵ_r):	34.73	35.36	-1.79	5
		e"	16.3700	Conductivity (σ):	5.23	5.21	0.38	5
	Head 5825	e'	34.6000	Relative Permittivity (ϵ_r):	34.60	35.30	-1.98	5
		e"	16.4100	Conductivity (σ):	5.32	5.27	0.85	5
12-21-2020	Head 5250	e'	36.9400	Relative Permittivity (ϵ_r):	36.94	35.93	2.80	5
		e"	16.2000	Conductivity (σ):	4.73	4.70	0.57	5
	Head 5260	e'	36.9100	Relative Permittivity (ϵ_r):	36.91	35.92	2.75	5
		e"	16.2100	Conductivity (σ):	4.74	4.71	0.61	5
	Head 5600	e'	36.3800	Relative Permittivity (ϵ_r):	36.38	35.53	2.38	5
		e"	16.4000	Conductivity (σ):	5.11	5.06	0.92	5
	Head 5750	e'	36.1500	Relative Permittivity (ϵ_r):	36.15	35.36	2.23	5
		e"	16.4900	Conductivity (σ):	5.27	5.21	1.12	5
	Head 5825	e'	36.0300	Relative Permittivity (ϵ_r):	36.03	35.30	2.07	5
		e"	16.5400	Conductivity (σ):	5.36	5.27	1.65	5
12-28-2020	Head 5250	e'	36.9600	Relative Permittivity (ϵ_r):	36.96	35.93	2.86	5
		e"	15.9500	Conductivity (σ):	4.66	4.70	-0.98	5
	Head 5260	e'	36.9300	Relative Permittivity (ϵ_r):	36.93	35.92	2.81	5
		e"	15.9600	Conductivity (σ):	4.67	4.71	-0.94	5
	Head 5600	e'	36.3400	Relative Permittivity (ϵ_r):	36.34	35.53	2.27	5
		e"	16.3300	Conductivity (σ):	5.08	5.06	0.49	5
	Head 5750	e'	36.0800	Relative Permittivity (ϵ_r):	36.08	35.36	2.03	5
		e"	16.5100	Conductivity (σ):	5.28	5.21	1.24	5
	Head 5825	e'	35.9600	Relative Permittivity (ϵ_r):	35.96	35.30	1.87	5
		e"	16.5900	Conductivity (σ):	5.37	5.27	1.96	5
1-18-2021	Head 5250	e'	36.5400	Relative Permittivity (ϵ_r):	36.54	35.93	1.69	5
		e"	15.8300	Conductivity (σ):	4.62	4.70	-1.72	5
	Head 5260	e'	36.5200	Relative Permittivity (ϵ_r):	36.52	35.92	1.67	5
		e"	15.8400	Conductivity (σ):	4.63	4.71	-1.69	5
	Head 5600	e'	36.0300	Relative Permittivity (ϵ_r):	36.03	35.53	1.40	5
		e"	16.0000	Conductivity (σ):	4.98	5.06	-1.55	5
	Head 5800	e'	35.7700	Relative Permittivity (ϵ_r):	35.77	35.30	1.33	5
		e"	16.1100	Conductivity (σ):	5.20	5.27	-1.41	5
	Head 5825	e'	35.7300	Relative Permittivity (ϵ_r):	35.73	35.30	1.22	5
		e"	16.1100	Conductivity (σ):	5.22	5.27	-0.99	5
1-25-2021	Head 5250	e'	36.2900	Relative Permittivity (ϵ_r):	36.29	35.93	0.99	5
		e"	15.9900	Conductivity (σ):	4.67	4.70	-0.73	5
	Head 5260	e'	36.2600	Relative Permittivity (ϵ_r):	36.26	35.92	0.94	5
		e"	15.9800	Conductivity (σ):	4.67	4.71	-0.82	5
	Head 5600	e'	35.7500	Relative Permittivity (ϵ_r):	35.75	35.53	0.61	5
		e"	16.1100	Conductivity (σ):	5.02	5.06	-0.87	5
	Head 5800	e'	35.4000	Relative Permittivity (ϵ_r):	35.40	35.30	0.28	5
		e"	16.0600	Conductivity (σ):	5.18	5.27	-1.72	5
	Head 5825	e'	35.3500	Relative Permittivity (ϵ_r):	35.35	35.30	0.14	5
		e"	16.1400	Conductivity (σ):	5.23	5.27	-0.81	5
1-28-2021	Head 5250	e'	36.2700	Relative Permittivity (ϵ_r):	36.27	35.93	0.94	5
		e"	15.9800	Conductivity (σ):	4.66	4.70	-0.79	5
	Head 5260	e'	36.2400	Relative Permittivity (ϵ_r):	36.24	35.92	0.89	5
		e"	15.9800	Conductivity (σ):	4.67	4.71	-0.82	5
	Head 5600	e'	35.7500	Relative Permittivity (ϵ_r):	35.75	35.53	0.61	5
		e"	16.0600	Conductivity (σ):	5.00	5.06	-1.18	5
	Head 5800	e'	35.4800	Relative Permittivity (ϵ_r):	35.48	35.30	0.51	5
		e"	16.1300	Conductivity (σ):	5.20	5.27	-1.29	5
	Head 5825	e'	35.4400	Relative Permittivity (ϵ_r):	35.44	35.30	0.40	5
		e"	16.1300	Conductivity (σ):	5.22	5.27	-0.87	5

SAR 3 Room

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
12-16-2020	Head 1750	e'	39.7900	Relative Permittivity (ϵ_r):	39.79	40.08	-0.73	5
		e"	14.2800	Conductivity (σ):	1.39	1.37	1.50	5
	Head 1710	e'	39.8400	Relative Permittivity (ϵ_r):	39.84	40.15	-0.76	5
		e"	14.3900	Conductivity (σ):	1.37	1.35	1.62	5
	Head 1755	e'	39.7800	Relative Permittivity (ϵ_r):	39.78	40.08	-0.74	5
		e"	14.2600	Conductivity (σ):	1.39	1.37	1.44	5
12-16-2020	Head 1900	e'	39.7300	Relative Permittivity (ϵ_r):	39.73	40.00	-0.68	5
		e"	13.2900	Conductivity (σ):	1.40	1.40	0.29	5
	Head 1850	e'	39.8000	Relative Permittivity (ϵ_r):	39.80	40.00	-0.50	5
		e"	13.3300	Conductivity (σ):	1.37	1.40	-2.06	5
	Head 1910	e'	39.7200	Relative Permittivity (ϵ_r):	39.72	40.00	-0.70	5
		e"	13.2900	Conductivity (σ):	1.41	1.40	0.82	5
12-21-2020	Head 1900	e'	40.4600	Relative Permittivity (ϵ_r):	40.46	40.00	1.15	5
		e"	13.2500	Conductivity (σ):	1.40	1.40	-0.01	5
	Head 1850	e'	40.5400	Relative Permittivity (ϵ_r):	40.54	40.00	1.35	5
		e"	13.3400	Conductivity (σ):	1.37	1.40	-1.98	5
	Head 1910	e'	40.4500	Relative Permittivity (ϵ_r):	40.45	40.00	1.13	5
		e"	13.2400	Conductivity (σ):	1.41	1.40	0.44	5
12-27-2020	Head 1750	e'	40.5400	Relative Permittivity (ϵ_r):	40.54	40.08	1.14	5
		e"	13.8000	Conductivity (σ):	1.34	1.37	-1.91	5
	Head 1710	e'	40.5900	Relative Permittivity (ϵ_r):	40.59	40.15	1.11	5
		e"	13.8800	Conductivity (σ):	1.32	1.35	-1.98	5
	Head 1755	e'	40.5300	Relative Permittivity (ϵ_r):	40.53	40.08	1.13	5
		e"	13.7900	Conductivity (σ):	1.35	1.37	-1.90	5
12-27-2020	Head 1900	e'	40.0400	Relative Permittivity (ϵ_r):	40.04	40.00	0.10	5
		e"	13.2000	Conductivity (σ):	1.39	1.40	-0.39	5
	Head 1850	e'	40.1300	Relative Permittivity (ϵ_r):	40.13	40.00	0.33	5
		e"	13.2100	Conductivity (σ):	1.36	1.40	-2.94	5
	Head 1910	e'	40.0100	Relative Permittivity (ϵ_r):	40.01	40.00	0.02	5
		e"	13.2000	Conductivity (σ):	1.40	1.40	0.13	5
12-30-2020	Head 1750	e'	40.0300	Relative Permittivity (ϵ_r):	40.03	40.08	-0.14	5
		e"	13.5900	Conductivity (σ):	1.32	1.37	-3.40	5
	Head 1710	e'	40.0800	Relative Permittivity (ϵ_r):	40.08	40.15	-0.16	5
		e"	13.6900	Conductivity (σ):	1.30	1.35	-3.32	5
	Head 1755	e'	40.0300	Relative Permittivity (ϵ_r):	40.03	40.08	-0.12	5
		e"	13.5800	Conductivity (σ):	1.33	1.37	-3.40	5
12-30-2020	Head 1900	e'	39.8000	Relative Permittivity (ϵ_r):	39.80	40.00	-0.50	5
		e"	13.3600	Conductivity (σ):	1.41	1.40	0.82	5
	Head 1850	e'	39.8900	Relative Permittivity (ϵ_r):	39.89	40.00	-0.27	5
		e"	13.4400	Conductivity (σ):	1.38	1.40	-1.25	5
	Head 1910	e'	39.7800	Relative Permittivity (ϵ_r):	39.78	40.00	-0.55	5
		e"	13.3500	Conductivity (σ):	1.42	1.40	1.27	5
1-11-2021	Head 1750	e'	39.1800	Relative Permittivity (ϵ_r):	39.18	40.08	-2.26	5
		e"	13.8200	Conductivity (σ):	1.34	1.37	-1.77	5
	Head 1710	e'	39.4100	Relative Permittivity (ϵ_r):	39.41	40.15	-1.83	5
		e"	13.8900	Conductivity (σ):	1.32	1.35	-1.91	5
	Head 1755	e'	39.1600	Relative Permittivity (ϵ_r):	39.16	40.08	-2.29	5
		e"	13.8100	Conductivity (σ):	1.35	1.37	-1.76	5
1-18-2021	Head 1750	e'	40.0000	Relative Permittivity (ϵ_r):	40.00	40.08	-0.21	5
		e"	13.5800	Conductivity (σ):	1.32	1.37	-3.47	5
	Head 1710	e'	40.0300	Relative Permittivity (ϵ_r):	40.03	40.15	-0.29	5
		e"	13.6600	Conductivity (σ):	1.30	1.35	-3.54	5
	Head 1755	e'	39.9900	Relative Permittivity (ϵ_r):	39.99	40.08	-0.22	5
		e"	13.5700	Conductivity (σ):	1.32	1.37	-3.47	5
1-21-2021	Head 1750	e'	39.7000	Relative Permittivity (ϵ_r):	39.70	40.08	-0.96	5
		e"	14.1400	Conductivity (σ):	1.38	1.37	0.51	5
	Head 1710	e'	39.7300	Relative Permittivity (ϵ_r):	39.73	40.15	-1.04	5
		e"	14.2300	Conductivity (σ):	1.35	1.35	0.49	5
	Head 1755	e'	39.7000	Relative Permittivity (ϵ_r):	39.70	40.08	-0.94	5
		e"	14.1300	Conductivity (σ):	1.38	1.37	0.51	5

SAR 4 Room

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
2020-12-15	Head 2600	e'	37.6400	Relative Permittivity (ε_r):	37.64	39.01	-3.51	5
		e"	14.0900	Conductivity (σ):	2.04	1.96	3.81	5
	Head 2500	e'	38.0400	Relative Permittivity (ε_r):	38.04	39.14	-2.80	5
		e"	13.8500	Conductivity (σ):	1.93	1.85	3.84	5
	Head 2700	e'	37.2400	Relative Permittivity (ε_r):	37.24	38.88	-4.23	5
		e"	14.2800	Conductivity (σ):	2.14	2.07	3.55	5
2021-01-18	Head 2450	e'	37.9400	Relative Permittivity (ε_r):	37.94	39.20	-3.21	5
		e"	13.1800	Conductivity (σ):	1.80	1.80	-0.25	5
	Head 2400	e'	38.0900	Relative Permittivity (ε_r):	38.09	39.30	-3.07	5
		e"	13.0600	Conductivity (σ):	1.74	1.75	-0.50	5
	Head 2480	e'	37.8400	Relative Permittivity (ε_r):	37.84	39.16	-3.38	5
		e"	13.2600	Conductivity (σ):	1.83	1.83	-0.21	5
2021-01-26	Head 2450	e'	38.9200	Relative Permittivity (ε_r):	38.92	39.20	-0.71	5
		e"	13.8000	Conductivity (σ):	1.88	1.80	4.44	5
	Head 2400	e'	39.1100	Relative Permittivity (ε_r):	39.11	39.30	-0.48	5
		e"	13.6600	Conductivity (σ):	1.82	1.75	4.07	5
	Head 2475	e'	38.8100	Relative Permittivity (ε_r):	38.81	39.17	-0.92	5
		e"	13.8600	Conductivity (σ):	1.91	1.83	4.40	5

SAR 5 Room

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
12-16-2020	Head 750	e'	41.8500	Relative Permittivity (ε_r):	41.85	41.96	-0.27	5
		e"	21.1800	Conductivity (σ):	0.88	0.89	-1.10	5
	Head 700	e'	42.0000	Relative Permittivity (ε_r):	42.00	42.22	-0.52	5
		e"	22.2500	Conductivity (σ):	0.87	0.89	-2.61	5
	Head 790	e'	41.7300	Relative Permittivity (ε_r):	41.73	41.76	-0.06	5
		e"	20.4200	Conductivity (σ):	0.90	0.90	0.09	5
12-16-2020	Head 835	e'	41.5900	Relative Permittivity (ε_r):	41.59	41.50	0.22	5
		e"	19.7000	Conductivity (σ):	0.91	0.90	1.63	5
	Head 820	e'	41.6300	Relative Permittivity (ε_r):	41.63	41.60	0.07	5
		e"	19.9300	Conductivity (σ):	0.91	0.90	1.14	5
	Head 850	e'	41.5500	Relative Permittivity (ε_r):	41.55	41.50	0.12	5
		e"	19.4700	Conductivity (σ):	0.92	0.92	0.57	5
12-21-2020	Head 835	e'	41.5800	Relative Permittivity (ε_r):	41.58	41.50	0.19	5
		e"	20.0600	Conductivity (σ):	0.93	0.90	3.48	5
	Head 820	e'	41.6000	Relative Permittivity (ε_r):	41.60	41.60	-0.01	5
		e"	20.3100	Conductivity (σ):	0.93	0.90	3.07	5
	Head 850	e'	41.5600	Relative Permittivity (ε_r):	41.56	41.50	0.14	5
		e"	19.8100	Conductivity (σ):	0.94	0.92	2.32	5
12-28-2020	Head 835	e'	42.1200	Relative Permittivity (ε_r):	42.12	41.50	1.49	5
		e"	19.7500	Conductivity (σ):	0.92	0.90	1.88	5
	Head 820	e'	42.1500	Relative Permittivity (ε_r):	42.15	41.60	1.32	5
		e"	19.9900	Conductivity (σ):	0.91	0.90	1.44	5
	Head 850	e'	42.1100	Relative Permittivity (ε_r):	42.11	41.50	1.47	5
		e"	19.5100	Conductivity (σ):	0.92	0.92	0.78	5
1-18-2021	Head 835	e'	41.1100	Relative Permittivity (ε_r):	41.11	41.50	-0.94	5
		e"	19.8500	Conductivity (σ):	0.92	0.90	2.40	5
	Head 820	e'	41.1400	Relative Permittivity (ε_r):	41.14	41.60	-1.11	5
		e"	20.1100	Conductivity (σ):	0.92	0.90	2.05	5
	Head 850	e'	41.0900	Relative Permittivity (ε_r):	41.09	41.50	-0.99	5
		e"	19.6100	Conductivity (σ):	0.93	0.92	1.29	5
1-25-2021	Head 835	e'	41.0400	Relative Permittivity (ε_r):	41.04	41.50	-1.11	5
		e"	19.9800	Conductivity (σ):	0.93	0.90	3.07	5
	Head 820	e'	41.0200	Relative Permittivity (ε_r):	41.02	41.60	-1.40	5
		e"	20.1400	Conductivity (σ):	0.92	0.90	2.21	5
	Head 850	e'	41.0400	Relative Permittivity (ε_r):	41.04	41.50	-1.11	5
		e"	19.7500	Conductivity (σ):	0.93	0.92	2.02	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 2.5 mm.
  For 5 GHz band - Distance between probe sensors and phantom surface was set to 1.4 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
D750V3	1122	2-24-2020	750	1g	8.54
				10g	5.59
D835V2	4d174	2-24-2020	835	1g	9.59
				10g	6.24
D1750V2	1125	2-21-2020	1750	1g	36.50
				10g	19.20
D1900V2	5d199	3-19-2020	1900	1g	40.50
				10g	21.00
D2450V2	939	7-25-2019	2450	1g	53.20
				10g	25.10
D2600V2	1097	9-19-2019	2600	1g	57.30
				10g	25.70
D5GHzV2	1209	2-27-2020	5250	1g	79.90
				10g	22.60
			5600	1g	83.60
				10g	23.60
			5750	1g	80.20
				10g	22.60

Note(s):

Refer to Appendix F that mentioned about justification for Extended SAR Dipole Calibrations. (D2450V2 (SN : 939), D2600V2 (SN : 1097))

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 1 Room

Date Tested	System Dipole		T.S. Liquid		Measured Results		Target (Ref. Value)	Delta ±10 %	Plot No.
	Type	Serial #			Zoom Scan to 100 mW	Normalize to 1 W			
12-16-2020	D5GHzV2 (5250)	1209	Head	1g	7.29	72.9	79.90	-8.76	1,2
				10g	2.09	20.9	22.60	-7.52	
12-16-2020	D5GHzV2 (5600)	1209	Head	1g	8.45	84.5	83.60	1.08	
				10g	2.39	23.9	23.60	1.27	
12-16-2020	D5GHzV2 (5750)	1209	Head	1g	8.25	82.5	80.20	2.87	
				10g	2.34	23.4	22.60	3.54	
12-21-2020	D5GHzV2 (5250)	1209	Head	1g	7.41	74.1	79.90	-7.26	
				10g	2.10	21.0	22.60	-7.08	
12-21-2020	D5GHzV2 (5600)	1209	Head	1g	8.39	83.9	83.60	0.36	
				10g	2.35	23.5	23.60	-0.42	
12-21-2020	D5GHzV2 (5750)	1209	Head	1g	7.98	79.8	80.20	-0.50	
				10g	2.26	22.6	22.60	0.00	
12-28-2020	D5GHzV2 (5250)	1209	Head	1g	7.45	74.5	79.90	-6.76	
				10g	2.11	21.1	22.60	-6.64	
12-28-2020	D5GHzV2 (5600)	1209	Head	1g	8.37	83.7	83.60	0.12	
				10g	2.35	23.5	23.60	-0.42	
12-28-2020	D5GHzV2 (5750)	1209	Head	1g	8.20	82.0	80.20	2.24	
				10g	2.31	23.1	22.60	2.21	
1-18-2021	D5GHzV2 (5250)	1209	Head	1g	7.72	77.2	79.90	-3.38	
				10g	2.21	22.1	22.60	-2.21	
1-18-2021	D5GHzV2 (5600)	1209	Head	1g	8.39	83.9	83.60	0.36	
				10g	2.38	23.8	23.60	0.85	
1-18-2021	D5GHzV2 (5750)	1209	Head	1g	7.97	79.7	80.20	-0.62	
				10g	2.27	22.7	22.60	0.44	
1-25-2021	D5GHzV2 (5250)	1209	Head	1g	8.20	82.0	79.90	2.63	
				10g	2.33	23.3	22.60	3.10	
1-25-2021	D5GHzV2 (5600)	1209	Head	1g	8.56	85.6	83.60	2.39	
				10g	2.42	24.2	23.60	2.54	
1-25-2021	D5GHzV2 (5750)	1209	Head	1g	7.94	79.4	80.20	-1.00	
				10g	2.26	22.6	22.60	0.00	
1-28-2021	D5GHzV2 (5600)	1209	Head	1g	8.51	85.1	83.60	1.79	
				10g	2.41	24.1	23.60	2.12	

SAR 3 Room

Date Tested	System Dipole		T.S. Liquid		Measured Results		Target (Ref. Value)	Delta ±10 %	Plot No.
	Type	Serial #			Zoom Scan to 100 mW	Normalize to 1 W			
12-16-2020	D1750V2	1125	Head	1g	3.62	36.2	36.50	-0.82	
				10g	1.96	19.6	19.20	2.08	
12-16-2020	D1900V2	5d199	Head	1g	3.91	39.1	40.50	-3.46	
				10g	2.06	20.6	21.00	-1.90	
12-21-2020	D1900V2	5d199	Head	1g	3.87	38.7	40.50	-4.44	
				10g	2.04	20.4	21.00	-2.86	
12-27-2020	D1750V2	1125	Head	1g	3.59	35.9	36.50	-1.64	
				10g	1.95	19.5	19.20	1.56	
12-27-2020	D1900V2	5d199	Head	1g	3.84	38.4	40.50	-5.19	3,4
				10g	2.03	20.3	21.00	-3.33	
12-30-2020	D1750V2	1125	Head	1g	3.35	33.5	36.50	-8.22	5,6
				10g	1.81	18.1	19.20	-5.73	
12-30-2020	D1900V2	5d199	Head	1g	3.89	38.9	40.50	-3.95	
				10g	2.04	20.4	21.00	-2.86	
1-11-2021	D1750V2	1125	Head	1g	3.40	34.0	36.50	-6.85	
				10g	1.83	18.3	19.20	-4.69	
1-18-2021	D1750V2	1125	Head	1g	3.50	35.0	36.50	-4.11	
				10g	1.89	18.9	19.20	-1.56	
1-21-2021	D1750V2	1125	Head	1g	3.56	35.6	36.50	-2.47	
				10g	1.91	19.1	19.20	-0.52	
1-25-2021	D1900V2	5d199	Head	1g	3.88	38.8	40.50	-4.20	
				10g	2.05	20.5	21.00	-2.38	

SAR 4 Room

Date Tested	System Dipole		T.S. Liquid		Measured Results		Target (Ref. Value)	Delta ±10 %	Plot No.
	Type	Serial #			Zoom Scan to 100 mW	Normalize to 1 W			
12-15-2020	D2600V2	1097	Head	1g	5.63	56.3	57.30	-1.75	7,8
				10g	2.46	24.6	25.70	-4.28	
1-18-2021	D2450V2	939	Head	1g	5.65	56.5	53.20	6.20	9,10
				10g	2.56	25.6	25.10	1.99	
1-26-2021	D2450V2	939	Head	1g	5.56	55.6	53.20	4.51	
				10g	2.53	25.3	25.10	0.80	

SAR 5 Room

Date Tested	System Dipole		T.S. Liquid		Measured Results		Target (Ref. Value)	Delta ±10 %	Plot No.
	Type	Serial #			Zoom Scan to 100 mW	Normalize to 1 W			
12-16-2020	D750V3	1122	Head	1g	0.83	8.3	8.54	-3.04	11,12
				10g	0.54	5.4	5.59	-3.04	
12-16-2020	D835V2	4d174	Head	1g	0.99	9.9	9.59	3.13	
				10g	0.65	6.5	6.24	3.37	
12-21-2020	D835V2	4d174	Head	1g	0.90	9.0	9.59	-6.67	
				10g	0.61	6.1	6.24	-2.56	
12-28-2020	D835V2	4d174	Head	1g	0.89	8.9	9.59	-6.99	13,14
				10g	0.60	6.0	6.24	-3.85	
1-18-2021	D835V2	4d174	Head	1g	0.98	9.8	9.59	1.67	
				10g	0.63	6.3	6.24	0.96	
1-25-2021	D835V2	4d174	Head	1g	0.93	9.3	9.59	-3.02	
				10g	0.60	6.0	6.24	-3.37	

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

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			
					Measured		Tune-up Limit	
					Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr
GSM (Voice)	CS1	1	128	824.2	32.3	23.3	33.5	24.5
			190	836.6	32.2	23.2		
			251	848.8	31.9	22.9		
GPRS (GMSK)	CS1	1	128	824.2	32.3	23.3	33.5	24.5
			190	836.6	32.2	23.2		
			251	848.8	31.8	22.8		
		2	128	824.2	30.6	24.6	31.5	25.5
			190	836.6	30.3	24.3		
			251	848.8	29.8	23.8		
		3	128	824.2	28.0	23.7	30.0	25.7
			190	836.6	28.4	24.1		
			251	848.8	28.6	24.4		
		4	128	824.2	27.7	24.7	29.0	**26.0**
			190	836.6	27.1	24.1		
			251	848.8	27.3	24.3		
EGPRS (8PSK)	MCS5	1	128	824.2	26.0	16.9	26.5	17.5
			190	836.6	25.5	16.5		
			251	848.8	25.4	16.4		
		2	128	824.2	23.9	17.9	24.5	18.5
			190	836.6	23.4	17.4		
			251	848.8	23.3	17.3		
		3	128	824.2	21.9	17.6	22.5	18.2
			190	836.6	21.5	17.2		
			251	848.8	21.4	17.1		
		4	128	824.2	21.4	18.4	21.5	18.5
			190	836.6	20.9	17.9		
			251	848.8	20.8	17.8		

Notes:

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

- GMSK (GPRS) mode with 4 time slots for Max power, based on the Tune-up Procedure. Refer to §6.3.
- SAR is not required for EGPRS (8PSK) mode because the maximum output power and tune-up limit is ≤ 1/4dB higher than GMSK GPRS or the adjusted SAR of the highest reported SAR of GMSK GPRS is ≤ 1.2W/kg.

GSM1900 Measured Results

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			
					Measured		Tune-up Limit	
					Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr
GSM (Voice)	CS1	1	512	1850.2	30.6	21.5	31.5	22.5
			661	1880.0	30.7	21.7		
			810	1909.8	30.7	21.7		
GPRS (GMSK)	CS1	1	512	1850.2	30.5	21.5	31.5	22.5
			661	1880.0	30.6	21.6		
			810	1909.8	30.6	21.5		
		2	512	1850.2	29.1	23.1	29.5	23.5
			661	1880.0	28.6	22.6		
			810	1909.8	28.7	22.7		
		3	512	1850.2	26.1	21.8	27.5	23.2
			661	1880.0	26.7	22.4		
			810	1909.8	26.6	22.3		
		4	512	1850.2	25.9	22.9	26.5	**23.5**
			661	1880.0	25.6	22.6		
			810	1909.8	26.4	23.4		
EGPRS (8PSK)	MCS5	1	512	1850.2	24.6	15.6	26.0	17.0
			661	1880.0	24.6	15.6		
			810	1909.8	25.2	16.1		
		2	512	1850.2	22.5	16.5	23.5	17.5
			661	1880.0	22.3	16.3		
			810	1909.8	23.0	16.9		
		3	512	1850.2	20.6	16.3	22.0	17.7
			661	1880.0	20.5	16.3		
			810	1909.8	21.3	17.1		
		4	512	1850.2	19.5	16.5	20.5	17.5
			661	1880.0	19.2	16.2		
			810	1909.8	19.9	16.8		

Notes:

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

- GMSK (GPRS) mode with 4 time slots for Max power, based on the Tune-up Procedure. Refer to §6.3.
- SAR is not required for EGPRS (8PSK) mode because the maximum output power and tune-up limit is ≤ 1/4dB higher than GMSK GPRS or the adjusted SAR of the highest reported SAR of GMSK GPRS is ≤ 1.2W/kg.

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
	βc/βd	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			
	βc	2/15	11/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	βc/βd	2/15	11/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	MPR (dB)	0	0	0.5	0.5
HSDPA Specific Settings	D_{ACK}	8			
	D_{NAK}	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	Ahs=βhs/βc	30/15			

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

The following 5 Sub-tests were completed according to Release 6 procedures in table C,11.1.3 of 3GPP TS 34.121-1 v13.
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
	βc	11/15	6/15	15/15	2/15	15/15
	βd	15/15	15/15	9/15	15/15	0
	βec	209/225	12/15	30/15	2/15	5/15
	βc/βd	11/15	6/15	15/9	2/15	-
	βhs	22/15	12/15	30/15	4/15	5/15
	βed	1309/225	94/75	47/15	56/75	47/15
	CM (dB)	1	3	2	3	1
	MPR (dB)	0	2	1	2	0
HSDPA Specific Settings	DACK	8				0
	DNAK	8				0
	DCQI	8				0
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
	CQI Repetition Factor (Table 5.2B.4)	2				
	Ahs = βhs/βc	30/15				
HSUPA Specific Settings	E-DPDCH	6	8	8	5	0
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	12
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	67
	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	Processes	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.		

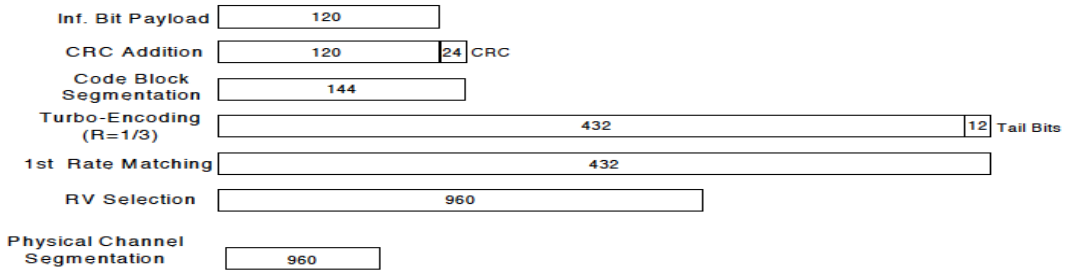


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

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 12			
	Power Control Algorithm	Algorithm2			
	βc	2/15	11/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	βd (SF)	64			
	βc/βd	2/15	11/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	MPR (dB)	0	0	0.5	0.5
HSDPA Specific Settings	DACK	8			
	DNAK	8			
	DCQI	8			
	Ack-Nack Repetition factor	3			
	CQI Feedback	4ms			
	CQI Repetition Factor	2			
	Ahs = βhs/ βc	30/15			

HSPA+

HSPA+ is only supported to down link. Therefore, the RF conducted power is not measured.

W-CDMA Band II Measured Results

Mode		UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)		
				Measured Pwr	MPR	Tune-up Limit
Release 99	Rel 99 (RMC, 12.2 kbps)	9262	1852.4	24.5	N/A	25.5
		9400	1880.0	24.5		
		9538	1907.6	24.7		
HSDPA	Subtest 1	9262	1852.4	21.4	0	22.5
		9400	1880.0	21.5		
		9538	1907.6	21.9		
	Subtest 2	9262	1852.4	21.5	0	22.5
		9400	1880.0	21.4		
		9538	1907.6	21.9		
	Subtest 3	9262	1852.4	21.0	0.5	22.0
		9400	1880.0	21.0		
		9538	1907.6	21.4		
	Subtest 4	9262	1852.4	21.0	0.5	22.0
		9400	1880.0	21.0		
		9538	1907.6	21.4		
HSUPA	Subtest 1	9262	1852.4	21.4	0	22.5
		9400	1880.0	21.5		
		9538	1907.6	21.9		
	Subtest 2	9262	1852.4	18.9	2	20.5
		9400	1880.0	19.0		
		9538	1907.6	19.4		
	Subtest 3	9262	1852.4	19.0	2	20.5
		9400	1880.0	19.0		
		9538	1907.6	19.4		
	Subtest 4	9262	1852.4	18.9	2	20.5
		9400	1880.0	19.0		
		9538	1907.6	19.4		
	Subtest 5	9262	1852.4	21.0	0	22.5
		9400	1880.0	21.1		
		9538	1907.6	21.4		
DC-HSDPA	Subtest 1	9262	1852.4	21.5	0	22.5
		9400	1880.0	21.5		
		9538	1907.6	21.9		
	Subtest 2	9262	1852.4	21.5	0	22.5
		9400	1880.0	21.5		
		9538	1907.6	21.9		
	Subtest 3	9262	1852.4	21.0	0.5	22.0
		9400	1880.0	21.0		
		9538	1907.6	21.4		
	Subtest 4	9262	1852.4	21.0	0.5	22.0
		9400	1880.0	21.0		
		9538	1907.6	21.4		

W-CDMA Band IV Measured Results

Mode		UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)		
				Measured Pwr	MPR	Tune-up Limit
Release 99	Rel 99 (RMC, 12.2 kbps)	1312	1712.4	23.5	N/A	24.5
		1413	1732.6	23.3		
		1513	1752.6	23.5		
HSDPA	Subtest 1	1312	1712.4	22.4	0	23.5
		1413	1732.6	22.3		
		1513	1752.6	22.6		
	Subtest 2	1312	1712.4	22.4	0	23.5
		1413	1732.6	22.3		
		1513	1752.6	22.5		
	Subtest 3	1312	1712.4	19.9	1.5	22.0
		1413	1732.6	19.9		
		1513	1752.6	20.0		
	Subtest 4	1312	1712.4	19.9	1.5	22.0
		1413	1732.6	19.7		
		1513	1752.6	20.0		
HSUPA	Subtest 1	1312	1712.4	22.4	0	23.5
		1413	1732.6	22.3		
		1513	1752.6	22.6		
	Subtest 2	1312	1712.4	20.4	2	21.5
		1413	1732.6	20.3		
		1513	1752.6	20.6		
	Subtest 3	1312	1712.4	19.5	3	20.5
		1413	1732.6	19.3		
		1513	1752.6	19.6		
	Subtest 4	1312	1712.4	20.3	2	21.5
		1413	1732.6	20.1		
		1513	1752.6	20.4		
	Subtest 5	1312	1712.4	22.5	0	23.5
		1413	1732.6	22.5		
		1513	1752.6	22.7		
DC-HSDPA	Subtest 1	1312	1712.4	22.5	0	23.5
		1413	1732.6	22.3		
		1513	1752.6	22.5		
	Subtest 2	1312	1712.4	22.5	0	23.5
		1413	1732.6	22.3		
		1513	1752.6	22.5		
	Subtest 3	1312	1712.4	20.0	1.5	22.0
		1413	1732.6	19.8		
		1513	1752.6	20.0		
	Subtest 4	1312	1712.4	19.9	1.5	22.0
		1413	1732.6	19.8		
		1513	1752.6	20.0		

W-CDMA Band V Measured Results

Mode		UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)		
				Measured Pwr	MPR	Tune-up Limit
Release 99	Rel 99 (RMC, 12.2 kbps)	4132	826.4	24.5	N/A	25.5
		4183	836.6	24.4		
		4233	846.6	23.3		
HSDPA	Subtest 1	4132	826.4	23.6	0	24.0
		4183	836.6	23.5		
		4233	846.6	22.3		
	Subtest 2	4132	826.4	23.6	0	24.0
		4183	836.6	23.5		
		4233	846.6	22.4		
	Subtest 3	4132	826.4	23.2	0.5	23.5
		4183	836.6	23.0		
		4233	846.6	21.9		
	Subtest 4	4132	826.4	23.2	0.5	23.5
		4183	836.6	23.0		
		4233	846.6	22.0		
HSUPA	Subtest 1	4132	826.4	23.8	0	24.0
		4183	836.6	23.7		
		4233	846.6	22.6		
	Subtest 2	4132	826.4	21.9	2	22.0
		4183	836.6	21.8		
		4233	846.6	20.8		
	Subtest 3	4132	826.4	22.9	1	23.0
		4183	836.6	22.8		
		4233	846.6	21.8		
	Subtest 4	4132	826.4	22.0	2	22.0
		4183	836.6	21.8		
		4233	846.6	20.8		
	Subtest 5	4132	826.4	23.4	0	24.0
		4183	836.6	23.3		
		4233	846.6	22.2		
DC-HSDPA	Subtest 1	4132	826.4	23.8	0	24.0
		4183	836.6	23.6		
		4233	846.6	22.5		
	Subtest 2	4132	826.4	23.8	0	24.0
		4183	836.6	23.7		
		4233	846.6	22.6		
	Subtest 3	4132	826.4	23.2	0.5	23.5
		4183	836.6	23.2		
		4233	846.6	22.1		
	Subtest 4	4132	826.4	23.4	0.5	23.5
		4183	836.6	23.2		
		4233	846.6	22.1		

9.3. LTE

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

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

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3

Modulation	Channel bandwidth / Transmission bandwidth (N_{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
64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3
256 QAM	≥ 1						≤ 5

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 (subclause)	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	N/A

Maximum Output Power (Tune-up Limit) for LTE

According to April 2015 TCB workshop, SAR test exclusion can be applied for testing overlapping LTE bands as follows:

a) The maximum output power, including tolerance, for the smaller band must be ≤ the larger band to qualify for the SAR test exclusion.
b) The channel bandwidth and other operating parameters for the smaller band must be fully supported by the larger band.
   - LTE Band 4 (1710 – 1755 MHz) is covered by LTE Band 66 (1710 – 1780 MHz)
   - LTE Band 17 (704 – 716 MHz) is covered by LTE Band 12 (699 – 716 MHz)

Maximum 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 QPSK configuration has the highest maximum average output power per 3GPP standard.

SAR measurement is not required for Higher order modulations. When the highest maximum output power for Higher order modulations are ≤ 0.5 dB higher than the QPSK or when the reported SAR for QPSK configuration is ≤ 1.45 W/kg.

LTE Band 2 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				Measured Pwr (dBm)			MPR	Tune-up Limit
				18700	18900	19100		
				1860 MHz	1880 MHz	1900 MHz		
20 MHz	QPSK	1	0	24.1	24.7	23.9	0.0	25.5
		1	49	24.5	24.2	23.9	0.0	25.5
		1	99	25.0	24.2	24.8	0.0	25.5
		50	0	23.3	23.5	22.9	1.0	24.5
		50	24	23.5	23.2	22.9	1.0	24.5
		50	50	23.5	23.1	23.2	1.0	24.5
		100	0	23.4	23.3	23.0	1.0	24.5
	16QAM	1	0	23.5	24.1	23.4	1.0	24.5
		1	49	23.8	23.7	23.3	1.0	24.5
		1	99	23.8	23.7	23.9	1.0	24.5
		50	0	22.3	22.6	22.0	2.0	23.5
		50	24	22.6	22.4	22.1	2.0	23.5
		50	50	22.5	22.2	22.3	2.0	23.5
		100	0	22.5	22.4	22.1	2.0	23.5
	64QAM	1	0	22.4	22.9	22.6	2.0	23.5
		1	49	22.7	22.5	22.5	2.0	23.5
		1	99	22.7	22.5	23.0	2.0	23.5
		50	0	21.4	21.6	20.9	3.0	22.5
		50	24	21.6	21.4	21.0	3.0	22.5
		50	50	21.6	21.3	21.2	3.0	22.5
		100	0	21.5	21.4	21.0	3.0	22.5
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				18675	18900	19125		
				1857.5 MHz	1880 MHz	1902.5 MHz		
15 MHz	QPSK	1	0	24.1	24.7	23.9	0.0	25.5
		1	37	24.4	24.2	24.0	0.0	25.5
		1	74	24.7	24.1	24.8	0.0	25.5
		36	0	23.2	23.4	22.8	1.0	24.5
		36	20	23.4	23.3	23.0	1.0	24.5
		36	39	23.5	23.1	23.2	1.0	24.5
		75	0	23.3	23.3	23.0	1.0	24.5
	16QAM	1	0	23.5	23.5	23.3	1.0	24.5
		1	37	23.7	23.1	23.4	1.0	24.5
		1	74	23.8	23.1	23.9	1.0	24.5
		36	0	22.2	22.5	22.0	2.0	23.5
		36	20	22.4	22.4	22.1	2.0	23.5
		36	39	22.5	22.2	22.3	2.0	23.5
		75	0	22.4	22.4	22.1	2.0	23.5
	64QAM	1	0	22.3	23.2	22.2	2.0	23.5
		1	37	22.4	22.8	22.3	2.0	23.5
		1	74	22.7	22.7	22.8	2.0	23.5
		36	0	21.3	21.5	20.9	3.0	22.5
		36	20	21.5	21.3	21.0	3.0	22.5
		36	39	21.6	21.2	21.2	3.0	22.5
		75	0	21.5	21.4	21.0	3.0	22.5

LTE Band 2 Measured Results (Continued)

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				18650	18900	19150		
				1855 MHz	1880 MHz	1905 MHz		
10 MHz	QPSK	1	0	24.1	24.5	24.0	0.0	25.5
		1	25	24.3	24.2	24.1	0.0	25.5
		1	49	24.4	24.3	24.8	0.0	25.5
		25	0	22.7	22.9	22.5	1.0	24.5
		25	12	22.7	22.8	22.7	1.0	24.5
		25	25	22.8	22.7	22.8	1.0	24.5
		50	0	22.7	22.7	22.6	1.0	24.5
	16QAM	1	0	23.1	23.3	23.3	1.0	24.5
		1	25	23.3	23.1	23.5	1.0	24.5
		1	49	23.4	23.2	23.9	1.0	24.5
		25	0	22.8	22.9	22.6	2.0	23.5
		25	12	22.9	22.8	22.7	2.0	23.5
		25	25	22.9	22.7	22.8	2.0	23.5
		50	0	22.8	22.8	22.7	2.0	23.5
	64QAM	1	0	22.2	22.6	22.3	2.0	23.5
		1	25	22.5	22.4	22.4	2.0	23.5
		1	49	22.6	22.4	22.9	2.0	23.5
		25	0	21.3	21.5	21.1	3.0	22.5
		25	12	21.4	21.4	21.2	3.0	22.5
		25	25	21.5	21.3	21.3	3.0	22.5
		50	0	21.3	21.3	21.2	3.0	22.5
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				18625	18900	19175		
				1852.5 MHz	1880 MHz	1907.5 MHz		
5 MHz	QPSK	1	0	24.1	24.5	24.2	0.0	25.5
		1	12	24.3	24.3	24.5	0.0	25.5
		1	24	24.3	24.2	24.6	0.0	25.5
		12	0	23.1	23.3	23.3	1.0	24.5
		12	7	23.2	23.2	23.4	1.0	24.5
		12	13	23.2	23.2	23.6	1.0	24.5
		25	0	22.6	22.7	22.9	1.0	24.5
	16QAM	1	0	23.1	23.5	23.7	1.0	24.5
		1	12	23.3	23.4	23.9	1.0	24.5
		1	24	23.4	23.3	24.1	1.0	24.5
		12	0	22.2	22.4	22.4	2.0	23.5
		12	7	22.3	22.4	22.5	2.0	23.5
		12	13	22.3	22.3	22.7	2.0	23.5
		25	0	22.1	22.3	22.4	2.0	23.5
	64QAM	1	0	22.4	22.5	22.1	2.0	23.5
		1	12	22.6	22.5	22.3	2.0	23.5
		1	24	22.6	22.4	22.5	2.0	23.5
		12	0	21.1	21.4	21.3	3.0	22.5
		12	7	21.2	21.4	21.4	3.0	22.5
		12	13	21.2	21.3	21.6	3.0	22.5
		25	0	21.2	21.3	21.4	3.0	22.5

LTE Band 2 Measured Results (Continued)

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				18615	18900	19185		
				1851.5 MHz	1880 MHz	1908.5 MHz		
3 MHz	QPSK	1	0	23.9	24.2	24.5	0.0	25.5
		1	8	24.2	24.3	24.9	0.0	25.5
		1	14	24.1	24.2	24.7	0.0	25.5
		8	0	23.0	23.3	23.5	1.0	24.5
		8	4	23.1	23.3	23.6	1.0	24.5
		8	7	23.1	23.2	23.7	1.0	24.5
		15	0	23.0	23.2	23.6	1.0	24.5
	16QAM	1	0	23.1	23.2	23.7	1.0	24.5
		1	8	23.3	23.2	23.9	1.0	24.5
		1	14	23.2	23.0	24.0	1.0	24.5
		8	0	22.1	22.5	22.5	2.0	23.5
		8	4	22.2	22.4	22.7	2.0	23.5
		8	7	22.2	22.4	22.7	2.0	23.5
		15	0	22.1	22.3	22.6	2.0	23.5
	64QAM	1	0	22.2	22.5	22.4	2.0	23.5
		1	8	22.4	22.6	22.7	2.0	23.5
		1	14	22.4	22.5	22.7	2.0	23.5
		8	0	21.1	21.4	21.5	3.0	22.5
		8	4	21.1	21.4	21.6	3.0	22.5
		8	7	21.1	21.3	21.7	3.0	22.5
		15	0	21.2	21.3	21.6	3.0	22.5
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				18607	18900	19193		
				1850.7 MHz	1880 MHz	1909.3 MHz		
1.4 MHz	QPSK	1	0	24.0	24.2	24.7	0.0	25.5
		1	3	24.0	24.2	24.7	0.0	25.5
		1	5	24.0	24.2	24.8	0.0	25.5
		3	0	23.9	24.1	24.5	0.0	25.5
		3	1	24.0	24.2	24.6	0.0	25.5
		3	3	24.0	24.1	24.6	0.0	25.5
		6	0	22.9	23.2	23.7	1.0	24.5
	16QAM	1	0	22.9	23.3	23.8	1.0	24.5
		1	3	23.1	23.3	23.8	1.0	24.5
		1	5	23.0	23.3	23.9	1.0	24.5
		3	0	23.2	23.2	23.7	1.0	24.5
		3	1	23.3	23.3	23.8	1.0	24.5
		3	3	23.3	23.3	23.7	1.0	24.5
		6	0	22.1	22.4	22.5	2.0	23.5
	64QAM	1	0	22.4	22.3	22.6	2.0	23.5
		1	3	22.5	22.4	22.7	2.0	23.5
		1	5	22.5	22.2	22.7	2.0	23.5
		3	0	22.4	22.4	22.5	2.0	23.5
		3	1	22.5	22.4	22.5	2.0	23.5
		3	3	22.5	22.4	22.6	2.0	23.5
		6	0	21.0	21.5	21.6	3.0	22.5

LTE Band 5 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				Measured Pwr (dBm)				
				20450	20525	20600		
				829 MHz	836.5 MHz	844 MHz		
10 MHz	QPSK	1	0		24.3		0.0	25.5
		1	25		24.2		0.0	25.5
		1	49		24.1		0.0	25.5
		25	0		23.4		1.0	24.5
		25	12		23.3		1.0	24.5
		25	25		23.2		1.0	24.5
		50	0		23.2		1.0	24.5
	16QAM	1	0		23.5		1.0	24.5
		1	25		23.3		1.0	24.5
		1	49		23.1		1.0	24.5
		25	0		22.0		2.0	23.5
		25	12		22.0		2.0	23.5
		25	25		21.8		2.0	23.5
		50	0		21.8		2.0	23.5
	64QAM	1	0		22.8		2.0	23.5
		1	25		22.6		2.0	23.5
		1	49		22.4		2.0	23.5
		25	0		21.9		3.0	22.5
		25	12		21.9		3.0	22.5
		25	25		21.8		3.0	22.5
		50	0		21.8		3.0	22.5

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				20425	20525	20625		
				826.5 MHz	836.5 MHz	846.5 MHz		
5 MHz	QPSK	1	0	24.7	24.5	23.6	0.0	25.5
		1	12	24.3	24.4	23.1	0.0	25.5
		1	24	24.1	24.1	23.2	0.0	25.5
		12	0	23.7	23.3	23.1	1.0	24.5
		12	7	23.6	23.3	23.1	1.0	24.5
		12	13	23.6	23.3	23.1	1.0	24.5
		25	0	23.6	23.3	23.0	1.0	24.5
	16QAM	1	0	23.8	23.5	23.1	1.0	24.5
		1	12	23.7	23.4	22.7	1.0	24.5
		1	24	23.5	23.3	22.3	1.0	24.5
		12	0	22.7	22.4	22.1	2.0	23.5
		12	7	22.6	22.4	22.1	2.0	23.5
		12	13	22.6	22.3	22.1	2.0	23.5
		25	0	22.5	22.2	22.0	2.0	23.5
	64QAM	1	0	22.6	22.3	22.0	2.0	23.5
		1	12	22.6	22.2	21.7	2.0	23.5
		1	24	22.5	22.2	21.3	2.0	23.5
		12	0	21.7	21.4	21.1	3.0	22.5
		12	7	21.7	21.4	21.1	3.0	22.5
		12	13	21.7	21.4	21.1	3.0	22.5
		25	0	21.6	21.3	21.1	3.0	22.5

LTE Band 5 Measured Results (Continued)

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				20415	20525	20635		
				825.5 MHz	836.5 MHz	847.5 MHz		
3 MHz	QPSK	1	0	23.3	24.3	23.3	0.0	25.5
		1	8	24.3	24.3	24.3	0.0	25.5
		1	14	24.4	24.4	24.4	0.0	25.5
		8	0	23.7	23.3	23.1	1.0	24.5
		8	4	23.7	23.3	23.0	1.0	24.5
		8	7	23.7	23.3	23.1	1.0	24.5
		15	0	23.4	23.4	23.4	1.0	24.5
	16QAM	1	0	23.7	23.3	22.7	1.0	24.5
		1	8	23.7	23.3	22.6	1.0	24.5
		1	14	23.5	23.2	22.3	1.0	24.5
		8	0	22.7	22.4	22.0	2.0	23.5
		8	4	22.8	22.4	22.1	2.0	23.5
		8	7	22.7	22.4	22.1	2.0	23.5
		15	0	22.6	22.2	22.0	2.0	23.5
	64QAM	1	0	22.9	22.6	22.2	2.0	23.5
		1	8	22.8	22.7	22.1	2.0	23.5
		1	14	22.9	22.5	21.8	2.0	23.5
		8	0	21.8	21.4	21.2	3.0	22.5
		8	4	21.8	21.4	21.2	3.0	22.5
		8	7	21.8	21.4	21.2	3.0	22.5
		15	0	21.7	21.3	21.1	3.0	22.5

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				20407	20525	20643		
				824.7 MHz	836.5 MHz	848.3 MHz		
1.4 MHz	QPSK	1	0	24.6	24.2	23.6	0.0	25.5
		1	3	24.5	24.3	23.5	0.0	25.5
		1	5	24.5	24.2	23.4	0.0	25.5
		3	0	24.4	24.1	23.4	0.0	25.5
		3	1	24.4	24.2	23.5	0.0	25.5
		3	3	24.4	24.2	23.4	0.0	25.5
		6	0	23.7	23.2	22.9	1.0	24.5
	16QAM	1	0	23.6	23.2	22.8	1.0	24.5
		1	3	23.6	23.2	22.8	1.0	24.5
		1	5	23.6	23.2	22.7	1.0	24.5
		3	0	23.7	23.3	22.6	1.0	24.5
		3	1	23.7	23.4	22.6	1.0	24.5
		3	3	23.7	23.3	22.6	1.0	24.5
		6	0	22.8	22.4	21.9	2.0	23.5
	64QAM	1	0	22.9	22.6	22.1	2.0	23.5
		1	3	22.7	22.6	22.1	2.0	23.5
		1	5	22.9	22.5	21.9	2.0	23.5
		3	0	22.8	22.5	21.9	2.0	23.5
		3	1	22.9	22.5	21.9	2.0	23.5
		3	3	22.9	22.5	21.9	2.0	23.5
		6	0	21.6	21.2	21.0	3.0	22.5

LTE Band 12 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				Measured Pwr (dBm)				
				23060	23095	23130		
				704 MHz	707.5 MHz	711 MHz		
10 MHz	QPSK	1	0		24.4		0.0	25.5
		1	25		24.3		0.0	25.5
		1	49		24.3		0.0	25.5
		25	0		23.4		1.0	24.5
		25	12		23.4		1.0	24.5
		25	25		23.3		1.0	24.5
		50	0		23.3		1.0	24.5
	16QAM	1	0		23.3		1.0	24.5
		1	25		23.2		1.0	24.5
		1	49		23.2		1.0	24.5
		25	0		22.4		2.0	23.5
		25	12		22.4		2.0	23.5
		25	25		22.3		2.0	23.5
		50	0		22.4		2.0	23.5
	64QAM	1	0		22.7		2.0	23.5
		1	25		22.6		2.0	23.5
		1	49		22.6		2.0	23.5
		25	0		21.4		3.0	22.5
		25	12		21.4		3.0	22.5
		25	25		21.4		3.0	22.5
		50	0		21.4		3.0	22.5

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				23035	23095	23155		
				701.5 MHz	707.5 MHz	713.5 MHz		
5 MHz	QPSK	1	0	24.5	24.5	24.2	0.0	25.5
		1	12	24.4	24.4	24.2	0.0	25.5
		1	24	24.4	24.4	24.2	0.0	25.5
		12	0	23.4	23.3	23.2	1.0	24.5
		12	7	23.5	23.3	23.3	1.0	24.5
		12	13	23.4	23.3	23.3	1.0	24.5
		25	0	23.4	23.4	23.2	1.0	24.5
	16QAM	1	0	23.5	23.5	23.7	1.0	24.5
		1	12	23.4	23.5	23.7	1.0	24.5
		1	24	23.5	23.5	23.7	1.0	24.5
		12	0	22.5	22.5	22.3	2.0	23.5
		12	7	22.5	22.5	22.4	2.0	23.5
		12	13	22.5	22.4	22.4	2.0	23.5
		25	0	22.4	22.4	22.2	2.0	23.5
	64QAM	1	0	22.7	22.3	22.5	2.0	23.5
		1	12	22.6	22.2	22.5	2.0	23.5
		1	24	22.6	22.2	22.5	2.0	23.5
		12	0	21.5	21.4	21.2	3.0	22.5
		12	7	21.5	21.4	21.3	3.0	22.5
		12	13	21.5	21.4	21.2	3.0	22.5
		25	0	21.5	21.3	21.2	3.0	22.5

LTE Band 12 Measured Results (Continued)

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				23025	23095	23165		
				700.5 MHz	707.5 MHz	714.5 MHz		
3 MHz	QPSK	1	0	24.4	24.3	24.3	0.0	25.5
		1	8	24.5	24.4	24.3	0.0	25.5
		1	14	24.4	24.3	24.2	0.0	25.5
		8	0	23.4	23.4	23.3	1.0	24.5
		8	4	23.4	23.4	23.3	1.0	24.5
		8	7	23.4	23.4	23.3	1.0	24.5
		15	0	23.4	23.3	23.2	1.0	24.5
	16QAM	1	0	23.4	23.2	23.6	1.0	24.5
		1	8	23.5	23.3	23.7	1.0	24.5
		1	14	23.4	23.2	23.6	1.0	24.5
		8	0	22.5	22.5	22.4	2.0	23.5
		8	4	22.5	22.5	22.4	2.0	23.5
		8	7	22.5	22.5	22.4	2.0	23.5
		15	0	22.4	22.4	22.3	2.0	23.5
	64QAM	1	0	22.6	22.6	22.3	2.0	23.5
		1	8	22.7	22.7	22.4	2.0	23.5
		1	14	22.5	22.6	22.3	2.0	23.5
		8	0	21.4	21.5	21.3	3.0	22.5
		8	4	21.4	21.4	21.4	3.0	22.5
		8	7	21.4	21.4	21.3	3.0	22.5
		15	0	21.5	21.3	21.3	3.0	22.5
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				23017	23095	23173		
				699.7 MHz	707.5 MHz	715.3 MHz		
1.4 MHz	QPSK	1	0	24.4	24.3	24.2	0.0	25.5
		1	3	24.5	24.4	24.2	0.0	25.5
		1	5	24.4	24.3	24.2	0.0	25.5
		3	0	24.3	24.1	24.1	0.0	25.5
		3	1	24.3	24.2	24.1	0.0	25.5
		3	3	24.3	24.2	24.1	0.0	25.5
		6	0	23.5	23.3	23.2	1.0	24.5
	16QAM	1	0	23.4	23.3	23.5	1.0	24.5
		1	3	23.5	23.4	23.5	1.0	24.5
		1	5	23.4	23.3	23.4	1.0	24.5
		3	0	23.5	23.3	23.3	1.0	24.5
		3	1	23.6	23.3	23.3	1.0	24.5
		3	3	23.6	23.3	23.3	1.0	24.5
		6	0	22.6	22.4	22.1	2.0	23.5
	64QAM	1	0	22.6	22.6	22.2	2.0	23.5
		1	3	22.6	22.7	22.3	2.0	23.5
		1	5	22.6	22.6	22.2	2.0	23.5
		3	0	22.3	22.5	22.2	2.0	23.5
		3	1	22.4	22.6	22.3	2.0	23.5
		3	3	22.4	22.6	22.3	2.0	23.5
		6	0	21.5	21.3	21.5	3.0	22.5

LTE Band 26 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)			MPR	Tune-up Limit
				Measured Pwr (dBm)				
				26765	26865	26965		
				821.5 MHz	831.5 MHz	841.5 MHz		
15 MHz	QPSK	1	0		24.3		0.0	25.5
		1	37		24.1		0.0	25.5
		1	74		23.9		0.0	25.5
		36	0		23.7		1.0	24.5
		36	20		23.6		1.0	24.5
		36	39		23.5		1.0	24.5
		75	0		23.6		1.0	24.5
	16QAM	1	0		24.0		1.0	24.5
		1	37		23.8		1.0	24.5
		1	74		23.7		1.0	24.5
		36	0		22.7		2.0	23.5
		36	20		22.7		2.0	23.5
		36	39		22.6		2.0	23.5
		75	0		22.6		2.0	23.5
	64QAM	1	0		23.0		2.0	23.5
		1	37		22.9		2.0	23.5
		1	74		22.6		2.0	23.5
		36	0		21.7		3.0	22.5
		36	20		21.7		3.0	22.5
		36	39		21.6		3.0	22.5
		75	0		21.7		3.0	22.5
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				26740	26865	26990		
				819 MHz	831.5 MHz	844 MHz		
10 MHz	QPSK	1	0	24.2	24.3	23.9	0.0	25.5
		1	25	24.2	24.1	23.7	0.0	25.5
		1	49	24.3	24.0	23.8	0.0	25.5
		25	0	23.7	23.6	23.3	1.0	24.5
		25	12	23.7	23.6	23.2	1.0	24.5
		25	25	23.8	23.5	23.2	1.0	24.5
		50	0	23.7	23.5	23.2	1.0	24.5
	16QAM	1	0	23.7	23.7	23.6	1.0	24.5
		1	25	23.7	23.4	23.5	1.0	24.5
		1	49	23.7	23.3	23.6	1.0	24.5
		25	0	22.8	22.6	22.3	2.0	23.5
		25	12	22.8	22.7	22.3	2.0	23.5
		25	25	22.8	22.6	22.2	2.0	23.5
		50	0	22.7	22.6	22.3	2.0	23.5
	64QAM	1	0	22.8	22.9	22.6	2.0	23.5
		1	25	22.8	22.7	22.5	2.0	23.5
		1	49	22.9	22.6	22.5	2.0	23.5
		25	0	21.8	21.7	21.3	3.0	22.5
		25	12	21.8	21.7	21.3	3.0	22.5
		25	25	21.9	21.6	21.2	3.0	22.5
		50	0	21.8	21.6	21.3	3.0	22.5

LTE Band 26 Measured Results (Continued)

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				26715	26865	27015		
				816.5 MHz	831.5 MHz	846.5 MHz		
5 MHz	QPSK	1	0	24.3	24.2	23.7	0.0	25.5
		1	12	24.3	24.2	23.7	0.0	25.5
		1	24	24.2	24.1	23.8	0.0	25.5
		12	0	23.7	23.6	23.2	1.0	24.5
		12	7	23.8	23.6	23.2	1.0	24.5
		12	13	23.8	23.6	23.2	1.0	24.5
		25	0	23.7	23.5	23.2	1.0	24.5
	16QAM	1	0	23.8	23.8	23.7	1.0	24.5
		1	12	23.8	23.7	23.7	1.0	24.5
		1	24	23.8	23.7	23.8	1.0	24.5
		12	0	22.8	22.7	22.4	2.0	23.5
		12	7	22.8	22.7	22.4	2.0	23.5
		12	13	22.8	22.7	22.4	2.0	23.5
		25	0	22.6	22.6	22.3	2.0	23.5
	64QAM	1	0	23.0	22.9	22.2	2.0	23.5
		1	12	23.0	22.8	22.1	2.0	23.5
		1	24	23.0	22.8	22.2	2.0	23.5
		12	0	21.7	21.7	21.3	3.0	22.5
		12	7	21.7	21.7	21.3	3.0	22.5
		12	13	21.8	21.6	21.3	3.0	22.5
		25	0	21.6	21.6	21.2	3.0	22.5
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				26705	26865	27025		
				815.5 MHz	831.5 MHz	847.5 MHz		
3 MHz	QPSK	1	0	24.2	24.1	23.7	0.0	25.5
		1	8	24.3	24.2	23.8	0.0	25.5
		1	14	24.2	24.0	23.7	0.0	25.5
		8	0	23.7	23.6	23.2	1.0	24.5
		8	4	23.8	23.6	23.3	1.0	24.5
		8	7	23.8	23.6	23.2	1.0	24.5
		15	0	23.7	23.6	23.2	1.0	24.5
	16QAM	1	0	23.7	23.4	23.5	1.0	24.5
		1	8	23.8	23.5	23.6	1.0	24.5
		1	14	23.7	23.4	23.6	1.0	24.5
		8	0	22.8	22.7	22.3	2.0	23.5
		8	4	22.8	22.7	22.3	2.0	23.5
		8	7	22.8	22.7	22.3	2.0	23.5
		15	0	22.7	22.6	22.3	2.0	23.5
	64QAM	1	0	23.0	22.7	22.4	2.0	23.5
		1	8	23.1	22.8	22.5	2.0	23.5
		1	14	23.0	22.6	22.4	2.0	23.5
		8	0	21.8	21.7	21.2	3.0	22.5
		8	4	21.9	21.7	21.2	3.0	22.5
		8	7	21.9	21.7	21.2	3.0	22.5
		15	0	21.7	21.7	21.3	3.0	22.5

LTE Band 26 Measured Results (Continued)

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				26697	26865	27033		
				814.7 MHz	831.5 MHz	848.3 MHz		
1.4 MHz	QPSK	1	0	24.2	24.0	23.7	0.0	25.5
		1	3	24.2	24.0	23.7	0.0	25.5
		1	5	24.2	23.9	23.7	0.0	25.5
		3	0	24.1	23.9	23.5	0.0	25.5
		3	1	24.1	23.9	23.6	0.0	25.5
		3	3	24.1	23.9	23.6	0.0	25.5
		6	0	23.7	23.6	23.2	1.0	24.5
	16QAM	1	0	24.0	23.4	23.2	1.0	24.5
		1	3	24.0	23.5	23.3	1.0	24.5
		1	5	24.0	23.5	23.3	1.0	24.5
		3	0	23.7	23.6	23.1	1.0	24.5
		3	1	23.8	23.6	23.2	1.0	24.5
		3	3	23.8	23.6	23.2	1.0	24.5
		6	0	22.6	22.7	22.4	2.0	23.5
	64QAM	1	0	23.0	22.6	22.3	2.0	23.5
		1	3	23.1	22.7	22.4	2.0	23.5
		1	5	23.0	22.6	22.4	2.0	23.5
		3	0	22.9	22.6	22.1	2.0	23.5
		3	1	23.0	22.6	22.2	2.0	23.5
		3	3	23.0	22.7	22.2	2.0	23.5
		6	0	21.7	21.9	21.3	3.0	22.5

LTE Band 66 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				Measured Pwr (dBm)			MPR	Tune-up Limit
				132072	132322	132572		
				1720 MHz	1745 MHz	1770 MHz		
20 MHz	QPSK	1	0	23.3	23.2	23.4	0.0	25
		1	49	23.3	23.4	23.5	0.0	25
		1	99	23.2	23.3	23.6	0.0	25
		50	0	22.4	22.5	22.5	1.0	24
		50	24	22.4	22.5	22.6	1.0	24
		50	50	22.4	22.4	22.6	1.0	24
		100	0	22.4	22.5	22.6	1.0	24
	16QAM	1	0	22.7	22.8	22.9	1.0	24
		1	49	22.7	23.0	23.0	1.0	24
		1	99	22.6	23.0	23.0	1.0	24
		50	0	21.4	21.6	21.6	2.0	23
		50	24	21.4	21.6	21.7	2.0	23
		50	50	21.4	21.5	21.7	2.0	23
		100	0	21.5	21.6	21.7	2.0	23
	64QAM	1	0	21.6	21.6	22.2	2.0	23
		1	49	21.6	21.8	22.2	2.0	23
		1	99	21.5	21.8	22.3	2.0	23
		50	0	20.5	20.7	20.7	3.0	22
		50	24	20.5	20.6	20.7	3.0	22
		50	50	20.5	20.6	20.7	3.0	22
		100	0	20.5	20.6	20.7	3.0	22
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				132047	132322	132597		
				1717.5 MHz	1745 MHz	1772.5 MHz		
15 MHz	QPSK	1	0	23.4	23.4	23.6	0.0	25
		1	37	23.4	23.4	23.6	0.0	25
		1	74	23.3	23.3	23.6	0.0	25
		36	0	22.4	22.4	22.6	1.0	24
		36	20	22.4	22.4	22.7	1.0	24
		36	39	22.3	22.4	22.7	1.0	24
		75	0	22.4	22.4	22.6	1.0	24
	16QAM	1	0	22.7	22.3	22.9	1.0	24
		1	37	22.7	22.4	23.0	1.0	24
		1	74	22.6	22.4	23.0	1.0	24
		36	0	21.4	21.5	21.7	2.0	23
		36	20	21.5	21.5	21.8	2.0	23
		36	39	21.4	21.5	21.7	2.0	23
		75	0	21.5	21.5	21.8	2.0	23
	64QAM	1	0	21.9	21.8	21.7	2.0	23
		1	37	21.8	21.9	21.8	2.0	23
		1	74	21.8	21.8	21.8	2.0	23
		36	0	20.5	20.6	20.7	3.0	22
		36	20	20.5	20.6	20.8	3.0	22
		36	39	20.4	20.5	20.8	3.0	22
		75	0	20.5	20.6	20.8	3.0	22

LTE Band 66 Measured Results (Continued)

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				132022	132322	132622		
				1715 MHz	1745 MHz	1775 MHz		
10 MHz	QPSK	1	0	23.4	23.4	23.7	0.0	25
		1	25	23.3	23.3	23.6	0.0	25
		1	49	23.3	23.3	23.6	0.0	25
		25	0	22.4	22.4	22.7	1.0	24
		25	12	22.4	22.4	22.7	1.0	24
		25	25	22.4	22.4	22.7	1.0	24
		50	0	22.4	22.5	22.7	1.0	24
	16QAM	1	0	22.7	22.5	22.6	1.0	24
		1	25	22.7	22.5	22.5	1.0	24
		1	49	22.7	22.5	22.6	1.0	24
		25	0	21.5	21.6	21.7	2.0	23
		25	12	21.5	21.6	21.7	2.0	23
		25	25	21.5	21.6	21.7	2.0	23
		50	0	21.5	21.5	21.7	2.0	23
	64QAM	1	0	21.6	21.8	21.8	2.0	23
		1	25	21.5	21.8	21.8	2.0	23
		1	49	21.5	21.8	21.9	2.0	23
		25	0	20.6	20.6	20.8	3.0	22
		25	12	20.5	20.6	20.8	3.0	22
		25	25	20.5	20.6	20.8	3.0	22
		50	0	20.5	20.6	20.8	3.0	22
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				131997	132322	132647		
				1712.5 MHz	1745 MHz	1777.5 MHz		
5 MHz	QPSK	1	0	23.5	23.5	23.8	0.0	25
		1	12	23.4	23.4	23.8	0.0	25
		1	24	23.5	23.4	23.7	0.0	25
		12	0	22.4	22.5	22.7	1.0	24
		12	7	22.4	22.5	22.7	1.0	24
		12	13	22.4	22.5	22.7	1.0	24
		25	0	22.5	22.5	22.7	1.0	24
	16QAM	1	0	22.6	23.1	22.8	1.0	24
		1	12	22.5	23.0	22.8	1.0	24
		1	24	22.6	23.0	22.9	1.0	24
		12	0	21.5	21.7	21.8	2.0	23
		12	7	21.6	21.7	21.8	2.0	23
		12	13	21.5	21.6	21.8	2.0	23
		25	0	21.5	21.6	21.7	2.0	23
	64QAM	1	0	21.7	21.5	22.0	2.0	23
		1	12	21.6	21.4	22.0	2.0	23
		1	24	21.6	21.4	22.0	2.0	23
		12	0	20.4	20.6	20.7	3.0	22
		12	7	20.5	20.6	20.7	3.0	22
		12	13	20.5	20.5	20.7	3.0	22
		25	0	20.5	20.5	20.7	3.0	22

LTE Band 66 Measured Results (Continued)

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				131987	132322	132657		
				1711.5 MHz	1745 MHz	1778.5 MHz		
3 MHz	QPSK	1	0	23.5	23.5	23.8	0.0	25
		1	8	23.5	23.6	23.9	0.0	25
		1	14	23.4	23.5	23.8	0.0	25
		8	0	22.5	22.5	22.8	1.0	24
		8	4	22.5	22.6	22.8	1.0	24
		8	7	22.5	22.5	22.8	1.0	24
		15	0	22.4	22.5	22.8	1.0	24
	16QAM	1	0	22.5	22.5	23.1	1.0	24
		1	8	22.5	22.6	23.2	1.0	24
		1	14	22.4	22.5	23.2	1.0	24
		8	0	21.5	21.7	21.9	2.0	23
		8	4	21.6	21.8	21.9	2.0	23
		8	7	21.5	21.8	21.9	2.0	23
		15	0	21.4	21.6	21.9	2.0	23
	64QAM	1	0	21.5	21.8	21.8	2.0	23
		1	8	21.6	21.9	21.9	2.0	23
		1	14	21.5	21.8	21.8	2.0	23
		8	0	20.3	20.6	20.7	3.0	22
		8	4	20.4	20.6	20.8	3.0	22
		8	7	20.3	20.5	20.8	3.0	22
		15	0	20.4	20.5	20.8	3.0	22

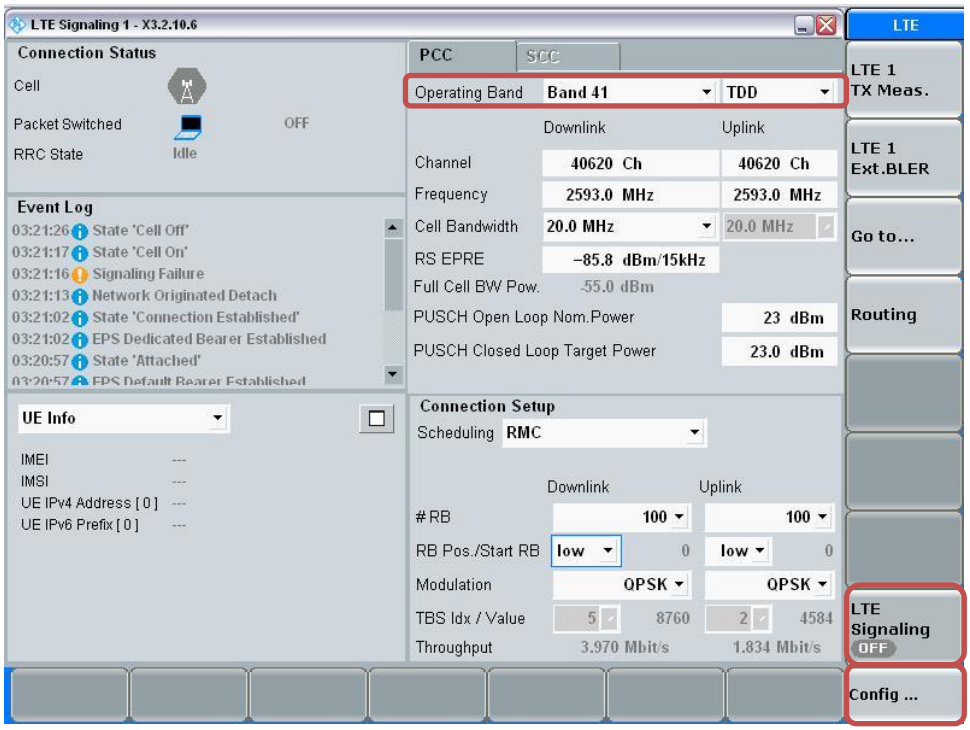
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				131979	132322	132665		
				1710.7 MHz	1745 MHz	1779.3 MHz		
1.4 MHz	QPSK	1	0	23.5	23.5	23.7	0.0	25
		1	3	23.6	23.6	23.8	0.0	25
		1	5	23.5	23.5	23.7	0.0	25
		3	0	23.4	23.6	23.7	0.0	25
		3	1	23.5	23.6	23.8	0.0	25
		3	3	23.5	23.6	23.8	0.0	25
		6	0	22.4	22.5	22.8	1.0	24
	16QAM	1	0	22.6	23.0	22.8	1.0	24
		1	3	22.6	23.1	22.8	1.0	24
		1	5	22.5	23.0	22.8	1.0	24
		3	0	22.5	22.9	23.0	1.0	24
		3	1	22.6	22.9	23.0	1.0	24
		3	3	22.6	22.9	23.0	1.0	24
		6	0	21.6	21.5	21.9	2.0	23
	64QAM	1	0	21.4	21.6	22.0	2.0	23
		1	3	21.4	21.6	22.1	2.0	23
		1	5	21.3	21.6	22.0	2.0	23
		3	0	21.4	21.4	22.0	2.0	23
		3	1	21.5	21.5	22.1	2.0	23
		3	3	21.5	21.5	22.0	2.0	23
		6	0	20.5	20.5	20.6	3.0	22

LTE Band TDD Measured Results

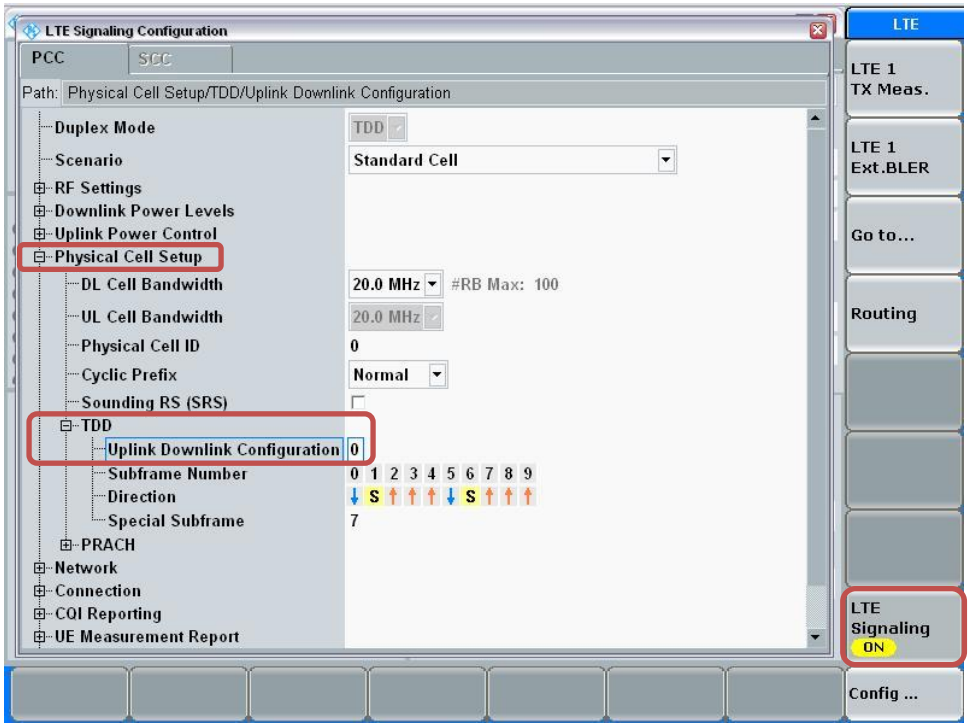
Procedure used to establish SAR test signal for LTE TDD Band

Set to CMW-500 with following parameters:

- Turn the LTE Signaling off using “ON | OFF” key
- Operating Band: Select Band 41 and TDD
- Go to “Config….”

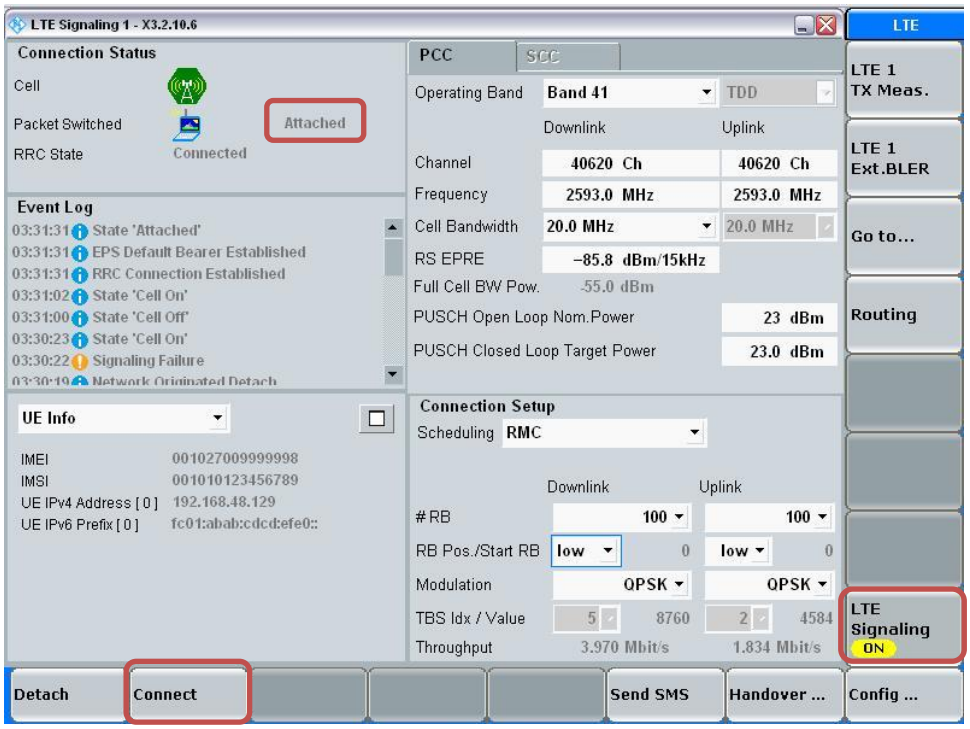


- Go to “Physical Cell Setup”
- Select “TDD” and Set “Uplink Downlink Configuration” to “0”
- Turn the cell on using “ON | OFF” key



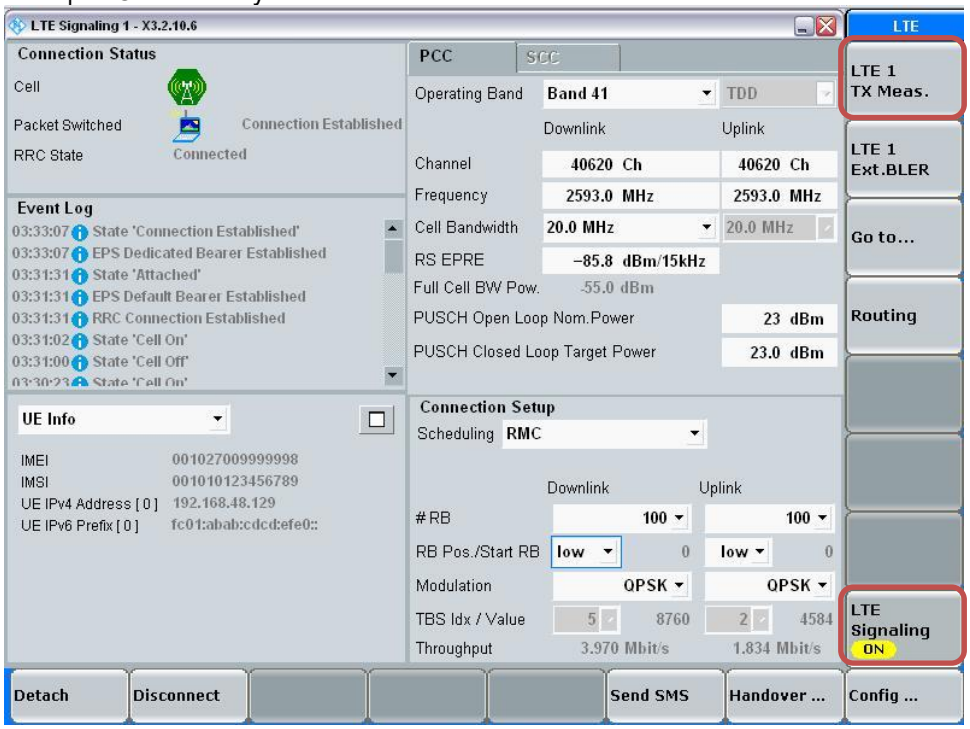
Connect to EUT

- Turn the cell on using “ON | OFF” key
- After EUT is Attached
- Select “Connect”

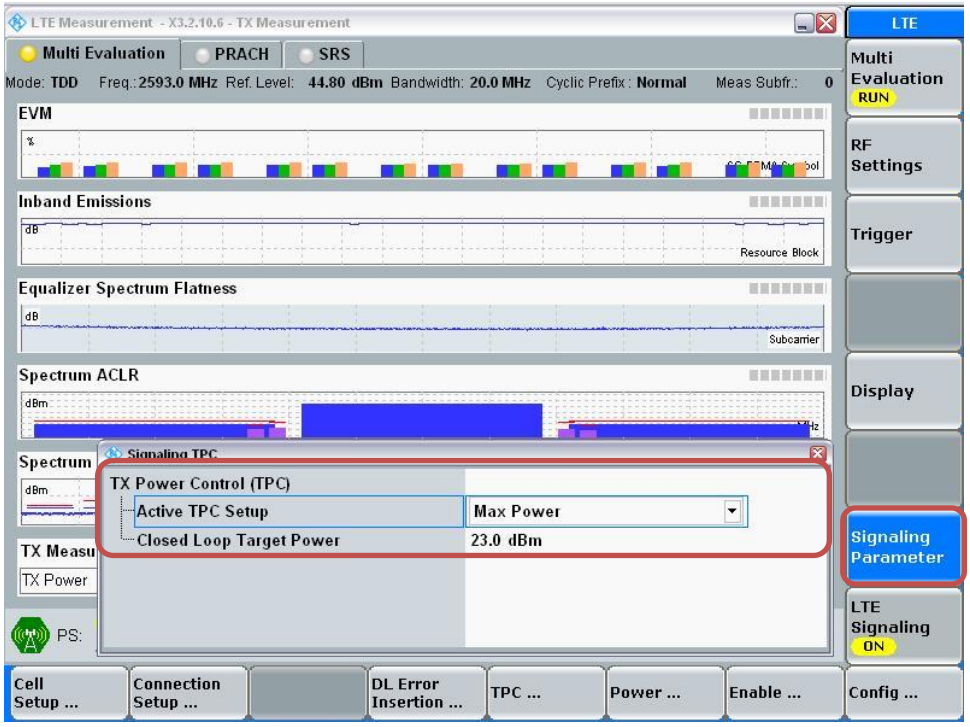


Max Power Setting

- Select “LTE 1 TX Meas.”
- Press “RESTART | STOP” Soft key

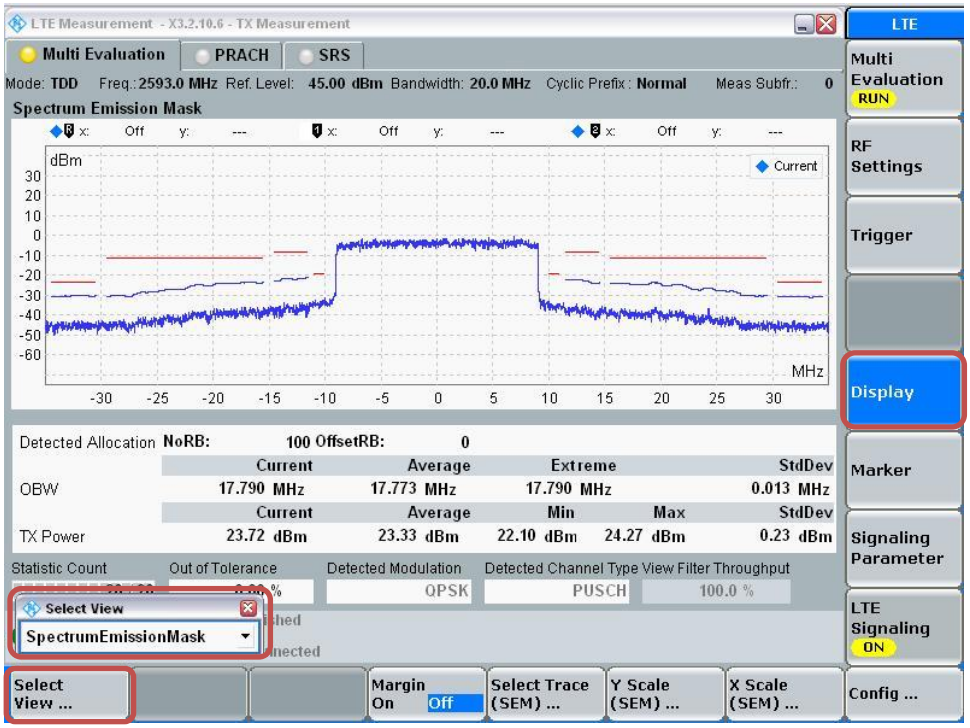


- Select “Signaling Parameter”
- Select “TX Power Control (TPC)” > Select “Active TPC Setup” to “Max Power” > Set “Closed Loop Target Power” to “23 dBm”



View TX Power

- Go to “Display”
- Select “Select View…”
- Select “Spectrum Emission Mask”



LTE Band 41 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)						
				Measured Pwr (dBm)					MPR	Tune-up Limit
				39750	40185	40620	41055	41490		
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz		
20 MHz	QPSK	1	0	23.5	23.9	23.7	23.6	23.6	0.0	24.8
		1	49	24.2	23.9	23.6	23.5	23.6	0.0	24.8
		1	99	24.1	23.9	23.5	23.5	23.6	0.0	24.8
		50	0	23.1	22.9	22.6	22.5	22.6	1.0	23.8
		50	24	23.0	22.9	22.6	22.5	22.6	1.0	23.8
		50	50	23.0	22.9	22.5	22.4	22.7	1.0	23.8
		100	0	22.9	22.9	22.6	22.5	22.6	1.0	23.8
	16QAM	1	0	23.3	22.9	22.6	22.7	22.5	1.0	23.8
		1	49	23.2	22.9	22.5	22.5	22.6	1.0	23.8
		1	99	23.1	22.9	22.4	22.5	22.6	1.0	23.8
		50	0	22.0	22.0	21.7	21.6	21.6	2.0	22.8
		50	24	22.0	21.9	21.7	21.6	21.6	2.0	22.8
		50	50	22.0	21.9	21.6	21.5	21.6	2.0	22.8
		100	0	22.0	21.9	21.7	21.5	21.6	2.0	22.8
	64QAM	1	0	22.0	22.3	21.7	21.6	22.0	2.0	22.8
		1	49	22.0	22.3	21.5	21.5	21.8	2.0	22.8
		1	99	22.0	22.3	21.5	21.5	22.0	2.0	22.8
		50	0	21.0	21.0	20.8	20.6	20.6	3.0	21.8
		50	24	21.0	21.0	20.8	20.6	20.6	3.0	21.8
		50	50	21.0	21.0	20.7	20.5	20.7	3.0	21.8
		100	0	21.0	21.0	20.7	20.6	20.6	3.0	21.8
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)					MPR	Tune-up Limit
				39750	40185	40620	41055	41490		
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz		
15 MHz	QPSK	1	0	24.0	23.8	23.7	23.5	23.4	0.0	24.8
		1	37	24.0	24.0	23.5	23.5	23.4	0.0	24.8
		1	74	24.3	23.8	23.5	23.8	23.6	0.0	24.8
		36	0	23.0	23.0	22.6	22.5	22.8	1.0	23.8
		36	20	22.9	22.9	22.6	22.5	22.8	1.0	23.8
		36	39	22.9	22.8	22.5	22.4	22.7	1.0	23.8
		75	0	23.0	22.8	22.6	22.5	22.6	1.0	23.8
	16QAM	1	0	23.0	22.9	22.6	22.5	22.7	1.0	23.8
		1	37	22.9	22.9	22.5	22.5	22.4	1.0	23.8
		1	74	23.3	22.8	22.5	23.2	22.6	1.0	23.8
		36	0	22.1	22.0	21.7	21.6	21.9	2.0	22.8
		36	20	22.0	22.0	21.7	21.6	21.9	2.0	22.8
		36	39	22.0	21.9	21.6	21.5	21.7	2.0	22.8
		75	0	22.4	22.0	21.7	21.6	21.8	2.0	22.8
	64QAM	1	0	21.8	21.5	22.0	21.4	21.4	2.0	22.8
		1	37	22.0	21.6	21.8	21.3	21.2	2.0	22.8
		1	74	22.0	21.5	21.8	21.5	21.4	2.0	22.8
		36	0	21.0	21.1	20.8	20.5	20.7	3.0	21.8
		36	20	20.9	21.1	20.8	20.5	20.7	3.0	21.8
		36	39	20.9	21.0	20.7	20.4	20.7	3.0	21.8
		75	0	21.3	21.0	20.7	20.6	20.9	3.0	21.8

LTE Band 41 Measured Results (Continued)

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)					MPR	Tune-up Limit
				39750	40185	40620	41055	41490		
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz		
10 MHz	QPSK	1	0	24.1	24.0	23.6	23.5	23.6	0.0	24.8
		1	25	24.0	23.9	23.4	23.4	23.6	0.0	24.8
		1	49	24.1	23.9	23.5	24.0	23.7	0.0	24.8
		25	0	22.4	22.5	22.1	22.0	22.0	1.0	23.8
		25	12	22.4	22.4	22.1	22.0	22.1	1.0	23.8
		25	25	22.4	22.4	22.0	21.9	22.1	1.0	23.8
		50	0	22.3	22.4	22.1	22.0	22.0	1.0	23.8
	16QAM	1	0	23.1	23.1	22.6	22.4	22.8	1.0	23.8
		1	25	22.9	23.0	22.5	22.4	22.9	1.0	23.8
		1	49	22.8	23.0	22.5	22.7	22.7	1.0	23.8
		25	0	22.0	22.0	21.6	21.5	21.6	2.0	22.8
		25	12	21.9	21.9	21.6	21.5	21.6	2.0	22.8
		25	25	21.9	21.9	21.6	21.4	21.6	2.0	22.8
		50	0	21.9	22.0	21.6	21.5	21.6	2.0	22.8
	64QAM	1	0	22.3	21.6	22.0	21.6	21.4	2.0	22.8
		1	25	22.3	21.6	21.8	21.5	21.4	2.0	22.8
		1	49	22.3	21.5	21.8	21.6	21.2	2.0	22.8
		25	0	20.9	21.1	20.7	20.5	20.6	3.0	21.8
		25	12	20.9	21.0	20.7	20.4	20.6	3.0	21.8
		25	25	20.9	21.0	20.6	20.4	20.6	3.0	21.8
		50	0	20.9	21.0	20.7	20.5	20.6	3.0	21.8
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)					MPR	Tune-up Limit
				39750	40185	40620	41055	41490		
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz		
5 MHz	QPSK	1	0	23.9	23.9	23.6	23.5	23.4	0.0	24.8
		1	12	23.9	23.9	23.5	23.4	23.6	0.0	24.8
		1	24	23.9	23.8	23.5	23.9	23.9	0.0	24.8
		12	0	23.0	23.0	22.5	22.5	22.6	1.0	23.8
		12	7	23.0	22.9	22.6	22.5	22.6	1.0	23.8
		12	13	23.1	22.8	22.5	22.5	22.6	1.0	23.8
		25	0	22.9	22.8	22.5	22.4	22.6	1.0	23.8
	16QAM	1	0	23.0	22.9	22.7	22.4	22.4	1.0	23.8
		1	12	22.9	22.9	22.6	22.4	22.5	1.0	23.8
		1	24	23.3	22.8	22.7	22.5	22.5	1.0	23.8
		12	0	21.9	22.0	21.7	21.4	21.5	2.0	22.8
		12	7	22.0	21.9	21.7	21.5	21.6	2.0	22.8
		12	13	22.0	21.9	21.6	21.4	21.7	2.0	22.8
		25	0	22.0	21.9	21.6	21.5	21.5	2.0	22.8
	64QAM	1	0	22.0	22.4	21.9	21.2	21.6	2.0	22.8
		1	12	21.8	22.4	21.7	21.2	21.8	2.0	22.8
		1	24	21.7	22.3	21.7	21.3	21.9	2.0	22.8
		12	0	21.0	21.1	20.6	20.5	20.6	3.0	21.8
		12	7	21.0	21.1	20.6	20.5	20.7	3.0	21.8
		12	13	21.0	21.0	20.6	20.5	20.7	3.0	21.8
		25	0	20.9	20.9	20.6	20.5	20.5	3.0	21.8

9.3.1. LTE Rel. 10 Carrier Aggregation

LTE Carrier Aggregation Down Link Combinations;

The DL CA power measurement conditions for various CC's combinations were determined according LTE DL CA SAR Test Exclusion guidance in TCB workshop note (April 2018). Only yellow highlighted cells need power measurement. The following power measurements were performed with a single carrier uplink; CA for this particular project only supports one (1) uplink and up to three (3) downlinks.

LTE Release 10 Carrier Aggregation

Index	2CC	Restriction	Completely Covered by Measurement Supersrt	Reverse
2CC #1	CA_2A-2A			
2CC #2	CA_2C			
2CC #3	CA_2A-4A		3CC #1	O
2CC #4	CA_2A-5A		3CC #1	O
2CC #5	CA_2A-12A		3CC #2	O
2CC #6	CA_2A-66A		3CC #3	O
2CC #7	CA_4A-4A		3CC #4	
2CC #8	CA_4A-5A		3CC #1	O
2CC #9	CA_4A-12A	B12 SCC Only	3CC #4	X
2CC #10	CA_5A-41A	B41 SCC only		X
2CC #11	CA_5A-66A		3CC #5	O
2CC #12	CA_12A-66A	B12 SCC Only	3CC #3	O
2CC #13	CA_26A-41A	B41 SCC only		X
2CC #14	CA_41A-41A			
2CC #15	CA_41C		3CC #7	
2CC #16	CA_66A-66A		3CC #5	
2CC #17	CA_66B			
2CC #18	CA_66C			

Index	3CC	Restriction	Completely Covered by Measurement Supersrt	Reverse
3CC #1	CA_2A-4A-5A			O
3CC #2	CA_2A-4A-12A	B12 SCC only		O
3CC #3	CA_2A-12A-66A	B12 SCC only		O
3CC #4	CA_4A-4A-12A	B12 SCC only		O
3CC #5	CA_5A-66A-66A			O
3CC #6	CA_12A-66A-66A	B12 SCC only		O
3CC #7	CA_41A-41C			O
3CC #8	CA_41D			O

Note:

Only yellow highlight cells need power measurement according to LTE DL CA SAR test Exclusion in TCB workshop (April.2018).

1. DL CA output power results

E-UTRA CA configutation (BCS)	Bands			UL					DL									LTE Rel 8 Tx. Power [dBm]	LTE Rel 10 Tx. Power [dBm]	Delta
	PCC	SCC1	SCC2	PCC					PCC			SCC1			SCC2					
	1st	2nd	3rd	Mode	BW (MHz)	Channel	Freq. (MHz)	RB/Offset	BW (MHz)	Channel	Freq. (MHz)	BW (MHz)	Channel	Freq. (MHz)	BW (MHz)	Channel	Freq. (MHz)			
5A-41A	5A	41A		QPSK	10	20525	836.5	1/0	10	2525	881.5	20	40620	2593.0				24.3	24.3	-0.04
26A-41A	26A	41A		QPSK	15	26865	831.5	1/0	15	26865	831.5	20	40620	2593.0				24.3	24.2	-0.04
2A-4A-5A	2A	4A	5A	QPSK	20	18700	1860.0	1/99	20	700	1940.0	20	2175	2132.5	10	2525	881.5	25.0	24.9	-0.07
	4A	5A	2A	QPSK	20	20175	1732.5	1/0	20	2175	2132.5	10	2525	881.5	20	900	1960.0	23.3	23.2	-0.10
	5A	2A	4A	QPSK	10	20525	836.5	1/0	10	2525	881.5	20	900	1960.0	20	2175	2132.5	24.3	24.3	-0.06
2A-4A-12A	2A	4A	12A	QPSK	20	18700	1860.0	1/99	20	700	1940.0	20	2175	2132.5	10	5095	737.5	25.0	24.9	-0.07
	4A	12A	2A	QPSK	20	20175	1732.5	1/0	20	2175	2132.5	10	5095	737.5	20	900	1960.0	23.3	23.2	-0.08
2A-12A-66A	2A	12A	66A	QPSK	20	18700	1860.0	1/99	20	700	1940.0	10	5095	737.5	20	2145	66786.0	25.0	24.9	-0.07
	66A	2A	12A	QPSK	20	132572	1770.0	1/99	20	67036	2170.0	20	900	1960.0	10	5095	737.5	23.6	23.5	-0.08
4A-4A-12A	4A	4A	12A	QPSK	20	20050	1720.0	1/0	20	2050	2120.0	20	2300	2145.0	10	5095	737.5	23.3	23.3	-0.02
5A-66A-66A	5A	66A	66A	QPSK	10	20525	836.5	1/0	10	2525	881.5	20	66786	2145.0	20	67036	2170.0	24.3	24.3	-0.04
	66A	66A	5A	QPSK	20	132572	1770.0	1/99	20	67036	2170.0	20	66536	2120.0	10	2525	881.5	23.6	23.5	-0.10
12A-66A-66A	66A	66A	12A	QPSK	20	132572	1770.0	1/99	20	67036	2170.0	20	66536	2120.0	10	5095	737.5	23.6	23.5	-0.10
2A-2A	2A	2A		QPSK	20	18700	1860.0	1/99	20	700	1940.0	20	1100	1980.0				25.0	24.9	-0.11
41A-41A	41A	41A		QPSK	20	39750	2506.0	1/49	20	39750	2506.0	20	41490	2680.0				24.2	24.2	-0.03
41A-41C	41A	41C	41C	QPSK	20	39750	2506.0	1/49	20	39750	2506.0	20	41490	2680.0	20	41292	2660.2	24.2	24.2	-0.06
2C	2C	2C		QPSK	20	18700	1860.0	1/99	20	700	1940.0	20	898	1959.8				25.0	24.9	-0.10
66B	66B	66B		QPSK	15	132597	1772.5	1/37	15	67061	2172.5	5	66968	2163.2				23.6	23.6	-0.07
66C	66C	66C		QPSK	20	132572	1770.0	1/99	20	67036	2170.0	20	66536	2120.0				23.6	23.5	-0.08
41D	41D	41D	41D	QPSK	20	39750	2506.0	1/49	20	39750	2506.0	20	39948	2525.8	20	40146	2545.6	24.2	24.1	-0.16

Note:

1. Per KDB 941225 D05A LTE Rel. 10 KDB Inquiry Sheet: SAR is excluded for Carrier Aggregation when measured power does not exceed LTE Release 8 by more than a 1/4 dB.
2. When the same frequency band is used for both contiguous and non-contiguous in DL CA Intra band, power was measured using the configuration with the largest aggregated bandwidth and maximum output power among the contiguous and non-contiguous in DL CA Intra band configurations

9.4. Wi-Fi 2.4 GHz (DTS Band)

When the RCV is activated in a held-to-ear user scenario, the output power level is reduced. The maximum allowed output powers in all conditions are included in the maximum power document.
Refer to Operational Description for WLAN explanation.

Antenna	Mode	Data Rate	Ch #	Freq. (MHz)	Max.Average Power			Reduced Average Power		
					Meas. Avg Pwr (dBm)	Max. Tune-up Limit (dBm)	SAR Test (Yes/No)	Meas. Avg Pwr (dBm)	Max. Tune-up Limit (dBm)	SAR Test (Yes/No)
WiFi 2.4G Ant.	802.11b	1 Mbps	1	2412.0	19.5	20.0	Yes	11.5	12.0	Yes
			6	2437.0	20.0			12.0		
			11	2462.0	18.9			12.0		
			12	2467.0	17.9	18.0	No	11.8		No
			13	2472.0	13.2	14.0		11.2		
	802.11g	6 Mbps	1	2412.0	Not Required	18.0	No	Not Required	12.0	No
			6	2437.0						
			11	2462.0		15.0				
			12	2467.0		13.0			8.0	
			13	2472.0		8.0			6.0	
	802.11n (HT20)	6.5 Mbps	1	2412.0	Not Required	18.0	No	Not Required	12.0	No
			6	2437.0						
			11	2462.0		15.0				
			12	2467.0		13.0			8.0	
			13	2472.0		6.0			6.0	

Note(s):

1. SAR is not required for 802.11g/n modes when the adjusted SAR for 802.11b is < 1.2 W/kg.
2. For "Not required", SAR Test reduction was applied from KDB 248227 guidance, Sec. 2.1, b), 1) when the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11n/g/ax mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band. Additional output power measurements were not deemed necessary.
3. Additionally, SAR is not required for Channels 12 and 13 because the tune-up limit and the measured output power for these two channels are no greater than those for the default test channels. Refer to §6.3.

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

When the RCV is active in a held-to-ear user scenario, the output power level is reduced. The maximum allowed output powers in all conditions are included in the maximum power document.
Refer to Operational Description for WLAN explanation.

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Max. Average Power			Reduced Average Power		
					Avg Pwr (dBm)	Max. Tune-up Limit (dBm)	SAR Test (Yes/No)	Avg Pwr (dBm)	Max. Tune-up Limit (dBm)	SAR Test (Yes/No)
5.3 (UNII 2A)	802.11a	6 Mbps	52	5260	16.4	18.0	Yes	Not Required	12.0	No
			56	5280	17.4					
			60	5300	18.0					
			64	5320	17.3					
	802.11n (HT20)	6.5 Mbps	52	5260	Not Required	18.0	No	Not Required	12.0	No
			56	5280						
			60	5300						
			64	5320						
	802.11n (HT40)	13.5 Mbps	54	5270	Not Required	14.0	No	11.5	12.0	Yes
			62	5310				11.2		
	802.11ac (VHT20)	6.5 Mbps	52	5260	Not Required	17.0	No	Not Required	12.0	No
			56	5280						
			60	5300						
			64	5320						
	802.11ac (VHT40)	13.5 Mbps	54	5270	Not Required	14.0	No	Not Required	12.0	No
			62	5310						
	802.11ac (VHT80)	29.3 Mbps	58	5290	Not Required	13.0	No	Not Required	11.0	No
5.5 (U-NII 2C)	802.11a	6 Mbps	100	5500	17.8	18.0	Yes	Not Required	12.0	No
			120	5600	17.3					
			124	5620	17.7					
			144	5720	17.1					
	802.11n (HT20)	6.5 Mbps	100	5500	Not Required	18.0	No	Not Required	12.0	No
			120	5600						
			124	5620						
			144	5720						
	802.11n (HT40)	13.5 Mbps	102	5510	Not Required	14.0	No	11.3	12.0	Yes
			118	5590				10.5		
			126	5630				10.9		
			142	5710				10.5		
	802.11ac (VHT20)	6.5 Mbps	100	5500	Not Required	17.0	No	Not Required	12.0	No
			120	5600						
			124	5620						
			144	5720						
	802.11ac (VHT40)	13.5 Mbps	102	5510	Not Required	14.0	No	Not Required	12.0	No
			118	5590						
			126	5630						
			142	5710						
	802.11ac (VHT80)	29.3 Mbps	106	5530	Not Required	13.0	No	Not Required	11.0	No
			122	5610						
			138	5690						
5.8 (U-NII 3)	802.11a	6 Mbps	149	5745	17.1	18.0	Yes	Not Required	12.0	No
			157	5785	17.1					
			165	5825	17.2					
	802.11n (HT20)	6.5 Mbps	149	5745	Not Required	18.0	No	Not Required	12.0	No
			157	5785						
			165	5825						
	802.11n (HT40)	13.5 Mbps	151	5755	Not Required	16.0	No	11.4	12.0	Yes
			159	5795				11.4		
	802.11ac (VHT20)	6.5 Mbps	149	5745	Not Required	17.0	No	Not Required	12.0	No
			157	5785						
			165	5825						
	802.11ac (VHT40)	13.5 Mbps	151	5755	Not Required	15.0	No	Not Required	12.0	No
			159	5795						
	802.11ac (VHT80)	29.3 Mbps	155	5775	Not Required	13.0	No	Not Required	11.0	No

Note(s):

1. For "Not required", SAR Test reduction was applied from KDB 248227 guidance, Sec. 2.1, b), 1) when the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band.
2. When the same transmission mode configurations have the same maximum output power on the same channel for the 802.11 a/g/n/ac/ax modes, the channel in the lower order/sequence 802.11 mode (i.e. a, g, n ac then ax) is selected.
3. When the specified maximum output power is the same for both UNII band I and UNII band 2A, begin SAR measurement in UNII band 2A; and if the highest *reported* SAR for UNII band 2A is
   - ≤ 1.2 W/kg, SAR is not required for UNII band I
   - > 1.2 W/kg, both bands should be tested independently for SAR.

9.6. Bluetooth

Measured Results

Band (GHz)	Mode	Ch #	Freq. (MHz)	Maximum Average Power (dBm)	
				Meas Pwr	Tune-up Limit
2.4	GFSK	0	2402	16.2	18.0
		39	2441	17.5	
		78	2480	17.1	
	EDR, 8-DPSK	0	2402	10.4	13.0
		39	2441	12.2	
		78	2480	12.1	
	LE, GFSK, 1M (37 pkt)	0	2402	5.2	7.0
		19	2440	6.5	
		39	2480	6.6	
	LE, GFSK, 2M (37 pkt)	0	2402	5.0	
		19	2440	6.3	
		39	2480	6.4	

Note(s):

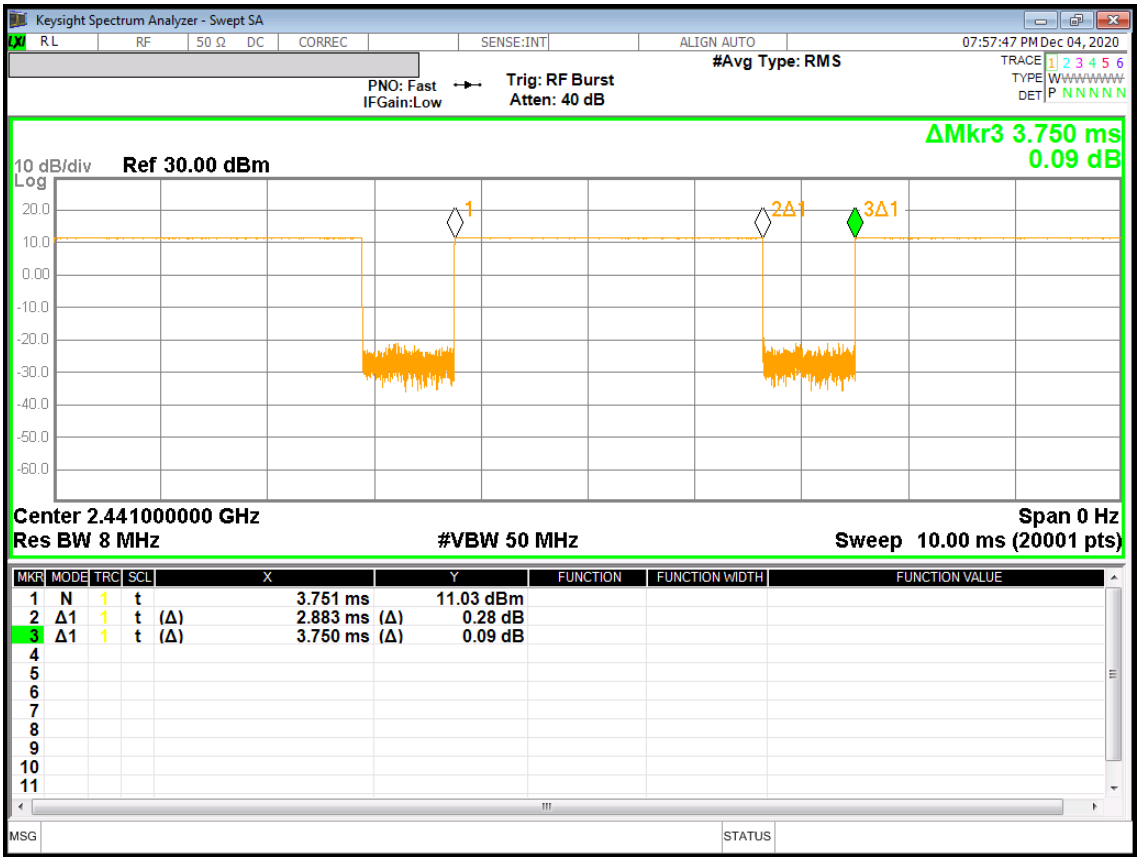
SAR test is evaluated at GFSK mode in Bluetooth

Duty Factor Measured Results

Mode	Type	T on (ms)	Period (ms)	Duty Cycle	Crest Factor (1/duty cycle)
GFSK	DH5	2.883	3.750	76.9%	1.30

Duty Cycle plots

GFSK



10. Measured and Reported (Scaled) SAR Results

SAR Test Reduction criteria are as follows:

- Reported SAR(W/kg) for WWAN= Measured SAR *Tune-up Scaling Factor
- Reported SAR(W/kg) for Wi-Fi and Bluetooth= Measured SAR * Tune-up scaling factor * Duty Cycle scaling factor
- Duty Cycle scaling factor = 1 / Duty cycle (%)

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 648474 D04 Handset SAR (Phablet Only):

For smart phones, with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm.
When hotspot mode does not apply, 10-g extremity SAR is required for all surfaces and edges with an antenna located at ≤ 25mm From that surface or edge in direct contact with a flat phantom, to address interactive hand use exposure conditions. When hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg; However, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, Including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold.

Additional 1-g SAR testing at 5 mm is not required when hotspot mode 10-g extremity SAR is not required for the surfaces and edges; since all 1-g reported SAR < 1.2 W/kg.

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 ≤ ¼ 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:

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*.

Spot-Check Verification Procedures :

Spot-check verification proceeds as follows, as suggested by the manufacturer.
Spot-check verification perform using Variant model at the highest configurations in each RF exposure conditions in Reference model.

Condition.1 If Highest SAR value is less than 0.4 or 1.0 W/kg (1-g or 10-g respectively) in RF exposure condition, then Spot check perform at highest configuration in RF exposure condition. and If SAR measured values are less than 0.4 W/kg, no further tests are performed even if the deviation was more than 30%.

Condition.2 If Highest SAR value is same or greater than 0.4 or 1.0 W/kg (1-g or 10-g respectively) in RF exposure condition, Spot check perform in All positions above 0.4 or 1.0 W/kg (1-g or 10-g respectively).

Condition.3 For some test positions in condition.2, If Variant model's SAR level deviated higher than 30% from Reference model's SAR level according to Spot-check results, Additional SAR test perform for other configurations at the position.

10.1. GSM 850

Data referencing from Reference model

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)	
								Tune-up limit	Meas.	Meas.	Scaled
Main 1 Ant.	Head	GPRS 4 Slots	N/A	0	Left Touch	128	824.2	29.0	27.9	0.267	0.348
					Left Tilt	128	824.2	29.0	27.9	0.164	0.214
					Right Touch	128	824.2	29.0	27.9	0.288	0.375
					Right Tilt	128	824.2	29.0	27.9	0.156	0.203
	Body-worn	GPRS 4 Slots	N/A	15	Rear	128	824.2	29.0	27.9	0.344	0.448
					Front	128	824.2	29.0	27.9	0.299	0.389
	Hotspot	GPRS 4 Slots	N/A	10	Rear	128	824.2	29.0	27.9	0.329	0.429
					Front	128	824.2	29.0	27.9	0.271	0.353
					Edge 2	128	824.2	29.0	27.9	0.363	0.473
					Edge 3	128	824.2	29.0	27.9	0.148	0.193
					Edge 4	128	824.2	29.0	27.9	0.254	0.331

Spot check results for Variant model

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Main 1 Ant.	Head	GPRS 4 Slots	N/A	0	Right Touch	128	824.2	29.0	27.7	0.256	0.342	1
	Body-worn	GPRS 4 Slots	N/A	15	Rear	128	824.2	29.0	27.7	0.326	0.435	2
	Hotspot	GPRS 4 Slots	N/A	10	Rear	128	824.2	29.0	27.7	0.358	0.478	3
					Edge 2	128	824.2	29.0	27.7	0.333	0.445	

10.2. GSM 1900

Data referencing from Reference model

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)	
								Tune-up limit	Meas.	Meas.	Scaled
Main 2 Ant.	Head	GPRS 4 Slots	N/A	0	Left Touch	810	1909.8	26.5	25.7	0.109	0.131
					Left Tilt	810	1909.8	26.5	25.7	0.078	0.093
					Right Touch	810	1909.8	26.5	25.7	0.074	0.089
					Right Tilt	810	1909.8	26.5	25.7	0.072	0.086
	Body-worn	GPRS 4 Slots	N/A	15	Rear	810	1909.8	26.5	25.7	0.130	0.156
					Front	810	1909.8	26.5	25.7	0.111	0.133
	Hotspot	GPRS 4 Slots	N/A	10	Rear	810	1909.8	26.5	25.7	0.274	0.329
					Front	810	1909.8	26.5	25.7	0.227	0.273
					Edge 3	810	1909.8	26.5	25.7	0.284	0.341
					Edge 4	810	1909.8	26.5	25.7	0.163	0.196

Spot check results for Variant model

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Main 2 Ant.	Head	GPRS 4 Slots	N/A	0	Left Touch	810	1909.8	26.5	26.4	0.117	0.120	4
	Body-worn	GPRS 4 Slots	N/A	15	Rear	810	1909.8	26.5	26.4	0.151	0.155	5
	Hotspot	GPRS 4 Slots	N/A	10	Edge 3	810	1909.8	26.5	26.4	0.378	0.388	6

10.3. W-CDMA Band II

Data referencing from Reference model

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)	
								Tune-up limit	Meas.	Meas.	Scaled
Main 2 Ant.	Head	Rel 99 RMC	N/A	0	Left Touch	9538	1907.6	25.5	25.1	0.147	0.161
					Left Tilt	9538	1907.6	25.5	25.1	0.100	0.109
					Right Touch	9538	1907.6	25.5	25.1	0.101	0.110
					Rightt Tilt	9538	1907.6	25.5	25.1	0.095	0.104
	Body-worn	Rel 99 RMC	N/A	15	Rear	9538	1907.6	25.5	25.1	0.244	0.267
					Front	9538	1907.6	25.5	25.1	0.164	0.179
	Hotspot	Rel 99 RMC	N/A	10	Rear	9538	1907.6	25.5	25.1	0.493	0.539
					Front	9538	1907.6	25.5	25.1	0.317	0.346
					Edge 3	9538	1907.6	25.5	25.1	0.442	0.483
					Edge 4	9538	1907.6	25.5	25.1	0.234	0.256

Spot check results for Variant model

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Main 2 Ant.	Head	Rel 99 RMC	N/A	0	Left Touch	9538	1907.6	25.5	24.7	0.234	0.282	7
	Body-worn	Rel 99 RMC	N/A	15	Rear	9538	1907.6	25.5	24.7	0.206	0.248	8
	Hotspot	Rel 99 RMC	N/A	10	Rear	9538	1907.6	25.5	24.7	0.534	0.643	9
					Edge 3	9538	1907.6	25.5	24.7	0.507	0.611	

10.4. W-CDMA Band IV

Data referencing from Reference model

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)	
								Tune-up limit	Meas.	Meas.	Scaled
Main 2 Ant.	Head	Rel 99 RMC	N/A	0	Left Touch	1413	1732.6	24.5	23.0	0.175	0.246
					Left Tilt	1413	1732.6	24.5	23.0	0.150	0.211
					Right Touch	1413	1732.6	24.5	23.0	0.193	0.271
					Rightt Tilt	1413	1732.6	24.5	23.0	0.134	0.188
	Body-worn	Rel 99 RMC	N/A	15	Rear	1413	1732.6	24.5	23.0	0.278	0.390
					Front	1413	1732.6	24.5	23.0	0.321	0.451
	Hotspot	Rel 99 RMC	N/A	10	Rear	1413	1732.6	24.5	23.0	0.480	0.674
					Front	1413	1732.6	24.5	23.0	0.505	0.709
					Edge 3	1312	1712.4	24.5	23.2	0.630	0.859
						1413	1732.6	24.5	23.0	0.646	0.907
						1513	1752.6	24.5	23.3	0.647	0.852
					Edge 4	1413	1732.6	24.5	23.0	0.315	0.442

Spot check results for Variant model

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Note	Plot No.
								Tune-up limit	Meas.	Meas.	Scaled		
Main 2 Ant.	Head	Rel 99 RMC	N/A	0	Right Touch	1413	1732.6	24.5	23.3	0.170	0.223		10
	Body-worn	Rel 99 RMC	N/A	15	Front	1413	1732.6	24.5	23.3	0.233	0.306		11
	Hotspot	Rel 99 RMC	N/A	10	Rear	1413	1732.6	24.5	23.3	0.462	0.606		
					Front	1413	1732.6	24.5	23.3	0.439	0.576		
					Edge 3	1312	1712.4	24.5	23.5	0.546	0.693		
						1413	1732.6	24.5	23.3	0.692	0.908		12
						1513	1752.6	24.5	23.5	0.467	0.582		
					Edge 4	1413	1732.6	24.5	23.3	0.378	0.496		

10.5. W-CDMA Band V

Data referencing from Reference model

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)	
								Tune-up limit	Meas.	Meas.	Scaled
Main 1 Ant.	Head	Rel 99 RMC	N/A	0	Left Touch	4132	826.4	25.5	24.3	0.201	0.266
					Left Tilt	4132	826.4	25.5	24.3	0.102	0.135
					Right Touch	4132	826.4	25.5	24.3	0.213	0.281
					Rightt Tilt	4132	826.4	25.5	24.3	0.117	0.155
	Body-worn	Rel 99 RMC	N/A	15	Rear	4132	826.4	25.5	24.3	0.244	0.322
					Front	4132	826.4	25.5	24.3	0.211	0.279
	Hotspot	Rel 99 RMC	N/A	10	Rear	4132	826.4	25.5	24.3	0.274	0.362
					Front	4132	826.4	25.5	24.3	0.212	0.280
					Edge 2	4132	826.4	25.5	24.3	0.235	0.311
					Edge 3	4132	826.4	25.5	24.3	0.070	0.092
					Edge 4	4132	826.4	25.5	24.3	0.157	0.207

Spot check results for Variant model

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Main 1 Ant.	Head	Rel 99 RMC	N/A	0	Right Touch	4132	826.4	25.5	24.5	0.260	0.328	13
	Body-worn	Rel 99 RMC	N/A	15	Rear	4132	826.4	25.5	24.5	0.274	0.346	14
	Hotspot	Rel 99 RMC	N/A	10	Rear	4132	826.4	25.5	24.5	0.295	0.372	15

10.6. LTE Band 2 (20MHz Bandwidth)

Data referencing from Reference model

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)	
										Tune-up limit	Meas.	Meas.	Scaled
Main 2 Ant.	Head	QPSK	N/A	0	Left Touch	18700	1860.0	1	99	25.5	24.8	0.111	0.131
								50	50	24.5	23.6	0.084	0.102
					Left Tilt	18700	1860.0	1	99	25.5	24.8	0.093	0.110
								50	50	24.5	23.6	0.073	0.089
					Right Touch	18700	1860.0	1	99	25.5	24.8	0.085	0.101
								50	50	24.5	23.6	0.065	0.080
					Right Tilt	18700	1860.0	1	99	25.5	24.8	0.082	0.097
								50	50	24.5	23.6	0.065	0.079
	Body-worn	QPSK	N/A	15	Rear	18700	1860.0	1	99	25.5	24.8	0.139	0.164
								50	50	24.5	23.6	0.104	0.127
					Front	18700	1860.0	1	99	25.5	24.8	0.129	0.152
								50	50	24.5	23.6	0.099	0.121
	Hotspot	QPSK	N/A	10	Rear	18700	1860.0	1	99	25.5	24.8	0.318	0.375
								50	50	24.5	23.6	0.237	0.290
					Front	18700	1860.0	1	99	25.5	24.8	0.254	0.300
								50	50	24.5	23.6	0.197	0.241
					Edge 3	18700	1860.0	1	99	25.5	24.8	0.387	0.457
								50	50	24.5	23.6	0.264	0.323
					Edge 4	18700	1860.0	1	99	25.5	24.8	0.192	0.227
								50	50	24.5	23.6	0.151	0.185

Spot check results for Variant model

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up limit	Meas.	Meas.	Scaled	
Main 2 Ant.	Head	QPSK	N/A	0	Left Touch	18700	1860.0	1	99	25.5	25.0	0.201	0.226	16
	Body-worn	QPSK	N/A	15	Rear	18700	1860.0	1	99	25.5	25.0	0.236	0.266	17
	Hotspot	QPSK	N/A	10	Edge 3	18700	1860.0	1	99	25.5	25.0	0.423	0.477	18

10.7. LTE Band 5 (10MHz Bandwidth)

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up limit	Meas.	Meas.	Scaled	
Main 1 Ant.	Head	QPSK	N/A	0	Left Touch	20525	836.5	1	0	25.5	24.3	0.217	0.284	
								25	0	24.5	23.4	0.203	0.259	
					Left Tilt	20525	836.5	1	0	25.5	24.3	0.114	0.149	
								25	0	24.5	23.4	0.110	0.140	
					Right Touch	20525	836.5	1	0	25.5	24.3	0.250	0.327	19
								25	0	24.5	23.4	0.234	0.299	
					Right Tilt	20525	836.5	1	0	25.5	24.3	0.126	0.165	
								25	0	24.5	23.4	0.121	0.154	
	Body-worn	QPSK	N/A	15	Rear	20525	836.5	1	0	25.5	24.3	0.297	0.388	20
								25	0	24.5	23.4	0.271	0.346	
					Front	20525	836.5	1	0	25.5	24.3	0.253	0.331	
								25	0	24.5	23.4	0.236	0.301	
	Hotspot	QPSK	N/A	10	Rear	20525	836.5	1	0	25.5	24.3	0.324	0.424	21
								25	0	24.5	23.4	0.286	0.365	
					Front	20525	836.5	1	0	25.5	24.3	0.241	0.315	
								25	0	24.5	23.4	0.223	0.285	
					Edge 2	20525	836.5	1	0	25.5	24.3	0.296	0.387	
								25	0	24.5	23.4	0.275	0.351	
					Edge 3	20525	836.5	1	0	25.5	24.3	0.085	0.112	
								25	0	24.5	23.4	0.082	0.105	
					Edge 4	20525	836.5	1	0	25.5	24.3	0.194	0.254	
								25	0	24.5	23.4	0.180	0.230	

10.8. LTE Band 12 (10MHz Bandwidth)

Data referencing from Reference model

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)	
										Tune-up limit	Meas.	Meas.	Scaled
Main 1 Ant.	Head	QPSK	N/A	0	Left Touch	23095	707.5	1	0	25.5	24.3	0.210	0.275
								25	0	24.5	23.3	0.190	0.251
					Left Tilt	23095	707.5	1	0	25.5	24.3	0.105	0.137
								25	0	24.5	23.3	0.096	0.127
					Right Touch	23095	707.5	1	0	25.5	24.3	0.221	0.289
								25	0	24.5	23.3	0.188	0.248
					Right Tilt	23095	707.5	1	0	25.5	24.3	0.121	0.158
								25	0	24.5	23.3	0.102	0.135
	Body-worn	QPSK	N/A	15	Rear	23095	707.5	1	0	25.5	24.3	0.337	0.441
								25	0	24.5	23.3	0.299	0.395
					Front	23095	707.5	1	0	25.5	24.3	0.312	0.408
								25	0	24.5	23.3	0.279	0.369
	Hotspot	QPSK	N/A	10	Rear	23095	707.5	1	0	25.5	24.3	0.366	0.478
								25	0	24.5	23.3	0.321	0.424
					Front	23095	707.5	1	0	25.5	24.3	0.285	0.373
								25	0	24.5	23.3	0.256	0.338
					Edge 2	23095	707.5	1	0	25.5	24.3	0.350	0.458
								25	0	24.5	23.3	0.308	0.407
					Edge 3	23095	707.5	1	0	25.5	24.3	0.071	0.093
								25	0	24.5	23.3	0.063	0.084
					Edge 4	23095	707.5	1	0	25.5	24.3	0.266	0.348
								25	0	24.5	23.3	0.249	0.329

Spot check results for Variant model

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up limit	Meas.	Meas.	Scaled	
Main 1 Ant.	Head	QPSK	N/A	0	Right Touch	23095	707.5	1	0	25.5	24.4	0.263	0.340	22
	Body-worn	QPSK	N/A	15	Rear	23095	707.5	1	0	25.5	24.4	0.379	0.490	23
					Front	23095	707.5	1	0	25.5	24.4	0.310	0.401	
	Hotspot	QPSK	N/A	10	Rear	23095	707.5	1	0	25.5	24.4	0.386	0.499	
								25	0	24.5	23.4	0.349	0.451	
					Edge 2	23095	707.5	1	0	25.5	24.4	0.393	0.508	24
								25	0	24.5	23.4	0.368	0.475	

10.9. LTE Band 26 (15MHz Bandwidth)

Data referencing from Reference model

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)	
										Tune-up limit	Meas.	Meas.	Scaled
Main 1 Ant.	Head	QPSK	N/A	0	Left Touch	26865	831.5	1	0	25.5	24.1	0.230	0.316
								36	0	24.5	23.6	0.190	0.232
					Left Tilt	26865	831.5	1	0	25.5	24.1	0.124	0.170
								36	0	24.5	23.6	0.101	0.123
					Right Touch	26865	831.5	1	0	25.5	24.1	0.218	0.299
								36	0	24.5	23.6	0.210	0.256
					Right Tilt	26865	831.5	1	0	25.5	24.1	0.114	0.157
								36	0	24.5	23.6	0.105	0.128
	Body-worn	QPSK	N/A	15	Rear	26865	831.5	1	0	25.5	24.1	0.291	0.400
								36	0	24.5	23.6	0.259	0.316
					Front	26865	831.5	1	0	25.5	24.1	0.252	0.346
								36	0	24.5	23.6	0.224	0.273
	Hotspot	QPSK	N/A	10	Rear	26865	831.5	1	0	25.5	24.1	0.345	0.474
								36	0	24.5	23.6	0.280	0.341
					Front	26865	831.5	1	0	25.5	24.1	0.247	0.339
								36	0	24.5	23.6	0.217	0.265
					Edge 2	26865	831.5	1	0	25.5	24.1	0.304	0.417
								36	0	24.5	23.6	0.264	0.322
					Edge 3	26865	831.5	1	0	25.5	24.1	0.101	0.139
								36	0	24.5	23.6	0.087	0.106
					Edge 4	26865	831.5	1	0	25.5	24.1	0.191	0.262
								36	0	24.5	23.6	0.166	0.202

Spot check results for Variant model

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up limit	Meas.	Meas.	Scaled	
Main 1 Ant.	Head	QPSK	N/A	0	Left Touch	26865	831.5	1	0	25.5	24.3	0.272	0.362	25
	Body-worn	QPSK	N/A	15	Rear	26865	831.5	1	0	25.5	24.3	0.336	0.447	26
	Hotspot	QPSK	N/A	10	Rear	26865	831.5	1	0	25.5	24.3	0.363	0.483	27
					Edge 2	26865	831.5	1	0	25.5	24.3	0.314	0.417	

10.10. LTE Band 41 (20MHz Bandwidth)

Data referencing from Reference model

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)	
										Tune-up limit	Meas.	Meas.	Scaled
Main 2 Ant.	Head	QPSK	N/A	0	Left Touch	40620	2593.0	1	0	24.8	24.1	0.196	0.232
								50	24	23.8	23.1	0.172	0.202
					Left Tilt	40620	2593.0	1	0	24.8	24.1	0.065	0.077
								50	24	23.8	23.1	0.053	0.062
					Right Touch	40620	2593.0	1	0	24.8	24.1	0.115	0.136
								50	24	23.8	23.1	0.100	0.117
					Right Tilt	40620	2593.0	1	0	24.8	24.1	0.109	0.129
								50	24	23.8	23.1	0.086	0.101
	Body-worn	QPSK	N/A	15	Rear	40620	2593.0	1	0	24.8	24.1	0.121	0.143
								50	24	23.8	23.1	0.103	0.121
					Front	40620	2593.0	1	0	24.8	24.1	0.156	0.185
								50	24	23.8	23.1	0.129	0.151
	Hotspot	QPSK	N/A	10	Rear	40620	2593.0	1	0	24.8	24.1	0.251	0.297
								50	24	23.8	23.1	0.211	0.248
					Front	40620	2593.0	1	0	24.8	24.1	0.291	0.345
								50	24	23.8	23.1	0.245	0.287
					Edge 3	40620	2593.0	1	0	24.8	24.1	0.216	0.256
								50	24	23.8	23.1	0.188	0.221
					Edge 4	40620	2593.0	1	0	24.8	24.1	0.230	0.272
								50	24	23.8	23.1	0.195	0.229

Spot check results for Variant model

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up limit	Meas.	Meas.	Scaled	
Main 2 Ant.	Head	QPSK	N/A	0	Left Touch	39750	2506.0	1	49	24.8	24.2	0.153	0.175	28
	Body-worn	QPSK	N/A	15	Front	39750	2506.0	1	49	24.8	24.2	0.124	0.142	29
	Hotspot	QPSK	N/A	10	Front	39750	2506.0	1	49	24.8	24.2	0.264	0.301	30

10.11. LTE Band 66 (20MHz Bandwidth)

Data referencing from Reference model

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)	
										Tune-up limit	Meas.	Meas.	Scaled
Main 2 Ant.	Head	QPSK	N/A	0	Left Touch	132572	1770.0	1	99	25.0	23.4	0.240	0.349
								50	50	24.0	22.3	0.191	0.285
					Left Tilt	132572	1770.0	1	99	25.0	23.4	0.157	0.229
								50	50	24.0	22.3	0.124	0.185
					Right Touch	132572	1770.0	1	99	25.0	23.4	0.164	0.239
								50	50	24.0	22.3	0.134	0.200
					Right Tilt	132572	1770.0	1	99	25.0	23.4	0.136	0.198
								50	50	24.0	22.3	0.109	0.163
	Body-worn	QPSK	N/A	15	Rear	132572	1770.0	1	99	25.0	23.4	0.267	0.389
								50	50	24.0	22.3	0.211	0.315
					Front	132572	1770.0	1	99	25.0	23.4	0.279	0.406
								50	50	24.0	22.3	0.225	0.336
	Hotspot	QPSK	N/A	10	Rear	132572	1770.0	1	99	25.0	23.4	0.452	0.658
								50	50	24.0	22.3	0.351	0.524
					Front	132572	1770.0	1	99	25.0	23.4	0.519	0.756
								50	50	24.0	22.3	0.410	0.612
					Edge 3	132072	1720.0	1	99	25.0	23.1	0.667	1.033
						132322	1745.0	1	99	25.0	23.1	0.630	0.982
						132572	1770.0	1	99	25.0	23.4	0.565	0.823
								50	50	24.0	22.3	0.475	0.709
					Edge 4	132572	1770.0	1	99	25.0	23.4	0.366	0.533
								50	50	24.0	22.3	0.282	0.421

Spot check results for Variant model

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offest	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up limit	Meas.	Meas.	Scaled	
Main 2 Ant.	Head	QPSK	N/A	0	Left Touch	132572	1770.0	1	99	25.0	23.6	0.235	0.325	31
	Body-worn	QPSK	N/A	15	Front	132572	1770.0	1	99	25.0	23.6	0.236	0.327	32
	Hotspot	QPSK	N/A	10	Rear	132572	1770.0	1	99	25.0	23.6	0.417	0.577	
								50	50	24.0	22.6	0.338	0.466	
					Front	132572	1770.0	1	99	25.0	23.6	0.477	0.660	
								50	50	24.0	22.6	0.391	0.538	
					Edge 3	132072	1720.0	1	99	25.0	23.2	0.648	0.975	33
						132322	1745.0	1	99	25.0	23.3	0.604	0.884	
						132572	1770.0	1	99	25.0	23.6	0.517	0.715	
								50	50	24.0	22.6	0.432	0.595	
					Edge 4	132572	1770.0	1	99	25.0	23.6	0.327	0.452	
								50	50	24.0	22.6	0.242	0.333	

10.12. Wi-Fi (DTS Band)

Data referencing from Reference model

Frequency Band	Mode	RF Exposure Conditions	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle (%)	Power (dBm)		1-g SAR (W/kg)		Note
										Tune-up limit	Meas.	Meas.	Scaled	
2.4GHz	802.11b 1 Mbps	Head	On	0	Left Touch	6	2437.0	0.188	98.8%	12.0	11.6			
					Left Tilt	6	2437.0	0.253	98.8%	12.0	11.6	0.197	0.217	1
					Right Touch	6	2437.0	0.237	98.8%	12.0	11.6			
					Rightt Tilt	6	2437.0	0.225	98.8%	12.0	11.6			
		Body-worn	Off	15	Rear	6	2437.0	0.431	98.8%	20.0	19.5	0.276	0.316	1
					Front	6	2437.0	0.223	98.8%	20.0	19.5	0.146	0.167	
		Hotspot	Off	10	Rear	6	2437.0	0.890	98.8%	20.0	19.5	0.557	0.637	2
					Front	6	2437.0	0.354	98.8%	20.0	19.5	0.242	0.277	4
					Edge 1	6	2437.0	0.981	98.8%	20.0	19.5	0.648	0.741	
					Edge 4	6	2437.0	0.161	98.8%	20.0	19.5			

Note(s):

1. When the Highest reported SAR is ≤ 0.4 or 1.0 W/kg (1-g or 10-g respectively). Therefore, further SAR measurements within this exposure condition are not required.
2. Highest reported SAR is > 0.4 or 1.0 W/kg (1-g or 10-g respectively). Due to the highest reported SAR for this test position, other test positions in this exposure condition were evaluated until a SAR ≤ 0.8 or 2.0 W/kg (1-g or 10-g respectively) was reported.
3. Testing for a second channel was required because the reported SAR for this test position was > 0.8 or 2.0 W/kg (1-g or 10-g respectively).
4. Additional testing required in order satisfying FCC simultaneous transmission limit criteria.
5. SAR testing is not required for OFDM mode(s) 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.

Spot check results for Variant model

Frequency Band	Mode	RF Exposure Conditions	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle (%)	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up limit	Meas.	Meas.	Scaled	
2.4GHz	802.11b 1 Mbps	Head	On	0	Left Tilt	6	2437.0	0.284	98.8%	12.0	12.0	0.194	0.198	34
		Body-worn	Off	15	Rear	6	2437.0	0.501	98.8%	20.0	20.0	0.318	0.325	35
		Hotspot	Off	10	Rear	6	2437.0	0.848	98.8%	20.0	20.0	0.518	0.529	
					Edge 1	6	2437.0	0.865	98.8%	20.0	20.0	0.625	0.638	36

10.13. Wi-Fi (U-NII Bands)

Data referencing from Reference model

U-NII 2A Results

Frequency Band	Mode	RF Exposure Conditions	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle (%)	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Note
										Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
5.3 GHz U-NII 2A	802.11n HT 40 13.5 Mbps	Head	On	0	Left Touch	54	5270.0	0.164	98.5%	12.0	11.4					
					Left Tilt	54	5270.0	0.194	98.5%	12.0	11.4					
					Right Touch	54	5270.0	0.375	98.5%	12.0	11.4	0.188	0.218			1
					Right Tilt	54	5270.0	0.319	98.5%	12.0	11.4					
	802.11a 6 Mbps	Body-worn	Off	15	Rear	64	5320.0	0.580	98.7%	18.0	17.7	0.262	0.287			1
					Front	64	5320.0	0.163	98.7%	18.0	17.7					
		Product Specific 10-g	Off	0	Rear	64	5320.0	9.799	98.7%	18.0	17.7			0.979	1.073	2
					Front	64	5320.0	3.344	98.7%	18.0	17.7					
					Edge 1	64	5320.0	4.439	98.7%	18.0	17.7					
					Edge 4	64	5320.0	13.687	98.7%	18.0	17.7			1.260	1.381	

U-NII 2C Results

Frequency Band	Mode	RF Exposure Conditions	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle (%)	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Note
										Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
5.5 GHz U-NII 2C	802.11n HT 40 13.5 Mbps	Head	On	0	Left Touch	102	5510.0	0.198	98.5%	12.0	11.4					
					Left Tilt	102	5510.0	0.174	98.5%	12.0	11.4					
					Right Touch	102	5510.0	0.789	98.5%	12.0	11.4	0.452	0.523			
					Right Tilt	102	5510.0	0.540	98.5%	12.0	11.4	0.216	0.250			2
	802.11a 6 Mbps	Body-worn	Off	15	Rear	120	5600.0	0.879	98.7%	18.0	17.7	0.422	0.460			
					Front	120	5600.0	0.414	98.7%	18.0	17.7	0.181	0.197			2
		Product Specific 10-g	Off	0	Rear	120	5600.0	10.595	98.7%	18.0	17.7			1.220	1.331	2
					Front	120	5600.0	6.868	98.7%	18.0	17.7					
					Edge 1	120	5600.0	2.922	98.7%	18.0	17.7					
					Edge 4	100	5500.0	22.383	98.7%	18.0	17.1			1.850	2.312	3
						120	5600.0	31.812	98.7%	18.0	17.7			2.400	2.619	

U-NII 3 Results

Frequency Band	Mode	RF Exposure Conditions	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle (%)	Power (dBm)		1-g SAR (W/kg)		Note
										Tune-up limit	Meas.	Meas.	Scaled	
5.8 GHz U-NII 3	802.11n HT 40 13.5 Mbps	Head	On	0	Left Touch	159	5795.0	0.140	98.5%	12.0	11.1			
					Left Tilt	159	5795.0	0.140	98.5%	12.0	11.1			
					Right Touch	159	5795.0	0.598	98.5%	12.0	11.1	0.294	0.370	1
					Right Tilt	159	5795.0	0.362	98.5%	12.0	11.1			
	802.11a 6 Mbps	Body-worn	Off	15	Rear	149	5745.0	0.844	98.7%	18.0	17.0	0.379	0.479	
					Front	149	5745.0	0.258	98.7%	18.0	17.0	0.123	0.156	2
		Hotspot	Off	10	Rear	149	5745.0	1.435	98.7%	18.0	17.0	0.608	0.769	
					Front	149	5745.0	0.452	98.7%	18.0	17.0	0.203	0.257	4
					Edge 1	149	5745.0	0.541	98.7%	18.0	17.0			
					Edge 4	149	5745.0	1.423	98.7%	18.0	17.0	0.617	0.780	2

Note(s):

1. When the Highest reported SAR is ≤ 0.4 or 1.0 W/kg (1-g or 10-g respectively). Therefore, further SAR measurements within this exposure condition are not required.
2. Highest reported SAR is > 0.4 or 1.0 W/kg (1-g or 10-g respectively). Due to the highest reported SAR for this test position, other test positions in this exposure condition were evaluated until a SAR ≤ 0.8 or 2.0 W/kg (1-g or 10-g respectively) was reported.
3. Testing for a second channel was required because the reported SAR for this test position was > 0.8 or 2.0 W/kg (1-g or 10-g respectively).
4. Additional testing required in order satisfying FCC simultaneous transmission limit criteria.

Spot check results for Variant model

U-NII 2A Results

Frequency Band	Mode	RF Exposure Conditions	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle (%)	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Note	Plot No.
										Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled		
5.3 GHz U-NII 2A	802.11n HT40 13.5Mbps	Head	On	0	Left Tilt	54	5270.0	0.061	98.5%	12.0	11.5	0.028	0.032			1	
					Right Touch	54	5270.0	0.224	98.5%	12.0	11.5	0.109	0.125				37
	802.11a 6 Mbps	Body-worn	Off	15	Rear	60	5300.0	0.450	98.7%	18.0	18.0	0.199	0.204				38
		Product Specific 10-g	Off	0	Rear	60	5300.0	6.827	98.7%	18.0	18.0			0.740	0.759		
					Edge 4	60	5300.0	9.326	98.7%	18.0	18.0			1.000	1.025		39

U-NII 2C Results

Frequency Band	Mode	RF Exposure Conditions	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle (%)	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Note	Plot No.
										Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled		
5.5 GHz U-NII 2C	802.11n HT40 13.5Mbps	Head	On	0	Left Tilt	102	5510.0	0.168	98.5%	12.0	11.3	0.076	0.091			1	
					Right Touch	102	5510.0	0.580	98.5%	12.0	11.3	0.326	0.390				40
	802.11a 6 Mbps	Body-worn	Off	15	Rear	100	5500.0	0..697	98.7%	18.0	17.8	0.312	0.334				41
		Product Specific 10-g	Off	0	Rear	100	5500.0	9.129	98.7%	18.0	17.8			0.884	0.947		
					Edge 4	100	5500.0	22.326	98.7%	18.0	17.8			1.500	1.607		
						120	5600.0	16.112	98.7%	18.0	17.7			1.670	1.822		42

U-NII 3 Results

Frequency Band	Mode	RF Exposure Conditions	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle (%)	Power (dBm)		1-g SAR (W/kg)		Note	Plot No.
										Tune-up limit	Meas.	Meas.	Scaled		
5.8 GHz U-NII 3	802.11n HT40 13.5Mbps	Head	On	0	Left Tilt	159	5795.0	0.118	98.5%	12.0	11.4	0.048	0.056	1	
					Right Touch	159	5795.0	0.399	98.5%	12.0	11.4	0.186	0.217		43
	802.11a 6 Mbps	Body-worn	Off	15	Rear	165	5825.0	0.608	98.7%	18.0	17.2	0.258	0.316		44
		Hotspot	Off	10	Rear	149	5745.0	1.412	98.7%	18.0	17.1	0.588	0.733		
					Front	149	5745.0	0.372	98.7%	18.0	17.1	0.163	0.203		
					Edge 4	149	5745.0	1.486	98.7%	18.0	17.1	0.637	0.794		45

Note(s):

1. Additional testing required in order satisfying FCC simultaneous transmission limit criteria.

10.14. Bluetooth

Data referencing from Reference model

Frequency Band	Mode	RF Exposure Conditions	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle (%)	Power (dBm)		1-g SAR (W/kg)	
									Tune-up limit	Meas.	Meas.	Scaled
2.4 GHz	GFSK	Head	N/A	0	Left Touch	39	2441.0	76.9%	18.0	17.9	0.413	0.549
					Left Tilt	39	2441.0	76.9%	18.0	17.9	0.549	0.730
					Right Touch	39	2441.0	76.9%	18.0	17.9	0.455	0.605
					Right Tilt	39	2441.0	76.9%	18.0	17.9	0.525	0.698
	GFSK	Body-worn	N/A	15	Rear	39	2441.0	76.9%	18.0	17.9	0.158	0.210
					Front	39	2441.0	76.9%	18.0	17.9	0.073	0.098
	GFSK	Hotspot	N/A	10	Rear	39	2441.0	76.9%	18.0	17.9	0.265	0.352
					Front	39	2441.0	76.9%	18.0	17.9	0.128	0.170
					Edge 1	39	2441.0	76.9%	18.0	17.9	0.275	0.366
					Edge 4	39	2441.0	76.9%	18.0	17.9	0.045	0.060

Spot check results for Variant model

Frequency Band	Mode	RF Exposure Conditions	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle (%)	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up limit	Meas.	Meas.	Scaled	
2.4 GHz	GFSK	Head	N/A	0	Left Touch	39	2441.0	76.9%	18.0	17.5	0.452	0.667	
					Left Tilt	0	2402.0	76.9%	18.0	16.2	0.413	0.822	
						39	2441.0	76.9%	18.0	17.5	0.642	0.947	46
						78	2480.0	76.9%	18.0	17.1	0.490	0.791	
					Right Touch	39	2441.0	76.9%	18.0	17.5	0.459	0.677	
					Right Tilt	39	2441.0	76.9%	18.0	17.5	0.527	0.777	
	GFSK	Body-worn	N/A	15	Rear	39	2441.0	76.9%	18.0	17.5	0.163	0.240	47
	GFSK	Hotspot	N/A	10	Edge 1	39	2441.0	76.9%	18.0	17.5	0.306	0.451	48

11. SAR Measurement Variability

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

1) Repeated measurement is not required when the original highest measured SAR is <0.8 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 when the original or repeated measurement is ≥ 1.45 or 3.6 W/kg (~ 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.

Peak spatial-average (1g of tissue)

Frequency Band (MHz)	Air Interface	RF Exposure Conditions	Test Position	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)	Repeated Measured SAR (W/kg)	Largest to Smallest SAR Ratio
700	LTE Band 12	Hotspot	Edge 2	No	0.393	N/A	N/A
835	GSM 850	Hotspot	Rear	No	0.358	N/A	N/A
	WCDMA Band V	Hotspot	Rear	No	0.295	N/A	N/A
	LTE Band 5	Hotspot	Rear	No	0.324	N/A	N/A
	LTE Band 26	Hotspot	Rear	No	0.363	N/A	N/A
1750	WCDMA Band IV	Hotspot	Edge 3	No	0.692	N/A	N/A
	LTE Band 66	Hotspot	Edge 3	No	0.648	N/A	N/A
1900	GSM 1900	Hotspot	Edge 3	No	0.378	N/A	N/A
	WCDMA Band II	Hotspot	Rear	No	0.534	N/A	N/A
	LTE Band 2	Hotspot	Edge 3	No	0.423	N/A	N/A
2400	Wi-Fi 802.11b/g/n	Hotspot	Edge 1	No	0.625	N/A	N/A
	Bluetooth	Head	Left Tilt	No	0.642	N/A	N/A
2600	LTE Band 41	Hotspot	Front	No	0.264	N/A	N/A
5300	Wi-Fi 802.11a/n	Body-worn	Rear	No	0.199	N/A	N/A
5500	Wi-Fi 802.11a/n	Head	Right Touch	No	0.326	N/A	N/A
5800	Wi-Fi 802.11a/n	Hotspot	Edge 4	No	0.637	N/A	N/A

Peak spatial-average (10g of tissue)

Frequency Band (MHz)	Air Interface	RF Exposure Conditions	Test Position	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)	Repeated Measured SAR (W/kg)	Largest to Smallest SAR Ratio
5300	Wi-Fi 802.11a/n	Product Specific 10g	Edge 4	No	1.000	N/A	N/A
5500	Wi-Fi 802.11a/n	Product Specific 10g	Edge 4	No	1.670	N/A	N/A

Note(s):

1. Second Repeated Measurement is not required since the ratio of the largest to smallest SAR for the original and first repeated measurement is not > 1.20.
2. SAR measurement Variability is only considered about Variant model's SAR test results.

12. Simultaneous Transmission SAR Analysis

Simultaneous Transmission Condition

RF Exposure Condition	Item	Capable Transmit Configurations				
Head & Body-worn & Phablet-10g	1	GSM(Voice/GPRS)	+	DTS		
	2	GSM(Voice/GPRS)	+	U-NII		
	3	GSM(Voice/GPRS)	+	BT		
	4	GSM(Voice/GPRS)	+	U-NII	+	BT
	5	WCDMA or LTE	+	DTS		
	6	WCDMA or LTE	+	U-NII		
	7	WCDMA or LTE	+	BT		
	8	WCDMA or LTE	+	U-NII	+	BT
Hotspot	9	GSM(GPRS)	+	DTS		
	10	GSM(GPRS)	+	U-NII		
	11	GSM(GPRS)	+	BT		
	12	GSM(GPRS)	+	U-NII	+	BT
	13	WCDMA or LTE	+	DTS		
	14	WCDMA or LTE	+	U-NII		
	15	WCDMA or LTE	+	BT		
	16	WCDMA or LTE	+	U-NII	+	BT

Notes:

1. DTS supports Wi-Fi Direct, Hotspot and VoIP.
2. U-NII supports Wi-Fi Direct, Hotspot and VoIP.
3. GPRS, W-CDMA, LTE supports Hotspot and VoIP.
4. U-NII Radio can transmit simultaneously with Bluetooth Radio.
5. DTS Radio cannot transmit simultaneously with Bluetooth Radio.
6. DTS Radio cannot transmit simultaneously with U-NII Radio.
7. BT tethering is considered about each RF exposure conditions.

Simultaneous transmission SAR test exclusion considerations

KDB 447498 D01 General RF Exposure Guidance provides two procedures for determining simultaneous transmission SAR test exclusion: Sum of SAR and SAR to Peak Location Ratio (SPLSR)

Sum of SAR

To qualify for simultaneous transmission SAR test exclusion based upon Sum of SAR the sum of the reported standalone SARs for all simultaneously transmitting antennas shall be below the applicable standalone SAR limit. If the sum of the SARs is above the applicable limit then simultaneous transmission SAR test exclusion may still apply if the requirements of the SAR to Peak Location Ratio (SPLSR) evaluation are met.

SAR to Peak Location Ratio (SPLSR)

KDB 447498 D01 General RF Exposure Guidance explains how to calculate the SAR to Peak Location Ratio (SPLSR) between pairs of simultaneously transmitting antennas:

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

Where:

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

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

Ri is the separation distance between the pair of simultaneous transmitting antennas. When the SAR is measured, for both antennas in the pair, it is determined by the actual x, y and z coordinates in the 1-g SAR for each SAR peak location, based on the extrapolated and interpolated result in the zoom scan measurement, using the formula of

$$[(x_1-x_2)^2 + (y_1-y_2)^2 + (z_1-z_2)^2]$$

In order for a pair of simultaneous transmitting antennas with the sum of 1-g SAR > 1.6 W/kg to qualify for exemption from Simultaneous Transmission SAR measurements, it has to satisfy the condition of:

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

When an individual antenna transmits at on two bands simultaneously, the sum of the highest *reported* SAR for the frequency bands should be used to determine SAR_1.or SAR_2. When SPLSR is necessary, the smallest distance between the peak SAR locations for the antenna pair with respect to the peaks from each antenna should be used.

The antennas in all antenna pairs that do not qualify for simultaneous transmission SAR test exclusion must be tested for SAR compliance, according to the enlarged zoom scan and volume scan post-processing procedures in KDB Publication 865664 D01

The antennas for the unlicensed transmitters are closely situated. As a result, the associated SAR hotspots are also closely situated. Some of the sum of SAR calculations yielded results over 1.6 W/kg. The SPSLR calculations for these situations were performed by treating the unlicensed SAR values as a single transmitter. The most conservative distance between all the unlicensed hotspots to the licensed hotspot was used for the value of *d* in the SPSLR calculation.

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

RF Exposure	Test Position	Standalone SAR (W/kg)				Sum of SAR (W/kg)			
		WWAN	DTS	UNII	BT	WWAN + DTS	WWAN + UNII	WWAN + BT	WWAN + BT + UNII
		1	2	3	4	1 + 2	1 + 3	1 + 4	1 + 3 + 4
Head (1-g SAR)	Left Touch	0.348	0.217	0.523	0.667	0.565	0.871	1.015	1.538
	Left Tilt	0.214	0.217	0.091	0.947	0.431	0.305	1.161	1.252
	Right Touch	0.375	0.217	0.523	0.677	0.592	0.898	1.052	1.575
	Right Tilt	0.203	0.217	0.250	0.777	0.420	0.453	0.980	1.230
Body-Worn (1-g SAR)	All position	0.448	0.325	0.479	0.240	0.773	0.927	0.688	1.167
Hotspot (1-g SAR)	Rear	0.478	0.637	0.769	0.352	1.115	1.247	0.830	1.599
	Front	0.353	0.277	0.257	0.170	0.630	0.610	0.523	0.780
	Edge 1		0.741	0.794	0.451				1.245
	Edge 2	0.473							
	Edge 3	0.193							
	Edge 4	0.331	0.741	0.794	0.060	1.072	1.125	0.391	1.185
Product Specific 10-g (10-g SAR)	All position			2.619					

SAR to Peak Location Separation Ratio (SPLSR)

RF Exposure	Test Position	Standalone SAR (W/kg)			∑ SAR (W/kg)		Calculated distance (mm)	SPLSR (=< 0.04)	Volume Scan (Yes/ No)	Figure
		WWAN	UNII	BT						
		1	3	4						
Hotspot (1-g SAR)	Rear	0.478	0.769	0.352	1+3+4	1.599				1
	Rear	0.478	0.769		1+3	1.247	55.6	0.03	No	
	Rear	0.478		0.352	1+4	0.830	60.2	0.01	No	
	Rear		0.769	0.352	3+4	1.121	52.2	0.02	No	

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

RF Exposure	Test Position	Standalone SAR (W/kg)				Sum of SAR (W/kg)			
		WWAN	DTS	UNII	BT	WWAN + DTS	WWAN + UNII	WWAN + BT	WWAN + BT + UNII
		1	2	3	4	1 + 2	1 + 3	1 + 4	1 + 3 + 4
Head (1-g SAR)	Left Touch	0.131	0.217	0.523	0.667	0.348	0.654	0.798	1.321
	Left Tilt	0.093	0.217	0.091	0.947	0.310	0.184	1.040	1.131
	Right Touch	0.089	0.217	0.523	0.677	0.306	0.612	0.766	1.289
	Right Tilt	0.086	0.217	0.250	0.777	0.303	0.336	0.863	1.113
Body-Worn (1-g SAR)	All position	0.156	0.325	0.479	0.240	0.481	0.635	0.396	0.875
Hotspot (1-g SAR)	Rear	0.329	0.637	0.769	0.352	0.966	1.098	0.681	1.450
	Front	0.273	0.277	0.257	0.170	0.550	0.530	0.443	0.700
	Edge 1		0.741	0.794	0.451				1.245
	Edge 2								
	Edge 3	0.388							
	Edge 4	0.196	0.741	0.794	0.060	0.937	0.990	0.256	1.050
Product Specific 10-g (10-g SAR)	All position			2.619					

Note(s):

1. Green values are referenced from highest SAR value of *initial test position* procedure in each RF exposure of each bands.
2. For Simultaneous Transmission SAR analysis, The highest *Reported SAR* value are determined to be the higher of both Reference model and Variant model.

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

RF Exposure	Test Position	Standalone SAR (W/kg)				Sum of SAR (W/kg)			
		WWAN	DTS	UNII	BT	WWAN + DTS	WWAN + UNII	WWAN + BT	WWAN + BT + UNII
		1	2	3	4	1 + 2	1 + 3	1 + 4	1 + 3 + 4
Head (1-g SAR)	Left Touch	0.282	0.217	0.523	0.667	0.499	0.805	0.949	1.472
	Left Tilt	0.109	0.217	0.091	0.947	0.326	0.200	1.056	1.147
	Right Touch	0.110	0.217	0.523	0.677	0.327	0.633	0.787	1.310
	Right Tilt	0.104	0.217	0.250	0.777	0.321	0.354	0.881	1.131
Body-Worn (1-g SAR)	All position	0.267	0.325	0.479	0.240	0.592	0.746	0.507	0.986
Hotspot (1-g SAR)	Rear	0.643	0.637	0.769	0.352	1.280	1.412	0.995	1.764
	Front	0.346	0.277	0.257	0.170	0.623	0.603	0.516	0.773
	Edge 1		0.741	0.794	0.451				1.245
	Edge 2								
	Edge 3	0.611							
	Edge 4	0.256	0.741	0.794	0.060	0.997	1.050	0.316	1.110
Product Specific 10-g (10-g SAR)	All position			2.619					

SAR to Peak Location Separation Ratio (SPLSR)

RF Exposure	Test Position	Standalone SAR (W/kg)			∑ SAR (W/kg)		Calculated distance (mm)	SPLSR (=< 0.04)	Volume Scan (Yes/ No)	Figure
		WWAN	UNII	BT						
		1	3	4						
Hotspot (1-g SAR)	Rear	0.643	0.769	0.352	1+3+4	1.764				2
	Rear	0.643	0.769		1+3	1.412	146.8	0.01	No	
	Rear	0.643		0.352	1+4	0.995	158.5	0.01	No	
	Rear		0.769	0.352	3+4	1.121	52.2	0.02	No	

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

RF Exposure	Test Position	Standalone SAR (W/kg)				Sum of SAR (W/kg)			
		WWAN	DTS	UNII	BT	WWAN + DTS	WWAN + UNII	WWAN + BT	WWAN + BT + UNII
		1	2	3	4	1 + 2	1 + 3	1 + 4	1 + 3 + 4
Head (1-g SAR)	Left Touch	0.246	0.217	0.523	0.667	0.463	0.769	0.913	1.436
	Left Tilt	0.211	0.217	0.091	0.947	0.428	0.302	1.158	1.249
	Right Touch	0.271	0.217	0.523	0.677	0.488	0.794	0.948	1.471
	Right Tilt	0.188	0.217	0.250	0.777	0.405	0.438	0.965	1.215
Body-Worn (1-g SAR)	All position	0.451	0.325	0.479	0.240	0.776	0.930	0.691	1.170
Hotspot (1-g SAR)	Rear	0.674	0.637	0.769	0.352	1.311	1.443	1.026	1.795
	Front	0.709	0.277	0.257	0.170	0.986	0.966	0.879	1.136
	Edge 1		0.741	0.794	0.451				1.245
	Edge 2								
	Edge 3	0.908							
	Edge 4	0.496	0.741	0.794	0.060	1.237	1.290	0.556	1.350
Product Specific 10-g (10-g SAR)	All position			2.619					

SAR to Peak Location Separation Ratio (SPLSR)

RF Exposure	Test Position	Standalone SAR (W/kg)			∑ SAR (W/kg)		Calculated distance (mm)	SPLSR (=< 0.04)	Volume Scan (Yes/ No)	Figure
		WWAN	UNII	BT						
		1	3	4						
Hotspot (1-g SAR)	Rear	0.674	0.769	0.352	1+3+4	1.795				3
	Rear	0.674	0.769		1+3	1.443	125.5	0.01	No	
	Rear	0.674		0.352	1+4	1.026	138.3	0.01	No	
	Rear		0.769	0.352	3+4	1.121	52.2	0.02	No	

Note(s):

1. Green values are referenced from highest SAR value of *initial test position* procedure in each RF exposure of each bands.
2. For Simultaneous Transmission SAR analysis, The highest *Reported SAR* value are determined to be the higher of both Reference model and Variant model.

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

RF Exposure	Test Position	Standalone SAR (W/kg)				Sum of SAR (W/kg)			
		WWAN	DTS	UNII	BT	WWAN + DTS	WWAN + UNII	WWAN + BT	WWAN + BT + UNII
		1	2	3	4	1 + 2	1 + 3	1 + 4	1 + 3 + 4
Head (1-g SAR)	Left Touch	0.266	0.217	0.523	0.667	0.483	0.789	0.933	1.456
	Left Tilt	0.135	0.217	0.091	0.947	0.352	0.226	1.082	1.173
	Right Touch	0.328	0.217	0.523	0.677	0.545	0.851	1.005	1.528
	Right Tilt	0.155	0.217	0.250	0.777	0.372	0.405	0.932	1.182
Body-Worn (1-g SAR)	All position	0.346	0.325	0.479	0.240	0.671	0.825	0.586	1.065
Hotspot (1-g SAR)	Rear	0.372	0.637	0.769	0.352	1.009	1.141	0.724	1.493
	Front	0.280	0.277	0.257	0.170	0.557	0.537	0.450	0.707
	Edge 1		0.741	0.794	0.451				1.245
	Edge 2	0.311							
	Edge 3	0.092							
	Edge 4	0.207	0.741	0.794	0.060	0.948	1.001	0.267	1.061
Product Specific 10-g (10-g SAR)	All position			2.619					

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

RF Exposure	Test Position	Standalone SAR (W/kg)				Sum of SAR (W/kg)			
		WWAN	DTS	UNII	BT	WWAN + DTS	WWAN + UNII	WWAN + BT	WWAN + BT + UNII
		1	2	3	4	1 + 2	1 + 3	1 + 4	1 + 3 + 4
Head (1-g SAR)	Left Touch	0.226	0.217	0.523	0.667	0.443	0.749	0.893	1.416
	Left Tilt	0.110	0.217	0.091	0.947	0.327	0.201	1.057	1.148
	Right Touch	0.101	0.217	0.523	0.677	0.318	0.624	0.778	1.301
	Right Tilt	0.097	0.217	0.250	0.777	0.314	0.347	0.874	1.124
Body-Worn (1-g SAR)	All position	0.266	0.325	0.479	0.240	0.591	0.745	0.506	0.985
Hotspot (1-g SAR)	Rear	0.375	0.637	0.769	0.352	1.012	1.144	0.727	1.496
	Front	0.300	0.277	0.257	0.170	0.577	0.557	0.470	0.727
	Edge 1		0.741	0.794	0.451				1.245
	Edge 2								
	Edge 3	0.477							
	Edge 4	0.227	0.741	0.794	0.060	0.968	1.021	0.287	1.081
Product Specific 10-g (10-g SAR)	All position			2.619					

Note(s):

1. Green values are referenced from highest SAR value of *initial test position* procedure in each RF exposure of each bands.
2. For Simultaneous Transmission SAR analysis, The highest *Reported SAR* value are determined to be the higher of both Reference model and Variant model.

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

RF Exposure	Test Position	Standalone SAR (W/kg)				Sum of SAR (W/kg)			
		WWAN	DTS	UNII	BT	WWAN + DTS	WWAN + UNII	WWAN + BT	WWAN + BT + UNII
		1	2	3	4	1 + 2	1 + 3	1 + 4	1 + 3 + 4
Head (1-g SAR)	Left Touch	0.284	0.217	0.523	0.667	0.501	0.807	0.951	1.474
	Left Tilt	0.149	0.217	0.091	0.947	0.366	0.240	1.096	1.187
	Right Touch	0.327	0.217	0.523	0.677	0.544	0.850	1.004	1.527
	Right Tilt	0.165	0.217	0.250	0.777	0.382	0.415	0.942	1.192
Body-Worn (1-g SAR)	All position	0.388	0.325	0.479	0.240	0.713	0.867	0.628	1.107
Hotspot (1-g SAR)	Rear	0.424	0.637	0.769	0.352	1.061	1.193	0.776	1.545
	Front	0.315	0.277	0.257	0.170	0.592	0.572	0.485	0.742
	Edge 1		0.741	0.794	0.451				1.245
	Edge 2	0.387							
	Edge 3	0.112							
	Edge 4	0.254	0.741	0.794	0.060	0.995	1.048	0.314	1.108
Product Specific 10-g (10-g SAR)	All position			2.619					

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

RF Exposure	Test Position	Standalone SAR (W/kg)				Sum of SAR (W/kg)			
		WWAN	DTS	UNII	BT	WWAN + DTS	WWAN + UNII	WWAN + BT	WWAN + BT + UNII
		1	2	3	4	1 + 2	1 + 3	1 + 4	1 + 3 + 4
Head (1-g SAR)	Left Touch	0.275	0.217	0.523	0.667	0.492	0.798	0.942	1.465
	Left Tilt	0.137	0.217	0.091	0.947	0.354	0.228	1.084	1.175
	Right Touch	0.340	0.217	0.523	0.677	0.557	0.863	1.017	1.540
	Right Tilt	0.158	0.217	0.250	0.777	0.375	0.408	0.935	1.185
Body-Worn (1-g SAR)	All position	0.490	0.325	0.479	0.240	0.815	0.969	0.730	1.209
Hotspot (1-g SAR)	Rear	0.499	0.637	0.769	0.352	1.136	1.268	0.851	1.620
	Front	0.373	0.277	0.257	0.170	0.650	0.630	0.543	0.800
	Edge 1		0.741	0.794	0.451				1.245
	Edge 2	0.508							
	Edge 3	0.093							
	Edge 4	0.348	0.741	0.794	0.060	1.089	1.142	0.408	1.202
Product Specific 10-g (10-g SAR)	All position			2.619					

SAR to Peak Location Separation Ratio (SPLSR)

RF Exposure	Test Position	Standalone SAR (W/kg)			∑ SAR (W/kg)		Calculated distance (mm)	SPLSR (=< 0.04)	Volume Scan (Yes/ No)	Figure
		WWAN	UNII	BT						
		1	3	4						
Hotspot (1-g SAR)	Rear	0.499	0.769	0.352	1+3+4	1.620				4
	Rear	0.499	0.769		1+3	1.268	85.0	0.02	No	
	Rear	0.499		0.352	1+4	0.851	84.0	0.01	No	
	Rear		0.769	0.352	3+4	1.121	52.2	0.02	No	

Note(s):

1. Green values are referenced from highest SAR value of *initial test position* procedure in each RF exposure of each bands.
2. For Simultaneous Transmission SAR analysis, The highest *Reported SAR* value are determined to be the higher of both Reference model and Variant model.

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

RF Exposure	Test Position	Standalone SAR (W/kg)				Sum of SAR (W/kg)			
		WWAN	DTS	UNII	BT	WWAN + DTS	WWAN + UNII	WWAN + BT	WWAN + BT + UNII
		1	2	3	4	1 + 2	1 + 3	1 + 4	1 + 3 + 4
Head (1-g SAR)	Left Touch	0.362	0.217	0.523	0.667	0.579	0.885	1.029	1.552
	Left Tilt	0.170	0.217	0.091	0.947	0.387	0.261	1.117	1.208
	Right Touch	0.299	0.217	0.523	0.677	0.516	0.822	0.976	1.499
	Right Tilt	0.157	0.217	0.250	0.777	0.374	0.407	0.934	1.184
Body-Worn (1-g SAR)	All position	0.447	0.325	0.479	0.240	0.772	0.926	0.687	1.166
Hotspot (1-g SAR)	Rear	0.483	0.637	0.769	0.352	1.120	1.252	0.835	1.604
	Front	0.339	0.277	0.257	0.170	0.616	0.596	0.509	0.766
	Edge 1		0.741	0.794	0.451				1.245
	Edge 2	0.417							
	Edge 3	0.139							
	Edge 4	0.262	0.741	0.794	0.060	1.003	1.056	0.322	1.116
Product Specific 10-g (10-g SAR)	All position			2.619					

SAR to Peak Location Separation Ratio (SPLSR)

RF Exposure	Test Position	Standalone SAR (W/kg)			∑ SAR (W/kg)		Calculated distance (mm)	SPLSR (=< 0.04)	Volume Scan (Yes/ No)	Figure
		WWAN	UNII	BT						
		1	3	4						
Hotspot (1-g SAR)	Rear	0.483	0.769	0.352	1+3+4	1.604				5
	Rear	0.483	0.769		1+3	1.252	76.1	0.02	No	
	Rear	0.483		0.352	1+4	0.835	79.5	0.01	No	
	Rear		0.769	0.352	3+4	1.121	52.2	0.02	No	

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

RF Exposure	Test Position	Standalone SAR (W/kg)				Sum of SAR (W/kg)			
		WWAN	DTS	UNII	BT	WWAN + DTS	WWAN + UNII	WWAN + BT	WWAN + BT + UNII
		1	2	3	4	1 + 2	1 + 3	1 + 4	1 + 3 + 4
Head (1-g SAR)	Left Touch	0.232	0.217	0.523	0.667	0.449	0.755	0.899	1.422
	Left Tilt	0.077	0.217	0.091	0.947	0.294	0.168	1.024	1.115
	Right Touch	0.136	0.217	0.523	0.677	0.353	0.659	0.813	1.336
	Right Tilt	0.129	0.217	0.250	0.777	0.346	0.379	0.906	1.156
Body-Worn (1-g SAR)	All position	0.185	0.325	0.479	0.240	0.510	0.664	0.425	0.904
Hotspot (1-g SAR)	Rear	0.297	0.637	0.769	0.352	0.934	1.066	0.649	1.418
	Front	0.345	0.277	0.257	0.170	0.622	0.602	0.515	0.772
	Edge 1		0.741	0.794	0.451				1.245
	Edge 2								
	Edge 3	0.256							
	Edge 4	0.272	0.741	0.794	0.060	1.013	1.066	0.332	1.126
Product Specific 10-g (10-g SAR)	All position			2.619					

Note(s):

1. Green values are referenced from highest SAR value of *initial test position* procedure in each RF exposure of each bands.
2. For Simultaneous Transmission SAR analysis, The highest *Reported SAR* value are determined to be the higher of both Reference model and Variant model.

12.11. Sum of the SAR for LTE Band 66 & Wi-Fi & BT

RF Exposure	Test Position	Standalone SAR (W/kg)				Sum of SAR (W/kg)			
		WWAN	DTS	UNII	BT	WWAN + DTS	WWAN + UNII	WWAN + BT	WWAN + BT + UNII
		1	2	3	4	1 + 2	1 + 3	1 + 4	1 + 3 + 4
Head (1-g SAR)	Left Touch	0.349	0.217	0.523	0.667	0.566	0.872	1.016	1.539
	Left Tilt	0.229	0.217	0.091	0.947	0.446	0.320	1.176	1.267
	Right Touch	0.239	0.217	0.523	0.677	0.456	0.762	0.916	1.439
	Right Tilt	0.198	0.217	0.250	0.777	0.415	0.448	0.975	1.225
Body-Worn (1-g SAR)	All position	0.406	0.325	0.479	0.240	0.731	0.885	0.646	1.125
Hotspot (1-g SAR)	Rear	0.658	0.637	0.769	0.352	1.295	1.427	1.010	1.779
	Front	0.756	0.277	0.257	0.170	1.033	1.013	0.926	1.183
	Edge 1		0.741	0.794	0.451				1.245
	Edge 2								
	Edge 3	1.033							
	Edge 4	0.533	0.741	0.794	0.060	1.274	1.327	0.593	1.387
Product Specific 10-g (10-g SAR)	All position			2.619					

SAR to Peak Location Separation Ratio (SPLSR)

RF Exposure	Test Position	Standalone SAR (W/kg)			∑ SAR (W/kg)		Calculated distance (mm)	SPLSR (=< 0.04)	Volume Scan (Yes/ No)	Figure
		WWAN	UNII	BT						
		1	3	4						
Hotspot (1-g SAR)	Rear	0.658	0.769	0.352	1+3+4	1.779				6
	Rear	0.658	0.769		1+3	1.427	139.7	0.01	No	
	Rear	0.658		0.352	1+4	1.010	153.9	0.01	No	
	Rear		0.769	0.352	3+4	1.121	52.2	0.02	No	

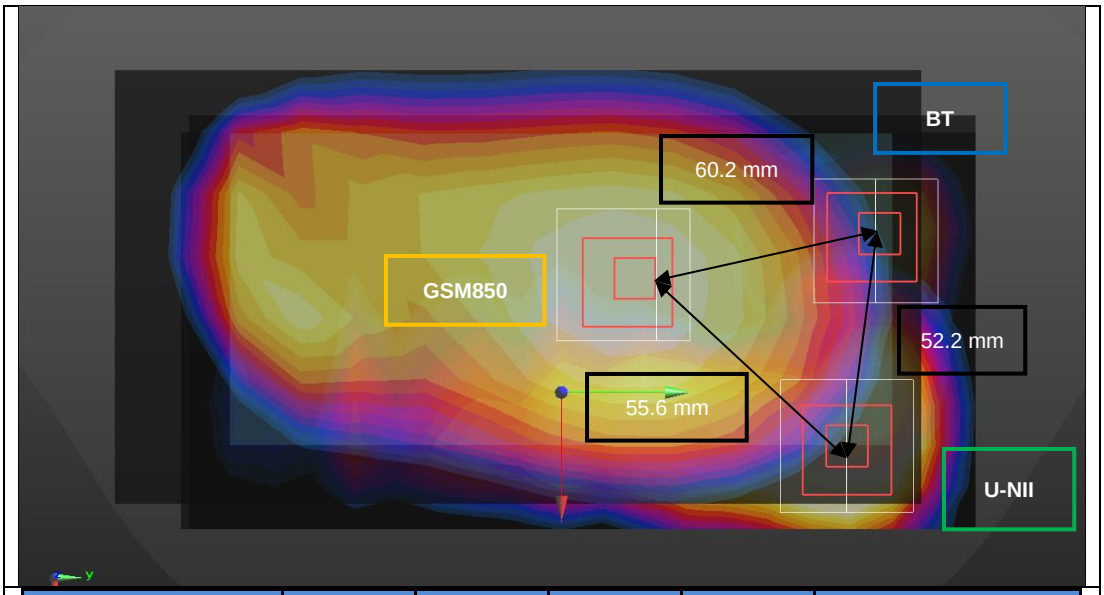
Note(s):

1. Green values are referenced from highest SAR value of *initial test position* procedure in each RF exposure of each bands.
2. For Simultaneous Transmission SAR analysis, The highest *Reported SAR* value are determined to be the higher of both Reference model and Variant model.

Conclusion:

Simultaneous Transmission SAR analysis results is satisfied the FCC Limit requirement according to procedures of “Sum of SAR” or “SPLSR”.

Figure (1)

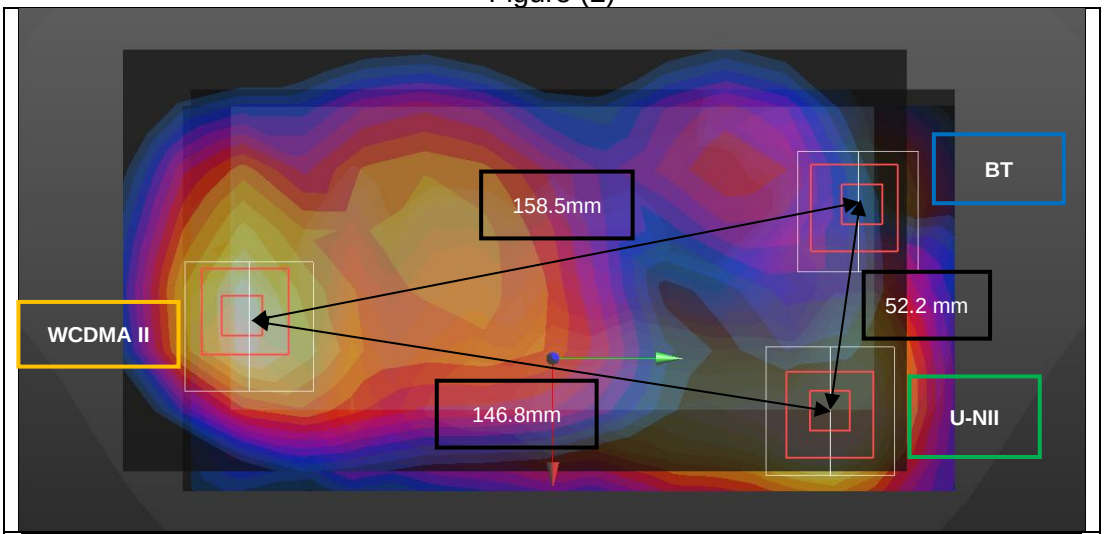


Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
GSM850	①	0.478	0.0013	0.0214	-0.0019	① + ②	55.6
UNII	②	0.769	0.0300	0.0690	-0.0019	① + ③	60.2
BT	③	0.352	-0.0216	0.0770	-0.0037	② + ③	52.2

The Peak Location Separation Distance is computed by using

SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

Figure (2)

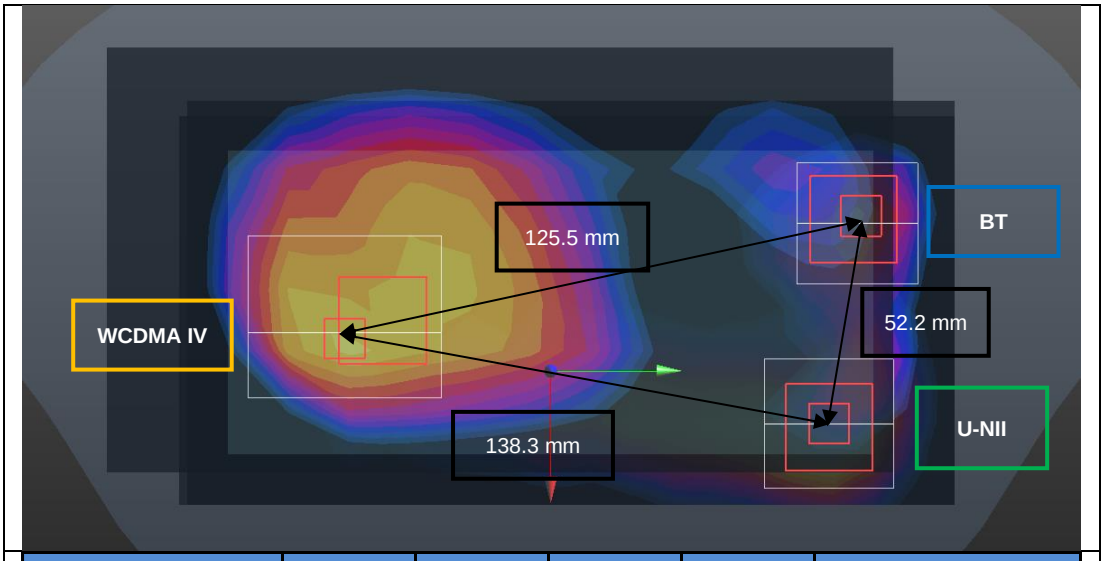


Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
W-CDMA II	①	0.643	0.0154	-0.0771	-0.0007	① + ②	146.8
UNII	②	0.769	0.0300	0.0690	-0.0019	① + ③	158.5
BT	③	0.352	-0.0216	0.0770	-0.0037	② + ③	52.2

The Peak Location Separation Distance is computed by using

SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

Figure (3)

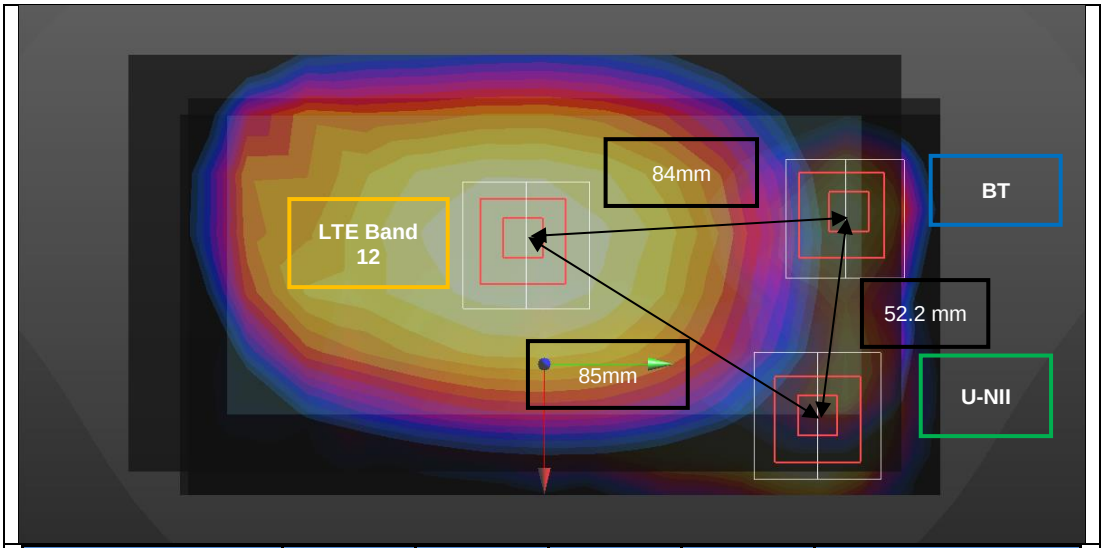


Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
W-CDMA IV	①	0.674	0.0171	-0.0558	-0.0017	① + ②	125.5
UNII	②	0.769	0.0300	0.0690	-0.0019	① + ③	138.3
BT	③	0.352	-0.0216	0.0770	-0.0037	② + ③	52.2

The Peak Location Separation Distance is computed by using

SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

Figure (4)

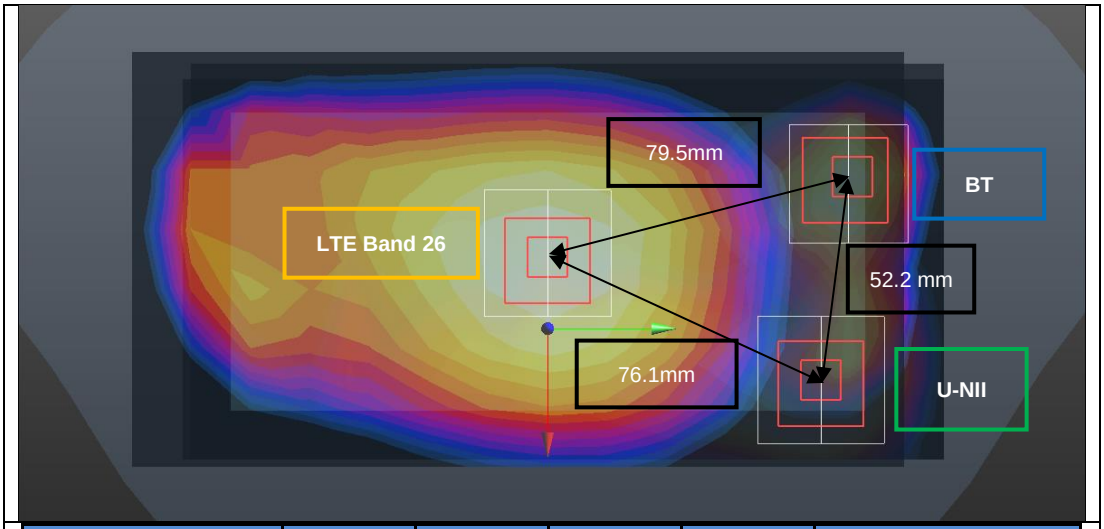


Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 12	①	0.499	-0.0098	-0.0061	-0.0017	① + ②	85.0
UNII	②	0.769	0.0300	0.0690	-0.0019	① + ③	84.0
BT	③	0.352	-0.0216	0.0770	-0.0037	② + ③	52.2

The Peak Location Separation Distance is computed by using

SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

Figure (5)

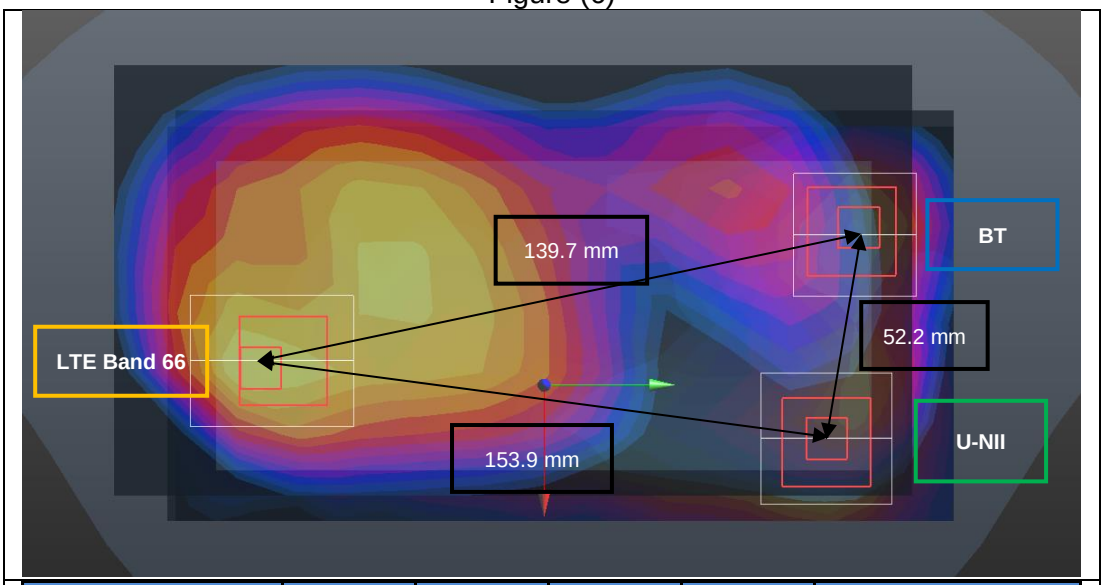


Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 26	①	0.483	-0.0020	0.0000	-0.0036	① + ②	76.1
UNII	②	0.769	0.0300	0.0690	-0.0019	① + ③	79.5
BT	③	0.352	-0.0216	0.0770	-0.0037	② + ③	52.2

The Peak Location Separation Distance is computed by using

SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

Figure (6)



Mode		SAR	X	Y	Z	d: Calculated distance (mm)	
		W/kg	m	m	m		
LTE Band 66	①	0.658	0.0222	-0.0705	-0.0005	① + ②	139.7
UNII	②	0.769	0.0300	0.0690	-0.0019	① + ③	153.9
BT	③	0.352	-0.0216	0.0770	-0.0037	② + ③	52.2

The Peak Location Separation Distance is computed by using

SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)

Appendixes

Refer to separated files for the following appendixes.

4789746865-S1 FCC Report SAR_App A_Photos & Ant. Locations

4789746865-S1 FCC Report SAR_App B_Highest SAR Test Plots

4789746865-S1 FCC Report SAR_App C_System Check Plots

4789746865-S1 FCC Report SAR_App D_SAR Tissue Ingredients

4789746865-S1 FCC Report SAR_App E_Probe Cal. Certificates

4789746865-S1 FCC Report SAR_App F_Dipole Cal. Certificates

END OF REPORT