



**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-A135M, SM-A135M/DS

FCC ID: A3LSMA135M

REPORT NUMBER: 4790215265-S1V1

ISSUE DATE: 2/7/2022

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**



Testing Laboratory

TL-637

Revision History

Rev.	Date	Revisions	Revised By
V1	2/7/2022	Initial Issue	--

Table of Contents

1.	Attestation of Test Results	6
1.1.	<i>The Highest Reported SAR for RF exposure conditions for each bands</i>	<i>7</i>
2.	Test Specification, Methods and Procedures.....	8
3.	Facilities and Accreditation	8
4.	SAR Measurement System & Test Equipment	9
4.1.	<i>SAR Measurement System.....</i>	<i>9</i>
4.2.	<i>SAR Scan Procedures</i>	<i>11</i>
4.3.	<i>Test Equipment.....</i>	<i>13</i>
5.	Measurement Uncertainty.....	14
5.1.	<i>DECISION RULE.....</i>	<i>14</i>
6.	Device Under Test (DUT) Information	14
6.1.	<i>DUT Description</i>	<i>14</i>
6.2.	<i>Wireless Technologies.....</i>	<i>15</i>
6.3.	<i>Nominal and Maximum Output Power.....</i>	<i>16</i>
6.4.	<i>Power Back-off Operation.....</i>	<i>18</i>
6.5.	<i>General LTE SAR Test and Reporting Considerations.....</i>	<i>19</i>
6.6.	<i>LTE (TDD) Considerations.....</i>	<i>21</i>
6.7.	<i>Proximity Sensor feature</i>	<i>22</i>
6.7.1.	<i>Proximity Sensor Triggering Distance (KDB 616217 §6.2).....</i>	<i>23</i>
6.7.2.	<i>Proximity Sensor Coverage (KDB 616217 Sec.6.3)</i>	<i>25</i>
6.7.3.	<i>Proximity Sensor Tilt Angle Assessment (KDB 616217 Sec.6.4)</i>	<i>25</i>
6.7.4.	<i>Resulting test positions for SAR measurements</i>	<i>25</i>
7.	RF Exposure Conditions (Test Configurations).....	26
8.	Dielectric Property Measurements & System Check	27
8.1.	<i>Dielectric Property Measurements</i>	<i>27</i>
8.2.	<i>System Check.....</i>	<i>32</i>
9.	Conducted Output Power Measurements.....	35
9.1.	<i>GSM</i>	<i>35</i>
9.2.	<i>WCDMA.....</i>	<i>37</i>
9.3.	<i>LTE.....</i>	<i>43</i>
9.4.	<i>Wi-Fi 2.4 GHz (DTS Band).....</i>	<i>57</i>
9.5.	<i>Wi-Fi 5GHz (U-NII Bands).....</i>	<i>58</i>

9.6. *Bluetooth* 59

10. Measured and Reported (Scaled) SAR Results..... **60**

10.1. *GSM 850*..... 62

10.2. *GSM 1900*..... 62

10.3. *W-CDMA Band II*..... 63

10.4. *W-CDMA Band IV* 63

10.5. *W-CDMA Band V* 63

10.6. *LTE Band 2 (20MHz Bandwidth)* 64

10.7. *LTE Band 12 (10MHz Bandwidth)* 64

10.8. *LTE Band 13 (10MHz Bandwidth)* 65

10.9. *LTE Band 26 (15MHz Bandwidth)* 65

10.10. *LTE Band 41 (20MHz Bandwidth)* 66

10.11. *LTE Band 66 (20MHz Bandwidth)* 66

10.12. *Wi-Fi (DTS Band)*..... 67

10.13. *Wi-Fi (U-NII Bands)*..... 67

10.14. *Bluetooth*..... 68

11. SAR Measurement Variability..... **69**

12. Simultaneous Transmission SAR Analysis..... **70**

12.1 *Sum of the SAR for GSM850 & Wi-Fi & BT*..... 72

12.2 *Sum of the SAR for GSM1900 & Wi-Fi & BT*..... 72

12.3 *Sum of the SAR for WCDMA Band II & Wi-Fi & BT*..... 73

12.4 *Sum of the SAR for WCDMA Band IV & Wi-Fi & BT* 73

12.5 *Sum of the SAR for WCDMA Band V & Wi-Fi & BT* 74

12.6 *Sum of the SAR for LTE Band 2 & Wi-Fi & BT*..... 74

12.7 *Sum of the SAR for LTE Band 12 & Wi-Fi & BT*..... 75

12.8 *Sum of the SAR for LTE Band 13 & Wi-Fi & BT*..... 75

12.9 *Sum of the SAR for LTE Band 26 & Wi-Fi & BT*..... 76

12.10 *Sum of the SAR for LTE Band 41 & Wi-Fi & BT* 76

12.11 *Sum of the SAR for LTE Band 66 & Wi-Fi & BT* 77

12.12 *Volume Scan Results* 77

Appendixes **78**

4790215265-S1 FCC Report SAR_App A_Photos & Ant. Locations 78



4790215265-S1 FCC Report SAR_App B_Highest SAR Test Plots 78

4790215265-S1 FCC Report SAR_App C_System Check Plots 78

4790215265-S1 FCC Report SAR_App D_SAR Tissue Ingredients..... 78

<i>4790215265-S1 FCC Report SAR_App E_Probe Cal. Certificates.....</i>	<i>78</i>
<i>4790215265-S1 FCC Report SAR_App F_Dipole Cal. Certificates</i>	<i>78</i>
<i>4790215265-S1 FCC Report SAR_App G_Volume Scan Results.....</i>	<i>78</i>
<i>4790215265-S1 FCC Report SAR_App H_SPLSR criteria plots.....</i>	<i>78</i>

1. Attestation of Test Results

Applicant Name		SAMSUNG ELECTRONICS CO.,LTD.			
FCC ID		A3LSMA135M			
Model Number		SM-A135M, SM-A135M/DS			
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		0.41	0.10	0.47	< 0.10
Body-worn		0.52	0.20	0.46	< 0.10
Hotspot		0.95	0.40	0.76	< 0.10
Product Specific 10g		0.94	N/A	1.68	N/A
Simultaneous TX	Head	0.93	0.51	0.93	0.93
	Body-worn	1.00	0.72	1.00	1.00
	Hotspot	1.58	1.36	1.58	1.58
	Product Specific 10g	2.62	N/A	2.62	N/A
Date Tested		12/22/2021 to 2/4/2022			
Test Results		Pass			
<p>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.</p> <p>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.</p>					
Approved & Released By:			Prepared By:		
					
Justin Park Operations Leader UL Korea, Ltd. Suwon Laboratory			Sunghoon Kim Senior 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	0.409	0.505	0.887	N/A
	GSM 1900	0.144	0.269	0.337	N/A
	WCDMA Band II	0.200	0.520	0.667	0.944
	WCDMA Band IV	0.188	0.158	0.430	N/A
	WCDMA Band V	0.389	0.438	0.933	N/A
	LTE Band 2	0.227	0.474	0.476	N/A
	LTE Band 4	N/A	N/A	N/A	N/A
	LTE Band 5	N/A	N/A	N/A	N/A
	LTE Band 12	0.280	0.379	0.476	N/A
	LTE Band 13	0.387	0.455	0.753	N/A
	LTE Band 17	N/A	N/A	N/A	N/A
	LTE Band 26	0.372	0.435	0.953	N/A
	LTE Band 41	0.380	0.457	0.935	N/A
	LTE Band 66	0.250	0.498	0.622	N/A
DTS	2.4GHz WLAN	0.100	0.200	0.402	N/A
UNII	5GHz WLAN	0.466	0.457	0.761	1.677
DSS	Bluetooth	0.055	0.023	0.061	N/A

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 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; RF Exposure Procedures Update (Overlapping LTE Bands)
- [TCB workshop](#) October, 2014; RF Exposure Procedures Update (Other LTE Considerations)
- [TCB workshop](#) October, 2016; RF Exposure Procedures (Bluetooth Duty Factor)
- [TCB workshop](#) October, 2016; RF Exposure Procedures (DUT Holder Perturbations)
- [TCB workshop](#) May, 2017; RF Exposure Procedures (LTE Test Conditions)
- [TCB workshop](#) April, 2019; RF Exposure Procedures (Tissue Simulating Liquids (TSL))
- [TCB workshop](#) November, 2019 Page 5, RF Exposure Procedures (SPLSR Hotspot Combination)

3. Facilities and Accreditation

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

Suwon
SAR 1 Room
SAR 2 Room
SAR 3 Room
SAR 4 Room
SAR 5 Room

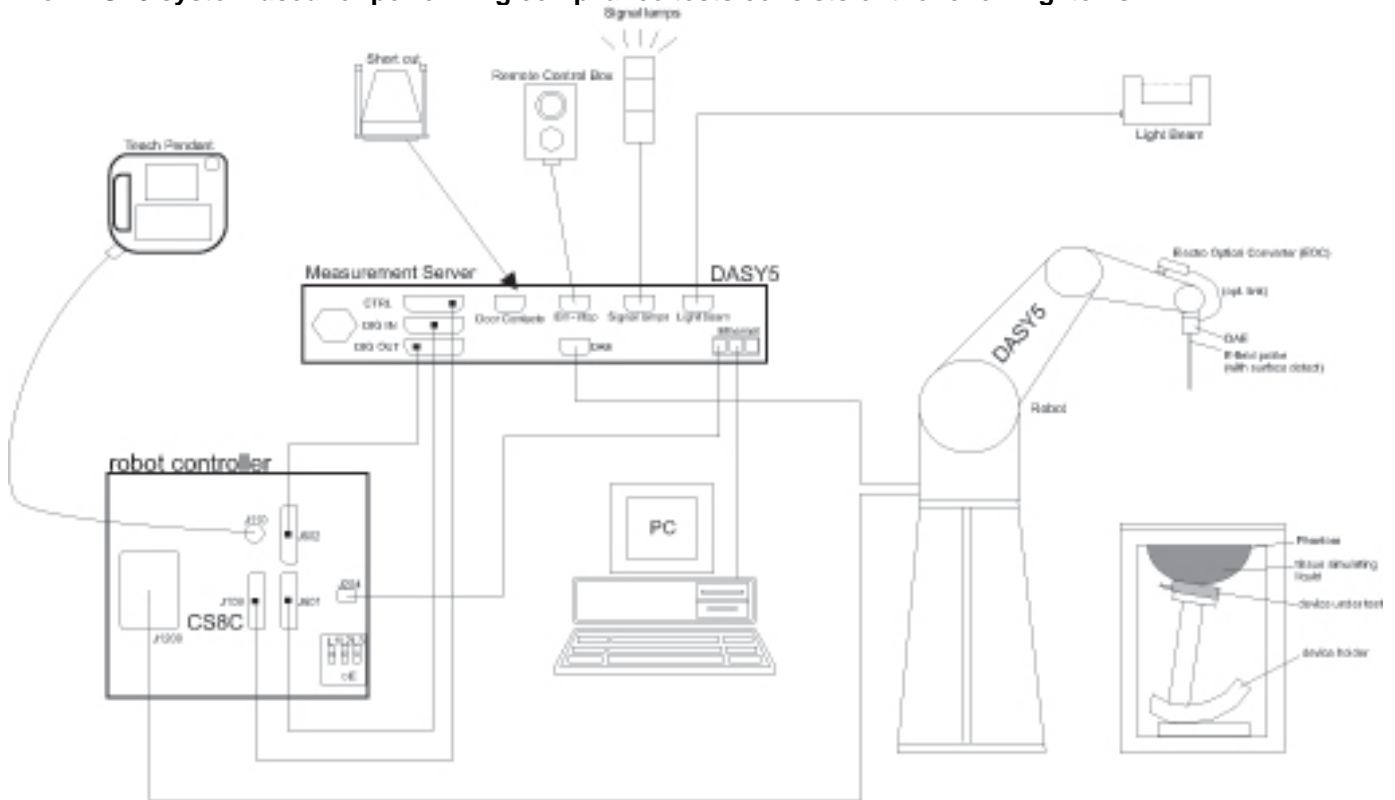
UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637.

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

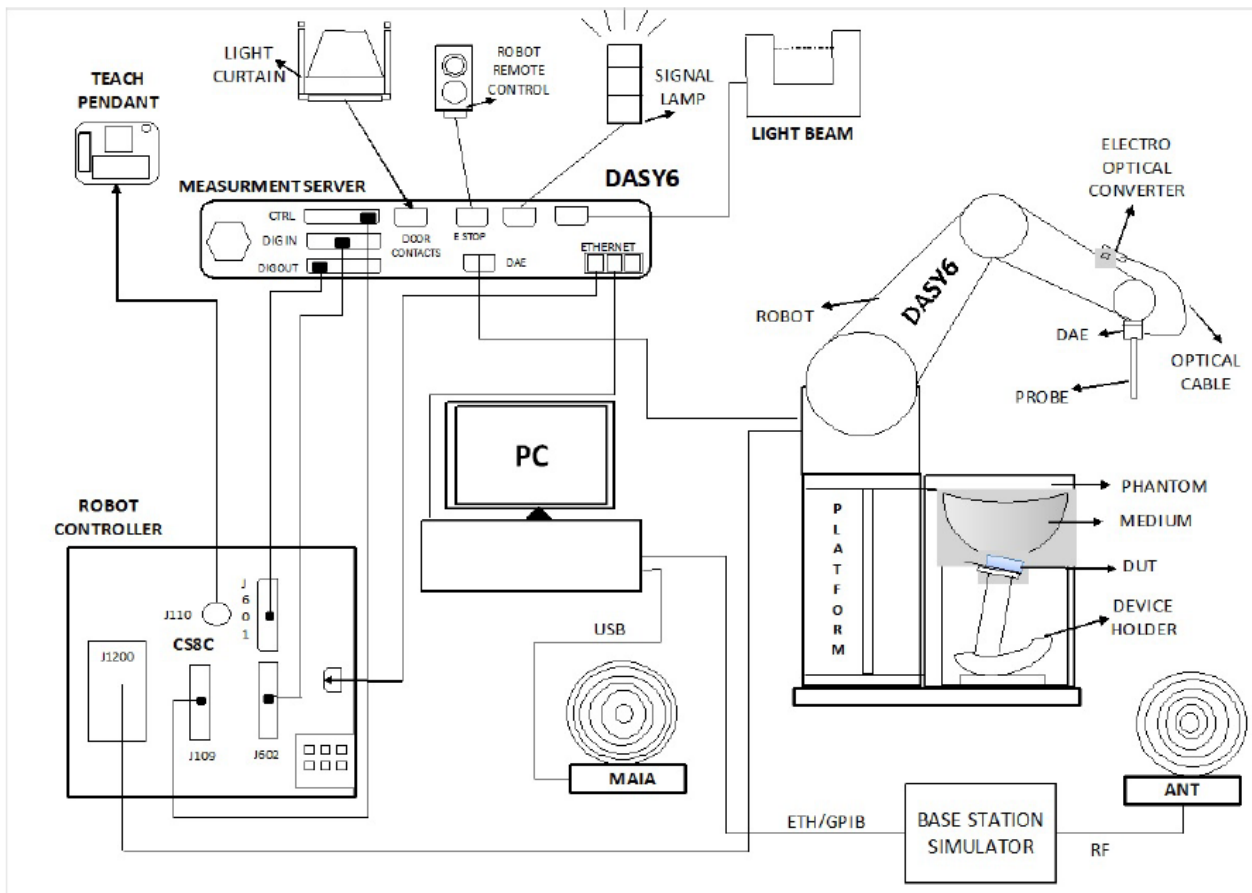
4.1. SAR Measurement System

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.

The DASY6 & 8 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 Win10 and the DASY6 or 8 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

4.2. SAR Scan Procedures

Step 1: Power Reference Measurement

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

Step 2: Area Scan

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

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

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
Maximum area scan spatial resolution: 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 \leq the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

Step 3: Zoom Scan

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

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

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: $\Delta x_{Zoom}, \Delta y_{Zoom}$			≤ 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 1 st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: 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 <i>reported</i> SAR from the <i>area scan based 1-g SAR estimation</i> procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.				

Step 4: Power drift measurement

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

Step 5: Z-Scan (FCC only)

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

4.3. Test Equipment

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

Dielectric Property Measurements

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Network Analyzer	Agilent	E5071C	MY46522054	8-6-2022
Dielectric Assessment Kit	SPEAG	DAK-3.5	1196	7-21-2022
Shorting block	SPEAG	DAK-3.5 Short	SM DAK 200 BA	N/A
Thermometer	LKM	DTM3000	3851	8-4-2022

System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
MXG Analog Signal Generator	Agilent	N5181A	MY50145882	8-4-2022
Power Sensor	Agilent	U2000A	MY54260007	8-4-2022
Power Sensor	Agilent	U2000A	MY60180020	8-4-2022
Power Amplifier	EXODUS	1410025-AMP2027-10003	10003	8-4-2022
Directional Coupler	Agilent	772D	MY52180193	8-3-2022
Directional Coupler	Agilent	778D	MY52180432	8-3-2022
Low Pass Filter	MINI-CIRCUITS	NLP-1200	VUU19301915	8-4-2022
Low Pass Filter	MICROLAB	LA-15N	3943	8-3-2022
Low Pass Filter	FILTRON	L14012FL	1410003S	8-3-2022
Low Pass Filter	MICROLAB	LA-60N	3942	8-4-2022
Attenuator	MINI-CIRCUITS	BW-N3W5+	N/A	8-4-2022
Attenuator	Agilent	8491B/003	MY39272275	8-17-2022
Attenuator	Agilent	8491B/010	MY39272011	8-4-2022
Attenuator	Agilent	8491B/020	MY39271973	8-4-2022
E-Field Probe	SPEAG	EX3DV4	7314	5-31-2022
E-Field Probe	SPEAG	EX3DV4	7645	4-15-2022
E-Field Probe	SPEAG	EX3DV4	7646	4-23-2022
E-Field Probe	SPEAG	EX3DV4	7313	2-23-2022
E-Field Probe	SPEAG	EX3DV4	7376	7-30-2022
Data Acquisition Electronics	SPEAG	DAE4	1447	3-23-2022
Data Acquisition Electronics	SPEAG	DAE4	1591	3-26-2022
Data Acquisition Electronics	SPEAG	DAE4	1343	8-23-2022
Data Acquisition Electronics	SPEAG	DAE4	1468	9-27-2022
Data Acquisition Electronics	SPEAG	DAE4	1494	7-27-2022
System Validation Dipole	SPEAG	D750V3	1122	2-24-2022
System Validation Dipole	SPEAG	D835V2	4d194	3-20-2022
System Validation Dipole	SPEAG	D1750V2	1125	2-21-2022
System Validation Dipole	SPEAG	D1900V2	5d199	3-19-2022
System Validation Dipole	SPEAG	D2450V2	960	3-20-2022
System Validation Dipole	SPEAG	D2600V2	1178	4-23-2022
System Validation Dipole	SPEAG	D5GHzV2	1184	12-3-2022
Thermometer	Lutron	MHB-382SD	AH.50213	8-4-2022
Thermometer	Lutron	MHB-382SD	AJ.45903	8-3-2022
Thermometer	Lutron	MHB-382SD	AH.50215	8-3-2022
Thermometer	Lutron	MHB-382SD	AK.12123	8-3-2022
Thermometer	Lutron	MHB-382SD	AK.18789	8-3-2022

Others

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Base Station Simulator	R & S	CMW500	169801	8-3-2022
Base Station Simulator	R & S	CMW500	169799	8-3-2022
Base Station Simulator	R & S	CMW500	169800	8-3-2022
Base Station Simulator	R & S	CMW500	169798	8-3-2022
Base Station Simulator	R & S	CMW500	169797	8-3-2022
Base Station Simulator	R & S	CMW500	150313	8-3-2022
Base Station Simulator	R & S	CMW500	150314	8-4-2022
Base Station Simulator	R & S	CMW500	162790	8-3-2022

Note(s):

1. For System Validation Dipole, Calibration interval applied every 2 years according to referencing KDB 865664 guidance.
2. Refer to Appendix F that mentioned about justification for Extended SAR Dipole Calibrations.

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	<input checked="" type="checkbox"/> The Back Cover is not removable.		
Battery Options	<input checked="" type="checkbox"/> The rechargeable battery is not user accessible		
Wireless Router (Hotspot)	Wi-Fi Hotspot mode permits the device to share its cellular data connection with other Wi-Fi-enabled devices. <input checked="" type="checkbox"/> Mobile Hotspot (Wi-Fi 2.4 GHz : Ch.1 – Ch.11) <input checked="" type="checkbox"/> 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 <input checked="" type="checkbox"/> Wi-Fi Direct (Wi-Fi 2.4 GHz) <input checked="" type="checkbox"/> Wi-Fi Direct (Wi-Fi 5.2 GHz_UNII-1 (Ch.36 – 48), Wi-Fi 5.8 GHz_UNII-3 (Ch. 149 – 165))		
Test Sample Information	No.	S/N	Notes
	1	ULL0986M	Main Conducted
	2	ULL0976M	Main Conducted
	3	UKT2277M	Main Conducted
	4	UKT2272M	Wi-Fi & BT Conducted
	5	UKT2301M	Wi-Fi & BT Conducted
	6	ULL0896M	SAR
	7	ULL0980M	SAR
	8	UKT2275M	SAR
	9	UKT2283M	SAR
	10	UKT2287M	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: <input type="checkbox"/> Class 8 - 1 Up, 4 Down <input type="checkbox"/> Class 10 - 2 Up, 4 Down <input type="checkbox"/> Class 12 - 4 Up, 4 Down <input checked="" type="checkbox"/> 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)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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 13 FDD Band 17 FDD Band 26 FDD Band 66 TDD Band 41	QPSK 16QAM		100% (FDD) 63.3% (TDD)
	Does this device support SV-LTE (1xRTT-LTE)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
Wi-Fi	2.4 GHz	802.11b 802.11g 802.11n (HT20)		SISO mode : 99.3 % (802.11b)
	5 GHz	802.11a 802.11n (HT20) 802.11n (HT40) 802.11ac (VHT20) 802.11ac (VHT40) 802.11ac (VHT80)		<u>SISO mode:</u> 97.3 % ^(802.11a) 94.5% ^{(802.11ac (VHT80))}
	Does this device support bands 5.60 ~ 5.65 GHz? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
Does this device support Band gap channel(s)? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No				
Bluetooth	2.4 GHz	Version 5.0 LE		76.7% (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 76.7% 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)		Reduced. RF Output Power (Hotspot & Proximity sensor & Earjack back-off) (dBm)	
				Tune-up Limit	Frame Pwr	Tune-up Limit	Frame Pwr
GSM850	Main 1 Ant.	Voice	1	33.5	24.5		
		GPRS	1	33.0	24.0		
		GPRS	2	31.0	25.0		
		GPRS	3	29.5	25.2		
		GPRS	4	28.0	25.0		
		EGPRS	1	27.5	18.5		
		EGPRS	2	25.5	19.5		
		EGPRS	3	24.5	20.2		
GSM1900	Main 2 Ant.	Voice	1	31.5	22.5	30.0	21.0
		GPRS	1	31.5	22.5	30.0	21.0
		GPRS	2	29.0	23.0	27.5	21.5
		GPRS	3	27.5	23.2	26.0	21.7
		GPRS	4	26.0	23.0	24.5	21.5
		EGPRS	1	26.5	17.5	24.5	15.5
		EGPRS	2	24.5	18.5	22.5	16.5
		EGPRS	3	23.0	18.7	21.0	16.7
GSM1900	Main 2 Ant.	EGPRS	4	21.5	18.5	19.5	16.5

RF Air interface	Antenna	Mode	Max. RF Output Power (dBm)	Reduced. RF Output Power (Hotspot & Proximity sensor & Earjack back-off) (dBm)
W-CDMA Band II	Main 2 Ant.	R99	25.5	22.5
		HSDPA	23.5	22.0
		HSUPA	22.5	22.0
		DC-HSDPA	23.5	22.0
W-CDMA Band IV	Main 2 Ant.	R99	25.5	22.5
		HSDPA	23.5	22.0
		HSUPA	22.5	21.5
		DC-HSDPA	23.5	22.0
W-CDMA Band V	Main 1 Ant.	R99	25.5	
		HSDPA	23.0	
		HSUPA	22.5	
		DC-HSDPA	23.0	

RF Air interface	Antenna	Mode	Max. RF Output Power (dBm)	Reduced. RF Output Power (Hotspot & Proximity sensor & Earjack back-off) (dBm)
LTE Band 2	Main 2 Ant.	QPSK	25.0	22.0
LTE Band 4	Main 2 Ant.	QPSK	25.0	22.0
LTE Band 5	Main 1 Ant.	QPSK	25.5	
LTE Band 12	Main 1 Ant.	QPSK	25.0	
LTE Band 13	Main 1 Ant.	QPSK	25.5	
LTE Band 17	Main 1 Ant.	QPSK	25.0	
LTE Band 26	Main 1 Ant.	QPSK	25.5	
LTE Band 66	Main 2 Ant.	QPSK	25.5	22.5
LTE Band 41	Main 2 Ant.	QPSK	24.5	

WLAN power

Band	Mode	Max. RF Output Power (dBm)	Reduced. RF Output Power (dBm)	Max. RF Output Power (dBm)				Reduced. RF Output Power (dBm)			
		b	b	a	g	n	ac	a	g	n	ac
2.4GHz	1Ch	19	13		14	14			13	13	
	2-10Ch	19	13		17	17			13	13	
	11Ch	19	13		16	16			13	13	
	12Ch	19	8		13	13			8	6	
	13Ch	16	8		9	9			8	6	
5GHz (20MHz)	UNII-1			13		13	13	11		11	11
	UNII-2A			13		13	13	11		11	11
	UNII-2C			13		13	13	11		11	11
	UNII-3			13		13	13	11		11	11
5GHz (40MHz)	UNII-1					12	12			11	11
	UNII-2A					12	12			11	11
	UNII-2C					12	12			11	11
	UNII-3					12	12			11	11
5GHz (80MHz)	UNII-1						11				11
	UNII-2A						11				11
	UNII-2C						11				11
	UNII-3						11				11

Bluetooth-Maximum power

Band	Mode	Max. RF Output Power (dBm)
2.4GHz	Bluetooth_GFSK	9.5
	Bluetooth_EDR	8.5
	Bluetooth_LE 1M	6.5
	Bluetooth_LE 2M	6.5

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 multiple power back-off modes: WWAN (Hotspot), WWAN (Proximity sensor), and WLAN (RCV). Each of the power back-off operates within specific exposure conditions for certain technologies. For full details on how each 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
WWAN (Hotspot) ¹	GSM 1900 WCDMA Band II, IV LTE Band 2, 4, 66	N/A	N/A	✓	N/A
WWAN (Proximity sensor) ¹	GSM 1900 WCDMA Band II, IV LTE Band 2, 4, 66	N/A	N/A	N/A	✓
WLAN (RCV)	Wi-Fi 2.4GHz Wi-Fi 5GHz	✓	N/A	N/A	N/A

Notes:

1. Tune-up Limits for WWAN (Hotspot) and WWAN (Proximity Sensor) are all Reduced Average Powers. Please refer to Sec.9 for all conducted power measurements.
2. WWAN Back-off priority: Hotspot < Earjack < Proximity Sensor
3. Body-worn SAR with ear-jack connected is not required due to Body-worn measured at max power is not over 1.2 W/kg.

Product Specific 10g Adjusted SAR Calculation

Wireless technologies	Max Tune-up Limit (dBm)	Reduced Tune-Up Limit (dBm)	Power Factor	Reported SAR Limit (W/kg)
GSM 1900	23.2	21.7	1.41	0.850
WCDMA Band II	25.5	22.5	2.00	0.601
WCDMA Band IV	25.5	22.5	2.00	0.601
LTE Band 2	25.0	22.0	2.00	0.601
LTE Band 4	25.0	22.0	2.00	0.601
LTE Band 66	25.5	22.5	2.00	0.601

Notes:

1. Tune-up limit powers for GSM 1900 are frame power(dBm).
2. Hotspot mode supports power reduction. When the measured SAR is scaled to the maximum tune-up limit, the adjusted SAR is < 1.2 W/kg. Therefore, Extremity SAR testing is not required for this band in accordance with KDB 648474 §2.5 b. Refer to §10 for Reported SAR results. If the Reported SAR 1g value in §10 is less than the Reported SAR Limit listed above, then Extremity SAR is not required.
3. LTE 50% RB is scaled up to the Max Tune-Up Limit with MPR included.
4. For Reported SAR limit in above table, it was calculated using Max tune-up Limit & Reduced Tune-up limit & Reported SAR 1.2 W/kg. (Reported SAR Limit = 1.2 W/kg / Power factor, Power factor = 10^{^((Max tune-up limit – Reduced tune-up limit)/10)})

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 13	Frequency range: 777 - 787 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
Low				23205/ 779.5			
Mid			23230/ 782	23230/ 782			
High				23255/ 784.5			
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			

General LTE SAR Test and Reporting Considerations (Continued)

Frequency range, Channel Bandwidth, Numbers and Frequencies	Band 26	Frequency range: 814 - 849 MHz																																																																		
		Channel Bandwidth																																																																		
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz																																																													
	Low		26765/ 821.5	26740/ 819	26715/ 816.5	26705/ 815.5	26697/ 814.7																																																													
	Mid		26865/ 831.5	26865/ 831.5	26865/ 831.5	26865/ 831.5	26865/ 831.5																																																													
	High		26965/ 841.5	26990/ 844	27015/ 846.5	27025/ 847.5	27033/ 848.3																																																													
	Band 41	Frequency range: 2496 - 2690 MHz																																																																		
		Channel Bandwidth																																																																		
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz																																																													
		Low	39750 / 2506.0																																																																	
		Low-Mid	40185 / 2549.5																																																																	
		Mid	40620 / 2593.0																																																																	
		Mid-High	41055 / 2636.5																																																																	
	High	41490 / 2680.0																																																																		
	Band 66	Frequency range: 1710 - 1780 MHz																																																																		
Channel Bandwidth																																																																				
20 MHz		15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz																																																														
Low		132072/ 1720	132047/ 1717.5	132022/ 1715	131997/ 1712.5	131987/ 1711.5	131979/ 1710.7																																																													
Mid		132322/ 1745	132322/ 1745	132322/ 1745	132322/ 1745	132322/ 1745	132322/ 1745																																																													
High	132572/ 1770	132597/ 1772.5	132622/ 1775	132647/ 1777.5	132657/ 1778.5	132665/ 1779.3																																																														
LTE transmitter and antenna implementation	Refer to Appendix A.																																																																			
Maximum power reduction (MPR)	<p>Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3</p> <table border="1"> <thead> <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> </thead> <tbody> <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> </tbody> </table> <p>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</p>						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
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																																																													
Power reduction	Yes																																																																			
Spectrum plots for RB configurations	A properly configured base station simulator was used for the SAR and power measurements; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.																																																																			

Notes:

- 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 Band 41 test channels in accordance with October 2014 TCB workshop for all channels bandwidths.
- 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	$26336 \cdot T_s$			$7680 \cdot T_s$		
5	$6592 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$20480 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$		
8	$24144 \cdot T_s$			-		
9	$13168 \cdot T_s$			-		

Calculated Duty Cycle

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

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

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

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

where

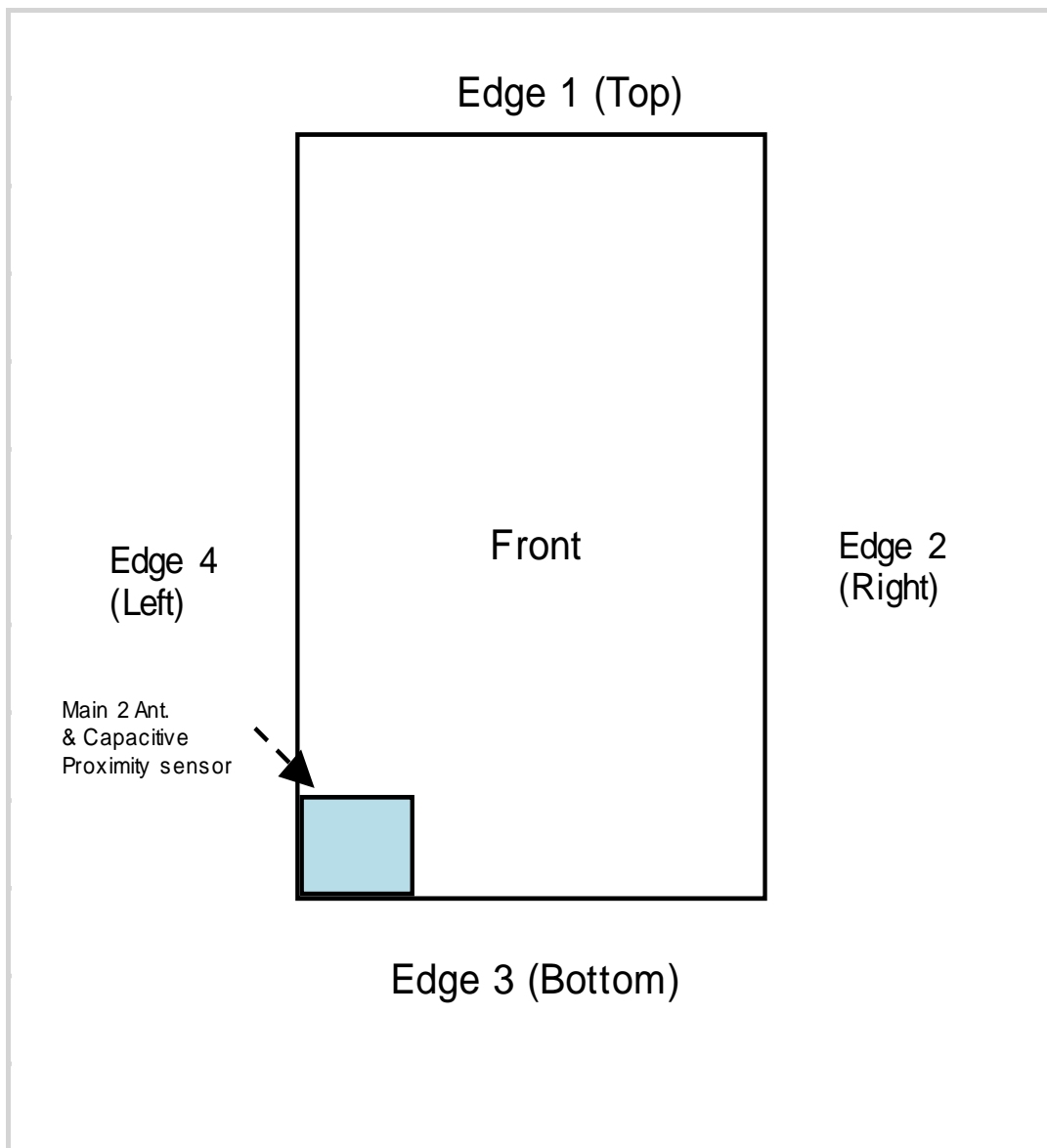
$T_s = 1/(15000 \times 2048)$ seconds

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. Proximity Sensor feature

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

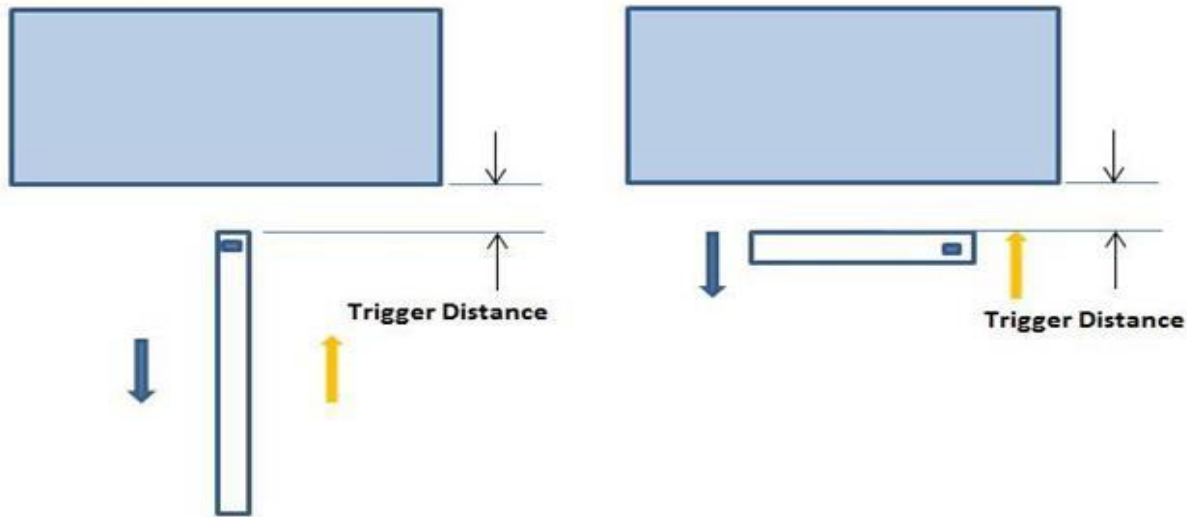


6.7.1. Proximity Sensor Triggering Distance (KDB 616217 §6.2)

Rear, Edge 3(Bottom) and Edge 4(Left) of the DUT was placed directly below the flat phantom. The DUT was moved toward the phantom in accordance with the steps outlined in KDB 616217 §6.2 to determine the trigger distance for enabling power reduction. The DUT was moved away from the phantom to determine the trigger distance for resuming full power.

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

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



Proximity Sensor Trigger Distance Assessment KDB 616217 Sec.6.2

LEGEND

- Direction of DUT travel for determination of power reduction triggering point
- Direction of DUT travel for determination of full power triggering point

Summary of Trigger Distances

Antenna	Trigger distance - Rear		Trigger distance – Edge 4 (Left)		Trigger distance – Edge 3 (Bottom)	
	Moving toward phantom	Moving from phantom	Moving toward phantom	Moving from phantom	Moving toward phantom	Moving from phantom
Main 2 Ant.	16 mm	16 mm	7 mm	7 mm	12 mm	12 mm

Proximity Sensor Triggering Distance Measurement Results**WWAN Bands**

Rear, DUT Moving Toward (Trigger) and Away (Release) from Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	12	13	14	15	16	17	18	19	20	21
GSM1900 GPRS 1 Slot	29.2	28.7	28.6	28.6	28.6	30.5	30.1	30.1	30.2	30.3
GSM1900 GPRS 2 Slots	26.9	26.0	26.7	26.2	26.1	28.0	27.9	28.3	28.3	28.5
GSM1900 GPRS 3 Slots	24.5	24.8	25.3	24.7	25.3	26.2	26.3	26.1	26.0	26.0
GSM1900 GPRS 4 Slots	23.1	23.3	23.9	23.9	23.9	25.2	24.7	25.0	24.8	25.4
WCDMA Band II	21.3	21.5	21.6	21.3	21.1	24.1	24.2	25.0	24.1	24.1
WCDMA Band IV	22.0	21.6	21.0	21.5	21.2	24.9	24.2	24.8	24.2	24.8
LTE Band 2	21.3	21.4	21.4	20.5	21.1	24.5	24.3	24.5	23.5	24.1
LTE Band 4	20.9	21.0	20.7	20.7	21.2	24.1	23.7	23.5	24.3	24.1
LTE Band 66	21.7	21.5	21.2	21.9	21.8	24.4	24.1	24.3	24.6	24.2

Edge4, DUT Moving Toward (Trigger) and Away (Release) from Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	3	4	5	6	7	8	9	10	11	12
GSM1900 GPRS 1 Slot	29.2	28.9	28.9	29.0	28.6	30.2	30.9	30.8	30.0	30.9
GSM1900 GPRS 2 Slots	27.0	26.3	27.0	26.3	26.5	28.0	28.0	27.7	28.2	28.2
GSM1900 GPRS 3 Slots	25.5	25.4	25.0	24.7	25.5	26.0	26.3	26.4	26.9	26.5
GSM1900 GPRS 4 Slots	23.5	23.7	23.5	23.7	23.1	25.2	25.5	24.8	25.3	24.9
WCDMA Band II	21.5	21.6	21.9	22.0	22.0	24.3	24.2	24.2	24.3	24.8
WCDMA Band IV	21.0	21.6	21.3	21.4	21.6	24.8	24.2	24.3	24.4	24.9
LTE Band 2	20.8	21.2	20.9	20.6	20.5	24.4	23.9	24.0	24.5	24.2
LTE Band 4	21.1	21.1	21.3	20.8	21.1	24.1	23.6	24.3	24.5	24.3
LTE Band 66	21.2	21.1	21.7	21.6	21.3	24.5	24.3	24.6	24.8	24.0

Edge3, DUT Moving Toward (Trigger) and Away (Release) from Phantom

Distance to DUT vs. Output Power in dBm										
Distance (mm)	8	9	10	11	12	13	14	15	16	17
GSM1900 GPRS 1 Slot	29.4	28.6	29.0	29.0	29.2	30.2	30.5	30.2	30.3	30.8
GSM1900 GPRS 2 Slots	26.6	26.1	26.6	26.5	26.0	27.5	28.2	28.1	28.5	28.4
GSM1900 GPRS 3 Slots	24.6	25.3	24.7	25.2	25.2	26.7	27.0	26.1	26.9	26.6
GSM1900 GPRS 4 Slots	23.1	23.4	23.7	23.1	23.7	25.3	25.4	24.8	25.1	25.1
WCDMA Band II	21.2	21.1	21.9	21.1	21.9	24.3	25.0	24.1	24.6	24.1
WCDMA Band IV	21.5	21.4	21.4	22.0	21.8	24.8	25.0	24.0	24.0	24.2
LTE Band 2	20.7	21.5	21.4	20.8	21.3	24.0	23.8	23.5	23.5	23.6
LTE Band 4	21.5	21.0	20.8	21.5	20.8	24.3	23.7	23.8	24.4	24.2
LTE Band 66	21.5	21.9	22.0	21.0	21.2	25.0	24.4	24.5	24.4	24.5

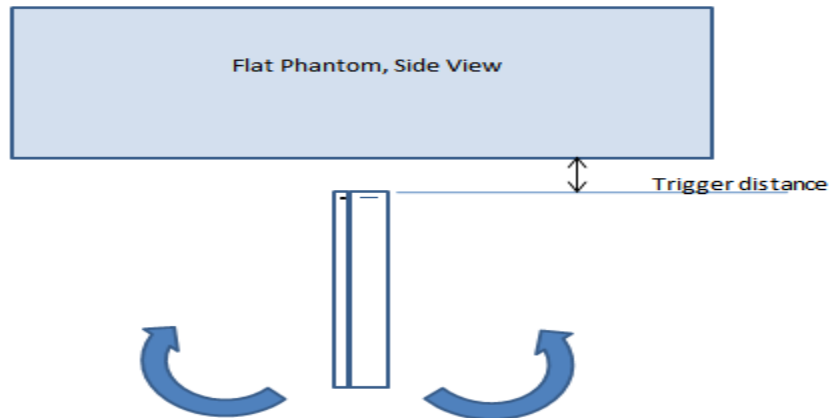
6.7.2. Proximity Sensor Coverage (KDB 616217 Sec.6.3)

As there is no spatial offset between the antenna and the proximity sensor element, proximity sensor coverage did not need to be assessed.

6.7.3. Proximity Sensor Tilt Angle Assessment (KDB 616217 Sec.6.4)

The DUT was positioned directly below the flat phantom at the minimum measured trigger distance with Edge 3 parallel to the base of the flat phantom for each band.

The EUT was rotated about Edge 3 for angles up to +/- 45°. If the output power increased during the rotation the DUT was moved 1mm toward the phantom and the rotation repeated. This procedure was repeated until the power remained reduced for all angles up to +/- 45°.



Proximity sensor tilt angle assessment (Edge 3) KDB 616217 §6.4

Summary of Tablet Tilt Angle Influence to Proximity Sensor Triggering (Edge 3)

Antenna	Minimum trigger distance measured according to KDB 616217 §6.2	Minimum distance at which power reduction was maintained over +/-45°	Power reduction status											
			-45°	-40°	-30°	-20°	-10°	0°	10°	20°	30°	40°	45°	
Main 2 Ant	12 mm	12 mm	On	On	On	On	On	On	On	On	On	On	On	On

6.7.4. Resulting test positions for SAR measurements

Wireless technologies	Position	§6.2 Triggering Distance	§6.3 Coverage	§6.4 Tilt Angle	Worst case distance for SAR
Main 2 Ant	Rear	16 mm	N/A	N/A	15 mm
	Edge 4	7 mm	N/A	N/A	6 mm
	Edge 3	12 mm	N/A	12 mm	11 mm

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	Antenna	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)				
WLAN/BT&BLE	Head	WiFi 2.4G & WiFi 5G	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	WiFi 2.4G & WiFi 5G	15 mm	Rear	N/A	Yes	
				Front	N/A	Yes	
	Hotspot	WiFi 2.4G & WiFi 5G	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	WiFi 2.4G & WiFi 5G	0 mm	Rear	Refer to notes 2 & 4		
				Front			
Edge 1 (Top)							
Edge 2 (Right)							
Edge 3 (Bottom)							
Edge 4 (Left)							

Notes:

- SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hot Spot SAR.
- 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.
- 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.
- 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 $\pm 2^\circ\text{C}$ of the temperature when the tissue parameters are characterized.

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

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

Tissue Dielectric Parameters

FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

Target Frequency (MHz)	Head	
	ϵ_r	σ (S/m)
150	52.3	0.76
300	45.3	0.87
450	43.5	0.87
835	41.5	0.90
900	41.5	0.97
915	41.5	0.98
1450	40.5	1.20
1610	40.3	1.29
1800 – 2000	40.0	1.40
2450	39.2	1.80
3000	38.5	2.40
5000	36.2	4.45
5100	36.1	4.55
5200	36.0	4.66
5300	35.9	4.76
5400	35.8	4.86
5500	35.6	4.96
5600	35.5	5.07
5700	35.4	5.17
5800	35.3	5.27
6000	35.1	5.48

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

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 ±(%)	
12-27-2021	Head 750	e'	40.4000	Relative Permittivity (ϵ_r):	40.40	41.96	-3.72	5
		e"	21.5800	Conductivity (σ):	0.90	0.89	0.77	5
	Head 700	e'	40.6600	Relative Permittivity (ϵ_r):	40.66	42.22	-3.69	5
		e"	22.8000	Conductivity (σ):	0.89	0.89	-0.20	5
	Head 790	e'	40.1100	Relative Permittivity (ϵ_r):	40.11	41.76	-3.94	5
		e"	20.4800	Conductivity (σ):	0.90	0.90	0.39	5
12-27-2021	Head 835	e'	40.0100	Relative Permittivity (ϵ_r):	40.01	41.50	-3.59	5
		e"	20.1200	Conductivity (σ):	0.93	0.90	3.79	5
	Head 820	e'	39.9800	Relative Permittivity (ϵ_r):	39.98	41.60	-3.90	5
		e"	20.1600	Conductivity (σ):	0.92	0.90	2.31	5
	Head 850	e'	40.0700	Relative Permittivity (ϵ_r):	40.07	41.50	-3.45	5
		e"	20.0500	Conductivity (σ):	0.95	0.92	3.56	5
1-3-2022	Head 835	e'	41.0900	Relative Permittivity (ϵ_r):	41.09	41.50	-0.99	5
		e"	19.0000	Conductivity (σ):	0.88	0.90	-1.98	5
	Head 820	e'	41.1100	Relative Permittivity (ϵ_r):	41.11	41.60	-1.18	5
		e"	19.1800	Conductivity (σ):	0.87	0.90	-2.67	5
	Head 850	e'	41.1100	Relative Permittivity (ϵ_r):	41.11	41.50	-0.94	5
		e"	18.8300	Conductivity (σ):	0.89	0.92	-2.74	5
1-17-2022	Head 5250	e'	35.6800	Relative Permittivity (ϵ_r):	35.68	35.93	-0.70	5
		e"	16.1700	Conductivity (σ):	4.72	4.70	0.39	5
	Head 5260	e'	35.6700	Relative Permittivity (ϵ_r):	35.67	35.92	-0.70	5
		e"	16.1700	Conductivity (σ):	4.73	4.71	0.36	5
	Head 5600	e'	34.6800	Relative Permittivity (ϵ_r):	34.68	35.53	-2.40	5
		e"	16.4200	Conductivity (σ):	5.11	5.06	1.04	5
	Head 5750	e'	34.5000	Relative Permittivity (ϵ_r):	34.50	35.36	-2.44	5
		e"	16.6600	Conductivity (σ):	5.33	5.21	2.16	5
	Head 5825	e'	34.4300	Relative Permittivity (ϵ_r):	34.43	35.30	-2.46	5
		e"	16.6700	Conductivity (σ):	5.40	5.27	2.45	5
1-20-2022	Head 5250	e'	35.3900	Relative Permittivity (ϵ_r):	35.39	35.93	-1.51	5
		e"	15.7400	Conductivity (σ):	4.59	4.70	-2.28	5
	Head 5260	e'	35.4000	Relative Permittivity (ϵ_r):	35.40	35.92	-1.45	5
		e"	15.8700	Conductivity (σ):	4.64	4.71	-1.50	5
	Head 5600	e'	34.5600	Relative Permittivity (ϵ_r):	34.56	35.53	-2.74	5
		e"	15.9600	Conductivity (σ):	4.97	5.06	-1.79	5
	Head 5750	e'	34.4600	Relative Permittivity (ϵ_r):	34.46	35.36	-2.55	5
		e"	15.8900	Conductivity (σ):	5.08	5.21	-2.56	5
	Head 5825	e'	34.0800	Relative Permittivity (ϵ_r):	34.08	35.30	-3.46	5
		e"	16.0600	Conductivity (σ):	5.20	5.27	-1.30	5
1-24-2022	Head 5250	e'	36.1700	Relative Permittivity (ϵ_r):	36.17	35.93	0.66	5
		e"	15.7000	Conductivity (σ):	4.58	4.70	-2.53	5
	Head 5260	e'	36.1600	Relative Permittivity (ϵ_r):	36.16	35.92	0.66	5
		e"	15.7100	Conductivity (σ):	4.59	4.71	-2.50	5
	Head 5600	e'	35.5600	Relative Permittivity (ϵ_r):	35.56	35.53	0.07	5
		e"	16.0100	Conductivity (σ):	4.99	5.06	-1.48	5
	Head 5750	e'	35.2800	Relative Permittivity (ϵ_r):	35.28	35.36	-0.23	5
		e"	16.1500	Conductivity (σ):	5.16	5.21	-0.96	5
	Head 5825	e'	35.1700	Relative Permittivity (ϵ_r):	35.17	35.30	-0.37	5
		e"	16.1800	Conductivity (σ):	5.24	5.27	-0.56	5
1-25-2022	Head 2450	e'	38.0900	Relative Permittivity (ϵ_r):	38.09	39.20	-2.83	5
		e"	13.5500	Conductivity (σ):	1.85	1.80	2.55	5
	Head 2400	e'	38.1800	Relative Permittivity (ϵ_r):	38.18	39.30	-2.84	5
		e"	13.5400	Conductivity (σ):	1.81	1.75	3.15	5
	Head 2480	e'	38.0300	Relative Permittivity (ϵ_r):	38.03	39.16	-2.89	5
		e"	13.5700	Conductivity (σ):	1.87	1.83	2.12	5

SAR 2 Room

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
1-17-2022	Head 750	e'	41.5000	Relative Permittivity (ϵ_r):	41.50	41.96	-1.10	5
		e"	21.4400	Conductivity (σ):	0.89	0.89	0.11	5
	Head 700	e'	41.6600	Relative Permittivity (ϵ_r):	41.66	42.22	-1.32	5
		e"	22.5800	Conductivity (σ):	0.88	0.89	-1.17	5
	Head 790	e'	41.3700	Relative Permittivity (ϵ_r):	41.37	41.76	-0.93	5
		e"	20.6700	Conductivity (σ):	0.91	0.90	1.32	5
1-17-2022	Head 835	e'	41.2200	Relative Permittivity (ϵ_r):	41.22	41.50	-0.67	5
		e"	19.8700	Conductivity (σ):	0.92	0.90	2.50	5
	Head 820	e'	41.2700	Relative Permittivity (ϵ_r):	41.27	41.60	-0.80	5
		e"	20.1300	Conductivity (σ):	0.92	0.90	2.15	5
	Head 850	e'	41.1700	Relative Permittivity (ϵ_r):	41.17	41.50	-0.80	5
		e"	19.6100	Conductivity (σ):	0.93	0.92	1.29	5
1-20-2022	Head 750	e'	42.1000	Relative Permittivity (ϵ_r):	42.10	41.96	0.33	5
		e"	21.2500	Conductivity (σ):	0.89	0.89	-0.77	5
	Head 700	e'	42.2500	Relative Permittivity (ϵ_r):	42.25	42.22	0.08	5
		e"	22.2600	Conductivity (σ):	0.87	0.89	-2.57	5
	Head 790	e'	41.9500	Relative Permittivity (ϵ_r):	41.95	41.76	0.46	5
		e"	20.5300	Conductivity (σ):	0.90	0.90	0.63	5

SAR 3 Room

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
12-29-2021	Head 1750	e'	41.4600	Relative Permittivity (ϵ_r):	41.46	40.08	3.43	5
		e"	13.9000	Conductivity (σ):	1.35	1.37	-1.20	5
	Head 1710	e'	41.6400	Relative Permittivity (ϵ_r):	41.64	40.15	3.72	5
		e"	14.0400	Conductivity (σ):	1.33	1.35	-0.85	5
	Head 1755	e'	41.4400	Relative Permittivity (ϵ_r):	41.44	40.08	3.40	5
		e"	13.9000	Conductivity (σ):	1.36	1.37	-1.12	5
12-29-2021	Head 1900	e'	41.1300	Relative Permittivity (ϵ_r):	41.13	40.00	2.83	5
		e"	13.4700	Conductivity (σ):	1.42	1.40	1.65	5
	Head 1850	e'	41.2500	Relative Permittivity (ϵ_r):	41.25	40.00	3.13	5
		e"	13.5700	Conductivity (σ):	1.40	1.40	-0.29	5
	Head 1910	e'	41.1300	Relative Permittivity (ϵ_r):	41.13	40.00	2.83	5
		e"	13.4700	Conductivity (σ):	1.43	1.40	2.18	5

SAR 4 Room

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
1-5-2022	Head 2600	e'	38.6100	Relative Permittivity (ε _r):	38.61	39.01	-1.03	5
		e"	13.4700	Conductivity (σ):	1.95	1.96	-0.76	5
	Head 2500	e'	38.7800	Relative Permittivity (ε _r):	38.78	39.14	-0.91	5
		e"	13.4200	Conductivity (σ):	1.87	1.85	0.62	5
	Head 2700	e'	38.4100	Relative Permittivity (ε _r):	38.41	38.88	-1.22	5
		e"	13.5200	Conductivity (σ):	2.03	2.07	-1.96	5
1-13-2022	Head 1900	e'	38.6300	Relative Permittivity (ε _r):	38.63	40.00	-3.42	5
		e"	13.4700	Conductivity (σ):	1.42	1.40	1.65	5
	Head 1850	e'	38.6900	Relative Permittivity (ε _r):	38.69	40.00	-3.28	5
		e"	13.5500	Conductivity (σ):	1.39	1.40	-0.44	5
	Head 1910	e'	38.6200	Relative Permittivity (ε _r):	38.62	40.00	-3.45	5
		e"	13.4700	Conductivity (σ):	1.43	1.40	2.18	5
1-17-2022	Head 1750	e'	41.7000	Relative Permittivity (ε _r):	41.70	40.08	4.03	5
		e"	13.7400	Conductivity (σ):	1.34	1.37	-2.34	5
	Head 1710	e'	41.7600	Relative Permittivity (ε _r):	41.76	40.15	4.02	5
		e"	13.9000	Conductivity (σ):	1.32	1.35	-1.84	5
	Head 1755	e'	41.7000	Relative Permittivity (ε _r):	41.70	40.08	4.05	5
		e"	13.7200	Conductivity (σ):	1.34	1.37	-2.40	5
1-17-2022	Head 1900	e'	41.5600	Relative Permittivity (ε _r):	41.56	40.00	3.90	5
		e"	13.3900	Conductivity (σ):	1.41	1.40	1.04	5
	Head 1850	e'	41.6300	Relative Permittivity (ε _r):	41.63	40.00	4.08	5
		e"	13.4800	Conductivity (σ):	1.39	1.40	-0.95	5
	Head 1910	e'	41.5500	Relative Permittivity (ε _r):	41.55	40.00	3.87	5
		e"	13.3700	Conductivity (σ):	1.42	1.40	1.42	5
1-17-2022	Head 2450	e'	38.3200	Relative Permittivity (ε _r):	38.32	39.20	-2.24	5
		e"	13.4400	Conductivity (σ):	1.83	1.80	1.72	5
	Head 2400	e'	38.4400	Relative Permittivity (ε _r):	38.44	39.30	-2.18	5
		e"	13.4100	Conductivity (σ):	1.79	1.75	2.16	5
	Head 2480	e'	38.2600	Relative Permittivity (ε _r):	38.26	39.16	-2.30	5
		e"	13.4400	Conductivity (σ):	1.85	1.83	1.14	5

SAR 5 Room

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
12-22-2021	Head 1750	e'	39.6200	Relative Permittivity (ϵ_r):	39.62	40.08	-1.16	5
		e"	13.9200	Conductivity (σ):	1.35	1.37	-1.06	5
	Head 1710	e'	39.8100	Relative Permittivity (ϵ_r):	39.81	40.15	-0.84	5
		e"	14.0800	Conductivity (σ):	1.34	1.35	-0.57	5
	Head 1755	e'	39.6000	Relative Permittivity (ϵ_r):	39.60	40.08	-1.19	5
		e"	13.9000	Conductivity (σ):	1.36	1.37	-1.12	5
12-27-2021	Head 1750	e'	40.7600	Relative Permittivity (ϵ_r):	40.76	40.08	1.68	5
		e"	13.6500	Conductivity (σ):	1.33	1.37	-2.98	5
	Head 1710	e'	40.5600	Relative Permittivity (ϵ_r):	40.56	40.15	1.03	5
		e"	13.8500	Conductivity (σ):	1.32	1.35	-2.19	5
	Head 1755	e'	40.7600	Relative Permittivity (ϵ_r):	40.76	40.08	1.70	5
		e"	13.5700	Conductivity (σ):	1.32	1.37	-3.47	5
12-27-2021	Head 1900	e'	40.4500	Relative Permittivity (ϵ_r):	40.45	40.00	1.13	5
		e"	13.1900	Conductivity (σ):	1.39	1.40	-0.47	5
	Head 1850	e'	40.3000	Relative Permittivity (ϵ_r):	40.30	40.00	0.75	5
		e"	13.6300	Conductivity (σ):	1.40	1.40	0.15	5
	Head 1910	e'	40.4000	Relative Permittivity (ϵ_r):	40.40	40.00	1.00	5
		e"	13.0500	Conductivity (σ):	1.39	1.40	-1.00	5
12-30-2021	Head 1900	e'	41.4500	Relative Permittivity (ϵ_r):	41.45	40.00	3.63	5
		e"	13.6500	Conductivity (σ):	1.44	1.40	3.00	5
	Head 1850	e'	41.4400	Relative Permittivity (ϵ_r):	41.44	40.00	3.60	5
		e"	13.6600	Conductivity (σ):	1.41	1.40	0.37	5
	Head 1910	e'	41.4300	Relative Permittivity (ϵ_r):	41.43	40.00	3.58	5
		e"	13.6200	Conductivity (σ):	1.45	1.40	3.32	5
1-17-2022	Head 2600	e'	38.6500	Relative Permittivity (ϵ_r):	38.65	39.01	-0.92	5
		e"	13.6300	Conductivity (σ):	1.97	1.96	0.42	5
	Head 2500	e'	39.1800	Relative Permittivity (ϵ_r):	39.18	39.14	0.11	5
		e"	13.7000	Conductivity (σ):	1.90	1.85	2.72	5
	Head 2700	e'	38.5400	Relative Permittivity (ϵ_r):	38.54	38.88	-0.89	5
		e"	13.3700	Conductivity (σ):	2.01	2.07	-3.05	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	Cal. Due.Date	Freq. (MHz)	Target SAR Values (W/kg)	
					1g/10g	Head
D750V3	1122	2-24-2020	2-24-2022	750	1g	8.54
					10g	5.59
D835V2	4d194	3-20-2020	3-20-2022	835	1g	9.76
					10g	6.42
D1750V2	1125	2-21-2020	2-21-2022	1750	1g	36.50
					10g	19.20
D1900V2	5d199	3-19-2020	3-19-2022	1900	1g	40.50
					10g	21.00
D2450V2	960	3-20-2020	3-20-2022	2450	1g	53.20
					10g	24.80
D2600V2	1178	4-23-2021	4-23-2023	2600	1g	57.10
					10g	25.50
D5GHzV2	1184	12-3-2020	12-3-2022	5250	1g	79.10
					10g	22.70
				5600	1g	82.40
					10g	23.30
				5750	1g	79.90
					10g	22.60

Note(s):

Refer to Appendix F that mentioned about justification for Extended SAR Dipole Calibrations.

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 $\pm 10\%$	Plot No.	
	Type	Serial #		Zoom Scan to 100 mW	Normalize to 1 W				
12-27-2021	D750V3	1122	Head	1g	0.88	8.8	8.54	3.28	
				10g	0.60	6.0	5.59	7.69	
12-27-2021	D835V2	4d194	Head	1g	1.02	10.2	9.76	4.51	
				10g	0.69	6.9	6.42	7.63	
1-3-2022	D835V2	4d194	Head	1g	1.04	10.4	9.76	6.56	1,2
				10g	0.69	6.9	6.42	7.94	
1-17-2022	D5GHzV2	1184	Head	1g	7.28	72.8	79.10	-7.96	3,4
				10g	2.14	21.4	22.70	-5.73	
1-17-2022	D5GHzV2	1184	Head	1g	8.41	84.1	82.40	2.06	
				10g	2.43	24.3	23.30	4.29	
1-17-2022	D5GHzV2	1184	Head	1g	8.25	82.5	79.90	3.25	
				10g	2.39	23.9	22.60	5.75	
1-20-2022	D5GHzV2	1184	Head	1g	8.05	80.5	79.10	1.77	
				10g	2.40	24.0	22.70	5.73	
1-20-2022	D5GHzV2	1184	Head	1g	8.48	84.8	82.40	2.91	
				10g	2.47	24.7	23.30	6.01	
1-20-2022	D5GHzV2	1184	Head	1g	7.95	79.5	79.90	-0.50	
				10g	2.32	23.2	22.60	2.65	
1-24-2022	D5GHzV2	1184	Head	1g	7.89	78.9	79.10	-0.25	
				10g	2.34	23.4	22.70	3.08	
1-24-2022	D5GHzV2	1184	Head	1g	7.95	79.5	82.40	-3.52	
				10g	2.31	23.1	23.30	-0.86	
1-24-2022	D5GHzV2	1184	Head	1g	8.33	83.3	79.90	4.26	
				10g	2.44	24.4	22.60	7.96	
1-25-2022	D2450V2	960	Head	1g	5.52	55.2	53.20	3.76	5,6
				10g	2.60	26.0	24.80	4.84	

SAR 2 Room

Date Tested	System Dipole		T.S. Liquid	Measured Results		Target (Ref. Value)	Delta $\pm 10\%$	Plot No.	
	Type	Serial #		Zoom Scan to 100 mW	Normalize to 1 W				
1-17-2022	D750V3	1122	Head	1g	0.89	8.9	8.54	4.57	7,8
				10g	0.61	6.1	5.59	8.23	
1-17-2022	D835V2	4d194	Head	1g	0.96	9.6	9.76	-1.43	
				10g	0.64	6.4	6.42	0.00	
1-20-2022	D750V3	1122	Head	1g	0.85	8.5	8.54	0.00	
				10g	0.57	5.7	5.59	2.33	

SAR 3 Room

Date Tested	System Dipole		T.S. Liquid	Measured Results		Target (Ref. Value)	Delta $\pm 10\%$	Plot No.	
	Type	Serial #		Zoom Scan to 100 mW	Normalize to 1 W				
12-29-2021	D1750V2	1125	Head	1g	3.58	35.8	36.50	-1.92	9,10
				10g	1.96	19.6	19.20	2.08	
12-29-2021	D1900V2	5d199	Head	1g	4.08	40.8	40.50	0.74	
				10g	2.17	21.7	21.00	3.33	

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				
1-5-2022	D2600V2	1178	Head	1g	5.58	55.8	56.60	-1.41	
				10g	2.48	24.8	25.40	-2.36	
1-13-2022	D1900V2	5d199	Head	1g	4.03	40.3	40.50	-0.49	
				10g	2.07	20.7	21.00	-1.43	
1-17-2022	D1750V2	1125	Head	1g	3.90	39.0	36.50	6.85	11,12
				10g	2.08	20.8	19.20	8.33	
1-17-2022	D1900V2	5d199	Head	1g	4.22	42.2	40.50	4.20	
				10g	2.19	21.9	21.00	4.29	
1-17-2022	D2450V2	960	Head	1g	5.41	54.1	53.20	1.69	
				10g	2.50	25.0	24.80	0.81	

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				
12-22-2021	D1750V2	1125	Head	1g	3.85	38.5	36.50	5.48	
				10g	2.06	20.6	19.20	7.29	
12-27-2021	D1750V2	1125	Head	1g	3.64	36.4	36.50	-0.27	
				10g	2.06	20.6	19.20	7.29	
12-27-2021	D1900V2	5d199	Head	1g	3.82	38.2	40.50	-5.68	13,14
				10g	2.11	21.1	21.00	0.48	
12-30-2021	D1900V2	5d199	Head	1g	4.10	41.0	40.50	1.23	
				10g	2.22	22.2	21.00	5.71	
1-17-2022	D2600V2	1178	Head	1g	5.42	54.2	56.60	-4.24	15,16
				10g	2.50	25.0	25.40	-1.57	
1-24-2022	D2600V2	1178	Head	1g	5.65	56.5	56.60	-0.18	
				10g	2.62	26.2	25.40	3.15	

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	31.6	22.6	33.5	24.5			
			190	836.6	31.9	22.9					
			251	848.8	32.4	23.3					
GPRS (GMSK)	CS1	1	128	824.2	31.8	22.8	33.0	24.0			
			190	836.6	31.9	22.9					
			251	848.8	32.4	23.3					
		2	128	824.2	29.6	23.5	31.0	25.0			
			190	836.6	29.6	23.6					
			251	848.8	29.8	23.8					
	3	128	824.2	28.2	24.0	29.5	25.2				
		190	836.6	28.1	23.8						
		251	848.8	28.3	24.0						
	4	128	824.2	26.9	23.9	28.0	25.0				
		190	836.6	26.7	23.7						
		251	848.8	26.9	23.9						
EGPRS (8PSK)		MCS5	1	128	824.2			26.1	17.1	27.5	18.5
				190	836.6			26.3	17.3		
				251	848.8			26.5	17.4		
2	128		824.2	24.1	18.1	25.5	19.5				
	190		836.6	24.3	18.3						
	251		848.8	24.5	18.5						
3	128		824.2	23.1	18.8	24.5	20.2				
	190		836.6	23.0	18.8						
	251		848.8	23.3	19.0						
4	128	824.2	21.5	18.5	23.0	20.0					
	190	836.6	21.7	18.7							
	251	848.8	21.9	18.9							

Notes:

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

- GMSK (GPRS) mode with 3 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 $\leq 1/4$ dB higher than GMSK GPRS or the adjusted SAR of the highest reported SAR of GMSK GPRS is ≤ 1.2 W/kg.

GSM1900 Measured Results

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)				Reduced Average Power (dBm) Hotspot back-off				Reduced Average Power (dBm) Proximity sensor back-off			
					Measured		Tune-up Limit		Measured		Tune-up Limit		Measured		Tune-up Limit	
					Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr
GSM (Voice)	CS1	1	512	1850.2	31.3	22.3	31.5	22.5	29.6	20.6	30.0	21.0	29.6	20.6	30.0	21.0
			661	1880.0	31.0	22.0			29.3	20.3			29.3	20.3		
			810	1909.8	30.3	21.3			29.1	20.1			29.1	20.1		
GPRS (GMSK)	CS1	1	512	1850.2	31.4	22.3	31.5	22.5	29.5	20.5	30.0	21.0	29.7	20.7	30.0	21.0
			661	1880.0	31.0	22.0			29.5	20.5			29.3	20.3		
			810	1909.8	30.4	21.3			28.8	19.7			28.6	19.6		
		2	512	1850.2	28.7	22.7	29.0	23.0	26.5	20.5	27.5	21.5	26.3	20.3	27.5	21.5
			661	1880.0	28.5	22.5			26.8	20.8			26.9	20.9		
			810	1909.8	27.8	21.8			27.0	21.0			27.0	21.0		
		3	512	1850.2	26.5	22.3	27.5	23.2	24.7	20.5	26.0	21.7	24.6	20.3	26.0	21.7
			661	1880.0	27.2	22.9			25.0	20.8			25.2	20.9		
			810	1909.8	27.2	22.9			25.2	20.9			25.1	20.9		
		4	512	1850.2	25.3	22.2	26.0	23.0	23.5	20.5	24.5	21.5	23.4	20.3	24.5	21.5
			661	1880.0	25.8	22.8			24.0	21.0			23.9	20.9		
			810	1909.8	25.8	22.8			24.0	21.0			23.9	20.8		
EGPRS (8PSK)	MCS5	1	512	1850.2	25.3	16.3	26.5	17.5	22.8	13.8	24.5	15.5	22.8	13.8	24.5	15.5
			661	1880.0	25.6	16.5			23.0	14.0			23.0	14.0		
			810	1909.8	25.8	16.7			23.2	14.2			23.1	14.1		
		2	512	1850.2	23.5	17.4	24.5	18.5	20.4	14.4	22.5	16.5	20.4	14.4	22.5	16.5
			661	1880.0	23.7	17.7			20.7	14.7			20.6	14.6		
			810	1909.8	24.0	18.0			20.9	14.9			20.9	14.9		
		3	512	1850.2	22.1	17.8	23.0	18.7	19.2	15.0	21.0	16.7	19.2	15.0	21.0	16.7
			661	1880.0	22.4	18.1			19.6	15.3			19.6	15.3		
			810	1909.8	22.4	18.1			19.5	15.2			19.5	15.2		
		4	512	1850.2	20.3	17.3	21.5	18.5	17.6	14.6	19.5	16.5	17.6	14.6	19.5	16.5
			661	1880.0	20.6	17.6			17.9	14.9			17.9	14.9		
			810	1909.8	20.8	17.8			18.0	15.0			18.1	15.1		

Notes:

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

- GMSK (GPRS) mode with 3 time slots for Max & Reduced 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. WCDMA

Release 99 Setup Procedures used to establish the test signals

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

Mode	Subtest	Rel99
WCDMA General Settings	Loopback Mode	Test Mode 2
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	β_c/β_d	8/15

HSDPA Setup Procedures used to establish the test signals

The following 4 Sub-tests were completed according to Release 5 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
W-CDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set 1			
	Power Control Algorithm	Algorithm 2			
	β_c	2/15	11/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	β_c/β_d	2/15	11/15	15/8	15/4
	β_{hs}	4/15	24/15	30/15	30/15
MPR (dB)	0	0	0.5	0.5	
HSDPA Specific Settings	D_{ACK}	8			
	D_{NAK}	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	$A_{hs}=\beta_{hs}/\beta_c$	30/15			

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

The following 5 Sub-tests were completed according to Release 6 procedures in 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
	β_c	11/15	6/15	15/15	2/15	15/15
	β_d	15/15	15/15	9/15	15/15	0
	β_{ec}	209/225	12/15	30/15	2/15	5/15
	β_c/β_d	11/15	6/15	15/9	2/15	-
	β_{hs}	22/15	12/15	30/15	4/15	5/15
	β_{ed}	1309/225	94/75	47/15	56/75	47/15
CM (dB)	1	3	2	3	1	
MPR (dB)	0	2	1	2	0	
HSDPA Specific Settings	DACK	8				0
	DNAK	8				0
	DCQI	8				0
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
	CQI Repetition Factor (Table 5.2B.4)	2				
	A _{hs} = β_{hs}/β_c	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.		

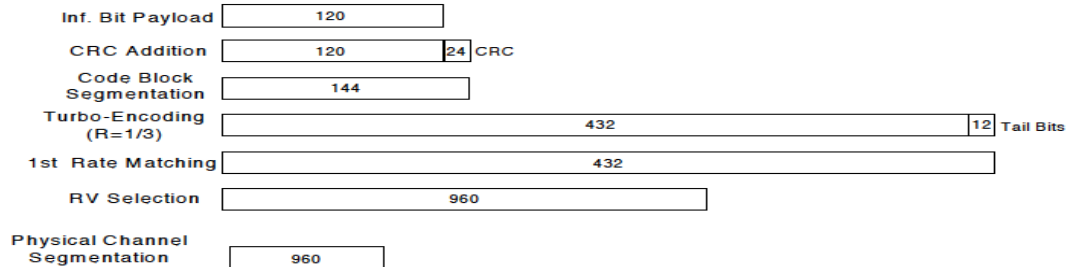


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

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

HSPA+

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

WCDMA Band II Measured Results

Mode	UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			Reduced Average Power (dBm) Hotspot back-off			Reduced Average Power (dBm) Proximity sensor back-off			
			Measured Pwr	MPR	Tune-up Limit	Measured Pwr	MPR	Tune-up Limit	Measured Pwr	MPR	Tune-up Limit	
Release 99	Rel 99 (RMC, 12.2 kbps)	9262	1852.4	23.9	NA	25.5	21.0	NA	22.5	21.0	NA	22.5
		9400	1880.0	23.8			20.9			20.9		
		9538	1907.6	23.9			21.0			21.0		
HSDPA	Subtest 1	9262	1852.4	22.4	0	23.5	21.0	0	22.0	21.0	0	22.0
		9400	1880.0	22.6			20.9			20.9		
		9538	1907.6	22.7			21.0			21.0		
	Subtest 2	9262	1852.4	22.4	0	23.5	21.0	0	22.0	21.0	0	22.0
		9400	1880.0	22.7			20.9			20.9		
		9538	1907.6	22.8			21.0			21.0		
	Subtest 3	9262	1852.4	21.4	0.5	23.0	21.0	0.5	21.5	21.1	0.5	21.5
		9400	1880.0	21.6			20.9			20.9		
		9538	1907.6	21.8			21.0			21.0		
	Subtest 4	9262	1852.4	21.7	0.5	23.0	21.0	0.5	21.5	21.1	0.5	21.5
		9400	1880.0	22.0			20.9			20.9		
		9538	1907.6	22.1			21.0			21.0		
HSUPA	Subtest 1	9262	1852.4	21.4	0	22.5	20.0	0	22.0	20.0	0	22.0
		9400	1880.0	21.6			19.9			19.9		
		9538	1907.6	21.7			20.0			20.0		
	Subtest 2	9262	1852.4	19.6	2	20.5	19.6	2	20.0	19.6	2	20.0
		9400	1880.0	19.8			19.8			19.8		
		9538	1907.6	19.9			19.9			19.9		
	Subtest 3	9262	1852.4	20.6	1	21.5	20.1	1	21.0	20.0	1	21.0
		9400	1880.0	20.7			20.0			20.0		
		9538	1907.6	20.8			20.0			20.0		
	Subtest 4	9262	1852.4	19.5	2	20.5	19.6	2	20.0	19.6	2	20.0
		9400	1880.0	19.8			19.8			19.8		
		9538	1907.6	19.9			19.9			19.9		
	Subtest 5	9262	1852.4	21.3	0	22.5	21.0	0	22.0	20.9	0	22.0
		9400	1880.0	21.6			20.9			20.9		
		9538	1907.6	21.7			20.9			20.9		
DC-HSDPA	Subtest 1	9262	1852.4	22.4	0	23.5	21.0	0	22.0	21.0	0	22.0
		9400	1880.0	22.7			20.9			20.9		
		9538	1907.6	22.7			20.9			21.0		
	Subtest 2	9262	1852.4	22.4	0	23.5	21.0	0	22.0	21.0	0	22.0
		9400	1880.0	22.7			20.9			20.9		
		9538	1907.6	22.8			20.9			21.0		
	Subtest 3	9262	1852.4	21.0	0.5	23.0	21.1	0.5	21.5	21.1	0.5	21.5
		9400	1880.0	21.2			21.0			20.9		
		9538	1907.6	21.2			21.0			21.0		
	Subtest 4	9262	1852.4	21.7	0.5	23.0	21.1	0.5	21.5	21.1	0.5	21.5
		9400	1880.0	22.0			21.0			21.0		
		9538	1907.6	22.1			21.0			21.0		

WCDMA Band IV Measured Results

Mode	UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			Reduced Average Power (dBm) Hotspot back-off			Reduced Average Power (dBm) Proximity sensor back-off			
			Measured Pwr	MPR	Tune-up Limit	Measured Pwr	MPR	Tune-up Limit	Measured Pwr	MPR	Tune-up Limit	
Release 99	Rel 99 (RMC, 12.2 kbps)	1312	1712.4	24.4	NA	25.5	21.4	NA	22.5	21.4	NA	22.5
		1413	1732.6	24.1			21.1			21.2		
		1513	1752.6	24.1			21.2			21.2		
HSDPA	Subtest 1	1312	1712.4	22.3	0	23.5	21.4	0	22.0	21.4	0	22.0
		1413	1732.6	22.0			21.1			21.2		
		1513	1752.6	22.0			21.2			21.2		
	Subtest 2	1312	1712.4	22.3	0	23.5	21.4	0	22.0	21.5	0	22.0
		1413	1732.6	22.0			21.2			21.2		
		1513	1752.6	22.1			21.2			21.2		
	Subtest 3	1312	1712.4	21.4	0.5	23.0	21.4	0.5	21.5	21.5	0.5	21.5
		1413	1732.6	21.1			21.1			21.2		
		1513	1752.6	21.2			21.2			21.2		
	Subtest 4	1312	1712.4	21.7	0.5	23.0	21.4	0.5	21.5	21.4	0.5	21.5
		1413	1732.6	21.4			21.2			21.1		
		1513	1752.6	21.5			21.3			21.2		
HSUPA	Subtest 1	1312	1712.4	21.5	0	22.5	20.4	0	21.5	20.5	0	21.5
		1413	1732.6	21.1			20.1			20.1		
		1513	1752.6	21.2			20.2			20.2		
	Subtest 2	1312	1712.4	19.3	2	20.5	19.3	2	19.5	19.3	2	19.5
		1413	1732.6	19.2			19.2			19.2		
		1513	1752.6	19.2			19.2			19.2		
	Subtest 3	1312	1712.4	21.0	1	21.5	20.5	1	20.5	20.5	1	20.5
		1413	1732.6	20.7			20.2			20.2		
		1513	1752.6	20.7			20.2			20.2		
	Subtest 4	1312	1712.4	19.3	2	20.5	19.3	2	19.5	19.3	2	19.5
		1413	1732.6	19.2			19.1			19.1		
		1513	1752.6	19.2			19.2			19.1		
	Subtest 5	1312	1712.4	21.8	0	22.5	21.4	0	21.5	21.4	0	21.5
		1413	1732.6	21.6			21.1			21.1		
		1513	1752.6	21.6			21.2			21.2		
DC-HSDPA	Subtest 1	1312	1712.4	22.4	0	23.5	21.5	0	22.0	21.5	0	22.0
		1413	1732.6	22.1			21.2			21.3		
		1513	1752.6	22.1			21.3			21.3		
	Subtest 2	1312	1712.4	22.4	0	23.5	21.5	0	22.0	21.6	0	22.0
		1413	1732.6	22.1			21.2			21.2		
		1513	1752.6	22.2			21.3			21.4		
	Subtest 3	1312	1712.4	21.1	0.5	23.0	21.5	0.5	21.5	21.1	0.5	21.5
		1413	1732.6	20.8			21.2			20.7		
		1513	1752.6	20.8			21.3			20.9		
	Subtest 4	1312	1712.4	21.9	0.5	23.0	21.5	0.5	21.5	21.4	0.5	21.5
		1413	1732.6	21.5			21.2			21.3		
		1513	1752.6	21.6			21.3			21.4		

WCDMA 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	24.8	NA	25.5
		4183	836.6	25.0		
		4233	846.6	24.8		
HSDPA	Subtest 1	4132	826.4	22.4	0	23.0
		4183	836.6	22.5		
		4233	846.6	22.4		
	Subtest 2	4132	826.4	22.4	0	23.0
		4183	836.6	22.6		
		4233	846.6	22.4		
	Subtest 3	4132	826.4	21.4	0.5	22.5
		4183	836.6	21.7		
		4233	846.6	21.5		
	Subtest 4	4132	826.4	21.7	0.5	22.5
		4183	836.6	22.0		
		4233	846.6	21.8		
HSUPA	Subtest 1	4132	826.4	21.9	0	22.5
		4183	836.6	22.1		
		4233	846.6	22.0		
	Subtest 2	4132	826.4	19.8	2	20.5
		4183	836.6	19.9		
		4233	846.6	19.8		
	Subtest 3	4132	826.4	20.8	1	21.5
		4183	836.6	21.0		
		4233	846.6	20.8		
	Subtest 4	4132	826.4	19.8	2	20.5
		4183	836.6	20.0		
		4233	846.6	19.8		
	Subtest 5	4132	826.4	21.9	0	22.5
		4183	836.6	22.1		
		4233	846.6	21.9		
DC-HSDPA	Subtest 1	4132	826.4	22.4	0	23.0
		4183	836.6	22.4		
		4233	846.6	22.3		
	Subtest 2	4132	826.4	22.4	0	23.0
		4183	836.6	22.4		
		4233	846.6	22.3		
	Subtest 3	4132	826.4	20.7	0.5	22.5
		4183	836.6	20.8		
		4233	846.6	20.7		
	Subtest 4	4132	826.4	21.7	0.5	22.5
		4183	836.6	21.7		
		4233	846.6	21.6		

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 \leq 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) in Main 1 Ant.
 - LTE Band 5 (824 – 849 MHz) is covered by LTE Band 26 (814 – 849 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.

1. Max power

LTE Band 2 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				Measured Pwr (dBm)			MPR	Tune-up Limit
				18700 1860 MHz	18900 1880 MHz	19100 1900 MHz		
20 MHz	QPSK	1	0	23.5	23.7	24.0	0.0	25.0
		1	49	23.5	23.7	24.0	0.0	25.0
		1	99	23.5	23.7	24.0	0.0	25.0
		50	0	22.5	22.8	23.0	1.0	24.0
		50	24	22.5	22.8	23.0	1.0	24.0
		50	50	22.5	22.8	23.0	1.0	24.0
	16QAM	100	0	22.6	22.8	23.0	1.0	24.0
		1	0	22.3	22.7	23.1	1.0	24.0
		1	49	22.3	22.7	23.1	1.0	24.0
		1	99	22.3	22.6	23.0	1.0	24.0
		50	0	21.6	21.8	22.0	2.0	23.0
		50	24	21.5	21.8	22.0	2.0	23.0
		50	50	21.5	21.8	22.0	2.0	23.0
		100	0	21.6	21.8	22.0	2.0	23.0
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				18675 1857.5 MHz	18900 1880 MHz	19125 1902.5 MHz		
				15 MHz	QPSK	1	0	23.5
1	37	23.4	23.7			23.9	0.0	25.0
1	74	23.5	23.7			23.9	0.0	25.0
36	0	22.6	22.8			23.0	1.0	24.0
36	20	22.5	22.8			23.0	1.0	24.0
36	39	22.5	22.8			23.0	1.0	24.0
16QAM	75	0	22.5		22.8	23.0	1.0	24.0
	1	0	22.6		22.8	23.0	1.0	24.0
	1	37	22.5		22.7	23.0	1.0	24.0
	1	74	22.5		22.7	23.0	1.0	24.0
	36	0	21.6		21.8	22.0	2.0	23.0
	36	20	21.6		21.8	22.0	2.0	23.0
		36	39	21.5	21.8	22.0	2.0	23.0
		75	0	21.6	21.8	22.0	2.0	23.0
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				18650 1855 MHz	18900 1880 MHz	19150 1905 MHz		
				10 MHz	QPSK	1	0	23.6
1	25	23.6	23.7			23.9	0.0	25.0
1	49	23.6	23.7			23.9	0.0	25.0
25	0	22.6	22.8			22.9	1.0	24.0
25	12	22.6	22.7			22.9	1.0	24.0
25	25	22.6	22.7			22.9	1.0	24.0
16QAM	50	0	22.6		22.8	22.9	1.0	24.0
	1	0	22.6		22.6	22.8	1.0	24.0
	1	25	22.6		22.6	22.7	1.0	24.0
	1	49	22.6		22.6	22.8	1.0	24.0
	25	0	21.6		21.8	22.0	2.0	23.0
	25	12	21.6		21.8	22.0	2.0	23.0
		25	25	21.6	21.8	22.0	2.0	23.0
		50	0	21.6	21.8	22.0	2.0	23.0
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				18625 1852.5 MHz	18900 1880 MHz	19175 1907.5 MHz		
				5 MHz	QPSK	1	0	23.5
1	12	23.5	23.7			23.8	0.0	25.0
1	24	23.5	23.7			23.8	0.0	25.0
12	0	22.5	22.7			22.9	1.0	24.0
12	7	22.5	22.7			22.9	1.0	24.0
12	13	22.5	22.7			22.9	1.0	24.0
16QAM	25	0	22.5		22.7	22.9	1.0	24.0
	1	0	22.4		22.7	22.8	1.0	24.0
	1	12	22.4		22.7	22.8	1.0	24.0
	1	24	22.4		22.7	22.8	1.0	24.0
	12	0	21.5		21.8	22.0	2.0	23.0
	12	7	21.5		21.7	22.0	2.0	23.0
		12	13	21.5	21.8	21.9	2.0	23.0
		25	0	21.6	21.8	21.9	2.0	23.0

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	23.5	23.7	23.9	0.0	25.0
		1	8	23.5	23.7	24.0	0.0	25.0
		1	14	23.5	23.7	24.0	0.0	25.0
		8	0	22.5	22.7	22.8	1.0	24.0
		8	4	22.5	22.7	22.8	1.0	24.0
		8	7	22.5	22.7	22.8	1.0	24.0
	16QAM	15	0	22.5	22.7	22.9	1.0	24.0
		1	0	22.3	22.6	22.8	1.0	24.0
		1	8	22.3	22.6	22.9	1.0	24.0
		1	14	22.3	22.6	22.8	1.0	24.0
		8	0	21.6	21.9	21.9	2.0	23.0
		8	4	21.6	21.9	21.9	2.0	23.0
		8	7	21.6	21.9	21.9	2.0	23.0
		15	0	21.5	21.8	21.9	2.0	23.0
		1.4 MHz	QPSK	1	0	23.6	23.8	23.9
1	3			23.5	23.8	23.8	0.0	25.0
1	5			23.6	23.9	23.9	0.0	25.0
3	0			23.5	23.7	23.8	0.0	25.0
3	1			23.5	23.7	23.9	0.0	25.0
3	3			23.5	23.7	23.8	0.0	25.0
16QAM	6		0	22.6	22.7	22.9	1.0	24.0
	1		0	22.3	22.5	22.9	1.0	24.0
	1		3	22.3	22.4	22.9	1.0	24.0
	1		5	22.4	22.5	22.9	1.0	24.0
	3		0	22.6	22.7	22.8	1.0	24.0
	3		1	22.6	22.7	22.8	1.0	24.0
	3		3	22.5	22.7	22.8	1.0	24.0
	6		0	21.6	21.9	21.8	2.0	23.0

LTE Band 12 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				Measured Pwr (dBm)			MPR	Tune-up Limit
				23060 704 MHz	23095 707.5 MHz	23130 711 MHz		
10 MHz	QPSK	1	0		24.5		0.0	25.0
		1	25		24.5		0.0	25.0
		1	49		24.5		0.0	25.0
		25	0		23.6		1.0	24.0
		25	12		23.6		1.0	24.0
	16QAM	25	25		23.6		1.0	24.0
		50	0		23.6		1.0	24.0
		1	0		23.3		1.0	24.0
		1	25		23.2		1.0	24.0
		1	49		23.3		1.0	24.0
	25	0		22.5		2.0	23.0	
	25	12		22.4		2.0	23.0	
	25	25		22.4		2.0	23.0	
	50	0		22.5		2.0	23.0	
	BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR
23035 701.5 MHz					23095 707.5 MHz	23155 713.5 MHz		
5 MHz	QPSK	1	0	24.6	24.6	24.7	0.0	25.0
		1	12	24.6	24.6	24.7	0.0	25.0
		1	24	24.6	24.6	24.7	0.0	25.0
		12	0	23.6	23.6	23.7	1.0	24.0
		12	7	23.6	23.6	23.7	1.0	24.0
	16QAM	12	13	23.6	23.6	23.7	1.0	24.0
		25	0	23.6	23.6	23.7	1.0	24.0
		1	0	23.6	23.5	23.5	1.0	24.0
		1	12	23.6	23.5	23.5	1.0	24.0
		1	24	23.6	23.5	23.5	1.0	24.0
	12	0	22.5	22.5	22.5	2.0	23.0	
	12	7	22.5	22.5	22.5	2.0	23.0	
	12	13	22.4	22.5	22.5	2.0	23.0	
	25	0	22.5	22.5	22.5	2.0	23.0	
	BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR
23025 700.5 MHz					23095 707.5 MHz	23165 714.5 MHz		
3 MHz	QPSK	1	0	24.7	24.6	24.7	0.0	25.0
		1	8	24.6	24.6	24.7	0.0	25.0
		1	14	24.6	24.6	24.7	0.0	25.0
		8	0	23.6	23.6	23.6	1.0	24.0
		8	4	23.6	23.6	23.6	1.0	24.0
	16QAM	8	7	23.6	23.6	23.6	1.0	24.0
		15	0	23.6	23.6	23.6	1.0	24.0
		1	0	23.4	23.5	23.6	1.0	24.0
		1	8	23.4	23.5	23.6	1.0	24.0
		1	14	23.4	23.6	23.6	1.0	24.0
	8	0	22.4	22.6	22.5	2.0	23.0	
	8	4	22.4	22.6	22.5	2.0	23.0	
	8	7	22.4	22.6	22.5	2.0	23.0	
	15	0	22.5	22.5	22.5	2.0	23.0	
	BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR
23017 699.7 MHz					23095 707.5 MHz	23173 715.3 MHz		
1.4 MHz	QPSK	1	0	24.7	24.7	24.7	0.0	25.0
		1	3	24.7	24.7	24.7	0.0	25.0
		1	5	24.7	24.7	24.8	0.0	25.0
		3	0	24.6	24.6	24.6	0.0	25.0
		3	1	24.6	24.6	24.6	0.0	25.0
	16QAM	3	3	24.6	24.6	24.6	0.0	25.0
		6	0	23.7	23.6	23.6	1.0	24.0
		1	0	23.7	23.6	23.5	1.0	24.0
		1	3	23.7	23.5	23.5	1.0	24.0
		1	5	23.8	23.5	23.6	1.0	24.0
	3	0	23.6	23.6	23.7	1.0	24.0	
	3	1	23.6	23.6	23.7	1.0	24.0	
	3	3	23.6	23.6	23.7	1.0	24.0	
	6	0	22.7	22.6	22.4	2.0	23.0	

LTE Band 13 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				Measured Pwr (dBm)			MPR	Tune-up Limit
				23230	782 MHz			
10 MHz	QPSK	1	0					
		1	25					
		1	49					
		25	0					
		25	12					
		25	25					
		50	0					
	16QAM	1	0					
		1	25					
		1	49					
		25	0					
		25	12					
		25	25					
		50	0					
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				23205	23230	23255		
				779.5 MHz	782 MHz	784.5 MHz		
5 MHz	QPSK	1	0					
		1	12					
		1	24					
		12	0					
		12	7					
		12	13					
		25	0					
	16QAM	1	0					
		1	12					
		1	24					
		12	0					
		12	7					
		12	13					
		25	0					

LTE Band 26 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)						MPR	Tune-up Limit
				Measured Pwr (dBm)				MPR	Tune-up Limit		
				26765 821.5 MHz	26790 824 MHz	26865 831.5 MHz	26965 841.5 MHz				
15 MHz	QPSK	1	0	24.4	24.5	24.8	24.8	0.0	25.5		
		1	37	24.3	24.5	24.8	24.8	0.0	25.5		
		1	74	24.2	24.4	24.7	24.7	0.0	25.5		
		36	0	23.4	23.6	23.9	23.9	1.0	24.5		
		36	20	23.4	23.5	23.9	23.9	1.0	24.5		
		36	39	23.3	23.5	23.8	23.8	1.0	24.5		
		75	0	23.4	23.5	23.9	23.9	1.0	24.5		
	16QAM	1	0	23.3	23.3	23.8	23.8	1.0	24.5		
		1	37	23.3	23.3	23.7	23.7	1.0	24.5		
		1	74	23.2	23.2	23.7	23.7	1.0	24.5		
		36	0	22.3	22.5	22.9	22.9	2.0	23.5		
		36	20	22.3	22.5	22.8	22.8	2.0	23.5		
		36	39	22.3	22.4	22.8	22.8	2.0	23.5		
		75	0	22.3	22.5	22.8	22.8	2.0	23.5		
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)				MPR	Tune-up Limit		
				26740 819 MHz	26790 824 MHz	26865 831.5 MHz	26990 844 MHz				
				26740 819 MHz	26790 824 MHz	26865 831.5 MHz	26990 844 MHz				
10 MHz	QPSK	1	0	25.0	24.6	25.0	24.8	0.0	25.5		
		1	25	25.0	24.5	25.0	24.8	0.0	25.5		
		1	49	25.0	24.5	24.9	24.8	0.0	25.5		
		25	0	23.9	23.5	23.9	23.8	1.0	24.5		
		25	12	23.9	23.5	23.9	23.8	1.0	24.5		
		25	25	23.9	23.5	23.9	23.8	1.0	24.5		
		50	0	23.9	23.5	23.9	23.8	1.0	24.5		
	16QAM	1	0	23.6	23.6	23.8	23.6	1.0	24.5		
		1	25	23.6	23.6	23.7	23.5	1.0	24.5		
		1	49	23.5	23.5	23.7	23.5	1.0	24.5		
		25	0	22.9	22.6	22.9	22.8	2.0	23.5		
		25	12	22.9	22.5	22.9	22.8	2.0	23.5		
		25	25	22.9	22.5	22.8	22.8	2.0	23.5		
		50	0	22.9	22.4	22.9	22.8	2.0	23.5		
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)				MPR	Tune-up Limit		
				26715 816.5 MHz	26790 824 MHz	26865 831.5 MHz	27015 846.5 MHz				
				26715 816.5 MHz	26790 824 MHz	26865 831.5 MHz	27015 846.5 MHz				
5 MHz	QPSK	1	0	24.8	24.5	24.9	24.9	0.0	25.5		
		1	12	24.8	24.5	24.9	24.9	0.0	25.5		
		1	24	24.8	24.4	24.9	24.8	0.0	25.5		
		12	0	23.8	23.5	23.9	23.8	1.0	24.5		
		12	7	23.8	23.5	23.9	23.8	1.0	24.5		
		12	13	23.8	23.5	23.9	23.8	1.0	24.5		
		25	0	23.8	23.5	23.9	23.8	1.0	24.5		
	16QAM	1	0	23.4	23.4	23.6	23.7	1.0	24.5		
		1	12	23.4	23.4	23.6	23.7	1.0	24.5		
		1	24	23.4	23.4	23.6	23.7	1.0	24.5		
		12	0	22.7	22.4	22.9	22.8	2.0	23.5		
		12	7	22.8	22.4	22.9	22.8	2.0	23.5		
		12	13	22.7	22.4	22.9	22.8	2.0	23.5		
		25	0	22.8	22.4	22.9	22.7	2.0	23.5		
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)				MPR	Tune-up Limit		
				26705 815.5 MHz	26790 824 MHz	26865 831.5 MHz	27025 847.5 MHz				
				26705 815.5 MHz	26790 824 MHz	26865 831.5 MHz	27025 847.5 MHz				
3 MHz	QPSK	1	0	24.9	24.6	24.9	24.9	0.0	25.5		
		1	8	24.9	24.6	24.9	24.9	0.0	25.5		
		1	14	24.9	24.6	24.9	24.9	0.0	25.5		
		8	0	23.8	23.5	23.9	23.8	1.0	24.5		
		8	4	23.8	23.5	23.9	23.8	1.0	24.5		
		8	7	23.8	23.5	23.9	23.8	1.0	24.5		
		15	0	23.8	23.5	23.9	23.8	1.0	24.5		
	16QAM	1	0	23.4	23.6	23.6	23.7	1.0	24.5		
		1	8	23.4	23.6	23.6	23.7	1.0	24.5		
		1	14	23.4	23.5	23.5	23.6	1.0	24.5		
		8	0	22.7	22.5	22.9	22.8	2.0	23.5		
		8	4	22.7	22.5	22.9	22.7	2.0	23.5		
		8	7	22.8	22.5	22.9	22.7	2.0	23.5		
		15	0	22.8	22.5	22.9	22.7	2.0	23.5		

Notes:

For Orange box's output power results, There are measured for the test of Part.90.

LTE Band 26 Measured Results (Continued)

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pw r (dBm)				MPR	Tune-up Limit
				26697	26790	26865	27033		
				814.7 MHz	824 MHz	831.5 MHz	848.3 MHz		
1.4 MHz	QPSK	1	0	24.9	24.5	25.0	24.9	0.0	25.5
		1	3	24.9	24.5	24.9	24.8	0.0	25.5
		1	5	24.9	24.5	24.9	24.9	0.0	25.5
		3	0	24.8	24.4	24.9	24.8	0.0	25.5
		3	1	24.8	24.5	24.9	24.8	0.0	25.5
		3	3	24.8	24.4	24.9	24.8	0.0	25.5
	16QAM	6	0	23.8	23.5	23.9	23.8	1.0	24.5
		1	0	23.7	23.4	23.6	23.8	1.0	24.5
		1	3	23.6	23.4	23.6	23.8	1.0	24.5
		1	5	23.7	23.4	23.6	23.8	1.0	24.5
		3	0	23.8	23.5	23.9	23.7	1.0	24.5
		3	1	23.8	23.5	24.0	23.7	1.0	24.5
		3	3	23.8	23.5	24.0	23.7	1.0	24.5
		6	0	22.9	22.5	22.9	22.6	2.0	23.5

Notes:

For Orange box's output power results, There are measured for the test of Part.90.

LTE Band 66 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				Measured Pwr (dBm)			MPR	Tune-up Limit
				132072 1720 MHz	132322 1745 MHz	132572 1770 MHz		
20 MHz	QPSK	1	0	24.6	25.0	25.0	0.0	25.5
		1	49	24.5	24.9	24.9	0.0	25.5
		1	99	24.5	24.9	24.9	0.0	25.5
		50	0	23.5	23.9	24.0	1.0	24.5
		50	24	23.5	23.9	23.9	1.0	24.5
		50	50	23.5	23.9	23.9	1.0	24.5
	16QAM	100	0	23.5	23.9	23.9	1.0	24.5
		1	0	23.3	23.9	24.0	1.0	24.5
		1	49	23.2	23.8	24.0	1.0	24.5
		1	99	23.2	23.8	23.9	1.0	24.5
		50	0	22.5	22.9	22.9	2.0	23.5
		50	24	22.4	22.8	22.9	2.0	23.5
		50	50	22.4	22.8	22.8	2.0	23.5
		100	0	22.5	22.9	22.9	2.0	23.5
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				132047 1717.5 MHz	132322 1745 MHz	132597 1772.5 MHz		
				15 MHz	QPSK	1	0	24.6
1	37	24.6	24.9			24.9	0.0	25.5
1	74	24.5	24.8			24.9	0.0	25.5
36	0	23.5	23.9			23.9	1.0	24.5
36	20	23.5	23.9			23.9	1.0	24.5
36	39	23.5	23.9			23.9	1.0	24.5
16QAM	1	37	23.3		23.7	24.0	1.0	24.5
	1	74	23.3		23.7	23.9	1.0	24.5
	36	0	22.5		22.8	22.9	2.0	23.5
	36	20	22.4		22.8	22.9	2.0	23.5
	36	39	22.4		22.8	22.8	2.0	23.5
	75	0	22.4		22.8	22.8	2.0	23.5
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				132022 1715 MHz	132322 1745 MHz	132622 1775 MHz		
				10 MHz	QPSK	1	0	24.5
1	25	24.5	24.9			24.8	0.0	25.5
1	49	24.5	24.9			24.8	0.0	25.5
25	0	23.5	23.9			23.8	1.0	24.5
25	12	23.4	23.9			23.8	1.0	24.5
25	25	23.4	23.8			23.8	1.0	24.5
16QAM	50	0	23.4		23.9	23.8	1.0	24.5
	1	0	23.3		23.9	23.8	1.0	24.5
	1	25	23.3		23.8	23.7	1.0	24.5
	1	49	23.3		23.8	23.7	1.0	24.5
	25	0	22.5		22.8	22.8	2.0	23.5
	25	12	22.5		22.8	22.8	2.0	23.5
		25	25	22.5	22.8	22.8	2.0	23.5
		50	0	22.5	22.8	22.7	2.0	23.5
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				131997 1712.5 MHz	132322 1745 MHz	132647 1777.5 MHz		
				5 MHz	QPSK	1	0	24.5
1	12	24.5	24.9			24.9	0.0	25.5
1	24	24.5	24.9			24.8	0.0	25.5
12	0	23.4	23.9			23.8	1.0	24.5
12	7	23.4	23.9			23.8	1.0	24.5
12	13	23.4	23.9			23.8	1.0	24.5
16QAM	25	0	23.4		23.8	23.8	1.0	24.5
	1	0	23.2		23.9	23.7	1.0	24.5
	1	12	23.2		23.9	23.7	1.0	24.5
	1	24	23.2		23.9	23.7	1.0	24.5
	12	0	22.4		22.8	22.8	2.0	23.5
	12	7	22.4		22.8	22.8	2.0	23.5
		12	13	22.3	22.8	22.8	2.0	23.5
		25	0	22.4	22.8	22.7	2.0	23.5

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	24.6	25.0	25.0	0.0	25.5
		1	8	24.6	25.0	25.0	0.0	25.5
		1	14	24.6	25.0	25.0	0.0	25.5
		8	0	23.5	24.0	23.9	1.0	24.5
		8	4	23.5	24.0	23.9	1.0	24.5
		8	7	23.5	24.0	23.9	1.0	24.5
	16QAM	15	0	23.5	24.0	23.9	1.0	24.5
		1	0	23.6	23.7	23.7	1.0	24.5
		1	8	23.6	23.7	23.7	1.0	24.5
		1	14	23.6	23.7	23.7	1.0	24.5
		8	0	22.5	23.0	22.8	2.0	23.5
		8	4	22.5	23.0	22.8	2.0	23.5
		8	7	22.5	23.0	22.8	2.0	23.5
		15	0	22.5	22.9	22.9	2.0	23.5
		15	0	22.5	22.9	22.9	2.0	23.5
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	24.6	25.1	25.0	0.0	25.5
		1	3	24.6	25.1	25.0	0.0	25.5
		1	5	24.6	25.1	25.0	0.0	25.5
		3	0	24.6	25.0	24.9	0.0	25.5
		3	1	24.6	25.0	24.9	0.0	25.5
		3	3	24.6	25.0	24.9	0.0	25.5
	16QAM	6	0	23.5	24.0	23.9	1.0	24.5
		1	0	23.6	23.8	23.9	1.0	24.5
		1	3	23.6	23.8	23.8	1.0	24.5
		1	5	23.6	23.9	23.8	1.0	24.5
		3	0	23.5	24.0	23.9	1.0	24.5
		3	1	23.5	24.0	23.9	1.0	24.5
		3	3	23.5	24.0	23.9	1.0	24.5
		6	0	22.4	23.0	22.9	2.0	23.5
		6	0	22.4	23.0	22.9	2.0	23.5

LTE Band 41 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)							MFR	Tune-up Limit
				Measured Pwr (dBm)								
				39750	40185	40620	41055	41490				
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz				
20 MHz	QPSK	1	0	23.1	23.5	24.3	23.2	22.6	0.0	24.5		
		1	49	23.0	23.5	24.2	23.2	22.6	0.0	24.5		
		1	99	23.1	23.6	24.2	23.1	22.6	0.0	24.5		
		50	0	22.1	22.6	23.2	22.2	21.6	1.0	23.5		
		50	24	22.1	22.6	23.1	22.2	21.6	1.0	23.5		
	16QAM	100	0	22.1	22.6	23.1	22.2	21.6	1.0	23.5		
		1	0	21.9	22.5	23.1	22.4	21.4	1.0	23.5		
		1	49	22.2	22.6	23.0	22.0	21.6	1.0	23.5		
		1	99	22.1	22.7	22.8	21.8	21.4	1.0	23.5		
		50	0	21.2	21.7	22.3	21.3	20.7	2.0	22.5		
				50	24	21.1	21.7	22.3	21.3	20.7	2.0	22.5
				50	50	21.1	21.7	22.2	21.3	20.6	2.0	22.5
				100	0	21.2	21.7	22.2	21.3	20.7	2.0	22.5
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)					MFR	Tune-up Limit		
				Measured Pwr (dBm)								
				39750	40185	40620	41055	41490				
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz				
15 MHz	QPSK	1	0	23.1	23.6	24.2	23.2	22.7	0.0	24.5		
		1	37	23.1	23.6	24.1	23.2	22.6	0.0	24.5		
		1	74	23.1	23.5	24.1	23.1	22.5	0.0	24.5		
		36	0	22.2	22.7	23.2	22.3	21.7	1.0	23.5		
		36	20	22.1	22.6	23.2	22.3	21.7	1.0	23.5		
	16QAM	36	39	22.1	22.7	23.2	22.2	21.7	1.0	23.5		
		75	0	22.1	22.7	23.2	22.2	21.7	1.0	23.5		
		1	0	22.0	22.5	23.0	22.0	21.7	1.0	23.5		
		1	37	21.7	22.6	23.2	21.8	21.4	1.0	23.5		
		1	74	21.8	22.8	23.3	21.9	21.8	1.0	23.5		
				36	0	21.1	21.8	22.3	21.4	20.8	2.0	22.5
				36	20	21.2	21.8	22.3	21.3	20.7	2.0	22.5
				36	39	21.1	21.8	22.2	21.3	20.7	2.0	22.5
				75	0	21.1	21.8	22.3	21.3	20.7	2.0	22.5
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)					MFR	Tune-up Limit		
				Measured Pwr (dBm)								
				39750	40185	40620	41055	41490				
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz				
10 MHz	QPSK	1	0	23.0	23.6	24.2	23.2	22.6	0.0	24.5		
		1	25	23.0	23.6	24.1	23.2	22.6	0.0	24.5		
		1	49	23.0	23.6	24.1	23.2	22.5	0.0	24.5		
		25	0	22.1	22.6	23.2	22.2	21.6	1.0	23.5		
		25	12	22.1	22.6	23.2	22.2	21.6	1.0	23.5		
	16QAM	25	25	22.1	22.6	23.2	22.2	21.6	1.0	23.5		
		50	0	22.1	22.6	23.2	22.2	21.6	1.0	23.5		
		1	0	21.9	22.8	23.0	22.0	21.7	1.0	23.5		
		1	25	21.9	22.8	23.0	22.0	21.7	1.0	23.5		
		1	49	21.9	22.8	22.9	22.0	21.7	1.0	23.5		
				25	0	21.2	21.8	22.3	21.3	20.7	2.0	22.5
				25	12	21.2	21.8	22.2	21.3	20.7	2.0	22.5
				25	25	21.1	21.8	22.2	21.3	20.7	2.0	22.5
				50	0	21.2	21.7	22.3	21.3	20.6	2.0	22.5
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)					MFR	Tune-up Limit		
				Measured Pwr (dBm)								
				39750	40185	40620	41055	41490				
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz				
5 MHz	QPSK	1	0	23.0	23.6	24.2	23.2	22.5	0.0	24.5		
		1	12	23.0	23.6	24.2	23.2	22.6	0.0	24.5		
		1	24	23.0	23.6	24.1	23.1	22.5	0.0	24.5		
		12	0	22.1	22.6	23.2	22.2	21.6	1.0	23.5		
		12	7	22.1	22.6	23.2	22.2	21.6	1.0	23.5		
	16QAM	12	13	22.1	22.6	23.2	22.2	21.6	1.0	23.5		
		25	0	22.1	22.6	23.2	22.2	21.6	1.0	23.5		
		1	0	22.0	22.3	23.1	22.2	21.3	1.0	23.5		
		1	12	22.0	22.3	23.1	22.2	21.3	1.0	23.5		
		12	0	21.0	21.6	22.3	21.2	20.5	2.0	22.5		
				12	7	21.0	21.6	22.3	21.2	20.5	2.0	22.5
				12	13	21.0	21.6	22.3	21.2	20.5	2.0	22.5
				25	0	21.1	21.8	22.3	21.2	20.6	2.0	22.5

2. Reduced power

LTE Band 2 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Reduced Average Power (dBm) Hotspot back-off					Reduced Average Power (dBm) Proximity sensor back-off				
				Measured Pw r (dBm)			MPR	Tune-up Limit	Measured Pw r (dBm)			MPR	Tune-up Limit
				18700	18900	19100			18700	18900	19100		
				1860 MHz	1880 MHz	1900 MHz			1860 MHz	1880 MHz	1900 MHz		
20 MHz	QPSK	1	0	21.0	21.2	21.3	0.0	22.0	21.1	21.4	21.4	0.0	22.0
		1	49	21.0	21.2	21.2	0.0	22.0	21.1	21.3	21.4	0.0	22.0
		1	99	21.0	21.2	21.2	0.0	22.0	21.1	21.3	21.4	0.0	22.0
		50	0	21.0	21.2	21.3	0.0	22.0	21.1	21.4	21.4	0.0	22.0
		50	24	21.0	21.2	21.2	0.0	22.0	21.1	21.4	21.4	0.0	22.0
		50	50	21.0	21.2	21.2	0.0	22.0	21.1	21.3	21.4	0.0	22.0
	16QAM	100	0	21.0	21.2	21.2	0.0	22.0	21.1	21.4	21.4	0.0	22.0
		1	0	21.0	21.0	21.2	0.0	22.0	21.2	21.5	21.4	0.0	22.0
		1	49	21.0	21.0	21.2	0.0	22.0	21.1	21.4	21.3	0.0	22.0
		1	99	21.0	21.0	21.2	0.0	22.0	21.1	21.4	21.3	0.0	22.0
		50	0	21.0	21.2	21.3	0.0	22.0	21.1	21.4	21.4	0.0	22.0
		50	24	21.0	21.2	21.2	0.0	22.0	21.1	21.4	21.3	0.0	22.0
15 MHz	QPSK	1	0	21.1	21.3	21.3	0.0	22.0	21.1	21.2	21.3	0.0	22.0
		1	37	21.1	21.3	21.2	0.0	22.0	21.1	21.2	21.3	0.0	22.0
		1	74	21.1	21.3	21.3	0.0	22.0	21.1	21.2	21.2	0.0	22.0
		36	0	21.1	21.3	21.3	0.0	22.0	21.1	21.3	21.3	0.0	22.0
		36	20	21.1	21.3	21.3	0.0	22.0	21.1	21.3	21.3	0.0	22.0
		36	39	21.1	21.3	21.3	0.0	22.0	21.1	21.3	21.3	0.0	22.0
	16QAM	75	0	21.1	21.3	21.3	0.0	22.0	21.1	21.3	21.3	0.0	22.0
		1	0	21.0	21.1	21.2	0.0	22.0	20.9	21.3	21.2	0.0	22.0
		1	37	21.0	21.1	21.2	0.0	22.0	20.9	21.3	21.2	0.0	22.0
		1	74	21.0	21.1	21.2	0.0	22.0	20.9	21.3	21.2	0.0	22.0
		36	0	21.1	21.3	21.3	0.0	22.0	21.1	21.3	21.3	0.0	22.0
		36	20	21.1	21.3	21.3	0.0	22.0	21.1	21.3	21.3	0.0	22.0
10 MHz	QPSK	1	0	21.1	21.3	21.1	0.0	22.0	21.2	21.2	21.2	0.0	22.0
		1	25	21.1	21.3	21.1	0.0	22.0	21.1	21.3	21.2	0.0	22.0
		1	49	21.1	21.2	21.2	0.0	22.0	21.2	21.3	21.2	0.0	22.0
		25	0	21.1	21.3	21.2	0.0	22.0	21.1	21.3	21.2	0.0	22.0
		25	12	21.1	21.3	21.2	0.0	22.0	21.1	21.3	21.2	0.0	22.0
		25	25	21.1	21.3	21.2	0.0	22.0	21.1	21.3	21.2	0.0	22.0
	16QAM	50	0	21.1	21.3	21.2	0.0	22.0	21.1	21.3	21.2	0.0	22.0
		1	0	20.9	21.1	21.2	0.0	22.0	21.0	21.0	20.9	0.0	22.0
		1	25	20.9	21.0	21.1	0.0	22.0	20.9	21.0	20.9	0.0	22.0
		1	49	20.9	21.0	21.1	0.0	22.0	20.9	21.0	20.9	0.0	22.0
		25	0	21.2	21.3	21.2	0.0	22.0	21.2	21.4	21.3	0.0	22.0
		25	12	21.2	21.3	21.2	0.0	22.0	21.2	21.3	21.3	0.0	22.0
5 MHz	QPSK	25	25	21.2	21.3	21.2	0.0	22.0	21.2	21.3	21.3	0.0	22.0
		50	0	21.1	21.3	21.2	0.0	22.0	21.1	21.3	21.2	0.0	22.0
		1	0	21.0	21.2	21.3	0.0	22.0	20.9	21.1	21.1	0.0	22.0
		1	12	21.0	21.2	21.3	0.0	22.0	20.9	21.1	21.1	0.0	22.0
		1	24	21.0	21.2	21.3	0.0	22.0	21.0	21.1	21.1	0.0	22.0
		12	0	21.1	21.3	21.3	0.0	22.0	21.1	21.3	21.2	0.0	22.0
	16QAM	12	7	21.2	21.3	21.2	0.0	22.0	21.1	21.3	21.2	0.0	22.0
		12	13	21.1	21.3	21.2	0.0	22.0	21.1	21.3	21.2	0.0	22.0
		25	0	21.2	21.3	21.2	0.0	22.0	21.1	21.3	21.2	0.0	22.0
		1	0	21.0	21.2	21.3	0.0	22.0	20.9	21.1	21.1	0.0	22.0
		1	12	21.0	21.2	21.3	0.0	22.0	20.9	21.1	21.1	0.0	22.0
		1	24	21.0	21.2	21.3	0.0	22.0	21.0	21.1	21.1	0.0	22.0

LTE Band 2 Measured Results (Continued)

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit	Measured Pwr (dBm)			MPR	Tune-up Limit
				18615	18900	19185			18615	18900	19185		
				1851.5 MHz	1880 MHz	1908.5 MHz			1851.5 MHz	1880 MHz	1908.5 MHz		
3 MHz	QPSK	1	0	21.1	21.3	21.3	0.0	22.0	21.1	21.3	21.2	0.0	22.0
		1	8	21.1	21.3	21.3	0.0	22.0	21.1	21.3	21.3	0.0	22.0
		1	14	21.2	21.3	21.3	0.0	22.0	21.1	21.3	21.3	0.0	22.0
		8	0	21.1	21.2	21.2	0.0	22.0	21.1	21.3	21.2	0.0	22.0
		8	4	21.1	21.2	21.2	0.0	22.0	21.1	21.3	21.2	0.0	22.0
		8	7	21.1	21.2	21.2	0.0	22.0	21.1	21.3	21.2	0.0	22.0
	16QAM	15	0	21.1	21.3	21.3	0.0	22.0	21.2	21.3	21.2	0.0	22.0
		1	0	20.8	21.1	20.9	0.0	22.0	21.0	21.1	21.1	0.0	22.0
		1	8	20.9	21.0	20.9	0.0	22.0	21.0	21.1	21.0	0.0	22.0
		1	14	20.9	21.0	20.9	0.0	22.0	21.0	21.1	21.0	0.0	22.0
		8	0	21.1	21.2	21.2	0.0	22.0	21.1	21.1	21.2	0.0	22.0
		8	4	21.2	21.2	21.2	0.0	22.0	21.1	21.2	21.2	0.0	22.0
		8	7	21.1	21.2	21.2	0.0	22.0	21.1	21.2	21.2	0.0	22.0
		15	0	21.2	21.2	21.2	0.0	22.0	21.1	21.2	21.2	0.0	22.0
		1.4 MHz	QPSK	1	0	21.1	21.3	21.2	0.0	22.0	21.2	21.3	21.2
1	3			21.1	21.3	21.2	0.0	22.0	21.2	21.2	21.2	0.0	22.0
1	5			21.1	21.3	21.2	0.0	22.0	21.2	21.2	21.2	0.0	22.0
3	0			21.1	21.2	21.1	0.0	22.0	21.1	21.2	21.2	0.0	22.0
3	1			21.1	21.2	21.1	0.0	22.0	21.2	21.2	21.2	0.0	22.0
3	3			21.1	21.2	21.2	0.0	22.0	21.2	21.2	21.2	0.0	22.0
16QAM	6		0	21.1	21.2	21.2	0.0	22.0	21.2	21.2	21.2	0.0	22.0
	1		0	21.1	21.1	21.0	0.0	22.0	21.2	21.0	21.0	0.0	22.0
	1		3	21.1	21.1	20.9	0.0	22.0	21.2	21.0	20.9	0.0	22.0
	1		5	21.1	21.1	21.0	0.0	22.0	21.2	21.0	21.0	0.0	22.0
	3		0	21.2	21.2	21.0	0.0	22.0	21.1	21.2	21.2	0.0	22.0
	3		1	21.2	21.2	21.0	0.0	22.0	21.1	21.2	21.2	0.0	22.0
	3		3	21.2	21.2	21.0	0.0	22.0	21.1	21.2	21.2	0.0	22.0
	6		0	21.0	21.2	21.1	0.0	22.0	21.2	21.3	21.3	0.0	22.0

LTE Band 66 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Reduced Average Power (dBm) Hotspot back-off					Reduced Average Power (dBm) Proximity sensor back-off						
				Measured Pw r (dBm)			MPR	Tune-up Limit	Measured Pw r (dBm)			MPR	Tune-up Limit		
				132072 1720 MHz	132322 1745 MHz	132572 1770 MHz			132072 1720 MHz	132322 1745 MHz	132572 1770 MHz				
20 MHz	QPSK	1	0	21.5	21.8	22.1	0.0	22.5	21.4	21.9	22.0	0.0	22.5		
		1	49	21.4	21.7	21.9	0.0	22.5	21.4	21.8	21.9	0.0	22.5		
		1	99	21.4	21.7	21.9	0.0	22.5	21.4	21.9	21.9	0.0	22.5		
		50	0	21.5	21.8	21.9	0.0	22.5	21.5	21.8	21.9	0.0	22.5		
		50	24	21.4	21.8	21.8	0.0	22.5	21.5	21.8	21.9	0.0	22.5		
		50	50	21.4	21.8	21.8	0.0	22.5	21.5	21.8	21.9	0.0	22.5		
	16QAM	100	0	21.5	21.7	21.8	0.0	22.5	21.5	21.9	21.9	0.0	22.5		
		1	0	21.3	21.6	21.9	0.0	22.5	21.6	21.9	21.7	0.0	22.5		
		1	49	21.2	21.6	21.8	0.0	22.5	21.5	21.8	21.7	0.0	22.5		
		1	99	21.2	21.6	21.8	0.0	22.5	21.5	21.8	21.6	0.0	22.5		
		50	0	21.4	21.8	21.8	0.0	22.5	21.5	21.8	21.9	0.0	22.5		
		50	24	21.4	21.8	21.8	0.0	22.5	21.4	21.8	21.9	0.0	22.5		
		50	50	21.4	21.8	21.8	0.0	22.5	21.4	21.8	21.8	0.0	22.5		
		100	0	21.4	21.9	21.9	0.0	22.5	21.5	21.8	21.9	0.0	22.5		
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pw r (dBm)			MPR	Tune-up Limit	Measured Pw r (dBm)			MPR	Tune-up Limit		
				132047 1717.5 MHz	132322 1745 MHz	132597 1772.5 MHz			132047 1717.5 MHz	132322 1745 MHz	132597 1772.5 MHz				
				15 MHz	QPSK	1	0	21.5	21.9	22.0	0.0	22.5	21.6	21.9	21.9
1	37	21.5	21.8			21.9	0.0	22.5	21.5	21.8	21.9	0.0	22.5		
1	74	21.5	21.8			21.9	0.0	22.5	21.5	21.8	21.9	0.0	22.5		
36	0	21.6	21.9			21.9	0.0	22.5	21.5	21.9	21.9	0.0	22.5		
36	20	21.6	21.9			21.9	0.0	22.5	21.5	21.9	21.9	0.0	22.5		
36	39	21.5	21.9			21.9	0.0	22.5	21.5	21.9	21.9	0.0	22.5		
16QAM	1	37	21.3		21.9	21.9	0.0	22.5	21.5	21.7	21.7	0.0	22.5		
	1	74	21.3		21.9	21.9	0.0	22.5	21.4	21.7	21.7	0.0	22.5		
	36	0	21.5		21.9	22.0	0.0	22.5	21.6	21.9	21.9	0.0	22.5		
	36	20	21.5		21.9	21.9	0.0	22.5	21.6	21.9	21.9	0.0	22.5		
	36	39	21.5		21.9	21.9	0.0	22.5	21.6	21.9	21.8	0.0	22.5		
	75	0	21.5		21.9	21.9	0.0	22.5	21.6	21.9	21.9	0.0	22.5		
	BW (MHz)	Mode	RB Allocation		RB offset	Measured Pw r (dBm)			MPR	Tune-up Limit	Measured Pw r (dBm)			MPR	Tune-up Limit
						132022 1715 MHz	132322 1745 MHz	132622 1775 MHz			132022 1715 MHz	132322 1745 MHz	132622 1775 MHz		
10 MHz				QPSK		1	0	21.5	21.9	21.9	0.0	22.5	21.5	21.8	21.9
	1	25	21.5		21.8	21.8	0.0	22.5	21.5	21.8	21.8	0.0	22.5		
	1	49	21.5		21.9	21.8	0.0	22.5	21.5	21.8	21.8	0.0	22.5		
	25	0	21.5		21.9	21.9	0.0	22.5	21.5	21.9	21.9	0.0	22.5		
	25	12	21.5		21.9	21.9	0.0	22.5	21.5	21.9	21.9	0.0	22.5		
	25	25	21.5		21.9	21.9	0.0	22.5	21.5	21.9	21.8	0.0	22.5		
	16QAM	50	0	21.5	21.9	21.9	0.0	22.5	21.5	21.9	21.9	0.0	22.5		
		1	0	21.4	21.9	21.9	0.0	22.5	21.3	21.8	21.9	0.0	22.5		
		1	25	21.4	21.9	21.8	0.0	22.5	21.3	21.8	21.8	0.0	22.5		
		1	49	21.3	21.9	21.8	0.0	22.5	21.3	21.8	21.8	0.0	22.5		
		25	0	21.6	21.9	21.9	0.0	22.5	21.5	21.9	21.9	0.0	22.5		
		25	12	21.6	21.9	21.9	0.0	22.5	21.5	21.9	21.9	0.0	22.5		
		25	25	21.6	21.8	21.9	0.0	22.5	21.5	21.9	21.9	0.0	22.5		
		50	0	21.5	21.9	21.8	0.0	22.5	21.5	21.9	21.9	0.0	22.5		
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pw r (dBm)			MPR	Tune-up Limit	Measured Pw r (dBm)			MPR	Tune-up Limit		
				131997 1712.5 MHz	132322 1745 MHz	132647 1777.5 MHz			131997 1712.5 MHz	132322 1745 MHz	132647 1777.5 MHz				
				5 MHz	QPSK	1	0	21.4	21.8	21.8	0.0	22.5	21.5	21.8	21.8
1	12	21.4	21.8			21.8	0.0	22.5	21.4	21.8	21.8	0.0	22.5		
1	24	21.4	21.8			21.8	0.0	22.5	21.4	21.8	21.8	0.0	22.5		
12	0	21.5	21.9			21.8	0.0	22.5	21.5	21.9	21.8	0.0	22.5		
12	7	21.4	21.8			21.8	0.0	22.5	21.5	21.9	21.8	0.0	22.5		
12	13	21.4	21.9			21.8	0.0	22.5	21.5	21.9	21.8	0.0	22.5		
16QAM	25	0	21.4		21.9	21.8	0.0	22.5	21.5	21.9	21.8	0.0	22.5		
	1	0	21.4		21.6	21.8	0.0	22.5	21.5	21.7	21.8	0.0	22.5		
	1	12	21.4		21.6	21.8	0.0	22.5	21.5	21.7	21.8	0.0	22.5		
	1	24	21.4		21.6	21.8	0.0	22.5	21.5	21.7	21.8	0.0	22.5		
	12	0	21.5		21.9	21.9	0.0	22.5	21.5	21.9	21.8	0.0	22.5		
	12	7	21.5		21.9	21.8	0.0	22.5	21.5	21.9	21.8	0.0	22.5		
	12	13	21.4		21.9	21.9	0.0	22.5	21.5	21.9	21.8	0.0	22.5		
	25	0	21.4		21.9	21.8	0.0	22.5	21.4	21.9	21.8	0.0	22.5		

LTE Band 66 Measured Results (Continued)

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pw r (dBm)			MPR	Tune-up Limit	Measured Pw r (dBm)			MPR	Tune-up Limit
				131987	132322	132657			131987	132322	132657		
				1711.5 MHz	1745 MHz	1778.5 MHz			1711.5 MHz	1745 MHz	1778.5 MHz		
3 MHz	QPSK	1	0	21.5	21.9	21.9	0.0	22.5	21.6	21.9	21.9	0.0	22.5
		1	8	21.5	21.9	21.9	0.0	22.5	21.5	21.9	21.9	0.0	22.5
		1	14	21.5	21.9	21.9	0.0	22.5	21.5	21.9	21.8	0.0	22.5
		8	0	21.5	21.9	21.8	0.0	22.5	21.4	21.9	21.8	0.0	22.5
		8	4	21.4	21.8	21.8	0.0	22.5	21.5	21.9	21.8	0.0	22.5
		8	7	21.5	21.9	21.8	0.0	22.5	21.4	21.9	21.8	0.0	22.5
	16QAM	15	0	21.5	21.9	21.8	0.0	22.5	21.5	21.8	21.9	0.0	22.5
		1	0	21.2	21.7	21.8	0.0	22.5	21.4	21.8	21.6	0.0	22.5
		1	8	21.1	21.7	21.9	0.0	22.5	21.4	21.8	21.5	0.0	22.5
		1	14	21.1	21.7	21.8	0.0	22.5	21.4	21.8	21.5	0.0	22.5
		8	0	21.4	21.8	21.9	0.0	22.5	21.5	22.0	21.8	0.0	22.5
		8	4	21.4	21.9	21.9	0.0	22.5	21.5	22.0	21.8	0.0	22.5
		8	7	21.4	21.9	21.9	0.0	22.5	21.5	22.0	21.8	0.0	22.5
		15	0	21.4	21.9	21.8	0.0	22.5	21.5	21.9	21.8	0.0	22.5
		1.4 MHz	QPSK	1	0	21.5	21.9	21.9	0.0	22.5	21.5	21.8	21.9
1	3			21.5	21.9	21.9	0.0	22.5	21.5	21.8	21.9	0.0	22.5
1	5			21.5	22.0	21.9	0.0	22.5	21.5	21.8	21.9	0.0	22.5
3	0			21.4	21.8	21.9	0.0	22.5	21.4	21.9	21.8	0.0	22.5
3	1			21.4	21.9	21.9	0.0	22.5	21.4	21.9	21.8	0.0	22.5
3	3			21.4	21.9	21.9	0.0	22.5	21.5	21.9	21.8	0.0	22.5
16QAM	6		0	21.5	21.8	21.9	0.0	22.5	21.5	21.9	21.8	0.0	22.5
	1		0	21.3	21.8	21.8	0.0	22.5	21.4	21.8	21.6	0.0	22.5
	1		3	21.3	21.8	21.8	0.0	22.5	21.3	21.8	21.6	0.0	22.5
	1		5	21.3	21.8	21.8	0.0	22.5	21.4	21.8	21.5	0.0	22.5
	3		0	21.5	21.8	21.8	0.0	22.5	21.5	22.0	21.8	0.0	22.5
	3		1	21.5	21.9	21.8	0.0	22.5	21.5	21.9	21.8	0.0	22.5
	3		3	21.5	21.9	21.8	0.0	22.5	21.5	21.9	21.9	0.0	22.5
	6		0	21.6	21.9	21.7	0.0	22.5	21.6	21.7	21.9	0.0	22.5

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.

Normal WLAN SISO output power results

Antenna	Mode	Data Rate	Ch #	Freq. (MHz)	WLAN mode power					
					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	18.0	19.0	Yes	12.3	13.0	Yes
			6	2437.0	18.4			12.2		
			11	2462.0	18.5			12.6		
			12	2467.0	18.3					
			13	2472.0	15.6					
	802.11g	6 Mbps	1	2412.0	Not required	17.0	No	Not required	13.0	No
			6	2437.0						
			13	2472.0						
	802.11n	6.5 Mbps	1	2412.0	Not required	17.0	No	Not required	13.0	No
			6	2437.0						
			13	2472.0						

Note(s):

- SAR is not required for 802.11g/n modes when the adjusted SAR for 802.11b is < 1.2 W/kg.
- 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.
- 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.

Normal WLAN SISO output power results

Antenna	Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	WLAN mode power					
						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)
5GHz Ant	5.3 (UNII 2A)	802.11a	6 Mbps	52	5260	12.8	13.0	Yes	Not Required	11.0	No
				56	5280	12.9					
				60	5300	12.5					
				64	5320	12.4					
		802.11n (HT20)	6.5 Mbps	Not Required			13.0	No	Not Required	11.0	No
		802.11n (HT40)	13.5 Mbps	Not Required			13.0	No	Not Required	11.0	No
	802.11ac (VHT20)	6.5 Mbps	Not Required			13.0	No	Not Required	11.0	No	
	802.11ac (VHT40)	13.5 Mbps	Not Required			12.0	No	Not Required	11.0	No	
	802.11ac (VHT80)	29.3 Mbps	58.0	5290.0	Not Required	11.0	No	10.3	11.0	Yes	
	5.5 (U-NII 2C)	802.11a	6 Mbps	100	5500	12.8	13.0	Yes	Not Required	11.0	No
				120	5600	12.5					
				124	5620	12.4					
				144	5720	12.3					
		802.11n (HT20)	6.5 Mbps	Not Required			13.0	No	Not Required	11.0	No
		802.11n (HT40)	13.5 Mbps	Not Required			12.0	No	Not Required	11.0	No
	802.11ac (VHT20)	6.5 Mbps	Not Required			13.0	No	Not Required	11.0	No	
	802.11ac (VHT40)	13.5 Mbps	Not Required			12.0	No	Not Required	11.0	No	
	802.11ac (VHT80)	29.3 Mbps	106	5530	Not Required	11.0	No	10.4	11.0	Yes	
	122	5610									
	138	5690									
	10.5										
	5.8 (UNII 3)	802.11a	6 Mbps	149	5745	12.7	13.0	Yes	Not Required	11.0	No
				157	5785	12.6					
				165	5825	12.9					
802.11n (HT20)		6.5 Mbps	Not Required			13.0	No	Not Required	11.0	No	
802.11n (HT40)		13.5 Mbps	Not Required			12.0	No	Not Required	11.0	No	
802.11ac (VHT20)		6.5 Mbps	Not Required			13.0	No	Not Required	11.0	No	
802.11ac (VHT40)	13.5 Mbps	Not Required			12.0	No	Not Required	11.0	No		
802.11ac (VHT80)	29.3 Mbps	155	5775.0	Not Required	11.0	No	10.5	11.0	Yes		

Note(s):

- 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.
- When the same transmission mode configurations have the same maximum output power on the same channel for the 802.11 a/g/n/ac modes, the channel in the lower order/sequence 802.11 mode (i.e. a, g, n ac then ax) is selected.
- 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	8.4	9.5
		39	2441	8.8	
		78	2480	8.6	
	EDR, 8-DPSK	0	2402	6.8	8.5
		39	2441	7.1	
		78	2480	7.0	
	LE, GFSK, 1M	0	2402	5.5	6.5
		19	2440	6.5	
		39	2480	6.1	
	LE, GFSK, 2M	0	2402	5.4	6.5
		19	2440	6.3	
		39	2480	5.9	

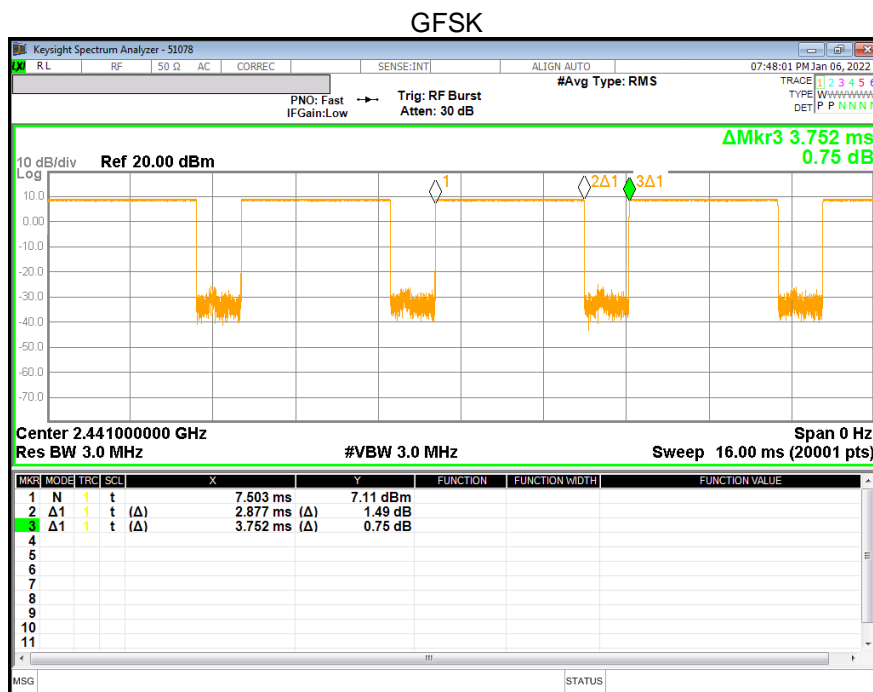
Note(s):

For All exposure conditions, SAR test is evaluated at GFSK mode in Bluetooth using maximum power condition.

Duty Factor Measured Results

Mode	Type	T on (ms)	Period (ms)	Duty Cycle	Crest Factor (1/duty cycle)
GFSK	DH5	2.877	3.752	76.7%	1.30

Duty Cycle plots



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 ≤ 25 mm 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 $\leq 1/4$ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.

KDB 941225 D05 SAR for LTE Devices:

SAR test reduction is applied using the following criteria:

- Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB, and 50% RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel.
- When the reported SAR is > 0.8 W/kg, testing for other Channels is performed at the highest output power level for 1RB, and 50% RB configuration for that channel.
- Testing for 100% RB configuration is performed at the highest output power level for 100% RB configuration across the Low, Mid and High Channel when the highest reported SAR for 1 RB and 50% RB are > 0.8 W/kg. Testing for the remaining required channels is not needed because the reported SAR for 100% RB Allocation < 1.45 W/kg.
- Testing for 16-QAM modulation is not required because the reported SAR for QPSK is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of QPSK.
- Testing for the other channel bandwidths is not required because the reported SAR for the highest channel bandwidth is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of the highest channel bandwidth.
- For LTE bands that do not support at least three non-overlapping channels in certain channel bandwidths, test the available non-overlapping channels instead. When a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing; therefore, the requirement for H, M and L channels may not fully apply.

KDB 248227 D01 SAR meas for 802.11:

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

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

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

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

10.1. GSM 850

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 3 Slots	N/A	0	Left Touch	190	836.6	29.5	28.1	0.229	0.320	
					Let Tilt	190	836.6	29.5	28.1	0.172	0.240	
					Right Touch	190	836.6	29.5	28.1	0.293	0.409	1
					Right Tilt	190	836.6	29.5	28.1	0.156	0.218	
	Body-w orn	GPRS 3 Slots	N/A	15	Rear	190	836.6	29.5	28.1	0.362	0.505	2
					Front	190	836.6	29.5	28.1	0.239	0.334	
	Hotspot	GPRS 3 Slots	N/A	10	Rear	128	824.4	29.5	28.2	0.588	0.787	
						190	836.6	29.5	28.1	0.596	0.832	
						251	848.8	29.5	28.3	0.665	0.887	3
					Front	190	836.6	29.5	28.1	0.218	0.304	
					Edge 2	190	836.6	29.5	28.1	0.351	0.490	
					Edge 3	190	836.6	29.5	28.1	0.328	0.458	
Edge 4	190	836.6	29.5	28.1	0.206	0.287						

10.2. GSM 1900

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 3 Slots	Off	0	Left Touch	661	1880.0	27.5	27.2	0.134	0.144	4
					Left Tilt	661	1880.0	27.5	27.2	0.125	0.135	
					Right Touch	661	1880.0	27.5	27.2	0.118	0.127	
					Right Tilt	661	1880.0	27.5	27.2	0.083	0.089	
	Body-w orn	GPRS 3 Slots	Off	15	Rear	661	1880.0	27.5	27.2	0.250	0.269	5
					Front	661	1880.0	27.5	27.2	0.129	0.139	
	Hotspot	GPRS 3 Slots	On	10	Rear	661	1880.0	26.0	25.0	0.269	0.337	6
					Front	661	1880.0	26.0	25.0	0.162	0.203	
					Edge 3	661	1880.0	26.0	25.0	0.229	0.287	
					Edge 4	661	1880.0	26.0	25.0	0.163	0.204	

10.3. W-CDMA Band II

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	Off	0	Left Touch	9400	1880.0	25.5	24.5	0.157	0.200	7
					Left Tilt	9400	1880.0	25.5	24.5	0.113	0.144	
					Right Touch	9400	1880.0	25.5	24.5	0.137	0.174	
					Right Tilt	9400	1880.0	25.5	24.5	0.113	0.144	
	Body-worn	Rel 99 RMC	Off	15	Rear	9400	1880.0	25.5	24.5	0.409	0.520	8
					Front	9400	1880.0	25.5	24.5	0.289	0.368	
	Hotspot	Rel 99 RMC	On	10	Rear	9400	1880.0	22.5	21.1	0.478	0.667	9
					Front	9400	1880.0	22.5	21.1	0.202	0.282	
					Edge 3	9400	1880.0	22.5	21.1	0.230	0.321	
					Edge 4	9400	1880.0	22.5	21.1	0.176	0.246	
Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		10-g SAR (W/kg)		Plot No.
Main 2 Ant.	Product Specific 10-g	Rel 99 RMC	Off	15	Rear	9400	1880.0	25.5	24.5	0.259	0.330	
			On	0	Rear	9400	1880.0	22.5	20.9	0.654	0.944	10

10.4. W-CDMA Band IV

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	Off	0	Left Touch	1413	1732.6	25.5	24.7	0.157	0.188	11
					Left Tilt	1413	1732.6	25.5	24.7	0.108	0.130	
					Right Touch	1413	1732.6	25.5	24.7	0.143	0.172	
					Right Tilt	1413	1732.6	25.5	24.7	0.084	0.100	
	Body-worn	Rel 99 RMC	Off	15	Rear	1413	1732.6	25.5	24.7	0.132	0.158	12
					Front	1413	1732.6	25.5	24.7	0.132	0.158	
	Hotspot	Rel 99 RMC	On	10	Rear	1413	1732.6	22.5	21.5	0.265	0.336	
					Front	1413	1732.6	22.5	21.5	0.243	0.308	
					Edge 3	1413	1732.6	22.5	21.5	0.339	0.430	13
					Edge 4	1413	1732.6	22.5	21.5	0.151	0.192	

10.5. W-CDMA Band V

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	Left Touch	4183	836.6	25.5	25.0	0.271	0.302	
					Left Tilt	4183	836.6	25.5	25.0	0.190	0.212	
					Right Touch	4183	836.6	25.5	25.0	0.349	0.389	14
					Right Tilt	4183	836.6	25.5	25.0	0.202	0.225	
	Body-worn	Rel 99 RMC	N/A	15	Rear	4183	836.6	25.5	25.0	0.393	0.438	15
					Front	4183	836.6	25.5	25.0	0.304	0.339	
	Hotspot	Rel 99 RMC	N/A	10	Rear	4132	826.4	25.5	24.8	0.707	0.834	
						4183	836.6	25.5	25.0	0.769	0.858	
					4233	846.6	25.5	24.8	0.794	0.933	16	
					Front	4183	836.6	25.5	25.0	0.294	0.328	
					Edge 2	4183	836.6	25.5	25.0	0.401	0.447	
					Edge 3	4183	836.6	25.5	25.0	0.379	0.423	
Edge 4	4183	836.6	25.5	25.0	0.234	0.261						

10.6. LTE Band 2 (20MHz Bandwidth)

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up limit	Meas.	Meas.	Scaled	
Main 2 Ant.	Head	QPSK	Off	0	Left Touch	19100	1900.0	1	0	25.0	24.4	0.196	0.227	17
								50	0	24.0	23.4	0.147	0.170	
					Left Tilt	19100	1900.0	1	0	25.0	24.4	0.117	0.135	
								50	0	24.0	23.4	0.082	0.095	
					Right Touch	19100	1900.0	1	0	25.0	24.4	0.157	0.182	
								50	0	24.0	23.4	0.144	0.166	
					Right Tilt	19100	1900.0	1	0	25.0	24.4	0.085	0.098	
								50	0	24.0	23.4	0.070	0.080	
	Body-worn	QPSK	Off	15	Rear	19100	1900.0	1	0	25.0	24.4	0.410	0.474	18
								50	0	24.0	23.4	0.314	0.362	
					Front	19100	1900.0	1	0	25.0	24.4	0.261	0.302	
								50	0	24.0	23.4	0.215	0.248	
	Hotspot	QPSK	On	10	Rear	19100	1900.0	1	0	22.0	21.3	0.401	0.476	19
								50	0	22.0	21.3	0.395	0.469	
					Front	19100	1900.0	1	0	22.0	21.3	0.241	0.286	
								50	0	22.0	21.3	0.239	0.284	
					Edge 3	19100	1900.0	1	0	22.0	21.3	0.343	0.407	
								50	0	22.0	21.3	0.358	0.425	
Edge 4					19100	1900.0	1	0	22.0	21.3	0.208	0.247		
							50	0	22.0	21.3	0.195	0.232		

10.7. LTE Band 12 (10MHz Bandwidth)

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up limit	Meas.	Meas.	Scaled	
Main 1 Ant.	Head	QPSK	N/A	0	Left Touch	23095	707.5	1	0	25.0	24.5	0.198	0.220	
								25	0	24.0	23.6	0.153	0.168	
					Left Tilt	23095	707.5	1	0	25.0	24.5	0.130	0.144	
								25	0	24.0	23.6	0.097	0.106	
					Right Touch	23095	707.5	1	0	25.0	24.5	0.252	0.280	20
								25	0	24.0	23.6	0.189	0.207	
					Right Tilt	23095	707.5	1	0	25.0	24.5	0.117	0.130	
								25	0	24.0	23.6	0.087	0.095	
	Body-worn	QPSK	N/A	15	Rear	23095	707.5	1	0	25.0	24.5	0.342	0.379	21
								25	0	24.0	23.6	0.258	0.283	
					Front	23095	707.5	1	0	25.0	24.5	0.242	0.268	
								25	0	24.0	23.6	0.186	0.204	
	Hotspot	QPSK	N/A	10	Rear	23095	707.5	1	0	25.0	24.5	0.429	0.476	22
								25	0	24.0	23.6	0.340	0.372	
					Front	23095	707.5	1	0	25.0	24.5	0.222	0.246	
								25	0	24.0	23.6	0.171	0.187	
					Edge 2	23095	707.5	1	0	25.0	24.5	0.256	0.284	
								25	0	24.0	23.6	0.280	0.307	
					Edge 3	23095	707.5	1	0	25.0	24.5	0.201	0.223	
								25	0	24.0	23.6	0.160	0.175	
Edge 4	23095	707.5	1	0	25.0	24.5	0.222	0.246						
			25	0	24.0	23.6	0.165	0.181						

10.8. LTE Band 13 (10MHz Bandwidth)

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up limit	Meas.	Meas.	Scaled	
Main 1 Ant.	Head	QPSK	N/A	0	Left Touch	23230	782.0	1	25	25.5	24.8	0.254	0.301	
								25	0	24.5	23.8	0.197	0.231	
					Left Tilt	23230	782.0	1	25	25.5	24.8	0.139	0.165	
								25	0	24.5	23.8	0.107	0.125	
					Right Touch	23230	782.0	1	25	25.5	24.8	0.326	0.387	23
								25	0	24.5	23.8	0.249	0.292	
					Right Tilt	23230	782.0	1	25	25.5	24.8	0.168	0.199	
								25	0	24.5	23.8	0.126	0.148	
	Body-w orn	QPSK	N/A	15	Rear	23230	782.0	1	25	25.5	24.8	0.384	0.455	24
								25	0	24.5	23.8	0.304	0.356	
					Front	23230	782.0	1	25	25.5	24.8	0.322	0.382	
								25	0	24.5	23.8	0.250	0.293	
	Hotspot	QPSK	N/A	10	Rear	23230	782.0	1	25	25.5	24.8	0.635	0.753	25
								25	0	24.5	23.8	0.486	0.569	
					Front	23230	782.0	1	25	25.5	24.8	0.276	0.327	
								25	0	24.5	23.8	0.217	0.254	
					Edge 2	23230	782.0	1	25	25.5	24.8	0.425	0.504	
								25	0	24.5	23.8	0.341	0.399	
					Edge 3	23230	782.0	1	25	25.5	24.8	0.350	0.415	
								25	0	24.5	23.8	0.263	0.308	
Edge 4					23230	782.0	1	25	25.5	24.8	0.287	0.340		
							25	0	24.5	23.8	0.220	0.258		

10.9. LTE Band 26 (15MHz Bandwidth)

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up limit	Meas.	Meas.	Scaled	
Main 1 Ant.	Head	QPSK	N/A	0	Left Touch	26865	831.5	1	0	25.5	24.8	0.315	0.368	
								36	0	24.5	23.9	0.237	0.271	
					Left Tilt	26865	831.5	1	0	25.5	24.8	0.195	0.228	
								36	0	24.5	23.9	0.145	0.166	
					Right Touch	26865	831.5	1	0	25.5	24.8	0.319	0.372	26
								36	0	24.5	23.9	0.260	0.298	
					Right Tilt	26865	831.5	1	0	25.5	24.8	0.186	0.217	
								36	0	24.5	23.9	0.148	0.169	
	Body-w orn	QPSK	N/A	15	Rear	26865	831.5	1	0	25.5	24.8	0.373	0.435	27
								36	0	24.5	23.9	0.297	0.340	
					Front	26865	831.5	1	0	25.5	24.8	0.304	0.355	
								36	0	24.5	23.9	0.235	0.269	
	Hotspot	QPSK	N/A	10	Rear	26865	831.5	1	0	25.5	24.8	0.817	0.953	28
								36	0	24.5	23.9	0.642	0.735	
					Front	26865	831.5	1	0	25.5	24.8	0.286	0.334	
								36	0	24.5	23.9	0.221	0.253	
					Edge 2	26865	831.5	1	0	25.5	24.8	0.435	0.508	
								36	0	24.5	23.9	0.338	0.387	
					Edge 3	26865	831.5	1	0	25.5	24.8	0.422	0.492	
								36	0	24.5	23.9	0.336	0.385	
Edge 4					26865	831.5	1	0	25.5	24.8	0.270	0.315		
							36	0	24.5	23.9	0.204	0.233		

10.10. LTE Band 41 (20MHz Bandwidth)

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up limit	Meas.	Meas.	Scaled	
Main 2 Ant.	Head	QPSK	N/A	0	Left Touch	40620	2593.0	1	0	24.5	24.3	0.361	0.380	29
								50	0	23.5	23.2	0.274	0.296	
					Left Tilt	40620	2593.0	1	0	24.5	24.3	0.134	0.141	
								50	0	23.5	23.2	0.098	0.106	
					Right Touch	40620	2593.0	1	0	24.5	24.3	0.252	0.265	
								50	0	23.5	23.2	0.198	0.214	
					Right Tilt	40620	2593.0	1	0	24.5	24.3	0.253	0.266	
								50	0	23.5	23.2	0.191	0.206	
	Body-worn	QPSK	N/A	15	Rear	40620	2593.0	1	0	24.5	24.3	0.434	0.457	30
								50	0	23.5	23.2	0.328	0.354	
					Front	40620	2593.0	1	0	24.5	24.3	0.309	0.325	
								50	0	23.5	23.2	0.238	0.257	
	Hotspot	QPSK	N/A	10	Rear	39750	2506.0	1	0	24.5	23.1	0.624	0.852	
								50	0	23.5	22.1	0.520	0.716	
						40185	2549.5	1	0	24.5	23.5	0.748	0.935	31
								50	0	23.5	22.6	0.584	0.714	
						40620	2593.0	1	0	24.5	24.3	0.756	0.796	
								50	0	23.5	23.2	0.581	0.628	
						41055	2636.5	1	0	24.5	23.2	0.561	0.763	
								50	0	23.5	22.2	0.445	0.596	
					41490	2680.0	1	0	24.5	22.6	0.449	0.694		
							50	0	23.5	21.6	0.344	0.528		
					Front	39750	2506.0	1	0	24.5	23.1	0.578	0.789	
								40185	2549.5	1	0	24.5	23.5	
						40620	2593.0	1	0	24.5	24.3	0.676	0.712	
								50	0	23.5	23.2	0.523	0.565	
					41055	2636.5	1	0	24.5	23.2	0.551	0.749		
							41490	2680.0	1	0	24.5	22.6		0.371
Edge 3	40620	2593.0	1	0	24.5	24.3	0.474	0.499						
			50	0	23.5	23.2	0.358	0.387						
Edge 4	40620	2593.0	1	0	24.5	24.3	0.411	0.433						
			50	0	23.5	23.2	0.311	0.336						

10.11. LTE Band 66 (20MHz Bandwidth)

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
										Tune-up limit	Meas.	Meas.	Scaled	
Main 2 Ant.	Head	QPSK	Off	0	Left Touch	132572	1770.0	1	0	25.5	25.0	0.210	0.236	
								50	0	24.5	24.0	0.152	0.172	
					Left Tilt	132572	1770.0	1	0	25.5	25.0	0.110	0.123	
								50	0	24.5	24.0	0.097	0.110	
					Right Touch	132572	1770.0	1	0	25.5	25.0	0.223	0.250	32
								50	0	24.5	24.0	0.194	0.220	
					Right Tilt	132572	1770.0	1	0	25.5	25.0	0.098	0.110	
								50	0	24.5	24.0	0.084	0.095	
	Body-worn	QPSK	Off	15	Rear	132572	1770.0	1	0	25.5	25.0	0.444	0.498	33
								50	0	24.5	24.0	0.368	0.417	
					Front	132572	1770.0	1	0	25.5	25.0	0.417	0.468	
								50	0	24.5	24.0	0.346	0.392	
	Hotspot	QPSK	On	10	Rear	132572	1770.0	1	0	22.5	22.1	0.548	0.601	
								50	0	22.5	21.9	0.538	0.622	
					Front	132572	1770.0	1	0	22.5	22.1	0.339	0.372	34
								50	0	22.5	21.9	0.328	0.379	
Edge 3					132572	1770.0	1	0	22.5	22.1	0.404	0.443		
							50	0	22.5	21.9	0.382	0.442		
Edge 4					132572	1770.0	1	0	22.5	22.1	0.237	0.260		
							50	0	22.5	21.9	0.221	0.256		

10.12. Wi-Fi (DTS Band)

Antenna	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			
WLAN	2.4GHz	802.11b 1 Mbps	Head	On	0	Left Touch	11	2462.0	0.056	99.3%	13.0	12.6					
						Left Tilt	11	2462.0	0.051	99.3%	13.0	12.6					
						Right Touch	11	2462.0	0.143	99.3%	13.0	12.6	0.091	0.100	1	35	
						Right Tilt	11	2462.0	0.123	99.3%	13.0	12.6					
			Body-worn	Off	15	Rear	11	2462.0	0.274	99.3%	19.0	18.5	0.179	0.200	1	36	
						Front	11	2462.0	0.085	99.3%	19.0	18.5					
			Hotspot	Off	10	Rear	11	2462.0	0.588	99.3%	19.0	18.5	0.359	0.402		37	
						Front	11	2462.0	0.168	99.3%	19.0	18.5					
						Edge 1	11	2462.0	0.129	99.3%	19.0	18.5					
						Edge 4	11	2462.0	0.253	99.3%	19.0	18.5	0.158	0.177	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.
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.

10.13. Wi-Fi (U-NII Bands)

U-NII 2A Results

Antenna	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			
WLAN	5.3 GHz U-NII 2A	802.11ac (VHT80) 29.3Mbps	Head	On	0	Left Touch	58	5290.0	0.337	94.5%	11.0	10.3							
						Left Tilt	58	5290.0	0.447	94.5%	11.0	10.3	0.220	0.275			1	38	
						Right Touch	58	5290.0	0.376	94.5%	11.0	10.3							
						Right Tilt	58	5290.0	0.435	94.5%	11.0	10.3							
		Body-worn	Off	15	Rear	56	5280.0	0.863	97.3%	13.0	12.9	0.417	0.443					39	
					Front	56	5280.0	0.116	97.3%	13.0	12.9	0.050	0.053			2			
		802.11a 6Mbps	Product Specific 10-g	Off	0	Rear	56	5280.0	6.824	97.3%	13.0	12.9			1.440	1.529			40
						Front	56	5280.0	0.987	97.3%	13.0	12.9							
						Edge 1	56	5280.0	5.960	97.3%	13.0	12.9			0.630	0.669	2		
						Edge 4	56	5280.0	2.438	97.3%	13.0	12.9							

U-NII 2C Results

Antenna	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			
WLAN	5.5 GHz U-NII 2C	802.11ac (VHT80) 29.3Mbps	Head	On	0	Left Touch	122	5610.0	0.647	94.5%	11.0	10.6							
						Left Tilt	122	5610.0	0.814	94.5%	11.0	10.6	0.401	0.466				41	
						Right Touch	122	5610.0	0.588	94.5%	11.0	10.6							
						Right Tilt	122	5610.0	0.770	94.5%	11.0	10.6	0.348	0.405			2		
		Body-worn	Off	15	Rear	100	5500.0	0.808	97.3%	13.0	12.8	0.420	0.457					42	
					Front	100	5500.0	0.110	97.3%	13.0	12.8	0.050	0.055			2			
		802.11a 6Mbps	Product Specific 10-g	Off	0	Rear	100	5500.0	11.622	97.3%	13.0	12.8			1.540	1.677			43
						Front	100	5500.0	0.927	97.3%	13.0	12.8							
						Edge 1	100	5500.0	5.021	97.3%	13.0	12.8			0.555	0.604	2		
						Edge 4	100	5500.0	3.543	97.3%	13.0	12.8							

Wi-Fi (U-NII Bands) (Continued)

U-NII 3 Results

Antenna	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		
WLAN	5.8 GHz U-NII 3	802.11ac (VHT80) 29.3Mbps	Head	On	0	Left Touch	155	5775.0	0.531	94.5%	11.0	10.5				
						Left Tilt	155	5775.0	0.693	94.5%	11.0	10.5	0.334	0.401		44
						Right Touch	155	5775.0	0.400	94.5%	11.0	10.5				
						Right Tilt	155	5775.0	0.532	94.5%	11.0	10.5	0.213	0.256		2
		Body-worn	Off	15	Rear	165	5825.0	0.585	97.3%	13.0	12.9	0.248	0.262		1	45
					Front	165	5825.0	0.111	97.3%	13.0	12.9					
		Hotspot	Off	10	Rear	149	5745.0	1.436	97.3%	13.0	12.7	0.686	0.761			46
					Front	149	5745.0	0.176	97.3%	13.0	12.7					
	Edge 1				149	5745.0	0.897	97.3%	13.0	12.7	0.437	0.485		2		
	Edge 4				149	5745.0	0.312	97.3%	13.0	12.7						

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.

10.14. Bluetooth

Antenna	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		
BT	2.4 GHz	GFSK	Head	On	0	Left Touch	39	2441.0	76.7%	9.5	8.8	0.020	0.030		
						Left Tilt	39	2441.0	76.7%	9.5	8.8	0.012	0.018		
						Right Touch	39	2441.0	76.7%	9.5	8.8	0.036	0.055		47
						Right Tilt	39	2441.0	76.7%	9.5	8.8	0.027	0.041		
		Body-worn	Off	15	Rear	39	2441.0	76.7%	9.5	8.8	0.015	0.023		48	
					Front	39	2441.0	76.7%	9.5	8.8	0.003	0.005			
		Hotspot	Off	10	Rear	39	2441.0	76.7%	9.5	8.8	0.040	0.061		49	
					Front	39	2441.0	76.7%	9.5	8.8	0.004	0.006			
					Edge 1	39	2441.0	76.7%	9.5	8.8	0.006	0.009			
					Edge 4	39	2441.0	76.7%	9.5	8.8	0.018	0.028			

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 ($\sim 10\%$ from the 1-g or 10-g respective SAR limit).
- 4) Perform a third repeated measurement only if the original, first, or second repeated measurement is ≥ 1.5 or 3.75 W/kg (1-g or 10-g respectively) and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .

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
750	LTE Band 12	Hotspot	Rear	No	0.429	N/A	N/A
	LTE Band 13	Hotspot	Rear	No	0.635	N/A	N/A
835	GSM 850	Hotspot	Rear	No	0.665	N/A	N/A
	WCDMA Band V	Hotspot	Rear	No	0.794	N/A	N/A
	LTE Band 26	Hotspot	Rear	Yes	0.817	0.810	N/A
1750	WCDMA Band IV	Hotspot	Edge 3	No	0.339	N/A	N/A
	LTE Band 66	Hotspot	Rear	No	0.548	N/A	N/A
1900	GSM 1900	Hotspot	Rear	No	0.269	N/A	N/A
	WCDMA Band II	Hotspot	Rear	No	0.478	N/A	N/A
	LTE Band 2	Body-w orn	Rear	No	0.410	N/A	N/A
2400	Wi-Fi 802.11b/g/n	Hotspot	Rear	No	0.359	N/A	N/A
	Bluetooth	Hotspot	Rear	No	0.040	N/A	N/A
2600	LTE Band 41	Hotspot	Rear	No	0.756	N/A	N/A
5300	Wi-Fi 802.11a/n	Body-w orn	Rear	No	0.417	N/A	N/A
5500	Wi-Fi 802.11a/n	Body-w orn	Rear	No	0.420	N/A	N/A
5800	Wi-Fi 802.11a/n	Hotspot	Rear	No	0.686	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
1900	WCDMA Band II	Product Specific 10g	Rear	No	0.654	N/A	N/A
5300	Wi-Fi 802.11a/n	Product Specific 10g	Rear	No	1.440	N/A	N/A
5500	Wi-Fi 802.11a/n	Product Specific 10g	Rear	No	1.540	N/A	N/A

Note(s):

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

12. Simultaneous Transmission SAR Analysis

Simultaneous Transmission Condition

RF Exposure Condition	Item	Capable Transmit Configurations				Scenarios
Head & Body-worn & Hotspot & Phablet-10g	1	WWAN (2G/3G/LTE)	+	DTS		
	2	WWAN (2G/3G/LTE)	+	UNII		
	3	WWAN (2G/3G/LTE)	+	BT		
	4	WWAN (2G/3G/LTE)	+	UNII	+	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 UNII Radio.
6. DTS Radio cannot transmit simultaneously with Bluetooth 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:

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

Where:

SAR₁ 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

SAR₂ 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

R_i 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:

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

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 **SAR₁** or **SAR₂**. 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 SPLSR 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 SPLSR calculation.

Simultaneous transmission SAR measurement

When simultaneous transmission SAR measurements are required in different frequency bands not covered by a single probe calibration point then separate tests for each frequency band are performed. The tests are performed using enlarged zoom scans which are processed, by means of superposition, using the DASY5 volume scan postprocessing procedures to determine the 1-g SAR for the aggregate SAR distribution.

The spatial resolution used for all enlarged zoom scans is the same as used for the most stringent zoom scans. I.E. the scan parameters required for the highest frequency assessed are used for all enlarged zoom scans. The scans cover the complete area of the device to ensure all transmitting antennas and radiating structures are assessed.

DASY5 provides the ability to perform Multiband Evaluations according to the latest standards using the Volume Scan job as well as appropriate routines for the Post-processing.

In order to extract and process measurements within different frequency bands, the SEMCAD X Post-processor performs the combination and subsequent superposition of these measurement data via DASY5= Combined MultiBand Averaged SAR.

Combined Multi Band Averaged SAR allows - in addition to the data extraction - an evaluation of the 1 g, 10 g and/or arbitrary averaged mass SAR.

Power Scaling Factor is used to allow the volume scans to be scaled by a value other than "1", this is important when the results need to be scaled to different maximum power levels. The Power Scaling Factor is applied to each individual point of the scan. When power scaling is used in multi-band combinations the scaling factor is applied to each individual point of the first scan, the second factor is then applied to each individual point of the second scan and so on. The scans are then combined.

SPLSR Hotspot Combination

Per November 2019 TCB Workshop Notes, SPLSR Hotspot Combination procedure can be applied to evaluate to simultaneous transmission SAR analysis.

Hybrid SPLSR and enlarged zoom scan (Volume scan) can be applied when Simultaneous transmission SAR is over 1.6 or 4.0 W/kg (1-g or 10-g respectively), it does not meet SPLSR criteria, and antenna pair is co-located. Antenna co-location means that SAR distributions overlap because the antennas are not significantly spatially separated.

Test procedure

Step.1 Perform enlarged zoom scan (Volume scan) on the co-located antenna pair to determine 1g/10g aggregate SAR.

Step.2 Apply SPLSR procedure for the spatially separated antenna and aggregate SAR distribution of the co-located antenna pair.

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)	All position	0.409	0.100	0.466	0.055	0.509	0.875	0.464	0.930
Body-Worn (1-g SAR)	All position	0.505	0.200	0.457	0.023	0.705	0.962	0.528	0.985
Hotspot (1-g SAR)	Rear	0.887	0.402	0.761	0.061	1.289	1.648	0.948	1.709
	Front	0.304	0.402	0.761	0.006	0.706	1.065	0.310	1.071
	Edge 1		0.402	0.485	0.009				
	Edge 2	0.490							
	Edge 3	0.458							
Edge 4	0.287	0.177	0.761	0.028	0.464	1.048	0.315	1.076	
Product Specific 10-g (10-g SAR)	All position			1.677					

SAR to Peak Location Separation Ratio (SPLSR)

RF Exposure	Test Position	Standalone SAR (W/kg)				Σ SAR (W/kg)	Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No) <i>Note.2</i>	Figure	
		WWAN	DTS	UNII	BT						
		1	2	3	4						
Hotspot (1-g SAR)	Rear	0.887		0.761	0.061	1+3+4	1.709			1	
		0.887		0.761		1+3	1.648	157.5	0.01		No
		0.887			0.061	1+4	0.948	148.6	0.01		No
				0.761	0.061	3+4	0.822	12.5	0.06		Yes
Hybrid SPLSR <i>Note.3</i>		0.887		0.762		1+(3+4)	1.649	157.1	0.01	No	1-a

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)	All position	0.144	0.100	0.466	0.055	0.244	0.610	0.199	0.665
Body-Worn (1-g SAR)	All position	0.269	0.200	0.457	0.023	0.469	0.726	0.292	0.749
Hotspot (1-g SAR)	Rear	0.337	0.402	0.761	0.061	0.739	1.098	0.398	1.159
	Front	0.203	0.402	0.761	0.006	0.605	0.964	0.209	0.970
	Edge 1		0.402	0.485	0.009				
	Edge 2								
	Edge 3	0.287							
Edge 4	0.204	0.177	0.761	0.028	0.381	0.965	0.232	0.993	
Product Specific 10-g (10-g SAR)	All position			1.677					

Note(s):

- Green value is estimated SAR value.
- SPLSR Hotspot Combination Step.1) Perform enlarged zoom scan (Volume scan) on the co-located antenna pair to determine 1g/10g aggregate SAR. Refer to the Sec.12.12 for detailed Volume Scan Result.
- SPLSR Hotspot Combination Step.2) Apply SPLSR procedure for the spatially separated antenna and aggregate SAR distribution of the co-located antenna pair. Hybrid SPLSR procedure was applied for the spatially separated main bands and unlicensed bands for Multi-band Combined results.
- Simultaneous transmission scenario (1+3) is subset of (1+3+4) scenario.

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)	All position	0.200	0.100	0.466	0.055	0.300	0.666	0.255	0.721
Body-Worn (1-g SAR)	All position	0.520	0.200	0.457	0.023	0.720	0.977	0.543	1.000
Hotspot (1-g SAR)	Rear	0.667	0.402	0.761	0.061	1.069	1.428	0.728	1.489
	Front	0.282	0.402	0.761	0.006	0.684	1.043	0.288	1.049
	Edge 1		0.402	0.485	0.009				
	Edge 2								
	Edge 3	0.321							
Edge 4	0.246	0.177	0.761	0.028	0.423	1.007	0.274	1.035	
Product Specific 10-g (10-g SAR)	All position	0.944		1.677			2.621		

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)	All position	0.188	0.100	0.466	0.055	0.288	0.654	0.243	0.709
Body-Worn (1-g SAR)	All position	0.158	0.200	0.457	0.023	0.358	0.615	0.181	0.638
Hotspot (1-g SAR)	Rear	0.336	0.402	0.761	0.061	0.738	1.097	0.397	1.158
	Front	0.308	0.402	0.761	0.006	0.710	1.069	0.314	1.075
	Edge 1		0.402	0.485	0.009				
	Edge 2								
	Edge 3	0.430							
Edge 4	0.192	0.177	0.761	0.028	0.369	0.953	0.220	0.981	
Product Specific 10-g (10-g SAR)	All position			1.677					

Note(s):

- Green value is estimated SAR value.

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)	All position	0.389	0.100	0.466	0.055	0.489	0.855	0.444	0.910
Body-Worn (1-g SAR)	All position	0.438	0.200	0.457	0.023	0.638	0.895	0.461	0.918
Hotspot (1-g SAR)	Rear	0.933	0.402	0.761	0.061	1.335	1.694	0.994	1.755
	Front	0.328	0.402	0.761	0.006	0.730	1.089	0.334	1.095
	Edge 1		0.402	0.485	0.009				
	Edge 2	0.447							
	Edge 3	0.423							
Edge 4	0.261	0.177	0.761	0.028	0.438	1.022	0.289	1.050	
Product Specific 10-g (10-g SAR)	All position			1.677					

SAR to Peak Location Separation Ratio (SPLSR)

RF Exposure	Test Position	Standalone SAR (W/kg)				Σ SAR (W/kg)	Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/ No) <i>Note.2</i>	Figure	
		WWAN	DTS	UNII	BT						
		1	2	3	4						
Hotspot (1-g SAR)	Rear	0.933		0.761	0.061	1+3+4	1.755			2	
		0.933		0.761		1+3	1.694	158.0	0.01		No
		0.933			0.061	1+4	0.994	149.3	0.01		No
				0.761	0.061	3+4	0.822	12.5	0.06		Yes
Hybrid SPLSR <i>Note.3</i>		0.933		0.762		1+(3+4)	1.695	157.6	0.01	No	2-a

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)	All position	0.227	0.100	0.466	0.055	0.327	0.693	0.282	0.748
Body-Worn (1-g SAR)	All position	0.474	0.200	0.457	0.023	0.674	0.931	0.497	0.954
Hotspot (1-g SAR)	Rear	0.476	0.402	0.761	0.061	0.878	1.237	0.537	1.298
	Front	0.286	0.402	0.761	0.006	0.688	1.047	0.292	1.053
	Edge 1		0.402	0.485	0.009				
	Edge 2								
	Edge 3	0.425							
Edge 4	0.247	0.177	0.761	0.028	0.424	1.008	0.275	1.036	
Product Specific 10-g (10-g SAR)	All position			1.677					

Note(s):

- Green value is estimated SAR value.
- SPLSR Hotspot Combination Step.1) Perform enlarged zoom scan (Volume scan) on the co-located antenna pair to determine 1g/10g aggregate SAR. Refer to the Sec.12.12 for detailed Volume Scan Result.
- SPLSR Hotspot Combination Step.2) Apply SPLSR procedure for the spatially separated antenna and aggregate SAR distribution of the co-located antenna pair. Hybrid SPLSR procedure was applied for the spatially separated main bands and unlicensed bands for Multi-band Combined results.
- Simultaneous transmission scenario (1+3) is subset of (1+3+4) scenario.

12.7 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)	All position	0.280	0.100	0.466	0.055	0.380	0.746	0.335	0.801
Body-Worn (1-g SAR)	All position	0.379	0.200	0.457	0.023	0.579	0.836	0.402	0.859
Hotspot (1-g SAR)	Rear	0.476	0.402	0.761	0.061	0.878	1.237	0.537	1.298
	Front	0.246	0.402	0.761	0.006	0.648	1.007	0.252	1.013
	Edge 1		0.402	0.485	0.009				
	Edge 2	0.307							
	Edge 3	0.223							
	Edge 4	0.246	0.177	0.761	0.028	0.423	1.007	0.274	1.035
Product Specific 10-g (10-g SAR)	All position			1.677					

12.8 Sum of the SAR for LTE Band 13 & 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)	All position	0.387	0.100	0.466	0.055	0.487	0.853	0.442	0.908
Body-Worn (1-g SAR)	All position	0.455	0.200	0.457	0.023	0.655	0.912	0.478	0.935
Hotspot (1-g SAR)	Rear	0.753	0.402	0.761	0.061	1.155	1.514	0.814	1.575
	Front	0.327	0.402	0.761	0.006	0.729	1.088	0.333	1.094
	Edge 1		0.402	0.485	0.009				
	Edge 2	0.504							
	Edge 3	0.415							
	Edge 4	0.340	0.177	0.761	0.028	0.517	1.101	0.368	1.129
Product Specific 10-g (10-g SAR)	All position			1.677					

Note(s):

- Green value is estimated SAR value.

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)	All position	0.372	0.100	0.466	0.055	0.472	0.838	0.427	0.893
Body-Worn (1-g SAR)	All position	0.435	0.200	0.457	0.023	0.635	0.892	0.458	0.915
Hotspot (1-g SAR)	Rear	0.953	0.402	0.761	0.061	1.355	1.714	1.014	1.775
	Front	0.334	0.402	0.761	0.006	0.736	1.095	0.340	1.101
	Edge 1		0.402	0.485	0.009				
	Edge 2	0.508							
	Edge 3	0.492							
Edge 4	0.315	0.177	0.761	0.028	0.492	1.076	0.343	1.104	
Product Specific 10-g (10-g SAR)	All position			1.677					

SAR to Peak Location Separation Ratio (SPLSR)

RF Exposure	Test Position	Standalone SAR (W/kg)				Σ SAR (W/kg)	Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/No) <i>Note.2</i>	Figure	
		WWAN	DTS	UNII	BT						
		1	2	3	4						
Hotspot (1-g SAR)	Rear	0.953		0.761	0.061	1+3+4	1.775			3	
		0.953		0.761		1+3	1.714	156.9	0.01		No
		0.953			0.061	1+4	1.014	148.2	0.01		No
				0.761	0.061	3+4	0.822	12.5	0.06		Yes
Hybrid SPLSR <i>Note.3</i>		0.953		0.762		1+(3+4)	1.715	156.5	0.01	No	3-a

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)	All position	0.380	0.100	0.466	0.055	0.480	0.846	0.435	0.901
Body-Worn (1-g SAR)	All position	0.457	0.200	0.457	0.023	0.657	0.914	0.480	0.937
Hotspot (1-g SAR)	Rear	0.935	0.402	0.761	0.061	1.337	1.696	0.996	1.757
	Front	0.789	0.402	0.761	0.006	1.191	1.550	0.795	1.556
	Edge 1		0.402	0.485	0.009				
	Edge 2								
	Edge 3	0.499							
Edge 4	0.433	0.177	0.761	0.028	0.610	1.194	0.461	1.222	
Product Specific 10-g (10-g SAR)	All position			1.677					

SAR to Peak Location Separation Ratio (SPLSR)

RF Exposure	Test Position	Standalone SAR (W/kg)				Σ SAR (W/kg)	Calculated distance (mm)	SPLSR (≤ 0.04)	Volume Scan (Yes/No) <i>Note.2</i>	Figure	
		WWAN	DTS	UNII	BT						
		1	2	3	4						
Hotspot (1-g SAR)	Rear	0.935		0.761	0.061	1+3+4	1.757			4	
		0.935		0.761		1+3	1.696	149.2	0.01		No
		0.935			0.061	1+4	0.996	138.2	0.01		No
				0.761	0.061	3+4	0.822	12.5	0.06		Yes
Hybrid SPLSR <i>Note.3</i>				0.762		1+(3+4)	0.762	148.2	0.00	No	4-a

Note(s):

- Green value is estimated SAR value.
- SPLSR Hotspot Combination Step.1) Perform enlarged zoom scan (Volume scan) on the co-located antenna pair to determine 1g/10g aggregate SAR. Refer to the Sec.12.12 for detailed Volume Scan Result.
- SPLSR Hotspot Combination Step.2) Apply SPLSR procedure for the spatially separated antenna and aggregate SAR distribution of the co-located antenna pair. Hybrid SPLSR procedure was applied for the spatially separated main bands and unlicensed bands for Multi-band Combined results.
- Simultaneous transmission scenario (1+3) is subset of (1+3+4) scenario.

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)	All position	0.250	0.100	0.466	0.055	0.350	0.716	0.305	0.771
Body-Worn (1-g SAR)	All position	0.498	0.200	0.457	0.023	0.698	0.955	0.521	0.978
Hotspot (1-g SAR)	Rear	0.622	0.402	0.761	0.061	1.024	1.383	0.683	1.444
	Front	0.379	0.402	0.761	0.006	0.781	1.140	0.385	1.146
	Edge 1		0.402	0.485	0.009				
	Edge 2								
	Edge 3	0.443							
	Edge 4	0.260	0.177	0.761	0.028	0.437	1.021	0.288	1.049
Product Specific 10-g (10-g SAR)	All position			1.677					

Note(s):

- Green value is estimated SAR value.

12.12 Volume Scan Results

RF Exposure	Test Position	Configuration	Band	Original Measured SAR (W/kg)	Volume Scan Result	Plot No.	Multi-Band Combined factor	Multi-Band Combined Result	Plot No.
Hotspot	Rear	UNII + BT	UNII	0.686	0.647	1	1.109	0.762	3
			BT	0.040	0.051	2	1.540		

Note(s):

- Multi-band Combined factor is the compensation value of power and duty.
- For Volume Scan plot number in this section, please refer to the Appendix G.

Conclusion:

Simultaneous Transmission SAR analysis results is satisfied the FCC Limit requirement according to follow procedures with “Sum of SAR” or “SPLSR” or “SPLSR Hotspot combination(including Volume Scan)”.

Appendixes

Refer to separated files for the following appendixes.

4790215265-S1 FCC Report SAR_App A_Photos & Ant. Locations

4790215265-S1 FCC Report SAR_App B_Highest SAR Test Plots

4790215265-S1 FCC Report SAR_App C_System Check Plots

4790215265-S1 FCC Report SAR_App D_SAR Tissue Ingredients

4790215265-S1 FCC Report SAR_App E_Probe Cal. Certificates

4790215265-S1 FCC Report SAR_App F_Dipole Cal. Certificates

4790215265-S1 FCC Report SAR_App G_Volume Scan Results

4790215265-S1 FCC Report SAR_App H_SPLSR criteria plots

END OF REPORT