



SAR EVALUATION REPORT

IEEE Std 1528-2013

For

GSM/WCDMA/LTE Phablet with BT, DTS b/g/n

FCC ID: A3LSMM127F

Model Name: SM-M127F/DS, SM-M127F

Report Number: 13548896-S1V2

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Prepared for

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Date	Revisions	Revised By
V1	12/4/2020	Initial Issue	--
V2	12/9/2020	Sections 1/6/7/9/10/12: (Updated in accordance to TCB Feedback) Section 9.3 (Added LTE B4 power) Section 10.7(Added LTE B4 Test data) Section 10.10 (Fixed Typo) Section 12.2 (Updated values, Removed Extremities)	Jason Kuo

Table of Contents

1. Attestation of Test Results	5
2. Test Specification, Methods and Procedures.....	6
3. Facilities and Accreditation.....	6
4. SAR Measurement System & Test Equipment	7
4.1. SAR Measurement System.....	7
4.2. SAR Scan Procedures.....	8
4.3. Test Equipment.....	10
5. Measurement Uncertainty.....	10
6. Device Under Test (DUT) Information	11
6.1. DUT Description	11
6.2. Wireless Technologies.....	12
6.3. General LTE SAR Test and Reporting Considerations.....	13
6.4. LTE (TDD) Considerations.....	15
6.5. Power Back-off Operation.....	16
7. RF Exposure Conditions (Test Configurations).....	17
8. Dielectric Property Measurements & System Check	19
8.1. Dielectric Property Measurements	19
8.2. System Check.....	21
9. Conducted Output Power Measurements.....	23
9.1. GSM	23
9.2. W-CDMA	26
9.3. LTE.....	31
9.4. Wi-Fi 2.4GHz (DTS Band)	45
9.5. Bluetooth	46
10. Measured and Reported (Scaled) SAR Results.....	48
10.1. GSM850.....	50
10.2. GSM1900.....	50
10.3. W-CDMA Band II.....	51
10.4. W-CDMA Band IV	52
10.5. W-CDMA Band V	52
10.6. LTE Band 2 (20MHz Bandwidth)	53
10.7. LTE Band 4 (20MHz Bandwidth)	54
10.8. LTE Band 12 (10MHz Bandwidth)	55

10.9.	<i>LTE Band 26 (15MHz Bandwidth)</i>	56
10.10.	<i>LTE Band 41 PC3 (20MHz Bandwidth)</i>	57
10.11.	<i>LTE Band 66 (20MHz Bandwidth)</i>	58
10.12.	<i>Wi-Fi (DTS Band)</i>	59
10.13.	<i>Bluetooth</i>	59
11.	SAR Measurement Variability	60
12.	Simultaneous Transmission Conditions	61
12.1.	<i>Simultaneous transmission SAR test exclusion considerations</i>	61
12.1.1.	<i>Sum of SAR</i>	61
12.2.	<i>Sum of the SAR for WWAN & Wi-Fi & BT</i>	62
Appendixes	.....	63
<i>Appendix A: SAR Setup Photos</i>	.....	63
<i>Appendix B: SAR System Check Plots</i>	.....	63
<i>Appendix C: SAR Highest Test Plots</i>	.....	63
<i>Appendix D: SAR Tissue Ingredients</i>	.....	63
<i>Appendix E: SAR Probe Certificates</i>	.....	63
<i>Appendix F: SAR Dipole Certificates</i>	.....	63
<i>Appendix G: Proximity Sensor</i>	.....	63



1. Attestation of Test Results

Applicant Name		Samsung Electronics Co. Ltd		
FCC ID		A3LSMM127F		
Model Name		SM-M127F/DS & SM-M127F		
Applicable Standards		Published RF exposure KDB procedures IEEE Std 1528-2013		
Exposure Category		SAR Limits (W/Kg)		
		Peak spatial-average (1g of tissue)	Extremities (hands, wrists, ankles, etc.) (10g of tissue)	
General population / Uncontrolled exposure		1.6	4	
RF Exposure Conditions		Equipment Class - Highest Reported SAR (W/kg)		
		PCE	DTS	DSS
Head		0.799	0.130	0.065
Body-worn		0.629	0.184	0.003
Hotspot		1.163	0.398	0.013
Extremities		1.964	N/A	N/A
Simultaneous TX	Head	0.929	0.929	0.864
	Body-worn	0.813	0.813	0.632
	Hotspot	1.561	1.561	1.176
Date Tested		10/30/2020 to 12/09/2020		
Test Results		Pass		

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of the U.S. government.

Approved & Released By: 	Prepared By: 
Devin Chang Senior Test Engineer UL Verification Services Inc.	Jason Kuo Senior Laboratory Technician UL Verification Services Inc.

2. Test Specification, Methods and Procedures

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

- 248227 D01 802.11 Wi-Fi SAR v02r02
- 447498 D01 General RF Exposure Guidance v06
- 447498 D03 Supplement C Cross-Reference v01
- 648474 D04 Handset SAR v01r03
- 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04
- 865664 D02 RF Exposure Reporting v01r02
- 941225 D01 3G SAR Procedures v03r01
- 941225 D05 SAR for LTE Devices v02r05
- 941225 D05A LTE Rel.10 KDB Inquiry Sheet
- 941225 D06 Hotspot Mode v02r01
- 941225 D07 UMPC Mini Tablet v01r02

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

- [TCB workshop](#) October 2015; RF Exposure Procedures (KDB 941225 D05A)
- [TCB workshop](#) April 2015; RF Exposure Procedures (Overlapping LTE Bands)
- [TCB workshop](#) October 2014; RF Exposure Procedures (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 (Broadband Liquid Above 3 GHz)
- [TCB workshop](#) April 2019; RF Exposure Procedures (Tissue Simulating Liquids (TSL))

3. Facilities and Accreditation

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

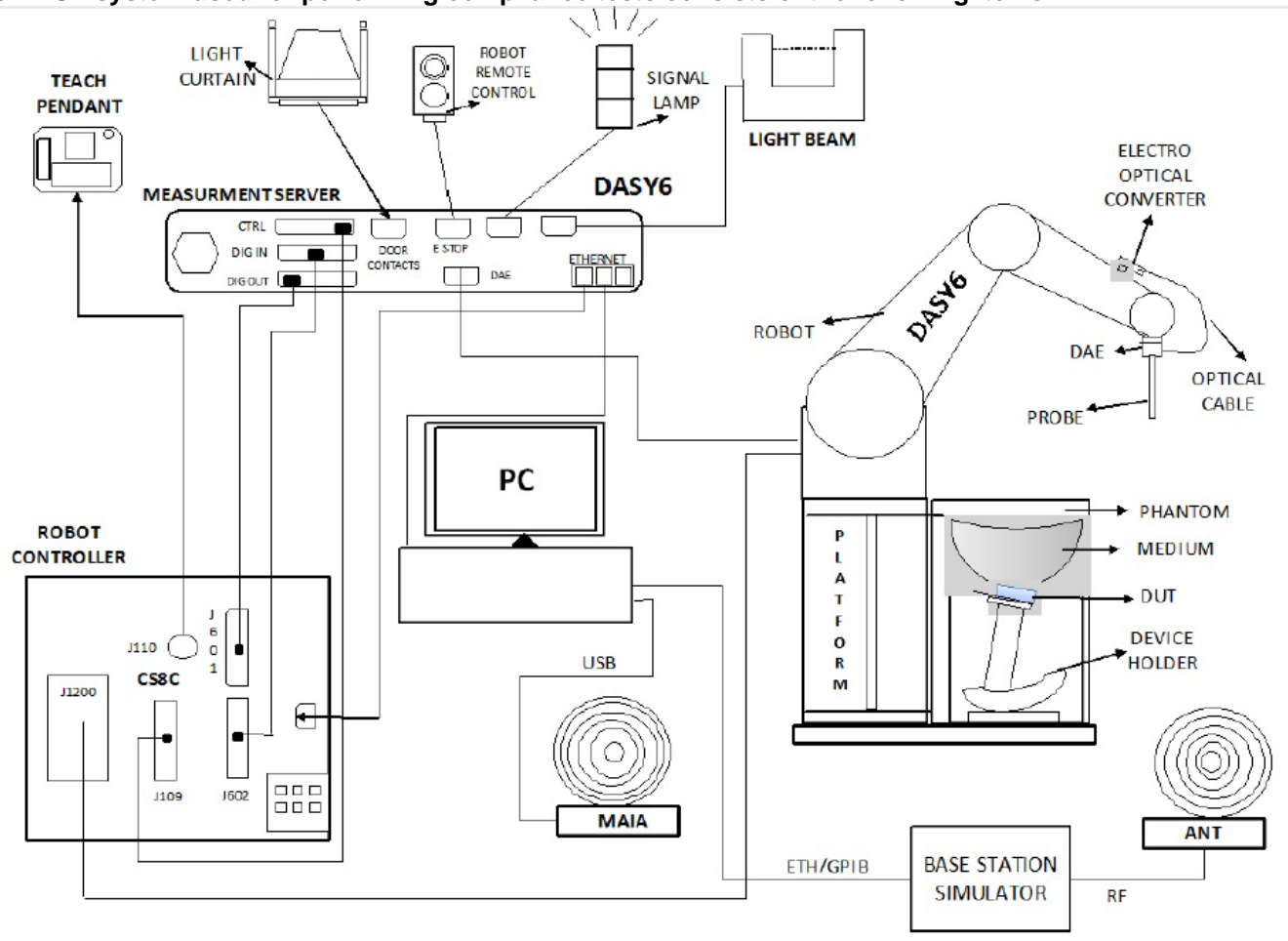
47173 Benicia Street	47266 Benicia Street
SAR Lab A	SAR Lab 1
SAR Lab B	SAR Lab 2
SAR Lab C	SAR Lab 3
SAR Lab D	SAR Lab 4
SAR Lab E	SAR Lab 5
SAR Lab F	SAR Lab 6
SAR Lab G	SAR Lab 7
SAR Lab H	SAR Lab 8

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0.

4. SAR Measurement System & Test Equipment

4.1. SAR Measurement System

The DASY 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 Win7, Win10 and the DASY52¹ and DASY6² 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.

¹ DASY52 software used: DASY52.10.4 & S 14.6.14 and older generations.

² DASY6 software used: DASY6.14 & S 14.6.14 and older generations.

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	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
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.

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
S-Parameter Network Analyzer	R&S	ZNLE6	5000-01683-0064	2/27/2021
Dielectric Probe kit	SPEAG	DAK-3.5	1103	2/18/2021
Shorting Block	SPEAG	DAK-3.5 Short	SM DAK 200 BA	2/18/2021
Thermometer	Fisher Scientific	Traceable	140493798	6/5/2021

System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
MXG Analog Signal Generator	Agilent	N5181A	MY50140630	1/21/2021
Power Sensor	Agilent	8481A	2237A31744	2/26/2021
Power Sensor	Agilent	8481A	2702A60780	2/12/2021
Power Meter	HP	437B	3125U16345	1/22/2021
Power Meter	HP	437B	3125U12345	1/22/2021
Regulated DC Power Supply	Ametek	XT15-4	1802A01877	N/A

Lab Equipment

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
E-Field Probe (SAR Lab 1)	SPEAG	EX3DV4	7463	7/24/2021
E-Field Probe (SAR Lab 2)	SPEAG	EX3DV4	7463	7/24/2021
E-Field Probe (SAR Lab 2)	SPEAG	EX3DV4	7501	5/15/2021
Data Acquisition Electronics (SAR Lab 1)	SPEAG	DAE4	1359	2/26/2021
Data Acquisition Electronics (SAR Lab 2)	SPEAG	DAE4	1472	3/12/2021
System Validation Dipole	SPEAG	D750V3	1071	11/20/2020*
System Validation Dipole	SPEAG	D835V2	4d142	8/18/2021
System Validation Dipole	SPEAG	D1750V2	1050	4/21/2021
System Validation Dipole	SPEAG	D1900V2	5d140	4/21/2021
System Validation Dipole	SPEAG	D2450V2	748	3/12/2021
System Validation Dipole	SPEAG	D2600V2	1036	4/17/2021
Thermometer (SAR Lab 2)	KEYSIGHT	14-650-118	181163664	3/11/2021

Notes:

* = Equipment was not used past its calibration date.

Other

Name of Equipment	Manufacturer	Type/Model	T Number	Serial No.	Cal. Due Date
Base Station Simulator	Rohde & Schwarz	CMW 500	T960	135384-pj	2/26/2021
Base Station Simulator	Rohde & Schwarz	CMW 500	T964	134853-ud	2/21/2021
Bluetooth Tester	Rohde & Schwarz	CBT	T258	100900-ac	2/22/2021
Lab Thermometer	Keysight	Traceable	1819	170024401	3/11/2021

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 $\leq 30\%$, 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.

Therefore, the measurement uncertainty is not required.

6. Device Under Test (DUT) Information

6.1. DUT Description

Device Dimension	Refer to Appendix A																		
Back Cover	The Back Cover is not removable																		
Battery Options	The rechargeable battery is not user accessible.																		
Accessory	Headset																		
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)																		
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)																		
Bluetooth Tethering (Hotspot)	BT Tethering mode permits the device to share its cellular data connection with other devices. <input checked="" type="checkbox"/> BT Tethering (Bluetooth 2.4 GHz)																		
Test sample information	<table border="1"> <thead> <tr> <th>S/N</th> <th>IMEI</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td>TJF2514M</td> <td>353930/95/004297/9</td> <td>Conducted</td> </tr> <tr> <td>TJF2515M</td> <td>353930/95/004084/1</td> <td>Conducted</td> </tr> <tr> <td>TJF2630M</td> <td>35390/95/004223/5</td> <td>WWAN Radiated</td> </tr> <tr> <td>TJF2464M</td> <td>353930/95/004214/4</td> <td>WLAN Radiated</td> </tr> <tr> <td>TJG0329H</td> <td>353930/95/004787/9</td> <td>WLAN Radiated</td> </tr> </tbody> </table>	S/N	IMEI	Notes	TJF2514M	353930/95/004297/9	Conducted	TJF2515M	353930/95/004084/1	Conducted	TJF2630M	35390/95/004223/5	WWAN Radiated	TJF2464M	353930/95/004214/4	WLAN Radiated	TJG0329H	353930/95/004787/9	WLAN Radiated
S/N	IMEI	Notes																	
TJF2514M	353930/95/004297/9	Conducted																	
TJF2515M	353930/95/004084/1	Conducted																	
TJF2630M	35390/95/004223/5	WWAN Radiated																	
TJF2464M	353930/95/004214/4	WLAN Radiated																	
TJG0329H	353930/95/004787/9	WLAN Radiated																	
Hardware Version	REV0.1																		
Software Version	M127FXXU0FCC_test																		

6.2. Wireless Technologies

Wireless technologies	Frequency bands	Operating mode		Duty Cycle used for SAR testing
GSM	850 1900	Voice (GMSK) GPRS (GMSK) EDGE (8PSK)	GSM Class : B Multi-Slot Class: 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 (Cat. 24) HSUPA (Cat. 6) DC-HSDPA (Cat. 24)		100%
LTE	FDD Band 2 FDD Band 4 FDD Band 5 FDD Band 12 FDD Band 17 FDD Band 26 TDD Band 41 FDD Band 66	QPSK 16QAM Rel. 10 Does not support Carrier Aggregation (CA)		100% (FDD) 63.3% (TDD) Refer to §6.4
Wi-Fi	2.4 GHz	802.11b 802.11g 802.11n (HT20)		98.9% _(802.11b) ¹
Bluetooth	2.4 GHz	BR, EDR, LE		32.19% (LE 2M, GFSK)

Notes:

1. Duty cycle for Wi-Fi is referenced from the DTS reports.

6.3. General LTE SAR Test and Reporting Considerations

Item	Description						
Frequency range, Channel Bandwidth, Numbers and Frequencies	Band 2	Frequency range: 1850 - 1910 MHz (BW = 60 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 (BW = 45 MHz)					
		Channel Bandwidth					
		20 MHz ¹	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 (BW = 25 MHz)					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz ¹	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 (BW = 17 MHz)					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz ¹	5 MHz	3 MHz	1.4 MHz
Low			23060/ 704	23035/ 701.5	23025/ 700.5	23017/ 699.7	
Mid			23095 707.5	23095/ 707.5	23095/ 707.5	23095/ 707.5	
High			23130/ 711	23155/ 713.5	23165/ 714.5	23173/ 715.3	
Band 17	Frequency range: 704 - 716 MHz (BW = 12 MHz)						
	Channel Bandwidth						
	20 MHz	15 MHz	10 MHz ¹	5 MHz ¹	3 MHz	1.4 MHz	
Low			23780/ 709	23755/ 706.5			
Mid			23790 710	23790/ 710			
High			23800/ 711	23825/ 713.5			
Band 26	Frequency range: 814 - 849 MHz (BW = 35 MHz)						
	Channel Bandwidth						
	20 MHz	15 MHz ¹	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 ²	Frequency range: 2496 - 2690 MHz (BW = 194 MHz)						
	Channel Bandwidth						
	20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz	
Low	39750 / 2506.0						
Mid- Low	40185 / 2549.5						
Mid	40620 / 2593.0						
Mid-High	41055 / 2636.5						
High	41490 / 2680.0						

	Band 66	Frequency range: 1710 - 1780 MHz (BW = 70 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 align="center">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).

6.4. 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	$6592 \cdot T_s$	$(1+X) \cdot 2192 \cdot T_s$	$(1+X) \cdot 2560 \cdot T_s$	$7680 \cdot T_s$	$(1+X) \cdot 2192 \cdot T_s$	$(1+X) \cdot 2560 \cdot T_s$
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	$6592 \cdot T_s$	$(2+X) \cdot 2192 \cdot T_s$	$(2+X) \cdot 2560 \cdot T_s$	$20480 \cdot T_s$	$(2+X) \cdot 2192 \cdot T_s$	$(2+X) \cdot 2560 \cdot T_s$
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$		
8	$24144 \cdot T_s$			-		
9	$13168 \cdot T_s$			-		
10	$13168 \cdot T_s$	$13152 \cdot T_s$	$12800 \cdot T_s$	-	-	-

Table 4.2-2: Uplink-downlink configurations & 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	63.3%
1	5 ms	D	S	U	U	D	D	S	U	U	D	43.3%
2	5 ms	D	S	U	D	D	D	S	U	D	D	23.3%
3	10 ms	D	S	U	U	U	D	D	D	D	D	31.7%
4	10 ms	D	S	U	U	D	D	D	D	D	D	21.7%
5	10 ms	D	S	U	D	D	D	D	D	D	D	11.7%
6	5 ms	D	S	U	U	U	D	S	U	U	D	53.3%

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

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.

6.5. Power Back-off Operation

This device supports multiple power back-off modes: WWAN (Ear-jack), WWAN (Hotspot), WWAN (Grip Sensor), and WWAN (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	Extremity
WWAN (Earjack) ^{1,2}	W-CDMA B2/B4 LTE B2/B41	N/A	N/A	N/A	✓
WWAN (Hotspot) ¹	LTE 41	N/A	N/A	✓	N/A
WWAN (Grip Sensor) ¹	W-CDMA B2/B4 LTE B2/B4/B5/B41/B66	N/A	N/A	N/A	✓
WWAN (RCV) ¹	W-CDMA B2/B4/B5 LTE 41	✓	N/A	N/A	N/A
WLAN	Wi-Fi 2.4GHz	✓	N/A	N/A	N/A

Note(s):

1. Tune-Up Limits for WWAN (Hotspot), WWAN (Grip Sensor), and WWAN (RCV) are all Reduced Average Powers. Please refer to §9 for all conducted power measurements.
2. Back-off priority: RCV → Ear-jack → Grip Sensor → Hotspot
3. Body-worn SAR with ear-jack connected at reduced power is tested when Body-worn measured at max power is > 1.2 W/kg.

Product Specific 10g (Extremity) Adjusted SAR Calculation

Wireless technologies	Max Tune-up Limit (dBm)	Reduced (Hotspot) Tune-Up Limit (dBm)	Power Factor	Reported SAR Limit (W/kg)
LTE B41	23.5	19.5	2.51	0.478

Note(s):

1. 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.
2. LTE 50% RB is scaled up to the Max Tune-Up Limit with MPR included.

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	DUT-to-User Separation	Test Position	Antenna-to-edge/surface	SAR Required	Note	
WWAN Main 1 ANT (GSM850/1900 W-CDMA B2/4/5 LTE B2/4/5/12/17/26/ 66)	Head	0 mm	Left Touch	N/A	Yes		
			Left Tilt (15°)	N/A	Yes		
			Right Touch	N/A	Yes		
			Right Tilt (15°)	N/A	Yes		
	Body	15 mm	Rear	N/A	Yes		
			Front	N/A	Yes		
	Hotspot	10 mm	Rear	≤ 25 mm	Yes		
			Front	≤ 25 mm	Yes		
			Edge 1 (Top)	> 25 mm	No	1	
			Edge 2 (Right)	≤ 25 mm	Yes		
			Edge 3 (Bottom)	≤ 25 mm	Yes		
			Edge 4 (Left)	≤ 25 mm	Yes		
	Extremity	0 mm	Rear	Refer to notes 2 & 3			
			Front				
			Edge 1 (Top)				
			Edge 2 (Right)				
Edge 3 (Bottom)							
Edge 4 (Left)							
WWAN Main 2 ANT (LTE B41)	Head	0 mm	Left Touch	N/A	Yes		
			Left Tilt (15°)	N/A	Yes		
			Right Touch	N/A	Yes		
			Right Tilt (15°)	N/A	Yes		
	Body	15 mm	Rear	N/A	Yes		
			Front	N/A	Yes		
	Hotspot	10 mm	Rear	≤ 25 mm	Yes		
			Front	≤ 25 mm	Yes		
			Edge 1 (Top)	≤ 25 mm	Yes		
			Edge 2 (Right)	> 25 mm	No	1	
			Edge 3 (Bottom)	> 25 mm	No	1	
			Edge 4 (Left)	≤ 25 mm	Yes		
	Extremity	0 mm	Rear	Refer to notes 2 & 3			
			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, Extremity 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, Extremity SAR is required for each test position that has an adjusted SAR to maximum power that is > 1.2 W/kg.

Wireless technologies	RF Exposure Conditions	DUT-to-User Separation	Test Position	Antenna-to-edge/surface	SAR Required	Note	
WLAN	Head	0 mm	Left Touch	N/A	Yes		
			Left Tilt (15°)	N/A	Yes		
			Right Touch	N/A	Yes		
			Right Tilt (15°)	N/A	Yes		
	Body	15 mm	Rear	N/A	Yes		
			Front	N/A	Yes		
	Hotspot	10 mm	Rear	≤ 25 mm	Yes		
			Front	≤ 25 mm	Yes		
			Edge 1 (Top)	≤ 25 mm	Yes		
			Edge 2 (Right)	> 25 mm	No	1	
			Edge 3 (Bottom)	> 25 mm	No	1	
	Extremity	0 mm	Rear	Refer to notes 2 & 3			
			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 is not supported, 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.
- For Phablet devices: when hotspot mode applies, Extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg.
- Wi-Fi Direct is only available in Hand use configuration.

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.

The dielectric constant (ϵ_r) and conductivity (σ) of typical tissue-equivalent media recipes are expected to be within $\pm 5\%$ of the required target values; but for SAR measurement systems that have implemented the SAR error compensation algorithms documented in IEEE Std 1528-2013, to automatically compensate the measured SAR results for deviations between the measured and required tissue dielectric parameters, the tolerance for ϵ_r and σ may be relaxed to $\pm 10\%$. This is limited to frequencies ≤ 3 GHz.

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

IEEE Std 1528-2013

Refer to Table 3 within the IEEE Std 1528-2013

IEC 62209-1

Refer to Table A.3 within the IEC 62209-1

Dielectric Property Measurements Results:

SAR Lab	Date	Band (MHz)	Tissue Type	Frequency (MHz)	Relative Permittivity (ϵ_r)			Conductivity (σ)		
					Measured	Target	Delta	Measured	Target	Delta
1	11/5/2020	2450	Head	2450	38.54	39.20	-1.68	1.75	1.80	-2.94
				2400	38.59	39.30	-1.80	1.71	1.75	-2.49
				2480	38.56	39.16	-1.54	1.76	1.83	-4.06
1	11/9/2020	2450	Head	2450	39.31	39.20	0.28	1.75	1.80	-2.94
				2400	39.37	39.30	0.19	1.71	1.75	-2.21
				2480	39.32	39.16	0.40	1.76	1.83	-4.01
1	11/12/2020	2600	Head	2600	40.04	39.01	2.64	1.94	1.96	-1.28
				2495	40.15	39.14	2.57	1.83	1.85	-0.95
				2690	39.92	38.90	2.63	2.01	2.06	-2.64
2	10/30/2020	835	Head	835	41.92	41.50	1.01	0.94	0.90	4.18
				805	42.07	41.68	0.94	0.93	0.90	3.84
				850	41.91	41.50	0.99	0.94	0.92	2.85
2	11/3/2020	835	Head	835	41.14	41.50	-0.87	0.92	0.90	2.36
				805	41.06	41.68	-1.49	0.91	0.90	1.53
				850	41.13	41.50	-0.89	0.93	0.92	1.57
2	11/3/2020	1750	Head	1750	39.34	40.08	-1.86	1.34	1.37	-2.12
				1710	39.31	40.15	-2.08	1.32	1.35	-2.26
				1755	39.36	40.08	-1.79	1.34	1.37	-2.03
2	11/6/2020	750	Head	750	40.70	41.96	-3.01	0.92	0.89	2.56
				660	41.13	42.42	-3.05	0.88	0.89	-0.15
				800	40.49	41.71	-2.91	0.93	0.90	4.06
2	11/6/2020	1900	Head	1900	38.31	40.00	-4.22	1.45	1.40	3.79
				1850	38.38	40.00	-4.05	1.43	1.40	2.07
				1920	38.24	40.00	-4.40	1.46	1.40	4.29
2	11/9/2020	2600	Head	2600	40.31	39.01	3.33	1.98	1.96	0.65
				2495	40.44	39.14	3.31	1.88	1.85	1.59
				2690	40.13	38.90	3.17	2.04	2.06	-0.85
2	11/16/2020	835	Head	835	41.47	41.50	-0.07	0.84	0.90	-6.94
				805	41.68	41.68	0.00	0.83	0.90	-7.60
				850	41.51	41.50	0.02	0.85	0.92	-7.57
2	11/16/2020	1900	Head	1900	38.86	40.00	-2.85	1.45	1.40	3.21
				1850	38.96	40.00	-2.60	1.39	1.40	-0.71
				1920	38.91	40.00	-2.73	1.46	1.40	4.57
2	11/30/2020	835	Head	835	43.15	41.50	3.98	0.93	0.90	2.99
				805	43.26	41.68	3.79	0.92	0.90	2.25
				850	43.10	41.50	3.86	0.94	0.92	2.23
2	11/30/2020	1750	Head	1750	41.39	40.08	3.26	1.36	1.37	-0.95
				1710	41.56	40.15	3.52	1.32	1.35	-2.04
				1755	41.38	40.08	3.25	1.36	1.37	-0.86
2	11/30/2020	1900	Head	1900	41.16	40.00	2.90	1.44	1.40	2.79
				1850	41.23	40.00	3.07	1.40	1.40	0.14
				1920	41.13	40.00	2.83	1.45	1.40	3.71
2	12/8/2020	1750	Head	1750	39.13	40.08	-2.38	1.36	1.37	-0.80
				1710	39.20	40.15	-2.36	1.33	1.35	-1.14
				1755	39.14	40.08	-2.34	1.36	1.37	-0.79

8.2. System Check

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

System Performance Check Measurement Conditions:

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

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 $\pm 10\%$ of the manufacturer calibrated dipole SAR target. Refer to Appendix B for the SAR System Check Plots.

SAR Lab	Date	Tissue Type	Dipole Type_Serial #	Dipole Cal. Due Date	Measured Results for 1g SAR				Measured Results for 10g SAR				Plot No.
					Zoom Scan to 100 mW	Normalize to 1W	Target (Ref. Value)	Delta $\pm 10\%$	Zoom Scan to 100 mW	Normalize to 1W	Target (Ref. Value)	Delta $\pm 10\%$	
1	11/5/2020	Head	D2450V2 SN:748	3/12/2021	5.120	51.20	54.14	-5.43	2.500	25.00	25.24	-0.95	1,2
1	11/9/2020	Head	D2450V2 SN:748	3/12/2021	5.210	52.10	54.14	-3.77	2.530	25.30	25.24	0.24	
1	11/12/2020	Head	D2600V2 SN:1036	4/17/2021	5.570	55.70	56.53	-1.47	2.610	26.10	25.23	3.45	3,4
2	10/30/2020	Head	D835V2 SN:4d142	8/18/2021	0.987	9.87	9.36	5.45	0.660	6.60	6.09	8.37	
2	11/3/2020	Head	D835V2 SN:4d142	8/18/2021	0.956	9.56	9.36	2.14	0.641	6.41	6.09	5.25	
2	11/3/2020	Head	D1750V2 SN:1050	4/21/2021	3.590	35.90	35.51	1.10	1.990	19.90	18.91	5.24	
2	11/4/2020	Head	D1750V2 SN:1050	4/21/2021	3.260	32.60	35.51	-8.19	1.810	18.10	18.91	-4.28	
2	11/6/2020	Head	D750V3 SN:1071	11/20/2020	0.886	8.86	8.52	3.99	0.573	5.73	5.56	3.06	5,6
2	11/6/2020	Head	D1900V2 SN:5d140	4/21/2021	4.070	40.70	38.77	4.98	2.090	20.90	19.90	5.03	7,8
2	11/9/2020	Head	D2600V2 SN:1036	4/17/2021	5.740	57.40	56.53	1.54	2.570	25.70	25.23	1.86	9,10
2	11/16/2020	Head	D835V2 SN:4d142	8/18/2021	1.020	10.20	9.36	8.97	0.660	6.60	6.09	8.37	11,12
2	11/16/2020	Head	D1900V2 SN:5d140	4/21/2021	4.040	40.40	38.77	4.20	2.080	20.80	19.90	4.52	
2	11/30/2020	Head	D835V2 SN:4d142	8/18/2021	0.964	9.64	9.36	2.99	0.619	6.19	6.09	1.64	
2	11/30/2020	Head	D1750V2 SN:1050	4/21/2021	3.890	38.90	35.51	9.55	2.060	20.60	18.91	8.94	13,14
2	11/30/2020	Head	D1900V2 SN:5d140	4/21/2021	3.740	37.40	38.77	-3.53	1.910	19.10	19.90	-4.02	
2	12/08/202	Head	D1750V2 SN:1050	4/21/2021	3.850	38.50	35.51	8.42	2.020	20.20	18.91	6.82	

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.

When different maximum output power applies to GSM voice or GPRS/EDGE time slots, GSM voice and GPRS/EDGE time slots should be tested separately to determine compliance by summing the corresponding reported SAR.

The GMSK EDGE configurations are grouped with GPRS and considered with respect to time-averaged maximum output power to determine compliance

Per October 2013 TCB Workshop:

When the maximum frame-averaged powers levels are within 0.25 dB of each other, test the configuration with the most number of time slots.

Maximum Output Power (Tune-up Limit) for GSM

SAR is not required for EDGE (8PSK) mode because the maximum output power and tune-up limit is $\leq 1/4$ dB higher than GPRS/EDGE (GMSK) or the adjusted SAR of the highest reported SAR of GPRS/EDGE (GMSK) is ≤ 1.2 W/kg.

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
GPRS/EDGE (GMSK)	CS1	1	128	824.2	32.7	23.6	34.0	25.0
			190	836.6	32.9	23.9		
			251	848.8	33.0	23.9		
		2	128	824.2	30.3	24.3	31.5	25.5
			190	836.6	30.6	24.5		
			251	848.8	30.5	24.5		
		3	128	824.2	28.9	24.7	30.0	25.7
			190	836.6	29.2	24.9		
			251	848.8	29.1	24.8		
		4	128	824.2	27.8	24.8	28.5	25.5
			190	836.6	27.7	24.7		
			251	848.8	27.8	24.8		
EDGE (8PSK)	MCS5	1	128	824.2	27.1	18.1	27.5	18.5
			190	836.6	27.1	18.0		
			251	848.8	27.1	18.1		
		2	128	824.2	24.6	18.6	25.5	19.5
			190	836.6	25.0	19.0		
			251	848.8	24.7	18.7		
		3	128	824.2	23.9	19.6	24.0	19.7
			190	836.6	23.7	19.5		
			251	848.8	23.9	19.6		
		4	128	824.2	22.1	19.1	22.5	19.5
			190	836.6	22.3	19.2		
			251	848.8	22.1	19.1		

Notes:

Based on the Tune-up Procedure, GPRS/EDGE (GMSK) mode with 3 time slots for Max power have maximum frame-averaged power.

GSM1900 Measured Results

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			
					Measured		Tune-up Limit	
					Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr
GPRS/EDGE (GMSK)	CS1	1	512	1850.2	29.3	20.2	31.0	22.0
			661	1880.0	29.3	20.2		
			810	1909.8	29.4	20.3		
		2	512	1850.2	26.2	20.2	28.0	22.0
			661	1880.0	26.1	20.0		
			810	1909.8	26.1	20.1		
		3	512	1850.2	24.4	20.1	26.0	21.7
			661	1880.0	24.4	20.2		
			810	1909.8	24.2	19.9		
		4	512	1850.2	22.6	19.6	24.0	21.0
			661	1880.0	22.5	19.5		
			810	1909.8	22.5	19.5		
EDGE (8PSK)	MCS5	1	512	1850.2	25.5	16.5	26.5	17.5
			661	1880.0	25.6	16.6		
			810	1909.8	25.4	16.3		
		2	512	1850.2	23.5	17.5	24.5	18.5
			661	1880.0	23.5	17.5		
			810	1909.8	23.6	17.5		
		3	512	1850.2	22.0	17.8	23.0	18.7
			661	1880.0	22.0	17.7		
			810	1909.8	21.9	17.6		
		4	512	1850.2	20.3	17.3	21.5	18.5
			661	1880.0	20.5	17.4		
			810	1909.8	20.3	17.3		

Notes:

Based on the Tune-up Procedure, GPRS/EDGE (GMSK) mode with 2 time slots for Max power have maximum frame-averaged power.

9.2. W-CDMA

Per KDB 941225 D01 3G SAR Procedures for W-CDMA:

Maximum output power is verified on the high, middle and low channels and using the appropriate 12.2 kbps RMC with TPC (transmit power control) set to all "1's"

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. A summary of these settings is illustrated below:

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 procedures in table C.10.1.4 of 3GPP TS 34.121-1. A summary of these settings is illustrated below:

Table C.10.1.4: β values for transmitter characteristics tests with HS-DPCCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note 1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (Note 4)	15/15 (Note 4)	64	12/15 (Note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 30/15$ with $\beta_{HS} = 30/15 * \beta_c$.

Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, Δ_{ACK} and $\Delta_{NACK} = 30/15$ with $\beta_{HS} = 30/15 * \beta_c$, and $\Delta_{CQI} = 24/15$ with $\beta_{HS} = 24/15 * \beta_c$.

Note 3: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{HS}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 4: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$.

HSUPA Setup Procedures used to establish the test signals

The following 5 Sub-tests were completed according to procedures in table C.11.1.3 of 3GPP TS 34.121-1. A summary of these settings is illustrated below:

Table C.11.1.3: β values for transmitter characteristics tests with HS-DPCCH and E-DCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note 1)	β_{ec}	β_{ed} (Note 4) (Note 5)	β_{ed} (SF)	β_{ed} (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2) (Note 6)	AG Index (Note 5)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/25	1309/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed1}: 47/15$ $\beta_{ed2}: 47/15$	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15	0	-	-	5/15	5/15	47/15	4	1	1.0	0.0	12	67

Note 1: For sub-test 1 to 4, Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 30/15$ with $\beta_{HS} = 30/15 * \beta_c$. For sub-test 5, Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 5/15$ with $\beta_{HS} = 5/15 * \beta_c$.

Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{HS}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPCCH and E-DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 10/15$ and $\beta_d = 15/15$.

Note 4: In case of testing by UE using E-DPCCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.

Note 5: β_{ed} can not be set directly; it is set by Absolute Grant Value.

Note 6: For subtests 2, 3 and 4, UE may perform E-DPCCH power scaling at max power which could result in slightly smaller MPR values.

DC-HSDPA Setup Procedures used to establish the test signals

The following 4 Sub-tests for DC-HSDPA were completed according to procedures in table C08.1.12 of 3GPP TS 34.121-1. A summary of subtest settings is illustrated below:

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.	

Maximum Output Power (Tune-up Limit) for W-CDMA

SAR measurement is not required for the HSDPA, HSUPA, DC-HSDPA. When primary mode and the adjusted SAR is ≤ 1.2 W/kg and secondary mode is $\leq 1/4$ dB higher than the primary mode

W-CDMA Band II Measured Results

Mode	UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			Receiver Mode Average Power (dBm)			Grip / Earjack Average Power (dBm)			
			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	23.3	N/A	25.0	20.3	N/A	22.0	21.3	N/A	23.0
		9400	1880.0	23.1			20.0			21.1		
		9538	1907.6	23.0			20.0			21.0		
HSDPA	Subtest 1	9262	1852.4	22.2	0	22.5	20.3	0	20.5	21.3	0	21.5
		9400	1880.0	21.9			20.1			21.1		
		9538	1907.6	21.7			19.8			20.8		
	Subtest 2	9262	1852.4	22.2	0	22.5	20.3	0	20.5	21.3	0	21.5
		9400	1880.0	22.0			20.1			21.1		
		9538	1907.6	21.7			19.8			20.9		
	Subtest 3	9262	1852.4	21.3	0.5	22.0	20.3	0	20.5	21.3	0	21.5
		9400	1880.0	21.1			20.1			21.2		
		9538	1907.6	20.8			19.8			20.9		
	Subtest 4	9262	1852.4	21.6	0.5	22.0	20.4	0	20.5	21.3	0	21.5
		9400	1880.0	21.4			20.1			21.1		
		9538	1907.6	21.2			19.9			20.9		
HSUPA	Subtest 1	9262	1852.4	21.3	0	22.5	19.1	0	20.5	20.4	0	21.5
		9400	1880.0	21.0			19.0			20.1		
		9538	1907.6	20.8			18.7			19.8		
	Subtest 2	9262	1852.4	19.2	2	20.5	19.2	0	20.5	19.2	0	21.5
		9400	1880.0	19.0			19.0			19.1		
		9538	1907.6	18.7			18.8			19.0		
	Subtest 3	9262	1852.4	20.3	1	21.5	19.2	0	20.5	20.4	0	21.5
		9400	1880.0	20.1			19.0			20.2		
		9538	1907.6	19.8			18.7			19.9		
	Subtest 4	9262	1852.4	19.2	2	20.5	19.2	0	20.5	19.2	0	21.5
		9400	1880.0	19.0			19.0			19.1		
		9538	1907.6	18.7			18.8			19.0		
	Subtest 5	9262	1852.4	21.2	0	22.5	20.3	0	20.5	21.3	0	21.5
		9400	1880.0	21.0			20.1			21.1		
		9538	1907.6	20.8			19.8			20.9		
DC-HSDPA	Subtest 1	9262	1852.4	22.2	0	22.5	20.3	0	20.5	20.3	0	21.5
		9400	1880.0	21.9			20.1			21.1		
		9538	1907.6	21.6			19.7			20.8		
	Subtest 2	9262	1852.4	22.2	0	22.5	20.3	0	20.5	20.3	0	21.5
		9400	1880.0	22.0			20.1			21.1		
		9538	1907.6	21.6			19.7			20.8		
	Subtest 3	9262	1852.4	20.8	0.5	22.0	20.3	0	20.5	20.8	0	21.5
		9400	1880.0	20.6			20.1			20.7		
		9538	1907.6	20.3			19.7			20.3		
	Subtest 4	9262	1852.4	21.5	0.5	22.0	20.3	0	20.5	21.3	0	21.5
		9400	1880.0	21.3			20.1			21.1		
		9538	1907.6	21.2			19.8			20.9		

Notes:

It is expected by the manufacturer that MPR for some HSPA subtests may be up to 3dB more than specified by 3GPP, but also as low as 0dB according to the chipset implementation in this model.

W-CDMA Band IV Measured Results

Mode	UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			Receiver Mode Average Power (dBm)			Grip / Earjack Average Power (dBm)			
			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	23.3	N/A	25.0	20.3	N/A	22.0	21.0	N/A	23.0
		1413	1732.6	23.3			20.3			21.1		
		1513	1752.6	23.2			20.0			20.5		
HSDPA	Subtest 1	1312	1712.4	21.5	0	22.0	20.1	0	20.5	21.0	0	21.5
		1413	1732.6	21.3			20.2			21.0		
		1513	1752.6	20.8			19.3			20.3		
	Subtest 2	1312	1712.4	21.5	0	22.0	20.1	0	20.5	21.0	0	21.5
		1413	1732.6	21.3			20.2			21.0		
		1513	1752.6	20.8			19.3			20.3		
	Subtest 3	1312	1712.4	20.2	0.5	21.5	20.5	0	20.5	20.4	0	21.5
		1413	1732.6	20.0			20.5			20.5		
		1513	1752.6	19.5			20.3			19.7		
	Subtest 4	1312	1712.4	20.6	0.5	21.5	20.5	0	20.5	20.7	0	21.5
		1413	1732.6	20.3			20.5			20.8		
		1513	1752.6	20.0			20.3			20.0		
HSUPA	Subtest 1	1312	1712.4	20.5	0	22.0	19.2	0	20.5	20.1	0	21.5
		1413	1732.6	20.6			19.4			20.1		
		1513	1752.6	19.9			18.5			19.4		
	Subtest 2	1312	1712.4	18.5	2	20.0	18.5	0	20.5	18.3	2	19.5
		1413	1732.6	18.6			18.6			18.4		
		1513	1752.6	17.8			18.0			18.0		
	Subtest 3	1312	1712.4	20.1	1	21.0	19.3	0	20.5	19.9	1	20.5
		1413	1732.6	20.2			19.4			20.0		
		1513	1752.6	19.4			18.5			19.2		
	Subtest 4	1312	1712.4	18.5	2	20.0	18.5	0	20.5	18.3	2	19.5
		1413	1732.6	18.6			18.6			18.4		
		1513	1752.6	17.8			18.0			18.0		
Subtest 5	1312	1712.4	21.1	0	22.0	20.3	0	20.5	20.7	0	21.5	
	1413	1732.6	21.1			20.4			20.8			
	1513	1752.6	20.1			19.6			20.1			
DC-HSDPA	Subtest 1	1312	1712.4	21.5	0	22.0	20.3	0	20.5	20.9	0	21.5
		1413	1732.6	21.3			20.2			20.8		
		1513	1752.6	20.8			19.7			20.4		
	Subtest 2	1312	1712.4	21.5	0	22.0	20.3	0	20.5	21.0	0	21.5
		1413	1732.6	21.3			20.2			20.9		
		1513	1752.6	20.8			19.7			20.5		
	Subtest 3	1312	1712.4	20.2	0.5	21.5	20.2	0	20.5	20.0	0	21.5
		1413	1732.6	20.0			20.0			19.8		
		1513	1752.6	19.5			19.5			19.4		
	Subtest 4	1312	1712.4	20.6	0.5	21.5	20.4	0	20.5	20.7	0	21.5
		1413	1732.6	20.3			20.2			20.5		
		1513	1752.6	20.0			19.7			20.1		

Notes:

It is expected by the manufacturer that MPR for some HSPA subtests may be up to 3dB more than specified by 3GPP, but also as low as 0dB according to the chipset implementation in this model.

W-CDMA Band V Measured Results

Mode		UL Ch No.	Freq. (MHz)	Maximum Average Power (dBm)			Receiver Mode Average Power (dBm)		
				Measured Pwr	MPR	Tune-up Limit	Measured Pwr	MPR	Tune-up Limit
Release 99	Rel 99 (RMC, 12.2 kbps)	4132	826.4	24.1	N/A	25.5	21.8	N/A	23.5
		4183	836.6	24.2			21.9		
		4233	846.6	24.3			22.0		
HSDPA	Subtest 1	4132	826.4	21.8	0	22.5	21.8	0	22.0
		4183	836.6	21.8			21.8		
		4233	846.6	22.0			22.0		
	Subtest 2	4132	826.4	21.8	0	22.5	21.8	0	22.0
		4183	836.6	21.8			21.8		
		4233	846.6	22.0			22.0		
	Subtest 3	4132	826.4	20.8	0.5	22.0	20.9	0	22.0
		4183	836.6	20.9			20.9		
		4233	846.6	21.0			21.0		
	Subtest 4	4132	826.4	21.1	0.5	22.0	21.1	0	22.0
		4183	836.6	21.2			21.2		
		4233	846.6	21.3			21.3		
HSUPA	Subtest 1	4132	826.4	20.8	0	22.5	20.9	0	22.0
		4183	836.6	20.8			20.9		
		4233	846.6	21.0			21.0		
	Subtest 2	4132	826.4	19.4	2	20.5	19.5	2	20.0
		4183	836.6	19.4			19.5		
		4233	846.6	19.6			19.6		
	Subtest 3	4132	826.4	20.4	1	21.5	20.5	1	21.0
		4183	836.6	20.5			20.5		
		4233	846.6	20.6			20.4		
	Subtest 4	4132	826.4	19.5	2	20.5	19.5	2	20.0
		4183	836.6	19.4			19.5		
		4233	846.6	19.6			19.6		
	Subtest 5	4132	826.4	21.3	0	22.5	21.3	0	22.0
		4183	836.6	21.4			21.4		
		4233	846.6	21.5			21.5		
DC-HSDPA	Subtest 1	4132	826.4	21.8	0	22.5	21.9	0	22.0
		4183	836.6	21.8			21.8		
		4233	846.6	22.0			21.7		
	Subtest 2	4132	826.4	21.8	0	22.5	21.9	0	22.0
		4183	836.6	21.8			21.8		
		4233	846.6	22.0			21.7		
	Subtest 3	4132	826.4	20.8	0.5	22.0	20.5	0	22.0
		4183	836.6	20.9			20.4		
		4233	846.6	21.0			20.6		
	Subtest 4	4132	826.4	21.2	0.5	22.0	21.3	0	22.0
		4183	836.6	21.2			21.2		
		4233	846.6	21.3			21.0		

Notes:

It is expected by the manufacturer that MPR for some HSPA subtests may be up to 3dB more than specified by 3GPP, but also as low as 0dB according to the chipset implementation in this model.

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 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 the 16QAM. When the highest maximum output power for 16QAM, is \leq ½ dB higher than the QPSK or when the reported SAR for the QPSK configuration is \leq 1.45 W/kg.

Please refer to section 6.3. for LTE detail test channels.

RF Air interface	Mode	Tune-up PowerLimit (dBm)			
		Maximum	Grip Sensor /Ear-Jack	Hotspot	RCV
LTE Band 2	QPSK	25.0	23.0		
LTE Band 4	QPSK	25.0	22.0		
LTE Band 5	QPSK	25.0	23.0		
LTE Band 12	QPSK	24.5			
LTE Band 17	QPSK	24.0			
LTE Band 26	QPSK	25.0			
LTE Band 41	QPSK	23.5	19.5	19.5	20.5
LTE Band 66	QPSK	24.5	22.5		

LTE Band 2 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Grip Sensor / Earjack Average Power (dBm)				
				18700	18900	19100	MPR	Tune-up Limit	18700	18900	19100	MPR	Tune-up Limit
				1860 MHz	1880 MHz	1900 MHz			1860 MHz	1880 MHz	1900 MHz		
20 MHz	QPSK	1	0	23.5	23.2	23.4	0	25.0	21.4	21.2	21.4	0	23
		1	49	23.5	23.2	23.4	0	25.0	21.3	21.1	21.3	0	23
		1	99	23.4	23.2	23.4	0	25.0	21.3	21.1	21.3	0	23
		50	0	22.6	22.3	22.4	1	24.0	21.4	21.2	21.3	0	23
		50	24	22.6	22.3	22.4	1	24.0	21.4	21.2	21.3	0	23
		50	50	22.6	22.3	22.4	1	24.0	21.4	21.2	21.3	0	23
	16QAM	100	0	22.6	22.3	22.4	1	24.0	21.4	21.2	21.3	0	23
		1	0	22.5	22.5	22.7	1	24.0	21.4	21.4	21.4	0	23
		1	49	22.5	22.4	22.6	1	24.0	21.4	21.4	21.4	0	23
		1	99	22.5	22.3	22.6	1	24.0	21.4	21.4	21.3	0	23
		50	0	21.6	21.3	21.4	2	23.0	21.4	21.3	21.3	0	23
		50	24	21.6	21.3	21.4	2	23.0	21.4	21.2	21.3	0	23
		50	50	21.6	21.3	21.4	2	23.0	21.4	21.2	21.3	0	23
		100	0	21.6	21.3	21.4	2	23.0	21.4	21.2	21.4	0	23
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Grip Sensor / Earjack Average Power (dBm)				
				18675	18900	19125	MPR	Tune-up Limit	18675	18900	19125	MPR	Tune-up Limit
				1857.5 MHz	1880 MHz	1902.5 MHz			1857.5 MHz	1880 MHz	1902.5 MHz		
15 MHz	QPSK	1	0	23.5	23.2	23.4	0	25.0	21.5	21.2	21.3	0	23
		1	37	23.5	23.2	23.4	0	25.0	21.5	21.2	21.3	0	23
		1	74	23.5	23.1	23.3	0	25.0	21.4	21.1	21.2	0	23
		36	0	22.6	22.3	22.4	1	24.0	21.5	21.2	21.2	0	23
		36	20	22.6	22.3	22.5	1	24.0	21.4	21.2	21.2	0	23
		36	39	22.6	22.3	22.4	1	24.0	21.4	21.2	21.2	0	23
		75	0	22.6	22.3	22.4	1	24.0	21.4	21.2	21.2	0	23
	16QAM	1	0	22.6	22.2	22.5	1	24.0	21.3	21.2	21.2	0	23
		1	37	22.6	22.2	22.5	1	24.0	21.3	21.2	21.2	0	23
		1	74	22.6	22.2	22.5	1	24.0	21.3	21.2	21.2	0	23
		36	0	21.6	21.3	21.5	2	23.0	21.4	21.2	21.3	0	23
		36	20	21.6	21.3	21.5	2	23.0	21.4	21.2	21.3	0	23
		36	39	21.6	21.3	21.5	2	23.0	21.4	21.2	21.3	0	23
		75	0	21.6	21.2	21.4	2	23.0	21.4	21.2	21.2	0	23
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Grip Sensor / Earjack Average Power (dBm)				
				18650	18900	19150	MPR	Tune-up Limit	18650	18900	19150	MPR	Tune-up Limit
				1855 MHz	1880 MHz	1905 MHz			1855 MHz	1880 MHz	1905 MHz		
10 MHz	QPSK	1	0	23.5	23.2	23.3	0	25.0	21.5	21.2	21.2	0	23
		1	25	23.5	23.2	23.3	0	25.0	21.5	21.2	21.2	0	23
		1	49	23.5	23.2	23.3	0	25.0	21.5	21.2	21.2	0	23
		25	0	22.6	22.3	22.4	1	24.0	21.4	21.2	21.2	0	23
		25	12	22.6	22.3	22.4	1	24.0	21.4	21.2	21.2	0	23
		25	25	22.6	22.3	22.4	1	24.0	21.4	21.2	21.2	0	23
		50	0	22.6	22.3	22.4	1	24.0	21.4	21.2	21.2	0	23
	16QAM	1	0	22.5	22.3	22.4	1	24.0	21.3	21.1	21.3	0	23
		1	25	22.4	22.3	22.4	1	24.0	21.3	21.1	21.3	0	23
		1	49	22.4	22.3	22.4	1	24.0	21.3	21.1	21.3	0	23
		25	0	21.6	21.2	21.4	2	23.0	21.5	21.2	21.3	0	23
		25	12	21.7	21.3	21.4	2	23.0	21.5	21.2	21.3	0	23
		25	25	21.6	21.2	21.4	2	23.0	21.5	21.2	21.3	0	23
		50	0	21.6	21.3	21.4	2	23.0	21.5	21.2	21.2	0	23

LTE Band 2 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Grip Sensor / Earjack Average Power (dBm)				
				18625	18900	19175	MPR	Tune-up Limit	18625	18900	19175	MPR	Tune-up Limit
				1852.5 MHz	1880 MHz	1907.5 MHz			1852.5 MHz	1880 MHz	1907.5 MHz		
5 MHz	QPSK	1	0	23.6	23.2	23.3	0	25.0	21.5	21.2	21.2	0	23
		1	12	23.5	23.2	23.2	0	25.0	21.5	21.2	21.2	0	23
		1	24	23.6	23.2	23.3	0	25.0	21.6	21.2	21.2	0	23
		12	0	22.6	22.3	22.4	1	24.0	21.5	21.2	21.2	0	23
		12	7	22.6	22.3	22.4	1	24.0	21.5	21.2	21.2	0	23
		12	13	22.6	22.3	22.4	1	24.0	21.5	21.2	21.2	0	23
	16QAM	25	0	22.6	22.3	22.4	1	24.0	21.5	21.2	21.2	0	23
		1	0	22.6	22.3	22.2	1	24.0	21.5	21.0	21.1	0	23
		1	12	22.6	22.3	22.2	1	24.0	21.4	21.0	21.1	0	23
		1	24	22.6	22.3	22.2	1	24.0	21.5	21.0	21.1	0	23
		12	0	21.5	21.3	21.4	2	23.0	21.5	21.3	21.3	0	23
		12	7	21.5	21.3	21.3	2	23.0	21.5	21.3	21.2	0	23
		12	13	21.5	21.3	21.3	2	23.0	21.5	21.3	21.2	0	23
		25	0	21.6	21.3	21.4	2	23.0	21.6	21.2	21.2	0	23
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Grip Sensor / Earjack Average Power (dBm)				
				18615	18900	19185	MPR	Tune-up Limit	18615	18900	19185	MPR	Tune-up Limit
				1851.5 MHz	1880 MHz	1908.5 MHz			1851.5 MHz	1880 MHz	1908.5 MHz		
3 MHz	QPSK	1	0	23.5	23.1	23.3	0	25.0	21.5	21.2	21.3	0	23
		1	8	23.5	23.2	23.3	0	25.0	21.6	21.2	21.3	0	23
		1	14	23.5	23.2	23.3	0	25.0	21.5	21.2	21.3	0	23
		8	0	22.5	22.2	22.3	1	24.0	21.5	21.2	21.2	0	23
		8	4	22.6	22.2	22.3	1	24.0	21.5	21.2	21.2	0	23
		8	7	22.6	22.2	22.3	1	24.0	21.5	21.2	21.2	0	23
	16QAM	15	0	22.6	22.3	22.4	1	24.0	21.5	21.2	21.2	0	23
		1	0	22.4	22.3	22.5	1	24.0	21.4	21.1	21.0	0	23
		1	8	22.4	22.2	22.5	1	24.0	21.3	21.1	21.0	0	23
		1	14	22.4	22.3	22.5	1	24.0	21.3	21.1	21.0	0	23
		8	0	21.5	21.3	21.4	2	23.0	21.5	21.3	21.3	0	23
		8	4	21.5	21.3	21.4	2	23.0	21.6	21.3	21.3	0	23
		8	7	21.5	21.3	21.4	2	23.0	21.6	21.3	21.3	0	23
		15	0	21.6	21.2	21.3	2	23.0	21.5	21.2	21.2	0	23
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Grip Sensor / Earjack Average Power (dBm)				
				18607	18900	19193	MPR	Tune-up Limit	18607	18900	19193	MPR	Tune-up Limit
				1850.7 MHz	1880 MHz	1909.3 MHz			1850.7 MHz	1880 MHz	1909.3 MHz		
1.4 MHz	QPSK	1	0	23.6	23.3	23.3	0	25.0	21.7	21.3	21.3	0	23
		1	3	23.6	23.3	23.3	0	25.0	21.6	21.3	21.2	0	23
		1	5	23.6	23.3	23.3	0	25.0	21.7	21.3	21.3	0	23
		3	0	23.5	23.2	23.3	0	25.0	21.5	21.2	21.3	0	23
		3	1	23.5	23.2	23.3	0	25.0	21.5	21.2	21.2	0	23
		3	3	23.5	23.2	23.3	0	25.0	21.5	21.2	21.3	0	23
	16QAM	6	0	22.5	22.3	22.4	1	24.0	21.5	21.2	21.2	0	23
		1	0	22.6	22.1	22.4	1	24.0	21.4	21.0	21.1	0	23
		1	3	22.4	22.1	22.4	1	24.0	21.7	21.0	21.1	0	23
		1	5	22.5	22.2	22.4	1	24.0	21.5	21.0	21.2	0	23
		3	0	22.6	22.3	22.3	1	24.0	21.5	21.2	21.2	0	23
		3	1	22.6	22.3	22.4	1	24.0	21.5	21.3	21.2	0	23
		3	3	22.6	22.3	22.3	1	24.0	21.5	21.3	21.2	0	23
		6	0	21.5	21.3	21.3	2	23.0	21.6	21.2	21.2	0	23

LTE Band 4 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Grip Sensor Average Power (dBm)				
				20175		MPR	Tune-up Limit	20175		MPR	Tune-up Limit		
				1732.5 MHz				1732.5 MHz					
20 MHz	QPSK	1	0	23.0		0	25	22.0		0	22		
		1	49	23.0		0	25	22.0		0	22		
		1	99	23.0		0	25	22.0		0	22		
		50	0	22.1		1	24	22.0		0	22		
		50	24	22.0		1	24	22.0		0	22		
		50	50	22.1		1	24	21.9		0	22		
		100	0	22.0		1	24	22.0		0	22		
	16QAM	1	0	22.0		1	24	21.9		0	22		
		1	49	22.0		1	24	21.8		0	22		
		1	99	22.0		1	24	21.7		0	22		
		50	0	21.0		2	23	21.0		0	22		
		50	24	21.0		2	23	21.0		0	22		
		50	50	21.0		2	23	21.0		0	22		
		100	0	21.0		2	23	21.1		0	22		
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Grip Sensor Average Power (dBm)				
				20025	20175	20325	MPR	Tune-up Limit	20025	20175	20325	MPR	Tune-up Limit
				1717.5 MHz	1732.5 MHz	1747.5 MHz			1717.5 MHz	1732.5 MHz	1747.5 MHz		
15 MHz	QPSK	1	0	22.9	23.0	22.6	0	25	19.9	20.0	19.6	0	22
		1	37	22.8	22.9	22.6	0	25	19.9	20.0	19.5	0	22
		1	74	22.8	22.9	22.6	0	25	19.8	19.9	19.5	0	22
		36	0	21.9	21.9	21.5	1	24	19.9	20.0	19.6	0	22
		36	20	21.9	21.9	21.5	1	24	20.0	20.0	19.6	0	22
		36	39	21.9	21.9	21.5	1	24	20.0	20.0	19.6	0	22
		75	0	21.9	21.9	21.5	1	24	20.0	20.0	19.6	0	22
	16QAM	1	0	21.8	22.1	21.5	1	24	19.9	20.1	19.5	0	22
		1	37	21.7	22.0	21.5	1	24	19.8	20.1	19.5	0	22
		1	74	21.7	22.0	21.5	1	24	19.8	20.0	19.5	0	22
		36	0	20.9	21.0	20.5	2	23	20.0	20.0	19.6	0	22
		36	20	20.9	21.0	20.5	2	23	19.9	20.0	19.7	0	22
		36	39	20.9	21.0	20.5	2	23	19.9	19.9	19.6	0	22
		75	0	20.9	20.9	20.5	2	23	20.0	20.0	19.6	0	22
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Grip Sensor Average Power (dBm)				
				20000	20175	20350	MPR	Tune-up Limit	20000	20175	20350	MPR	Tune-up Limit
				1715 MHz	1732.5 MHz	1750 MHz			1715 MHz	1732.5 MHz	1750 MHz		
10 MHz	QPSK	1	0	22.9	23.0	22.6	0	25	20.0	20.0	19.5	0	22
		1	25	22.9	22.9	22.5	0	25	20.0	19.9	19.5	0	22
		1	49	22.9	23.0	22.5	0	25	20.0	20.0	19.5	0	22
		25	0	21.9	21.9	21.5	1	24	20.0	20.0	19.5	0	22
		25	12	21.9	21.9	21.5	1	24	19.9	20.0	19.5	0	22
		25	25	21.9	21.9	21.5	1	24	19.9	19.9	19.5	0	22
		50	0	21.9	21.9	21.5	1	24	20.0	20.0	19.5	0	22
	16QAM	1	0	21.9	21.8	21.5	1	24	19.7	19.9	19.5	0	22
		1	25	21.8	21.8	21.5	1	24	19.7	19.9	19.5	0	22
		1	49	21.8	21.8	21.5	1	24	19.7	19.9	19.5	0	22
		25	0	20.9	21.0	20.6	2	23	20.0	20.0	19.5	0	22
		25	12	20.9	21.0	20.6	2	23	20.0	20.0	19.5	0	22
		25	25	20.9	20.9	20.6	2	23	20.0	20.0	19.5	0	22
		50	0	20.9	20.9	20.5	2	23	20.0	20.0	19.5	0	22

LTE Band 4 Measured Results Continue

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Grip Sensor Average Power (dBm)				
				19975	20175	20375	MPR	Tune-up Limit	19975	20175	20375	MPR	Tune-up Limit
				1712.5 MHz	1732.5 MHz	1752.5 MHz			1712.5 MHz	1732.5 MHz	1752.5 MHz		
5 MHz	QPSK	1	0	23.0	22.9	22.5	0	25	19.9	19.9	19.5	0	22
		1	12	22.9	22.9	22.5	0	25	19.9	19.9	19.5	0	22
		1	24	22.9	22.9	22.5	0	25	19.8	19.9	19.5	0	22
		12	0	21.9	21.9	21.5	1	24	19.9	19.9	19.5	0	22
		12	7	21.9	21.9	21.5	1	24	19.9	19.9	19.5	0	22
		12	13	21.9	21.9	21.5	1	24	19.9	19.9	19.5	0	22
	16QAM	25	0	21.9	21.9	21.5	1	24	19.9	19.9	19.5	0	22
		1	0	21.8	21.9	21.5	1	24	19.7	19.8	19.5	0	22
		1	12	21.7	21.9	21.5	1	24	19.6	19.8	19.5	0	22
		1	24	21.7	21.9	21.5	1	24	19.7	19.9	19.5	0	22
		12	0	20.9	21.0	20.5	2	23	19.8	19.9	19.5	0	22
		12	7	20.9	21.0	20.5	2	23	19.8	19.9	19.5	0	22
		12	13	20.9	21.0	20.5	2	23	19.8	19.9	19.5	0	22
		25	0	21.0	20.9	20.5	2	23	19.9	20.0	19.5	0	22
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Grip Sensor Average Power (dBm)				
				19965	20175	20385	MPR	Tune-up Limit	19965	20175	20385	MPR	Tune-up Limit
				1711.5 MHz	1732.5 MHz	1753.5 MHz			1711.5 MHz	1732.5 MHz	1753.5 MHz		
3 MHz	QPSK	1	0	22.9	22.9	22.5	0	25	19.9	19.9	19.5	0	22
		1	8	22.9	22.9	22.5	0	25	19.9	19.9	19.5	0	22
		1	14	22.9	22.9	22.5	0	25	19.8	19.9	19.5	0	22
		8	0	21.9	21.9	21.5	1	24	19.8	19.9	19.5	0	22
		8	4	21.9	21.9	21.5	1	24	19.8	19.9	19.5	0	22
		8	7	21.9	21.9	21.5	1	24	19.9	19.9	19.5	0	22
	16QAM	15	0	21.9	21.9	21.5	1	24	19.8	19.9	19.5	0	22
		1	0	21.7	21.7	21.5	1	24	19.5	20.0	19.5	0	22
		1	8	21.7	21.7	21.5	1	24	19.5	20.0	19.5	0	22
		1	14	21.8	21.7	21.5	1	24	19.5	19.9	19.5	0	22
		8	0	21.0	21.0	20.5	2	23	19.9	20.0	19.5	0	22
		8	4	21.0	21.0	20.5	2	23	19.9	20.0	19.5	0	22
		8	7	21.0	21.0	20.5	2	23	19.9	20.0	19.5	0	22
		15	0	20.9	20.9	20.5	2	23	19.9	20.0	19.5	0	22
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Grip Sensor Average Power (dBm)				
				19957	20175	20393	MPR	Tune-up Limit	19957	20175	20393	MPR	Tune-up Limit
				1710.7 MHz	1732.5 MHz	1754.3 MHz			1710.7 MHz	1732.5 MHz	1754.3 MHz		
1.4 MHz	QPSK	1	0	23.0	22.9	22.5	0	25	19.9	19.9	19.5	0	22
		1	3	22.9	22.9	22.5	0	25	19.9	19.9	19.5	0	22
		1	5	23.0	22.9	22.5	0	25	19.9	20.0	19.5	0	22
		3	0	22.9	22.8	22.5	0	25	19.9	19.9	19.5	0	22
		3	1	22.8	22.9	22.5	0	25	19.9	19.9	19.5	0	22
		3	3	22.9	22.8	22.5	0	25	19.9	19.9	19.5	0	22
	16QAM	6	0	21.8	21.9	21.5	1	24	19.9	19.9	19.5	0	22
		1	0	21.9	21.7	21.5	1	24	19.6	19.8	19.5	0	22
		1	3	21.5	21.6	21.5	1	24	19.5	19.7	19.5	0	22
		1	5	21.9	21.8	21.5	1	24	19.6	19.6	19.5	0	22
		3	0	21.9	21.9	21.5	1	24	19.9	19.9	19.5	0	22
		3	1	21.9	21.9	21.5	1	24	19.9	19.9	19.5	0	22
		3	3	21.9	21.9	21.5	1	24	19.9	19.9	19.5	0	22
		6	0	21.0	20.8	20.5	2	23	19.9	19.9	19.5	0	22

LTE Band 5 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Grip Sensor Average Power (dBm)				
				20525			MPR	Tune-up Limit	20525			MPR	Tune-up Limit
				836.5 MHz					836.5 MHz				
10 MHz	QPSK	1	0	23.9			0	25.0	21.7			0	23
		1	25	23.8			0	25.0	21.7			0	23
		1	49	23.8			0	25.0	21.7			0	23
		25	0	22.6			1	24.0	21.7			0	23
		25	12	22.6			1	24.0	21.7			0	23
		25	25	22.6			1	24.0	21.7			0	23
		50	0	22.6			1	24.0	21.7			0	23
	16QAM	1	0	22.6			1	24.0	21.6			0	23
		1	25	22.6			1	24.0	21.6			0	23
		1	49	22.7			1	24.0	21.6			0	23
		25	0	21.6			2	23.0	21.7			0	23
		25	12	21.6			2	23.0	21.7			0	23
		25	25	21.6			2	23.0	21.7			0	23
		50	0	21.6			2	23.0	21.8			0	23
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Grip Sensor Average Power (dBm)				
				20425	20525	20625	MPR	Tune-up Limit	20425	20525	20625	MPR	Tune-up Limit
				826.5 MHz					846.5 MHz					846.5 MHz
5 MHz	QPSK	1	0	23.6	23.8	23.8	0	25.0	21.7	21.7	21.8	0	23
		1	12	23.6	23.8	23.7	0	25.0	21.7	21.7	21.7	0	23
		1	24	23.6	23.8	23.7	0	25.0	21.6	21.7	21.6	0	23
		12	0	22.5	22.6	22.5	1	24.0	21.7	21.7	21.7	0	23
		12	7	22.5	22.6	22.5	1	24.0	21.6	21.7	21.7	0	23
		12	13	22.5	22.6	22.5	1	24.0	21.6	21.7	21.7	0	23
		25	0	22.5	22.5	22.5	1	24.0	21.6	21.7	21.7	0	23
	16QAM	1	0	22.5	22.6	22.4	1	24.0	21.6	21.8	21.7	0	23
		1	12	22.4	22.6	22.4	1	24.0	21.5	21.8	21.7	0	23
		1	24	22.4	22.7	22.4	1	24.0	21.5	21.8	21.6	0	23
		12	0	21.5	21.7	21.5	2	23.0	21.6	21.9	21.7	0	23
		12	7	21.5	21.7	21.5	2	23.0	21.6	21.8	21.7	0	23
		12	13	21.5	21.7	21.5	2	23.0	21.6	21.8	21.7	0	23
		25	0	21.6	21.6	21.6	2	23.0	21.6	21.8	21.7	0	23
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Grip Sensor Average Power (dBm)				
				20415	20525	20635	MPR	Tune-up Limit	20415	20525	20635	MPR	Tune-up Limit
				825.5 MHz					847.5 MHz					847.5 MHz
3 MHz	QPSK	1	0	23.6	23.8	23.8	0	25.0	21.6	21.6	21.7	0	23
		1	8	23.6	23.8	23.7	0	25.0	21.6	21.6	21.7	0	23
		1	14	23.6	23.8	23.7	0	25.0	21.5	21.6	21.6	0	23
		8	0	22.6	22.6	22.5	1	24.0	21.5	21.7	21.6	0	23
		8	4	22.6	22.6	22.5	1	24.0	21.5	21.7	21.6	0	23
		8	7	22.6	22.6	22.5	1	24.0	21.5	21.7	21.6	0	23
		15	0	22.5	22.6	22.5	1	24.0	21.5	21.7	21.6	0	23
	16QAM	1	0	22.6	22.4	22.1	1	24.0	21.5	21.6	21.8	0	23
		1	8	22.5	22.5	22.1	1	24.0	21.4	21.6	21.8	0	23
		1	14	22.6	22.4	22.1	1	24.0	21.3	21.5	21.7	0	23
		8	0	21.6	21.7	21.6	2	23.0	21.5	21.7	21.7	0	23
		8	4	21.6	21.7	21.5	2	23.0	21.5	21.7	21.7	0	23
		8	7	21.6	21.7	21.5	2	23.0	21.5	21.7	21.7	0	23
		15	0	21.6	21.7	21.6	2	23.0	21.6	21.7	21.6	0	23
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Grip Sensor Average Power (dBm)				
				20407	20525	20643	MPR	Tune-up Limit	20407	20525	20643	MPR	Tune-up Limit
				824.7 MHz					848.3 MHz					848.3 MHz
1.4 MHz	QPSK	1	0	22.6	23.8	23.7	0	25.0	21.7	21.8	21.7	0	23
		1	3	23.9	23.9	23.7	0	25.0	21.6	21.7	21.7	0	23
		1	5	23.8	23.8	23.7	0	25.0	21.7	21.8	21.7	0	23
		3	0	23.7	23.6	23.6	0	25.0	21.6	21.6	21.6	0	23
		3	1	23.7	23.7	23.6	0	25.0	21.6	21.7	21.6	0	23
		3	3	23.7	23.7	23.6	0	25.0	21.6	21.6	21.6	0	23
		6	0	22.5	22.5	22.4	1	24.0	21.6	21.7	21.6	0	23
	16QAM	1	0	22.5	22.4	22.4	1	24.0	21.6	21.6	21.7	0	23
		1	3	22.5	22.4	22.2	1	24.0	21.5	21.7	21.5	0	23
		1	5	22.5	22.5	22.4	1	24.0	21.6	21.6	21.6	0	23
		3	0	22.7	22.6	22.4	1	24.0	21.6	21.7	21.6	0	23
		3	1	22.7	22.7	22.4	1	24.0	21.6	21.7	21.6	0	23
		3	3	22.7	22.7	22.4	1	24.0	21.7	21.7	21.6	0	23
		6	0	21.6	21.6	21.5	2	23.0	21.6	21.7	21.6	0	23

LTE Band 12 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				23095			MPR	Tune-up Limit
				707.5 MHz				
10 MHz	QPSK	1	0	23.1			0	24.5
		1	25	23.1			0	24.5
		1	49	23.1			0	24.5
		25	0	22.1			1	23.5
		25	12	22.0			1	23.5
		25	25	22.0			1	23.5
		50	0	22.1			1	23.5
	16QAM	1	0	22.1			1	23.5
		1	25	22.1			1	23.5
		1	49	22.1			1	23.5
		25	0	21.0			2	22.5
		25	12	21.0			2	22.5
		25	25	21.0			2	22.5
		50	0	21.0			2	22.5
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				23035	23095	23155	MPR	Tune-up Limit
				701.5 MHz					707.5 MHz	713.5 MHz
5 MHz	QPSK	1	0	22.9	23.1	22.9	0	24.5
		1	12	22.9	23.0	22.9	0	24.5
		1	24	22.9	23.0	23.0	0	24.5
		12	0	21.9	22.0	21.9	1	23.5
		12	7	21.9	22.0	22.0	1	23.5
		12	13	21.9	22.0	22.0	1	23.5
		25	0	21.8	22.0	21.9	1	23.5
	16QAM	1	0	21.9	22.0	21.9	1	23.5
		1	12	21.9	22.0	22.0	1	23.5
		1	24	21.9	22.0	22.0	1	23.5
		12	0	20.7	20.9	20.8	2	22.5
		12	7	20.7	21.0	20.8	2	22.5
		12	13	20.7	21.0	20.9	2	22.5
		25	0	20.8	20.9	20.9	2	22.5
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				23025	23095	23165	MPR	Tune-up Limit
				700.5 MHz					707.5 MHz	714.5 MHz
3 MHz	QPSK	1	0	22.9	23.0	23.0	0	24.5
		1	8	22.9	23.0	23.0	0	24.5
		1	14	22.9	23.0	23.0	0	24.5
		8	0	21.9	21.9	21.9	1	23.5
		8	4	21.9	22.0	21.9	1	23.5
		8	7	21.8	22.0	21.9	1	23.5
		15	0	21.8	22.0	21.9	1	23.5
	16QAM	1	0	21.7	22.0	21.6	1	23.5
		1	8	21.7	22.0	21.7	1	23.5
		1	14	21.7	22.0	21.9	1	23.5
		8	0	20.8	21.0	20.7	2	22.5
		8	4	20.8	20.9	20.8	2	22.5
		8	7	20.8	21.0	20.8	2	22.5
		15	0	20.8	20.9	20.9	2	22.5

LTE Band 12 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				23017	23095	23173	MPR	Tune-up Limit
				699.7 MHz	707.5 MHz	715.3 MHz		
1.4 MHz	QPSK	1	0	22.1	23.2	23.1	0	24.5
		1	3	23.3	23.2	23.0	0	24.5
		1	5	23.2	23.2	23.1	0	24.5
		3	0	23.0	23.0	22.9	0	24.5
		3	1	23.0	23.0	22.9	0	24.5
		3	3	23.0	23.0	22.9	0	24.5
		6	0	22.0	22.0	21.9	1	23.5
	16QAM	1	0	21.8	21.8	21.6	1	23.5
		1	3	21.9	21.8	21.7	1	23.5
		1	5	21.8	21.7	22.0	1	23.5
		3	0	22.1	22.0	22.0	1	23.5
		3	1	22.1	22.0	22.0	1	23.5
		3	3	22.1	22.1	22.0	1	23.5
		6	0	20.9	20.9	20.8	2	22.5

LTE Band 26 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				26865			MPR	Tune-up Limit
				831.5 MHz				
15 MHz	QPSK	1	0	23.7			0	25.0
		1	37	23.7			0	25.0
		1	74	23.7			0	25.0
		36	0	22.5			1	24.0
		36	20	22.5			1	24.0
		36	39	22.5			1	24.0
		75	0	22.5			1	24.0
	16QAM	1	0	22.4			1	24.0
		1	37	22.4			1	24.0
		1	74	22.4			1	24.0
		36	0	21.5			2	23.0
		36	20	21.5			2	23.0
		36	39	21.5			2	23.0
		75	0	21.5			2	23.0
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				26740	26865	26990	MPR	Tune-up Limit
				819 MHz	831.5 MHz	844 MHz		
10 MHz	QPSK	1	0	23.7	23.7	23.8	0	25.0
		1	25	23.7	23.7	23.7	0	25.0
		1	49	23.6	23.7	23.7	0	25.0
		25	0	22.6	22.5	22.5	1	24.0
		25	12	22.6	22.5	22.5	1	24.0
		25	25	22.5	22.5	22.5	1	24.0
		50	0	22.5	22.5	22.5	1	24.0
	16QAM	1	0	22.5	22.4	22.2	1	24.0
		1	25	22.4	22.4	22.2	1	24.0
		1	49	22.3	22.4	22.1	1	24.0
		25	0	21.6	21.4	21.6	2	23.0
		25	12	21.5	21.4	21.6	2	23.0
		25	25	21.5	21.4	21.6	2	23.0
		50	0	21.5	21.4	21.5	2	23.0
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				26715	26865	27015	MPR	Tune-up Limit
				816.5 MHz	831.5 MHz	846.5 MHz		
5 MHz	QPSK	1	0	23.7	23.6	23.8	0	25.0
		1	12	23.7	23.6	23.7	0	25.0
		1	24	23.7	23.6	23.6	0	25.0
		12	0	22.5	22.5	22.6	1	24.0
		12	7	22.5	22.4	22.6	1	24.0
		12	13	22.5	22.4	22.5	1	24.0
		25	0	22.5	22.4	22.5	1	24.0
	16QAM	1	0	22.6	22.5	22.6	1	24.0
		1	12	22.5	22.4	22.5	1	24.0
		1	24	22.5	22.5	22.5	1	24.0
		12	0	21.5	21.5	21.5	2	23.0
		12	7	21.5	21.5	21.5	2	23.0
		12	13	21.5	21.5	21.5	2	23.0
		25	0	21.5	21.4	21.6	2	23.0

LTE Band 26 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				26705	26865	27025	MPR	Tune-up Limit
				815.5 MHz	831.5 MHz	847.5 MHz		
3 MHz	QPSK	1	0	23.6	23.6	23.8	0	25.0
		1	8	23.6	23.6	23.8	0	25.0
		1	14	23.6	23.6	23.8	0	25.0
		8	0	22.5	22.4	22.6	1	24.0
		8	4	22.5	22.4	22.6	1	24.0
		8	7	22.5	22.4	22.6	1	24.0
		15	0	22.5	22.4	22.5	1	24.0
	16QAM	1	0	22.3	22.4	22.2	1	24.0
		1	8	22.3	22.4	22.2	1	24.0
		1	14	22.3	22.4	22.1	1	24.0
		8	0	21.5	21.5	21.5	2	23.0
		8	4	21.5	21.5	21.5	2	23.0
		8	7	21.5	21.5	21.5	2	23.0
		15	0	21.5	21.4	21.5	2	23.0
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				26697	26865	27033	MPR	Tune-up Limit
				814.7 MHz	831.5 MHz	848.3 MHz		
1.4 MHz	QPSK	1	0	23.8	23.7	23.7	0	25.0
		1	3	23.7	23.7	23.7	0	25.0
		1	5	23.8	23.7	23.7	0	25.0
		3	0	23.6	23.5	23.7	0	25.0
		3	1	23.6	23.5	23.7	0	25.0
		3	3	23.6	23.5	23.7	0	25.0
		6	0	22.6	22.5	22.5	1	24.0
	16QAM	1	0	22.8	22.4	22.5	1	24.0
		1	3	22.3	22.3	22.6	1	24.0
		1	5	22.8	22.4	22.5	1	24.0
		3	0	22.5	22.5	22.5	1	24.0
		3	1	22.6	22.5	22.5	1	24.0
		3	3	22.5	22.5	22.5	1	24.0
		6	0	21.5	21.4	21.6	2	23.0

LTE Band 41 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					MPR	Tune-up Limit	Receiver Mode Average Power (dBm)					MPR	Tune-up Limit	Hotspot/Grip Sensor/Earjack Mode Average Power (dBm)					MPR	Tune-up Limit
				39750	40185	40620	41055	41490			39750	40185	40620	41055	41490			39750	40185	40620	41055	41490		
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz			2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz			2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz		
20 MHz	QPSK	1	0	22.2	22.1	22.1	22.1	22.1	0	23.5	19.5	19.4	19.4	19.2	19.3	0	20.5	18.5	18.3	18.2	18.4	18.4	0	19.5
		1	49	22.1	22.0	22.0	22.0	22.0	0	23.5	19.3	19.4	19.4	19.1	19.2	0	20.5	18.3	18.2	18.1	18.3	18.4	0	19.5
		50	0	21.2	21.1	21.1	21.2	21.2	1	22.5	19.7	19.3	19.3	19.2	19.3	0	20.5	19.3	18.1	18.1	19.3	19.3	0	19.5
		50	24	21.1	21.1	21.1	21.2	21.2	1	22.5	19.3	19.3	19.2	19.2	19.2	0	20.5	18.2	18.1	18.1	18.3	18.3	0	19.5
		50	50	21.1	21.1	21.1	21.2	21.1	1	22.5	19.3	19.3	19.2	19.2	19.2	0	20.5	18.2	18.1	18.1	18.2	18.2	0	19.5
		100	0	21.1	21.1	21.1	21.2	21.1	1	22.5	19.3	19.3	19.2	19.2	19.2	0	20.5	18.2	18.1	18.2	18.3	18.3	0	19.5
	16QAM	1	0	21.0	20.8	21.5	20.9	21.3	1	22.5	18.9	19.2	18.9	19.1	19.1	0	20.5	18.1	17.5	17.9	18.0	18.4	0	19.5
		1	49	20.9	20.8	21.4	20.8	21.2	1	22.5	18.8	19.1	18.9	19.0	19.1	0	20.5	18.0	17.5	17.9	17.9	18.2	0	19.5
		1	99	20.9	20.7	21.3	20.8	21.2	1	22.5	18.7	19.0	18.8	19.0	19.0	0	20.5	18.0	17.5	17.9	17.9	18.2	0	19.5
		50	0	20.3	20.2	20.3	20.3	20.2	2	21.5	19.4	19.4	19.3	19.3	19.3	0	20.5	18.3	18.3	18.4	18.4	18.5	0	19.5
		50	24	20.3	20.2	20.2	20.2	20.2	2	21.5	19.3	19.4	19.2	19.3	19.3	0	20.5	18.2	18.3	18.3	18.4	18.5	0	19.5
		100	0	20.2	20.2	20.2	20.3	20.2	2	21.5	19.3	19.4	19.2	19.3	19.2	0	20.5	18.2	18.2	18.2	18.4	18.5	0	19.5
15 MHz	QPSK	1	0	22.3	22.3	22.3	22.4	22.4	0	23.5	19.4	19.2	19.4	19.2	19.4	0	20.5	18.2	18.1	18.2	18.2	18.4	0	19.5
		1	37	22.3	22.3	22.2	22.3	22.3	0	23.5	19.3	19.2	19.3	19.2	19.3	0	20.5	18.1	18.1	18.2	18.2	18.4	0	19.5
		1	74	22.3	22.3	22.2	22.3	22.4	0	23.5	19.3	19.1	19.3	19.2	19.3	0	20.5	18.1	18.1	18.2	18.2	18.3	0	19.5
		36	0	21.7	21.6	21.6	21.6	21.7	1	22.5	19.7	19.6	19.6	19.6	19.7	0	20.5	18.6	18.5	18.5	18.5	18.6	0	19.5
		36	20	21.7	21.6	21.6	21.6	21.7	1	22.5	19.7	19.6	19.6	19.6	19.7	0	20.5	18.5	18.5	18.5	18.5	18.6	0	19.5
		36	39	21.6	21.6	21.6	21.6	21.7	1	22.5	19.7	19.5	19.6	19.6	19.7	0	20.5	18.6	18.5	18.5	18.5	18.6	0	19.5
	16QAM	1	0	21.7	21.6	21.6	21.6	21.7	1	22.5	19.7	19.6	19.6	19.6	19.7	0	20.5	18.6	18.5	18.5	18.5	18.6	0	19.5
		1	0	21.5	21.2	21.3	21.6	21.3	1	22.5	19.6	19.2	19.0	19.3	19.3	0	20.5	18.5	17.8	18.3	18.2	18.1	0	19.5
		1	37	21.5	21.3	21.8	21.7	21.4	1	22.5	19.4	19.0	19.1	19.5	19.3	0	20.5	18.4	18.0	18.2	18.2	18.3	0	19.5
		1	74	21.4	21.6	21.7	21.7	21.3	1	22.5	19.4	18.9	18.9	19.1	19.3	0	20.5	18.7	17.5	18.0	18.2	18.4	0	19.5
		36	0	20.7	20.6	20.6	20.7	20.7	2	21.5	19.8	19.6	19.6	19.7	19.7	0	20.5	18.7	18.6	18.6	18.6	18.6	0	19.5
		36	20	20.6	20.6	20.5	20.6	20.7	2	21.5	19.7	19.6	19.6	19.6	19.7	0	20.5	18.7	18.6	18.7	18.6	18.6	0	19.5
10 MHz	QPSK	1	0	22.2	22.3	22.3	22.4	22.4	0	23.5	19.4	19.3	19.2	19.2	19.4	0	20.5	18.2	18.1	18.1	18.2	18.3	0	19.5
		1	49	22.2	22.3	22.2	22.3	22.4	0	23.5	19.3	19.2	19.2	19.2	19.3	0	20.5	18.2	18.1	18.1	18.1	18.3	0	19.5
		25	0	21.6	21.6	21.6	21.6	21.6	1	22.5	19.7	19.6	19.6	19.6	19.7	0	20.5	18.5	18.4	18.4	18.5	18.5	0	19.5
		25	12	21.5	21.6	21.6	21.6	21.6	1	22.5	19.7	19.6	19.6	19.6	19.7	0	20.5	18.5	18.4	18.4	18.5	18.5	0	19.5
		25	25	21.5	21.6	21.6	21.6	21.6	1	22.5	19.7	19.6	19.6	19.6	19.7	0	20.5	18.5	18.4	18.4	18.5	18.5	0	19.5
		50	0	21.5	21.6	21.6	21.6	21.6	1	22.5	19.7	19.6	19.6	19.6	19.7	0	20.5	18.5	18.4	18.4	18.5	18.6	0	19.5
	16QAM	1	0	21.7	21.5	21.4	21.9	21.6	1	22.5	19.1	19.4	19.0	19.0	19.4	0	20.5	18.4	18.0	18.1	18.4	18.2	0	19.5
		1	25	21.6	21.5	21.4	21.8	21.6	1	22.5	19.1	19.4	18.9	18.9	19.3	0	20.5	18.4	18.0	18.1	18.4	18.1	0	19.5
		1	49	21.6	21.5	21.4	21.8	21.6	1	22.5	19.1	19.3	18.9	19.0	19.4	0	20.5	18.3	18.0	18.1	18.4	18.1	0	19.5
		25	0	20.6	20.5	20.5	20.7	20.6	2	21.5	19.7	19.6	19.6	19.6	19.7	0	20.5	18.6	18.5	18.5	18.6	18.6	0	19.5
		25	12	20.6	20.6	20.5	20.6	20.6	2	21.5	19.7	19.6	19.6	19.6	19.7	0	20.5	18.6	18.5	18.5	18.6	18.6	0	19.5
		25	25	20.6	20.5	20.5	20.6	20.6	2	21.5	19.7	19.6	19.6	19.6	19.7	0	20.5	18.6	18.5	18.5	18.6	18.6	0	19.5
5 MHz	QPSK	1	0	22.0	22.3	22.3	22.4	22.4	0	23.5	19.4	19.3	19.2	19.2	19.4	0	20.5	18.3	18.1	18.2	18.2	18.4	0	19.5
		1	12	22.0	22.3	22.3	22.3	22.4	0	23.5	19.3	19.2	19.2	19.2	19.4	0	20.5	18.3	18.1	18.2	18.2	18.4	0	19.5
		12	0	21.3	21.6	21.6	21.6	21.6	1	22.5	19.7	19.5	19.6	19.6	19.7	0	20.5	18.6	18.4	18.5	18.5	18.5	0	19.5
		12	7	21.3	21.6	21.6	21.6	21.6	1	22.5	19.7	19.5	19.6	19.6	19.7	0	20.5	18.6	18.4	18.5	18.5	18.5	0	19.5
		12	13	21.3	21.6	21.6	21.6	21.6	1	22.5	19.7	19.5	19.6	19.6	19.7	0	20.5	18.6	18.4	18.5	18.5	18.5	0	19.5
		25	0	21.3	21.6	21.6	21.7	21.6	1	22.5	19.7	19.5	19.6	19.6	19.7	0	20.5	18.6	18.4	18.5	18.5	18.5	0	19.5
	16QAM	1	0	20.8	21.6	21.5	21.5	21.7	1	22.5	19.4	18.8	19.2	19.3	19.0	0	20.5	18.1	18.2	18.2	18.0	18.3	0	19.5
		1	12	20.8	21.6	21.5	21.5	21.7	1	22.5	19.4	18.8	19.3	19.4	19.0	0	20.5	18.1	18.1	18.2	18.0	18.3	0	19.5
		1	24	20.8	21.6	21.5	21.5	21.7	1	22.5	19.4	18.8	19.2	19.3	19.0	0	20.5	18.1	18.1	18.1	18.0	18.3	0	19.5
		12	0	20.2	20.5	20.6	20.5	20.5	2	21.5	19.7	19.5	19.6	19.6	19.6	0	20.5	18.6	18.4	18.5	18.5	18.5	0	19.5
		12	7	20.2	20.5	20.6	20.5	20.5	2	21.5	19.7	19.5	19.6	19.6	19.6	0	20.5	18.6	18.4	18.5	18.5	18.6	0	19.5
		12	13	20.3	20.5	20.6	20.5	20.5	2	21.5	19.7	19.5	19.6	19.6	19.6	0	20.5	18.6	18.4	18.5	18.5	18.6	0	19.5

LTE Band 66 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Grip Sensor Average Power (dBm)				
				132072	132322	132572	MPR	Tune-up Limit	132072	132322	132572	MPR	Tune-up Limit
				1720 MHz	1745 MHz	1770 MHz			1720 MHz	1745 MHz	1770 MHz		
20 MHz	QPSK	1	0	23.2	22.8	22.8	0	24.5	21.1	20.8	20.9	0	22.5
		1	49	23.2	22.7	22.8	0	24.5	21.1	20.7	20.8	0	22.5
		1	99	23.1	22.7	22.7	0	24.5	21.0	20.7	20.8	0	22.5
		50	0	22.1	21.8	21.8	1	23.5	21.1	20.8	20.8	0	22.5
		50	24	22.1	21.8	21.7	1	23.5	21.1	20.8	20.8	0	22.5
	16QAM	50	50	22.1	21.7	21.7	1	23.5	21.1	20.7	20.7	0	22.5
		100	0	22.1	21.7	21.7	1	23.5	21.1	20.8	20.8	0	22.5
		1	0	22.1	21.9	22.0	1	23.5	21.1	20.9	21.0	0	22.5
		1	49	22.0	21.8	21.9	1	23.5	21.0	20.8	20.9	0	22.5
		1	99	21.9	21.7	21.8	1	23.5	20.9	20.8	20.8	0	22.5
16QAM	50	0	21.1	20.8	20.7	2	22.5	21.1	20.8	20.8	0	22.5	
	50	24	21.1	20.7	20.7	2	22.5	21.1	20.7	20.8	0	22.5	
	50	50	21.1	20.7	20.7	2	22.5	21.1	20.7	20.7	0	22.5	
	100	0	21.1	20.8	20.8	2	22.5	21.1	20.8	20.8	0	22.5	
	15 MHz	QPSK	1	0	23.1	22.9	23.0	0	24.5	21.1	20.8	20.9	0	22.5
1			37	23.1	22.8	22.9	0	24.5	21.0	20.7	20.9	0	22.5
1			74	23.0	22.8	22.9	0	24.5	21.0	20.7	20.8	0	22.5
36			0	22.1	21.8	21.9	1	23.5	21.1	20.8	20.8	0	22.5
36			20	22.1	21.8	21.9	1	23.5	21.0	20.8	20.8	0	22.5
36			39	22.0	21.8	21.9	1	23.5	21.0	20.8	20.8	0	22.5
75			0	22.0	21.8	21.9	1	23.5	21.0	20.8	20.8	0	22.5
16QAM		1	0	22.1	21.6	22.0	1	23.5	20.8	20.6	20.8	0	22.5
		1	37	22.0	21.6	21.9	1	23.5	20.8	20.6	20.8	0	22.5
		1	74	22.0	21.5	21.9	1	23.5	20.8	20.5	20.7	0	22.5
		36	0	21.0	20.8	20.9	2	22.5	21.0	20.8	20.9	0	22.5
		36	20	21.0	20.8	20.9	2	22.5	21.0	20.8	20.9	0	22.5
		36	39	21.0	20.8	20.9	2	22.5	21.0	20.8	20.9	0	22.5
10 MHz	QPSK	1	0	23.1	22.7	22.9	0	24.5	21.1	20.7	20.9	0	22.5
		1	25	23.1	22.7	22.9	0	24.5	21.1	20.7	20.9	0	22.5
		1	49	23.1	22.7	22.9	0	24.5	21.1	20.7	20.9	0	22.5
		25	0	22.0	21.8	21.9	1	23.5	21.0	20.8	20.9	0	22.5
		25	12	22.0	21.8	21.9	1	23.5	21.0	20.7	20.9	0	22.5
		25	25	22.0	21.7	21.9	1	23.5	21.0	20.7	20.8	0	22.5
	16QAM	50	0	22.0	21.8	21.9	1	23.5	21.0	20.7	20.9	0	22.5
		1	0	22.0	21.7	21.7	1	23.5	20.9	20.7	20.9	0	22.5
		1	25	22.0	21.7	21.7	1	23.5	20.8	20.7	20.9	0	22.5
		1	49	22.0	21.6	21.7	1	23.5	20.8	20.7	20.8	0	22.5
		25	0	21.1	20.8	20.9	2	22.5	21.1	20.8	20.9	0	22.5
		25	12	21.1	20.8	20.9	2	22.5	21.1	20.8	20.9	0	22.5
		25	25	21.1	20.7	20.9	2	22.5	21.1	20.8	20.9	0	22.5
50	0	21.0	20.8	20.9	2	22.5	21.1	20.8	20.9	0	22.5		

LTE Band 66 Measured Results (continued)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Grip Sensor Average Power (dBm)				
				131997	132322	132647	MPR	Tune-up Limit	131997	132322	132647	MPR	Tune-up Limit
				1712.5 MHz	1745 MHz	1777.5 MHz			1712.5 MHz	1745 MHz	1777.5 MHz		
5 MHz	QPSK	1	0	23.1	22.8	22.9	0	24.5	21.1	20.7	20.8	0	22.5
		1	12	23.1	22.8	22.9	0	24.5	21.1	20.7	20.8	0	22.5
		1	24	23.1	22.8	22.9	0	24.5	21.0	20.7	20.8	0	22.5
		12	0	22.1	21.8	21.9	1	23.5	21.1	20.8	20.9	0	22.5
		12	7	22.0	21.8	21.9	1	23.5	21.1	20.7	20.9	0	22.5
		12	13	22.0	21.8	21.9	1	23.5	21.1	20.7	20.9	0	22.5
	16QAM	25	0	22.0	21.8	21.9	1	23.5	21.1	20.8	20.9	0	22.5
		1	0	22.0	21.9	21.9	1	23.5	20.8	20.6	20.9	0	22.5
		1	12	22.0	21.9	21.9	1	23.5	20.8	20.6	20.9	0	22.5
		1	24	22.0	21.9	21.9	1	23.5	20.8	20.6	20.9	0	22.5
		12	0	21.0	20.9	20.9	2	22.5	21.1	20.7	21.0	0	22.5
		12	7	21.0	20.9	20.8	2	22.5	21.1	20.7	21.0	0	22.5
		12	13	21.0	20.9	20.9	2	22.5	21.1	20.7	21.0	0	22.5
		25	0	21.1	20.8	20.9	2	22.5	21.1	20.8	20.9	0	22.5
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Grip Sensor Average Power (dBm)				
				131987	132322	132657	MPR	Tune-up Limit	131987	132322	132657	MPR	Tune-up Limit
				1711.5 MHz	1745 MHz	1778.5 MHz			1711.5 MHz	1745 MHz	1778.5 MHz		
3 MHz	QPSK	1	0	23.1	22.7	23.0	0	24.5	21.2	20.7	21.0	0	22.5
		1	8	23.1	22.7	23.0	0	24.5	21.1	20.7	21.0	0	22.5
		1	14	23.1	22.7	22.9	0	24.5	21.1	20.7	21.0	0	22.5
		8	0	22.0	21.7	21.9	1	23.5	21.1	20.7	20.9	0	22.5
		8	4	22.0	21.7	21.9	1	23.5	21.1	20.7	20.9	0	22.5
		8	7	22.0	21.7	21.9	1	23.5	21.1	20.7	20.9	0	22.5
	16QAM	15	0	22.1	21.8	21.9	1	23.5	21.1	20.8	20.9	0	22.5
		1	0	21.8	21.7	21.9	1	23.5	20.9	20.7	21.0	0	22.5
		1	8	21.9	21.6	21.7	1	23.5	21.0	20.7	21.0	0	22.5
		1	14	21.7	21.7	21.9	1	23.5	20.8	20.6	21.0	0	22.5
		8	0	21.0	20.8	21.0	2	22.5	21.1	20.8	21.0	0	22.5
		8	4	21.0	20.8	21.0	2	22.5	21.1	20.8	21.0	0	22.5
		8	7	21.0	20.8	21.0	2	22.5	21.1	20.8	21.0	0	22.5
		15	0	21.1	20.7	20.9	2	22.5	21.1	20.8	20.9	0	22.5
BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)					Reduced Average Power (dBm)				
				131979	132322	132665	MPR	Tune-up Limit	131979	132322	132665	MPR	Tune-up Limit
				1710.7 MHz	1745 MHz	1779.3 MHz			1710.7 MHz	1745 MHz	1779.3 MHz		
1.4 MHz	QPSK	1	0	23.2	22.8	23.1	0	24.5	21.3	20.8	20.9	0	22.5
		1	3	23.3	22.8	23.1	0	24.5	21.2	20.8	21.0	0	22.5
		1	5	23.3	22.8	23.1	0	24.5	21.3	20.8	21.0	0	22.5
		3	0	23.1	22.7	22.9	0	24.5	21.1	20.7	20.9	0	22.5
		3	1	23.1	22.8	22.9	0	24.5	21.1	20.7	20.9	0	22.5
		3	3	23.1	22.8	22.9	0	24.5	21.1	20.7	20.9	0	22.5
	16QAM	6	0	22.1	21.8	21.9	1	23.5	21.1	20.7	20.9	0	22.5
		1	0	22.0	21.7	22.0	1	23.5	21.1	20.5	21.0	0	22.5
		1	3	21.9	21.8	22.0	1	23.5	20.9	20.5	21.1	0	22.5
		1	5	22.1	21.8	21.9	1	23.5	21.1	20.5	20.8	0	22.5
		3	0	22.1	21.7	21.9	1	23.5	21.1	20.7	20.9	0	22.5
		3	1	22.1	21.8	21.9	1	23.5	21.1	20.8	20.9	0	22.5
		3	3	22.1	21.8	21.9	1	23.5	21.1	20.8	20.8	0	22.5
		6	0	21.1	20.7	21.0	2	22.5	21.1	20.8	20.8	0	22.5

9.4. Wi-Fi 2.4GHz (DTS Band)

Maximum Output Power (Tune-up Limit) for Wi-Fi 2.4 GHz

The maximum output power specified for production units are determined for all applicable 802.11 transmission modes in each standalone and aggregated frequency band. Maximum output power is measured for the highest maximum output power configuration(s) in each frequency band according to the default power measurement procedures.

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 802.11b/g/n 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.

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.

Wi-Fi 2.4GHz Measured Results

Band	Mode	Ch #	Freq. (MHz)	Maximum Average Power (dBm)			Reduced Average Power (dBm)		
				Meas Pwr	Tune-up	SAR Test (Yes/No)	Meas Pwr	Tune-up	SAR Test (Yes/No)
DSSS 2.4 GHz	802.11b	1	2412	18.3	19.5	Yes	12.2	13.0	Yes
		6	2437	18.5	19.5		13.0	13.0	
		11	2462	18.7	19.5		13.0	13.0	
		12	2467		7.0			7.0	
		13	2472		7.0			7.0	
OFDM 2.4 GHz	802.11g	1	2412	15.9	17.0	No	12.0	13.0	No
		6	2437	15.7	17.0		12.3	13.0	
		11	2462	16.0	17.0		12.6	13.0	
		12	2467		5.0			5.0	
		13	2472		5.0			5.0	
	802.11n (HT20)	1	2412	15.5	17.0	No	11.5	13.0	No
		6	2437	15.8	17.0		12.3	13.0	
		11	2462	16.3	17.0		12.4	13.0	
		12	2467		5.0			5.0	
		13	2472		5.0			5.0	

Note(s):

SAR is not required for channel 12 and 13 because the tune-up limit and the measured output power for these two channels are not greater than those for the default test channels. Refer to KDB 248227 D01 section 3.1

9.5. Bluetooth

Maximum Output Power (Tune-up Limit) for Bluetooth

SAR measurement is required for the LE. When the secondary mode is $\leq \frac{1}{4}$ dB higher than the primary mode.

Bluetooth Measured Results

Band	Mode	Ch #	Freq. (MHz)	Maximum Average Power (dBm)		
				Meas Pwr	Tune-up	SAR Test (Yes/No)
2.4	BR GFSK	0	2402	7.9	9.0	No
		39	2441	8.3	9.0	
		78	2480	8.2	9.0	
	EDR, $\pi/4$ DQPSK	0	2402	6.8	7.0	No
		39	2441	7.2	7.0	
		78	2480	7.1	7.0	
	EDR, 8-DPSK	0	2402	6.7	7.0	No
		39	2441	7.3	7.0	
		78	2480	7.1	7.0	
	LE 1M, GFSK	0	2402	4.5	5.5	No
		19	2440	5.3	5.5	
		39	2480	5.1	5.5	
	LE 125k, GFSK	0	2402	4.6	5.5	No
		19	2440	5.3	5.5	
		39	2480	5.1	5.5	
	LE 500k, GFSK	0	2402	4.6	5.5	No
		19	2440	5.3	5.5	
		39	2480	5.2	5.5	
	LE 2M, GFSK	0	2402	8.6	9.5	Yes
		19	2440	9.1	9.5	
		39	2480	8.8	9.5	

Duty Factor Measured Results

Mode	Type	T on (ms)	Period (ms)	Duty Cycle	Crest Factor (1/duty cycle)
GFSK	LE 2M	201.3	625.3	32.19%	3.11

Note(s):

Duty Cycle = (T on / period) * 100%

Duty Cycle plots

LE 2M



10. Measured and Reported (Scaled) SAR Results

SAR Test Reduction criteria are as follows:

- Reported SAR(W/kg) for WWAN and Bluetooth = Measured SAR * Tune-up Scaling Factor
- Reported SAR(W/kg) for Wi-Fi = 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.

KDB 941225 D01 SAR test for 3G devices:

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

KDB 941225 D05 SAR for LTE Devices:

SAR test reduction is applied using the following criteria:

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

KDB 248227 D01 SAR meas for 802.11:

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

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

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

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

10.1. GSM850

RF Exposure Conditions	Mode	Power Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
							Tune-up Limit	Meas.	Meas.	Scaled	
Head	GPRS 3 Slots	N/A	0	Left Touch	190	836.6	30.0	29.2	0.265	0.319	
				Left Tilt	190	836.6	30.0	29.2	0.159	0.191	
				Right Touch	190	836.6	30.0	29.2	0.301	0.362	1
				Right Tilt	190	836.6	30.0	29.2	0.186	0.224	
Body-Worn	GPRS 3 Slots	N/A	15	Rear	190	836.6	30.0	29.2	0.402	0.483	2
				Front	190	836.6	30.0	29.2	0.246	0.296	
Hotspot	GPRS 3 Slots	N/A	10	Rear	190	836.6	30.0	29.2	0.528	0.635	3
				Front	190	836.6	30.0	29.2	0.252	0.303	
				Edge 2	190	836.6	30.0	29.2	0.330	0.397	
				Edge 3	190	836.6	30.0	29.2	0.186	0.224	
				Edge 4	190	836.6	30.0	29.2	0.118	0.142	

10.2. GSM1900

RF Exposure Conditions	Mode	Power Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
							Tune-up Limit	Meas.	Meas.	Scaled	
Head	GPRS 2 Slots	N/A	0	Left Touch	661	1880.0	28.0	26.1	0.086	0.133	4
				Left Tilt	661	1880.0	28.0	26.1	0.047	0.073	
				Right Touch	661	1880.0	28.0	26.1	0.071	0.110	
				Right Tilt	661	1880.0	28.0	26.1	0.049	0.076	
Body-Worn	GPRS 2 Slots	N/A	15	Rear	661	1880.0	28.0	26.1	0.121	0.187	5
				Front	661	1880.0	28.0	26.1	0.092	0.142	
Hotspot	GPRS 2 Slots	N/A	10	Rear	661	1880.0	28.0	26.1	0.261	0.404	6
				Front	661	1880.0	28.0	26.1	0.171	0.265	
				Edge 2	661	1880.0	28.0	26.1	0.080	0.124	
				Edge 3	661	1880.0	28.0	26.1	0.017	0.027	
				Edge 4	661	1880.0	28.0	26.1	0.172	0.266	

10.3. W-CDMA Band II

RF Exposure Conditions	Mode	Power Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
							Tune-up Limit	Meas.	Meas.	Scaled	
Head	Rel 99 RMC 12.2 kbps	N/A	0	Left Touch	9400	1880.0	22.0	20.0	0.112	0.178	7
				Left Tilt	9400	1880.0	22.0	20.0	0.050	0.079	
				Right Touch	9400	1880.0	22.0	20.0	0.076	0.120	
				Right Tilt	9400	1880.0	22.0	20.0	0.050	0.079	
Body-worn	Rel 99 RMC 12.2 kbps	N/A	15	Rear	9400	1880.0	25.0	23.1	0.273	0.428	8
				Front	9400	1880.0	25.0	23.1	0.225	0.353	
Hotspot	Rel 99 RMC 12.2 kbps	N/A	10	Rear	9262	1852.4	25.0	23.3	0.657	0.983	
					9400	1880.0	25.0	23.1	0.524	0.821	
					9538	1907.6	25.0	23.0	0.737	1.163	9
				Front	9400	1880.0	25.0	23.1	0.335	0.525	
				Edge 2	9400	1880.0	25.0	23.1	0.181	0.284	
				Edge 3	9262	1852.4	25.0	23.3	0.628	0.940	
					9400	1880.0	25.0	23.1	0.520	0.815	
					9538	1907.6	25.0	23.0	0.462	0.729	
				Edge 4	9400	1880.0	25.0	23.1	0.343	0.537	

10.4. W-CDMA Band IV

RF Exposure Conditions	Mode	Power Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
							Tune-up Limit	Meas.	Meas.	Scaled	
Head	Rel 99 RMC 12.2 kbps	N/A	0	Left Touch	1413	1732.6	22.0	20.3	0.155	0.229	10
				Left Tilt	1413	1732.6	22.0	20.3	0.088	0.130	
				Right Touch	1413	1732.6	22.0	20.3	0.071	0.105	
				Right Tilt	1413	1732.6	22.0	20.3	0.076	0.112	
Body-Worn	Rel 99 RMC 12.2 kbps	N/A	15	Rear	1413	1732.6	25.0	23.3	0.397	0.587	
				Front	1413	1732.6	25.0	23.3	0.403	0.596	11
Hotspot	Rel 99 RMC 12.2 kbps	N/A	10	Rear	1312	1712.4	25.0	23.3	0.645	0.950	
					1413	1732.6	25.0	23.3	0.664	0.982	
					1513	1752.6	25.0	23.2	0.595	0.896	
				Front	1312	1712.4	25.0	23.3	0.600	0.883	
					1413	1732.6	25.0	23.3	0.605	0.895	
					1513	1752.6	25.0	23.2	0.634	0.955	
				Edge 2	1413	1732.6	25.0	23.3	0.301	0.445	
				Edge 3	1312	1712.4	25.0	23.3	0.609	0.897	
					1413	1732.6	25.0	23.3	0.665	0.984	
					1513	1752.6	25.0	23.2	0.665	1.002	
				Edge 4	1312	1712.4	25.0	23.3	0.561	0.826	
					1413	1732.6	25.0	23.3	0.678	1.003	12
1513	1752.6	25.0	23.2		0.575	0.866					

10.5. W-CDMA Band V

RF Exposure Conditions	Mode	Power Back Off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
							Tune-up Limit	Meas.	Meas.	Scaled	
Head	Rel 99 RMC 12.2 kbps	N/A	0	Left Touch	4183	836.6	23.5	21.9	0.167	0.241	
				Left Tilt	4183	836.6	23.5	21.9	0.099	0.143	
				Right Touch	4183	836.6	23.5	21.9	0.181	0.262	13
				Right Tilt	4183	836.6	23.5	21.9	0.091	0.132	
Body-Worn	Rel 99 RMC 12.2 kbps	N/A	15	Rear	4183	836.6	25.5	24.2	0.303	0.409	14
				Front	4183	836.6	25.5	24.2	0.183	0.247	
Hotspot	Rel 99 RMC 12.2 kbps	N/A	10	Rear	4132	926.4	25.5	24.1	0.532	0.734	
					4183	836.6	25.5	24.2	0.579	0.781	
					4233	846.6	25.5	24.3	0.630	0.831	15
				Front	4183	836.6	25.5	24.2	0.179	0.241	
				Edge 2	4183	836.6	25.5	24.2	0.236	0.318	
				Edge 3	4183	836.6	25.5	24.2	0.176	0.237	
Edge 4	4183	836.6	25.5	24.2	0.146	0.197					

10.6. LTE Band 2 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Power 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	
Head	QPSK	N/A	0	Left Touch	18900	1880.0	1	0	25.0	23.2	0.140	0.210	16
							50	0	24.0	22.3	0.128	0.188	
				Left Tilt (15°)	18900	1880.0	1	0	25.0	23.2	0.086	0.128	
							50	0	24.0	22.3	0.069	0.102	
				Right Touch	18900	1880.0	1	0	25.0	23.2	0.127	0.190	
							50	0	24.0	22.3	0.106	0.156	
Right Tilt (15°)	18900	1880.0	1	0	25.0	23.2	0.088	0.132					
			50	0	24.0	22.3	0.072	0.106					
Body-worn	QPSK	N/A	15	Rear	18900	1880.0	1	0	25.0	23.2	0.275	0.412	17
							50	0	24.0	22.3	0.227	0.334	
				Front	18900	1880.0	1	0	25.0	23.2	0.213	0.319	
							50	0	24.0	22.3	0.175	0.258	
Hotspot	QPSK	N/A	10	Rear	18900	1880.0	1	0	25.0	23.2	0.561	0.841	18
							50	0	24.0	22.3	0.470	0.692	
				Front	18900	1880.0	1	0	25.0	23.2	0.380	0.570	
							50	0	24.0	22.3	0.317	0.467	
				Edge 2	18900	1880.0	1	0	25.0	23.2	0.195	0.292	
							50	0	24.0	22.3	0.162	0.239	
				Edge 3	18900	1880.0	1	0	25.0	23.2	0.546	0.819	
							50	0	24.0	22.3	0.459	0.676	
Edge 4	18900	1880.0	1	0	25.0	23.2	0.344	0.516					
			50	0	24.0	22.3	0.283	0.417					

10.7. LTE Band 4 (20MHz Bandwidth)

RF Exposure Conditions	Power Back Off	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	OFF	QPSK	0	Left Touch	20175	1732.5	1	0	25.0	23.0	0.322	0.507	19
							50	0	24.0	22.1	0.241	0.373	
				Left Tilt	20175	1732.5	1	0	25.0	23.0	0.200	0.315	
							50	0	24.0	22.1	0.153	0.237	
				Right Touch	20175	1732.5	1	0	25.0	23.0	0.173	0.272	
							50	0	24.0	22.1	0.132	0.204	
				Right Tilt	20175	1732.5	1	0	25.0	23.0	0.180	0.283	
							50	0	24.0	22.1	0.138	0.214	
Body-worn	OFF	QPSK	15	Rear	20175	1732.5	1	0	25.0	23.0	0.280	0.441	
							50	0	24.0	22.1	0.222	0.344	
				Front	20175	1732.5	1	0	25.0	23.0	0.300	0.472	20
							50	0	24.0	22.1	0.235	0.364	
Hotspot	OFF	QPSK	10	Rear	20175	1732.5	1	0	25.0	23.0	0.563	0.886	
							50	0	24.0	22.1	0.446	0.691	
				Front	20175	1732.5	1	0	25.0	23.0	0.463	0.729	
							50	0	24.0	22.1	0.364	0.564	
				Edge 2	20175	1732.5	1	0	25.0	23.0	0.203	0.320	
							50	0	24.0	22.1	0.163	0.252	
				Edge 3	20175	1732.5	1	0	25.0	23.0	0.575	0.905	21
							50	0	24.0	22.1	0.446	0.691	
				Edge 4	20175	1732.5	1	0	25.0	23.0	0.499	0.785	
							50	0	24.0	22.1	0.389	0.602	

10.8. LTE Band 12 (10MHz Bandwidth)

RF Exposure Conditions	Mode	Power 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	
Head	QPSK	N/A	0	Left Touch	23095	707.5	1	0	24.5	23.1	0.095	0.131	
							25	0	23.5	22.1	0.079	0.108	
				Left Tilt (15°)	23095	707.5	1	0	24.5	23.1	0.053	0.073	
							25	0	23.5	22.1	0.043	0.059	
				Right Touch	23095	707.5	1	0	24.5	23.1	0.117	0.162	22
							25	0	23.5	22.1	0.096	0.133	
				Right Tilt (15°)	23095	707.5	1	0	24.5	23.1	0.064	0.088	
							25	0	23.5	22.1	0.052	0.072	
Body-w orn	QPSK	N/A	15	Rear	23095	707.5	1	0	24.5	23.1	0.237	0.327	23
							25	0	23.5	22.1	0.188	0.260	
				Front	23095	707.5	1	0	24.5	23.1	0.147	0.203	
							25	0	23.5	22.1	0.117	0.162	
Hotspot	QPSK	N/A	10	Rear	23095	707.5	1	0	24.5	23.1	0.266	0.367	24
							25	0	23.5	22.1	0.208	0.287	
				Front	23095	707.5	1	0	24.5	23.1	0.125	0.173	
							25	0	23.5	22.1	0.101	0.139	
				Edge 2	23095	707.5	1	0	24.5	23.1	0.187	0.258	
							25	0	23.5	22.1	0.148	0.204	
				Edge 3	23095	707.5	1	0	24.5	23.1	0.029	0.041	
							25	0	23.5	22.1	0.024	0.033	
				Edge 4	23095	707.5	1	0	24.5	23.1	0.183	0.253	
							25	0	23.5	22.1	0.144	0.199	

10.9. LTE Band 26 (15MHz Bandwidth)

RF Exposure Conditions	Mode	Power 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	
Head	QPSK	N/A	0	Left Touch	26865	831.5	1	0	25.0	23.7	0.258	0.348	
							36	0	24.0	22.5	0.205	0.290	
				Left Tilt (15°)	26865	831.5	1	0	25.0	23.7	0.150	0.202	
							36	0	24.0	22.5	0.118	0.167	
				Right Touch	26865	831.5	1	0	25.0	23.7	0.258	0.348	25
							36	0	24.0	22.5	0.209	0.295	
				Right Tilt (15°)	26865	831.5	1	0	25.0	23.7	0.159	0.214	
							36	0	24.0	22.5	0.119	0.168	
Body-w orn	QPSK	N/A	15	Rear	26865	831.5	1	0	25.0	23.7	0.308	0.415	26
							36	0	24.0	22.5	0.241	0.340	
				Front	26865	831.5	1	0	25.0	23.7	0.188	0.254	
							36	0	24.0	22.5	0.145	0.205	
Hotspot	QPSK	N/A	10	Rear	26865	831.5	1	0	25.0	23.7	0.499	0.673	27
							36	0	24.0	22.5	0.435	0.614	
				Front	26865	831.5	1	0	25.0	23.7	0.189	0.255	
							36	0	24.0	22.5	0.149	0.210	
				Edge 2	26865	831.5	1	0	25.0	23.7	0.231	0.312	
							36	0	24.0	22.5	0.179	0.253	
				Edge 3	26865	831.5	1	0	25.0	23.7	0.123	0.166	
							36	0	24.0	22.5	0.106	0.150	
				Edge 4	26865	831.5	1	0	25.0	23.7	0.134	0.181	
							36	0	24.0	22.5	0.102	0.144	

10.10. LTE Band 41 PC3 (20MHz Bandwidth)

RF Exposure Conditions	Power Back Off	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	ON	QPSK	0	Left Touch	39750	2506.0	1	0	20.5	19.5	0.174	0.219	
							50	0	20.5	19.7	0.175	0.210	
				Left Tilt	39750	2506.0	1	0	20.5	19.5	0.099	0.124	
							50	0	20.5	19.7	0.096	0.115	
				Right Touch	39750	2506.0	1	0	20.5	19.5	0.635	0.799	28
							50	0	20.5	19.7	0.650	0.781	
Right Tilt	39750	2506.0	1	0	20.5	19.5	0.303	0.381					
			50	0	20.5	19.7	0.333	0.400					
Body-worn	N/A	QPSK	15	Rear	39750	2506.0	1	0	23.5	22.2	0.372	0.502	29
							50	0	22.5	21.2	0.227	0.306	
				Front	39750	2506.0	1	0	23.5	22.2	0.066	0.089	
							50	0	22.5	21.2	0.075	0.101	
Hotspot	ON	QPSK	10	Rear	39750	2506.0	1	0	19.5	18.5	0.448	0.564	
							50	0	19.5	18.3	0.505	0.666	30
				Front	39750	2506.0	1	0	19.5	18.5	0.126	0.159	
							50	0	19.5	18.3	0.142	0.187	
				Edge 1	39750	2506.0	1	0	19.5	18.5	0.048	0.061	
							50	0	19.5	18.3	0.053	0.070	
Edge 4	39750	2506.0	1	0	19.5	18.5	0.343	0.432					
			50	0	19.5	18.3	0.408	0.538					
RF Exposure Conditions	Power Back Off	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		10-g SAR (W/kg)		Plot No.
Product Specific 10g	N/A	QPSK	12	Rear	39750	2506.0	1	0	23.5	22.2	0.308	0.415	31
							50	0	22.5	21.2	0.294	0.397	
Product Specific 10g	ON	QPSK	0	Rear	39750	2506.0	1	0	19.5	18.5	1.510	1.901	
							50	0	19.5	18.3	1.490	1.964	32

10.11. LTE Band 66 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Power 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					
Head	QPSK	N/A	0	Left Touch	132322	1745.0	1	0	24.5	22.8	0.392	0.580	33				
							50	0	23.5	21.8	0.339	0.501					
				Left Tilt (15°)	132322	1745.0	1	0	24.5	22.8	0.252	0.373					
							50	0	23.5	21.8	0.217	0.321					
				Right Touch	132322	1745.0	1	0	24.5	22.8	0.218	0.322					
							50	0	23.5	21.8	0.181	0.268					
				Right Tilt (15°)	132322	1745.0	1	0	24.5	22.8	0.229	0.339					
							50	0	23.5	21.8	0.193	0.285					
				Body-worn	QPSK	N/A	15	Rear	132322	1745.0	1	0	24.5	22.8	0.420	0.621	
											50	0	23.5	21.8	0.361	0.534	
								Front	132322	1745.0	1	0	24.5	22.8	0.425	0.629	34
											50	0	23.5	21.8	0.366	0.541	
Hotspot	QPSK	N/A	10	Rear	132072	1720.0	1	0	24.5	23.2	0.697	0.940					
							50	24	23.5	22.1	0.607	0.838					
							100	0	23.5	22.1	0.609	0.841					
					132322	1745.0	1	0	24.5	22.8	0.726	1.074	35				
							50	0	23.5	21.8	0.624	0.923					
							132572	1707.0	1	0	24.5	22.8	0.716	1.059			
				50	0	23.5	21.8		0.647	0.957							
				Front	132072	1720.0	1		0	24.5	23.2	0.667	0.900				
							50	24	23.5	22.1	0.587	0.810					
							100	0	23.5	22.1	0.587	0.810					
				132322	1745.0	1	0	24.5	22.8	0.687	1.016						
						50	0	23.5	21.8	0.584	0.864						
						132572	1707.0	1	0	24.5	22.8	0.596	0.882				
				50	0	23.5		21.8	0.536	0.793							
				Edge 2	132322	1745.0		25	23	24.5	22.8	0.288	0.426				
							24	22	23.5	21.8	0.248	0.367					
				Edge 3	132072	1720.0	1	0	24.5	23.2	0.607	0.819					
							50	24	23.5	22.1	0.539	0.744					
							100	0	23.5	22.1	0.541	0.747					
					132322	1745.0	1	0	24.5	22.8	0.686	1.015					
							50	0	23.5	21.8	0.593	0.877					
							132572	1707.0	1	0	24.5	22.8	0.681	1.007			
				50	0	23.5	21.8		0.618	0.914							
				Edge 4	132072	1720.0	1		0	24.5	23.2	0.683	0.921				
							50	24	23.5	22.1	0.604	0.834					
							100	0	23.5	22.1	0.602	0.831					
					132322	1745.0	1	0	24.5	22.8	0.685	1.013					
							50	0	23.5	21.8	0.581	0.859					
							132572	1707.0	1	0	24.5	22.8	0.684	1.012			
				50	0	23.5	21.8		0.604	0.893							

10.12. Wi-Fi (DTS Band)

When the 802.11b reported SAR of the highest measured maximum output power channel is ≤ 0.8 W/kg, no further SAR testing is required. If SAR is > 0.8 W/kg and ≤ 1.2 W/kg, SAR is required for the next highest measured output power channel. Finally, if SAR is > 1.2 W/kg, SAR is required for the third channel.

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.

RF Exposure Conditions	Mode	Pwr Back-off or Antenna	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up Limit	Meas.	Meas.	Scaled	
Head	802.11b	ON	0	Left Touch	6	2437	0.064	98.9%	13.0	13.0			
				Left Tilt	6	2437	0.056	98.9%	13.0	13.0			
				Right Touch	6	2437	0.167	98.9%	13.0	13.0	0.127	0.130	36
				Right Tilt	6	2437	0.137	98.9%	13.0	13.0			
Body-worn	802.11b	N/A	15	Rear	11	2462	0.201	98.9%	19.5	18.7	0.153	0.184	37
				Front	11	2462	0.096	98.9%	19.5	18.7			
Hotspot	802.11b	N/A	10	Rear	11	2462	0.429	98.9%	19.5	18.7	0.330	0.398	38
				Front	11	2462	0.165	98.9%	19.5	18.7			
				Edge 1	11	2462	0.181	98.9%	19.5	18.7			
				Edge 4	11	2462	0.178	98.9%	19.5	18.7			

10.13. Bluetooth

RF Exposure Conditions	Mode	Power 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	
Head	LE 2M GFSK	N/A	0	Left Touch	19	2440	32.19%	9.5	9.1	0.002	0.007	
				Left Tilt	19	2440	32.19%	9.5	9.1	0.003	0.012	
				Right Touch	19	2440	32.19%	9.5	9.1	0.019	0.065	39
				Right Tilt	19	2440	32.19%	9.5	9.1	0.014	0.048	
Body-worn	LE 2M GFSK	N/A	15	Rear	19	2440	32.19%	9.5	9.1	0.001	0.003	40
				Front	19	2440	32.19%	9.5	9.1	-	-	
Hotspot	LE 2M GFSK	N/A	10	Rear	19	2440	32.19%	9.5	9.1	0.004	0.013	41
				Front	19	2440	32.19%	9.5	9.1	-	-	
				Edge 1	19	2440	32.19%	9.5	9.1	-	-	
				Edge 4	19	2440	32.19%	9.5	9.1	-	-	

Note(s):

- For results listed with "-", the SAR result is less than 0.001 W/kg.

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 .

Note(s):

Repeated measurement is not required since the original highest measured SAR is < 0.8 W/kg (1-g) or 2 W/kg (10-g) .

12. Simultaneous Transmission Conditions

RF Exposure Condition	Item	Capable Transmit Configurations		
Head Body-w orn Hotspot	1	GSM(Voice)	+	DTS
	2	GSM(Voice)	+	BT
	3	GSM(GPRS/EDGE)	+	DTS
	4	GSM(GPRS/EDGE)	+	BT
	5	W-CDMA	+	DTS
	6	W-CDMA	+	BT
	7	LTE	+	DTS
	8	LTE	+	BT

Notes:

1. DTS & UNII (Ch. 149) supports Hotspot.
2. GPRS/EDGE, W-CDMA, and LTE support Hotspot.
3. DTS Radio cannot transmit simultaneously w ith Bluetooth Radio.

12.1. 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)

12.1.1. 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.

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.

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

RF Exposure conditions	Standalone SAR (W/kg)			Σ 1-g SAR (W/kg)	
	1	2	3	1+2	1+3
	WWAN	Wi-Fi 2.4G	BT		
Head	0.799	0.130	0.065	0.929	0.864
Body-worn	0.629	0.184	0.003	0.813	0.632
Hotspot	1.163	0.398	0.013	1.561	1.176

Conclusion:

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

Appendixes

Refer to separated files for the following appendixes.

Appendix A: SAR Setup Photos

Appendix B: SAR System Check Plots

Appendix C: SAR Highest Test Plots

Appendix D: SAR Tissue Ingredients

Appendix E: SAR Probe Certificates

Appendix F: SAR Dipole Certificates

Appendix G: Proximity Sensor

END OF REPORT