



SAR EVALUATION REPORT

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

For

GSM/WCDMA/LTE Tablet + BT/BLE and DTS b/g/n

**FCC ID: A3LSMT285M
Model Name: SM-T285M**

**Report Number: 16K22923-S1V2
Issue Date: 3/7/2016**

Prepared for

**SAMSUNG ELECTRONICS CO., LTD.
129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI,
GYEONGGI-DO, 443-742, KOREA**

Prepared by

**UL Korea, Ltd. Suwon Laboratory
218 Maeyeong-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 443-823, Korea
TEL: (031) 337-9902
FAX: (031) 213-5433**



TL-637

Revision History

Rev.	Date	Revisions	Revised By
V1	3/2/2016	Initial Issue	Sunghoon Kim
V2	3/7/2016	Revised LTE Band Reduce power in Sec 10.8. Revised W-CDMA operating mode in Sec 6.1.	Sunghoon Kim

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
6.1. Wireless Technologies.....	11
6.2. Nominal and Maximum Output Power.....	12
6.3. General LTE SAR Test and Reporting Considerations.....	13
6.4. Power Reduction by Proximity Sensing	14
6.4.1. Proximity Sensor Triggering Distance (KDB 616217 §6.2).....	14
6.4.2. Proximity Sensor Coverage (KDB 616217 §6.3)	25
6.4.3. Proximity Sensor Tilt Angle Assessment (KDB 616217 §6.4).....	25
6.4.4. Resulting test positions for SAR measurements	25
7. RF Exposure Conditions (Test Configurations)	26
7.1. Standalone SAR Test Exclusion Considerations.....	26
7.2. Required Test Configurations	28
8. Dielectric Property Measurements & System Check	29
8.1. Dielectric Property Measurements	29
8.2. System Check.....	32
9. Conducted Output Power Measurements.....	34
9.1. GSM	34
9.2. W-CDMA	36
9.3. LTE.....	41
9.4. Wi-Fi 2.4GHz (DTS Band)	49
9.5. Bluetooth	49
10. Measured and Reported (Scaled) SAR Results.....	50
10.1. GSM850	52
10.2. GSM1900	52

10.3. W-CDMA Band V.....	53
10.4. W-CDMA Band IV.....	53
10.5. W-CDMA Band II.....	53
10.6. LTE Band 2 (20MHz Bandwidth)	54
10.7. LTE Band 4 (20MHz Bandwidth)	54
10.8. LTE Band 5 (10MHz Bandwidth)	55
10.9. LTE Band 17 (10MHz Bandwidth)	55
10.10. Wi-Fi (DTS Band)	56
10.11. Bluetooth	56
11. SAR Measurement Variability.....	57
12. Simultaneous Transmission SAR Analysis.....	58
12.1. Sum of the SAR for WWAN & WLAN & BT.....	60
Appendixes	61
16K22923-S1V2 FCC Report SAR_App A_Photos & Ant. Locations.....	61
16K22923-S1V2 FCC Report SAR_App B_Highest SAR Test Plots.....	61
16K22923-S1V2 FCC Report SAR_App C_System Check Plots.....	61
16K22923-S1V2 FCC Report SAR_App D_SAR Tissue Ingredients	61
16K22923-S1V2 FCC Report SAR_App E_Probe Cal. Certificates	61
16K22923-S1V2 FCC Report SAR_App F_Dipole Cal. Certificates.....	61

1. Attestation of Test Results

Applicant Name	SAMSUNG ELECTRONICS CO.,LTD.				
FCC ID	A3LSMT285M				
Model Name	SM-T285M				
Applicable Standards	FCC 47 CFR § 2.1093 Published RF exposure KDB procedures IEEE Std 1528-2013				
SAR Limits (W/Kg)					
Exposure Category	Peak spatial-average(1g of tissue)				
General population / Uncontrolled exposure	1.6				
The Highest Reported SAR (W/kg)					
RF Exposure Conditions		Equipment Class			
		Licensed	DTS	U-NII	DSS(BT)
Head		0.349	0.086	N/A	N/A
Body		1.083	0.385		0.155
Simultaneous TX	Head	0.435		N/A	
	Body	1.468		1.238	
*Note: The WLAN(DTS) and BT SAR measurement results from the original filling can be found in SAR test report 16K22741-S1V2, FCC ID A3LSMT285. The WLAN(DTS) and BT antennas and surrounding circuitry is the same between these two units, and tune up power targets are identical for WLAN(DTS) and BT operations. Therefore, SAR data for WLAN(DTS) and BT from the original filling was used for this model. Spot checks for WLAN(DTS) and BT, were performed to ensure that the SAR measurements for both devices are the same.					
Date Tested	WWAN : 2/18/2016 to 2/29/2016 , WLAN&BT : 2/11/2016 to 2/12/2016				
Test Results	Pass				
UL Korea, Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Korea, Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report. Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Korea, Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Korea, Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by IAS, any agency of the Federal Government, or any agency of any government.					
Approved & Released By:			Prepared By:		
					
JiHo Choi Operations Manager UL Korea, Ltd Suwon Laboratory			Sunghoon Kim Laboratory Engineer UL Korea, Ltd Suwon Laboratory		

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
- 616217 D04 SAR for laptop and tablets v01r02
- 690783 D01 SAR Listings on Grants v01r03
- 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04
- 865664 D02 RF Exposure Reporting v01r02
- 941225 D01 3G SAR Procedures v03r01
- 941225 D05 SAR for LTE Devices v02r05
- 941225 D06 Hotspot Mode v02r01

3. Facilities and Accreditation

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

Suwon
SAR 1 Room
SAR 2 Room
SAR 3 Room

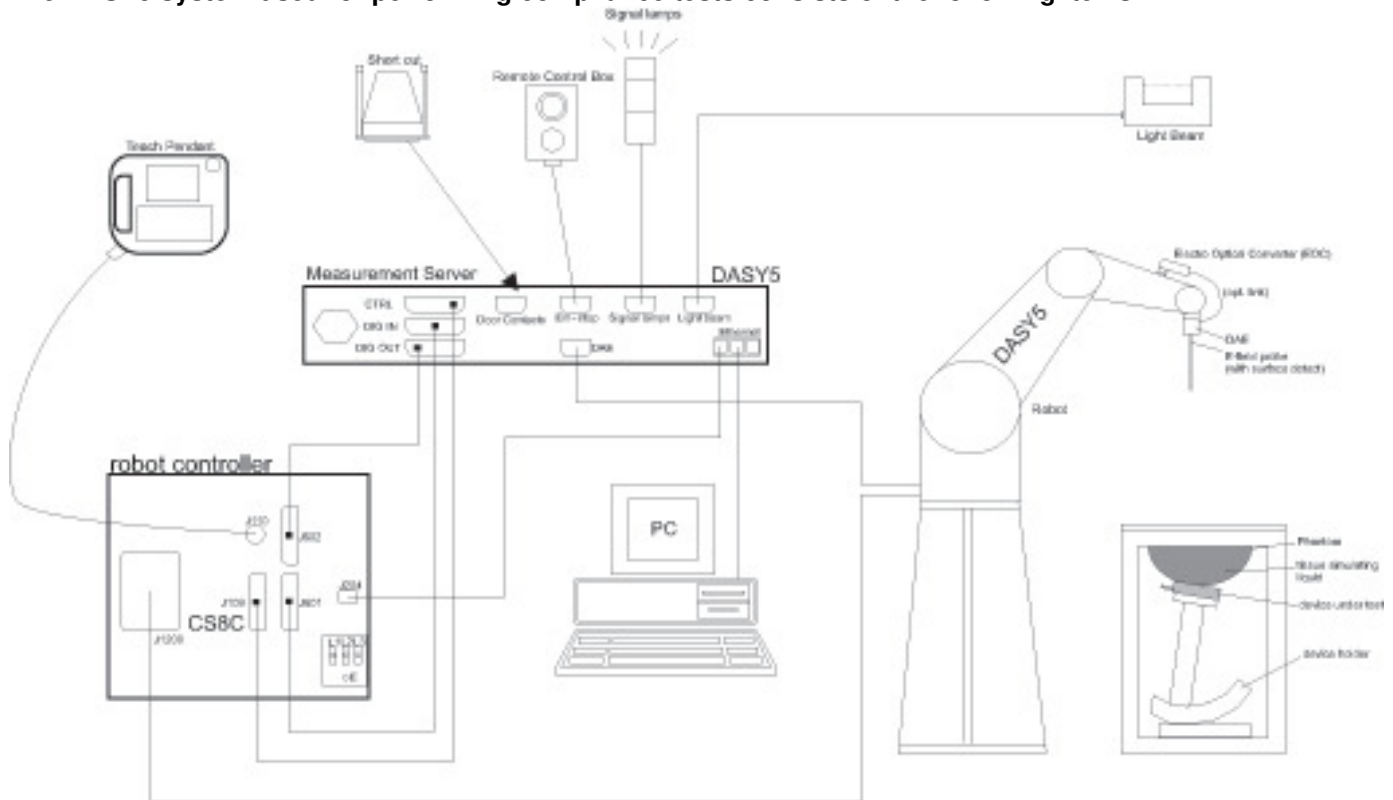
UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637.

The full scope of accreditation can be viewed at <http://www.iasonline.org/PDF/TL/TL-637.pdf>.

4. SAR Measurement System & Test Equipment

4.1. SAR Measurement System

The DASY5 system used for performing compliance tests consists of the following items:



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP or Win7 and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

4.2. SAR Scan Procedures

Step 1: Power Reference Measurement

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

Step 2: Area Scan

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

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

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
Maximum area scan spatial resolution: $\Delta x_{\text{Area}}, \Delta y_{\text{Area}}$	≤ 2 GHz: ≤ 15 mm $2 - 3$ GHz: ≤ 12 mm	$3 - 4$ GHz: ≤ 12 mm $4 - 6$ GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\leq$ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

Step 3: Zoom Scan

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

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

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

Step 4: Power drift measurement

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

Step 5: Z-Scan (FCC only)

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

4.3. Test Equipment

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

Dielectric Property Measurements

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Network Analyzer	Agilent	E5071C	MY46522054	8-18-2016
Dielectric Assessment Kit	SPEAG	DAK-3.5	1196	8-4-2016
Shorting block	SPEAG	DAK-3.5 Short	SM DAK 200 BA	N/A
Thermometer	LKM	DTM3000	3424	8-19-2016
Thermometer	Lutron	MHB-382SD	AH.91478	8-12-2016

System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
MXG Analog Signal Generator	Agilent	N5181A	MY50145882	8-18-2016
Power Sensor	Agilent	U2000A	MY54260010	8-18-2016
Power Sensor	Agilent	U2000A	MY54260007	8-18-2016
Power Amplifier	EXODUS	1410025-AMP2027-10003	10003	8-18-2016
Directional Coupler	Agilent	772D	MY52180193	8-18-2016
Directional Coupler	Agilent	778D	MY52180432	8-18-2016
Low Pass Filter	MICROLAB	LA-15N	03943	8-18-2016
Low Pass Filter	FILTRON	L14012FL	1410003S	8-18-2016
Attenuator	Agilent	8491B/003	MY39269292	8-18-2016
Attenuator	Agilent	8491B/010	MY39269315	8-18-2016
Attenuator	Agilent	8491B/020	MY39269298	8-18-2016
E-Field Probe (SAR1)	SPEAG	EX3DV4	7314	9-25-2016
E-Field Probe (SAR2)	SPEAG	EX3DV4	7376	9-2-2016
E-Field Probe (SAR3)	SPEAG	EX3DV4	7313	12-30-2016
Data Acquisition Electronics (SAR1)	SPEAG	DAE4	1447	9-23-2016
Data Acquisition Electronics (SAR2)	SPEAG	DAE4	1468	9-15-2016
Data Acquisition Electronics (SAR3)	SPEAG	DAE4	1494	11-11-2016
System Validation Dipole	SPEAG	D750V3	1122	8-17-2016
System Validation Dipole	SPEAG	D835V2	4d194	9-17-2016
System Validation Dipole	SPEAG	D1750V2	1125	8-20-2016
System Validation Dipole	SPEAG	D1900V2	5d190	9-29-2016
System Validation Dipole	SPEAG	D2450V2	939	9-28-2016
Thermometer (SAR1)	Lutron	MHB-382SD	AH.91463	8-12-2016
Thermometer (SAR2)	Lutron	MHB-382SD	AH.50215	8-19-2016
Thermometer (SAR3)	Lutron	MHB-382SD	AH.50213	8-24-2016

Others

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Base Station Simulator	R & S	CMW500	150313	8-18-2016
Base Station Simulator	R & S	CMW500	150314	8-18-2016
Bluetooth Tester	TESCOM	TC-3000C	3000C000546	8-18-2016

5. Measurement Uncertainty

Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval.

6. Device Under Test (DUT) Information

6.1.DUT Description

Device Dimension	Overall (Length x Width): 186 mm x 117 mm Overall Diagonal: 207 mm Display Diagonal: 180 mm		
Back Cover	☒ The rechargeable battery is not user accessible.		
Battery Options	☒ The rechargeable battery is not user accessible.		
Wireless Router (Hotspot)	Wi-Fi Hotspot mode permits the device to share its cellular data connection with other Wi-Fi-enabled devices. ☒ Mobile Hotspot (Wi-Fi 2.4 GHz)		
Wi-Fi Direct	Wi-Fi Direct enabled devices transfer data directly between each other ☒ Wi-Fi Direct (Wi-Fi 2.4 GHz)		
Test Sample Information	No.	S/N	Notes
	1	R32GC00C46Z	Conducted
	2	R32GC00C4XK	SAR
	3	R32H1008CQL	Conducted
	4	R32H1008CFK	SAR
	5	R32H1008CWE	SAR

6.1.Wireless Technologies

Wireless technologies	Frequency bands	Operating mode		Duty Cycle used for SAR testing
GSM	850 1900	Voice (GMSK) GPRS (GMSK) EGPRS (8PSK)	GPRS Multi-Slot Class: ☐ Class 8 - 1 Up, 4 Down ☐ Class 10 - 2 Up, 4 Down ☒ Class 12 - 4 Up, 4 Down ☐ Class 33 - 4 Up, 5 Down	GSM Voice: 12.5% (E)GPRS: 1 Slot: 12.5% 2 Slots: 25% 3 Slots: 37.5% 4 Slots: 50%
	Does this device support DTM (Dual Transfer Mode)? ☐ Yes ☒ No			
W-CDMA (UMTS)	Band II Band IV Band V	UMTS Rel. 99 (Voice & Data) HSDPA (Category 14) HSUPA (Category 6) HSPA+ (Rel. 7)		100%
LTE	FDD Band 2 FDD Band 4 FDD Band 5 FDD Band 17	QPSK 16QAM		100%
	Does this device support SV-LTE (1xRTT-LTE)? ☐ Yes ☒ No			
Wi-Fi	2.4 GHz	802.11b 802.11g 802.11n (HT20)		100%
Bluetooth	2.4 GHz	Version 4.0+ LE		77.73%

6.2.Nominal and Maximum Output Power

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

Upper limit (dB): 0.5 ~ -1.5		Max. RF Output Power (dBm)		Reduce. RF Output Power (dBm)	
RF Air interface	Mode	Target	Max. tune-up tolerance limit	Target	Max. tune-up tolerance limit
			Burst		Burst
GSM850	Voice (1 slot)	32.5	33.0	28.5	29.0
	GPRS 1 slot	32.5	33.0	28.5	29.0
	GPRS 2 slots	31.0	31.5	26.5	27.0
	GPRS 3 slots	29.5	30.0	24.5	25.0
	GPRS 4 slots	27.5	28.0	22.5	23.0
	EGPRS 1 slot	26.5	27.0	21.5	22.0
	EGPRS 2 slots	25.0	25.5	19.0	19.5
	EGPRS 3 slots	25.0	25.5	19.0	19.5
	EGPRS 4 slots	23.0	23.5	18.5	19.0
GSM1900	Voice (1 slot)	29.5	30.0	25.5	26.0
	GPRS 1 slot	29.5	30.0	25.5	26.0
	GPRS 2 slots	27.5	28.0	22.5	23.0
	GPRS 3 slots	26.0	26.5	20.5	21.0
	GPRS 4 slots	24.0	24.5	19.5	20.0
	EGPRS 1 slot	26.0	26.5	21.5	22.0
	EGPRS 2 slots	24.0	24.5	18.5	19.0
	EGPRS 3 slots	23.0	23.5	18.5	19.0
	EGPRS 4 slots	22.0	22.5	17.5	18.0
W-CDMA Band V	R99	24.0	24.5	20.0	20.5
	HSDPA	24.0	24.5	20.0	20.5
	HSUPA	23.0	23.5	20.0	20.5
W-CDMA Band IV	R99	23.0	23.5	15.5	16.0
	HSDPA	22.5	23.0	15.0	15.5
	HSUPA	22.0	22.5	14.5	15.0
W-CDMA Band II	R99	23.0	23.5	16.0	16.5
	HSDPA	23.0	23.5	16.0	16.5
	HSUPA	21.5	22.0	14.8	15.3
LTE Band 2	QPSK, 16QAM	23.0	23.5	16.5	17.0
LTE Band 4	QPSK, 16QAM	24.0	24.5	16.5	17.0
LTE Band 5	QPSK, 16QAM	24.0	24.5	18.5	19.0
LTE Band 17	QPSK, 16QAM	23.5	24.0	18.0	18.5

Upper limit (dB): ~ 0.5		Max. RF Output Power (dBm)		Reduce RF Output Power (dBm)	
RF Air interface	Mode	Target	Max. Power limit	Target	Max. Power limit
WiFi 2.4 GHz	802.11b	16.0	16.5	12.0	12.5
	802.11g	14.0	14.5	12.0	12.5
	802.11n HT20	14.0	14.5	12.0	12.5
Bluetooth		11.5	12.0	N/A	
Bluetooth LE		1.5	2.0	N/A	

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																																											
		Channel Bandwidth																																											
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz																																						
	Low	18700 /1860	18675/ 1857.5	18650/ 1855	18625/ 1852.5	18615/ 1851.5	18607/ 1850.7																																						
	Mid	18900/ 1880	18900/ 1880	18900/ 1880	18900/ 1880	18900/ 1880	18900/ 1880																																						
	High	19100/ 1900	19125/ 1902.5	19150/ 1905	19175/ 1907.5	19185/ 1908.5	19193/ 1909.3																																						
	Band 4	Frequency range: 1710 - 1755 MHz																																											
		Channel Bandwidth																																											
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz																																						
	Low	20050/ 1720	20025/ 1717.5	20000/ 1715	19975/ 1712.5	19965/ 1711.5	19957/ 1710.7																																						
	Mid	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5																																						
	High	20300/ 1745	20325/ 1747.5	20350/ 1750	20375/ 1752.5	20385/ 1753.5	20393/ 1754.3																																						
	Band 5	Frequency range: 824 - 849 MHz																																											
		Channel Bandwidth																																											
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz																																						
	Low			20450/ 829	20425/ 826.5	20415/ 825.5	20407/ 824.7																																						
	Mid			20525/ 836.5	20525/ 836.5	20525/ 836.5	20525/ 836.5																																						
	High			20600/ 844	20625/ 846.5	20635/ 847.5	20643/ 848.3																																						
	Band 17	Frequency range: 704 - 716 MHz																																											
		Channel Bandwidth																																											
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz																																						
	Low			23780/ 709	23755/ 706.5																																								
	Mid			23790/ 710	23790/ 710																																								
	High			23800/ 711	23825/ 713.5																																								
LTE transmitter and antenna implementation	LTE has 2 Main TX/RX Ant and 1 Diversity RX Ant Refer to Appendix A...																																												
Maximum power reduction (MPR)	Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3 <table border="1"> <thead> <tr> <th rowspan="2">Modulation</th><th colspan="6">Channel bandwidth / Transmission bandwidth (RB)</th><th rowspan="2">MPR (dB)</th></tr> <tr> <th>1.4 MHz</th><th>3.0 MHz</th><th>5 MHz</th><th>10 MHz</th><th>15 MHz</th><th>20 MHz</th></tr> </thead> <tbody> <tr> <td>QPSK</td><td>> 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>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> </tbody> </table> MPR Built-in by design A-MPR (additional MPR) was disabled during SAR testing							Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1	16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1	64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2
Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)																																						
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz																																							
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1																																						
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1																																						
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2																																						
Power reduction	Yes																																												
Spectrum plots for RB configurations	A properly configured base station simulator was used for the SAR and power measurements; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.																																												

6.4. Power Reduction by Proximity Sensing

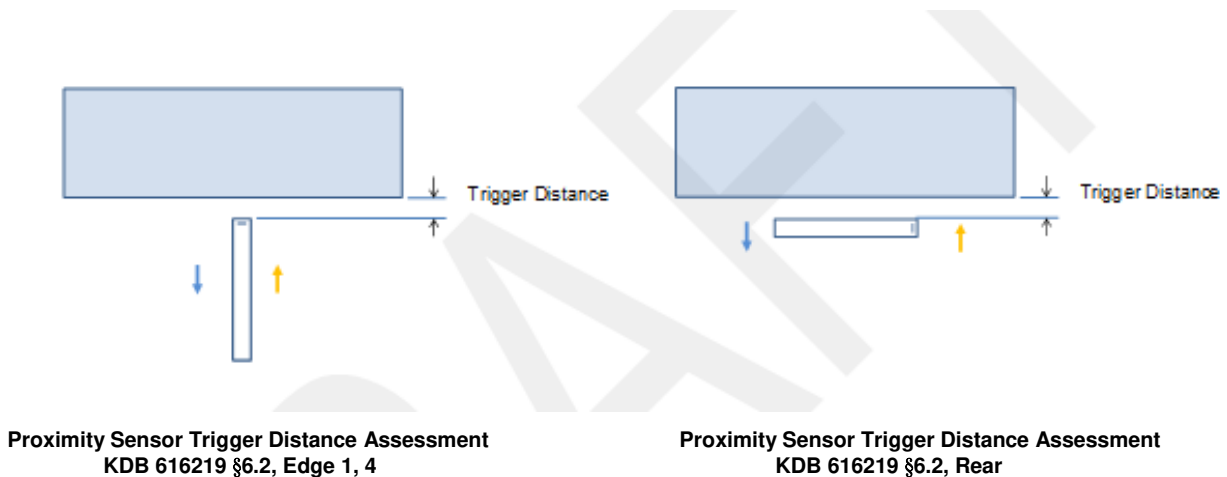
6.4.1. Proximity Sensor Triggering Distance (KDB 616217 §6.2)

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

The measurement was then repeated for the surface of Edge 1, 4

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

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



LEGEND

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

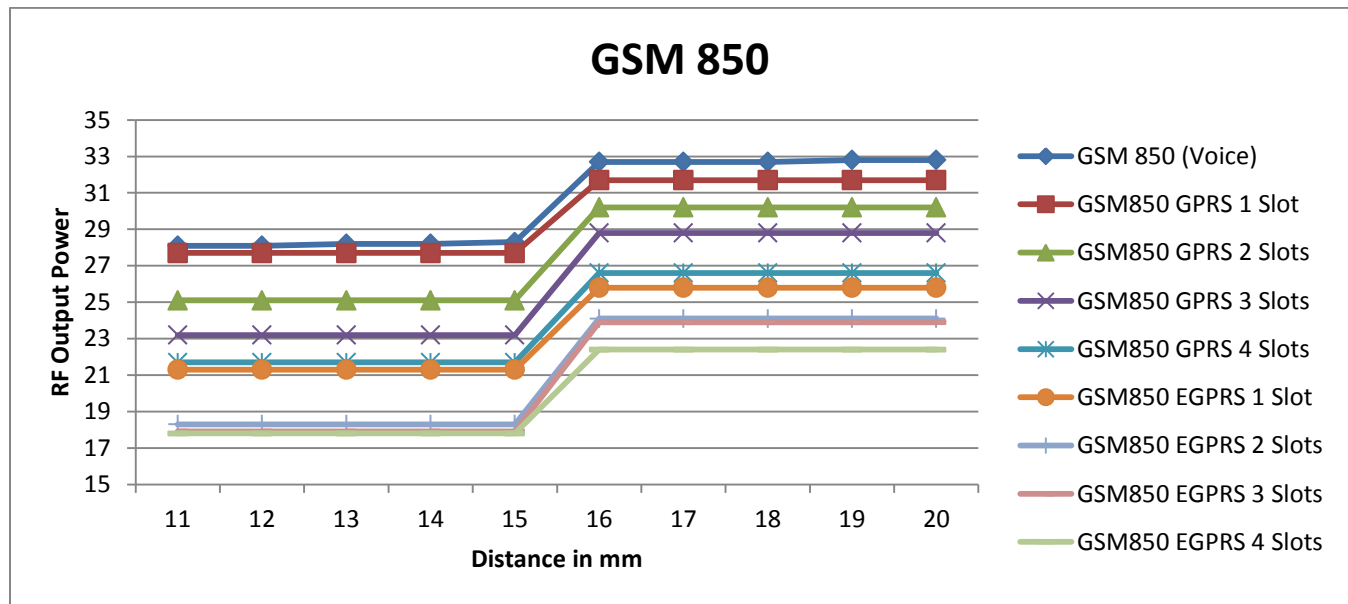
Summary of Trigger Distances

Tissue simulating liquid	Trigger distance - Rear		Trigger distance - Edge 1		Trigger distance - Edge 4	
	Moving toward phantom	Moving from phantom	Moving toward phantom	Moving from phantom	Moving toward phantom	Moving from phantom
750 muscle	15 mm	15 mm	10 mm	10 mm	5 mm	5 mm
850 muscle	15 mm	15 mm	10 mm	10 mm	5 mm	5 mm
1750 muscle	15 mm	15 mm	10 mm	10 mm	5 mm	5 mm
1900 muscle	15 mm	15 mm	10 mm	10 mm	5 mm	5 mm
2450 muscle	5 mm	5 mm	N/A	N/A	N/A	N/A

Proximity Sensor Triggering Distance Measurement Results**GSM 850**

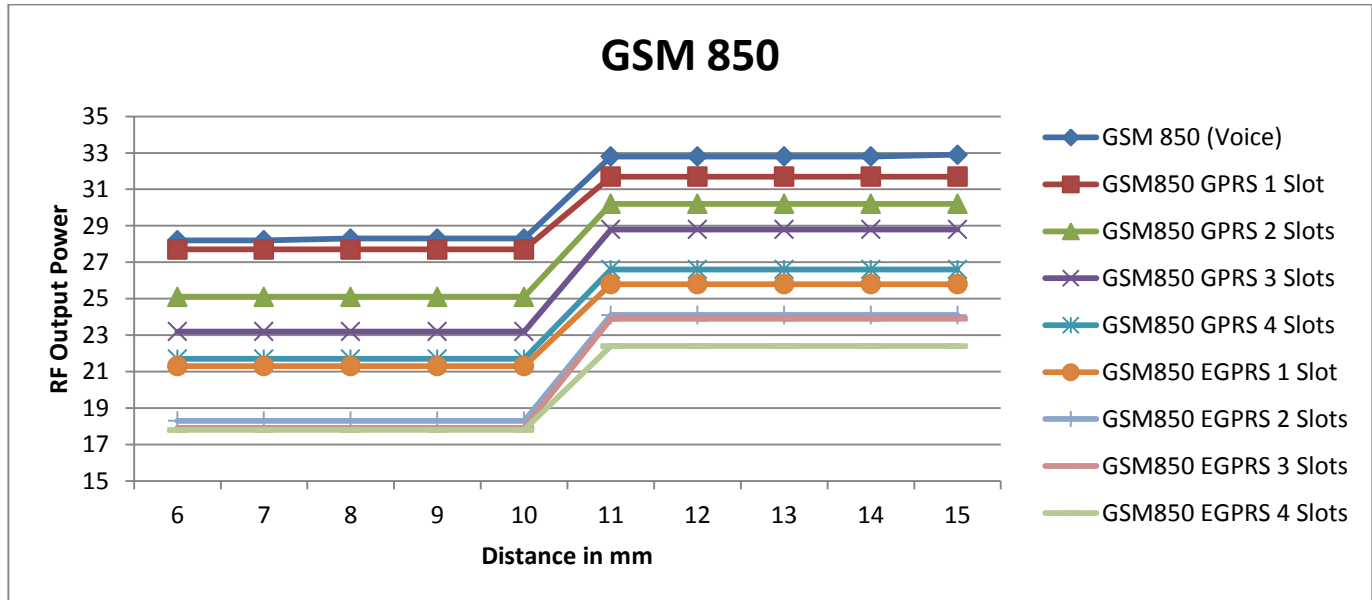
Rear, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance (mm)	11	12	13	14	15	16	17	18	19	20
GSM 850 (Voice)	28.1	28.1	28.2	28.2	28.3	32.7	32.7	32.7	32.8	32.8
GSM850 GPRS 1 Slot	27.7	27.7	27.7	27.7	27.7	31.7	31.7	31.7	31.7	31.7
GSM850 GPRS 2 Slots	25.1	25.1	25.1	25.1	25.1	30.2	30.2	30.2	30.2	30.2
GSM850 GPRS 3 Slots	23.2	23.2	23.2	23.2	23.2	28.8	28.8	28.8	28.8	28.8
GSM850 GPRS 4 Slots	21.7	21.7	21.7	21.7	21.7	26.6	26.6	26.6	26.6	26.6
GSM850 EGPRS 1 Slot	21.3	21.3	21.3	21.3	21.3	25.8	25.8	25.8	25.8	25.8
GSM850 EGPRS 2 Slots	18.3	18.3	18.3	18.3	18.3	24.1	24.1	24.1	24.1	24.1
GSM850 EGPRS 3 Slots	17.9	17.9	17.9	17.9	17.9	23.9	23.9	23.9	23.9	23.9
GSM850 EGPRS 4 Slots	17.8	17.8	17.8	17.8	17.8	22.4	22.4	22.4	22.4	22.4



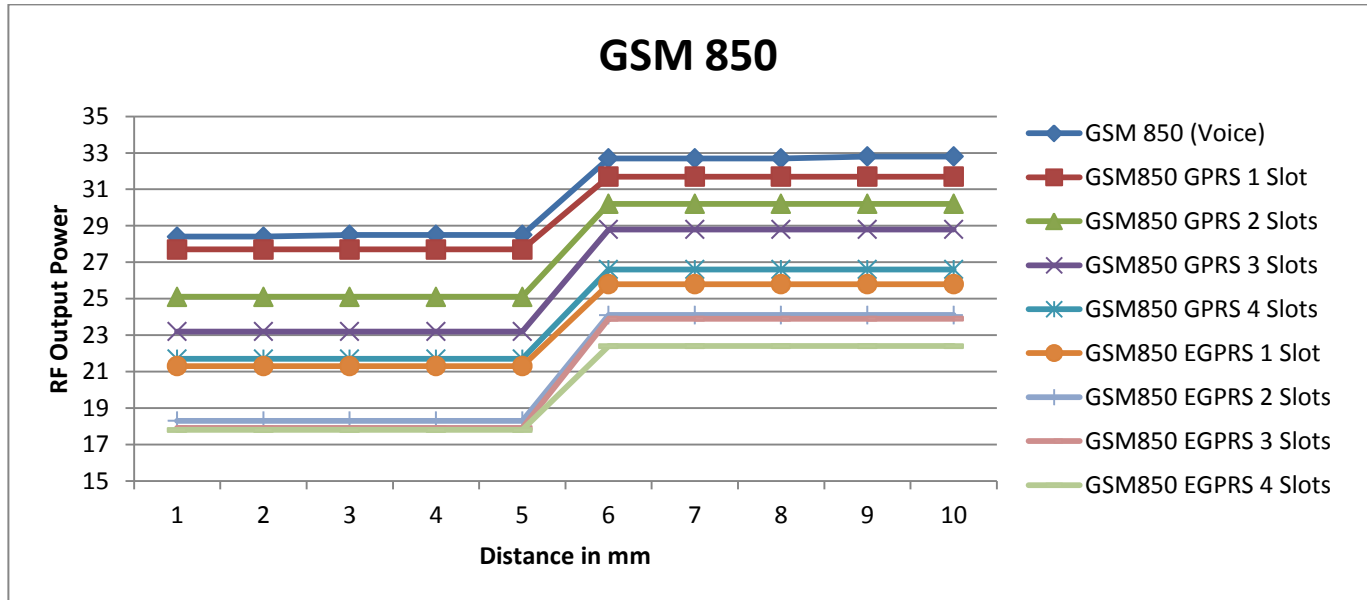
Edge 1, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance (mm)	6	7	8	9	10	11	12	13	14	15
GSM 850 (Voice)	28.2	28.2	28.3	28.3	28.3	32.8	32.8	32.8	32.8	32.9
GSM850 GPRS 1 Slot	27.7	27.7	27.7	27.7	27.7	31.7	31.7	31.7	31.7	31.7
GSM850 GPRS 2 Slots	25.1	25.1	25.1	25.1	25.1	30.2	30.2	30.2	30.2	30.2
GSM850 GPRS 3 Slots	23.2	23.2	23.2	23.2	23.2	28.8	28.8	28.8	28.8	28.8
GSM850 GPRS 4 Slots	21.7	21.7	21.7	21.7	21.7	26.6	26.6	26.6	26.6	26.6
GSM850 EGPRS 1 Slot	21.3	21.3	21.3	21.3	21.3	25.8	25.8	25.8	25.8	25.8
GSM850 EGPRS 2 Slots	18.3	18.3	18.3	18.3	18.3	24.1	24.1	24.1	24.1	24.1
GSM850 EGPRS 3 Slots	17.9	17.9	17.9	17.9	17.9	23.9	23.9	23.9	23.9	23.9
GSM850 EGPRS 4 Slots	17.8	17.8	17.8	17.8	17.8	22.4	22.4	22.4	22.4	22.4



Edge 4, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

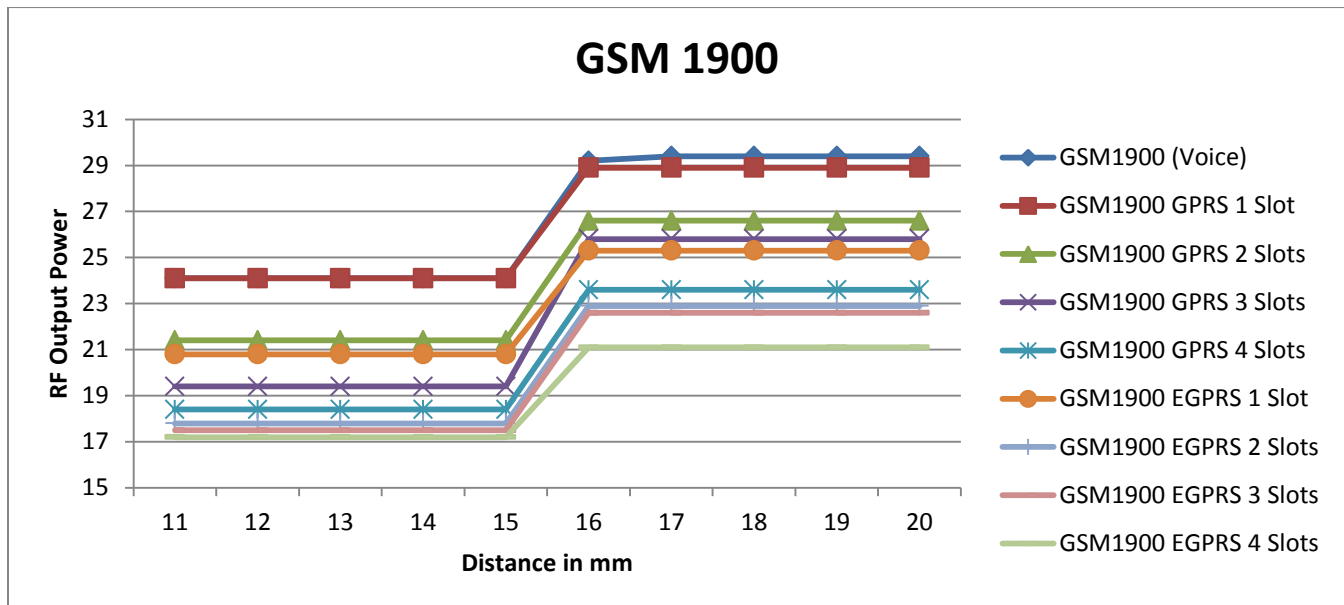
Distance (mm)	1	2	3	4	5	6	7	8	9	10
GSM 850 (Voice)	28.4	28.4	28.5	28.5	28.5	32.7	32.7	32.7	32.8	32.8
GSM850 GPRS 1 Slot	27.7	27.7	27.7	27.7	27.7	31.7	31.7	31.7	31.7	31.7
GSM850 GPRS 2 Slots	25.1	25.1	25.1	25.1	25.1	30.2	30.2	30.2	30.2	30.2
GSM850 GPRS 3 Slots	23.2	23.2	23.2	23.2	23.2	28.8	28.8	28.8	28.8	28.8
GSM850 GPRS 4 Slots	21.7	21.7	21.7	21.7	21.7	26.6	26.6	26.6	26.6	26.6
GSM850 EGPRS 1 Slot	21.3	21.3	21.3	21.3	21.3	25.8	25.8	25.8	25.8	25.8
GSM850 EGPRS 2 Slots	18.3	18.3	18.3	18.3	18.3	24.1	24.1	24.1	24.1	24.1
GSM850 EGPRS 3 Slots	17.9	17.9	17.9	17.9	17.9	23.9	23.9	23.9	23.9	23.9
GSM850 EGPRS 4 Slots	17.8	17.8	17.8	17.8	17.8	22.4	22.4	22.4	22.4	22.4



GSM 1900

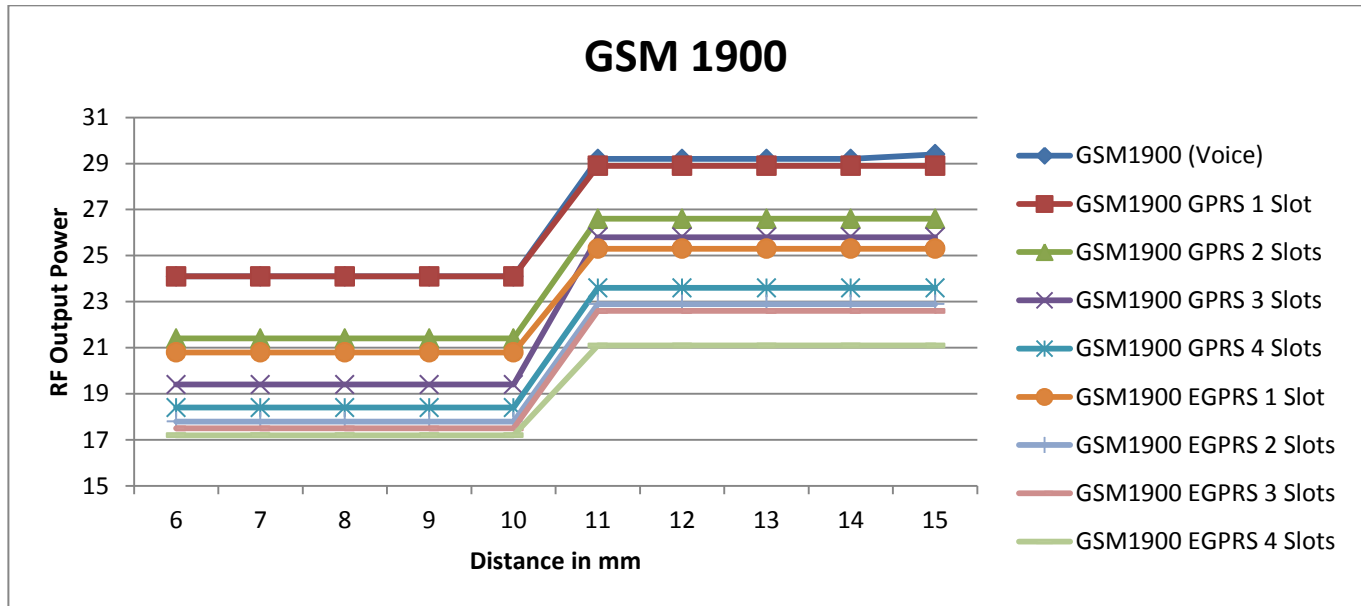
Rear, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance (mm)	11	12	13	14	15	16	17	18	19	20
GSM1900 (Voice)	24.1	24.1	24.1	24.1	24.1	29.2	29.4	29.4	29.4	29.4
GSM1900 GPRS 1 Slot	24.1	24.1	24.1	24.1	24.1	28.9	28.9	28.9	28.9	28.9
GSM1900 GPRS 2 Slots	21.4	21.4	21.4	21.4	21.4	26.6	26.6	26.6	26.6	26.6
GSM1900 GPRS 3 Slots	19.4	19.4	19.4	19.4	19.4	25.8	25.8	25.8	25.8	25.8
GSM1900 GPRS 4 Slots	18.4	18.4	18.4	18.4	18.4	23.6	23.6	23.6	23.6	23.6
GSM1900 EGPRS 1 Slot	20.8	20.8	20.8	20.8	20.8	25.3	25.3	25.3	25.3	25.3
GSM1900 EGPRS 2 Slots	17.8	17.8	17.8	17.8	17.8	22.9	22.9	22.9	22.9	22.9
GSM1900 EGPRS 3 Slots	17.5	17.5	17.5	17.5	17.5	22.6	22.6	22.6	22.6	22.6
GSM1900 EGPRS 4 Slots	17.2	17.2	17.2	17.2	17.2	21.1	21.1	21.1	21.1	21.1



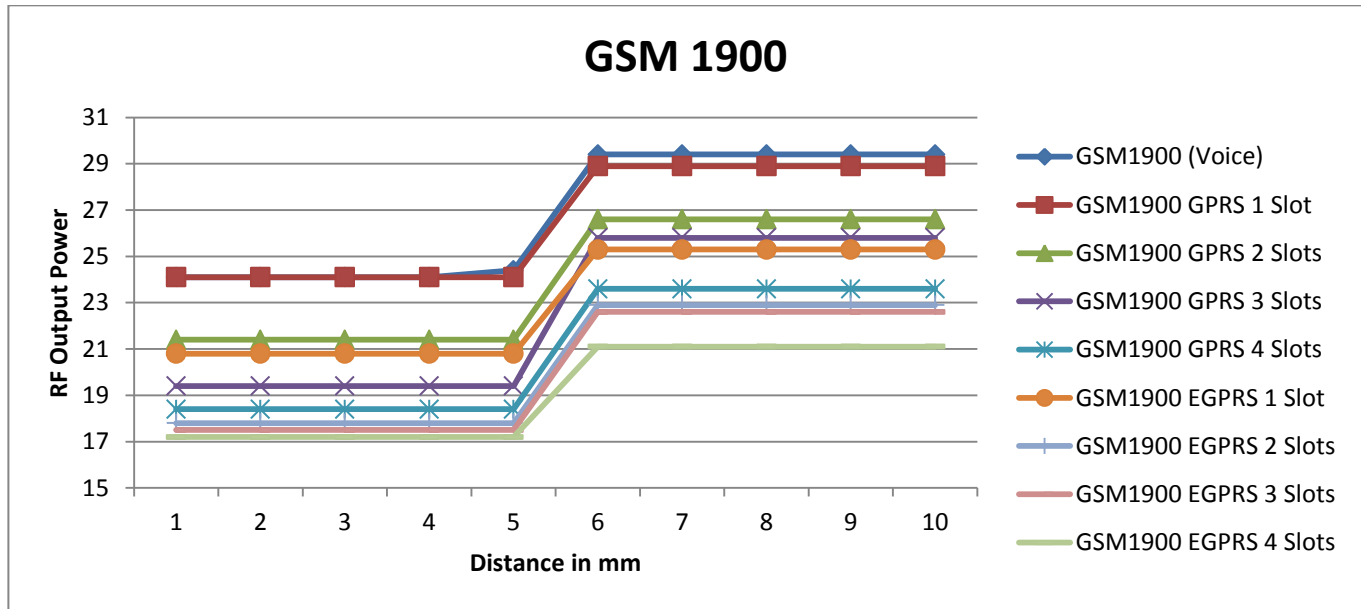
Edge 1, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance (mm)	6	7	8	9	10	11	12	13	14	15
GSM1900 (Voice)	24.1	24.1	24.1	24.1	24.1	29.2	29.2	29.2	29.2	29.4
GSM1900 GPRS 1 Slot	24.1	24.1	24.1	24.1	24.1	28.9	28.9	28.9	28.9	28.9
GSM1900 GPRS 2 Slots	21.4	21.4	21.4	21.4	21.4	26.6	26.6	26.6	26.6	26.6
GSM1900 GPRS 3 Slots	19.4	19.4	19.4	19.4	19.4	25.8	25.8	25.8	25.8	25.8
GSM1900 GPRS 4 Slots	18.4	18.4	18.4	18.4	18.4	23.6	23.6	23.6	23.6	23.6
GSM1900 EGPRS 1 Slot	20.8	20.8	20.8	20.8	20.8	25.3	25.3	25.3	25.3	25.3
GSM1900 EGPRS 2 Slots	17.8	17.8	17.8	17.8	17.8	22.9	22.9	22.9	22.9	22.9
GSM1900 EGPRS 3 Slots	17.5	17.5	17.5	17.5	17.5	22.6	22.6	22.6	22.6	22.6
GSM1900 EGPRS 4 Slots	17.2	17.2	17.2	17.2	17.2	21.1	21.1	21.1	21.1	21.1



Edge 4, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

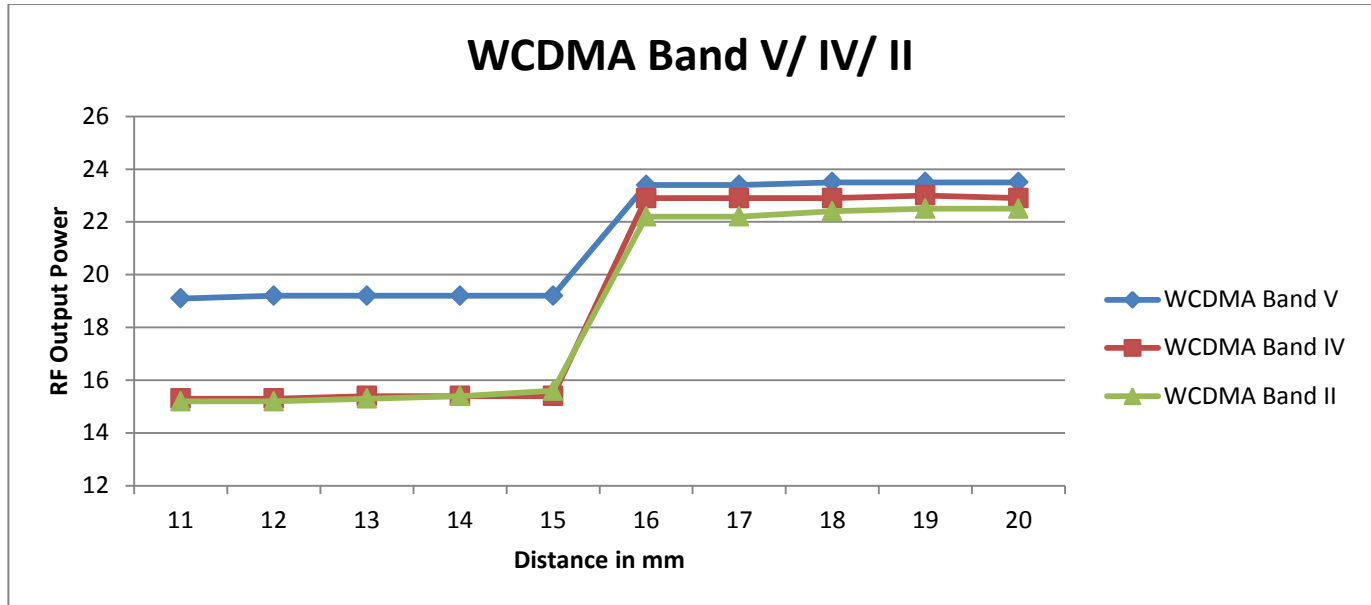
Distance (mm)	1	2	3	4	5	6	7	8	9	10
GSM1900 (Voice)	24.1	24.1	24.1	24.1	24.4	29.4	29.4	29.4	29.4	29.4
GSM1900 GPRS 1 Slot	24.1	24.1	24.1	24.1	24.1	28.9	28.9	28.9	28.9	28.9
GSM1900 GPRS 2 Slots	21.4	21.4	21.4	21.4	21.4	26.6	26.6	26.6	26.6	26.6
GSM1900 GPRS 3 Slots	19.4	19.4	19.4	19.4	19.4	25.8	25.8	25.8	25.8	25.8
GSM1900 GPRS 4 Slots	18.4	18.4	18.4	18.4	18.4	23.6	23.6	23.6	23.6	23.6
GSM1900 EGPRS 1 Slot	20.8	20.8	20.8	20.8	20.8	25.3	25.3	25.3	25.3	25.3
GSM1900 EGPRS 2 Slots	17.8	17.8	17.8	17.8	17.8	22.9	22.9	22.9	22.9	22.9
GSM1900 EGPRS 3 Slots	17.5	17.5	17.5	17.5	17.5	22.6	22.6	22.6	22.6	22.6
GSM1900 EGPRS 4 Slots	17.2	17.2	17.2	17.2	17.2	21.1	21.1	21.1	21.1	21.1



WCDMA Band V / IV / II

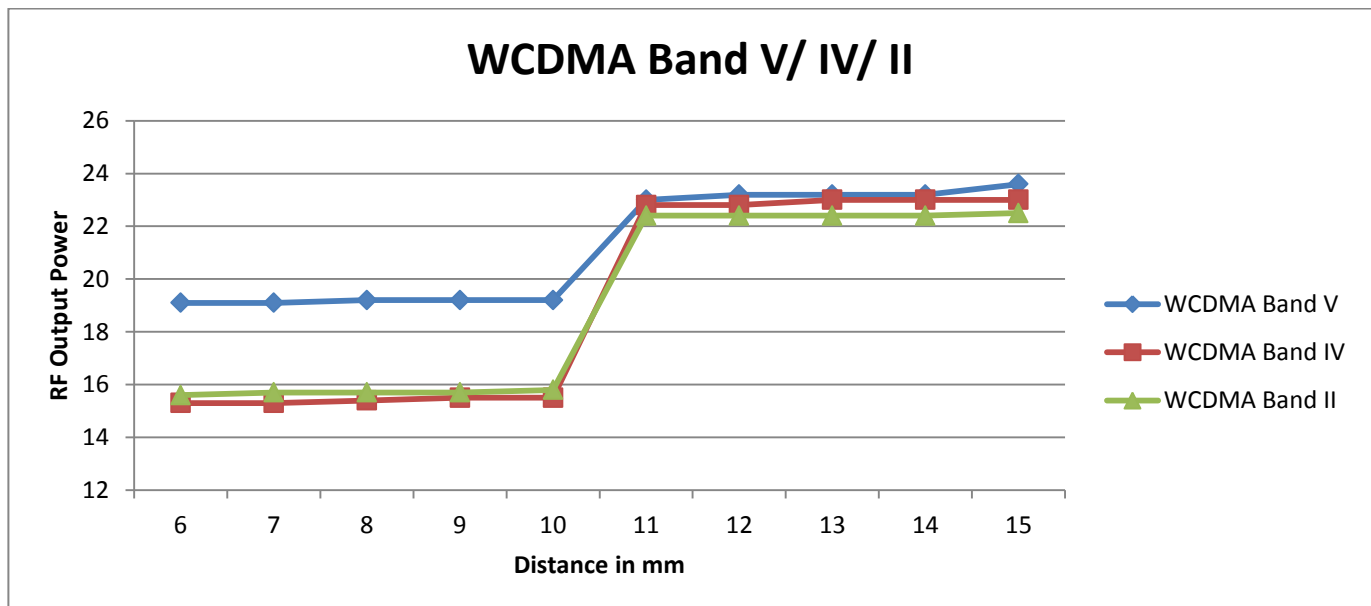
Rear, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance (mm)	11	12	13	14	15	16	17	18	19	20
WCDMA Band V	19.1	19.2	19.2	19.2	19.2	23.4	23.4	23.5	23.5	23.5
WCDMA Band IV	15.3	15.3	15.4	15.4	15.4	22.9	22.9	22.9	23.0	22.9
WCDMA Band II	15.2	15.2	15.3	15.4	15.6	22.2	22.2	22.4	22.5	22.5



Edge 1, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

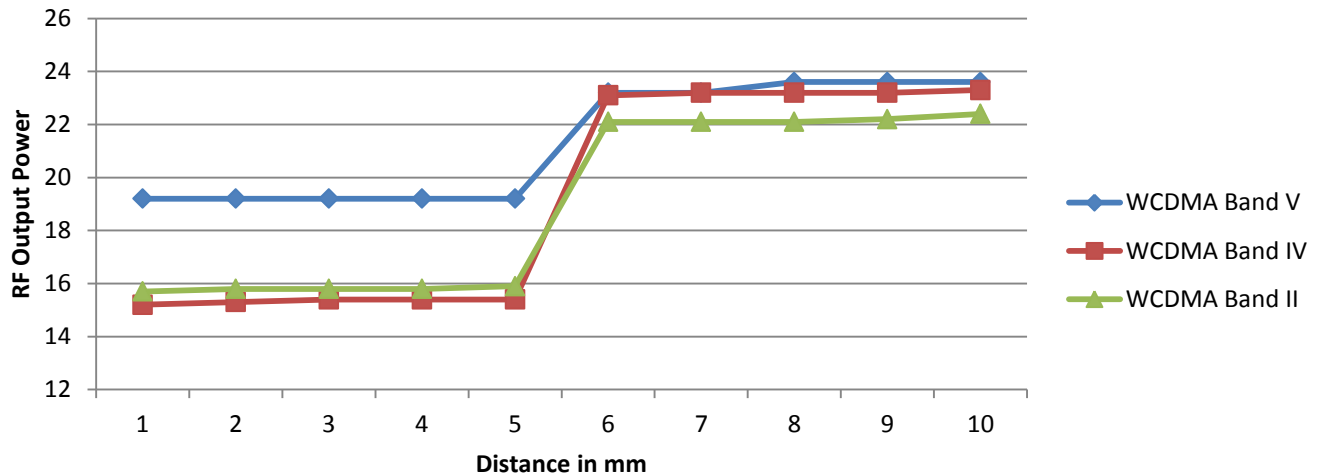
Distance (mm)	6	7	8	9	10	11	12	13	14	15
WCDMA Band V	19.1	19.1	19.2	19.2	19.2	23.0	23.2	23.2	23.2	23.6
WCDMA Band IV	15.3	15.3	15.4	15.5	15.5	22.8	22.8	23.0	23.0	23.0
WCDMA Band II	15.6	15.7	15.7	15.7	15.8	22.4	22.4	22.4	22.4	22.5



Edge 4, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance (mm)	1	2	3	4	5	6	7	8	9	10
WCDMA Band V	19.2	19.2	19.2	19.2	19.2	23.2	23.2	23.6	23.6	23.6
WCDMA Band IV	15.2	15.3	15.4	15.4	15.4	23.1	23.2	23.2	23.2	23.3
WCDMA Band II	15.7	15.8	15.8	15.8	15.9	22.1	22.1	22.1	22.2	22.4

WCDMA Band V/ IV/ II

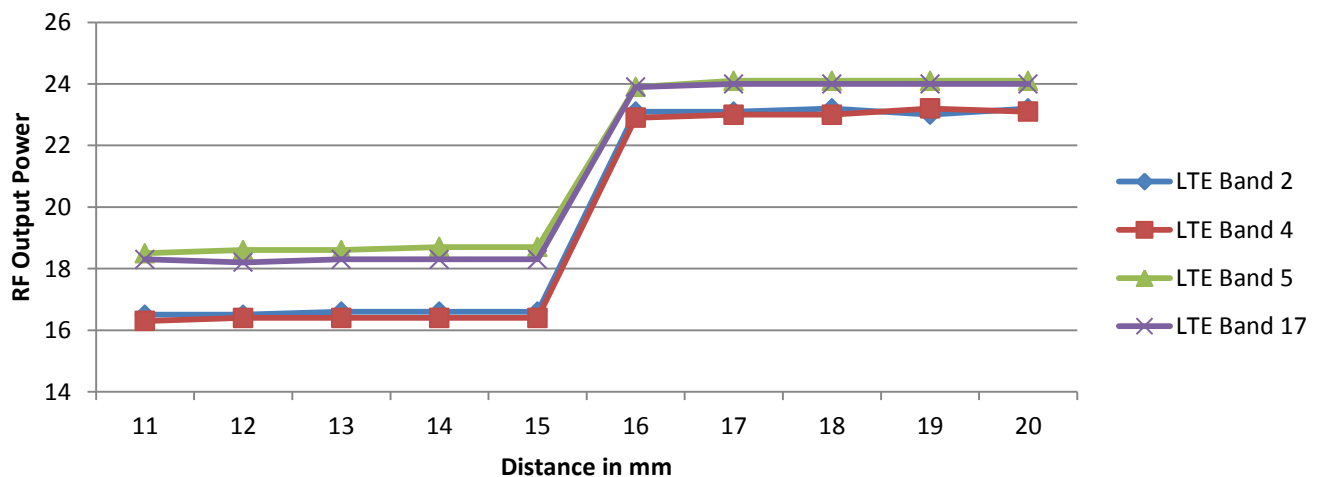


LTE Band 2 / 4 / 5 / 17

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

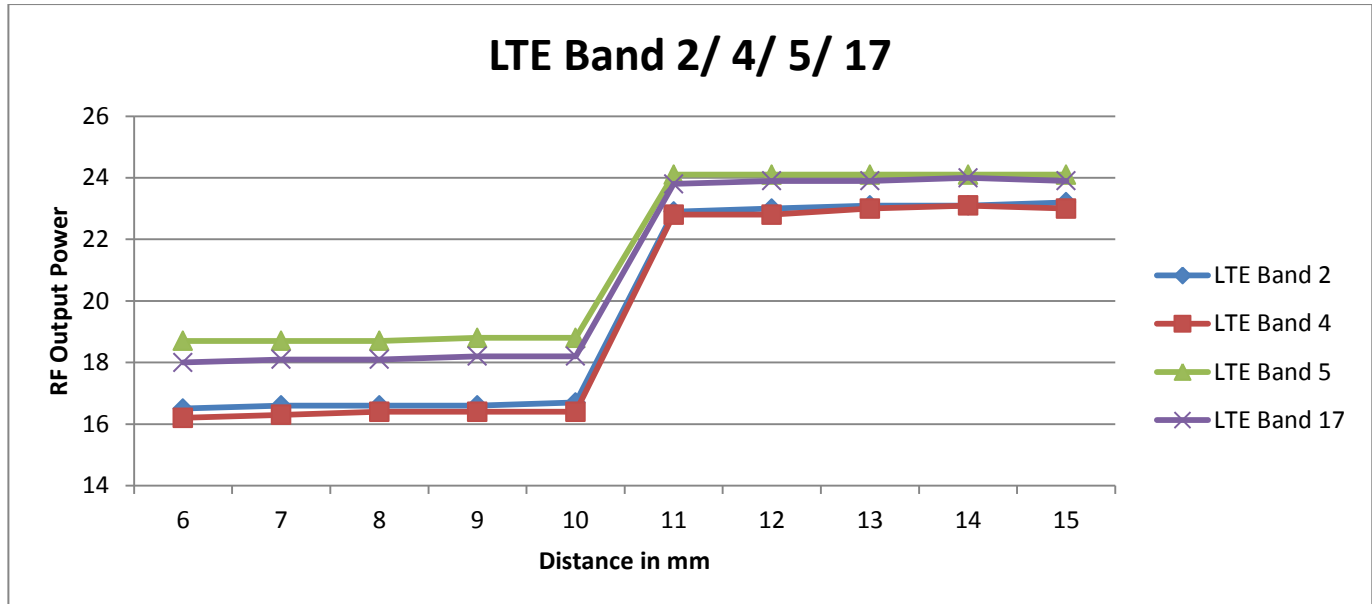
Distance (mm)	11	12	13	14	15	16	17	18	19	20
LTE Band 2	16.5	16.5	16.6	16.6	16.6	23.1	23.1	23.2	23.0	23.2
LTE Band 4	16.3	16.4	16.4	16.4	16.4	22.9	23.0	23.0	23.2	23.1
LTE Band 5	18.5	18.6	18.6	18.7	18.7	23.9	24.1	24.1	24.1	24.1
LTE Band 17	18.3	18.2	18.3	18.3	18.3	23.9	24.0	24.0	24.0	24.0

LTE Band 2/ 4/ 5/ 17



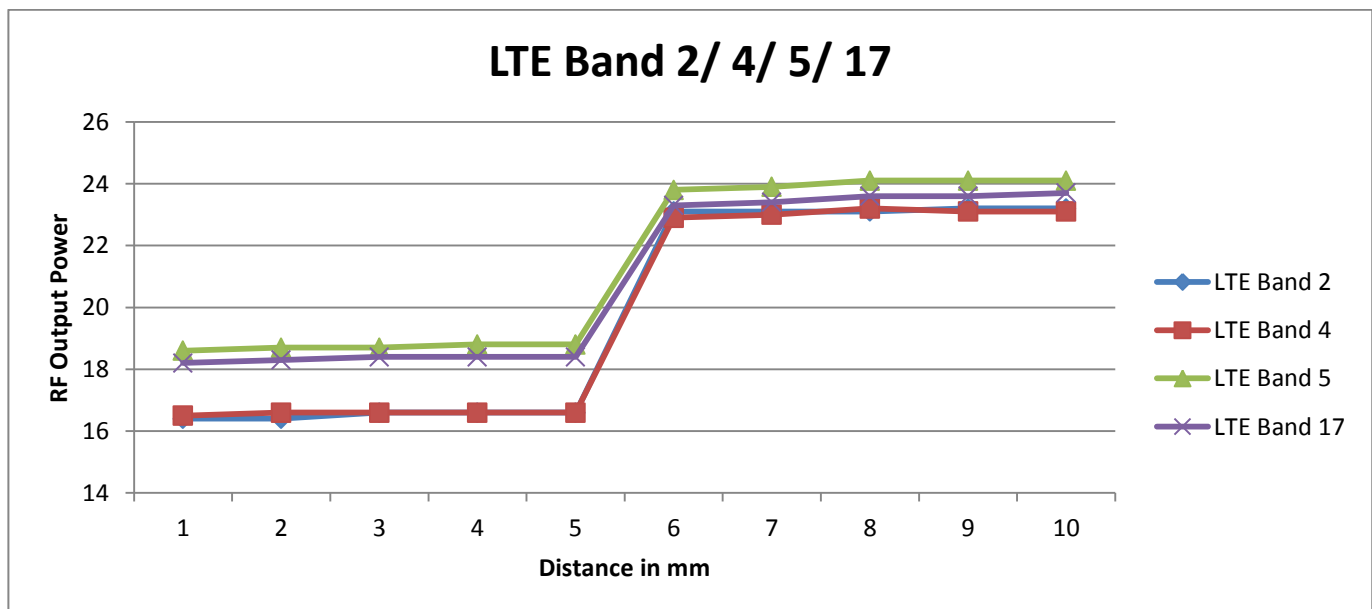
Edge 1, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

Distance (mm)	6	7	8	9	10	11	12	13	14	15
LTE Band 2	16.5	16.6	16.6	16.6	16.7	22.9	23.0	23.1	23.1	23.2
LTE Band 4	16.2	16.3	16.4	16.4	16.4	22.8	22.8	23.0	23.1	23.0
LTE Band 5	18.7	18.7	18.7	18.8	18.8	24.1	24.1	24.1	24.1	24.1
LTE Band 17	18.0	18.1	18.1	18.2	18.2	23.8	23.9	23.9	24.0	23.9



Edge 4, DUT Moving Toward (Trigger) and Away (Release) from the Phantom

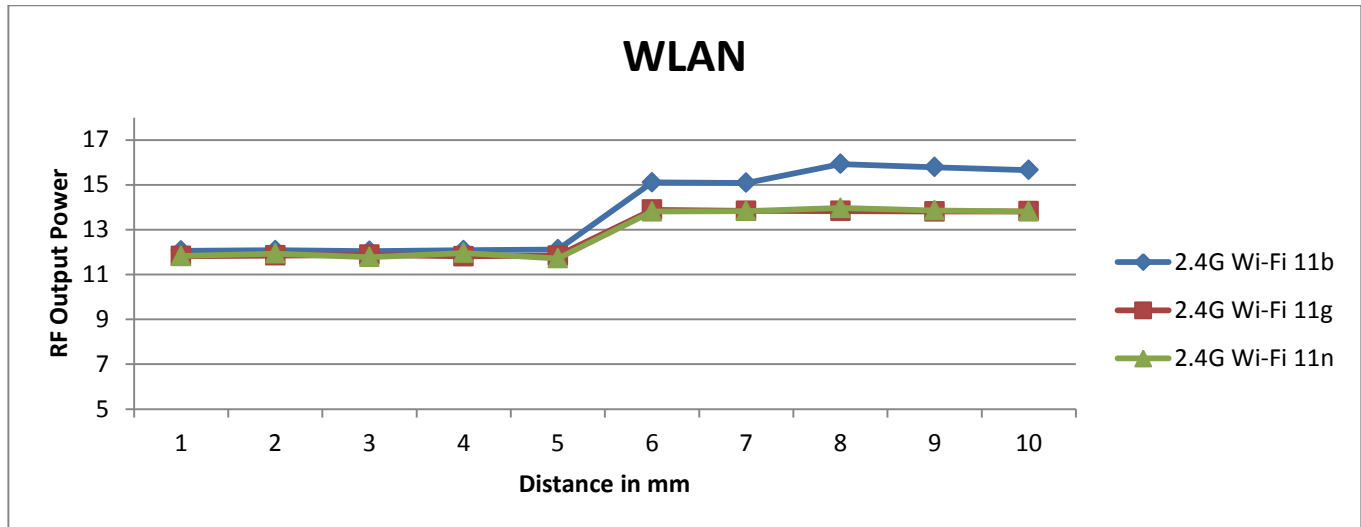
Distance (mm)	1	2	3	4	5	6	7	8	9	10
LTE Band 2	16.4	16.4	16.6	16.6	16.6	23.1	23.1	23.1	23.2	23.2
LTE Band 4	16.5	16.6	16.6	16.6	16.6	22.9	23.0	23.2	23.1	23.1
LTE Band 5	18.6	18.7	18.7	18.8	18.8	23.8	23.9	24.1	24.1	24.1
LTE Band 17	18.2	18.3	18.4	18.4	18.4	23.3	23.4	23.6	23.6	23.7



Wi-Fi 2.4GHz

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

Distance to DUT vs. Output Power in dBm										
Distance	1	2	3	4	5	6	7	8	9	10
2.4G Wi-Fi 11b	12.1	12.1	12.1	12.1	12.1	15.1	15.1	15.9	15.8	15.7
2.4G Wi-Fi 11g	11.8	11.9	11.9	11.8	11.8	13.9	13.8	13.8	13.8	13.8
2.4G Wi-Fi 11n	11.8	11.9	11.8	12.0	11.7	13.8	13.8	14.0	13.9	13.8



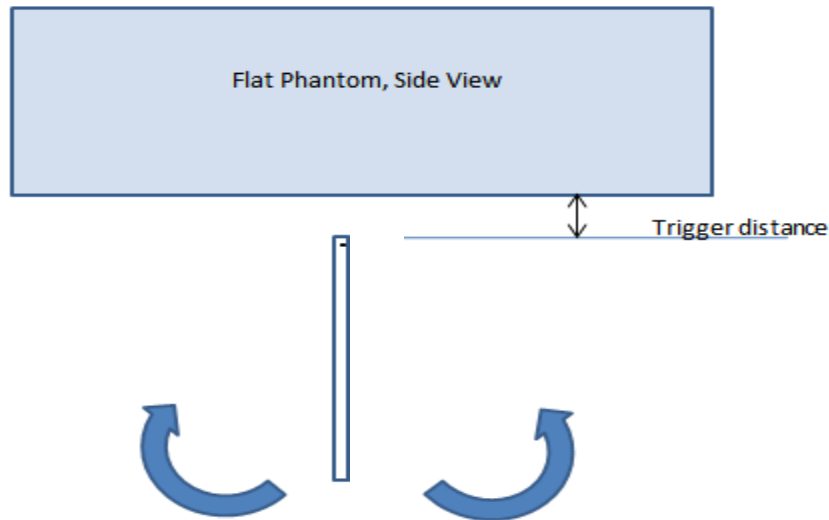
6.4.2. Proximity Sensor Coverage (KDB 616217 §6.3)

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

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

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

The EUT was rotated about Edge 1 for angles up to $\pm 45^\circ$. If the output power increased during the rotation the DUT was moved 1mm toward the phantom and the rotation repeated. This procedure was repeated until the power remained reduced for all angles up to $\pm 45^\circ$.



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

Summary of Tablet Tilt Angle Influence to Proximity Sensor Triggering (Edge 1)

Band (MHz)	Minimum trigger distance measured according to KDB 616217 §6.2	Minimum distance at which power reduction was maintained over $\pm 45^\circ$	Power reduction status										
			-45°	-40°	-30°	-20°	-10°	0°	10°	20°	30°	40°	45°
750	10 mm	10 mm	On	On	On	On	On	On	On	On	On	On	On
850	10 mm	10 mm	On	On	On	On	On	On	On	On	On	On	On
1750	10 mm	10 mm	On	On	On	On	On	On	On	On	On	On	On
1900	10 mm	10 mm	On	On	On	On	On	On	On	On	On	On	On

6.4.4. Resulting test positions for SAR measurements

Wireless technologies	Position	§6.2 Triggering Distance	§6.3 Coverage	§6.4 Tilt Angle	Worst case distance for SAR
WWAN	Rear	15 mm	N/A	N/A	14 mm
	Edge 1	10 mm	N/A	10 mm	9 mm
	Edge 4	5 mm	N/A	5 mm	4 mm
WLAN	Rear	5 mm	N/A	N/A	4 mm

Antennas > 50mm to adjacent edges

Antenna	Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Calculated Threshold Value					
			dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
Full Power, Proximity Sensor Off																
Cellular	GPRS 2 Slots	848.8	31.50	353	1	0	68	149	0		< 50 mm	< 50 mm	264.7 mW -MEASURE-	723 mW -EXEMPT-	< 50 mm	
Cellular	GPRS 3 Slots	1909.8	26.50	168	1	0	68	149	0		< 50 mm	< 50 mm	288.5 mW -EXEMPT-	1098.5 mW -EXEMPT-	< 50 mm	
Cellular	W-CDMA V	848.6	24.50	282	1	0	68	149	0		< 50 mm	< 50 mm	264.7 mW -MEASURE-	722.9 mW -EXEMPT-	< 50 mm	
Cellular	W-CDMA IV	1752.6	23.50	224	1	0	68	149	0		< 50 mm	< 50 mm	293.3 mW -EXEMPT-	1103.3 mW -EXEMPT-	< 50 mm	
Cellular	W-CDMA II	1907.6	23.50	224	1	0	68	149	0		< 50 mm	< 50 mm	288.6 mW -EXEMPT-	1098.6 mW -EXEMPT-	< 50 mm	
Cellular	LTE Band 2	1900	23.50	224	1	0	68	149	0		< 50 mm	< 50 mm	288.8 mW -EXEMPT-	1098.8 mW -EXEMPT-	< 50 mm	
Cellular	LTE Band 4	1745	24.50	282	1	0	68	149	0		< 50 mm	< 50 mm	293.6 mW -EXEMPT-	1103.6 mW -EXEMPT-	< 50 mm	
Cellular	LTE Band 5	844	24.50	282	1	0	68	149	0		< 50 mm	< 50 mm	264.6 mW -MEASURE-	720.3 mW -EXEMPT-	< 50 mm	
Cellular	LTE Band 17	710	24.00	251	1	0	68	149	0		< 50 mm	< 50 mm	263.2 mW -EXEMPT-	646.6 mW -EXEMPT-	< 50 mm	
Power Back-off, Proximity Sensor On																
Cellular	GPRS 1 Slots	848.8	29.00	99	1	0	68	149	0		< 50 mm	< 50 mm	264.7 mW -EXEMPT-	723 mW -EXEMPT-	< 50 mm	
Cellular	GPRS 1 Slots	1909.8	26.00	50	1	0	68	149	0		< 50 mm	< 50 mm	288.5 mW -EXEMPT-	1098.5 mW -EXEMPT-	< 50 mm	
Cellular	W-CDMA V	848.6	20.50	112	1	0	68	149	0		< 50 mm	< 50 mm	264.7 mW -EXEMPT-	722.9 mW -EXEMPT-	< 50 mm	
Cellular	W-CDMA IV	1752.6	16.00	40	1	0	68	149	0		< 50 mm	< 50 mm	293.3 mW -EXEMPT-	1103.3 mW -EXEMPT-	< 50 mm	
Cellular	W-CDMA II	1907.6	16.50	45	1	0	68	149	0		< 50 mm	< 50 mm	288.6 mW -EXEMPT-	1098.6 mW -EXEMPT-	< 50 mm	
Cellular	LTE Band 2	1900	17.00	50	1	0	68	149	0		< 50 mm	< 50 mm	288.8 mW -EXEMPT-	1098.8 mW -EXEMPT-	< 50 mm	
Cellular	LTE Band 4	1745	17.00	50	1	0	68	149	0		< 50 mm	< 50 mm	293.6 mW -EXEMPT-	1103.6 mW -EXEMPT-	< 50 mm	
Cellular	LTE Band 5	844	19.00	79	1	0	68	149	0		< 50 mm	< 50 mm	264.6 mW -EXEMPT-	720.3 mW -EXEMPT-	< 50 mm	
Cellular	LTE Band 17	710	18.50	71	1	0	68	149	0		< 50 mm	< 50 mm	263.2 mW -EXEMPT-	646.6 mW -EXEMPT-	< 50 mm	

Note(s):

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

SAR Test Exclusion Calculations for WLAN**Antennas < 50mm to adjacent edges**

Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Calculated Threshold Value					
		dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
Full Power, Proximity Sensor Off															
Wi-Fi 2.4 GHz	2462	16.50	45	1	1	36	174	39		14.1 -MEASURE-	14.1 -MEASURE-	2 -EXEMPT-	> 50 mm	1.8 -EXEMPT-	
Bluetooth	2480	11.50	14	1	1	36	174	39		4.4 -MEASURE-	4.4 -MEASURE-	0.6 -EXEMPT-	> 50 mm	0.6 -EXEMPT-	
Power Back-off, Proximity Sensor On															
Wi-Fi 2.4 GHz	2462	12.50	18	1						5.6 -MEASURE-					

Note(s):

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

Antennas > 50mm to adjacent edges

Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Calculated Threshold Value					
		dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
Full Power, Proximity Sensor Off															
Wi-Fi 2.4 GHz	2462	16.50	45	1	1	36	174	39		< 50 mm	< 50 mm	< 50 mm	1335.6 mW -EXEMPT-	< 50 mm	
Bluetooth	2480	11.50	14	1	1	36	174	39		< 50 mm	< 50 mm	< 50 mm	1335.3 mW -EXEMPT-	< 50 mm	
Power Back-off, Proximity Sensor On															
Wi-Fi 2.4 GHz	2462	12.50	18	1	1	36	174	39		< 50 mm	< 50 mm	< 50 mm	1335.6 mW -EXEMPT-	< 50 mm	

Note(s):

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

7.2. Required Test Configurations

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

Test Configurations	Pwr Back-off	Rear	Edge 1	Edge 2	Edge 3	Edge 4
			(Top Edge)	(Right Edge)	(Bottom Edge)	(Left Edge)
GSM850	OFF	Yes	Yes	Yes	No	Yes
	ON	Yes	Yes	No	No	Yes
GSM1900	OFF	Yes	Yes	No	No	Yes
	ON	Yes	Yes	No	No	Yes
W-CDMA Band 2	OFF	Yes	Yes	No	No	Yes
	ON	Yes	Yes	No	No	Yes
W-CDMA Band 4	OFF	Yes	Yes	No	No	Yes
	ON	Yes	Yes	No	No	Yes
W-CDMA Band 5	OFF	Yes	Yes	Yes	No	Yes
	ON	Yes	Yes	No	No	Yes
LTE Band 2	OFF	Yes	Yes	No	No	Yes
	ON	Yes	Yes	No	No	Yes
LTE Band 4	OFF	Yes	Yes	No	No	Yes
	ON	Yes	Yes	No	No	Yes
LTE Band 5	OFF	Yes	Yes	Yes	No	Yes
	ON	Yes	Yes	No	No	Yes
LTE Band 17	OFF	Yes	Yes	No	No	Yes
	ON	Yes	Yes	No	No	Yes
Wi-Fi 2.4 GHz	OFF	Yes	Yes	No	No	No
	ON	Yes	No	No	No	No
Bluetooth	OFF	Yes	Yes	No	No	No

Note(s):

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

8. Dielectric Property Measurements & System Check

8.1. Dielectric Property Measurements

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

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

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

Tissue Dielectric Parameters

FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

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

IEEE Std 1528-2013

Refer to Table 3 within the IEEE Std 1528-2013

Dielectric Property Measurements Results:**SAR 1 Room**

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
2-11-2016	Head 2450	e'	37.9100	Relative Permittivity (ϵ_r):	37.91	39.20	-3.29	5
		e"	13.7800	Conductivity (σ):	1.88	1.80	4.29	5
	Head 2410	e'	38.0400	Relative Permittivity (ϵ_r):	38.04	39.28	-3.15	5
		e"	13.7000	Conductivity (σ):	1.84	1.76	4.28	5
	Head 2475	e'	37.8200	Relative Permittivity (ϵ_r):	37.82	39.17	-3.44	5
		e"	13.8700	Conductivity (σ):	1.91	1.83	4.47	5
2-18-2016	Body 750	e'	54.4200	Relative Permittivity (ϵ_r):	54.42	55.55	-2.03	5
		e"	22.9300	Conductivity (σ):	0.96	0.96	-0.71	5
	Body 700	e'	55.0100	Relative Permittivity (ϵ_r):	55.01	55.74	-1.31	5
		e"	23.4400	Conductivity (σ):	0.91	0.96	-4.89	5
	Body 790	e'	54.0300	Relative Permittivity (ϵ_r):	54.03	55.39	-2.46	5
		e"	22.7400	Conductivity (σ):	1.00	0.97	3.39	5

SAR 2 Room

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
2-12-2016	Body 2450	e'	52.6500	Relative Permittivity (ϵ_r):	52.65	52.70	-0.09	5
		e"	14.0200	Conductivity (σ):	1.91	1.95	-2.06	5
	Body 2410	e'	52.7600	Relative Permittivity (ϵ_r):	52.76	52.76	0.00	5
		e"	13.8700	Conductivity (σ):	1.86	1.91	-2.56	5
	Body 2475	e'	52.5800	Relative Permittivity (ϵ_r):	52.58	52.67	-0.17	5
		e"	14.1300	Conductivity (σ):	1.94	1.99	-2.05	5
2-22-2016	Body 835	e'	54.5400	Relative Permittivity (ϵ_r):	54.54	55.20	-1.20	5
		e"	21.5400	Conductivity (σ):	1.00	0.97	3.10	5
	Body 820	e'	54.6500	Relative Permittivity (ϵ_r):	54.65	55.28	-1.13	5
		e"	21.6300	Conductivity (σ):	0.99	0.97	1.83	5
	Body 850	e'	54.4400	Relative Permittivity (ϵ_r):	54.44	55.16	-1.30	5
		e"	21.4600	Conductivity (σ):	1.01	0.99	2.75	5
2-23-2016	Head 750	e'	42.5500	Relative Permittivity (ϵ_r):	42.55	41.96	1.40	5
		e"	21.6800	Conductivity (σ):	0.90	0.89	1.24	5
	Head 700	e'	43.1800	Relative Permittivity (ϵ_r):	43.18	42.22	2.28	5
		e"	22.0600	Conductivity (σ):	0.86	0.89	-3.44	5
	Head 790	e'	42.0000	Relative Permittivity (ϵ_r):	42.00	41.76	0.58	5
		e"	21.3700	Conductivity (σ):	0.94	0.90	4.75	5
2-25-2016	Head 835	e'	42.9000	Relative Permittivity (ϵ_r):	42.90	41.50	3.37	5
		e"	20.0000	Conductivity (σ):	0.93	0.90	3.17	5
	Head 820	e'	43.0800	Relative Permittivity (ϵ_r):	43.08	41.60	3.55	5
		e"	20.0600	Conductivity (σ):	0.91	0.90	1.80	5
	Head 850	e'	42.7300	Relative Permittivity (ϵ_r):	42.73	41.50	2.96	5
		e"	19.9300	Conductivity (σ):	0.94	0.92	2.94	5
2-26-2016	Body 835	e'	53.7700	Relative Permittivity (ϵ_r):	53.77	55.20	-2.59	5
		e"	21.6000	Conductivity (σ):	1.00	0.97	3.39	5
	Body 820	e'	53.9100	Relative Permittivity (ϵ_r):	53.91	55.28	-2.47	5
		e"	21.6800	Conductivity (σ):	0.99	0.97	2.07	5
	Body 850	e'	53.6500	Relative Permittivity (ϵ_r):	53.65	55.16	-2.73	5
		e"	21.5400	Conductivity (σ):	1.02	0.99	3.13	5
2-29-2016	Head 1900	e'	40.2300	Relative Permittivity (ϵ_r):	40.23	40.00	0.57	5
		e"	13.1400	Conductivity (σ):	1.39	1.40	-0.84	5
	Head 1850	e'	40.4100	Relative Permittivity (ϵ_r):	40.41	40.00	1.02	5
		e"	13.0000	Conductivity (σ):	1.34	1.40	-4.48	5
	Head 1910	e'	40.2000	Relative Permittivity (ϵ_r):	40.20	40.00	0.50	5
		e"	13.1800	Conductivity (σ):	1.40	1.40	-0.02	5

SAR 3 Room

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
2-23-2016	Body 1750	e'	51.6100	Relative Permittivity (ϵ_r):	51.61	53.44	-3.43	5
		e"	14.8300	Conductivity (σ):	1.44	1.49	-2.90	5
	Body 1710	e'	51.7400	Relative Permittivity (ϵ_r):	51.74	53.54	-3.37	5
		e"	14.6800	Conductivity (σ):	1.40	1.46	-4.50	5
	Body 1755	e'	51.5900	Relative Permittivity (ϵ_r):	51.59	53.43	-3.44	5
		e"	14.8400	Conductivity (σ):	1.45	1.49	-2.76	5
2-23-2016	Body 1900	e'	50.9200	Relative Permittivity (ϵ_r):	50.92	53.30	-4.47	5
		e"	15.0100	Conductivity (σ):	1.59	1.52	4.33	5
	Body 1850	e'	51.1600	Relative Permittivity (ϵ_r):	51.16	53.30	-4.02	5
		e"	14.9900	Conductivity (σ):	1.54	1.52	1.44	5
	Body 1910	e'	50.8800	Relative Permittivity (ϵ_r):	50.88	53.30	-4.54	5
		e"	15.0100	Conductivity (σ):	1.59	1.52	4.87	5
2-25-2016	Head 1750	e'	39.6300	Relative Permittivity (ϵ_r):	39.63	40.08	-1.13	5
		e"	13.5300	Conductivity (σ):	1.32	1.37	-3.83	5
	Head 1710	e'	39.7500	Relative Permittivity (ϵ_r):	39.75	40.15	-0.99	5
		e"	13.4700	Conductivity (σ):	1.28	1.35	-4.88	5
	Head 1755	e'	39.6200	Relative Permittivity (ϵ_r):	39.62	40.08	-1.14	5
		e"	13.5300	Conductivity (σ):	1.32	1.37	-3.75	5
2-25-2016	Head 1900	e'	39.1000	Relative Permittivity (ϵ_r):	39.10	40.00	-2.25	5
		e"	13.7700	Conductivity (σ):	1.45	1.40	3.91	5
	Head 1850	e'	39.2800	Relative Permittivity (ϵ_r):	39.28	40.00	-1.80	5
		e"	13.6800	Conductivity (σ):	1.41	1.40	0.51	5
	Head 1910	e'	39.0700	Relative Permittivity (ϵ_r):	39.07	40.00	-2.33	5
		e"	13.7900	Conductivity (σ):	1.46	1.40	4.61	5

8.2. System Check

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

System Performance Check Measurement Conditions:

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

Reference Target SAR Values

The reference SAR values can be obtained from the calibration certificate of system validation dipoles

System Dipole	Serial No.	Cal. Date	Freq. (MHz)	Target SAR Values (W/kg)		
				1g/10g	Head	Body
D750V3	1122	8-17-2015	750	1g	8.23	8.6
				10g	5.37	5.67
D835V2	4d194	9-17-2015	835	1g	9.38	9.49
				10g	6.09	6.18
D1750V2	1125	8-20-2015	1750	1g	36.70	37.20
				10g	19.50	20.00
D1900V2	5d190	9-29-2015	1900	1g	39.70	39.60
				10g	20.70	20.80
D2450V2	939	9-28-2015	2450	1g	51.6	50.7
				10g	23.9	23.7

System Check Results

The 1-g and 10-g SAR measured with a reference dipole, using the required tissue-equivalent medium at the test frequency, must be within 10% of the manufacturer calibrated dipole SAR target.

SAR 1 Room

Date Tested	System Dipole		T.S. Liquid	Measured Results		Target (Ref. Value)	Delta $\pm 10\%$	Plot No.
	Type	Serial #		Zoom Scan to 100 mW	Normalize to 1 W			
2-11-2016	D2450V2	939	Head	1g	5.60	56.00	51.60	8.53
				10g	2.53	25.30	23.90	
2-18-2016	D750V3	1122	Body	1g	0.83	8.26	8.60	-3.95
				10g	0.55	5.50	5.67	

SAR 2 Room

Date Tested	System Dipole		T.S. Liquid	Measured Results		Target (Ref. Value)	Delta $\pm 10\%$	Plot No.
	Type	Serial #		Zoom Scan to 100 mW	Normalize to 1 W			
2-12-2016	D2450V2	939	Body	1g	5.21	52.10	50.70	2.76
				10g	2.40	24.00	23.70	
2-22-2016	D835V2	4d194	Body	1g	0.99	9.92	9.49	4.53
				10g	0.65	6.53	6.18	
2-23-2016	D750V3	1122	Head	1g	0.83	8.30	8.23	0.85
				10g	0.55	5.50	5.37	
2-25-2016	D835V2	4d194	Head	1g	1.01	10.10	9.38	7.68
				10g	0.66	6.61	6.09	
2-26-2016	D835V2	4d194	Body	1g	0.99	9.94	9.49	4.74
				10g	0.65	6.53	6.18	
2-29-2016	D1900V2	5d190	Head	1g	3.83	38.30	39.70	-3.53
				10g	1.96	19.60	20.70	

SAR 3 Room

Date Tested	System Dipole		T.S. Liquid	Measured Results		Target (Ref. Value)	Delta $\pm 10\%$	Plot No.
	Type	Serial #		Zoom Scan to 100 mW	Normalize to 1 W			
2-23-2016	D1750V2	1125	Body	1g	3.70	37.00	37.20	-0.54
				10g	1.94	19.40	20.00	
2-23-2016	D1900V2	5d190	Body	1g	4.10	41.00	39.60	3.54
				10g	2.08	20.80	20.80	
2-25-2016	D1750V2	1125	Head	1g	3.47	34.70	36.70	-5.45
				10g	1.84	18.40	19.50	
2-25-2016	D1900V2	5d190	Head	1g	3.58	35.80	39.70	-9.82
				10g	1.87	18.70	20.70	

9. Conducted Output Power Measurements

9.1. GSM

GSM850 Measured Results

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Max. Pwr		Reduced Pwr	
						Burst (dBm)	Frame (dBm)	Burst (dBm)	Frame (dBm)
850	GSM (Voice)	CS1	1	128	824.2	32.8	23.8	28.4	19.4
				190	836.6	32.9	23.9	28.6	19.6
				251	848.8	32.9	23.9	28.6	19.6
	GPRS (GMSK)	CS1	1	128	824.2	32.8	23.8	28.4	19.4
				190	836.6	32.9	23.9	28.5	19.5
				251	848.8	32.8	23.8	28.6	19.6
			2	128	824.2	31.2	25.2	25.3	19.3
				190	836.6	31.3	25.3	25.4	19.4
				251	848.8	31.3	25.3	25.5	19.5
			3	128	824.2	29.4	25.1	23.4	19.1
				190	836.6	29.5	25.2	23.6	19.3
				251	848.8	29.5	25.2	23.7	19.4
			4	128	824.2	27.3	24.3	22.3	19.3
				190	836.6	27.4	24.4	22.4	19.4
				251	848.8	27.5	24.5	22.5	19.5
	EGPRS (8PSK)	MCS5	1	128	824.2	26.4	17.4	21.8	12.8
				190	836.6	26.6	17.6	22.0	13.0
				251	848.8	26.6	17.6	22.0	13.0
			2	128	824.2	24.5	18.5	18.8	12.8
				190	836.6	24.5	18.5	18.9	12.9
				251	848.8	24.6	18.6	18.8	12.8
			3	128	824.2	24.1	19.8	18.5	14.2
				190	836.6	24.2	19.9	18.6	14.3
				251	848.8	25.2	20.9	18.5	14.2
			4	128	824.2	23.2	20.2	18.2	15.2
				190	836.6	23.2	20.2	18.4	15.4
				251	848.8	23.2	20.2	18.3	15.3

Notes:

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

- Standalone: GMSK (GPRS) mode with 2 time slots for Max power and 1 time slot for Reduced power, based on the output power measurements above
- SAR is not required for EGPRS (8PSK) mode because its output power is less than that of GPRS Mode

GSM1900 Measured Results

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Max. Pwr		Reduced Pwr	
						Burst (dBm)	Frame (dBm)	Burst (dBm)	Frame (dBm)
1900	GSM (Voice)	CS1	1	512	1850.2	29.7	20.7	25.4	16.4
				661	1880.0	29.5	20.5	25.5	16.5
				810	1909.8	29.7	20.7	25.4	16.4
	GPRS (GMSK)	CS1	1	512	1850.2	29.8	20.8	25.4	16.4
				661	1880.0	29.5	20.5	25.5	16.5
				810	1909.8	29.8	20.8	25.4	16.4
			2	512	1850.2	27.3	21.3	22.3	16.3
				661	1880.0	27.5	21.5	22.3	16.3
				810	1909.8	27.5	21.5	22.4	16.4
			3	512	1850.2	26.1	21.8	20.2	15.9
				661	1880.0	26.3	22.0	20.4	16.1
				810	1909.8	26.2	21.9	20.3	16.0
			4	512	1850.2	24.0	21.0	19.2	16.2
				661	1880.0	24.2	21.2	19.3	16.3
				810	1909.8	24.1	21.1	19.2	16.2
	EGPRS (8PSK)	MCS5	1	512	1850.2	25.8	16.8	21.3	12.3
				661	1880.0	25.7	16.7	21.1	12.1
				810	1909.8	26.0	17.0	21.4	12.4
			2	512	1850.2	23.3	17.3	18.2	12.2
				661	1880.0	23.3	17.3	18.0	12.0
				810	1909.8	23.6	17.6	18.3	12.3
			3	512	1850.2	23.1	18.8	18.0	13.7
				661	1880.0	23.0	18.7	17.7	13.4
				810	1909.8	23.3	19.0	18.0	13.7
			4	512	1850.2	21.9	18.9	17.7	14.7
				661	1880.0	21.7	18.7	17.4	14.4
				810	1909.8	22.0	19.0	17.8	14.8

Notes:

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

- Standalone: GMSK (GPRS) mode with 3 time slots for Max power and 1 time slot for Reduced power, based on the output power measurements above
- SAR is not required for EGPRS (8PSK) mode because its output power is less than that of GPRS Mode

9.2. W-CDMA

Release 99 Setup Procedures used to establish the test signals

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

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

HSDPA Setup Procedures used to establish the test signals

The following 4 Sub-tests were completed according to Release 7 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

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

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

The following 5 Sub-tests were completed according to Release 6 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	HSPA				
	Subtest	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2 kbps RMC				
	HSDPA FRC	H-Set 1				
	HSUPA Test	HSPA				
	Power Control Algorithm	Algorithm 2				Algorithm 1
	β_c	11/15	6/15	15/15	2/15	15/15
	β_d	15/15	15/15	9/15	15/15	0
	β_{ec}	209/225	12/15	30/15	2/15	5/15
	β_c/β_d	11/15	6/15	15/9	2/15	15/1
	β_{hs}	22/15	12/15	30/15	4/15	5/15
	β_{ed}	1309/225	94/75	47/15	56/75	47/15
HSDPA Specific Settings	CM (dB)	1	3	2	3	1
	MPR (dB)	0	2	1	2	0
	DACK	8				0
	DNAK	8				0
	DCQI	8				0
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
HSUPA Specific Settings	CQI Repetition Factor (Table 5.2B.4)	2				
	$A_{hs} = \beta_{hs}/\beta_c$	30/15				
	E-DPDCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	21
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	81
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E-TFCIs	5	5	2	5	1
	Reference E-TFCI	11	11	11	11	67
	Reference E-TFCI PO	4	4	4	4	18
	Reference E-TFCI	67	67	92	67	67
	Reference E-TFCI PO	18	18	18	18	18
	Reference E-TFCI	71	71	71	71	71
	Reference E-TFCI PO	23	23	23	23	23
	Reference E-TFCI	75	75	75	75	75
	Reference E-TFCI PO	26	26	26	26	26
	Reference E-TFCI	81	81	81	81	81
	Reference E-TFCI PO	27	27	27	27	27
	Maximum Channelization Codes	2xSF2				SF4

HSPA+

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

WCDMA Band V Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Max. Pwr (dBm)	MPR (dB)	Reduced Pwr (dBm)
W-CDMA Band V	Rel 99	RMC, 12.2 kbps	4132	826.4	N/A	23.9	N/A	20.1
			4183	836.6	N/A	24.0	N/A	20.4
			4233	846.6	N/A	24.0	N/A	20.4
	HSDPA	Subtest 1	4132	826.4	0	23.2	0	19.9
			4183	836.6	0	23.7	0	20.3
			4233	846.6	0	23.6	0	20.3
		Subtest 2	4132	826.4	0	23.5	0	20.0
			4183	836.6	0	23.7	0	20.3
			4233	846.6	0	23.7	0	20.2
		Subtest 3	4132	826.4	0.5	23.6	0	20.1
			4183	836.6	0.5	23.9	0	20.3
			4233	846.6	0.5	23.8	0	20.4
		Subtest 4	4132	826.4	0.5	23.5	0	20.0
			4183	836.6	0.5	23.8	0	20.3
			4233	846.6	0.5	23.8	0	20.3
	HSUPA	Subtest 1	4132	826.4	0	21.7	0	18.6
			4183	836.6	0	22.2	0	19.9
			4233	846.6	0	22.1	0	19.8
		Subtest 2	4132	826.4	2	19.8	0	19.1
			4183	836.6	2	20.2	0	19.9
			4233	846.6	2	20.2	0	19.8
		Subtest 3	4132	826.4	1	21.1	0	19.8
			4183	836.6	1	21.5	0	20.4
			4233	846.6	1	21.5	0	20.3
		Subtest 4	4132	826.4	2	20.6	0	19.6
			4183	836.6	2	21.0	0	20.1
			4233	846.6	2	21.0	0	20.1
		Subtest 5	4132	826.4	0	23.0	0	19.5
			4183	836.6	0	23.5	0	19.8
			4233	846.6	0	23.4	0	19.8

W-CDMA Band IV Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Max. Pwr (dBm)	MPR (dB)	Reduced Pwr (dBm)
W-CDMA Band IV	Rel 99	RMC, 12.2 kbps	1312	1712.4	N/A	23.1	N/A	14.8
			1413	1732.6	N/A	23.4	N/A	15.6
			1513	1752.6	N/A	23.4	N/A	15.8
	HSDPA	Subtest 1	1312	1712.4	0	22.0	0	14.8
			1413	1732.6	0	22.7	0	15.5
			1513	1752.6	0	22.2	0	15.1
		Subtest 2	1312	1712.4	0	21.8	0	14.6
			1413	1732.6	0	22.6	0	15.5
			1513	1752.6	0	22.0	0	15.2
		Subtest 3	1312	1712.4	0.5	21.8	0	14.7
			1413	1732.6	0.5	22.5	0	15.5
			1513	1752.6	0.5	22.1	0	15.2
		Subtest 4	1312	1712.4	0.5	21.7	0	14.5
			1413	1732.6	0.5	22.5	0	15.5
			1513	1752.6	0.5	22.1	0	15.3
	HSUPA	Subtest 1	1312	1712.4	0	20.5	0	13.9
			1413	1732.6	0	21.5	0	14.8
			1513	1752.6	0	20.9	0	14.6
		Subtest 2	1312	1712.4	2	18.7	0	13.7
			1413	1732.6	2	19.6	0	14.3
			1513	1752.6	2	19.0	0	14.0
		Subtest 3	1312	1712.4	1	20.0	0	13.5
			1413	1732.6	1	20.9	0	14.0
			1513	1752.6	1	20.3	0	13.7
		Subtest 4	1312	1712.4	2	19.5	0	14.0
			1413	1732.6	2	20.3	0	14.1
			1513	1752.6	2	19.8	0	14.4
		Subtest 5	1312	1712.4	0	21.0	0	13.9
			1413	1732.6	0	21.8	0	14.6
			1513	1752.6	0	21.2	0	14.8

W-CDMA Band II Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Max. Pwr (dBm)	MPR (dB)	Reduced Pwr (dBm)
W-CDMA Band II	Rel 99	RMC, 12.2 kbps	9262	1852.4	N/A	23.5	N/A	15.9
			9400	1880.0	N/A	23.2	N/A	16.1
			9538	1907.6	N/A	23.4	N/A	16.4
	HSDPA	Subtest 1	9262	1852.4	0	22.5	0	15.8
			9400	1880.0	0	22.8	0	16.1
			9538	1907.6	0	22.9	0	16.3
		Subtest 2	9262	1852.4	0	22.5	0	15.8
			9400	1880.0	0	22.6	0	15.9
			9538	1907.6	0	22.7	0	16.3
		Subtest 3	9262	1852.4	0.5	22.5	0	15.8
			9400	1880.0	0.5	22.7	0	15.9
			9538	1907.6	0.5	22.7	0	16.3
		Subtest 4	9262	1852.4	0.5	22.5	0	15.8
			9400	1880.0	0.5	22.7	0	15.9
			9538	1907.6	0.5	22.7	0	16.2
	HSUPA	Subtest 1	9262	1852.4	0	20.2	0	13.6
			9400	1880.0	0	20.6	0	14.4
			9538	1907.6	0	20.6	0	14.8
		Subtest 2	9262	1852.4	2	18.5	0	13.4
			9400	1880.0	2	18.8	0	13.6
			9538	1907.6	2	19.0	0	13.8
		Subtest 3	9262	1852.4	1	19.0	0	14.4
			9400	1880.0	1	19.2	0	13.7
			9538	1907.6	1	19.3	0	14.1
		Subtest 4	9262	1852.4	2	18.4	0	13.4
			9400	1880.0	2	18.7	0	13.4
			9538	1907.6	2	18.8	0	13.8
		Subtest 5	9262	1852.4	0	21.6	0	15.1
			9400	1880.0	0	21.8	0	14.9
			9538	1907.6	0	21.9	0	15.2

9.3. LTE

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

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

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

Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

The allowed A-MPR values specified below in Table 6.2.4-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signalling Value of "NS_01".

Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
NS_03	6.6.2.2.1	2, 4, 10, 23, 25, 35, 36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2	41	5	>6	≤ 1
			10, 15, 20	See Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10, 15, 20	≥ 50	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS_07	6.6.2.2.3	13	10	Table 6.2.4-2	Table 6.2.4-2
	6.6.3.3.2				
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23 ¹	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5
..					
NS_32	-	-	-	-	-

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

LTE Band 2 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce. Avg Pwr (dBm)		
						1860 MHz	1880 MHz	1900 MHz		1860 MHz	1880 MHz	1900 MHz
LTE Band 2	20	QPSK	1	0	0	23.4	23.2	22.9	0	16.3	16.4	15.9
			1	49	0	23.5	23.1	22.8	0	15.3	16.0	15.5
			1	99	0	23.2	23.1	23.1	0	16.2	16.1	15.9
			50	0	1	22.0	21.2	21.4	2	13.3	13.7	13.2
			50	24	1	21.9	21.1	21.4	2	13.2	13.7	13.5
			50	50	1	21.7	21.3	21.3	2	13.4	13.6	14.2
			100	0	1	21.9	21.2	21.5	2	13.2	13.6	13.3
		16QAM	1	0	0	23.2	23.0	23.5	0	16.8	16.8	16.3
			1	49	0	23.2	22.8	23.0	0	15.9	16.4	16.0
			1	99	0	23.1	22.9	23.5	0	16.7	16.5	16.3
			50	0	1	22.0	21.2	21.5	2	13.4	13.7	13.2
			50	24	1	21.9	21.2	21.5	2	13.3	13.7	13.5
			50	50	1	21.6	21.4	21.3	2	13.4	13.6	14.2
			100	0	1	21.9	21.3	21.5	2	13.2	13.7	13.3
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce. Avg Pwr (dBm)		
						1857.5 MHz	1880 MHz	1902.5 MHz		1857.5 MHz	1880 MHz	1902.5 MHz
LTE Band 2	15	QPSK	1	0	0	23.4	23.2	23.0	1	14.9	15.2	14.7
			1	37	0	23.5	23.0	23.0	1	15.5	15.9	15.7
			1	74	0	23.4	23.1	23.2	1	14.5	14.7	14.6
			36	0	1	22.0	21.3	21.5	2	13.1	13.6	13.3
			36	20	1	21.8	21.1	21.3	2	13.5	13.8	13.6
			36	39	1	21.7	21.2	21.3	2	13.2	13.7	14.2
			75	0	1	21.8	21.3	21.4	2	13.5	13.6	13.4
		16QAM	1	0	0	23.0	23.1	23.2	0	15.1	15.6	15.2
			1	37	0	23.1	23.0	23.2	0	15.5	16.2	16.3
			1	74	0	22.9	23.0	23.3	0	15.0	15.1	15.1
			36	0	1	22.0	21.4	21.5	2	13.0	13.6	13.3
			36	20	1	21.9	21.3	21.4	2	13.5	13.8	13.6
			36	39	1	21.7	21.4	21.3	2	13.2	13.7	14.1
			75	0	1	21.9	21.3	21.4	2	13.5	13.6	13.4
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce. Avg Pwr (dBm)		
						1855 MHz	1880 MHz	1905 MHz		1855 MHz	1880 MHz	1905 MHz
LTE Band 2	10	QPSK	1	0	0	23.3	23.1	23.1	1	15.2	15.5	15.3
			1	25	0	23.5	23.0	23.0	1	15.2	15.9	15.9
			1	49	0	23.5	23.1	23.2	1	14.8	15.3	15.0
			25	0	1	21.8	21.2	21.4	2	13.1	14.0	14.5
			25	12	1	21.9	21.1	21.2	2	13.3	13.8	14.4
			25	25	1	21.8	21.2	21.5	2	13.6	13.6	14.1
			50	0	1	21.9	21.2	21.2	2	13.4	13.8	14.3
		16QAM	1	0	0	22.9	23.0	22.7	0	15.2	15.8	15.4
			1	25	0	23.0	23.0	22.6	0	15.2	16.3	16.4
			1	49	0	23.0	23.0	22.9	0	15.2	15.6	15.0
			25	0	1	22.0	21.2	21.4	2	13.1	14.1	14.6
			25	12	1	22.0	21.2	21.4	2	13.3	13.8	14.5
			25	25	1	21.9	21.2	21.8	2	13.6	13.6	14.2
			50	0	1	22.0	21.2	21.4	2	13.4	13.8	14.3

LTE Band 2 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce. Avg Pwr (dBm)		
						1852.5 MHz	1880 MHz	1907.5 MHz		1852.5 MHz	1880 MHz	1907.5 MHz
LTE Band 2	5	QPSK	1	0	0	23.4	23.4	23.1	1	15.2	15.9	15.7
			1	12	0	23.4	23.3	23.3	1	15.6	15.8	15.8
			1	24	0	23.5	23.4	23.4	1	14.8	15.4	15.0
			12	0	1	21.7	21.3	21.6	2	13.5	13.7	14.1
			12	7	1	21.7	21.2	21.6	2	13.7	13.8	14.0
			12	13	1	21.7	21.3	21.5	2	13.0	13.6	13.7
			25	0	1	21.8	21.2	21.7	2	13.6	13.6	13.9
		16QAM	1	0	0	22.9	22.9	23.4	1	15.3	15.4	15.7
			1	12	0	22.9	22.9	23.2	1	15.6	15.4	15.5
			1	24	0	23.1	22.9	23.1	1	14.9	15.7	15.7
			12	0	1	21.8	21.4	21.7	2	13.5	13.8	14.1
			12	7	1	21.9	21.3	21.7	2	13.7	13.8	14.0
			12	13	1	22.0	21.4	21.4	2	13.1	13.7	13.7
			25	0	1	21.9	21.2	21.5	2	13.7	13.7	13.8
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce. Avg Pwr (dBm)		
						1851.5 MHz	1880 MHz	1908.5 MHz		1851.5 MHz	1880 MHz	1908.5 MHz
LTE Band 2	3	QPSK	1	0	0	23.4	23.1	23.4	0	15.7	16.2	16.2
			1	8	0	23.4	23.1	23.3	0	15.6	15.9	15.6
			1	14	0	23.4	23.2	23.4	0	15.2	15.9	15.3
			8	0	1	21.7	21.2	21.6	2	13.7	13.9	14.0
			8	4	1	21.7	21.3	21.4	2	13.6	13.8	13.8
			8	7	1	21.7	21.3	21.4	2	13.7	13.8	13.7
			15	0	1	21.7	21.3	21.5	2	13.7	13.8	13.8
		16QAM	1	0	0	22.5	22.9	22.9	0	15.7	16.6	16.2
			1	8	0	22.6	22.8	22.7	0	15.6	16.2	15.6
			1	14	0	22.5	22.8	22.8	0	15.2	16.3	15.3
			8	0	1	21.6	21.2	21.8	2	13.8	13.8	14.2
			8	4	1	21.6	21.2	21.6	2	13.8	13.7	14.0
			8	7	1	21.6	21.3	21.6	2	13.8	13.7	13.9
			15	0	1	21.9	21.3	21.5	2	13.8	13.8	13.7
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce. Avg Pwr (dBm)		
						1850.7 MHz	1880 MHz	1909.3 MHz		1850.7 MHz	1880 MHz	1909.3 MHz
LTE Band 2	1.4	QPSK	1	0	0	23.3	23.2	23.2	0	15.7	16.0	15.5
			1	3	0	23.4	23.2	23.3	0	15.6	15.9	15.3
			1	5	0	23.3	23.2	23.3	0	15.7	15.8	15.1
			3	0	0	23.2	23.0	23.3	0	15.6	15.9	15.4
			3	1	0	23.3	23.0	23.2	0	15.6	15.9	15.4
			3	3	0	23.2	23.0	23.3	0	15.6	15.8	15.3
			6	0	1	21.7	21.2	21.6	2	13.6	13.8	13.4
		16QAM	1	0	0	22.8	22.7	22.5	0	15.7	16.3	15.5
			1	3	0	22.8	22.7	22.4	0	15.7	16.3	15.4
			1	5	0	22.9	22.7	22.5	0	15.7	16.2	15.2
			3	0	0	23.1	23.0	23.1	0	15.6	16.1	15.6
			3	1	0	23.3	23.0	23.2	0	15.6	16.1	15.5
			3	3	0	23.2	23.0	23.2	0	15.6	16.0	15.5
			6	0	1	22.0	21.4	21.6	2	13.8	13.7	13.6

LTE Band 4 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce. Avg Pwr (dBm)		
						1720 MHz	1732.5 MHz	1745 MHz		1720 MHz	1732.5 MHz	1745 MHz
LTE Band 4	20	QPSK	1	0	0	24.1	24.4	24.4	0	15.8	16.3	16.7
			1	49	0	24.2	24.5	24.4	0	16.0	16.7	16.2
			1	99	0	24.4	24.5	24.3	0	16.5	16.2	16.1
			50	0	1	21.8	21.9	22.0	3	12.8	13.5	13.4
			50	24	1	21.9	22.0	21.9	3	13.0	13.6	13.3
			50	50	1	21.9	21.9	21.9	3	13.3	13.5	13.0
			100	0	1	21.9	22.0	21.9	3	12.9	13.4	13.3
		16QAM	1	0	1	22.7	23.4	23.3	1	14.9	15.1	15.6
			1	49	1	22.9	23.5	23.1	1	15.1	15.7	15.3
			1	99	1	23.1	23.5	23.0	1	15.4	15.2	15.1
			50	0	2	21.6	21.6	21.7	3	12.3	13.0	12.9
			50	24	2	21.6	21.6	21.6	3	12.6	13.2	12.9
			50	50	2	21.6	21.6	21.7	3	12.8	13.0	12.7
			100	0	2	21.6	21.6	21.6	3	12.5	13.1	12.8
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce. Avg Pwr (dBm)		
						1717.5 MHz	1732.5 MHz	1747.5 MHz		1717.5 MHz	1732.5 MHz	1747.5 MHz
LTE Band 4	15	QPSK	1	0	0	24.2	24.5	24.3	0	15.2	15.8	15.8
			1	37	0	24.3	24.5	24.3	0	16.0	16.8	16.2
			1	74	0	24.4	24.5	24.2	0	15.5	15.7	15.5
			36	0	1	21.7	22.0	21.9	3	12.7	13.5	13.3
			36	20	1	21.7	21.9	22.0	3	13.0	13.7	13.3
			36	39	1	21.8	22.1	21.9	3	13.0	13.7	13.1
			75	0	1	21.7	22.0	21.9	3	13.0	13.6	13.3
		16QAM	1	0	1	22.6	23.5	23.5	1	14.2	14.6	14.9
			1	37	1	22.6	23.5	23.5	1	14.6	15.6	15.4
			1	74	1	22.7	23.5	23.4	1	14.6	14.7	14.6
			36	0	2	21.5	21.7	21.6	3	12.2	13.2	12.8
			36	20	2	21.5	21.7	21.6	3	12.5	13.4	12.9
			36	39	2	21.6	21.8	21.6	3	12.5	13.2	12.8
			75	0	2	21.5	21.7	21.6	3	12.5	13.2	12.8
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce. Avg Pwr (dBm)		
						1715 MHz	1732.5 MHz	1750 MHz		1715 MHz	1732.5 MHz	1750 MHz
LTE Band 4	10	QPSK	1	0	0	24.2	24.4	24.4	0	15.6	16.3	16.0
			1	25	0	24.3	24.5	24.3	0	15.9	16.8	16.3
			1	49	0	24.3	24.5	24.3	0	15.6	16.3	16.0
			25	0	1	21.7	21.9	22.0	3	12.9	13.7	13.3
			25	12	1	21.8	22.0	22.0	3	13.0	13.8	13.3
			25	25	1	21.8	22.1	21.9	3	13.2	13.8	13.3
			50	0	1	21.9	22.0	21.9	3	13.1	13.8	13.3
		16QAM	1	0	1	22.5	23.5	22.6	1	14.3	15.1	14.7
			1	25	1	22.6	23.4	22.6	1	14.6	15.6	14.9
			1	49	1	22.6	23.4	22.5	1	14.2	15.2	14.6
			25	0	2	21.4	21.6	21.7	3	12.4	13.4	13.0
			25	12	2	21.5	21.6	21.7	3	12.5	13.4	13.0
			25	25	2	21.4	21.7	21.7	3	12.7	13.3	13.1
			50	0	2	21.4	21.7	21.7	3	12.5	13.4	13.0

LTE Band 4 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce. Avg Pwr (dBm)		
						1712.5 MHz	1732.5 MHz	1752.5 MHz		1712.5 MHz	1732.5 MHz	1752.5 MHz
LTE Band 4	5	QPSK	1	0	0	24.2	24.4	24.5	0	15.7	16.4	16.0
			1	12	0	24.2	24.5	24.5	0	15.9	16.7	16.2
			1	24	0	24.3	24.5	24.5	0	15.6	16.4	16.0
			12	0	1	21.6	22.0	21.9	3	13.0	13.6	13.1
			12	7	1	21.6	22.1	21.8	3	13.1	13.8	13.3
			12	13	1	21.6	22.0	21.9	3	12.8	13.7	13.2
			25	0	1	21.6	22.0	21.9	3	13.0	13.6	13.2
		16QAM	1	0	1	23.3	23.0	23.4	1	14.5	15.3	14.7
			1	12	1	23.4	23.0	23.4	1	14.7	15.7	14.9
			1	24	1	23.5	23.1	23.4	1	14.4	15.4	14.7
			12	0	2	21.3	21.7	21.6	3	12.5	13.3	12.9
			12	7	2	21.3	21.7	21.5	3	12.6	13.5	13.0
			12	13	2	21.3	21.7	21.5	3	12.4	13.3	12.9
			25	0	2	21.2	21.7	21.5	3	12.5	13.3	12.8
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce. Avg Pwr (dBm)		
						1711.5 MHz	1732.5 MHz	1753.5 MHz		1711.5 MHz	1732.5 MHz	1753.5 MHz
LTE Band 4	3	QPSK	1	0	0	24.1	24.4	24.5	0	16.1	16.9	16.5
			1	8	0	24.3	24.5	24.5	0	15.8	16.7	16.2
			1	14	0	24.2	24.5	24.5	0	15.9	16.8	16.5
			8	0	1	21.7	22.0	21.9	2	13.1	13.8	13.3
			8	4	1	21.7	22.1	22.0	2	13.1	13.7	13.2
			8	7	1	21.7	22.1	21.9	2	13.1	13.8	13.3
			15	0	1	21.7	22.1	21.9	2	13.1	13.8	13.3
		16QAM	1	0	1	22.5	23.5	22.7	1	14.7	15.8	15.1
			1	8	1	22.6	23.5	22.6	1	14.5	15.6	14.9
			1	14	1	22.6	23.5	22.6	1	14.5	15.8	15.1
			8	0	2	21.3	21.7	21.8	3	12.7	13.3	13.2
			8	4	2	21.3	21.7	21.7	3	12.6	13.3	13.1
			8	7	2	21.3	21.7	21.7	3	12.7	13.2	13.2
			15	0	2	21.3	21.8	21.6	3	12.6	13.4	13.0
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce. Avg Pwr (dBm)		
						1710.7 MHz	1732.5 MHz	1754.3 MHz		1710.7 MHz	1732.5 MHz	1754.3 MHz
LTE Band 4	1.4	QPSK	1	0	0	24.3	24.5	24.5	0	15.8	16.6	16.2
			1	3	0	24.3	24.5	24.5	0	15.7	16.6	16.1
			1	5	0	24.3	24.5	24.5	0	15.7	16.5	16.2
			3	0	0	24.2	24.5	24.5	0	15.7	16.6	16.1
			3	1	0	24.2	24.5	24.5	0	15.7	16.6	16.1
			3	3	0	24.2	24.5	24.5	0	15.7	16.6	16.1
			6	0	1	21.7	22.1	22.0	3	12.9	13.6	13.1
		16QAM	1	0	1	23.0	23.5	22.7	1	14.5	15.1	14.8
			1	3	1	23.0	23.5	22.7	1	14.5	15.1	14.9
			1	5	1	23.0	23.5	22.8	1	14.5	15.1	14.9
			3	0	1	22.9	23.5	23.3	1	14.4	15.3	14.8
			3	1	1	22.8	23.5	23.3	1	14.4	15.3	14.8
			3	3	1	23.2	23.5	23.3	1	14.4	15.3	14.8
			6	0	2	21.4	21.6	22.1	3	12.6	13.5	13.0

LTE Band 5 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce. Avg Pwr (dBm)		
						829 MHz	836.5 MHz	844 MHz		829 MHz	836.5 MHz	844 MHz
LTE Band 5	10	QPSK	1	0	0	24.3	24.3	24.1	0	18.1	17.9	18.2
			1	25	0	24.3	24.1	24.5	0	18.0	18.5	18.5
			1	49	0	24.4	24.5	24.2	0	18.2	18.2	18.0
			25	0	1	22.2	22.0	22.5	2	16.0	16.6	16.6
			25	12	1	22.3	22.1	22.4	2	16.1	16.6	16.6
			25	25	1	22.2	22.1	22.5	2	16.7	16.7	16.7
		16QAM	50	0	1	22.1	21.9	22.4	2	16.3	16.5	16.7
			1	0	1	23.3	23.2	23.1	0	17.7	17.8	17.7
			1	25	1	23.2	23.0	23.4	0	17.5	18.4	18.1
			1	49	1	23.2	23.5	23.2	0	17.7	18.1	17.6
			25	0	2	21.7	21.7	22.1	2	15.7	16.2	16.2
			25	12	2	21.8	21.7	22.1	2	15.6	16.2	16.2
			25	25	2	21.7	21.8	22.0	2	16.1	16.2	16.2
			50	0	2	21.9	21.6	22.2	2	15.8	16.1	16.1
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce. Avg Pwr (dBm)		
						826.5 MHz	836.5 MHz	846.5 MHz		826.5 MHz	836.5 MHz	846.5 MHz
LTE Band 5	5	QPSK	1	0	0	24.2	24.1	24.5	0	18.2	18.3	18.2
			1	12	0	24.2	24.1	24.3	0	18.3	18.5	18.6
			1	24	0	24.2	24.1	24.2	0	17.7	18.3	18.1
			12	0	1	22.3	22.1	22.6	2	16.5	16.5	16.6
			12	6	1	22.2	22.1	22.2	2	16.0	16.9	16.7
			12	11	1	22.3	22.1	22.2	2	15.8	16.6	16.6
		16QAM	25	0	1	22.3	22.0	22.2	2	16.4	16.5	16.6
			1	0	1	23.1	23.3	23.5	0	17.7	18.1	18.0
			1	12	1	23.0	23.2	23.4	0	17.9	18.2	18.3
			1	24	1	23.0	23.3	23.4	0	17.1	18.1	18.4
			12	0	2	21.8	21.8	22.1	2	15.9	16.1	16.0
			12	6	2	21.6	21.7	21.9	2	15.9	16.2	16.2
			12	11	2	21.7	21.7	21.8	2	15.8	16.2	16.1
			25	0	2	21.9	21.7	21.7	2	15.9	15.9	15.9
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce. Avg Pwr (dBm)		
						825.5 MHz	836.5 MHz	847.5 MHz		825.5 MHz	836.5 MHz	847.5 MHz
LTE Band 5	3	QPSK	1	0	0	24.1	24.3	24.3	0	18.7	18.8	18.8
			1	8	0	24.3	24.2	24.3	0	18.5	18.5	18.5
			1	14	0	24.3	24.3	24.4	0	18.0	18.9	18.4
			8	0	1	22.3	22.1	22.4	1	16.7	16.6	16.7
			8	4	1	22.4	22.1	22.3	1	16.6	17.0	16.6
			8	7	1	22.4	22.1	22.3	1	16.6	16.8	16.6
		16QAM	15	0	1	22.4	22.2	22.3	1	16.7	16.5	16.6
			1	0	1	23.2	23.1	23.2	0	18.2	18.3	18.5
			1	8	1	23.3	22.9	23.3	0	18.0	17.9	18.4
			1	14	1	23.3	22.9	23.3	0	17.4	18.4	18.3
			8	0	2	22.0	22.0	21.9	2	16.2	16.4	16.1
			8	4	2	22.0	22.1	22.0	2	16.2	16.3	16.0
			8	7	2	22.0	22.0	22.0	2	16.2	16.5	16.0
			15	0	2	22.0	21.8	21.9	2	16.1	16.1	16.1

LTE Band 5 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce. Avg Pwr (dBm)		
						824.7 MHz	836.5 MHz	848.3 MHz		824.7 MHz	836.5 MHz	848.3 MHz
LTE Band 5	1.4	QPSK	1	0	0	24.2	24.0	24.3	0	18.5	18.7	18.5
			1	3	0	24.2	24.3	24.3	0	18.4	18.5	18.4
			1	5	0	24.2	24.1	24.3	0	18.4	18.7	18.3
			3	0	0	24.1	24.0	24.3	0	18.4	18.6	18.4
			3	1	0	24.1	24.0	24.3	0	18.4	18.5	18.4
			3	3	0	24.1	24.0	24.3	0	18.4	18.4	18.3
			6	0	1	22.3	22.2	22.2	1	16.6	16.6	16.7
		16QAM	1	0	1	23.5	23.5	23.2	0	18.2	18.1	18.1
			1	3	1	23.5	23.5	23.2	0	18.2	18.0	18.1
			1	5	1	23.5	23.4	23.3	0	18.2	18.2	17.9
			3	0	1	23.5	23.5	23.3	0	18.1	18.2	18.0
			3	1	1	23.4	23.5	23.3	0	18.1	18.1	18.0
			3	3	1	23.5	23.5	23.3	0	18.1	18.1	17.9
			6	0	2	22.3	21.7	22.1	2	16.3	16.3	16.1

LTE Band 17 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)	Target MPR	Reduce. Avg Pwr (dBm)
						710 MHz		710 MHz
LTE Band 17	10	QPSK	1	0	0	23.1	0	18.0
			1	25	0	24.0	0	18.4
			1	49	0	22.9	0	17.7
			25	0	1	22.0	1	15.6
			25	12	1	22.0	1	15.8
			25	25	1	22.0	1	16.3
			50	0	1	22.0	1	15.7
		16QAM	1	0	1	22.9	1	17.1
			1	25	1	22.9	1	17.4
			1	49	1	22.5	1	17.0
			25	0	2	21.6	2	15.3
			25	12	2	21.5	2	15.5
			25	25	2	21.6	2	15.9
			50	0	2	21.6	2	15.3
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)	Target MPR	Max. Avg Pwr (dBm)
						710 MHz		710 MHz
LTE Band 17	5	QPSK	1	0	0	23.3	0	17.6
			1	12	0	23.9	0	18.2
			1	24	0	23.3	0	18.2
			12	0	1	22.0	1	15.5
			12	6	1	22.0	1	15.8
			12	11	1	21.9	1	15.8
			25	0	1	21.9	1	15.7
		16QAM	1	0	1	23.0	1	16.7
			1	12	1	23.0	1	17.3
			1	24	1	23.0	1	17.5
			12	0	2	21.4	2	15.1
			12	6	2	21.4	2	15.4
			12	11	2	21.6	2	15.4
			25	0	2	21.7	2	15.3

Note(s):

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

9.4. Wi-Fi 2.4GHz (DTS Band)

Measured Results

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Max Pwr.			Reduced Pwr.			Note(s)
					Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)	Avg Pwr (dBm)	Max Output Power (dBm)	SAR Test (Yes/No)	
2.4	802.11b	1 Mbps	1	2412	15.9	16.5	Yes	12.4	12.5	Yes	
			6	2437	15.7			11.9			
			11	2462	16.5			12.3			
	802.11g	6 Mbps	1	2412	Not Required	14.5	No	11.8	12.5	No	1
			6	2437				12.2			
			11	2462				12.1			
	802.11n (HT20)	6.5 Mbps	1	2412		14.5	No	11.6	12.5	No	1
			6	2437				12.1			
			11	2462				12.0			

Note(s):

- Output Power and SAR is not required for 802.11g/n HT20 channels when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

9.5. Bluetooth

Band (GHz)	Mode	Ch #	Freq. (MHz)	Avg Pwr (dBm)
2.4	V3.0 + EDR, GFSK	0	2402	11.8
		39	2441	11.4
		78	2480	12.0
	V3.0 + EDR, $\pi/4$ DQPSK	0	2402	11.4
		39	2441	10.9
		78	2480	11.5
	V3.0 + EDR, 8-DPSK	0	2402	11.4
		39	2441	11.0
		78	2480	11.5
	V4.0 LE, GFSK	0	2402	1.5
		19	2440	2.0
		39	2480	1.9

10. Measured and Reported (Scaled) SAR Results

SAR Test Reduction criteria are as follows:

KDB 447498 D01 General RF Exposure Guidance:

Testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:

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

KDB 941225 D01 SAR test for 3G devices:

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

KDB 941225 D05 SAR for LTE Devices:

SAR test reduction is applied using the following criteria:

- Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB, and 50% RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel.
- When the reported SAR is > 0.8 W/kg, testing for other Channels is performed at the highest output power level for 1RB, and 50% RB configuration for that channel.
- Testing for 100% RB configuration is performed at the highest output power level for 100% RB configuration across the Low, Mid and High Channel when the highest reported SAR for 1 RB and 50% RB are > 0.8 W/kg. Testing for the remaining required channels is not needed because the reported SAR for 100% RB Allocation < 1.45 W/kg.
- Testing for 16-QAM modulation is not required because the reported SAR for QPSK is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of QPSK.
- Testing for the other channel bandwidths is not required because the reported SAR for the highest channel bandwidth is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of the highest channel bandwidth.

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	Pwr Back Off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
							Tune-up limit	Meas.	Meas.	Scaled	
Head	Voice	On	0	Left Touch	190	836.6	29.0	28.6	0.104	0.115	1
				Left Tilt	190	836.6	29.0	28.6	0.094	0.104	
				Right Touch	190	836.6	29.0	28.6	0.206	0.228	
				Right Tilt	190	836.6	29.0	28.6	0.166	0.184	
Head VoIP	GPRS 1 Slots	On	0	Left Touch	190	836.6	29.0	28.5	0.101	0.112	
				Left Tilt	190	836.6	29.0	28.5	0.089	0.099	
				Right Touch	190	836.6	29.0	28.5	0.200	0.222	
				Right Tilt	190	836.6	29.0	28.5	0.158	0.175	
Body	GPRS 2 Slots	Off	14	Rear	190	836.6	31.5	31.3	0.376	0.394	2
			9	Edge 1	190	836.6	31.5	31.3	0.279	0.292	
			0	Edge 2	190	836.6	31.5	31.3	0.178	0.186	
			4	Edge 4	190	836.6	31.5	31.3	0.441	0.462	
	GPRS 1 Slots	On	0	Rear	190	836.6	29.0	28.5	0.402	0.446	
			0	Edge 1	190	836.6	29.0	28.5	0.321	0.356	
			0	Edge 4	190	836.6	29.0	28.5	0.296	0.329	
			0	Edge 4	190	836.6	29.0	28.5	0.296	0.329	

10.2. GSM1900

RF Exposure Conditions	Mode	Pwr Back Off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
							Tune-up limit	Meas.	Meas.	Scaled	
Head	Voice	On	0	Left Touch	661	1880.0	26.0	25.5	0.110	0.124	3
				Left Tilt	661	1880.0	26.0	25.5	0.076	0.086	
				Right Touch	661	1880.0	26.0	25.5	0.267	0.302	
				Right Tilt	661	1880.0	26.0	25.5	0.194	0.219	
Head VoIP	GPRS 1 Slots	On	0	Left Touch	661	1880.0	26.0	25.5	0.105	0.119	
				Left Tilt	661	1880.0	26.0	25.5	0.064	0.073	
				Right Touch	661	1880.0	26.0	25.5	0.251	0.283	
				Right Tilt	661	1880.0	26.0	25.5	0.187	0.211	
Body	GPRS 3 Slots	Off	14	Rear	661	1880.0	26.5	26.3	0.294	0.308	
			9	Edge 1	661	1880.0	26.5	26.3	0.234	0.245	
			4	Edge 4	661	1880.0	26.5	26.3	0.587	0.615	
	GPRS 1 Slots	On	0	Rear	661	1880.0	26.0	25.5	0.557	0.629	4
			0	Edge 1	661	1880.0	26.0	25.5	0.427	0.482	
			0	Edge 4	661	1880.0	26.0	25.5	0.421	0.475	

10.3. W-CDMA Band V

RF Exposure Conditions	Mode	Pwr back Off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
							Tune-up limit	Meas.	Meas.	Scaled	
Head	Rel 99 RMC	On	0	Left Touch	4183	836.6	20.5	20.4	0.142	0.146	5
				Left Tilt	4183	836.6	20.5	20.4	0.135	0.139	
				Right Touch	4183	836.6	20.5	20.4	0.282	0.291	
				Right Tilt	4183	836.6	20.5	20.4	0.240	0.248	
Body	Rel 99 RMC	Off	14	Rear	4183	836.6	24.5	24.0	0.315	0.352	6
			9	Edge 1	4183	836.6	24.5	24.0	0.236	0.263	
			0	Edge 2	4183	836.6	24.5	24.0	0.143	0.160	
			4	Edge 4	4183	836.6	24.5	24.0	0.339	0.378	
		On	0	Rear	4132	826.4	20.5	20.1	0.945	1.040	
					4183	836.6	20.5	20.4	0.945	0.975	
					4233	846.6	20.5	20.4	0.781	0.792	
			0	Edge 1	4183	836.6	20.5	20.4	0.565	0.583	
			0	Edge 4	4183	836.6	20.5	20.4	0.513	0.529	

10.4. W-CDMA Band IV

RF Exposure Conditions	Mode	Pwr back Off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
							Tune-up limit	Meas.	Meas.	Scaled	
Head	Rel 99 RMC	On	0	Left Touch	1413	1732.6	16.0	15.6	0.027	0.030	7
				Left Tilt	1413	1732.6	16.0	15.6	0.019	0.021	
				Right Touch	1413	1732.6	16.0	15.6	0.133	0.146	
				Right Tilt	1413	1732.6	16.0	15.6	0.127	0.139	
Body	Rel 99 RMC	Off	14	Rear	1413	1732.6	23.5	23.4	0.228	0.233	8
			9	Edge 1	1413	1732.6	23.5	23.4	0.138	0.141	
			4	Edge 4	1413	1732.6	23.5	23.4	0.688	0.702	
		On	0	Rear	1413	1732.6	16.0	15.6	0.545	0.599	
			0	Edge 1	1413	1732.6	16.0	15.6	0.219	0.241	
			0	Edge 4	1413	1732.6	16.0	15.6	0.345	0.379	

10.5. W-CDMA Band II

RF Exposure Conditions	Mode	Pwr back Off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
							Tune-up limit	Meas.	Meas.	Scaled	
Head	Rel 99 RMC	On	0	Left Touch	9400	1880.0	16.5	16.1	0.106	0.116	9
				Left Tilt	9400	1880.0	16.5	16.1	0.077	0.084	
				Right Touch	9400	1880.0	16.5	16.1	0.285	0.311	
				Right Tilt	9400	1880.0	16.5	16.1	0.221	0.242	
Body	Rel 99 RMC	Off	14	Rear	9400	1880.0	23.5	23.2	0.321	0.344	10
			9	Edge 1	9400	1880.0	23.5	23.2	0.247	0.264	
			4	Edge 4	9262	1852.4	23.5	23.5	0.734	0.740	
					9400	1880.0	23.5	23.2	0.766	0.820	
			On	Rear	9400	1880.0	16.5	16.1	0.693	0.757	
				Edge 1	9400	1880.0	16.5	16.1	0.344	0.376	
				Edge 4	9400	1880.0	16.5	16.1	0.454	0.496	

10.6. LTE Band 2 (20MHz Bandwidth)

RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	On	0	Left Touch	18900	1880.0	1	0	17.0	16.4	0.105	0.121	11
							50	24	15.0	13.7	0.062	0.083	
				Left Tilt	18900	1880.0	1	0	17.0	16.4	0.067	0.077	
							50	24	15.0	13.7	0.039	0.052	
				Right Touch	18900	1880.0	1	0	17.0	16.4	0.304	0.349	
							50	24	15.0	13.7	0.174	0.233	
Body	QPSK	Off	14	Rear	18900	1880.0	1	0	23.5	23.2	0.364	0.388	
							50	50	22.5	21.3	0.261	0.347	
			9	Edge 1	18900	1880.0	1	0	23.5	23.2	0.229	0.244	
							50	50	22.5	21.3	0.163	0.217	
			4	Edge 4	18700	1860.0	1	0	23.5	23.4	0.831	0.850	
					18900	1880.0	1	0	23.5	23.2	0.885	0.943	
					19100	1900.0	50	50	22.5	21.3	0.582	0.773	
							1	0	23.5	22.9	0.950	1.083	
	QPSK	On	0	Rear	18900	1880.0	1	0	17.0	16.4	0.608	0.698	
							50	24	15.0	13.7	0.346	0.463	
				Edge 1	18900	1880.0	1	0	17.0	16.4	0.404	0.464	
							50	24	15.0	13.7	0.247	0.331	
				Edge 4	18900	1880.0	1	0	17.0	16.4	0.479	0.550	
							50	24	15.0	13.7	0.291	0.389	

10.7. LTE Band 4 (20MHz Bandwidth)

RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	On	0	Left Touch	20175	1732.5	1	49	17.0	16.7	0.037	0.039	13
							50	24	14.0	13.6	0.018	0.019	
				Left Tilt	20175	1732.5	1	49	17.0	16.7	0.020	0.022	
							50	24	14.0	13.6	0.009	0.009	
				Right Touch	20175	1732.5	1	49	17.0	16.7	0.100	0.106	
							50	24	14.0	13.6	0.051	0.055	
Body	QPSK	Off	14	Rear	20175	1732.5	1	99	24.5	24.5	0.275	0.275	14
							50	24	23.5	22.0	0.155	0.218	
			9	Edge 1	20175	1732.5	1	99	24.5	24.5	0.270	0.270	
							50	24	23.5	22.0	0.146	0.205	
			4	Edge 4	20050	1720.0	1	99	24.5	24.4	0.844	0.870	
					20175	1732.5	1	99	24.5	24.5	0.857	0.857	
					20300	1745.0	50	24	23.5	22.0	0.447	0.627	
							1	99	24.5	24.3	0.724	0.765	
	QPSK	On	0	Rear	20175	1732.5	1	49	17.0	16.7	0.423	0.450	
							50	24	14.0	13.6	0.222	0.242	
				Edge 1	20175	1732.5	1	49	17.0	16.7	0.120	0.128	
							50	24	14.0	13.6	0.060	0.065	
				Edge 4	20175	1732.5	1	49	17.0	16.7	0.268	0.285	
							50	24	14.0	13.6	0.138	0.150	

10.8. LTE Band 5 (10MHz Bandwidth)

RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	On	0	Left Touch	20525	836.5	1	25	19.0	18.5	0.075	0.084	15
							25	25	17.0	16.7	0.072	0.076	
				Left Tilt	20525	836.5	1	25	19.0	18.5	0.075	0.084	
							25	25	17.0	16.7	0.073	0.077	
				Right Touch	20525	836.5	1	25	19.0	18.5	0.155	0.173	
							25	25	17.0	16.7	0.145	0.154	
Body	QPSK	Off	14	Rear	20525	836.5	1	49	24.5	24.5	0.337	0.339	
							25	12	23.5	22.1	0.204	0.279	
			9	Edge 1	20525	836.5	1	49	24.5	24.5	0.256	0.258	
							25	12	23.5	22.1	0.162	0.221	
			0	Edge 2	20525	836.5	1	49	24.5	24.5	0.113	0.114	
							25	12	23.5	22.1	0.076	0.104	
			4	Edge 4	20525	836.5	1	49	24.5	24.5	0.443	0.446	
							25	12	23.5	22.1	0.267	0.365	
	QPSK	On	0	Rear	20525	836.5	1	25	19.0	18.5	0.593	0.662	16
							25	25	17.0	16.7	0.497	0.529	
				Edge 1	20525	836.5	1	25	19.0	18.5	0.388	0.433	
							25	25	17.0	16.7	0.317	0.337	
				Edge 4	20525	836.5	1	25	19.0	18.5	0.298	0.333	
							25	25	17.0	16.7	0.280	0.298	

10.9. LTE Band 17 (10MHz Bandwidth)

RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	On	0	Left Touch	23790	710.0	1	25	18.5	18.4	0.083	0.085	17
							25	25	17.5	16.3	0.026	0.034	
				Left Tilt	23790	710.0	1	25	18.5	18.4	0.077	0.079	
							25	25	17.5	16.3	0.026	0.035	
				Right Touch	23790	710.0	1	25	18.5	18.4	0.191	0.197	
							25	25	17.5	16.3	0.061	0.081	
Body	QPSK	Off	14	Rear	23790	710.0	1	25	24.0	24.0	0.154	0.155	
							25	25	23.0	22.0	0.091	0.114	
			9	Edge 1	23790	710.0	1	25	24.0	24.0	0.153	0.154	
							25	25	23.0	22.0	0.094	0.118	
			4	Edge 4	23790	710.0	1	25	24.0	24.0	0.182	0.183	
							25	25	23.0	22.0	0.107	0.134	
	QPSK	On	0	Rear	23790	710.0	1	25	18.5	18.4	0.691	0.712	18
							25	25	17.5	16.3	0.379	0.502	
				Edge 1	23790	710.0	1	25	18.5	18.4	0.458	0.472	
							25	25	17.5	16.3	0.209	0.277	
				Edge 4	23790	710.0	1	25	18.5	18.4	0.231	0.238	
							25	25	17.5	16.3	0.086	0.114	

10.10. Wi-Fi (DTS Band)

Frequency Band	Mode	RF Exposure Conditions	PWR Back Off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Plot No.
									Tune-up limit	Meas.	Meas.	Scaled	
2.4GHz	802.11b 1 Mbps	Head	On	0	Left Touch	1	2412	0.135	12.5	12.4	0.085	0.086	19
					Left Tilt	1	2412	0.113	12.5	12.4			
					Right Touch	1	2412	0.080	12.5	12.4			
					Right Tilt	1	2412	0.061	12.5	12.4			
		Body	Off	4	Rear	11	2462	0.573	16.5	16.5	0.381	0.385	20
				0	Edge 1	11	2462	0.308	16.5	16.5	0.232	0.235	
			On	0	Rear	1	2412	0.474	12.5	12.4	0.281	0.285	

Note(s):

1. Highest reported SAR is ≤ 0.4 W/kg. Therefore, further SAR measurements within this exposure condition are not required.
2. Highest reported SAR is > 0.4 W/kg. Due to the highest reported SAR for this test position, other test positions in this exposure condition were evaluated until a SAR ≤ 0.8 W/kg was reported.
3. Testing for a second channel was required because the reported SAR for this test position was > 0.8 W/kg.
4. Additional testing required in order satisfying FCC simultaneous transmission limit criteria.
5. SAR data of Wi-Fi (DTS Band) used in this report were taken from SAR report 16K22741-S1V2, submitted under FCC ID A3LSMT285. Both models share identical antennas and output power. Spot checks were performed on model SM-T285M to ensure SAR values were the same between both models.

10.11. Bluetooth

Frequency Band	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
2.4 GHz	GFSK	0	Rear	78	2480.0	12.0	12.0	0.154	0.155	21
			Edge 1	78	2480.0	12.0	12.0	0.055	0.056	

Note(s):

1. SAR data of BT Band used in this report were taken from SAR report 16K22741-S1V2, submitted under FCC ID A3LSMT285. Both models share identical antennas and output power. Spot checks were performed on model SM-T285M to ensure SAR values were the same between both models.

11. SAR Measurement Variability

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

- 1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
- 2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
- 3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
- 4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .

Frequency Band (MHz)	Air Interface	RF Exposure Conditions	Test Position	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)	Repeated Measured SAR (W/kg)	Largest to Smallest SAR Ratio
750	LTE Band 17	Standalone	Rear	No	0.691	N/A	N/A
850	GSM 850	Standalone	Edge 4	No	0.441	N/A	N/A
	WCDMA Band V	Standalone	Rear	Yes	0.945	0.95	1.01
	LTE Band 5	Standalone	Rear	No	0.593	N/A	N/A
1750	WCDMA Band IV	Standalone	Edge 4	No	0.688	N/A	N/A
	LTE Band 4	Standalone	Edge 4	No	0.857	0.827	1.04
1900	GSM 1900	Standalone	Edge 4	No	0.587	N/A	N/A
	WCDMA Band II	Standalone	Edge 4	No	0.855	N/A	N/A
	LTE Band 2	Standalone	Edge 4	Yes	0.95	0.948	1.00
2400	Wi-Fi 802.11b/g/n	Standalone	Rear	No	0.381	N/A	N/A
	Bluetooth	Standalone	Rear	No	0.154	N/A	N/A

Note(s):

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

12. Simultaneous Transmission SAR Analysis

KDB 447498 D01 General RF Exposure Guidance introduces a new formula for calculating the SAR to Peak Location Ratio (SPLSR) between pairs of simultaneously transmitting antennas:

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

Where:

SAR₁ is the highest measured or estimated SAR for the first of a pair of simultaneous transmitting antennas, in a specific test operating mode and exposure condition

SAR₂ is the highest measured or estimated SAR for the second of a pair of simultaneous transmitting antennas, in the same test operating mode and exposure condition as the first

Ri is the separation distance between the pair of simultaneous transmitting antennas. When the SAR is measured, for both antennas in the pair, it is determined by the actual x, y and z coordinates in the 1-g SAR for each SAR peak location, based on the extrapolated and interpolated result in the zoom scan measurement, using the formula of $[(x_1-x_2)^2 + (y_1-y_2)^2 + (z_1-z_2)^2]$

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

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

Simultaneous Transmission Condition

RF Exposure Condition	Item	Capable Transmit Configurations	
Head	1	GSM(GPRS/EDGE)	+ DTS
	2	W-CDMA	+ DTS
	3	LTE	+ DTS
Body	4	GSM(GPRS/EDGE)	+ DTS
	5	GSM(GPRS/EDGE)	+ BT
	6	W-CDMA	+ DTS
	7	W-CDMA	+ BT
	8	LTE	+ DTS
	9	LTE	+ BT
Notes:			
1. DTS support Hotspot and Wi-Fi Direct 2. GPRS/EDGE, W-CDMA and LTE support Hotspot. 3. VoIP is supported in GPRS/EDGE, W-CDMA and LTE. 4. DTS Radio can transmit simultaneously with Bluetooth Radio.			

Estimated SAR for Simultaneous Transmission SAR Analysis

Considerations for SAR estimation

- When standalone SAR test exclusion applies, standalone SAR must also be estimated to determine simultaneous transmission SAR test exclusion.
- Dedicated Host Approach criteria for SAR test exclusion is likewise applied to SAR estimation, with certain distinctions between test exclusion and SAR estimation:
 - When the separation distance from the antenna to an adjacent edge is ≤ 5 mm, a distance of 5 mm is applied for SAR estimation; this is the same between test exclusion and SAR estimation calculations.
 - When the separation distance from the antenna to an adjacent edge is > 5 mm but ≤ 50 mm, the actual antenna-to-edge separation distance is applied for SAR estimation.
 - When the minimum test separation distance is > 50 mm, the estimated SAR value is 0.4 W/kg
- Please refer to Estimated SAR Tables to see which test positions are inherently compliant as they consist of only estimated SAR values for all applicable transmitters and consequently will always have sum of SAR values < 1.2 W/kg. Simultaneous transmission SAR analysis was therefore not performed for these test positions.

Estimated SAR for WWAN

Antenna	Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Estimated 1-g SAR Value (W/kg)					
			dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
Full Power, Proximity Sensor Off																
Cellular	GPRS 2 Slots	848.8	31.50	353	1	0	68	149	0		-MEASURE	-MEASURE	-MEASURE	0.400	-MEASURE	
Cellular	GPRS 3 Slots	1909.8	26.50	168	1	0	68	149	0		-MEASURE	-MEASURE	0.400	0.400	-MEASURE	
Cellular	W-CDMA V	848.6	24.50	282	1	0	68	149	0		-MEASURE	-MEASURE	-MEASURE	0.400	-MEASURE	
Cellular	W-CDMA IV	1752.6	23.50	224	1	0	68	149	0		-MEASURE	-MEASURE	0.400	0.400	-MEASURE	
Cellular	W-CDMA II	1907.6	23.50	224	1	0	68	149	0		-MEASURE	-MEASURE	0.400	0.400	-MEASURE	
Cellular	LTE Band 2	1900	23.50	224	1	0	68	149	0		-MEASURE	-MEASURE	0.400	0.400	-MEASURE	
Cellular	LTE Band 4	1745	24.50	282	1	0	68	149	0		-MEASURE	-MEASURE	0.400	0.400	-MEASURE	
Cellular	LTE Band 5	844	24.50	282	1	0	68	149	0		-MEASURE	-MEASURE	-MEASURE	0.400	-MEASURE	
Cellular	LTE Band 17	710	24.00	251	1	0	68	149	0		-MEASURE	-MEASURE	0.400	0.400	-MEASURE	
Power Back-off, Proximity Sensor On																
Cellular	GPRS 1 Slots	848.8	29.00	99	1	0	68	149	0		-MEASURE	-MEASURE	0.400	0.400	-MEASURE	
Cellular	GPRS 1 Slots	1909.8	26.00	50	1	0	68	149	0		-MEASURE	-MEASURE	0.400	0.400	-MEASURE	
Cellular	W-CDMA V	848.6	20.50	112	1	0	68	149	0		-MEASURE	-MEASURE	0.400	0.400	-MEASURE	
Cellular	W-CDMA IV	1752.6	16.00	40	1	0	68	149	0		-MEASURE	-MEASURE	0.400	0.400	-MEASURE	
Cellular	W-CDMA II	1907.6	16.50	45	1	0	68	149	0		-MEASURE	-MEASURE	0.400	0.400	-MEASURE	
Cellular	LTE Band 2	1900	17.00	50	1	0	68	149	0		-MEASURE	-MEASURE	0.400	0.400	-MEASURE	
Cellular	LTE Band 4	1745	17.00	50	1	0	68	149	0		-MEASURE	-MEASURE	0.400	0.400	-MEASURE	
Cellular	LTE Band 5	844	19.00	79	1	0	68	149	0		-MEASURE	-MEASURE	0.400	0.400	-MEASURE	
Cellular	LTE Band 17	710	18.50	71	1	0	68	149	0		-MEASURE	-MEASURE	0.400	0.400	-MEASURE	

Estimated SAR for WLAN

Tx Interface	Frequency (MHz)	Output Power		Separation Distances (mm)						Estimated 1-g SAR Value (W/kg)					
		dBm	mW	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front	Rear	Edge 1	Edge 2	Edge 3	Edge 4	Front
Full Power, Proximity Sensor Off															
Wi-Fi 2.4 GHz	2462	16.50	45	1	1	36	174	39		-MEASURE	-MEASURE	0.262	0.400	0.241	
Bluetooth	2480	11.50	14	1	1	36	174	39		-MEASURE	-MEASURE	0.082	0.400	0.075	
Power Back-off, Proximity Sensor On															
Wi-Fi 2.4 GHz	2462.00	12.5	18	1	1	36	174	39		-MEASURE	-MEASURE	0.105	0.400	0.097	

12.1. Sum of the SAR for WWAN & WLAN & BT

RF Exposure conditions	① WWAN	② DTS (Main Ant)	③ BT (Main Ant)	① + ② WWAN + DTS		① + ③ WWAN + BT	
				Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	0.349	0.086		0.435	No		
Body	1.083	0.385	0.155	1.468	No	1.238	No

Note(s):

SAR data of WLAN(DTS) and BT Band used in this report were taken from SAR report 16K22741-S1V2, submitted under FCC ID A3LSMT285. Both models share identical antennas and output power. Spot checks were performed on model SM-T285M to ensure SAR values were the same between both models.

Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is not required because the either 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.

16K22923-S1V2 FCC Report SAR_App A_Photos & Ant. Locations

16K22923-S1V2 FCC Report SAR_App B_Highest SAR Test Plots

16K22923-S1V2 FCC Report SAR_App C_System Check Plots

16K22923-S1V2 FCC Report SAR_App D_SAR Tissue Ingredients

16K22923-S1V2 FCC Report SAR_App E_Probe Cal. Certificates

16K22923-S1V2 FCC Report SAR_App F_Dipole Cal. Certificates

END OF REPORT