



SAR EVALUATION REPORT

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

For
GSM/WCDMA/LTE Phone + Bluetooth, DTS/UNII a/b/g/n/ac, ANT+, NFC

**FCC ID: A3LSMG9280
Model Name: SM-G9280**

**Report Number: 15K21155-S1B
Issue Date: 8/13/2015**

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
-	7/11/2015	Initial Issue	Justin Park
A	7/14/2015	1. Sec 6.4. : Updated LTE Bands 2. Updated Appendix A, B	Justin Park
B	8/9/2015	1.Sec 9.3.1: Add LTE Band 41 CA Output Power Result 2.Sec 10.14: U-NII SISO Mode SAR Result 3.Sec 12: Updated Simultaneous Transmission SAR Analysis	Justin Park

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1. Attestation of Test Results

Applicant Name	SAMSUNG ELECTRONICS CO.,LTD.			
FCC ID	A3LSMG9280			
Model Name	SM-G9280			
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	0.165	0.324	0.753	N/A
Body-worn*	1.019	0.113	0.162	
Hotspot/Wi-Fi Direct	1.019	0.113	0.110	
Simultaneous TX	Head	1.094		
	Body-worn*	1.261		
	Hotspot/ Wi-Fi Direct	1.158		
Date Tested	WWAN & WLAN: 6/24/2015 to 7/11/2015		WLAN U-NII SISO mode: 8/7/2015 to 8/9/2015	
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		Justin Park 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 v02
- 447498 D01 General RF Exposure Guidance v05r02
- 648474 D04 Handset SAR v01r02
- 865664 D01 SAR measurement 100 MHz to 6 GHz v01r03
- 865664 D02 RF Exposure Reporting v01r01
- 941225 D01 3G SAR Procedures v03
- 941225 D05 SAR for LTE Devices v02r03
- 941225 D06 Hotspot Mode v02

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

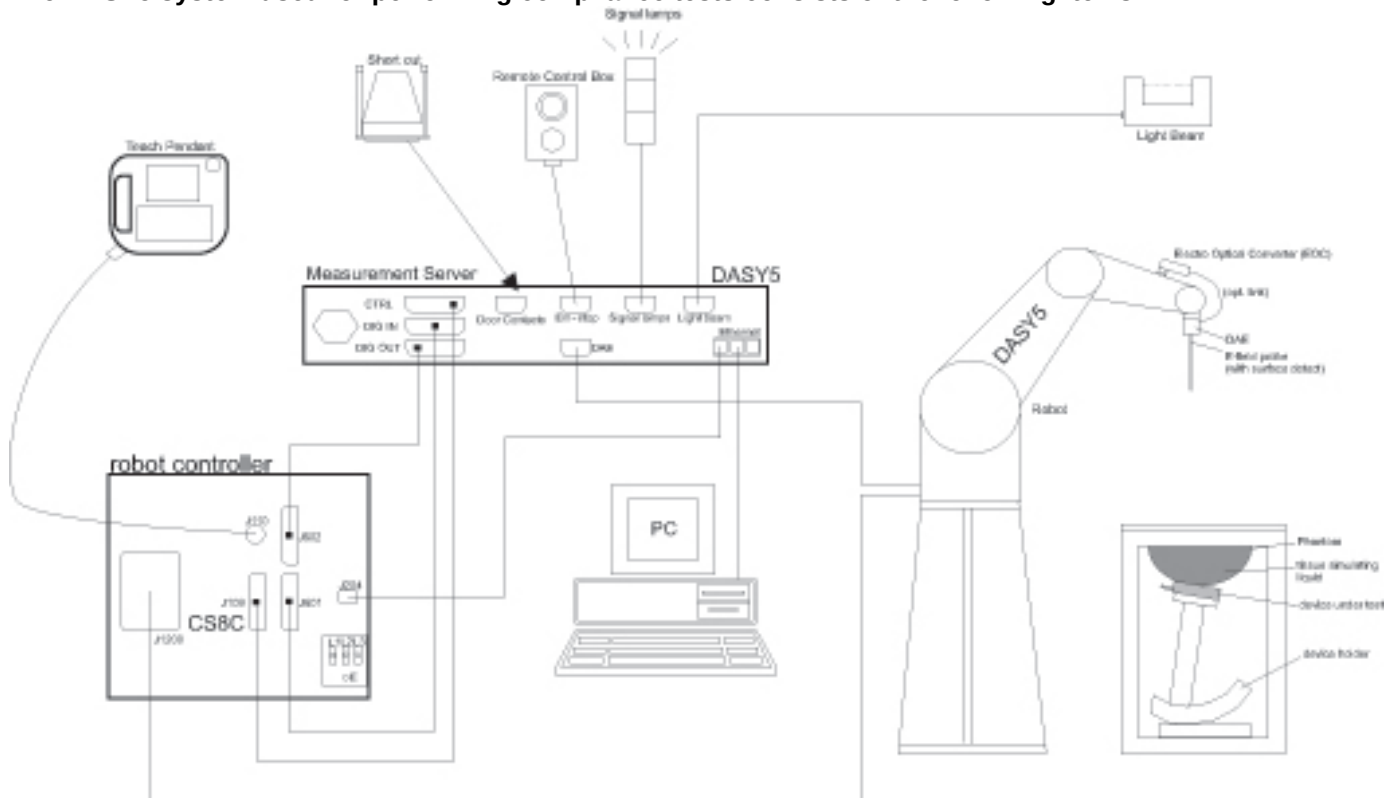
UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637.

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 <u>reported</u> 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	9-23-2015
Dielectronic Probe kit	SPEAG	DAK-3.5	1196	8-5-2015
Dielectronic Probe kit	SPEAG	DAK-3.5	1046	4-28-2016
Dielectronic Probe kit	SPEAG	DAK-3.5 Short	SM DAK 200 BA	N/A
Thermometer	LKM	DTM3000	3424	11-13-2015

System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
MXG Analog Signal Generator	Agilent	N5181A	MY50145882	9-23-2015
Power Sensor	Agilent	U2000A	MY54260010	9-23-2015
Power Sensor	Agilent	U2000A	MY54260007	9-23-2015
Power Amplifier	EXODUS	1410025-AMP2027-10003	10003	11-7-2015
Directional Coupler	Agilent	772D	MY52180193	9-22-2015
Directional Coupler	Agilent	778D	MY52180432	9-22-2015
Low Pass Filter	MICROLAB	LA-15N	03943	11-4-2015
Low Pass Filter	FILTRON	L14012FL	1410003S	11-4-2015
Low Pass Filter	MICROLAB	LA-60N	03942	11-5-2015
Attenuator	Agilent	8491B/003	MY39269292	9-22-2015
Attenuator	Agilent	8491B/010	MY39269315	9-22-2015
Attenuator	Agilent	8491B/020	MY39269298	9-22-2015
E-Field Probe	SPEAG	EX3DV4	7330	2-12-2016
E-Field Probe	SPEAG	EX3DV4	7313	8-27-2015
E-Field Probe	SPEAG	EX3DV4	7314	8-27-2015
E-Field Probe	SPEAG	EX3DV4	7323	12-5-2015
Data Acquisition Electronics	SPEAG	DAE4	1468	1-12-2016
Data Acquisition Electronics	SPEAG	DAE4	1447	8-25-2015
Data Acquisition Electronics	SPEAG	DAE4	1446	8-27-2015
Data Acquisition Electronics	SPEAG	DAE4	614	10-18-2015
System Validation Dipole	SPEAG	D750V3	1122	9-13-2015
System Validation Dipole	SPEAG	D835V2	4d174	8-13-2015
System Validation Dipole	SPEAG	D1750V2	1125	8-12-2015
System Validation Dipole	SPEAG	D1900V2	5d199	2-6-2016
System Validation Dipole	SPEAG	D2450V2	939	8-11-2015
System Validation Dipole	SPEAG	D2600V2	1097	11-27-2015
System Validation Dipole	SPEAG	D5GHzV2	1184	8-22-2015
System Validation Dipole	SPEAG	D5GHzV2	1209	2-10-2016
Thermometer (SAR 1)	Lutron	MHB-382SD	AH.53049	11-18-2015
Thermometer (SAR 2)	Lutron	MHB-382SD	AH.50215	11-18-2015
Thermometer (SAR 3)	Lutron	MHB-382SD	AH.50213	11-18-2015

Others

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Base Station Simulator	R & S	CMW500	150313	8-13-2015
Base Station Simulator	R & S	CMW500	150314	8-13-2015
Bluetooth Tester	TESCOM	TC-3000C	3000C000546	11-17-2015

5. Measurement Uncertainty

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

6. Device Under Test (DUT) Information

6.1. DUT Description

Device Dimension	Overall (Length x Width): 150 mm x 73 mm Overall Diagonal: 162 mm Display Diagonal: 145 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) ☒ Mobile Hotspot (Wi-Fi 5.8 GHz)
Wi-Fi Direct	Wi-Fi Direct enabled devices transfer data directly between each other ☒ Wi-Fi Direct (Wi-Fi 2.4 GHz) ☒ Wi-Fi Direct (Wi-Fi 5.8 GHz)

6.2. Wireless Technologies

Wireless technologies	Frequency bands	Operating mode		Duty Cycle used for SAR testing
GSM	850 1900	Voice (GMSK) GPRS (GMSK) EGPRS (8PSK)	GPRS Multi-Slot Class: ☐ Class 8 - 1 Up, 4 Down ☐ Class 10 - 2 Up, 4 Down ☐ Class 12 - 4 Up, 4 Down ☒ Class 33 - 4 Up, 5 Down	GSM Voice: 12.5% (E)GPRS: 1 Slot: 12.5% 2 Slots: 25% 3 Slots: 37.5% 4 Slots: 50%
	Does this device support DTM (Dual Transfer Mode)? ☐ Yes ☒ No			
W-CDMA (UMTS)	Band II Band V	UMTS Rel. 99 (Voice & Data) HSDPA (Rel. 5) HSUPA (Rel. 6) DC-HSDPA (Rel. 8) HSPA+ (Rel. 7)		100%
LTE	FDD Band 2 FDD Band 4 FDD Band 5 FDD Band 12 FDD Band 17 FDD Band 25 FDD Band 26 TDD Band 41	QPSK 16QAM ☒ Rel. 10 Carrier Aggregation (Downlink only)		100% (FDD) 63.3% (TDD)
	Does this device support SV-LTE (1xRTT-LTE)? ☐ Yes ☒ No			
Wi-Fi	2.4 GHz	802.11b 802.11g 802.11n (HT20)		100%
	5 GHz	802.11a 802.11n (HT20) 802.11n (HT40) 802.11ac (VHT20) 802.11ac (VHT40) 802.11ac (VHT80)		100%
	Does this device support bands 5.60 ~ 5.65 GHz? ☒ Yes ☐ No			
	Does this device support Band gap channel(s)? ☒ Yes ☐ No			
Bluetooth	2.4 GHz	Version 4.2 LE		77.5% (DH5)

6.3. Nominal and Maximum Output Power

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

Upper limit (dB): -1.5 ~ 0.5		Max. RF Output Power (dBm)		Reduce RF Output Power (dBm)	
RF Air interface	Mode	Target	Max. tune-up tolerance limit	Target	Max. tune-up tolerance limit
GSM850	Voice	33.0	33.5		
	GPRS 1 slot	33.0	33.5		
	GPRS 2 slots	31.0	31.5		
	GPRS 3 slots	29.5	30.0		
	GPRS 4 slots	28.0	28.5		
	EGPRS 1 slot	27.0	27.5		
	EGPRS 2 slots	26.5	27.0		
	EGPRS 3 slots	24.0	24.5		
	EGPRS 4 slots	23.5	24.0		
GSM1900	Voice	30.0	30.5		
	GPRS 1 slot	30.0	30.5		
	GPRS 2 slots	28.0	28.5		
	GPRS 3 slots	27.0	27.5		
	GPRS 4 slots	25.0	25.5		
	EGPRS 1 slot	26.0	26.5		
	EGPRS 2 slots	24.0	24.5		
	EGPRS 3 slots	23.0	23.5		
	EGPRS 4 slots	22.0	22.5		
W-CDMA Band V	R99	23.5	24.0		
	HSDPA	23.0	23.5		
	HSUPA	23.0	23.5		
	DC-HSDPA	23.0	23.5		
W-CDMA Band II	R99	23.0	23.5	19.5	20.0
	HSDPA	22.0	22.5	19.0	19.5
	HSUPA	21.5	22.0	18.5	19.0
	DC-HSDPA	21.5	22.0	18.5	19.0
LTE Band 2	QPSK, 16QAM	22.5	23.0	20.0	20.5
LTE Band 4	QPSK, 16QAM	22.0	22.5	20.0	20.5
LTE Band 5	QPSK, 16QAM	23.5	24.0		
LTE Band 12	QPSK, 16QAM	23.0	23.5		
LTE Band 17	QPSK, 16QAM	23.0	23.5		
LTE Band 25	QPSK, 16QAM	22.5	23.0	20.0	20.5
LTE Band 26	QPSK, 16QAM	23.5	24.0		
LTE Band 41	QPSK, 16QAM	24.0	24.5		
Upper limit (dB): ~ 0.5		RF Output Power (dBm)			
RF Air interface	Mode	Target	Max. tune-up tolerance limit		
WiFi 2.4 GHz	802.11b	15.0	15.5		
	802.11g	12.0	12.5		
	802.11n HT20	11.0	11.5		
WiFi 5 GHz	802.11a	11.0	11.5		
	802.11n HT20	10.0	10.5		
	802.11n HT40	10.0	10.5		
	802.11ac VHT20	9.5	10.0		
	802.11ac VHT40	9.5	10.0		
	802.11ac VHT80	9.5	10.0		
	Bluetooth	10.5	11.0		
Bluetooth LE		7.0	7.5		

Notes:

1. The device utilizes power reduction under portable hotspot for SAR compliance.
2. There is power reduction for W-CDMA Band II, LTE Band 2 / 4 / 25.
3. A detailed description of the hotspot power reduction is included in the technical descriptions in the FCC filing

6.4. General LTE SAR Test and Reporting Considerations

Item	Description						
Frequency range, Channel Bandwidth, Numbers and Frequencies	Band 2	Frequency range: 1850 - 1910 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low	18700 /1860	18675/ 1857.5	18650/ 1855	18625/ 1852.5	18615/ 1851.5	18607/ 1850.7
	Mid	18900/ 1880	18900/ 1880	18900/ 1880	18900/ 1880	18900/ 1880	18900/ 1880
	High	19100/ 1900	19125/ 1902.5	19150/ 1905	19175/ 1907.5	19185/ 1908.5	19193/ 1909.3
	Band 4	Frequency range: 1710 - 1755 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low	20050/ 1720	20025/ 1717.5	20000/ 1715	19975/ 1712.5	19965/ 1711.5	19957/ 1710.7
	Mid	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5
	High	20300/ 1745	20325/ 1747.5	20350/ 1750	20375/ 1752.5	20385/ 1753.5	20393/ 1754.3
	Band 5	Frequency range: 824 - 849 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low			20450/ 829	20425/ 826.5	20415/ 825.5	20407/ 824.7
	Mid			20525/ 836.5	20525/ 836.5	20525/ 836.5	20525/ 836.5
	High			20600/ 844	20625/ 846.5	20635/ 847.5	20643/ 848.3
	Band 12	Frequency range: 699 – 716 MHz					
		Channel Bandwidth					
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz
	Low			23060/ 704	23035/ 701.5	23025/ 700.5	23017/ 699.7
	Mid			23095/ 707.5	23095/ 707.5	23095/ 707.5	23095/ 707.5
	High			23130/ 711	23155/ 713.5	23165/ 714.5	23173/ 715.3

General LTE SAR Test and Reporting Considerations (Continued)

Frequency range, Channel Bandwidth, Numbers and Frequencies	Band 17	Frequency range: 704 - 716 MHz																																																		
		Channel Bandwidth																																																		
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz																																													
	Low			23780/ 709	23755/ 706.5																																															
	Mid			23790/ 710	23790/ 710																																															
	High			23800/ 711	23825/ 713.5																																															
	Band 25	Frequency range: 1850 - 1915 MHz																																																		
		Channel Bandwidth																																																		
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz																																													
	Low	26140/ 1860	26115/ 1857.5	26090/ 1855	26065/ 1852.5	26055/ 1851.5	26047/ 1850.7																																													
	Mid	26365/ 1882.5	26365/ 1882.5	26365/ 1882.5	26365/ 1882.5	26365/ 1882.5	26365/ 1882.5																																													
	High	26590/ 1905	26615/ 1907.5	26640/ 1910	26665/ 1912.5	26675/ 1913.5	26683/ 1914.3																																													
	Band 26	Frequency range: 814 - 849 MHz																																																		
		Channel Bandwidth																																																		
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz																																													
	Low			26740/ 819	26715/ 816.5	26705/ 815.5	26697/ 814.7																																													
	Mid		26865/ 831.5	26865/ 831.5	26865/ 831.5	26865/ 831.5	26865/ 831.5																																													
	High		26965/ 841.5	26990/ 844	27015/ 846.5	27025/ 847.5	27033/ 848.3																																													
	Band 41	Frequency range: 2496 - 2690 MHz																																																		
		Channel Bandwidth																																																		
		20 MHz	15 MHz	10 MHz	5 MHz	3 MHz	1.4 MHz																																													
	Low	39650/ 2496.0	39650/ 2496.0	39650/ 2496.0	39650/ 2496.0																																															
	Mid	40620/ 2593.0	40620/ 2593.0	40620/ 2593.0	40620/ 2593.0																																															
	High	41589/ 2690.0	41589/ 2690.0	41589/ 2690.0	41589/ 2690.0																																															
Carrier Aggregation Combinations	Band 41 Primary		Channel Bandwidth 20 MHz		Band 41 Secondary		Channel Bandwidth 20 MHz																																													
	Low		39750/2506.0		Secondary Cell is Downlink only																																															
	Mid		40620/2593.0																																																	
	High		41490/2680.0																																																	
LTE transmitter and antenna implementation	LTE has two (2) TX/RX antennas and one (2) RX antennas Refer to Appendix A...																																																			
Maximum power reduction (MPR)	<table><tr><th colspan="8">Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3</th></tr><tr><th rowspan="2">Modulation</th><th colspan="6">Channel bandwidth / Transmission bandwidth (RB)</th><th rowspan="2">MPR (dB)</th></tr><tr><th>1.4 MHz</th><th>3.0 MHz</th><th>5 MHz</th><th>10 MHz</th><th>15 MHz</th><th>20 MHz</th></tr><tr><td>QPSK</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 1</td></tr><tr><td>16 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 1</td></tr><tr><td>16 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 2</td></tr></table> MPR Built-in by design A-MPR (additional MPR) was disabled during SAR testing						Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3								Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1	16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1	16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2
Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3																																																				
Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)																																													
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz																																														
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1																																													
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1																																													
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2																																													
Power reduction	No																																																			
Spectrum plots for RB configurations	A properly configured base station simulator was used for the SAR and power measurements; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.																																																			

6.5. LTE (TDD) Considerations

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

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

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

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

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

Calculated Duty Cycle

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

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

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

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

where

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

7. RF Exposure Conditions (Test Configurations)

Refer to “SAR Photos and Ant locations” Appendix for the specific details of the antenna-to-antenna and antenna-to-edge(s) distances.

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

Notes:

1. SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hot Spot SAR.
2. The Body-worn minimum separation distance is 15 mm. To cover both body-worn and hotspot RF exposure conditions testing was performed at a separation distance of 10 mm.

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 ±(%)
6-27-2015	Body 835	e'	53.3000	Relative Permittivity (ϵ_r):	53.30	55.20	-3.44	5
		e"	21.9200	Conductivity (σ):	1.02	0.97	4.92	5
	Body 820	e'	53.4400	Relative Permittivity (ϵ_r):	53.44	55.28	-3.32	5
		e"	22.0100	Conductivity (σ):	1.00	0.97	3.62	5
	Body 850	e'	53.1600	Relative Permittivity (ϵ_r):	53.16	55.16	-3.62	5
		e"	21.8300	Conductivity (σ):	1.03	0.99	4.52	5
7-9-2015	Body 1750	e'	51.8900	Relative Permittivity (ϵ_r):	51.89	53.44	-2.90	5
		e"	14.8800	Conductivity (σ):	1.45	1.49	-2.57	5
	Body 1710	e'	52.0100	Relative Permittivity (ϵ_r):	52.01	53.54	-2.86	5
		e"	14.8300	Conductivity (σ):	1.41	1.46	-3.52	5
	Body 1755	e'	51.8800	Relative Permittivity (ϵ_r):	51.88	53.43	-2.90	5
		e"	14.8900	Conductivity (σ):	1.45	1.49	-2.43	5
7-9-2015	Body 1900	e'	51.5100	Relative Permittivity (ϵ_r):	51.51	53.30	-3.36	5
		e"	14.9900	Conductivity (σ):	1.58	1.52	4.19	5
	Body 1850	e'	51.5800	Relative Permittivity (ϵ_r):	51.58	53.30	-3.23	5
		e"	14.9400	Conductivity (σ):	1.54	1.52	1.11	5
	Body 1910	e'	51.4800	Relative Permittivity (ϵ_r):	51.48	53.30	-3.41	5
		e"	15.0100	Conductivity (σ):	1.59	1.52	4.87	5
7-10-2015	Head 2450	e'	38.2100	Relative Permittivity (ϵ_r):	38.21	39.20	-2.53	5
		e"	13.5900	Conductivity (σ):	1.85	1.80	2.85	5
	Head 2410	e'	38.3800	Relative Permittivity (ϵ_r):	38.38	39.28	-2.29	5
		e"	13.4900	Conductivity (σ):	1.81	1.76	2.69	5
	Head 2475	e'	38.1100	Relative Permittivity (ϵ_r):	38.11	39.17	-2.70	5
		e"	13.6700	Conductivity (σ):	1.88	1.83	2.97	5

SAR 2 Room

Date	Freq. (MHz)		Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)
6-24-2015	Head 835	e'	40.9900	Relative Permittivity (ϵ_r):	40.99	41.50	-1.23	5
		e"	19.4700	Conductivity (σ):	0.90	0.90	0.44	5
	Head 820	e'	41.1700	Relative Permittivity (ϵ_r):	41.17	41.60	-1.04	5
		e"	19.5100	Conductivity (σ):	0.89	0.90	-0.99	5
	Head 850	e'	40.7800	Relative Permittivity (ϵ_r):	40.78	41.50	-1.73	5
		e"	19.4200	Conductivity (σ):	0.92	0.92	0.31	5
6-24-2015	Head 1750	e'	38.9300	Relative Permittivity (ϵ_r):	38.93	40.08	-2.88	5
		e"	13.5200	Conductivity (σ):	1.32	1.37	-3.90	5
	Head 1710	e'	39.0400	Relative Permittivity (ϵ_r):	39.04	40.15	-2.76	5
		e"	13.5100	Conductivity (σ):	1.28	1.35	-4.57	5
	Head 1755	e'	38.9200	Relative Permittivity (ϵ_r):	38.92	40.08	-2.88	5
		e"	13.5300	Conductivity (σ):	1.32	1.37	-3.70	5
6-24-2015	Head 1900	e'	38.3900	Relative Permittivity (ϵ_r):	38.39	40.00	-4.03	5
		e"	13.8000	Conductivity (σ):	1.46	1.40	4.14	5
	Head 1850	e'	38.6000	Relative Permittivity (ϵ_r):	38.60	40.00	-3.50	5
		e"	13.7200	Conductivity (σ):	1.41	1.40	0.81	5
	Head 1910	e'	38.3400	Relative Permittivity (ϵ_r):	38.34	40.00	-4.15	5
		e"	13.8200	Conductivity (σ):	1.47	1.40	4.84	5
6-26-2015	Body 750	e'	54.1600	Relative Permittivity (ϵ_r):	54.16	55.55	-2.50	5
		e"	23.3100	Conductivity (σ):	0.97	0.96	0.93	5
	Body 700	e'	54.6400	Relative Permittivity (ϵ_r):	54.64	55.74	-1.97	5
		e"	23.8300	Conductivity (σ):	0.93	0.96	-3.31	5
	Body 790	e'	53.7700	Relative Permittivity (ϵ_r):	53.77	55.39	-2.93	5
		e"	22.9200	Conductivity (σ):	1.01	0.97	4.21	5
6-28-2015	Head 835	e'	42.2300	Relative Permittivity (ϵ_r):	42.23	41.50	1.76	5
		e"	19.6200	Conductivity (σ):	0.91	0.90	1.21	5
	Head 820	e'	42.3600	Relative Permittivity (ϵ_r):	42.36	41.60	1.82	5
		e"	19.6800	Conductivity (σ):	0.90	0.90	-0.13	5
	Head 850	e'	42.1000	Relative Permittivity (ϵ_r):	42.10	41.50	1.45	5
		e"	19.5300	Conductivity (σ):	0.92	0.92	0.88	5
7-2-2015	Body 5180	e'	50.9500	Relative Permittivity (ϵ_r):	50.95	49.05	3.88	5
		e"	18.0500	Conductivity (σ):	5.20	5.27	-1.38	5
	Body 5200	e'	50.9000	Relative Permittivity (ϵ_r):	50.90	49.02	3.84	5
		e"	18.0800	Conductivity (σ):	5.23	5.29	-1.27	5
	Body 5600	e'	50.1800	Relative Permittivity (ϵ_r):	50.18	48.48	3.51	5
		e"	18.5200	Conductivity (σ):	5.77	5.76	0.10	5
	Body 5800	e'	49.8200	Relative Permittivity (ϵ_r):	49.82	48.20	3.36	5
		e"	18.7500	Conductivity (σ):	6.05	6.00	0.78	5
	Body 5825	e'	49.7700	Relative Permittivity (ϵ_r):	49.77	48.20	3.26	5
		e"	18.7800	Conductivity (σ):	6.08	6.00	1.38	5
7-6-2015	Head 835	e'	42.1200	Relative Permittivity (ϵ_r):	42.12	41.50	1.49	5
		e"	19.6200	Conductivity (σ):	0.91	0.90	1.21	5
	Head 820	e'	42.2800	Relative Permittivity (ϵ_r):	42.28	41.60	1.63	5
		e"	19.6800	Conductivity (σ):	0.90	0.90	-0.13	5
	Head 850	e'	41.9700	Relative Permittivity (ϵ_r):	41.97	41.50	1.13	5
		e"	19.5500	Conductivity (σ):	0.92	0.92	0.98	5
7-10-2015	Body 2450	e'	52.2100	Relative Permittivity (ϵ_r):	52.21	52.70	-0.93	5
		e"	14.8800	Conductivity (σ):	2.03	1.95	3.95	5
	Body 2410	e'	52.3400	Relative Permittivity (ϵ_r):	52.34	52.76	-0.79	5
		e"	14.6800	Conductivity (σ):	1.97	1.91	3.13	5
	Body 2475	e'	52.1300	Relative Permittivity (ϵ_r):	52.13	52.67	-1.02	5
		e"	14.9700	Conductivity (σ):	2.06	1.99	3.78	5

SAR 2 Room(Continued)

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
2015-08-06	Head 5180	e'	36.3700	Relative Permittivity (ϵ_r):	36.37	36.01	0.99	5
		e''	15.9300	Conductivity (σ):	4.59	4.63	-0.91	5
	Head 5200	e'	36.3700	Relative Permittivity (ϵ_r):	36.37	35.99	1.06	5
		e''	15.9800	Conductivity (σ):	4.62	4.65	-0.66	5
	Head 5600	e'	35.7400	Relative Permittivity (ϵ_r):	35.74	35.53	0.58	5
		e''	16.0700	Conductivity (σ):	5.00	5.06	-1.11	5
	Head 5800	e'	35.5900	Relative Permittivity (ϵ_r):	35.59	35.30	0.82	5
		e''	16.2500	Conductivity (σ):	5.24	5.27	-0.56	5
	Head 5825	e'	35.4700	Relative Permittivity (ϵ_r):	35.47	35.30	0.48	5
		e''	16.1900	Conductivity (σ):	5.24	5.27	-0.50	5

SAR 3 Room

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
6-24-2015	Body 835	e'	53.6500	Relative Permittivity (ϵ_r):	53.65	55.20	-2.81	5
		e"	21.8600	Conductivity (σ):	1.01	0.97	4.63	5
	Body 820	e'	53.7400	Relative Permittivity (ϵ_r):	53.74	55.28	-2.78	5
		e"	21.9400	Conductivity (σ):	1.00	0.97	3.29	5
	Body 850	e'	53.6400	Relative Permittivity (ϵ_r):	53.64	55.16	-2.75	5
		e"	21.7800	Conductivity (σ):	1.03	0.99	4.28	5
6-25-2015	Body 1900	e'	53.2800	Relative Permittivity (ϵ_r):	53.28	53.30	-0.04	5
		e"	14.9000	Conductivity (σ):	1.57	1.52	3.56	5
	Body 1850	e'	53.4900	Relative Permittivity (ϵ_r):	53.49	53.30	0.36	5
		e"	15.0000	Conductivity (σ):	1.54	1.52	1.51	5
	Body 1910	e'	53.2600	Relative Permittivity (ϵ_r):	53.26	53.30	-0.08	5
		e"	14.8800	Conductivity (σ):	1.58	1.52	3.97	5
6-26-2015	Head 750	e'	42.7900	Relative Permittivity (ϵ_r):	42.79	41.96	1.97	5
		e"	21.6900	Conductivity (σ):	0.90	0.89	1.28	5
	Head 700	e'	43.2800	Relative Permittivity (ϵ_r):	43.28	42.22	2.52	5
		e"	21.9700	Conductivity (σ):	0.86	0.89	-3.84	5
	Head 790	e'	42.2100	Relative Permittivity (ϵ_r):	42.21	41.76	1.09	5
		e"	21.3500	Conductivity (σ):	0.94	0.90	4.65	5
6-29-2015	Body 1900	e'	53.9300	Relative Permittivity (ϵ_r):	53.93	53.30	1.18	5
		e"	14.9800	Conductivity (σ):	1.58	1.52	4.12	5
	Body 1850	e'	54.0600	Relative Permittivity (ϵ_r):	54.06	53.30	1.43	5
		e"	14.9400	Conductivity (σ):	1.54	1.52	1.11	5
	Body 1910	e'	53.9200	Relative Permittivity (ϵ_r):	53.92	53.30	1.16	5
		e"	15.0000	Conductivity (σ):	1.59	1.52	4.80	5
7-1-2015	Head 2600	e'	39.1200	Relative Permittivity (ϵ_r):	39.12	39.01	0.28	5
		e"	13.5600	Conductivity (σ):	1.96	1.96	-0.09	5
	Head 2500	e'	39.4600	Relative Permittivity (ϵ_r):	39.46	39.14	0.83	5
		e"	13.3000	Conductivity (σ):	1.85	1.85	-0.28	5
	Head 2700	e'	38.8200	Relative Permittivity (ϵ_r):	38.82	38.88	-0.17	5
		e"	13.7800	Conductivity (σ):	2.07	2.07	-0.07	5
7-3-2015	Body 1750	e'	54.6200	Relative Permittivity (ϵ_r):	54.62	53.44	2.21	5
		e"	14.6400	Conductivity (σ):	1.42	1.49	-4.15	5
	Body 1710	e'	54.6500	Relative Permittivity (ϵ_r):	54.65	53.54	2.07	5
		e"	14.6600	Conductivity (σ):	1.39	1.46	-4.63	5
	Body 1755	e'	54.6100	Relative Permittivity (ϵ_r):	54.61	53.43	2.21	5
		e"	14.6400	Conductivity (σ):	1.43	1.49	-4.07	5
7-3-2015	Body 2600	e'	51.3000	Relative Permittivity (ϵ_r):	51.30	52.51	-2.31	5
		e"	15.2000	Conductivity (σ):	2.20	2.16	1.69	5
	Body 2500	e'	51.5200	Relative Permittivity (ϵ_r):	51.52	52.64	-2.12	5
		e"	14.9500	Conductivity (σ):	2.08	2.02	2.87	5
	Body 2700	e'	51.1100	Relative Permittivity (ϵ_r):	51.11	52.38	-2.43	5
		e"	15.4300	Conductivity (σ):	2.32	2.30	0.66	5
7-6-2015	Head 750	e'	41.4900	Relative Permittivity (ϵ_r):	41.49	41.96	-1.12	5
		e"	21.5200	Conductivity (σ):	0.90	0.89	0.49	5
	Head 700	e'	42.2300	Relative Permittivity (ϵ_r):	42.23	42.22	0.03	5
		e"	21.8700	Conductivity (σ):	0.85	0.89	-4.27	5
	Head 790	e'	40.9600	Relative Permittivity (ϵ_r):	40.96	41.76	-1.91	5
		e"	21.3000	Conductivity (σ):	0.94	0.90	4.41	5

SAR 3 Room (Continued)

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
7-8-2015	Head 5180	e'	34.9500	Relative Permittivity (ϵ_r):	34.95	36.01	-2.95	5
		e"	15.7900	Conductivity (σ):	4.55	4.63	-1.78	5
	Head 5200	e'	34.9100	Relative Permittivity (ϵ_r):	34.91	35.99	-3.00	5
		e"	15.8000	Conductivity (σ):	4.57	4.65	-1.78	5
	Head 5600	e'	34.3700	Relative Permittivity (ϵ_r):	34.37	35.53	-3.28	5
		e"	15.9300	Conductivity (σ):	4.96	5.06	-1.98	5
	Head 5800	e'	34.1200	Relative Permittivity (ϵ_r):	34.12	35.30	-3.34	5
		e"	16.0200	Conductivity (σ):	5.17	5.27	-1.97	5
	Head 5825	e'	34.0800	Relative Permittivity (ϵ_r):	34.08	35.30	-3.46	5
e"		16.0300	Conductivity (σ):	5.19	5.27	-1.48	5	
2015-08-06	Body 5180	e'	47.3200	Relative Permittivity (ϵ_r):	47.32	49.05	-3.52	5
		e"	18.3900	Conductivity (σ):	5.30	5.27	0.48	5
	Body 5200	e'	47.2800	Relative Permittivity (ϵ_r):	47.28	49.02	-3.55	5
		e"	18.4100	Conductivity (σ):	5.32	5.29	0.53	5
	Body 5600	e'	46.6500	Relative Permittivity (ϵ_r):	46.65	48.48	-3.77	5
		e"	18.7600	Conductivity (σ):	5.84	5.76	1.40	5
	Body 5800	e'	46.3700	Relative Permittivity (ϵ_r):	46.37	48.20	-3.80	5
		e"	18.9500	Conductivity (σ):	6.11	6.00	1.86	5
	Body 5825	e'	46.3300	Relative Permittivity (ϵ_r):	46.33	48.20	-3.88	5
e"		18.9900	Conductivity (σ):	6.15	6.00	2.51	5	

8.2. System Check

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

System Performance Check Measurement Conditions:

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

Reference Target SAR Values

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

System Dipole	Serial No.	Cal. Date	Freq. (MHz)	Target SAR Values (W/kg)		
				1g/10g	Head	Body
D750V3	1122	8-13-2014	750	1g	8.31	8.71
				10g	5.45	5.81
D835V2	4d174	8-13-2014	835	1g	9.32	9.62
				10g	6.09	6.37
D1750V2	1125	8-12-2014	1750	1g	36.60	36.70
				10g	19.50	19.70
D1900V2	5d199	2-6-2015	1900	1g	41.00	40.60
				10g	21.40	21.60
D2450V2	939	8-11-2014	2450	1g	52.10	51.40
				10g	24.20	24.00
D2600V2	1097	11-27-2014	2450	1g	56.50	57.30
				10g	25.40	25.50
D5GHzV2	1184	8-22-2014	5200	1g	79.50	77.10
				10g	22.70	21.50
			5600	1g	83.30	82.70
				10g	23.50	22.80
			5800	1g	79.20	76.90
				10g	22.40	21.30
D5GHzV2	1209	2-10-2015	5200	1g	78.20	74.00
				10g	22.20	20.60
			5600	1g	81.30	77.40
				10g	23.20	21.30
			5800	1g	79.60	74.90
				10g	22.50	20.50

System Check Results

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

SAR 1 Room

Date Tested	System Dipole		T.S. Liquid		Measured Results		Target (Ref. Value)	Delta ±10 %	Plot No.
	Type	Serial #			Zoom Scan to 100 mW	Normalize to 1 W			
6-27-2015	D835V2	4d174	Body	1g	1.04	10.40	9.62	8.11	1,2
				10g	0.69	6.88	6.37	8.01	
7-9-2015	D1750V2	1125	Body	1g	3.51	35.10	36.70	-4.36	
				10g	1.87	18.70	19.70	-5.08	
7-9-2015	D1900V2	5d199	Body	1g	4.09	40.90	40.60	0.74	
				10g	2.11	21.10	21.60	-2.31	
7-10-2015	D2450V2	939	Head	1g	4.97	49.70	51.40	-3.31	3,4
				10g	2.31	23.10	24.00	-3.75	

SAR 2 Room

6-24-2015	D835V2	4d174	Head	1g	1.01	10.10	9.32	8.37	
				10g	0.66	6.63	6.09	8.87	
6-25-2015	D1750V2	1125	Head	1g	3.51	35.10	36.60	-4.10	
				10g	1.86	18.60	19.50	-4.62	
6-25-2015	D1900V2	5d199	Head	1g	4.09	40.90	41.00	-0.24	
				10g	2.09	20.90	21.40	-2.34	
6-26-2015	D750V3	1122	Body	1g	0.82	8.24	8.71	-5.40	5,6
				10g	0.55	5.46	5.81	-6.02	
6-28-2015	D835V2	4d174	Head	1g	0.96	9.64	9.32	3.43	
				10g	0.63	6.33	6.09	3.94	
7-2-2015	D5GHzV2 (5200)	1209	Body	1g	7.16	71.60	74	-3.24	
				10g	2.06	20.60	20.6	0.00	
7-2-2015	D5GHzV2 (5600)	1209	Body	1g	7.77	77.70	77.4	0.39	7,8
				10g	2.21	22.10	21.3	3.76	
7-2-2015	D5GHzV2 (5800)	1209	Body	1g	6.90	69.00	74.9	-7.88	
				10g	1.97	19.70	20.5	-3.90	
7-6-2015	D835V2	4d174	Head	1g	1.00	10.00	9.32	7.30	
				10g	0.66	6.59	6.09	8.21	
7-10-2015	D2450V2	939	Body	1g	5.42	54.20	51.40	5.45	
				10g	2.48	24.80	24.00	3.33	
8-6-2015	D5GHzV2 (5200)	1184	Head	1g	8.03	80.30	79.5	1.01	9,10
				10g	2.28	22.80	22.7	0.44	
8-6-2015	D5GHzV2 (5600)	1184	Head	1g	8.16	81.60	83.3	-2.04	
				10g	2.31	23.10	23.5	-1.70	
8-6-2015	D5GHzV2 (5800)	1184	Head	1g	7.65	76.50	79.2	-3.41	
				10g	2.17	21.70	22.4	-3.13	

SAR 3 Room

Date Tested	System Dipole		T.S. Liquid	Measured Results		Target (Ref. Value)	Delta ±10 %	Plot No.
	Type	Serial #		Zoom Scan to 100 mW	Normalize to 1 W			
6-24-2015	D835V2	4d174	Body	1g	0.95	9.53	9.62	-0.94
				10g	0.63	6.27	6.37	-1.57
6-25-2015	D1900V2	5d199	Body	1g	4.11	41.10	40.6	1.23
				10g	2.11	21.10	21.60	-2.31
6-26-2015	D750V3	1122	Head	1g	0.76	7.64	8.31	-8.06
				10g	0.50	5.04	5.45	-7.52
6-29-2015	D1900V2	5d199	Body	1g	4.21	42.10	40.6	3.69
				10g	2.16	21.60	21.60	0.00
7-1-2015	D2600V2	1097	Head	1g	6.02	60.20	56.5	6.55
				10g	2.64	26.40	25.40	3.94
7-3-2015	D1750V2	1125	Body	1g	3.54	35.40	36.70	-3.54
				10g	1.87	18.70	19.70	-5.08
7-3-2015	D2600V2	1097	Body	1g	5.79	57.90	57.3	1.05
				10g	2.57	25.70	25.50	0.78
7-6-2015	D750V3	1122	Head	1g	0.78	7.82	8.31	-5.90
				10g	0.52	5.16	5.45	-5.32
7-8-2015	D5GHzV2 (5200)	1184	Head	1g	7.80	78.00	79.50	-1.89
				10g	2.23	22.30	22.70	-1.76
7-8-2015	D5GHzV2 (5600)	1184	Head	1g	7.65	76.50	83.30	-8.16
				10g	2.17	21.70	23.50	-7.66
7-8-2015	D5GHzV2 (5800)	1184	Head	1g	7.66	76.60	79.20	-3.28
				10g	2.16	21.60	22.40	-3.57
8-6-2015	D5GHzV2 (5200)	1184	Body	1g	7.78	77.80	77.1	0.91
				10g	2.23	22.30	21.5	3.72
8-6-2015	D5GHzV2 (5600)	1184	Body	1g	8.47	84.70	82.7	2.42
				10g	2.40	24.00	22.8	5.26
8-6-2015	D5GHzV2 (5800)	1184	Body	1g	7.50	75.00	76.9	-2.47
				10g	2.11	21.10	21.3	-0.94

9. Conducted Output Power Measurements

9.1. GSM

GSM850 Measured Results

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Burst (dBm)	Frame (dBm)
850	GSM (Voice)	CS1	1	128	824.2	32.3	23.3
				190	836.6	32.3	23.3
				251	848.8	32.3	23.3
	GPRS (GMSK)	CS1	1	128	824.2	32.4	23.4
				190	836.6	32.4	23.4
				251	848.8	32.4	23.4
			2	128	824.2	29.8	23.8
				190	836.6	30.5	24.5
				251	848.8	29.8	23.8
			3	128	824.2	28.5	24.3
				190	836.6	28.6	24.3
				251	848.8	28.5	24.2
			4	128	824.2	28.5	25.5
				190	836.6	28.5	25.5
				251	848.8	28.3	25.3
	EGPRS (8PSK)	MCS5	1	128	824.2	26.6	17.6
				190	836.6	26.7	17.7
				251	848.8	26.6	17.6
			2	128	824.2	25.4	19.4
				190	836.6	25.7	19.6
				251	848.8	25.5	19.5
			3	128	824.2	23.7	19.5
				190	836.6	23.9	19.7
				251	848.8	23.8	19.6
			4	128	824.2	23.3	20.3
				190	836.6	23.6	20.6
				251	848.8	23.6	20.5

Notes:

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

- Head & Body-worn: GMSK Voice Mode
- Hotspot mode: GMSK (GPRS) mode with 4 time slots, 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)	Burst (dBm)	Frame (dBm)
1900	GSM (Voice)	CS1	1	512	1850.2	29.4	20.3
				661	1880.0	29.8	20.8
				810	1909.8	29.7	20.7
	GPRS (GMSK)	CS1	1	512	1850.2	29.1	20.1
				661	1880.0	29.6	20.6
				810	1909.8	29.4	20.4
			2	512	1850.2	27.3	21.2
				661	1880.0	27.1	21.0
				810	1909.8	27.6	21.5
			3	512	1850.2	26.0	21.8
				661	1880.0	25.9	21.7
				810	1909.8	26.5	22.2
			4	512	1850.2	24.8	21.8
				661	1880.0	25.2	22.2
				810	1909.8	25.2	22.2
	EGPRS (8PSK)	MCS5	1	512	1850.2	25.0	15.9
				661	1880.0	25.1	16.1
				810	1909.8	25.4	16.3
			2	512	1850.2	23.9	17.9
				661	1880.0	24.0	18.0
				810	1909.8	24.3	18.3
			3	512	1850.2	22.5	18.2
				661	1880.0	22.7	18.4
				810	1909.8	22.9	18.7
			4	512	1850.2	21.1	18.1
				661	1880.0	21.3	18.3
				810	1909.8	21.5	18.5

Notes:

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

- Head & Body-worn: GMSK Voice Mode
- Hotspot mode: GMSK (GPRS) mode with 4 time slots, based on the output power measurements above.
- SAR is not required for EGPRS (8PSK) mode because its output power is less than that of GPRS Mode

9.2. W-CDMA

Release 99 Setup Procedures used to establish the test signals

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

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

HSDPA Setup Procedures used to establish the test signals

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

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

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

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

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

DC-HSDPA Setup Procedures used to establish the test signals

The following tests were completed according to procedures in section 7.3.13 of 3GPP TS34.108 v9.5.0. A summary of these settings are illustrated below:

Downlink Physical Channels are set as per 3GPP TS34.121-1 v9.0.0 E.5.0

Table E.5.0: Levels for HSDPA connection setup

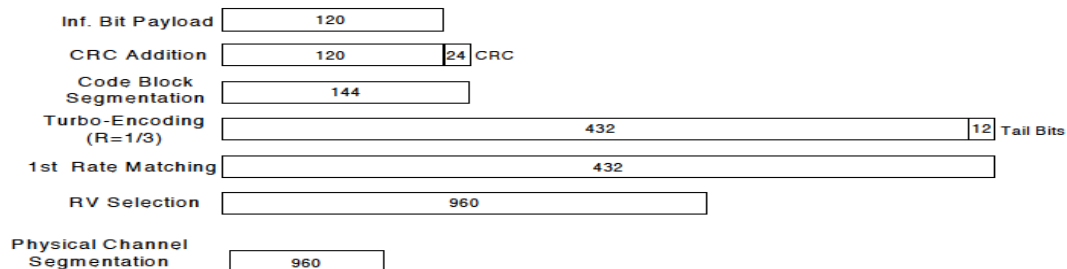
Parameter During Connection setup	Unit	Value
P-CPICH_Ec/Ior	dB	-10
P-CCPCH and SCH_Ec/Ior	dB	-12
PICH_Ec/Ior	dB	-15
HS-PDSCH	dB	off
HS-SCCH_1	dB	off
DPCH_Ec/Ior	dB	-5
OCNS_Ec/Ior	dB	-3.1

Call is set up as per 3GPP TS34.108 v9.5.0 sub clause 7.3.13

The configurations of the fixed reference channels for HSDPA RF tests are described in 3GPP TS 34.121, annex C for FDD and 3GPP TS 34.122.

Table C.8.1.12: Fixed Reference Channel H-Set 12

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Proces ses	6
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK
Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table.		
Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.		

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

The following 4 Sub-tests for HSDPA were completed according to Release 8 procedures in section 5.2 of 3GPP TS34.121. A summary of subtest settings are illustrated below:

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set 1			
	Power Control Algorithm	Algorithm2			
	β_c	2/15	11/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	β_d (SF)	64			
	β_c/β_d	2/15	11/15	15/8	15/4
	β_{hs}	4/15	24/15	30/15	30/15
HSDPA Specific Settings	MPR (dB)	0	0	0.5	0.5
	DACK	8			
	DNAK	8			
	DCQI	8			
	Ack-Nack Repetition factor	3			
	CQI Feedback	4ms			
	CQI Repetition Factor	2			
	$A_{hs} = \beta_{hs}/\beta_c$	30/15			

HSPA+

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

W-CDMA Band II Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Avg. Pwr (dBm)	Reduced Pwr (dBm)
W-CDMA Band II	Rel 99	RMC, 12.2 kbps	9262	1852.4	N/A	23.0	19.6
			9400	1880.0	N/A	22.8	19.4
			9538	1907.6	N/A	23.1	19.7
	HSDPA	Subtest 1	9262	1852.4	0	22.0	18.6
			9400	1880.0	0	21.9	18.5
			9538	1907.6	0	22.1	18.8
		Subtest 2	9262	1852.4	0	21.6	18.2
			9400	1880.0	0	21.5	18.1
			9538	1907.6	0	21.7	18.4
		Subtest 3	9262	1852.4	0.5	21.5	18.1
			9400	1880.0	0.5	21.3	18.0
			9538	1907.6	0.5	21.6	18.2
		Subtest 4	9262	1852.4	0.5	21.5	18.1
			9400	1880.0	0.5	21.3	17.7
			9538	1907.6	0.5	21.6	18.2
	HSUPA	Subtest 1	9262	1852.4	0	21.4	18.2
			9400	1880.0	0	20.2	17.4
			9538	1907.6	0	20.4	18.8
		Subtest 2	9262	1852.4	2	20.7	17.3
			9400	1880.0	2	20.2	17.0
			9538	1907.6	2	20.5	17.2
		Subtest 3	9262	1852.4	1	20.6	17.5
			9400	1880.0	1	20.6	17.0
			9538	1907.6	1	20.4	17.0
		Subtest 4	9262	1852.4	2	21.0	17.6
			9400	1880.0	2	20.6	17.3
			9538	1907.6	2	21.6	17.6
		Subtest 5	9262	1852.4	0	22.0	18.6
			9400	1880.0	0	21.8	18.5
			9538	1907.6	0	22.0	18.8
	DC-HSDPA	Subtest 1	9262	1852.4	0	21.9	18.6
			9400	1880.0	0	21.8	18.4
			9538	1907.6	0	22.0	18.7
		Subtest 2	9262	1852.4	0	21.6	18.2
			9400	1880.0	0	21.3	18.0
			9538	1907.6	0	21.7	18.4
		Subtest 3	9262	1852.4	0.5	21.4	18.1
			9400	1880.0	0.5	21.3	18.0
			9538	1907.6	0.5	21.6	18.3
		Subtest 4	9262	1852.4	0.5	21.5	18.0
			9400	1880.0	0.5	21.3	17.9
			9538	1907.6	0.5	21.6	18.2

Notes:

1. WCDMA Band II HSDPA : Subset 3,4 are mostly higher than the tune up power with MPR.
2. WCDMA Band II HSUPA : Subset 2,3,4 are mostly higher than the tune up power with MPR.

W-CDMA Band V Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Avg. Pwr (dBm)
W-CDMA Band V	Rel 99	RMC, 12.2 kbps	4132	826.4	N/A	23.8
			4183	836.6	N/A	23.9
			4233	846.6	N/A	24.0
	HSDPA	Subtest 1	4132	826.4	0	22.9
			4183	836.6	0	22.8
			4233	846.6	0	22.9
		Subtest 2	4132	826.4	0	22.4
			4183	836.6	0	22.4
			4233	846.6	0	22.5
		Subtest 3	4132	826.4	0.5	22.4
			4183	836.6	0.5	22.3
			4233	846.6	0.5	22.4
		Subtest 4	4132	826.4	0.5	22.4
			4183	836.6	0.5	22.3
			4233	846.6	0.5	22.4
	HSUPA	Subtest 1	4132	826.4	0	22.1
			4183	836.6	0	22.2
			4233	846.6	0	22.2
		Subtest 2	4132	826.4	2	21.5
			4183	836.6	2	21.3
			4233	846.6	2	21.3
		Subtest 3	4132	826.4	1	21.7
			4183	836.6	1	22.0
			4233	846.6	1	21.8
		Subtest 4	4132	826.4	2	21.5
			4183	836.6	2	21.5
			4233	846.6	2	21.5
		Subtest 5	4132	826.4	0	22.9
			4183	836.6	0	22.4
			4233	846.6	0	22.9
	DC-HSDPA	Subtest 1	4132	826.4	0	22.7
			4183	836.6	0	22.8
			4233	846.6	0	22.8
		Subtest 2	4132	826.4	0	22.3
			4183	836.6	0	22.5
			4233	846.6	0	22.5
		Subtest 3	4132	826.4	0.5	22.4
			4183	836.6	0.5	21.9
			4233	846.6	0.5	22.4
		Subtest 4	4132	826.4	0.5	22.3
			4183	836.6	0.5	22.4
			4233	846.6	0.5	22.5

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

SAR for LTE Band 2 is covered by LTE Band 25 due to similar frequency range, same maximum tune-up limit and same channel bandwidth.

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	22.4	22.5	22.4	0	20.5	20.5	20.4
			1	49	0	21.4	21.6	21.5	0	19.6	19.7	19.4
			1	99	0	21.9	21.9	21.7	0	20.0	20.0	19.6
			50	0	1	20.8	20.9	20.9	0	19.8	19.9	19.6
			50	24	1	20.6	20.6	20.5	0	19.6	19.7	19.6
			50	50	1	20.6	20.6	20.5	0	19.6	19.7	19.5
			100	0	1	20.7	20.8	20.7	0	19.7	19.8	19.7
		16QAM	1	0	1	21.5	21.5	21.5	0	20.5	20.5	20.5
			1	49	1	20.9	21.0	20.9	0	20.0	20.0	19.8
			1	99	1	21.3	21.2	21.0	0	20.3	20.2	20.0
			50	0	2	19.7	19.9	19.7	0	19.8	19.9	19.8
			50	24	2	19.6	19.7	19.4	0	19.6	19.7	19.5
			50	50	2	19.6	19.6	19.4	0	19.6	19.7	19.4
			100	0	2	19.7	19.8	19.7	0	19.8	19.8	19.7
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	22.0	22.1	22.2	0	20.0	20.1	20.3
			1	37	0	21.3	21.4	21.5	0	19.5	19.5	19.5
			1	74	0	21.7	21.6	21.7	0	19.6	19.6	20.0
			36	0	1	20.6	20.7	20.7	0	19.6	19.8	19.8
			36	20	1	20.5	20.7	20.5	0	19.6	19.7	19.5
			36	39	1	20.6	20.5	20.4	0	19.6	19.6	19.5
			75	0	1	20.5	20.7	20.5	0	19.6	19.8	19.5
		16QAM	1	0	1	21.0	21.5	21.5	0	20.0	20.5	20.5
			1	37	1	20.3	20.9	21.3	0	19.4	19.9	20.3
			1	74	1	20.7	21.0	21.2	0	19.6	20.1	20.2
			36	0	2	19.5	19.8	19.7	0	19.7	19.8	19.7
			36	20	2	19.4	19.7	19.5	0	19.6	19.7	19.5
			36	39	2	19.4	19.5	19.3	0	19.6	19.6	19.4
			75	0	2	19.5	19.7	19.5	0	19.6	19.8	19.5
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	21.9	22.1	22.3	0	20.0	20.0	20.2
			1	25	0	21.7	21.9	21.7	0	19.6	19.9	19.7
			1	49	0	21.8	21.7	21.8	0	19.7	19.7	19.8
			25	0	1	20.7	20.9	20.7	0	19.7	19.8	19.7
			25	12	1	20.7	20.8	20.5	0	19.6	19.8	19.5
			25	25	1	20.5	20.7	20.5	0	19.5	19.7	19.5
			50	0	1	20.7	20.8	20.6	0	19.6	19.8	19.6
		16QAM	1	0	1	21.3	21.4	21.5	0	19.5	20.3	20.4
			1	25	1	20.9	21.0	21.5	0	19.6	20.0	20.2
			1	49	1	21.1	21.1	21.3	0	20.0	20.0	20.5
			25	0	2	19.6	19.9	19.8	0	19.7	19.8	19.8
			25	12	2	19.6	19.8	19.6	0	19.6	19.8	19.7
			25	25	2	19.5	19.7	19.6	0	19.6	19.7	19.6
			50	0	2	19.6	19.8	19.6	0	19.5	19.8	19.5

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	21.7	21.9	21.9	0	19.6	20.0	19.7
			1	12	0	21.6	21.8	21.7	0	19.4	19.8	19.3
			1	24	0	21.6	21.7	21.8	0	19.5	19.9	19.5
			12	0	1	20.6	20.7	20.6	0	19.6	19.7	19.5
			12	7	1	20.5	20.7	20.6	0	19.6	19.7	19.5
			12	13	1	20.5	20.7	20.5	0	19.5	19.7	19.4
			25	0	1	20.5	20.7	20.6	0	19.5	19.7	19.5
		16QAM	1	0	1	20.8	21.0	21.2	0	19.7	20.4	19.7
			1	12	1	20.3	21.5	21.1	0	19.6	20.3	19.3
			1	24	1	20.7	20.9	21.0	0	19.6	20.3	19.5
			12	0	2	19.6	19.8	19.6	0	19.6	19.9	19.5
			12	7	2	19.6	19.8	19.6	0	19.6	19.9	19.6
			12	13	2	19.5	19.7	19.5	0	19.6	19.8	19.4
			25	0	2	19.4	19.8	19.6	0	19.6	19.8	19.4
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	21.7	21.9	21.8	0	19.6	19.8	19.6
			1	8	0	22.2	22.2	22.0	0	20.0	20.0	20.3
			1	14	0	21.6	21.8	21.6	0	19.6	19.7	19.6
			8	0	1	20.6	20.7	20.7	0	19.6	19.7	19.5
			8	4	1	20.6	20.8	20.7	0	19.6	19.8	19.5
			8	7	1	20.6	20.8	20.6	0	19.6	19.8	19.5
			15	0	1	20.6	20.7	20.5	0	19.6	19.7	19.5
		16QAM	1	0	1	20.7	20.8	21.3	0	19.6	20.3	20.0
			1	8	1	20.8	20.7	21.1	0	19.6	20.2	20.2
			1	14	1	20.6	20.8	21.1	0	19.7	20.2	19.8
			8	0	2	19.6	19.8	19.3	0	19.6	19.6	19.6
			8	4	2	19.6	19.8	19.3	0	19.6	19.7	19.6
			8	7	2	19.7	19.8	19.3	0	19.6	19.7	19.6
			15	0	2	19.6	19.8	19.4	0	19.6	19.8	19.4
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	21.8	21.8	21.5	0	19.5	19.6	19.5
			1	3	0	21.6	21.7	21.6	0	19.6	19.7	19.6
			1	5	0	20.9	21.6	21.6	0	19.5	19.7	19.5
			3	0	0	21.0	21.7	21.7	0	19.5	19.8	19.6
			3	1	0	21.0	21.7	22.0	0	19.6	19.8	19.5
			3	3	0	21.0	21.7	21.9	0	19.6	19.8	19.6
			6	0	1	19.8	20.7	20.7	0	19.5	19.8	19.6
		16QAM	1	0	1	20.8	21.2	21.0	0	19.8	20.5	19.5
			1	3	1	21.1	21.5	21.3	0	19.6	20.5	19.6
			1	5	1	21.1	21.2	21.0	0	19.8	20.4	19.4
			3	0	1	20.7	20.9	21.0	0	19.5	19.9	19.7
			3	1	1	20.8	20.9	21.0	0	19.5	19.9	19.6
			3	3	1	20.8	20.9	21.0	0	19.6	19.9	19.6
			6	0	2	19.7	19.6	19.8	0	19.6	19.6	19.6

LTE Band 5 Measured Results

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

LTE Band 12 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						704 MHz	707.5 MHz	711 MHz
LTE Band 12	10	QPSK	1	0	0	23.2	23.2	23.3
			1	25	0	23.2	23.4	23.2
			1	49	0	23.1	23.1	23.3
			25	0	1	22.1	22.1	22.1
			25	12	1	22.2	22.1	22.2
			25	25	1	22.1	22.1	22.2
			50	0	1	22.2	22.1	22.1
		16QAM	1	0	1	22.4	22.5	22.4
			1	25	1	22.1	22.5	22.5
			1	49	1	22.1	22.5	22.4
			25	0	2	21.1	21.1	21.2
			25	12	2	21.2	21.2	21.2
			25	25	2	21.2	21.1	21.2
			50	0	2	21.2	21.2	21.1
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						701.5 MHz	707.5 MHz	713.5 MHz
LTE Band 12	5	QPSK	1	0	0	23.3	23.2	23.3
			1	12	0	23.1	23.2	23.3
			1	24	0	23.3	23.2	23.3
			12	0	1	22.2	22.1	22.1
			12	7	1	22.2	22.1	22.1
			12	13	1	22.1	22.0	22.2
			25	0	1	22.2	22.1	22.1
		16QAM	1	0	1	22.3	22.3	22.2
			1	12	1	22.3	22.5	22.3
			1	24	1	22.3	22.3	22.4
			12	0	2	21.2	21.2	21.2
			12	7	2	21.3	21.3	21.2
			12	13	2	21.2	21.1	21.2
			25	0	2	21.2	21.1	21.0
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						700.5 MHz	707.5 MHz	714.5 MHz
LTE Band 12	3	QPSK	1	0	0	23.2	23.3	23.2
			1	8	0	23.4	23.2	23.3
			1	14	0	23.1	23.2	23.1
			8	0	1	22.1	22.1	22.0
			8	4	1	22.2	22.1	22.1
			8	7	1	22.2	22.2	22.1
			15	0	1	22.2	22.1	22.1
		16QAM	1	0	1	22.1	22.5	22.1
			1	8	1	22.3	22.5	22.2
			1	14	1	22.1	22.5	22.2
			8	0	2	21.2	21.0	21.1
			8	4	2	21.3	21.0	21.2
			8	7	2	21.3	21.0	21.2
			15	0	2	21.2	21.2	21.2

LTE Band 12 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						699.7 MHz	707.5 MHz	715.3 MHz
LTE Band 12	1.4	QPSK	1	0	0	23.3	23.2	23.1
			1	3	0	23.2	23.3	23.1
			1	5	0	23.2	23.3	23.1
			3	0	0	23.1	23.1	23.1
			3	1	0	23.1	23.2	23.0
			3	3	0	23.2	23.2	23.1
			6	0	1	22.0	22.1	22.0
		16QAM	1	0	1	22.3	22.4	22.1
			1	3	1	22.5	22.5	22.0
			1	5	1	22.5	22.5	22.2
			3	0	1	22.2	22.2	22.3
			3	1	1	22.2	22.3	22.2
			3	3	1	22.4	22.3	22.4
			6	0	2	21.2	21.0	21.1

LTE Band 17 Measured Results

SAR for LTE Band 17 is covered by LTE Band 12 due to similar frequency range, same maximum tune-up limit and same channel bandwidth.

LTE Band 25 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						1860 MHz	1882.5 MHz	1905 MHz		1860 MHz	1882.5 MHz	1905 MHz
LTE Band 25	20	QPSK	1	0	0	22.6	22.4	22.5	0	20.4	20.5	20.5
			1	49	0	21.6	21.5	21.5	0	19.7	19.6	19.7
			1	99	0	21.9	21.8	21.9	0	20.0	20.0	20.1
			50	0	1	20.9	20.7	21.0	0	20.0	19.9	20.1
			50	24	1	20.7	20.5	20.7	0	19.8	19.7	19.8
			50	50	1	20.6	20.6	20.6	0	19.8	19.7	19.8
			100	0	1	20.8	20.6	20.9	0	19.9	19.8	20.0
		16QAM	1	0	1	21.5	21.7	21.8	0	19.8	20.0	19.9
			1	49	1	21.4	20.8	21.0	0	20.2	20.0	20.1
			1	99	1	21.4	21.3	21.2	0	20.5	20.4	20.4
			50	0	2	20.0	19.8	19.8	0	20.1	20.0	20.1
			50	24	2	19.7	19.5	19.6	0	19.8	19.7	19.8
			50	50	2	19.6	19.6	19.7	0	19.8	19.8	19.8
			100	0	2	19.9	19.6	19.9	0	20.0	19.8	20.0
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						1857.5 MHz	1882.5 MHz	1907.5 MHz		1857.5 MHz	1882.5 MHz	1907.5 MHz
LTE Band 25	15	QPSK	1	0	0	22.2	22.0	22.3	0	20.3	20.1	20.5
			1	37	0	21.6	21.3	21.5	0	19.6	19.5	19.6
			1	74	0	21.6	21.6	21.9	0	19.8	19.7	20.1
			36	0	1	20.7	20.6	20.8	0	20.0	19.8	20.0
			36	20	1	20.6	20.5	20.7	0	19.7	19.7	19.8
			36	39	1	20.6	20.5	20.6	0	19.7	19.6	19.8
			75	0	1	20.6	20.5	20.8	0	19.8	19.7	19.9
		16QAM	1	0	1	21.1	21.4	21.6	0	20.2	20.5	20.5
			1	37	1	20.3	20.6	20.9	0	19.5	19.9	20.0
			1	74	1	20.5	21.0	21.1	0	19.7	20.1	20.3
			36	0	2	19.8	19.7	19.8	0	20.0	19.9	19.9
			36	20	2	19.6	19.5	19.6	0	19.7	19.7	19.8
			36	39	2	19.6	19.5	19.5	0	19.7	19.7	19.7
			75	0	2	19.7	19.5	19.7	0	19.8	19.7	19.9
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						1855 MHz	1882.5 MHz	1910 MHz		1855 MHz	1882.5 MHz	1910 MHz
LTE Band 25	10	QPSK	1	0	0	22.2	21.9	22.4	0	20.1	19.9	20.3
			1	25	0	21.7	21.7	21.9	0	19.7	19.6	19.9
			1	49	0	21.8	21.7	22.2	0	19.7	19.6	20.2
			25	0	1	20.9	20.7	20.9	0	19.8	19.7	19.9
			25	12	1	20.7	20.6	20.8	0	19.7	19.5	19.8
			25	25	1	20.7	20.6	20.7	0	19.6	19.6	19.7
			50	0	1	20.8	20.6	20.9	0	19.7	19.6	19.8
		16QAM	1	0	1	21.2	21.3	21.5	0	20.1	20.2	20.3
			1	25	1	20.8	20.9	20.5	0	19.8	19.8	19.9
			1	49	1	20.9	21.1	21.1	0	19.8	19.9	20.3
			25	0	2	19.9	19.7	20.0	0	19.8	19.6	20.0
			25	12	2	19.7	19.7	19.8	0	19.7	19.6	19.9
			25	25	2	19.7	19.6	19.8	0	19.6	19.6	19.8
			50	0	2	19.7	19.7	19.8	0	19.7	19.6	19.8

LTE Band 25 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	1882.5 MHz	1912.5 MHz		1852.5 MHz	1882.5 MHz	1912.5 MHz
LTE Band 25	5	QPSK	1	0	0	21.9	21.8	21.9	0	19.8	19.7	19.8
			1	12	0	22.1	21.6	21.9	0	19.7	19.6	19.7
			1	24	0	21.8	21.6	21.8	0	19.6	19.7	19.8
			12	0	1	20.8	20.6	20.8	0	19.7	19.6	19.8
			12	7	1	20.8	20.5	20.8	0	19.7	19.5	19.7
			12	13	1	20.7	20.5	20.7	0	19.6	19.5	19.7
			25	0	1	20.7	20.4	20.7	0	19.7	19.5	19.7
		16QAM	1	0	1	21.0	21.3	20.9	0	19.9	20.3	20.0
			1	12	1	21.5	21.1	20.8	0	19.7	20.1	20.3
			1	24	1	21.0	21.2	20.9	0	19.9	20.2	19.9
			12	0	2	19.9	19.7	19.8	0	19.8	19.7	19.9
			12	7	2	19.8	19.7	19.9	0	19.8	19.6	19.8
			12	13	2	19.8	19.7	19.7	0	19.7	19.7	19.8
			25	0	2	19.7	19.6	19.8	0	19.7	19.5	19.7
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						1851.5 MHz	1882.5 MHz	1913.5 MHz		1851.5 MHz	1882.5 MHz	1913.5 MHz
LTE Band 25	3	QPSK	1	0	0	21.8	21.7	21.7	0	19.8	19.7	19.9
			1	8	0	22.1	21.7	22.2	0	20.2	19.7	19.9
			1	14	0	21.7	21.5	21.9	0	19.7	19.5	20.0
			8	0	1	20.7	20.6	20.7	0	19.7	19.6	19.8
			8	4	1	20.7	20.5	20.7	0	19.7	19.5	19.8
			8	7	1	20.7	20.5	20.8	0	19.7	19.5	19.8
			15	0	1	20.7	20.5	20.7	0	19.7	19.5	19.8
		16QAM	1	0	1	20.8	21.3	20.8	0	19.7	20.2	20.0
			1	8	1	20.7	21.0	20.9	0	19.6	20.0	20.2
			1	14	1	20.8	21.1	20.7	0	19.7	20.1	20.0
			8	0	2	19.9	19.4	19.9	0	19.8	19.4	20.0
			8	4	2	19.9	19.4	19.9	0	19.8	19.4	20.0
			8	7	2	19.9	19.4	19.9	0	19.8	19.4	20.0
			15	0	2	19.8	19.5	19.7	0	19.7	19.6	19.7
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)			Target MPR	Reduce Avg Pwr (dBm)		
						1850.7 MHz	1882.5 MHz	1914.3 MHz		1850.7 MHz	1882.5 MHz	1914.3 MHz
LTE Band 25	1.4	QPSK	1	0	0	21.9	21.6	21.8	0	19.6	19.6	19.8
			1	3	0	21.9	21.5	22.0	0	19.7	19.5	20.0
			1	5	0	21.9	21.5	21.9	0	19.7	19.6	19.9
			3	0	0	21.7	21.5	21.8	0	19.7	19.5	19.9
			3	1	0	21.8	21.5	21.8	0	19.7	19.5	19.9
			3	3	0	21.7	21.5	21.8	0	19.7	19.5	19.8
			6	0	1	20.6	20.4	20.7	0	19.6	19.5	19.8
		16QAM	1	0	1	21.0	21.0	21.0	0	19.9	19.9	20.2
			1	3	1	21.2	21.0	20.9	0	19.9	19.9	20.5
			1	5	1	21.0	20.9	21.1	0	19.9	20.0	20.4
			3	0	1	20.7	20.7	20.8	0	19.7	20.1	20.5
			3	1	1	20.9	20.7	20.8	0	19.8	20.0	20.5
			3	3	1	20.9	20.7	20.8	0	19.7	20.0	20.5
			6	0	2	19.8	19.9	19.9	0	19.8	19.7	20.5

LTE Band 26 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						821.5 MHz	831.5 MHz	841.5 MHz
LTE Band 26	15	QPSK	1	0	0	23.0	23.2	23.4
			1	37	0	23.0	23.2	23.0
			1	74	0	23.0	23.1	23.2
			36	0	1	22.0	22.2	22.2
			36	20	1	22.0	22.2	22.1
			36	39	1	22.0	22.2	22.2
			75	0	1	22.0	22.1	22.2
		16QAM	1	0	1	22.0	22.5	22.5
			1	37	1	22.0	22.5	22.1
			1	74	1	22.0	22.4	22.4
			36	0	2	21.0	21.2	21.2
			36	20	2	21.0	21.2	21.1
			36	39	2	21.0	21.2	21.1
			75	0	2	21.0	21.2	21.2
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						819 MHz	831.5 MHz	844 MHz
LTE Band 26	10	QPSK	1	0	0	23.0	23.3	23.0
			1	25	0	23.1	23.4	23.1
			1	49	0	23.0	23.2	23.0
			25	0	1	22.0	22.2	22.0
			25	12	1	22.0	22.2	22.1
			25	25	1	22.0	22.2	22.1
			50	0	1	22.0	22.2	22.1
		16QAM	1	0	1	22.0	22.5	22.0
			1	25	1	22.0	22.5	22.2
			1	49	1	22.0	22.5	22.0
			25	0	2	21.0	21.2	21.1
			25	12	2	21.0	21.2	21.2
			25	25	2	21.0	21.2	21.2
			50	0	2	21.0	21.2	21.1
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						816.5 MHz	831.5 MHz	846.5 MHz
LTE Band 26	5	QPSK	1	0	0	23.0	23.4	23.2
			1	12	0	23.0	23.3	23.2
			1	24	0	23.0	23.4	23.0
			12	0	1	22.0	22.2	22.1
			12	7	1	22.0	22.2	22.1
			12	13	1	22.0	22.1	22.0
			25	0	1	22.0	22.2	22.0
		16QAM	1	0	1	22.1	22.5	22.2
			1	12	1	22.5	22.5	22.1
			1	24	1	22.0	22.5	22.0
			12	0	2	21.0	21.3	21.1
			12	7	2	21.0	21.3	21.1
			12	13	2	21.0	21.3	21.1
			25	0	2	21.0	21.2	21.0

LTE Band 26 Measured Results (continued)

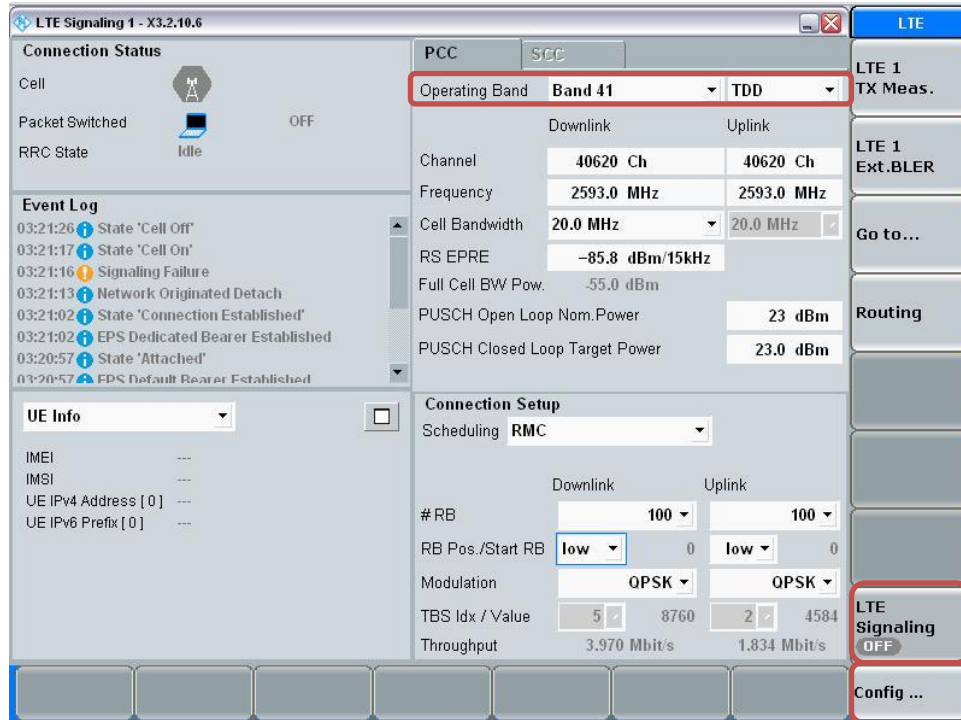
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						815.5 MHz	831.5 MHz	847.5 MHz
LTE Band 26	3	QPSK	1	0	0	23.0	23.3	23.2
			1	8	0	23.4	23.3	23.5
			1	14	0	23.0	23.3	23.0
			8	0	1	22.0	22.2	22.0
			8	4	1	22.0	22.2	22.1
			8	7	1	22.0	22.2	22.1
			15	0	1	22.0	22.2	22.1
		16QAM	1	0	1	22.0	22.5	22.2
			1	8	1	22.0	22.5	22.1
			1	14	1	22.0	22.5	22.0
			8	0	2	21.0	21.1	21.2
			8	4	2	21.0	21.1	21.3
			8	7	2	21.0	21.1	21.3
			15	0	2	21.0	21.2	21.0
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						814.7 MHz	831.5 MHz	848.3 MHz
LTE Band 26	1.4	QPSK	1	0	0	23.0	23.4	23.1
			1	3	0	23.0	23.3	23.1
			1	5	0	23.0	23.3	23.0
			3	0	0	23.0	23.2	23.1
			3	1	0	23.0	23.2	23.1
			3	3	0	23.0	23.2	23.0
			6	0	1	22.0	22.1	22.0
		16QAM	1	0	1	22.5	22.5	22.1
			1	3	1	22.0	22.5	22.2
			1	5	1	22.1	22.5	22.0
			3	0	1	22.0	22.3	22.2
			3	1	1	22.0	22.3	22.3
			3	3	1	22.1	22.4	22.2
			6	0	2	21.1	21.0	21.1

LTE Band 41 Measured Results

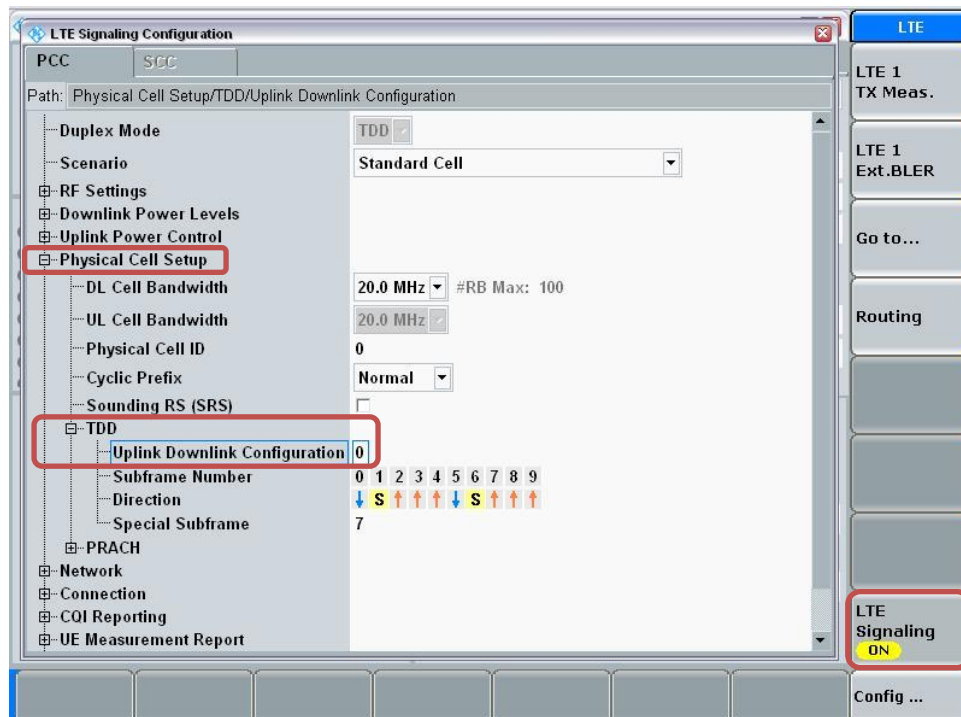
Procedure used to establish SAR test signal for LTE TDD Band 41

Set to CMW-500 with following parameters:

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

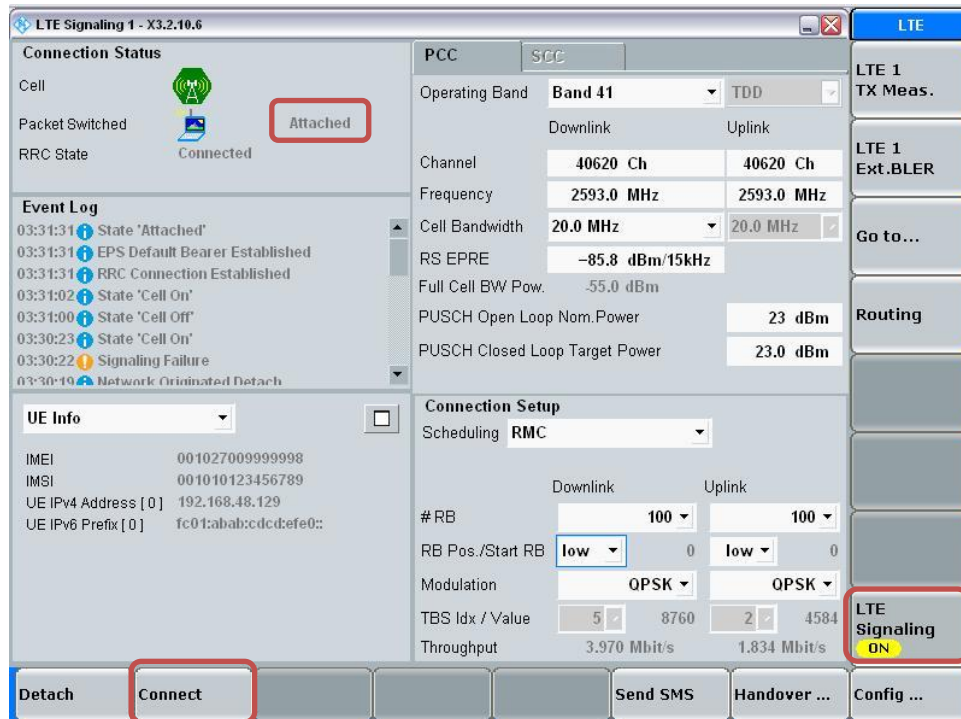


- Go to “Physical Cell Setup”
- Select “TDD” and Set “Uplink Downlink Configuration” to “0”
- Turn the cell on using “ON | OFF” key

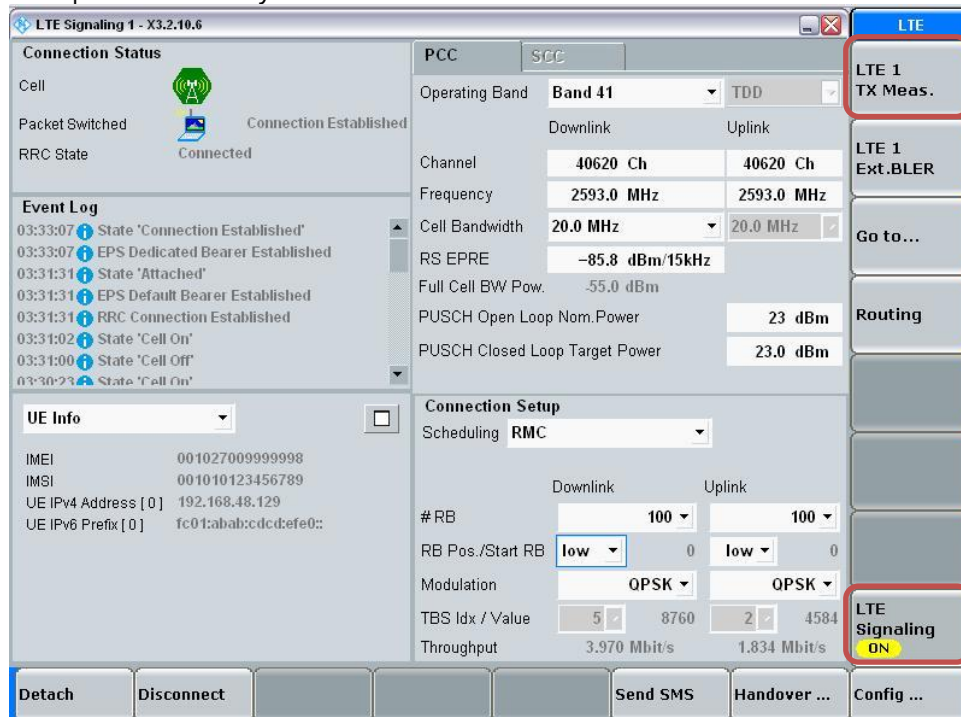


Connect to EUT

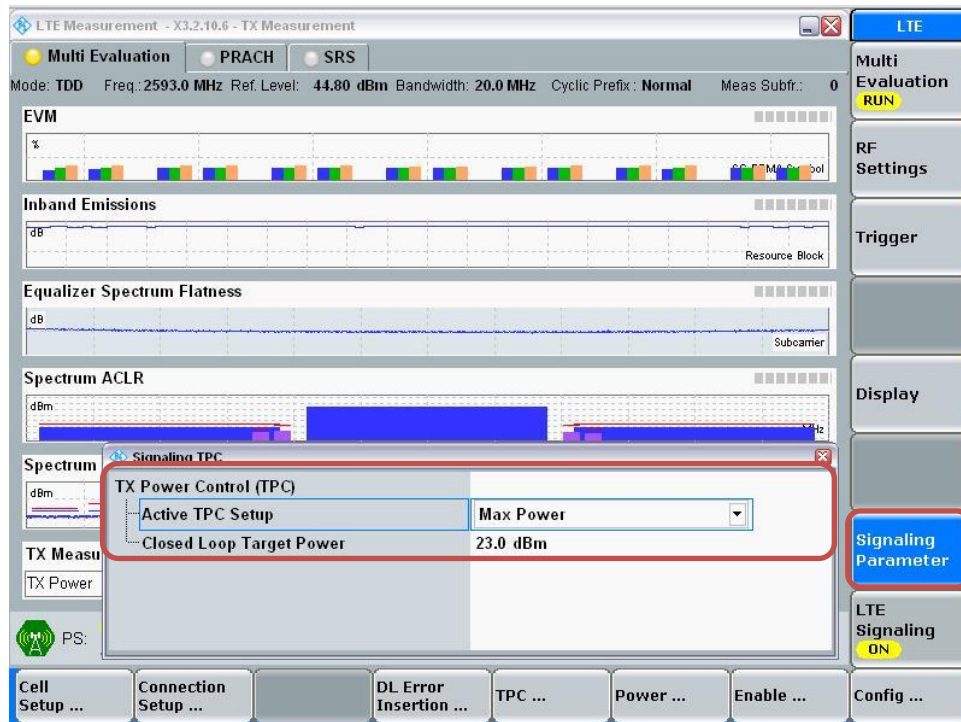
- Turn the cell on using “ON | OFF” key
- After EUT is Attached
- Select “Connect”

**Max Power Setting**

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



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



View TX Power

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



LTE Band 41 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						2506 MHz	2593 MHz	2680 MHz
LTE Band 41	20	QPSK	1	0	0	24.5	24.4	24.5
			1	49	0	24.2	24.4	24.5
			1	99	0	23.7	23.8	24.2
			50	0	1	23.5	23.5	23.5
			50	24	1	23.5	23.5	23.5
			50	50	1	23.2	23.4	23.5
			100	0	1	23.5	23.5	23.5
		16QAM	1	0	1	23.5	23.5	23.5
			1	49	1	23.5	23.5	23.5
			1	99	1	23.0	23.4	23.5
			50	0	2	22.5	22.5	22.3
			50	24	2	22.5	22.5	22.2
			50	50	2	22.2	22.5	22.1
			100	0	2	22.4	22.5	22.5
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						2503.5 MHz	2593 MHz	2682.5 MHz
LTE Band 41	15	QPSK	1	0	0	24.2	24.3	24.5
			1	37	0	24.1	24.0	24.4
			1	74	0	23.7	23.8	24.3
			36	0	1	23.5	23.5	23.2
			36	20	1	23.5	23.5	23.2
			36	39	1	23.4	23.5	23.5
			75	0	1	23.4	23.5	23.5
		16QAM	1	0	1	23.5	23.4	23.5
			1	37	1	23.5	23.5	23.5
			1	74	1	23.1	23.1	23.1
			36	0	2	22.5	22.5	22.5
			36	20	2	22.5	22.5	22.5
			36	39	2	22.4	22.4	22.5
			75	0	2	22.4	22.5	22.5
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						2501 MHz	2593 MHz	2685 MHz
LTE Band 41	10	QPSK	1	0	0	24.3	24.2	24.5
			1	25	0	24.3	24.2	24.5
			1	49	0	24.0	24.1	24.5
			25	0	1	23.5	23.5	23.5
			25	12	1	23.5	23.5	23.5
			25	25	1	23.5	23.4	23.5
			50	0	1	23.5	23.4	23.5
		16QAM	1	0	1	23.5	23.5	23.5
			1	25	1	23.4	23.5	23.5
			1	49	1	23.5	23.4	23.5
			25	0	2	22.5	22.5	22.5
			25	12	2	22.5	22.5	22.5
			25	25	2	22.4	22.4	22.5
			50	0	2	22.5	22.5	22.5

LTE Band 41 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						2498.5 MHz	2593 MHz	2687.5 MHz
LTE Band 41	5	QPSK	1	0	0	24.5	24.3	24.5
			1	12	0	24.1	24.3	24.3
			1	24	0	24.4	24.1	24.1
			12	0	1	23.5	23.4	23.4
			12	7	1	23.5	23.5	23.5
			12	13	1	23.5	23.4	23.4
			25	0	1	23.5	23.4	23.5
		16QAM	1	0	1	23.5	23.5	23.5
			1	12	1	23.5	23.5	23.5
			1	24	1	23.4	23.5	23.5
			12	0	2	22.5	22.5	22.5
			12	7	2	22.5	22.5	22.5
			12	13	2	22.5	22.5	22.5
			25	0	2	22.5	22.4	22.4

9.3.1. LTE Rel. 10 Carrier Aggregation

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

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)					
						LTE Band 41(Primary Cell)			LTE Band 41(Secondary Cell)		
						2506 MHz	2593 MHz	2680 MHz	2506 MHz	2593 MHz	2680 MHz
LTE Band 41	20	QPSK	1	0	0	24.38	24.38	24.50	Downlink Only		
			1	49	0	24.08	24.30	24.28			
			1	99	0	24.35	24.20	24.17			
			50	0	1	23.50	23.45	23.44			
			50	24	1	23.45	23.45	23.43			
			50	50	1	23.44	23.33	23.45			
			100	0	1	23.47	23.27	23.30			
		16QAM	1	0	1	23.45	23.49	23.47			
			1	49	1	23.47	23.47	23.44			
			1	99	1	23.42	23.38	23.47			
			50	0	2	22.50	21.35	22.48			
			50	24	2	22.48	22.50	22.45			
			50	50	2	22.47	22.47	22.43			
			100	0	2	22.50	22.43	22.40			

9.4. Wi-Fi 2.4GHz (DTS Band)

SISO

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Chain 0	Chain 1	Max Output Power (dBm)	SAR Test (Yes/No)
					Avg Pwr (dBm) (dBm)	Avg Pwr (dBm) (dBm)		
2.4	802.11b	1 Mbps	1	2412	14.5	15.0	15.5	Yes
			6	2437	15.4	15.3		
			11	2462	14.8	15.3		
	802.11g	6 Mbps	1	2412	Not Required	Not Required	12.5	No
			6	2437				
			11	2462				
	802.11n (HT20)	6.5 Mbps	1	2412	Not Required	Not Required	11.5	No
			6	2437				
			11	2462				

MIMO

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Chain 0	Chain 1	Chain 0 + Chain 1	Max Output Power (dBm)	SAR Test (Yes/No)
					Avg Pwr (dBm)	Avg Pwr (dBm)	Avg Pwr MIMO (dBm)		
2.4	802.11n (HT20)	6.5 Mbps	1	2412	10.2	9.7	13.0	14.5	No
			6	2437	10.0	9.7	12.9		
			11	2462	9.8	9.5	12.7		

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

SISO

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Chain 0	Chain 1	Max Output Power (dBm)	SAR Test (Yes/No)
					Avg Pwr (dBm)	Avg Pwr (dBm)		
5.2 (U-NII 1)	802.11a	6 Mbps	36	5180	11.3	10.2	11.5	No
			40	5200	11.1	10.3		
			44	5220	11.0	10.2		
			48	5240	10.9	10.2		
	802.11n (HT20)	6.5 Mbps	36 ~ 48	5180 ~ 5240	Not Required	Not Required	10.5	No
	802.11n (HT40)	13.5 Mbps	38 ~ 46	5190 ~ 5230			10.5	No
	802.11ac (VHT20)	6.5 Mbps	36 ~ 48	5180 ~ 5240			10	No
	802.11ac (VHT40)	13.5 Mbps	38 ~ 46	5190 ~ 5230			10	No
	802.11ac (VHT80)	29.3 Mbps	42	5210			10	No
5.3 UNII-2A	802.11a	6 Mbps	52	5260	11.2	10.4	11.5	Yes
			56	5280	11.1	10.3		
			60	5300	11.0	10.4		
			64	5320	11.0	10.5		
	802.11n (HT20)	6.5 Mbps	52 ~ 64	5260 ~ 5320	Not Required	Not Required	10.5	No
	802.11n (HT40)	13.5 Mbps	54 ~ 62	5270 ~ 5310			10.5	No
	802.11ac (VHT20)	6.5 Mbps	52 ~ 64	5260 ~ 5320			10	No
	802.11ac (VHT40)	13.5 Mbps	54 ~ 62	5270 ~ 5310			10	No
	802.11ac (VHT80)	29.3 Mbps	58	5290			10	No
5.5 UNII-2C	802.11a	6 Mbps	100	5500	11.0	9.9	11.5	Yes
			104	5520	11.1	9.9		
			108	5540	11.0	9.8		
			112	5560	10.7	9.7		
			116	5580	10.6	9.9		
			120	5600	10.6	9.8		
			124	5620	10.6	9.8		
			128	5640	10.4	9.8		
			132	5660	10.3	9.8		
			136	5680	10.2	9.7		
			140	5700	10.1	9.6		
			144	5720	10.2	9.3		
	802.11n (HT20)	6.5 Mbps	100 ~ 144	5500 ~ 5720	Not Required	Not Required	10.5	No
	802.11n (HT40)	13.5 Mbps	102 ~ 142	5510 ~ 5710			10.5	No
	802.11ac (VHT20)	6.5 Mbps	100 ~ 144	5500 ~ 5720			10	No
	802.11ac (VHT40)	13.5 Mbps	102 ~ 142	5510 ~ 5710			10	No
	802.11ac (VHT80)	29.3 Mbps	106 ~ 138	5530 ~ 5690			10	No

Wi-Fi 5GHz SISO Measured Results (continued)

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Chain 0	Chain 1	Max Output Power (dBm)	SAR Test (Yes/No)
					Avg Pwr (dBm)	Avg Pwr (dBm)		
5.8 UNII-3 or §15.247	802.11a	6 Mbps	149	5745	10.4	9.8	11.5	Yes
			153	5765	10.2	9.8		
			157	5785	10.2	9.8		
			161	5805	10.0	9.8		
			165	5825	10.0	9.7		
	802.11n (HT20)	6.5 Mbps	149 ~ 165	5745 ~ 5825	Not Required	Not Required	10.5	No
	802.11n (HT40)	13.5 Mbps	151 ~ 159	5755 ~ 5795			10.5	No
	802.11ac (VHT20)	6.5 Mbps	149 ~ 165	5745 ~ 5825			10.0	No
	802.11ac (VHT40)	13.5 Mbps	151 ~ 159	5755 ~ 5795			10.0	No
	802.11ac (VHT80)	29.3 Mbps	155	5775			10.0	No

MIMO

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Chain 0	Chain 1	Chain 0 + Chain 1	Max Output Power (dBm)	SAR Test (Yes/No)
					Avg Pwr (dBm)	Avg Pwr (dBm)	Avg Pwr MIMO (dBm)		
5.2 (U-NII 1)	802.11n (HT20)	6.5 Mbps	36 ~ 48	5180 ~ 5240	Not Required	Not Required	Not Required	13.5	No
	802.11n (HT40)	13.5 Mbps	38	5190	9.8	8.7	12.3	13.5	Yes
			46	5230	10.0	8.9	12.4		
	802.11ac (VHT20)	6.5 Mbps	36 ~ 48	5180 ~ 5240	Not Required	Not Required	Not Required	13	No
	802.11ac (VHT40)	13.5 Mbps	38 ~ 46	5190 ~ 5230				13	No
	802.11ac (VHT80)	29.3 Mbps	42	5210				13	No
5.3 UNII-2A	802.11n (HT20)	6.5 Mbps	52 ~ 64	5260 ~ 5320	Not Required	Not Required	Not Required	13.5	No
	802.11n (HT40)	13.5 Mbps	54	5270	10.3	9.7	13.0	13.5	Yes
			62	5310	10.2	9.8	13.0		
	802.11ac (VHT20)	6.5 Mbps	52 ~ 64	5260 ~ 5320	Not Required	Not Required	Not Required	13	No
	802.11ac (VHT40)	13.5 Mbps	54 ~ 62	5270 ~ 5310				13	No
	802.11ac (VHT80)	29.3 Mbps	58	5290				13	No
5.5 UNII-2C	802.11n (HT20)	6.5 Mbps	100 ~ 144	5500 ~ 5720	Not Required	Not Required	Not Required	13.5	No
	802.11n (HT40)	13.5 Mbps	102	5510	10.2	9.4	12.8	13.5	Yes
			110	5550	10.1	9.3	12.7		
			118	5590	9.8	9.1	12.5		
			126	5630	9.7	8.9	12.3		
			134	5670	9.4	8.9	12.2		
			142	5710	9.3	8.7	12.0		
	802.11ac (VHT20)	6.5 Mbps	100 ~ 144	5500 ~ 5720	Not Required	Not Required	Not Required	13	No
	802.11ac (VHT40)	13.5 Mbps	102 ~ 142	5510 ~ 5710				13	No
	802.11ac (VHT80)	29.3 Mbps	106	5530				13	No
			122	5610					
			138	5690					
5.8 UNII-3 or §15.247	802.11n (HT20)	6.5 Mbps	149 ~ 165	5745 ~ 5825	Not Required	Not Required	Not Required	13.5	No
	802.11n (HT40)	13.5 Mbps	151	5755	9.6	9.0	12.3	13.5	Yes
			159	5795	9.6	8.8	12.2		
	802.11ac (VHT20)	6.5 Mbps	149 ~ 165	5745 ~ 5825	Not Required	Not Required	Not Required	13	No
	802.11ac (VHT40)	13.5 Mbps	151 ~ 159	5755 ~ 5795				13	No
	802.11ac (VHT80)	29.3 Mbps	155	5775				13	No

Note(s):

- Output Power and SAR measurement is not required for 802.11n HT20/HT40/HT80 channels when the specified tune-up tolerances for 802.11n HT20/HT40/HT80 are lower than 802.11a by more than ½ dB and the measured SAR is ≤ 1.2 W/Kg.
- When the same transmission mode configurations have the same maximum output power on the same channel for the 802.11 a/g/n/ac modes, the channel in the lower order/sequence 802.11 mode (i.e. a, g, n then ac) is selected.
- When the specified maximum output power is the same for both UNII band I and UNII band 2A, begin SAR measurement in UNII band 2A; and if the highest reported SAR for UNII band 2A is
 - ≤ 1.2 W/kg, SAR is not required for UNII band I
 - > 1.2 W/kg, both bands should be tested independently for SAR.

9.6. Bluetooth

Maximum tune-up tolerance limit is 11 dBm from the rated nominal maximum output power. This power level qualifies for exclusion of SAR testing.

10. Measured and Reported (Scaled) SAR Results

SAR Test Reduction criteria are as follows:

KDB 447498 D01 General RF Exposure Guidance:

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

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

KDB 648474 D04 Handset SAR:

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

Additional 1-g SAR testing at 5 mm is not required. For hotspot mode, 10-g extremity SAR is not required for the surfaces and edges since all 1-g reported SAR < 1.2 W/kg. (for Phablet only)

KDB 941225 D01 SAR test for 3G devices:

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

KDB 941225 D05 SAR for LTE Devices:

SAR test reduction is applied using the following criteria:

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

KDB 248227 D01 SAR meas for 802.11 v02:

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

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

- ≤ 0.4 W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and wireless mode combination within the frequency band or aggregated band. DSSS and OFDM configurations are considered separately according to the required SAR procedures.

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

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

10.1. GSM850

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	Voice	0	Left Touch	190	836.6	33.5	32.3	0.025	0.033	
			Left Tilt	190	836.6	33.5	32.3	0.014	0.018	
			Right Touch	190	836.6	33.5	32.3	0.042	0.055	
			Right Tilt	190	836.6	33.5	32.3	0.018	0.023	
Head VoIP	GPRS 4 Slots	0	Left Touch	190	836.6	28.5	28.5	0.046	0.046	
			Left Tilt	190	836.6	28.5	28.5	0.027	0.027	
			Right Touch	190	836.6	28.5	28.5	0.071	0.071	1
			Right Tilt	190	836.6	28.5	28.5	0.029	0.029	
Body-worn	Voice	10	Rear	190	836.6	33.5	32.3	0.145	0.190	
			Front	190	836.6	33.5	32.3	0.126	0.165	
Body-worn(VoIP) & Hotspot	GPRS 4 Slots	10	Rear	190	836.6	28.5	28.5	0.250	0.250	2
			Front	190	836.6	28.5	28.5	0.214	0.214	
Hotspot			Edge 3	190	836.6	28.5	28.5	0.120	0.120	

10.2. GSM1900

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	Voice	0	Left Touch	661	1880.0	30.5	29.8	0.064	0.074	
			Left Tilt	661	1880.0	30.5	29.8	0.018	0.021	
			Right Touch	661	1880.0	30.5	29.8	0.030	0.035	
			Right Tilt	661	1880.0	30.5	29.8	0.023	0.026	
Head VoIP	GPRS 4 Slots	0	Left Touch	661	1880.0	25.5	25.2	0.076	0.082	3
			Left Tilt	661	1880.0	25.5	25.2	0.024	0.026	
			Right Touch	661	1880.0	25.5	25.2	0.035	0.038	
			Right Tilt	661	1880.0	25.5	25.2	0.028	0.030	
Body-worn	Voice	10	Rear	512	1850.2	30.5	29.4	0.736	0.953	
				661	1880.0	30.5	29.8	0.843	0.984	
				810	1909.8	30.5	29.7	0.800	0.965	
			Front	512	1850.2	30.5	29.4	0.689	0.893	
				661	1880.0	30.5	29.8	0.796	0.929	
				810	1909.8	30.5	29.7	0.742	0.895	
Body-worn(VoIP) & Hotspot	GPRS 4 Slots	10	Rear	512	1850.2	25.5	24.8	0.788	0.919	
				661	1880.0	25.5	25.2	0.939	1.013	
				810	1909.8	25.5	25.2	0.949	1.019	4
			Front	512	1850.2	25.5	24.8	0.665	0.776	
				661	1880.0	25.5	25.2	0.847	0.914	
				810	1909.8	25.5	25.2	0.830	0.891	
Hotspot			Edge 3	661	1880.0	25.5	25.2	0.623	0.672	

10.3. W-CDMA Band V

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	Rel 99 RMC	0	Left Touch	4183	836.6	24.0	23.9	0.041	0.042	
			Left Tilt	4183	836.6	24.0	23.9	0.023	0.024	
			Right Touch	4183	836.6	24.0	23.9	0.067	0.069	5
			Right Tilt	4183	836.6	24.0	23.9	0.027	0.028	
Body-worn & Hptspot	Rel 99 RMC	10	Rear	4183	836.6	24.0	23.9	0.267	0.276	6
			Front	4183	836.6	24.0	23.9	0.235	0.243	
Hotspot	Rel 99 RMC	10	Edge 3	4183	836.6	24.0	23.9	0.125	0.129	

10.4. W-CDMA Band II

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Power (dBm)		1-g SAR (W/kg)		Plot No.
						Tune-up limit	Meas.	Meas.	Scaled	
Head	Rel 99 RMC	10	Left Touch	9400	1880.0	23.5	22.8	0.046	0.054	7
			Left Tilt	9400	1880.0	23.5	22.8	0.016	0.018	
			Right Touch	9400	1880.0	23.5	22.8	0.023	0.027	
			Right Tilt	9400	1880.0	23.5	22.8	0.017	0.020	
Body-worn	Rel 99 RMC	15	Rear	9400	1880.0	23.5	22.8	0.393	0.460	
			Front	9400	1880.0	23.5	22.8	0.396	0.463	8
Hotspot	Rel 99 RMC	10	Rear	9400	1880.0	20.0	19.4	0.328	0.373	
			Front	9400	1880.0	20.0	19.4	0.336	0.382	
			Edge 3	9400	1880.0	20.0	19.4	0.242	0.275	

10.5. LTE Band 2 (20MHz Bandwidth)

SAR for LTE Band 2 is covered by LTE Band 25 due to similar frequency range, same maximum tune-up limit and same channel bandwidth.

10.6. LTE Band 4 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	20175	1732.5	1	0	22.5	22.5	0.117	0.117	9
						50	0	21.5	20.9	0.081	0.093	
			Left Tilt	20175	1732.5	1	0	22.5	22.5	0.070	0.070	
						50	0	21.5	20.9	0.048	0.055	
			Right Touch	20175	1732.5	1	0	22.5	22.5	0.104	0.104	
						50	0	21.5	20.9	0.071	0.082	
Body-worn	QPSK	15	Rear	20175	1732.5	1	0	22.5	22.5	0.509	0.509	
						50	0	21.5	20.9	0.347	0.397	
			Front	20175	1732.5	1	0	22.5	22.5	0.498	0.498	
						50	0	21.5	20.9	0.350	0.400	
Hotspot	QPSK	10	Rear	20175	1732.5	1	0	20.5	20.5	0.704	0.712	10
						50	0	20.5	19.9	0.593	0.683	
			Front	20175	1732.5	1	0	20.5	20.5	0.700	0.708	
						50	0	20.5	19.9	0.586	0.675	
			Edge 3	20175	1732.5	1	0	20.5	20.5	0.648	0.655	
						50	0	20.5	19.9	0.563	0.649	

10.7. LTE Band 5 (10MHz Bandwidth)

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

10.8. LTE Band 12 (10MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	23095	707.5	1	25	23.5	23.4	0.031	0.032	
						25	12	22.5	22.1	0.024	0.026	
			Left Tilt	23095	707.5	1	25	23.5	23.4	0.021	0.021	
						25	12	22.5	22.1	0.016	0.017	
			Right Touch	23095	707.5	1	25	23.5	23.4	0.042	0.043	11
						25	12	22.5	22.1	0.031	0.034	
Body-worn & Hotspot	QPSK	10	Rear	23095	707.5	1	25	23.5	23.4	0.181	0.187	12
						25	12	22.5	22.1	0.138	0.150	
			Front	23095	707.5	1	25	23.5	23.4	0.176	0.182	
						25	12	22.5	22.1	0.133	0.144	
Hotspot	QPSK	10	Edge 3	23095	707.5	1	25	23.5	23.4	0.068	0.070	
						25	12	22.5	22.1	0.052	0.056	

10.9. LTE Band 17 (10MHz Bandwidth)

SAR for LTE Band 17 is covered by LTE Band 12 due to similar frequency range, same maximum tune-up limit and same channel bandwidth.

10.10. LTE Band 25 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	26365	1882.5	1	0	23.0	22.4	0.051	0.059	13
						50	0	22.0	20.7	0.033	0.044	
			Left Tilt	26365	1882.5	1	0	23.0	22.4	0.018	0.021	
						50	0	22.0	20.7	0.010	0.014	
			Right Touch	26365	1882.5	1	0	23.0	22.4	0.025	0.028	
						50	0	22.0	20.7	0.017	0.022	
			Right Tilt	26365	1882.5	1	0	23.0	22.4	0.019	0.022	
						50	0	22.0	20.7	0.014	0.018	
Body-worn	QPSK	15	Rear	26365	1882.5	1	0	23.0	22.4	0.430	0.496	
						50	0	22.0	20.7	0.291	0.393	
			Front	26365	1882.5	1	0	23.0	22.4	0.417	0.481	
						50	0	22.0	20.7	0.291	0.393	
Hotspot	QPSK	10	Rear	26365	1882.5	1	0	20.5	20.5	0.654	0.654	14
						50	0	20.5	19.9	0.567	0.648	
			Front	26365	1882.5	1	0	20.5	20.5	0.622	0.622	
						50	0	20.5	19.9	0.532	0.608	
			Edge 3	26365	1882.5	1	0	20.5	20.5	0.365	0.365	
						50	0	20.5	19.9	0.241	0.276	

10.11. LTE Band 26 (15MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	26865	831.5	1	0	24.0	23.2	0.028	0.034	
						36	20	23.0	22.2	0.027	0.032	
			Left Tilt	26865	831.5	1	0	24.0	23.2	0.019	0.023	
						36	20	23.0	22.2	0.019	0.023	
			Right Touch	26865	831.5	1	0	24.0	23.2	0.044	0.053	15
						36	20	23.0	22.2	0.042	0.050	
			Right Tilt	26865	831.5	1	0	24.0	23.2	0.018	0.022	
						36	20	23.0	22.2	0.017	0.020	
Body-worn & Hotspot	QPSK	10	Rear	26865	831.5	1	0	24.0	23.2	0.196	0.236	16
						36	20	23.0	22.2	0.174	0.208	
			Front	26865	831.5	1	0	24.0	23.2	0.152	0.183	
						36	20	23.0	22.2	0.159	0.190	
Hotspot	QPSK	10	Edge 3	26865	831.5	1	0	24.0	23.2	0.086	0.103	
						36	20	23.0	22.2	0.093	0.111	

10.12. LTE Band 41 (20MHz Bandwidth)

RF Exposure Conditions	Mode	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	RB Allocation	RB offset	Power (dBm)		1-g SAR (W/kg)		Plot No.
								Tune-up limit	Meas.	Meas.	Scaled	
Head	QPSK	0	Left Touch	40620	2593.0	1	0	24.5	24.4	0.160	0.165	17
						50	0	23.5	23.5	0.123	0.123	
			Left Tilt	40620	2593.0	1	0	24.5	24.4	0.075	0.077	
						50	0	23.5	23.5	0.062	0.062	
			Right Touch	40620	2593.0	1	0	24.5	24.4	0.084	0.086	
						50	0	23.5	23.5	0.072	0.072	
			Right Tilt	40620	2593.0	1	0	24.5	24.4	0.105	0.108	
						50	0	23.5	23.5	0.096	0.096	
Body-worn & Hotspot	QPSK	10	Rear	39750	2506.0	1	0	24.5	24.5	0.528	0.533	
						50	0	23.5	23.5	0.477	0.477	
				40185	2549.5	1	0	24.5	24.2	0.697	0.741	
						50	0	23.5	23.5	0.670	0.670	
				40620	2593.0	1	0	24.5	24.4	0.776	0.799	
						50	0	23.5	23.5	0.679	0.679	
				41055	2636.5	1	0	24.5	24.3	0.597	0.632	
						50	0	23.5	23.5	0.563	0.563	
			Front	41490	2680.0	1	0	24.5	24.5	0.419	0.419	
						50	0	23.5	23.5	0.347	0.347	
				39750	2506.0	1	0	24.5	24.5	0.639	0.645	
						50	0	23.5	23.5	0.544	0.544	
				40185	2549.5	1	0	24.5	24.2	0.891	0.948	18
						50	0	23.5	23.5	0.736	0.736	
				40620	2593.0	1	0	24.5	24.4	0.839	0.864	
						50	0	23.5	23.5	0.794	0.794	
				41055	2636.5	1	0	24.5	24.3	0.747	0.791	
						50	0	23.5	23.5	0.623	0.623	
				41490	2680.0	1	0	24.5	24.5	0.477	0.477	
						50	0	23.5	23.5	0.391	0.391	
Hotspot	QPSK	10	Edge 3	40620	2593.0	1	0	24.5	24.4	0.019	0.019	
						50	0	23.5	23.5	0.019	0.019	
			Edge 4	40620	2593.0	1	0	24.5	24.4	0.435	0.448	
						50	0	23.5	23.5	0.395	0.395	

10.13. Wi-Fi (DTS Band)

SISO Chain 0 Measured Results

Mode	RF Exposure Conditions	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	
802.11b 1 Mbps	Head	0	Left Touch	6	2437.0	0.165	15.5	15.4			
			Left Tilt	6	2437.0	0.139	15.5	15.4			
			Right Touch	6	2437.0	0.357	15.5	15.4	0.265	0.271	
			Right Tilt	6	2437.0	0.300	15.5	15.4			
	Body-worn & Hotspot & Wi-Fi Direct	10	Rear	6	2437.0	0.111	15.5	15.4	0.079	0.080	
			Front	6	2437.0	0.091	15.5	15.4			
			Edge 1	6	2437.0	0.062	15.5	15.4			
			Edge 4	6	2437.0	0.064	15.5	15.4			

SISO Chain 1 Measured Results

Mode	RF Exposure Conditions	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	
802.11b 1 Mbps	Head	0	Left Touch	6	2437.0	0.220	15.5	15.3			
			Left Tilt	6	2437.0	0.328	15.5	15.3			
			Right Touch	6	2437.0	0.469	15.5	15.3			
			Right Tilt	6	2437.0	0.498	15.5	15.3	0.309	0.324	19
	Body-worn & Hotspot & Wi-Fi Direct	10	Rear	6	2437.0	0.097	15.5	15.3			
			Front	6	2437.0	0.088	15.5	15.3			
			Edge 1	6	2437.0	0.131	15.5	15.3	0.108	0.113	20
			Edge 4	6	2437.0	0.022	15.5	15.3			

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 Head 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.

10.14. Wi-Fi (U-NII Band)

SISO Measured Results

Frequency Band	Mode	RF Exposure Conditions	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Chain 0						Chain 1						Plot No.
							Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)				
								Tune-up limit	Meas.	Meas.	Scaled		Tune-up limit	Meas.	Meas.	Scaled			
5.3 GHz U-NII 2A	802.11n 6.5 Mbps	Head	0	Left Touch	52	5260.0	0.054	11.5	11.2			0.351	11.5	10.4					
				Left Tilt	52	5260.0	0.065	11.5	11.2			0.325	11.5	10.4					
				Right Touch	52	5260.0	0.146	11.5	11.2	0.068	0.072	0.748	11.5	10.4	0.364	0.469	21		
				Right Tilt	52	5260.0	0.125	11.5	11.2			0.455	11.5	10.4	0.272	0.350			
		Body-worn	10	Rear	52	5260.0	0.010	11.5	11.2			0.041	11.5	10.4					
				Front	52	5260.0	0.012	11.5	11.2	<0.001	<0.001	0.106	11.5	10.4	0.058	0.075	22		
Frequency Band	Mode	RF Exposure Conditions	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Plot No.		
								Tune-up limit	Meas.	Meas.	Scaled		Tune-up limit	Meas.	Meas.	Scaled			
5.5 GHz U-NII 2C	802.11n 6.5 Mbps	Head	0	Left Touch	104	5520.0	0.053	11.5	11.1			0.509	11.5	9.9	0.299	0.432			
				Left Tilt	104	5520.0	0.069	11.5	11.1			0.432	11.5	9.9	0.262	0.379			
				Right Touch	104	5520.0	0.248	11.5	11.1	0.098	0.107	0.584	11.5	9.9	0.424	0.613			
				Right Tilt	104	5520.0	0.351	11.5	11.1	0.155	0.169	0.640	11.5	9.9	0.437	0.632	23		
		Body-worn	10	Rear	104	5520.0	0.001	11.5	11.1	<0.001	<0.001	0.095	11.5	9.9	0.112	0.162	24		
				Front	104	5520.0	0.001	11.5	11.1			0.217	11.5	9.9					
Frequency Band	Mode	RF Exposure Conditions	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Area Scan Max. SAR (W/kg)	Power (dBm)		1-g SAR (W/kg)		Plot No.		
								Tune-up limit	Meas.	Meas.	Scaled		Tune-up limit	Meas.	Meas.	Scaled			
5.8 GHz U-NII 3	802.11n 13.5 Mbps	Head	0	Left Touch	149	5745.0	0.132	11.5	10.4			0.599	11.5	9.8	0.320	0.474			
				Left Tilt	149	5745.0	0.170	11.5	10.4			0.493	11.5	9.8	0.305	0.452			
				Right Touch	149	5745.0	0.256	11.5	10.4			0.698	11.5	9.8	0.444	0.658	25		
				Right Tilt	149	5745.0	0.422	11.5	10.4	0.205	0.266	0.622	11.5	9.8	0.409	0.606			
		Body-worn & Hotspot & Wi-Fi Direct	10	Rear	149	5745.0	0.003	11.5	10.4			0.033	11.5	9.8					
				Front	149	5745.0	0.001	11.5	10.4	<0.001	<0.001	0.095	11.5	9.8	0.040	0.059	26		
				Edge 1	149	5745.0	0.001	11.5	10.4			0.078	11.5	9.8					
				Edge 4	149	5745.0	0.000	11.5	10.4			0.006	11.5	9.8					

MIMO Measured Results

Frequency Band	Mode	RF Exposure Conditions	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Power (dBm)		Chain 0		Power (dBm)		Chain 1		Plot No.
								Tune-up limit	Meas.	1-g SAR (W/kg)		Tune-up limit	Meas.	1-g SAR (W/kg)		
										Meas.	Scaled			Meas.	Scaled	
5.3 GHz U-NII 2A	802.11n 13.5 Mbps	Head	0	Left Touch	54	5270.0	0.448	10.5	10.3	0.263	0.275	10.5	9.7	0.263	0.316	
				Left Tilt	54	5270.0	0.425	10.5	10.3			10.5	9.7			
				Right Touch	54	5270.0	0.789	10.5	10.3	0.465	0.487	10.5	9.7	0.465	0.559	27
				Right Tilt	54	5270.0	1.131	10.5	10.3	0.549	0.575	10.5	9.7	0.549	0.660	
		Body-worn	10	Rear	54	5270.0	0.055	10.5	10.3			10.5	9.7			
				Front	54	5270.0	0.124	10.5	10.3	0.061	0.064	10.5	9.7	0.061	0.073	28
Frequency Band	Mode	RF Exposure Conditions	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Power (dBm)		Chain 0		Power (dBm)		Chain 1		Plot No.
								Tune-up limit	Meas.	1-g SAR (W/kg)		Tune-up limit	Meas.	1-g SAR (W/kg)		
										Meas.	Scaled			Meas.	Scaled	
5.5 GHz U-NII 2C	802.11n 13.5 Mbps	Head	0	Left Touch	102	5510.0	0.521	10.5	10.2	0.304	0.326	10.5	9.4	0.304	0.392	
				Left Tilt	102	5510.0	0.491	10.5	10.2			10.5	9.4			
				Right Touch	102	5510.0	1.041	10.5	10.2	0.515	0.552	10.5	9.4	0.515	0.663	29
				Right Tilt	102	5510.0	0.970	10.5	10.2	0.471	0.505	10.5	9.4	0.471	0.607	
		Body-worn	10	Rear	102	5510.0	0.058	10.5	10.2			10.5	9.4			
				Front	102	5510.0	0.241	10.5	10.2	0.122	0.131	10.5	9.4	0.122	0.157	30
Frequency Band	Mode	RF Exposure Conditions	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Power (dBm)		Chain 0		Power (dBm)		Chain 1		Plot No.
								Tune-up limit	Meas.	1-g SAR (W/kg)		Tune-up limit	Meas.	1-g SAR (W/kg)		
										Meas.	Scaled			Meas.	Scaled	
5.8 GHz U-NII 3	802.11n 13.5 Mbps	Head	0	Left Touch	151	5755.0	0.426	10.5	9.6	0.227	0.279	10.5	9.0	0.227	0.321	
				Left Tilt	151	5755.0	0.422	10.5	9.6			10.5	9.0			
				Right Touch	151	5755.0	1.082	10.5	9.6	0.533	0.656	10.5	9.0	0.533	0.753	31
				Right Tilt	151	5755.0	0.911	10.5	9.6	0.530	0.652	10.5	9.0	0.530	0.749	
		Body-worn & Hotspot & Wi-Fi Direct	10	Rear	151	5755.0	0.048	10.5	9.6			10.5	9.0			
				Front	151	5755.0	0.142	10.5	9.6	0.078	0.096	10.5	9.0	0.078	0.110	32
				Edge 1	151	5755.0	0.083	10.5	9.6			10.5	9.0			
				Edge 4	151	5755.0	0.016	10.5	9.6			10.5	9.0			

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 Head 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.

10.15. Bluetooth

Standalone SAR Test Exclusion Considerations & Estimated SAR

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$, for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

- $f_{(\text{GHz})}$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

When the standalone SAR test exclusion is applied to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:

- $(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f_{(\text{GHz})}}/x]$ W/kg for test separation distances ≤ 50 mm;
where $x = 7.5$ for 1-g SAR, and $x = 18.75$ for 10-g SAR.
- 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distances is > 50 mm.

Body-worn Accessory Exposure Conditions

Max. tune-up tolerance limit		Min. test separation distance (mm)	Frequency (GHz)	SAR test exclusion Result*	Test Configuration	Estimated 1-g SAR (W/kg)
(dBm)	(mW)					
11.0	13	10	2.480	2.0	Rear/Front	0.273

Conclusion:

*: The computed value is < 3 ; therefore, Bluetooth qualifies for Standalone SAR test exclusion.

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
700	LTE Band 12	Body & Hotspot	Rear	No	0.181	N/A	N/A
850	GSM 850	Body & Hotspot	Rear	No	0.250	N/A	N/A
	WCDMA Band V	Body & Hotspot	Rear	No	0.267	N/A	N/A
	LTE Band 26	Body & Hotspot	Rear	No	0.196	N/A	N/A
1900	GSM 1900	Body & Hotspot	Rear	Yes	0.949	0.918	1.03
	WCDMA Band II	Body & Hotspot	Front	No	0.396	N/A	N/A
	LTE Band 25	Body	Front	No	0.654	N/A	N/A
1700	LTE Band 4	Hotspot	Rear	No	0.704	N/A	N/A
2400	Wi-Fi 802.11b/g/n	Head	Right Touch	No	0.309	N/A	N/A
2600	LTE Band 41	Body & Hotspot	Front	Yes	0.891	0.882	1.01
5300	Wi-Fi 802.11a/n/ac	Head	Right Tilt	No	0.549	N/A	N/A
5500	Wi-Fi 802.11a/n/ac	Head	Right Touch	No	0.515	N/A	N/A
5800	Wi-Fi 802.11a/n/ac	Head	Right Touch	No	0.533	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(Voice)	+	DTS	
	2	GSM(Voice)	+	U-NII	
	3	GSM(Voice)	+	DTS	+
	4	GSM(Voice)	+	U-NII	
	5	GSM(GPRS/EDGE)	+	DTS	
	6	GSM(GPRS/EDGE)	+	U-NII	
	7	GSM(GPRS/EDGE)	+	DTS	+
	8	GSM(GPRS/EDGE)	+	U-NII	
	9	W-CDMA	+	DTS	+
	10	W-CDMA	+	U-NII	
	11	LTE	+	DTS	
	12	LTE	+	U-NII	
Body-worn	13	GSM(Voice)	+	DTS	
	14	GSM(Voice)	+	U-NII	
	15	GSM(Voice)	+	BT	
	16	GSM(Voice)	+	DTS	+
	17	GSM(Voice)	+	U-NII	
	18	GSM(GPRS/EDGE)	+	DTS	
	19	GSM(GPRS/EDGE)	+	U-NII	
	20	GSM(GPRS/EDGE)	+	BT	
	21	GSM(GPRS/EDGE)	+	DTS	+
	22	GSM(GPRS/EDGE)	+	U-NII	
	23	W-CDMA	+	DTS	
	24	W-CDMA	+	U-NII	
	25	W-CDMA	+	BT	
	26	W-CDMA	+	DTS	+
	27	W-CDMA	+	U-NII	
	28	LTE	+	DTS	
Hotspot & Wi-Fi Direct	29	LTE	+	U-NII	
	30	GSM(GPRS/EDGE)	+	DTS	
	31	GSM(GPRS/EDGE)	+	U-NII	
	32	GSM(GPRS/EDGE)	+	DTS	+
	33	GSM(GPRS/EDGE)	+	U-NII	
	34	W-CDMA	+	DTS	
	35	W-CDMA	+	U-NII	
	36	W-CDMA	+	DTS	+
	37	W-CDMA	+	U-NII	

Notes:

1. DTS, U-NII supports Hotspot.
2. GPRS/EDGE, W-CDMA, LTE support Hotspot.
3. VoIP is supported in GPRS/EDGE, W-CDMA, LTE.
4. DTS Radio cannot transmit simultaneously with Bluetooth Radio.
5. U-NII Radio cannot transmit simultaneously with Bluetooth Radio.

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

RF Exposure conditions	① WWAN	② DTS		③ U-NII		④ BT	①+② WWAN + DTS		①+③ WWAN + U-NII		①+④ WWAN + BT		①+②+③ WWAN + DTS + U-NII	
		Chain 0	Chain 1	Chain 0	Chain 1		Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	0.071	0.271	0.324	0.266	0.658		0.342	No	0.337	No			1.000	No
Body-worn	0.250	0.080	0.113	0.001	0.162	0.273	0.363	No	0.251	No	0.523	No	0.492	No
Hotspot	0.250	0.080	0.113	0.001	0.059		0.363	No	0.251	No			0.389	No

MIMO

RF Exposure conditions	① WWAN	② DTS		③ U-NII	①+② WWAN + DTS MIMO		①+③ WWAN + U-NII MIMO	
		Chain 0	Chain 1		Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	0.071	0.271	0.324	0.753	0.666	No	0.824	No
Body-worn	0.250	0.080	0.113	0.157	0.443	No	0.407	No
Hotspot	0.250	0.080	0.113	0.110	0.443	No	0.360	No

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

RF Exposure conditions	① WWAN	② DTS		③ U-NII		④ BT	①+② WWAN + DTS		①+③ WWAN + U-NII		①+④ WWAN + BT		①+②+③ WWAN + DTS + U-NII	
		Chain 0	Chain 1	Chain 0	Chain 1		Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	0.082	0.271	0.324	0.266	0.658		0.353	No	0.348	No			1.011	No
Body-worn	1.019	0.080	0.113	0.001	0.162	0.273	1.132	No	1.020	No	1.292	No	1.261	No
Hotspot	1.019	0.080	0.113	0.001	0.059		1.132	No	1.020	No			1.158	No

MIMO

RF Exposure conditions	① WWAN	② DTS		③ U-NII	①+② WWAN + DTS MIMO		①+③ WWAN + U-NII MIMO	
		Chain 0	Chain 1		Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	0.082	0.271	0.324	0.753	0.677	No	0.835	No
Body-worn	1.019	0.080	0.113	0.157	1.212	No	1.176	No
Hotspot	1.019	0.080	0.113	0.110	1.212	No	1.129	No

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

SISO

RF Exposure conditions	① WWAN	② DTS		③ U-NII		④ BT	①+② WWAN + DTS		①+③ WWAN + U-NII		①+④ WWAN + BT		①+②+③ WWAN + DTS + U-NII	
		Chain 0	Chain 1	Chain 0	Chain 1		Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	0.069	0.271	0.324	0.266	0.658		0.340	No	0.335	No			0.998	No
Body-worn	0.276	0.080	0.113	0.001	0.162	0.273	0.389	No	0.277	No	0.549	No	0.518	No
Hotspot	0.276	0.080	0.113	0.001	0.059		0.389	No	0.277	No			0.415	No

MIMO

RF Exposure conditions	① WWAN	② DTS		③ U-NII	①+② WWAN + DTS MIMO		①+③ WWAN + U-NII MIMO	
		Chain 0	Chain 1		Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	0.069	0.271	0.324	0.753	0.664	No	0.822	No
Body-worn	0.276	0.080	0.113	0.157	0.469	No	0.433	No
Hotspot	0.276	0.080	0.113	0.110	0.469	No	0.386	No

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

SISO

RF Exposure conditions	① WWAN	② DTS		③ U-NII		④ BT	①+② WWAN + DTS		①+③ WWAN + U-NII		①+④ WWAN + BT		①+②+③ WWAN + DTS + U-NII	
		Chain 0	Chain 1	Chain 0	Chain 1		Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	0.054	0.271	0.324	0.266	0.658		0.325	No	0.320	No			0.983	No
Body-worn	0.463	0.080	0.113	0.001	0.162	0.273	0.576	No	0.464	No	0.736	No	0.705	No
Hotspot	0.382	0.080	0.113	0.001	0.059		0.495	No	0.383	No			0.521	No

MIMO

RF Exposure conditions	① WWAN	② DTS		③ U-NII	①+② WWAN + DTS MIMO		①+③ WWAN + U-NII MIMO	
		Chain 0	Chain 1		Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	0.054	0.271	0.324	0.753	0.649	No	0.807	No
Body-worn	0.463	0.080	0.113	0.157	0.656	No	0.620	No
Hotspot	0.382	0.080	0.113	0.110	0.575	No	0.492	No

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

SISO

RF Exposure conditions	① WWAN	② DTS		③ U-NII		④ BT	①+② WWAN + DTS		①+③ WWAN + U-NII		①+④ WWAN + BT		①+②+③ WWAN + DTS + U-NII	
		Chain 0	Chain 1	Chain 0	Chain 1		Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	0.117	0.271	0.324	0.266	0.658		0.388	No	0.383	No			1.046	No
Body-worn	0.509	0.080	0.113	0.001	0.162	0.273	0.622	No	0.510	No	0.782	No	0.751	No
Hotspot	0.712	0.080	0.113	0.001	0.059		0.825	No	0.713	No			0.851	No

MIMO

RF Exposure conditions	① WWAN	② DTS		③ U-NII	①+② WWAN + DTS MIMO		①+③ WWAN + U-NII MIMO	
		Chain 0	Chain 1		Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	0.117	0.271	0.324	0.753	0.712	No	0.870	No
Body-worn	0.509	0.080	0.113	0.157	0.702	No	0.666	No
Hotspot	0.712	0.080	0.113	0.110	0.905	No	0.822	No

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

SISO

RF Exposure conditions	① WWAN	② DTS		③ U-NII		④ BT	①+② WWAN + DTS		①+③ WWAN + U-NII		①+④ WWAN + BT		①+②+③ WWAN + DTS + U-NII	
		Chain 0	Chain 1	Chain 0	Chain 1		Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	0.043	0.271	0.324	0.266	0.658		0.314	No	0.309	No			0.972	No
Body-worn	0.187	0.080	0.113	0.001	0.162	0.273	0.300	No	0.188	No	0.460	No	0.429	No
Hotspot	0.187	0.080	0.113	0.001	0.059		0.300	No	0.188	No			0.326	No

MIMO

RF Exposure conditions	① WWAN	② DTS		③ U-NII	①+② WWAN + DTS MIMO		①+③ WWAN + U-NII MIMO	
		Chain 0	Chain 1		Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	0.043	0.271	0.324	0.753	0.638	No	0.796	No
Body-worn	0.187	0.080	0.113	0.157	0.380	No	0.344	No
Hotspot	0.187	0.080	0.113	0.110	0.380	No	0.297	No

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

SISO

RF Exposure conditions	① WWAN	② DTS		③ U-NII		④ BT	①+② WWAN + DTS		①+③ WWAN + U-NII		①+④ WWAN + BT		①+②+③ WWAN + DTS + U-NII	
		Chain 0	Chain 1	Chain 0	Chain 1		Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	0.059	0.271	0.324	0.266	0.658		0.330	No	0.325	No			0.988	No
Body-worn	0.496	0.080	0.113	0.001	0.162	0.273	0.609	No	0.497	No	0.769	No	0.738	No
Hotspot	0.654	0.080	0.113	0.001	0.059		0.767	No	0.655	No			0.793	No

MIMO

RF Exposure conditions	① WWAN	② DTS		③ U-NII	①+② WWAN + DTS MIMO		①+③ WWAN + U-NII MIMO	
		Chain 0	Chain 1		Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	0.059	0.271	0.324	0.753	0.654	No	0.812	No
Body-worn	0.496	0.080	0.113	0.157	0.689	No	0.653	No
Hotspot	0.654	0.080	0.113	0.110	0.847	No	0.764	No

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

SISO

RF Exposure conditions	① WWAN	② DTS		③ U-NII		④ BT	①+② WWAN + DTS		①+③ WWAN + U-NII		①+④ WWAN + BT		①+②+③ WWAN + DTS + U-NII	
		Chain 0	Chain 1	Chain 0	Chain 1		Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	0.053	0.271	0.324	0.266	0.658		0.324	No	0.319	No			0.982	No
Body-worn	0.236	0.080	0.113	0.001	0.162	0.273	0.349	No	0.237	No	0.509	No	0.478	No
Hotspot	0.236	0.080	0.113	0.001	0.059		0.349	No	0.237	No			0.375	No

MIMO

RF Exposure conditions	① WWAN	② DTS		③ U-NII	①+② WWAN + DTS MIMO		①+③ WWAN + U-NII MIMO	
		Chain 0	Chain 1		Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	0.053	0.271	0.324	0.753	0.648	No	0.806	No
Body-worn	0.236	0.080	0.113	0.157	0.429	No	0.393	No
Hotspot	0.236	0.080	0.113	0.110	0.429	No	0.346	No

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

SISO

RF Exposure conditions	① WWAN	② DTS		③ U-NII		④ BT	① + ② WWAN + DTS		① + ③ WWAN + U-NII		① + ④ WWAN + BT		① + ② + ③ WWAN + DTS + U-NII	
		Chain 0	Chain 1	Chain 0	Chain 1		Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	0.165	0.271	0.324	0.266	0.658		0.436	No	0.431	No			1.094	No
Body-worn	0.948	0.080	0.113	0.001	0.162	0.273	1.061	No	0.949	No	1.221	No	1.190	No
Hotspot	0.948	0.080	0.113	0.001	0.059		1.061	No	0.949	No			1.087	No

MIMO

RF Exposure conditions	① WWAN	② DTS		③ U-NII	① + ② WWAN + DTS MIMO		① + ③ WWAN + U-NII MIMO	
		Chain 0	Chain 1		Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)	Σ 1-g SAR (mW/g)	SPLSR (Yes/ No)
Head	0.165	0.271	0.324	0.753	0.760	No	0.918	No
Body-worn	0.948	0.080	0.113	0.157	1.141	No	1.105	No
Hotspot	0.948	0.080	0.113	0.110	1.141	No	1.058	No

Conclusion:

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

Appendixes

Refer to separated files for the following appendixes.

A_15K21155 SAR Photos & Ant. Locations

B_15K21155 SAR Highest Test Plots

C_15K21155 SAR System Check Plots

D_15K21155 SAR Tissue Ingredients

E_15K21155 SAR Probe Cal. Certificates

F_15K21155 SAR Dipole Cal. Certificates

END OF REPORT