FCC SAR Test Report

APPLICANT	:	Bullitt Group
EQUIPMENT	:	Rugged Smart Phone
BRAND NAME	:	CAT
MODEL NAME	:	S61
FCC ID	:	ZL5S61
STANDARD	:	FCC 47 CFR Part 2 (2.1093) ANSI/IEEE C95.1-1992 IEEE 1528-2013

We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and had been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by: Eric Huang / Manager

Approved by: Jones Tsai / Manager

Testing Laboratory
1190

SPORTON INTERNATIONAL INC.
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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA7D2711-02	Rev. 01	Initial issue of report	Apr. 18, 2018

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Bullitt Group, Rugged Smart Phone, S61**, are as follows.

Equipment Class	Frequency Band		Highest SAR Summary				Highest Simultaneous Transmission 1g SAR (W/kg)
			Head (Separation 0mm)	Body-worn (Separation 15mm)	Hotspot (Separation 10mm)	Product Specific (Separation 0mm)	
			1g SAR (W/kg)			10g SAR (W/kg)	
Licensed	GSM	GSM850	0.34	0.52	0.79		1.59
		GSM1900	0.68	0.55	0.93		
	WCDMA	WCDMA II	0.68	0.84	1.19	3.28	
		WCDMA IV	0.79	0.61	1.20		
		WCDMA V	0.34	0.57	0.89		
	LTE	LTE Band 4	0.73	0.57	1.18		
		LTE Band 5	0.22	0.36	0.71		
		LTE Band 7	0.57	0.43	1.14		
		LTE Band 12 / 17	0.13	0.29	0.37		
		LTE Band 13	0.17	0.33	0.45		
		LTE Band 2 / 25	0.78	0.63	1.15	3.02	
		LTE Band 26	0.12	0.23	0.41		
		LTE Band 66	0.76	0.52	1.05		
DTS	WLAN	2.4GHz WLAN	1.17	0.12	0.23		1.38
NII		5GHz WLAN	0.83	0.61	0.89	2.30	1.59
DSS	2.4GHz Band	Bluetooth	0.24	0.02	0.07		1.22
Date of Testing:			2018/3/16 ~ 2018/4/5				

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg for Partial-Body, 4.0 W/kg for Product Specific) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013 and FCC KDB publications.

2. Administration Data

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190) and the FCC designation No. TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC test.

Testing Laboratory	
Test Site	SPORTON INTERNATIONAL INC.
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Applicant	
Company Name	Bullitt Group
Address	One Valpy, Valpy Street, Reading, Berkshire, England RG1 1AR

Manufacturer	
Company Name	Compal Electronics, INC.
Address	No. 385, Yangguang St. Neihu District, Taipei City 11491, Taiwan, R.O.C

3. Guidance Applied

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards:

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 648474 D04 SAR Evaluation Considerations for Wireless Handsets v01r03
- FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02
- FCC KDB 941225 D01 3G SAR Procedures v03r01
- FCC KDB 941225 D05 SAR for LTE Devices v02r05
- FCC KDB 941225 D05A Rel.10 LTE SAR Test Guidance v01r02
- FCC KDB 941225 D06 Hotspot Mode SAR v02r01

4. Equipment Under Test (EUT) Information

4.1 General Information

Product Feature & Specification	
Equipment Name	Rugged Smart Phone
Brand Name	CAT
Model Name	S61
FCC ID	ZL5S61
IMEI Code	SIM1: 356180090001934 SIM2: 356180090001926
Wireless Technology and Frequency Range	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz WCDMA Band IV: 1712.4 MHz ~ 1752.6 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz LTE Band 2: 1850.7 MHz ~ 1909.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 7: 2502.5 MHz ~ 2567.5 MHz LTE Band 12: 699.7 MHz ~ 715.3 MHz LTE Band 13: 779.5 MHz ~ 784.5 MHz LTE Band 17: 706.5 MHz ~ 713.5 MHz LTE Band 25: 1850.7 MHz ~ 1914.3 MHz LTE Band 26: 814.7 MHz ~ 848.3 MHz LTE Band 66: 1710.7 MHz ~ 1779.3 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5720 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz NFC : 13.56 MHz
Mode	GSM/GPRS/EGPRS/DTM RMC/AMR 12.2Kbps HSDPA HSUPA DC-HSDPA LTE: QPSK, 16QAM, 64QAM WLAN 2.4GHz : 802.11b/g/n HT20 WLAN 5GHz : 802.11a/n/ac HT20/HT40/VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE NFC:ASK
GSM / (E)GPRS Dual Transfer mode	Class A – EUT can support Packet Switched and Circuit Switched Network simultaneously.
EUT Stage	Identical Prototype

Remark:

1. This device 2.4GHz / 5.2GHz / 5.8GHz WLAN supports Hotspot operation.
2. The device has two SIM slots and supports Dual SIM Dual Standby. The WWAN radio transmission will be enabled by either one SIM at a time (Single active).
3. This device implements antenna tuning techniques for several WWAN (cellular) operating modes and frequencies for the purpose of improving antenna efficiency over a broad range of frequencies. Specifically, this technique is employed in the GSM, WCDMA and LTE modes but not supports LTE B7. In this report SAR was measured according to the normally required SAR configurations with the tuner active and worst tune state (auto tune) was used for SAR testing and this design will provide the highest power at different user scenarios and would not influence to the antenna characteristics other than impedance matching. The detail descriptions of the antenna tuner are included in the operational description and supplemental data for additional information on section16.
4. When the hotspot function is active, the device reduces output power on the GSM1900, WCDMA B2 and LTE B2/B25.

S61 has 2 different Variant	
Sample1	Dual SIM
Sample2	Single SIM
Dual SIM to Single SIM choose by SIM tray HW detection to select by image setting.(Two setting, by HW detection pin to trigger)	

Remark: All test items were performed with Sample 1

4.2 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05	
FCC ID	ZL5S61
Equipment Name	Rugged Smart Phone
Operating Frequency Range of each LTE transmission band	LTE Band 2: 1850.7 MHz ~ 1909.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 7: 2502.5 MHz ~ 2567.5 MHz LTE Band 12: 699.7 MHz ~ 715.3 MHz LTE Band 13: 779.5 MHz ~ 784.5 MHz LTE Band 17: 706.5 MHz ~ 713.5 MHz LTE Band 25: 1850.7 MHz ~ 1914.3 MHz LTE Band 26: 814.7 MHz ~ 848.3 MHz LTE Band 66: 1710.7 MHz ~ 1779.3 MHz
Channel Bandwidth	LTE Band 02:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 04:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 05:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 07: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 12:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 13: 5MHz, 10MHz LTE Band 17: 5MHz, 10MHz LTE Band 25:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 26:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz LTE Band 66:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz
uplink modulations used	QPSK / 16QAM / 64QAM
LTE Voice / Data requirements	Voice and Data
LTE MPR permanently built-in by design	**Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3** Modulation | Channel bandwidth / Transmission bandwidth (N_{RB}) 1.4 MHz | 3.0 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | MPR (dB) QPSK | > 5 | > 4 | > 8 | > 12 | > 16 | > 18 | ≤ 1 16 QAM | ≤ 5 | ≤ 4 | ≤ 8 | ≤ 12 | ≤ 16 | ≤ 18 | ≤ 1 16 QAM | > 5 | > 4 | > 8 | > 12 | > 16 | > 18 | ≤ 2 64 QAM | ≤ 5 | ≤ 4 | ≤ 8 | ≤ 12 | ≤ 16 | ≤ 18 | ≤ 2 64 QAM | > 5 | > 4 | > 8 | > 12 | > 16 | > 18 | ≤ 3 256 QAM | ≥ 1 | ≤ 5
LTE A-MPR	In the base station simulator configuration, Network Setting value is set to NS_01 to disable A-MPR during SAR testing and the LTE SAR tests was transmitting on all TTI frames (Maximum TTI)
Spectrum plots for RB configuration	A properly configured base station simulator was used for the SAR and power measurement; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.
Power reduction applied to satisfy SAR compliance	1. Yes, when operating in hotspot mode that LTE B2 / B25 power reduction applied to satisfy SAR compliance.
LTE Carrier Aggregation Combinations	Inter-Band and Intra-Band possible combinations and the detail power verification please referred to section 12.
LTE Carrier Aggregation Additional Information	1. This device supports LTE Carrier Aggregation (CA) in the uplink for LTE Band 7 with two component carriers in the uplink. SAR Measurements and conducted powers were evaluated per FCC Guidance. 2. This device supports maximum of 3 carriers in the downlink and 2 carriers in the uplink. Additional following LTE Release features are not supported: Relay, HetNet, Enhanced MIMO, eICI, WiFi Offloading, MDH, eMBMA, Cross-Carrier Scheduling, Enhanced SC-FDMA.

Transmission (H, M, L) channel numbers and frequencies in each LTE band												
LTE Band 2												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	18607	1850.7	18615	1851.5	18625	1852.5	18650	1855	18675	1857.5	18700	1860
M	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880
H	19193	1909.3	19185	1908.5	19175	1907.5	19150	1905	19125	1902.5	19100	1900
LTE Band 4												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	19957	1710.7	19965	1711.5	19975	1712.5	20000	1715	20025	1717.5	20050	1720
M	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5
H	20393	1754.3	20385	1753.5	20375	1752.5	20350	1750	20325	1747.5	20300	1745
LTE Band 5								
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20407	824.7	20415	825.5	20425	826.5	20450	829
M	20525	836.5	20525	836.5	20525	836.5	20525	836.5
H	20643	848.3	20635	847.5	20625	846.5	20600	844
LTE Band 7								
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20775	2502.5	20800	2505	20825	2507.5	20850	2510
M	21100	2535	21100	2535	21100	2535	21100	2535
H	21425	2567.5	21400	2565	21375	2562.5	21350	2560
LTE Band 12								
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	23017	699.7	23025	700.5	23035	701.5	23060	704
M	23095	707.5	23095	707.5	23095	707.5	23095	707.5
H	23173	715.3	23165	714.5	23155	713.5	23130	711
LTE Band 13				
	Bandwidth 5 MHz		Bandwidth 10 MHz	
	Channel #	Freq.(MHz)	Channel #	Freq.(MHz)
L	23205	779.5	23230	782
M	23230	782		
H	23255	784.5		
LTE Band 17				
	Bandwidth 5 MHz		Bandwidth 10 MHz	
	Channel #	Freq.(MHz)	Channel #	Freq. (MHz)
L	23755	706.5	23780	709
M	23790	710	23790	710
H	23825	713.5	23800	711
LTE Band 25												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	26047	1850.7	26055	1851.5	26065	1852.5	26090	1855	26115	1857.5	26140	1860
M	26340	1880	26340	1880	26340	1880	26340	1880	26340	1880	26340	1880
H	26683	1914.3	26675	1913.5	26665	1912.5	26640	1910	26615	1907.5	26590	1905

LTE Band 26										
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	26697	814.7	26705	815.5	26715	816.5	26740	819	26765	821.5
M	26865	831.5	26865	831.5	26865	831.5	26865	831.5	26865	831.5
H	27033	848.3	27025	847.5	27015	846.5	26990	844	26965	841.5

LTE Band 66												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	131979	1710.7	131987	1711.5	131997	1712.5	132022	1715	132047	1717.5	132072	1720
M	132322	1745	132322	1745	132322	1745	132322	1745	132322	1745	132322	1745
H	132665	1779.3	132657	1778.5	132647	1777.5	132622	1775	132597	1772.5	132572	1770

5. RF Exposure Limits

5.1 Uncontrolled Environment

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

5.2 Controlled Environment

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. The exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Limits for Occupational/Controlled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

Limits for General Population/Uncontrolled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	1.6	4.0

1. Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.

6. Specific Absorption Rate (SAR)

6.1 Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

6.2 SAR Definition

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (ρ). The equation description is as below:

$$\mathbf{SAR} = \frac{\mathbf{d}}{\mathbf{dt}}\left(\frac{\mathbf{dW}}{\mathbf{dm}}\right) = \frac{\mathbf{d}}{\mathbf{dt}}\left(\frac{\mathbf{dW}}{\boldsymbol{\rho}\mathbf{dv}}\right)$$

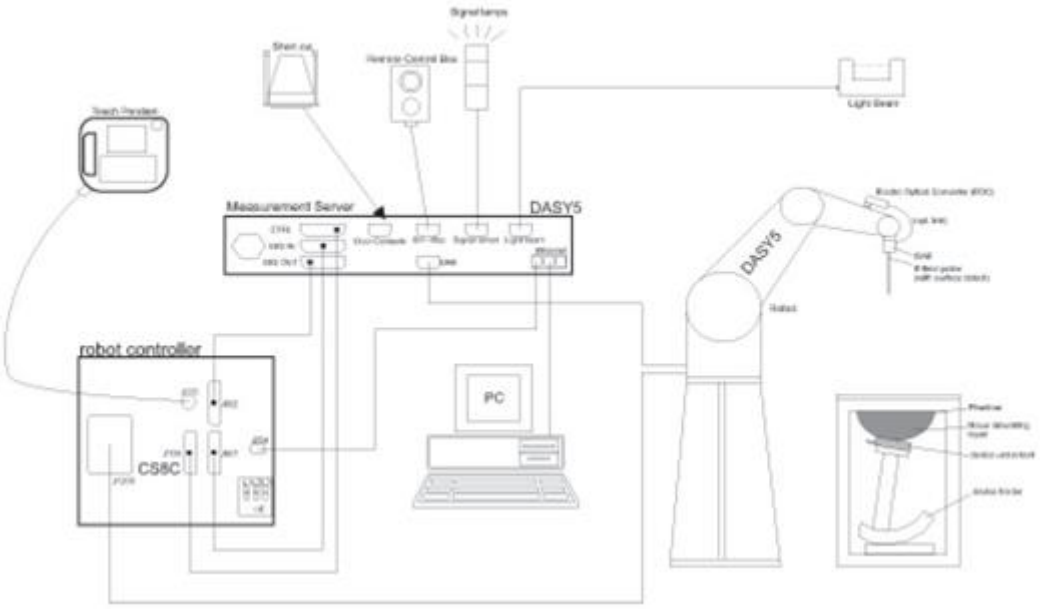
SAR is expressed in units of Watts per kilogram (W/kg)

$$\mathbf{SAR} = \frac{\boldsymbol{\sigma}|\mathbf{E}|^{\mathbf{2}}}{\boldsymbol{\rho}}$$

Where: σ is the conductivity of the tissue, ρ is the mass density of the tissue and E is the RMS electrical field strength.

7. System Description and Setup

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



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

7.1 E-Field Probe

The SAR measurement is conducted with the dosimetric probe (manufactured by SPEAG).The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency. This probe has a built in optical surface detection system to prevent from collision with phantom.

<ES3DV3 Probe>

Construction	Symmetric design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	10 MHz – 4 GHz; Linearity: ±0.2 dB (30 MHz – 4 GHz)	
Directivity	±0.2 dB in TSL (rotation around probe axis) ±0.3 dB in TSL (rotation normal to probe axis)	
Dynamic Range	5 µW/g – >100 mW/g; Linearity: ±0.2 dB	
Dimensions	Overall length: 337 mm (tip: 20 mm) Tip diameter: 3.9 mm (body: 12 mm) Distance from probe tip to dipole centers: 3.0 mm	

<EX3DV4 Probe>

Construction	Symmetric design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	10 MHz – >6 GHz Linearity: ±0.2 dB (30 MHz – 6 GHz)	
Directivity	±0.3 dB in TSL (rotation around probe axis) ±0.5 dB in TSL (rotation normal to probe axis)	
Dynamic Range	10 µW/g – >100 mW/g Linearity: ±0.2 dB (noise: typically <1 µW/g)	
Dimensions	Overall length: 337 mm (tip: 20 mm) Tip diameter: 2.5 mm (body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm	

7.2 Data Acquisition Electronics (DAE)

The data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock.

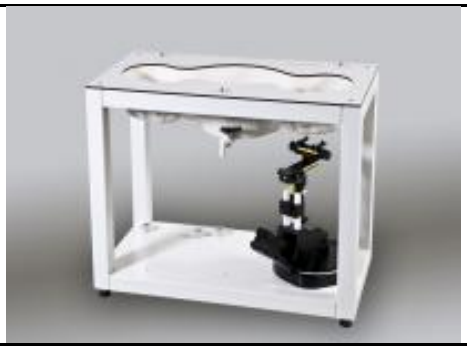
The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

Fig 5.1 Photo of DAE

7.3 Phantom

<SAM Twin Phantom>

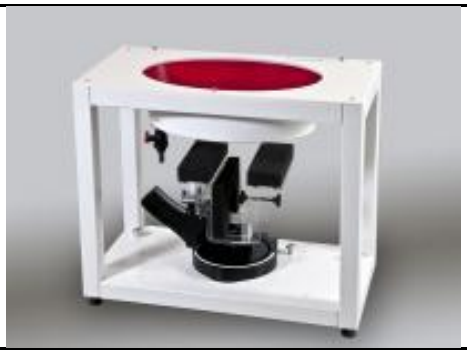
Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm
Filling Volume	Approx. 25 liters
Dimensions	Length: 1000 mm; Width: 500 mm; Height: adjustable feet
Measurement Areas	Left Hand, Right Hand, Flat Phantom



The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

<ELI Phantom>

Shell Thickness	2 ± 0.2 mm (sagging: <1%)
Filling Volume	Approx. 30 liters
Dimensions	Major ellipse axis: 600 mm Minor axis: 400 mm



The ELI phantom is intended for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI4 is fully compatible with standard and all known tissue simulating liquids.

7.4 Device Holder

<Mounting Device for Hand-Held Transmitter>

In combination with the Twin SAM V5.0/V5.0c or ELI phantoms, the Mounting Device for Hand-Held Transmitters enables rotation of the mounted transmitter device to specified spherical coordinates. At the heads, the rotation axis is at the ear opening. Transmitter devices can be easily and accurately positioned according to IEC 62209-1, IEEE 1528, FCC, or other specifications. The device holder can be locked for positioning at different phantom sections (left head, right head, flat). And upgrade kit to Mounting Device to enable easy mounting of wider devices like big smart-phones, e-books, small tablets, etc. It holds devices with width up to 140 mm.

Mounting Device for Hand-Held Transmitters

Mounting Device Adaptor for Wide-Phones

<Mounting Device for Laptops and other Body-Worn Transmitters>

The extension is lightweight and made of POM, acrylic glass and foam. It fits easily on the upper part of the mounting device in place of the phone positioned. The extension is fully compatible with the SAM Twin and ELI phantoms.

Mounting Device for Laptops

8. Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

(a) For WWAN power measurement, use base station simulator to configure EUT WWAN transmission in conducted connection with RF cable, at maximum power in each supported wireless interface and frequency band.
(b) Read the WWAN RF power level from the base station simulator.
(c) For WLAN/BT power measurement, use engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power in each supported wireless interface and frequency band
(d) Connect EUT RF port through RF cable to the power meter, and measure WLAN/BT output power

<SAR measurement>

(a) Use base station simulator to configure EUT WWAN transmission in radiated connection, and engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power, in the highest power channel.
(b) Place the EUT in the positions as Appendix D demonstrates.
(c) Set scan area, grid size and other setting on the DASY software.
(d) Measure SAR results for the highest power channel on each testing position.
(e) Find out the largest SAR result on these testing positions of each band
(f) Measure SAR results for other channels in worst SAR testing position if the reported SAR of highest power channel is larger than 0.8 W/kg

According to the test standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

(a) Power reference measurement
(b) Area scan
(c) Zoom scan
(d) Power drift measurement

8.1 Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the test standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The DASY software includes all numerical procedures necessary to evaluate the spatial peak SAR value.

The base for the evaluation is a "cube" measurement. The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.

The entire evaluation of the spatial peak values is performed within the post-processing engine (SEMCAD). The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

(a) Extraction of the measured data (grid and values) from the Zoom Scan
(b) Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
(c) Generation of a high-resolution mesh within the measured volume
(d) Interpolation of all measured values form the measurement grid to the high-resolution grid
(e) Extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
(f) Calculation of the averaged SAR within masses of 1g and 10g

8.2 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. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

8.3 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 found in the scanned area, within a range of the global maximum. The range (in dB0 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 FCC KDB 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz.

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

8.4 Zoom Scan

Zoom scans are used assess the peak spatial SAR values within a cubic averaging volume containing 1 gram and 10 gram of simulated tissue. The zoom scan measures points (refer to table below) within a cube shoes 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 gram and 10 gram and displays these values next to the job's label.

Zoom scan parameters extracted from FCC KDB 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz.

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

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

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

8.5 Volume Scan Procedures

The volume scan is used for assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the EUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing. When all volume scan were completed, the software, SEMCAD postprocessor can combine and subsequently superpose these measurement data to calculating the multiband SAR.

8.6 Power Drift Monitoring

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In DASY measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of EUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in dB. If the power drifts more than 5%, the SAR will be retested.

9. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	750MHz System Validation Kit	D750V3	1012	May. 22, 2017	May. 21, 2018
SPEAG	835MHz System Validation Kit	D835V2	499	Mar. 21, 2017	Mar. 20, 2018
SPEAG	1750MHz System Validation Kit	D1750V2	1068	Nov. 15, 2017	Nov. 14, 2018
SPEAG	1900MHz System Validation Kit	D1900V2	5d041	Sep. 28, 2017	Sep. 27, 2018
SPEAG	2450MHz System Validation Kit	D2450V2	736	Sep. 18, 2017	Sep. 17, 2018
SPEAG	2600MHz System Validation Kit	D2600V2	1008	Sep. 18, 2017	Sep. 17, 2018
SPEAG	5GHz System Validation Kit	D5GHzV2	1171	Jul. 18, 2017	Jul. 17, 2018
SPEAG	Data Acquisition Electronics	DAE4	1424	Jan. 18, 2018	Jan. 17, 2019
SPEAG	Data Acquisition Electronics	DAE4	1399	Nov. 16, 2017	Nov. 15, 2018
SPEAG	Data Acquisition Electronics	DAE4	778	May. 22, 2017	May. 21, 2018
SPEAG	Dosimetric E-Field Probe	EX3DV4	3925	May. 24, 2017	May. 23, 2018
SPEAG	Dosimetric E-Field Probe	ES3DV3	3270	Sep. 25, 2017	Sep. 24, 2018
SPEAG	Dosimetric E-Field Probe	EX3DV4	3931	Sep. 29, 2017	Sep. 28, 2018
Gencom	Thermometer	TE1	TM685-1	Mar. 16, 2018	Mar. 15, 2019
Gencom	Thermometer	TE1	TM685-2	Mar. 16, 2018	Mar. 15, 2019
Anritsu	Radio Communication Analyzer	MT8821C	6201341950	Apr. 20, 2017	Apr. 19, 2018
Agilent	Wireless Communication Test Set	E5515C	MY50266977	May. 30, 2017	May. 29, 2018
R&S	BT Base Station	CBT	100815	Feb. 05, 2018	Feb. 04, 2019
SPEAG	Device Holder	N/A	N/A	N/A	N/A
Anritsu	Signal Generator	MG3710A	6201502524	Dec. 07, 2017	Dec. 06, 2018
Agilent	ENA Network Analyzer	E5071C	MY46316648	Jan. 17, 2018	Jan. 16, 2019
SPEAG	Dielectric Probe Kit	DAK-3.5	1126	Sep. 26, 2017	Sep. 25, 2018
LINE SEIKI	Digital Thermometer	LKMelectronic	DTM3000SPEZIAL	Sep. 06, 2017	Sep. 05, 2018
Anritsu	Power Meter	ML2495A	1419002	May. 15, 2017	May. 14, 2018
Anritsu	Power Sensor	MA2411B	1339124	May. 15, 2017	May. 14, 2018
Anritsu	Power Meter	ML2495A	1218006	Oct. 06, 2017	Oct. 05, 2018
Anritsu	Power Sensor	MA2411B	1207363	Oct. 06, 2017	Oct. 05, 2018
Agilent	Spectrum Analyzer	E4408B	MY44211028	Aug. 23, 2017	Aug. 22, 2018
Anritsu	Spectrum Analyzer	MS2830A	6201396378	Jun. 26, 2017	Jun. 25, 2018
Mini-Circuits	Power Amplifier	ZVE-8G+	D120604	Mar. 12, 2018	Mar. 11, 2019
Mini-Circuits	Power Amplifier	ZHL-42W+	QA1344002	Mar. 12, 2018	Mar. 11, 2019
ATM	Dual Directional Coupler	C122H-10	P610410z-02	Note 1	
Woken	Attenuator 1	WK0602-XX	N/A	Note 1	
PE	Attenuator 2	PE7005-10	N/A	Note 1	
PE	Attenuator 3	PE7005- 3	N/A	Note 1	

General Note:

1. Prior to system verification and validation, the path loss from the signal generator to the system check source and the power meter, which includes the amplifier, cable, attenuator and directional coupler, was measured by the network analyzer. The reading of the power meter was offset by the path loss difference between the path to the power meter and the path to the system check source to monitor the actual power level fed to the system check source.

10. System Verification

10.1 Tissue Simulating Liquids

For the measurement of the field distribution inside the SAM phantom with DASY, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 10.1. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 10.2.

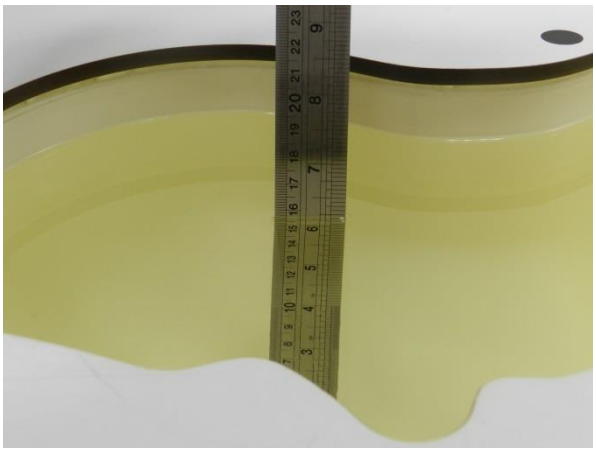


Fig 10.1Photo of Liquid Height for Head SAR

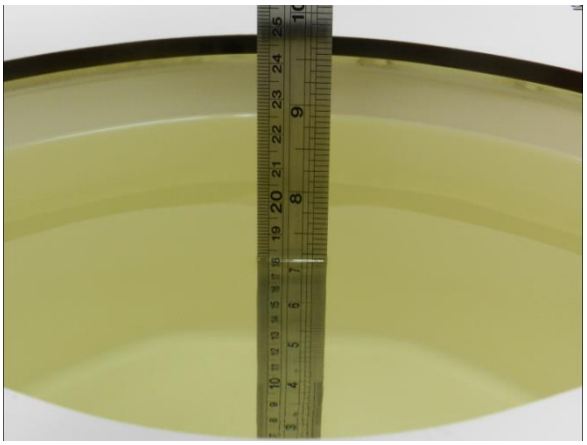


Fig 10.2 Photo of Liquid Height for Body SAR

10.2 Tissue Verification

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (εr)
For Head								
750	41.1	57.0	0.2	1.4	0.2	0	0.89	41.9
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
900	40.3	57.9	0.2	1.4	0.2	0	0.97	41.5
1800, 1900, 2000	55.2	0	0	0.3	0	44.5	1.40	40.0
2450	55.0	0	0	0	0	45.0	1.80	39.2
2600	54.8	0	0	0.1	0	45.1	1.96	39.0
For Body								
750	51.7	47.2	0	0.9	0.1	0	0.96	55.5
835	50.8	48.2	0	0.9	0.1	0	0.97	55.2
900	50.8	48.2	0	0.9	0.1	0	1.05	55.0
1800, 1900, 2000	70.2	0	0	0.4	0	29.4	1.52	53.3
2450	68.6	0	0	0	0	31.4	1.95	52.7
2600	68.1	0	0	0.1	0	31.8	2.16	52.5

Simulating Liquid for 5GHz, Manufactured by SPEAG

Ingredients	(% by weight)
Water	64~78%
Mineral oil	11~18%
Emulsifiers	9~15%
Additives and Salt	2~3%

<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
750	HSL	22.3	0.891	43.513	0.89	41.90	0.11	3.85	±5	2018/3/21
750	MSL	22.3	0.976	54.334	0.96	55.50	1.67	-2.10	±5	2018/3/18
750	MSL	22.3	0.964	54.133	0.96	55.50	0.42	-2.46	±5	2018/3/19
835	HSL	22.2	0.887	42.872	0.90	41.50	-1.44	3.31	±5	2018/3/20
835	MSL	22.3	0.977	55.890	0.97	55.20	0.72	1.25	±5	2018/3/18
835	MSL	22.6	0.963	56.844	0.97	55.20	-0.72	2.98	±5	2018/3/20
1750	HSL	22.6	1.373	41.294	1.37	40.10	0.22	2.98	±5	2018/3/23
1750	MSL	22.5	1.467	55.730	1.49	53.40	-1.54	4.36	±5	2018/3/20
1750	MSL	22.2	1.483	54.807	1.49	53.40	-0.47	2.63	±5	2018/3/22
1900	HSL	22.6	1.422	38.588	1.40	40.00	1.57	-3.53	±5	2018/3/23
1900	HSL	22.3	1.444	41.098	1.40	40.00	3.14	2.75	±5	2018/3/28
1900	MSL	22.5	1.548	51.645	1.52	53.30	1.84	-3.11	±5	2018/3/26
1900	MSL	22.3	1.561	54.028	1.52	53.30	2.70	1.37	±5	2018/3/28
2450	HSL	22.6	1.751	38.667	1.80	39.20	-2.72	-1.36	±5	2018/3/23
2450	HSL	22.7	1.831	39.060	1.80	39.20	1.72	-0.36	±5	2018/3/28
2450	MSL	22.5	1.974	51.146	1.95	52.70	1.23	-2.95	±5	2018/3/24
2450	MSL	22.2	2.022	54.466	1.95	52.70	3.69	3.35	±5	2018/3/28
2600	HSL	22.6	1.922	38.108	1.96	39.00	-1.94	-2.29	±5	2018/3/23
2600	MSL	22.6	2.222	52.708	2.16	52.50	2.87	0.40	±5	2018/3/22
5250	HSL	22.6	4.633	36.692	4.71	35.95	-1.63	2.06	±5	2018/4/5
5250	MSL	22.5	5.523	47.066	5.36	48.95	3.04	-3.85	±5	2018/4/5
5600	HSL	22.6	4.979	36.206	5.07	35.50	-1.79	1.99	±5	2018/3/16
5600	HSL	22.5	4.861	35.073	5.07	35.50	-4.12	-1.20	±5	2018/3/29
5600	MSL	22.5	5.966	46.391	5.77	48.50	3.40	-4.35	±5	2018/3/29
5750	HSL	22.6	5.139	36.006	5.22	35.35	-1.55	1.86	±5	2018/3/16
5750	MSL	22.5	6.165	46.111	5.94	48.28	3.79	-4.49	±5	2018/3/29

10.3 System Performance Check Results

Comparing to the original SAR value provided by SPEAG, the verification data should be within its specification of 10 %. Below table shows the target SAR and measured SAR after normalized to 1W input power. The table below indicates the system performance check can meet the variation criterion and the plots can be referred to Appendix A of this report.

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2018/3/21	750	HSL	250	D750V3-1012	ES3DV3 - SN3270	DAE4 Sn778	2.07	8.22	8.28	0.73
2018/3/18	750	MSL	250	D750V3-1012	ES3DV3 - SN3270	DAE4 Sn778	2.21	8.71	8.84	1.49
2018/3/19	750	MSL	250	D750V3-1012	ES3DV3 - SN3270	DAE4 Sn778	2.19	8.71	8.76	0.57
2018/3/20	835	HSL	250	D835V2-499	ES3DV3 - SN3270	DAE4 Sn778	2.29	9.45	9.16	-3.07
2018/3/18	835	MSL	250	D835V2-499	ES3DV3 - SN3270	DAE4 Sn778	2.52	9.67	10.08	4.24
2018/3/20	835	MSL	250	D835V2-499	EX3DV4 - SN3931	DAE4 Sn1399	2.49	9.67	9.96	3.00
2018/3/23	1750	HSL	250	D1750V2-1068	EX3DV4 - SN3931	DAE4 Sn1399	9.31	36.70	37.24	1.47
2018/3/20	1750	MSL	250	D1750V2-1068	ES3DV3 - SN3270	DAE4 Sn778	9.26	37.20	37.04	-0.43
2018/3/22	1750	MSL	250	D1750V2-1068	EX3DV4 - SN3931	DAE4 Sn1399	8.93	37.20	35.72	-3.98
2018/3/23	1900	HSL	250	D1900V2-5d041	EX3DV4 - SN3931	DAE4 Sn1399	10.80	40.50	43.20	6.67
2018/3/28	1900	HSL	250	D1900V2-5d041	EX3DV4 - SN3925	DAE4 Sn1424	11.00	40.50	44.00	8.64
2018/3/26	1900	MSL	250	D1900V2-5d041	EX3DV4 - SN3931	DAE4 Sn1399	10.10	40.70	40.40	-0.74
2018/3/28	1900	MSL	250	D1900V2-5d041	EX3DV4 - SN3925	DAE4 Sn1424	10.50	40.70	42.00	3.19
2018/3/23	2450	HSL	250	D2450V2-736	EX3DV4 - SN3931	DAE4 Sn1399	12.40	52.40	49.60	-5.34
2018/3/28	2450	HSL	250	D2450V2-736	EX3DV4 - SN3925	DAE4 Sn1424	12.70	52.40	50.80	-3.05
2018/3/24	2450	MSL	250	D2450V2-736	EX3DV4 - SN3931	DAE4 Sn1399	13.30	50.80	53.20	4.72
2018/3/28	2450	MSL	250	D2450V2-736	EX3DV4 - SN3925	DAE4 Sn1424	12.50	50.80	50.00	-1.57
2018/3/23	2600	HSL	250	D2600V2-1008	EX3DV4 - SN3931	DAE4 Sn1399	13.90	56.80	55.60	-2.11
2018/3/22	2600	MSL	250	D2600V2-1008	EX3DV4 - SN3931	DAE4 Sn1399	14.20	55.00	56.80	3.27
2018/4/5	5250	HSL	100	D5GHzV2-1171-5250	EX3DV4 - SN3925	DAE4 Sn1424	7.94	81.20	79.40	-2.22
2018/4/5	5250	MSL	100	D5GHzV2-1171-5250	EX3DV4 - SN3925	DAE4 Sn1424	8.23	78.10	82.30	5.38
2018/3/16	5600	HSL	100	D5GHzV2-1171-5600	EX3DV4 - SN3925	DAE4 Sn1424	8.59	84.90	85.90	1.18
2018/3/29	5600	HSL	100	D5GHzV2-1171-5600	EX3DV4 - SN3925	DAE4 Sn1424	8.39	84.90	83.90	-1.18
2018/3/29	5600	MSL	100	D5GHzV2-1171-5600	EX3DV4 - SN3925	DAE4 Sn1424	8.61	81.00	86.10	6.30
2018/3/16	5750	HSL	100	D5GHzV2-1171-5750	EX3DV4 - SN3925	DAE4 Sn1424	8.31	82.20	83.10	5.86
2018/3/29	5750	MSL	100	D5GHzV2-1171-5750	EX3DV4 - SN3925	DAE4 Sn1424	8.29	78.70	82.90	5.34

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 10g SAR (W/kg)	Targeted 10g SAR (W/kg)	Normalized 10g SAR (W/kg)	Deviation (%)
2018/3/26	1900	MSL	250	D1900V2-5d041	EX3DV4 - SN3931	DAE4 Sn1399	5.28	21.40	21.12	-1.31
2018/3/28	1900	MSL	250	D1900V2-5d041	EX3DV4 - SN3925	DAE4 Sn1424	5.50	21.40	22.00	2.80
2018/4/5	5250	MSL	100	D5GHzV2-1171-5250	EX3DV4 - SN3925	DAE4 Sn1424	2.24	21.80	22.40	2.75
2018/3/29	5600	MSL	100	D5GHzV2-1171-5600	EX3DV4 - SN3925	DAE4 Sn1424	2.29	22.80	22.90	0.44
2018/3/29	5750	MSL	100	D5GHzV2-1171-5750	EX3DV4 - SN3925	DAE4 Sn1424	2.18	21.90	21.80	-0.46

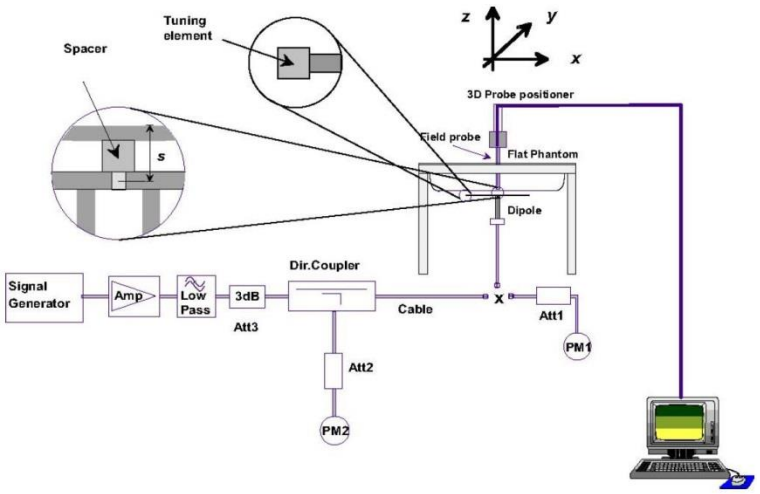


Fig 8.3.1 System Performance Check Setup

Fig 8.3.2 Setup Photo

11. RF Exposure Positions

11.1 Ear and handset reference point

Figure 9.1.1 shows the front, back, and side views of the SAM phantom. The center-of-mouth reference point is labeled “M,” the left ear reference point (ERP) is marked “LE,” and the right ERP is marked “RE.” Each ERP is 15 mm along the B-M (back-mouth) line behind the entrance-to-ear-canal (EEC) point, as shown in Figure 9.1.2 The Reference Plane is defined as passing through the two ear reference points and point M. The line N-F (neck-front), also called the reference pivoting line, is normal to the Reference Plane and perpendicular to both a line passing through RE and LE and the B-M line (see Figure 9.1.3). Both N-F and B-M lines should be marked on the exterior of the phantom shell to facilitate handset positioning. Posterior to the N-F line the ear shape is a flat surface with 6 mm thickness at each ERP, and forward of the N-F line the ear is truncated, as illustrated in Figure 9.1.2. The ear truncation is introduced to preclude the ear lobe from interfering with handset tilt, which could lead to unstable positioning at the cheek.

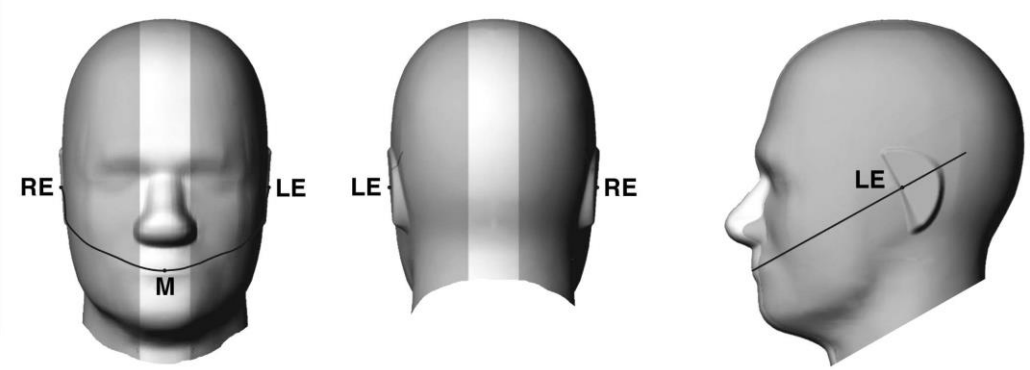


Fig 9.1.1 Front, back, and side views of SAM twin phantom

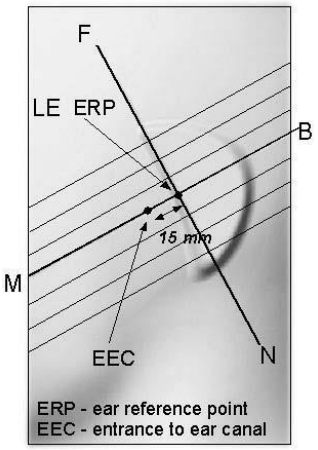


Fig 9.1.2 Close-up side view of phantom showing the ear region.

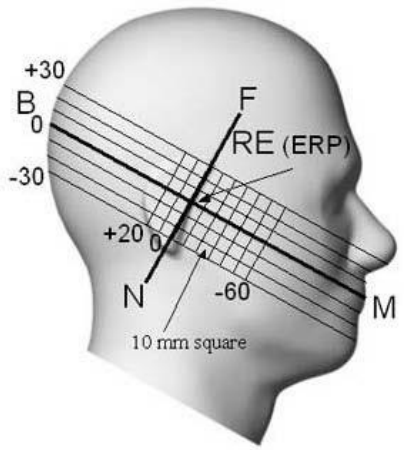


Fig 9.1.3 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

11.2 Definition of the cheek position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. Define two imaginary lines on the handset—the vertical centerline and the horizontal line. The vertical centerline passes through two points on the front side of the handset—the midpoint of the width wt of the handset at the level of the acoustic output (point A in Figure 9.2.1 and Figure 9.2.2), and the midpoint of the width wb of the bottom of the handset (point B). The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output (see Figure 9.2.1). The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front face of the handset (see Figure 9.2.2), especially for clamshell handsets, handsets with flip covers, and other irregularly-shaped handsets.
3. Position the handset close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 9.2.3), such that the plane defined by the vertical centerline and the horizontal line of the handset is approximately parallel to the sagittal plane of the phantom.
4. Translate the handset towards the phantom along the line passing through RE and LE until handset point A touches the pinna at the ERP.
5. While maintaining the handset in this plane, rotate it around the LE-RE line until the vertical centerline is in the plane normal to the plane containing B-M and N-F lines, i.e., the Reference Plane.
6. Rotate the handset around the vertical centerline until the handset (horizontal line) is parallel to the N-F line.
7. While maintaining the vertical centerline in the Reference Plane, keeping point A on the line passing through RE and LE, and maintaining the handset contact with the pinna, rotate the handset about the N-F line until any point on the handset is in contact with a phantom point below the pinna on the cheek. See Figure 9.2.3. The actual rotation angles should be documented in the test report.

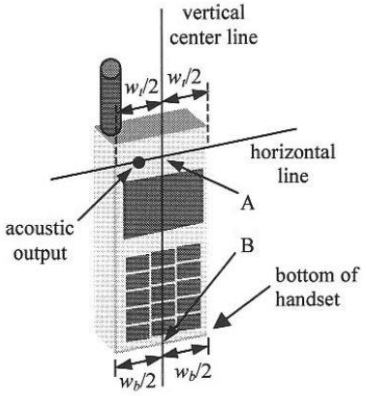


Fig 9.2.1 Handset vertical and horizontal reference lines—"fixed case

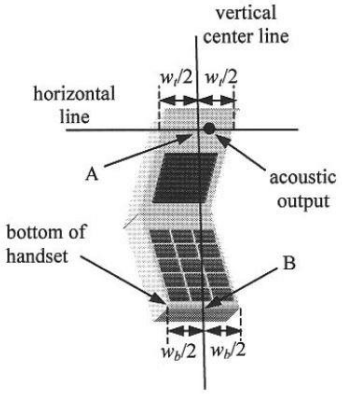


Fig 9.2.2 Handset vertical and horizontal reference lines—"clam-shell case"

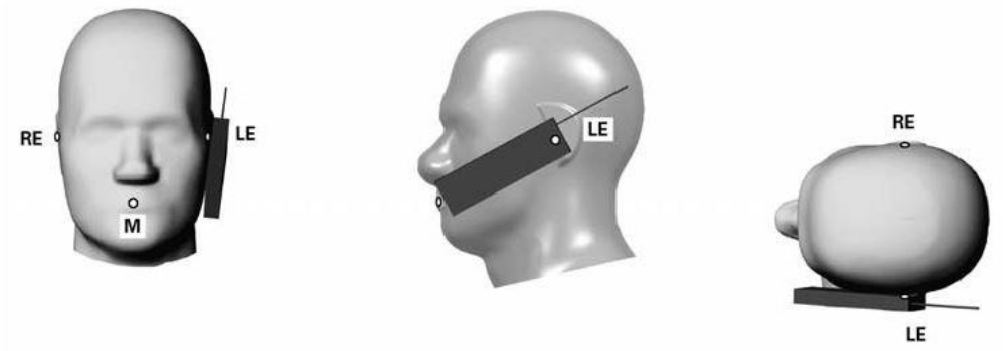


Fig 9.2.3 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

11.3 Definition of the tilt position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. While maintaining the orientation of the handset, move the handset away from the pinna along the line passing through RE and LE far enough to allow a rotation of the handset away from the cheek by 15°.
3. Rotate the handset around the horizontal line by 15°.
4. While maintaining the orientation of the handset, move the handset towards the phantom on the line passing through RE and LE until any part of the handset touches the ear. The tilt position is obtained when the contact point is on the pinna. See Figure 9.3.1. If contact occurs at any location other than the pinna, e.g., the antenna at the back of the phantom head, the angle of the handset should be reduced. In this case, the tilt position is obtained if any point on the handset is in contact with the pinna and a second point

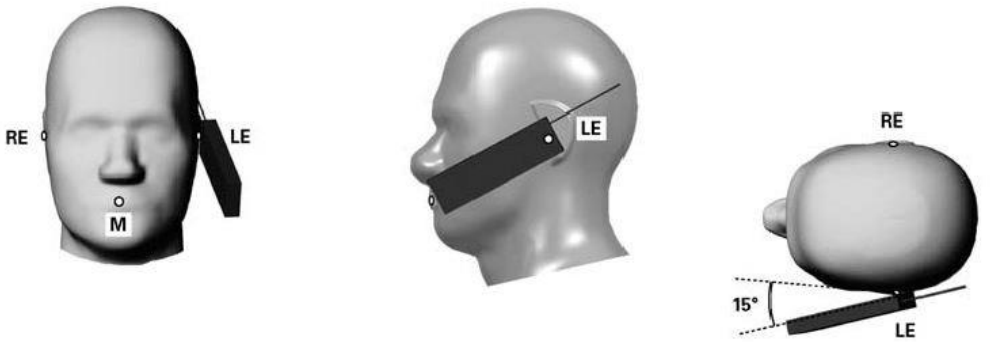


Fig 9.3.1 Tilt position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which define the Reference Plane for handset positioning, are indicated.

11.4 Body Worn Accessory

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Figure 9.4). Per KDB648474 D04v01r03, body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB 447498 D01v06 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. 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 handset attached to the handset.

Accessories for body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are test with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-chip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

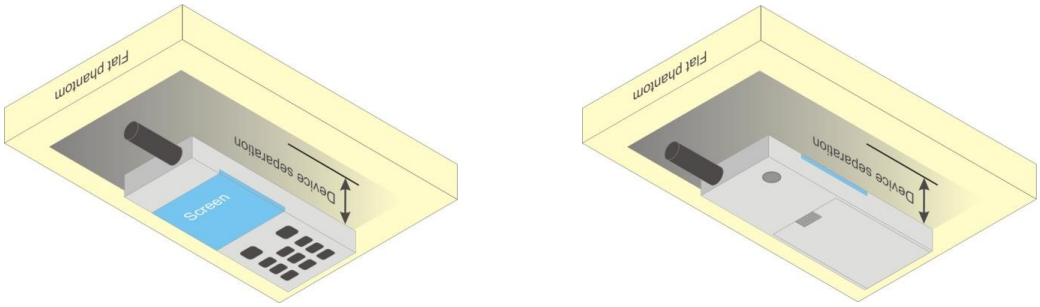


Fig 9.4 Body Worn Position

11.5 Product specific Exposure Configurations

For smart phones with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm that provide similar mobile web access and multimedia support found in mini-tablets or UMPC mini-tablets that support voice calls next to the ear, According to KDB648474 D04v01r03, the following phablet procedures should be applied to evaluate SAR compliance for each applicable wireless modes and frequency band. Devices marketed as phablets, regardless of form factors and operating characteristics must be tested as a phablet to determine SAR compliance

1. The normally required head and body-worn accessory SAR test procedures for handsets, including hotspot mode, must be applied.

2. The UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna located at ≤ 25 mm from that surface or edge, in direct contact with a flat phantom, for 10-g extremity SAR according to the body-equivalent tissue dielectric parameters in KDB 865664 to address interactive hand use exposure conditions.6 The UMPC mini-tablet 1-g SAR at 5 mm is not required. When hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg.

11.6 Wireless Router

Some battery-operated handsets have the capability to transmit and receive user through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06 v02r01 where SAR test considerations for handsets (L x W ≥ 9 cm x 5 cm) are based on a composite test separation distance of 10mm from the front, back and edges of the device containing transmitting antennas within 2.5cm of their edges, determined form general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions due to the limitations of the SAR assessment probes. Therefore, SAR must be evaluated for each frequency transmission and mode separately and spatially summed with the WIFI transmitter according to FCC KDB Publication 447498 D01v06 publication procedures. The “Portable Hotspot” feature on the handset was NOT activated during SAR assessments, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal at a time.

12. Conducted RF Output Power (Unit: dBm)

<GSM Conducted Power>

General Note:

1. For DTM multi-slot class mode, the device was linked with base station simulator (Agilent E5515C) and transmit maximum power on maximum number of TX slots, i.e. one CS timeslot, and additional PS timeslots (1 for DTM class 5 and 9, 2 for DTM class 11) in one TDMA frame.
2. Agilent E5515C was used to setup the device operated under DTM mode for power measurement and SAR testing. For conducted power, the power of the burst for voice and the power of the bursts for data was reported separately in the table above, and the frame-average power is derived below to determine SAR testing.

   *DTM frame average power (dBm) = 10*log [∑(power of each slot, in mW)/8]*
3. Per KDB 447498 D01v06, the maximum output power channel is used for SAR testing and for further SAR test reduction.
4. Per KDB 941225 D01v03r01, for SAR test reduction for GSM / GPRS / EDGE / DTM modes is determined by the source-based time-averaged output power including tune-up tolerance. The mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested. Therefore, the GPRS (4Tx slots) for GSM850/GSM1900 is considered as the primary mode.
5. Other configurations of GSM / GPRS / EDGE / DTM are considered as secondary modes. The 3G SAR test reduction procedure is applied, when the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode, SAR measurement is not required for the secondary mode
6. Power reduction which is triggered by hotspot mode is implemented in GSM1900 band, for hotspot mode SAR testing EUT was set in reduced power mode and GPRS 4 Tx slot due to its highest frame-average power.

<Default Power Mode>

GSM850		Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
TX Channel		128	189	251		128	189	251	
Frequency (MHz)		824.2	836.4	848.8		824.2	836.4	848.8	
GSM 1 Tx slot		33.20	33.26	33.70	34.00	24.20	24.26	24.70	25.00
GPRS 1 Tx slot		33.31	33.49	33.73	34.00	24.31	24.49	24.73	25.00
GPRS 2 Tx slots		30.79	30.87	31.20	31.50	24.79	24.87	25.20	25.50
GPRS 3 Tx slots		29.36	29.35	29.61	29.70	25.10	25.09	25.35	25.44
GPRS 4 Tx slots		27.94	28.05	28.30	28.50	24.94	25.05	25.30	25.50
EDGE 1 Tx slot		26.83	26.91	27.26	27.50	17.83	17.91	18.26	18.50
EDGE 2 Tx slots		26.55	26.87	27.01	27.30	20.55	20.87	21.01	21.30
EDGE 3 Tx slots		26.39	26.56	26.89	27.10	22.13	22.30	22.63	22.84
EDGE 4 Tx slots		26.06	26.40	26.60	26.90	23.06	23.40	23.60	23.90
DTM Multi-slot class 5	GSM 1 Tx slot	30.56	30.67	30.87	31.50	24.59	24.69	24.87	25.48
	GPRS 1 Tx slot	30.66	30.76	30.92	31.50				
DTM Multi-slot class 9	GSM 1 Tx slot	30.82	30.83	30.98	31.50	24.82	24.88	24.99	25.48
	GPRS 1 Tx slot	30.86	30.97	31.04	31.50				
DTM Multi-slot class 11	GSM 1 Tx slot	29.28	29.30	29.56	29.70	24.93	24.98	25.25	25.44
	GPRS 2 Tx slots	29.14	29.21	29.48	29.70				
DTM Multi-slot class 5	GSM 1 Tx slot	30.92	31.24	31.46	31.50	23.22	23.56	23.80	23.87
	EDGE 1 Tx slot	26.48	26.86	27.14	27.30				
DTM Multi-slot class 9	GSM 1 Tx slot	30.77	30.85	31.15	31.50	23.09	23.29	23.51	23.87
	EDGE 1 Tx slot	26.38	26.92	26.92	27.30				
DTM Multi-slot class 11	GSM 1 Tx slot	29.28	29.55	29.58	29.70	23.34	23.59	23.72	23.89
	EDGE 2 Tx slots	26.42	26.66	26.88	27.10				

GSM1900		Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
TX Channel		512	661	810		512	661	810	
Frequency (MHz)		1850.2	1880	1909.8		1850.2	1880	1909.8	
GSM 1 Tx slot		29.70	29.83	29.89	30.50	20.70	20.83	20.89	21.50
GPRS 1 Tx slot		29.73	29.86	29.92	30.50	20.73	20.86	20.92	21.50
GPRS 2 Tx slots		27.05	27.18	27.45	28.00	21.05	21.18	21.45	22.00
GPRS 3 Tx slots		25.43	25.55	25.61	26.00	21.17	21.29	21.35	21.74
GPRS 4 Tx slots		24.26	24.40	24.42	25.00	21.26	21.40	21.42	22.00
EDGE 1 Tx slot		25.35	25.40	25.50	26.00	16.35	16.40	16.50	17.00
EDGE 2 Tx slots		25.15	25.31	25.41	26.00	19.15	19.31	19.41	20.00
EDGE 3 Tx slots		25.00	25.11	25.30	25.50	20.74	20.85	21.04	21.24
EDGE 4 Tx slots		24.85	24.91	24.98	25.00	21.85	21.91	21.98	22.00
DTM Multi-slot class 5	GSM 1 Tx slot	27.01	27.27	27.44	28.00	20.90	21.21	21.34	21.98
	GPRS 1 Tx slot	26.82	27.20	27.28	28.00				
DTM Multi-slot class 9	GSM 1 Tx slot	26.95	27.15	27.42	28.00	20.88	21.17	21.32	21.98
	GPRS 1 Tx slot	26.85	27.24	27.25	28.00				
DTM Multi-slot class 11	GSM 1 Tx slot	25.40	25.48	25.60	26.00	20.78	20.91	20.99	21.74
	GPRS 2 Tx slots	24.84	25.01	25.07	26.00				
DTM Multi-slot class 5	GSM 1 Tx slot	26.53	26.65	26.86	28.00	19.90	19.98	20.18	21.09
	EDGE 1 Tx slot	25.22	25.23	25.43	26.00				
DTM Multi-slot class 9	GSM 1 Tx slot	27.03	27.17	27.40	28.00	19.95	20.07	20.25	21.09
	EDGE 1 Tx slot	24.56	24.64	24.75	26.00				
DTM Multi-slot class 11	GSM 1 Tx slot	24.90	25.04	25.11	26.00	20.73	20.83	20.91	21.41
	EDGE 2 Tx slots	25.03	25.12	25.20	25.50				

<Reduced Power Mode>

GSM1900		Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
TX Channel		512	661	810		512	661	810	
Frequency (MHz)		1850.2	1880	1909.8		1850.2	1880	1909.8	
GSM 1 Tx slot		29.81	29.90	28.89	30.00	20.81	20.90	19.89	21.00
GPRS 1 Tx slot		29.81	29.91	29.90	30.00	20.81	20.91	20.90	21.00
GPRS 2 Tx slots		26.20	26.39	26.59	27.00	20.20	20.39	20.59	21.00
GPRS 3 Tx slots		24.33	24.49	24.60	25.00	20.07	20.23	20.34	20.74
GPRS 4 Tx slots		23.05	23.22	23.45	24.00	20.05	20.22	20.45	21.00
EDGE 1 Tx slot		24.66	24.77	24.84	25.00	15.66	15.77	15.84	16.00
EDGE 2 Tx slots		24.23	24.34	24.46	25.00	18.23	18.34	18.46	19.00
EDGE 3 Tx slots		24.05	24.19	24.29	24.50	19.79	19.93	20.03	20.24
EDGE 4 Tx slots		23.81	23.90	24.00	24.00	20.81	20.90	21.00	21.00
DTM Multi-slot class 5	GSM 1 Tx slot	26.22	26.39	26.59	27.00	19.94	20.10	20.30	20.98
	GPRS 1 Tx slot	25.69	25.84	26.03	27.00				
DTM Multi-slot class 9	GSM 1 Tx slot	26.20	26.37	26.58	27.00	19.92	20.08	20.29	20.98
	GPRS 1 Tx slot	25.67	25.82	26.02	27.00				
DTM Multi-slot class 11	GSM 1 Tx slot	24.32	24.40	24.59	25.00	19.73	19.79	19.98	20.74
	GPRS 2 Tx slots	23.81	23.87	24.06	25.00				
DTM Multi-slot class 5	GSM 1 Tx slot	25.78	25.85	26.17	27.00	19.02	19.11	19.37	20.09
	EDGE 1 Tx slot	24.16	24.28	24.44	25.00				
DTM Multi-slot class 9	GSM 1 Tx slot	26.25	26.42	26.62	27.00	19.10	19.25	19.41	20.09
	EDGE 1 Tx slot	23.60	23.69	23.78	25.00				
DTM Multi-slot class 11	GSM 1 Tx slot	23.82	24.00	24.05	25.00	19.69	19.83	19.94	20.41
	EDGE 2 Tx slots	24.02	24.13	24.28	24.50				

<WCDMA Conducted Power>

1. The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification.
2. The procedures in KDB 941225 D01v03r01 are applied for 3GPP Rel. 6 HSPA to configure the device in the required sub-test mode(s) to determine SAR test exclusion.
3. For DC-HSDPA, the device was configured according to the H-Set 12, Fixed Reference Channel (FRC) configuration in Table C.8.1.12 of 3GPP TS 34.121-1, with the primary and the secondary serving HS-DSCH Cell enabled during the power measurement.

A summary of these settings are illustrated below:

HSDPA Setup Configuration:

a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting:
   i. Set Gain Factors (β_c and β_d) and parameters were set according to each
   ii. Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
   iii. Set RMC 12.2Kbps + HSDPA mode.
   iv. Set Cell Power = -86 dBm
   v. Set HS-DSCH Configuration Type to FRC (H-set 1, QPSK)
   vi. Select HSDPA Uplink Parameters
   vii. Set Delta ACK, Delta NACK and Delta CQI = 8
   viii. Set Ack-Nack Repetition Factor to 3
   ix. Set CQI Feedback Cycle (k) to 4 ms
   x. Set CQI Repetition Factor to 2
   xi. Power Ctrl Mode = All Up bits
d. The transmitted maximum output power was recorded.

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

Sub-test	β_c	β_d	β_d *(SF)*	β_c/β_d	β_{HS} *(Note1, Note 2)*	**CM** (dB) *(Note 3)*	**MPR** (dB) *(Note 3)*
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 *(Note 4)*	15/15 *(Note 4)*	64	12/15 *(Note 4)*	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c.

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

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

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

Setup Configuration

HSUPA Setup Configuration:

a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting * :
   i. Call Configs = 5.2B, 5.9B, 5.10B, and 5.13.2B with QPSK
   ii. Set the Gain Factors (β_c and β_d) and parameters (AG Index) were set according to each specific sub-test in the following table, C11.1.3, quoted from the TS 34.121
   iii. Set Cell Power = -86 dBm
   iv. Set Channel Type = 12.2k + HSPA
   v. Set UE Target Power
   vi. Power Ctrl Mode= Alternating bits
   vii. Set and observe the E-TFCI
   viii. Confirm that E-TFCI is equal to the target E-TFCI of 75 for sub-test 1, and other subtest's E-TFCI
d. The transmitted maximum output power was recorded.

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

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (Note 4) (Note 5)	β_{ed} (SF)	β_{ed} (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2) (Note 6)	AG Index (Note 5)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/225	1309/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed}1$: 47/15 $\beta_{ed}2$: 47/15	4 4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15	0	-	-	5/15	5/15	47/15	4	1	1.0	0.0	12	67

Note 1: For sub-test 1 to 4, Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c. For sub-test 5, Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 5/15 with β_{hs} = 5/15 * β_c.

Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH, HS- DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

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

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

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

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

Setup Configuration

DC-HSDPA 3GPP release 8 Setup Configuration:

a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration below
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting:
   i. Set RMC 12.2Kbps + HSDPA mode.
   ii. Set Cell Power = -25 dBm
   iii. Set HS-DSCH Configuration Type to FRC (H-set 12, QPSK)
   iv. Select HSDPA Uplink Parameters
   v. Set Gain Factors (β_c and β_d) and parameters were set according to each Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
      a). Subtest 1: β_c/β_d=2/15
      b). Subtest 2: β_c/β_d=12/15
      c). Subtest 3: β_c/β_d=15/8
      d). Subtest 4: β_c/β_d=15/4
   vi. Set Delta ACK, Delta NACK and Delta CQI = 8
   vii. Set Ack-Nack Repetition Factor to 3
   viii. Set CQI Feedback Cycle (k) to 4 ms
   ix. Set CQI Repetition Factor to 2
   x. Power Ctrl Mode = All Up bits
d. The transmitted maximum output power was recorded.

The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification.
A summary of these settings are illustrated below:

C.8.1.12 Fixed Reference Channel Definition H-Set 12

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.		

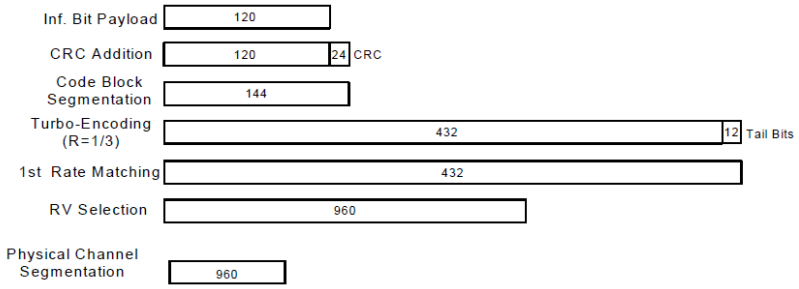


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

Setup Configuration

<WCDMA Conducted Power>

General Note:

1. Per KDB 941225 D01v03r01, for SAR testing is measured using a 12.2 kbps RMC with TPC bits configured to all "1's".
2. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. The maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA is ≤ ¼ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA, and according to the following RF output power, the output power results of the secondary modes (HSUPA, HSDPA, DC-HSDPA) are less than ¼ dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA.

<Default Power Mode>

Band		WCDMA II			Tune-up Limit (dBm)	WCDMA IV			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)
TX Channel		9262	9400	9538		1312	1413	1513		4132	4182	4233	
Rx Channel		9662	9800	9938		1537	1638	1738		4357	4407	4458	
Frequency (MHz)		1852.4	1880	1907.6		1712.4	1732.6	1752.6		826.4	836.4	846.6	
3GPP Rel 99	AMR 12.2Kbps	22.66	22.75	22.52	23.00	24.17	24.28	24.16	24.50	24.38	24.78	24.69	25.00
3GPP Rel 99	RMC 12.2Kbps	22.68	22.77	22.54	23.00	24.18	24.29	24.18	24.50	24.40	24.79	24.70	25.00
3GPP Rel 6	HSDPA Subtest-1	21.58	21.72	21.48	22.00	23.08	23.36	23.19	24.50	23.72	23.73	23.62	24.00
3GPP Rel 6	HSDPA Subtest-2	21.60	21.74	21.50	22.00	23.08	23.38	23.20	24.50	23.75	23.74	23.66	24.00
3GPP Rel 6	HSDPA Subtest-3	21.14	21.27	21.02	21.50	22.58	22.88	22.70	24.00	23.24	23.27	23.16	23.50
3GPP Rel 6	HSDPA Subtest-4	21.14	21.26	21.02	21.50	22.57	22.87	22.69	24.00	23.23	23.26	23.17	23.50
3GPP Rel 8	DC-HSDPA Subtest-1	21.58	21.68	21.43	22.00	22.98	23.34	23.12	24.50	23.66	23.67	23.62	24.00
3GPP Rel 8	DC-HSDPA Subtest-2	21.60	21.68	21.43	22.00	23.07	23.36	23.14	24.50	23.66	23.69	23.58	24.00
3GPP Rel 8	DC-HSDPA Subtest-3	21.07	21.26	20.95	21.50	22.57	22.80	22.62	24.00	23.24	23.27	23.11	23.50
3GPP Rel 8	DC-HSDPA Subtest-4	21.11	21.20	20.93	21.50	22.47	22.82	22.69	24.00	23.14	23.19	23.11	23.50
3GPP Rel 6	HSUPA Subtest-1	21.39	21.50	21.29	21.50	23.06	23.36	23.34	23.50	23.44	23.43	23.33	23.50
3GPP Rel 6	HSUPA Subtest-2	19.39	19.51	19.28	20.00	21.07	21.36	21.34	21.50	21.44	21.44	21.32	21.50
3GPP Rel 6	HSUPA Subtest-3	20.41	20.51	20.29	21.00	22.06	22.35	22.25	22.50	22.44	22.44	22.32	22.50
3GPP Rel 6	HSUPA Subtest-4	19.41	19.50	19.31	19.50	21.08	21.35	21.35	21.50	21.42	21.42	21.33	21.50
3GPP Rel 6	HSUPA Subtest-5	21.38	21.48	21.28	21.50	23.10	23.40	23.32	23.50	23.50	23.40	23.30	23.50

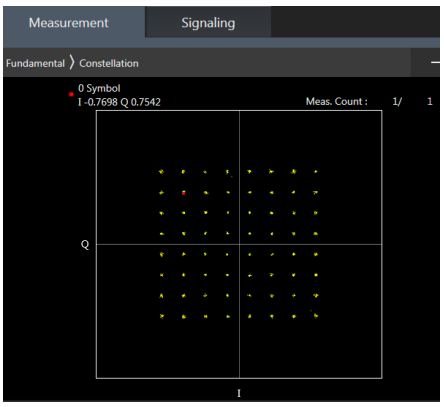
<Reduced Power Mode>

Band		WCDMA II			Tune-up Limit (dBm)
TX Channel		9262	9400	9538	
Rx Channel		9662	9800	9938	
Frequency (MHz)		1852.4	1880	1907.6	
3GPP Rel 99	AMR 12.2Kbps	20.56	20.70	20.50	21.50
3GPP Rel 99	RMC 12.2Kbps	20.58	20.72	20.51	21.50
3GPP Rel 6	HSDPA Subtest-1	19.71	19.83	19.58	20.50
3GPP Rel 6	HSDPA Subtest-2	19.74	19.86	19.64	20.50
3GPP Rel 6	HSDPA Subtest-3	19.20	19.34	19.13	20.00
3GPP Rel 6	HSDPA Subtest-4	19.23	19.36	19.11	20.00
3GPP Rel 8	DC-HSDPA Subtest-1	19.70	19.73	19.52	20.50
3GPP Rel 8	DC-HSDPA Subtest-2	19.65	19.80	19.67	20.50
3GPP Rel 8	DC-HSDPA Subtest-3	19.24	19.35	19.17	20.00
3GPP Rel 8	DC-HSDPA Subtest-4	19.32	19.35	19.10	20.00
3GPP Rel 6	HSUPA Subtest-1	19.76	19.86	19.60	20.00
3GPP Rel 6	HSUPA Subtest-2	17.74	17.86	17.63	18.50
3GPP Rel 6	HSUPA Subtest-3	18.71	18.81	18.62	19.50
3GPP Rel 6	HSUPA Subtest-4	17.77	17.86	17.65	18.00
3GPP Rel 6	HSUPA Subtest-5	19.80	19.90	19.60	20.00

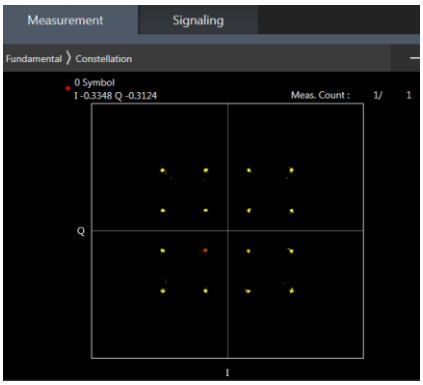
<LTE Conducted Power>

General Note:

1. Anritsu MT8820C base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.
2. Per KDB 941225 D05v02r05, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.
3. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
6. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
7. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
8. For LTE B4 / B5 / B12 / B17 / B26 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
9. LTE band 2 / 17 SAR test was covered by Band 25 / 12; according to April 2015 TCB workshop, SAR test for overlapping LTE bands can be reduced if
   a. the maximum output power, including tolerance, for the smaller band is ≤ the larger band to qualify for the SAR test exclusion
   b. the channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band
10. According to 2017 TCB workshop, for 64 QAM and 16 QAM should be verified by checking the signal constellation with a call box to avoid incorrect maximum power levels due to MPR and other requirements associated with signal modulation, and the following figure is taken from the "Fundamental Measurement >> Modulation Analysis >> constellation" mode of the device connect to the MT8821C base station, therefore, the device 64QAM and 16QAM signal modulation are correct.



64QAM



16QAM

Default Power Mode

<LTE Band 2>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				18700	18900	19100		
Frequency (MHz)				1860	1880	1900		
20	QPSK	1	0	22.78	22.82	22.68	23	0
20	QPSK	1	49	22.72	22.78	22.64		
20	QPSK	1	99	22.67	22.73	22.58		
20	QPSK	50	0	21.74	21.78	21.66	22	1
20	QPSK	50	24	21.73	21.76	21.61		
20	QPSK	50	50	21.67	21.75	21.58		
20	QPSK	100	0	21.69	21.77	21.68		
20	16QAM	1	0	21.90	22.00	21.89	22	1
20	16QAM	1	49	21.88	22.00	21.89		
20	16QAM	1	99	21.95	21.95	21.80		
20	16QAM	50	0	20.66	20.73	20.67	21	2
20	16QAM	50	24	20.72	20.77	20.58		
20	16QAM	50	50	20.68	20.74	20.57		
20	16QAM	100	0	20.66	20.74	20.71		
20	64QAM	1	0	20.85	20.99	20.82	21	2
20	64QAM	1	49	20.88	20.97	20.86		
20	64QAM	1	99	20.93	20.84	20.79		
20	64QAM	50	0	19.68	19.77	19.69	20	3
20	64QAM	50	24	19.73	19.80	19.61		
20	64QAM	50	50	19.70	19.76	19.63		
20	64QAM	100	0	19.70	19.79	19.71		
Channel				18675	18900	19125	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	22.80	22.75	22.75	23	0
15	QPSK	1	37	22.70	22.82	22.61		
15	QPSK	1	74	22.75	22.65	22.68		
15	QPSK	36	0	21.72	21.72	21.64	22	1
15	QPSK	36	20	21.74	21.70	21.56		
15	QPSK	36	39	21.60	21.83	21.68		
15	QPSK	75	0	21.60	21.77	21.74		
15	16QAM	1	0	21.87	21.93	21.79	22	1
15	16QAM	1	37	21.90	21.94	21.82		
15	16QAM	1	74	21.85	21.88	21.80		
15	16QAM	36	0	20.72	20.76	20.59	21	2
15	16QAM	36	20	20.71	20.75	20.52		
15	16QAM	36	39	20.76	20.75	20.66		
15	16QAM	75	0	20.64	20.67	20.71		
15	64QAM	1	0	20.75	20.98	20.79	21	2
15	64QAM	1	37	20.83	21.00	20.92		
15	64QAM	1	74	20.86	20.92	20.82		
15	64QAM	36	0	19.73	19.87	19.71	20	3
15	64QAM	36	20	19.66	19.77	19.64		
15	64QAM	36	39	19.69	19.70	19.64		
15	64QAM	75	0	19.80	19.75	19.71		

Channel				18650	18900	19150	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	22.73	22.81	22.74	23	0
10	QPSK	1	25	22.72	22.79	22.66		
10	QPSK	1	49	22.61	22.70	22.54		
10	QPSK	25	0	21.77	21.70	21.70	22	1
10	QPSK	25	12	21.80	21.84	21.62		
10	QPSK	25	25	21.57	21.70	21.51		
10	QPSK	50	0	21.75	21.68	21.58		
10	16QAM	1	0	21.80	21.98	21.79	22	1
10	16QAM	1	25	21.90	21.94	21.87		
10	16QAM	1	49	21.93	22.00	21.76		
10	16QAM	25	0	20.64	20.65	20.77	21	2
10	16QAM	25	12	20.82	20.69	20.48		
10	16QAM	25	25	20.64	20.77	20.52		
10	16QAM	50	0	20.72	20.72	20.64		
10	64QAM	1	0	20.84	21.00	20.88	21	2
10	64QAM	1	25	20.87	21.00	20.76		
10	64QAM	1	49	20.97	20.76	20.77		
10	64QAM	25	0	19.58	19.85	19.63	20	3
10	64QAM	25	12	19.82	19.80	19.57		
10	64QAM	25	25	19.65	19.86	19.64		
10	64QAM	50	0	19.62	19.75	19.65		
Channel				18625	18900	19175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	22.73	22.81	22.66	23	0
5	QPSK	1	12	22.81	22.79	22.71		
5	QPSK	1	24	22.64	22.64	22.49		
5	QPSK	12	0	21.61	21.72	21.61	22	1
5	QPSK	12	7	21.67	21.66	21.54		
5	QPSK	12	13	21.62	21.79	21.53		
5	QPSK	25	0	21.74	21.75	21.61		
5	16QAM	1	0	21.90	21.93	21.97	22	1
5	16QAM	1	12	21.90	21.91	21.94		
5	16QAM	1	24	21.94	21.93	21.86		
5	16QAM	12	0	20.63	20.78	20.73	21	2
5	16QAM	12	7	20.77	20.72	20.49		
5	16QAM	12	13	20.78	20.72	20.56		
5	16QAM	25	0	20.66	20.73	20.62		
5	64QAM	1	0	20.93	20.91	20.92	21	2
5	64QAM	1	12	20.95	20.93	20.96		
5	64QAM	1	24	20.90	20.81	20.86		
5	64QAM	12	0	19.62	19.78	19.67	20	3
5	64QAM	12	7	19.63	19.75	19.71		
5	64QAM	12	13	19.76	19.81	19.57		
5	64QAM	25	0	19.70	19.86	19.65		

Channel				18615	18900	19185	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	22.80	22.66	22.58	23	0
3	QPSK	1	8	22.71	22.72	22.54		
3	QPSK	1	14	22.64	22.76	22.56		
3	QPSK	8	0	21.62	21.77	21.73	22	1
3	QPSK	8	4	21.73	21.82	21.58		
3	QPSK	8	7	21.59	21.76	21.55		
3	QPSK	15	0	21.66	21.68	21.59		
3	16QAM	1	0	21.82	21.97	21.80	22	1
3	16QAM	1	8	21.80	21.99	21.91		
3	16QAM	1	14	21.93	21.86	21.74		
3	16QAM	8	0	20.63	20.78	20.61	21	2
3	16QAM	8	4	20.64	20.82	20.63		
3	16QAM	8	7	20.67	20.84	20.47		
3	16QAM	15	0	20.57	20.65	20.71		
3	64QAM	1	0	20.83	20.95	20.77	21	2
3	64QAM	1	8	20.93	20.94	20.92		
3	64QAM	1	14	20.93	20.93	20.70		
3	64QAM	8	0	19.75	19.84	19.72	20	3
3	64QAM	8	4	19.82	19.70	19.60		
3	64QAM	8	7	19.63	19.66	19.72		
3	64QAM	15	0	19.65	19.89	19.68		
Channel				18607	18900	19193	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3		
1.4	QPSK	1	0	22.41	22.65	22.46	23	0
1.4	QPSK	1	3	22.50	22.72	22.56		
1.4	QPSK	1	5	22.41	22.63	22.46		
1.4	QPSK	3	0	22.48	22.68	22.53		
1.4	QPSK	3	1	22.51	22.72	22.54		
1.4	QPSK	3	3	22.48	22.68	22.53		
1.4	QPSK	6	0	21.43	21.68	21.50	22	1
1.4	16QAM	1	0	21.65	21.88	21.70	22	1
1.4	16QAM	1	3	21.72	21.95	21.78		
1.4	16QAM	1	5	21.64	21.86	21.68		
1.4	16QAM	3	0	21.41	21.65	21.48		
1.4	16QAM	3	1	21.48	21.70	21.49		
1.4	16QAM	3	3	21.39	21.63	21.46		
1.4	16QAM	6	0	20.46	20.70	20.55	21	2
1.4	64QAM	1	0	20.64	20.85	20.70	21	2
1.4	64QAM	1	3	20.68	20.92	20.73		
1.4	64QAM	1	5	20.59	20.88	20.70		
1.4	64QAM	3	0	20.59	20.84	20.68		
1.4	64QAM	3	1	20.65	20.90	20.69		
1.4	64QAM	3	3	20.61	20.84	20.67		
1.4	64QAM	6	0	19.42	19.67	19.50	20	3

<LTE Band 4>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20050	20175	20300		
Frequency (MHz)				1720	1732.5	1745		
20	QPSK	1	0	23.92	24.18	24.32	24.5	0
20	QPSK	1	49	23.91	24.17	24.11		
20	QPSK	1	99	24.06	24.01	23.95		
20	QPSK	50	0	23.23	23.28	23.34	23.5	1
20	QPSK	50	24	23.15	23.27	23.25		
20	QPSK	50	50	23.22	23.27	23.20		
20	QPSK	100	0	23.12	23.25	23.26		
20	16QAM	1	0	23.06	23.32	23.41	23.5	1
20	16QAM	1	49	23.19	23.40	23.33		
20	16QAM	1	99	23.31	23.21	23.21		
20	16QAM	50	0	22.12	22.32	22.38	22.5	2
20	16QAM	50	24	22.24	22.35	22.29		
20	16QAM	50	50	22.29	22.31	22.27		
20	16QAM	100	0	22.18	22.29	22.26		
20	64QAM	1	0	22.02	22.32	22.39	22.5	2
20	64QAM	1	49	22.17	22.41	22.36		
20	64QAM	1	99	22.30	22.17	22.16		
20	64QAM	50	0	21.13	21.36	21.39	21.5	3
20	64QAM	50	24	21.25	21.38	21.34		
20	64QAM	50	50	21.33	21.34	21.30		
20	64QAM	100	0	21.21	21.32	21.26		
Channel				20025	20175	20325	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1732.5	1747.5		
15	QPSK	1	0	23.72	24.11	24.21	24.5	0
15	QPSK	1	37	24.04	24.25	24.06		
15	QPSK	1	74	24.06	24.03	23.98		
15	QPSK	36	0	22.95	23.33	23.34	23.5	1
15	QPSK	36	20	23.16	23.30	23.31		
15	QPSK	36	39	23.26	23.17	23.23		
15	QPSK	75	0	23.11	23.17	23.16		
15	16QAM	1	0	23.09	23.37	23.50	23.5	1
15	16QAM	1	37	23.25	23.46	23.38		
15	16QAM	1	74	23.33	23.21	23.27		
15	16QAM	36	0	22.09	22.37	22.40	22.5	2
15	16QAM	36	20	22.24	22.44	22.39		
15	16QAM	36	39	22.34	22.28	22.17		
15	16QAM	75	0	22.19	22.28	22.28		
15	64QAM	1	0	22.04	22.31	22.29	22.5	2
15	64QAM	1	37	22.21	22.46	22.37		
15	64QAM	1	74	22.40	22.25	22.17		
15	64QAM	36	0	21.09	21.33	21.45	21.5	3
15	64QAM	36	20	21.32	21.41	21.27		
15	64QAM	36	39	21.35	21.36	21.25		
15	64QAM	75	0	21.30	21.32	21.16		

Channel				20000	20175	20350	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1732.5	1750		
10	QPSK	1	0	24.03	24.19	24.27	24.5	0
10	QPSK	1	25	24.14	24.13	24.18		
10	QPSK	1	49	24.10	24.14	24.12		
10	QPSK	25	0	23.21	23.50	23.35	23.5	1
10	QPSK	25	12	23.22	23.50	23.36		
10	QPSK	25	25	23.19	23.46	23.22		
10	QPSK	50	0	23.22	23.47	23.34		
10	16QAM	1	0	23.23	23.50	23.48	23.5	1
10	16QAM	1	25	23.35	23.50	23.43		
10	16QAM	1	49	23.32	23.43	23.38		
10	16QAM	25	0	22.27	22.42	22.39	22.5	2
10	16QAM	25	12	22.31	22.45	22.43		
10	16QAM	25	25	22.26	22.40	22.29		
10	16QAM	50	0	22.27	22.42	22.40		
10	64QAM	1	0	22.21	22.50	22.45	22.5	2
10	64QAM	1	25	22.35	22.50	22.38		
10	64QAM	1	49	22.29	22.41	22.34		
10	64QAM	25	0	21.28	21.47	21.42	21.5	3
10	64QAM	25	12	21.30	21.48	21.42		
10	64QAM	25	25	21.25	21.44	21.28		
10	64QAM	50	0	21.30	21.45	21.42		
Channel				19975	20175	20375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1732.5	1752.5		
5	QPSK	1	0	23.74	24.09	24.20	24.5	0
5	QPSK	1	12	23.85	24.20	24.13		
5	QPSK	1	24	24.14	23.94	23.98		
5	QPSK	12	0	22.96	23.21	23.30	23.5	1
5	QPSK	12	7	23.14	23.35	23.30		
5	QPSK	12	13	23.24	23.17	23.18		
5	QPSK	25	0	23.22	23.24	23.30		
5	16QAM	1	0	23.00	23.27	23.31	23.5	1
5	16QAM	1	12	23.13	23.40	23.24		
5	16QAM	1	24	23.37	23.12	23.13		
5	16QAM	12	0	22.10	22.27	22.37	22.5	2
5	16QAM	12	7	22.34	22.26	22.19		
5	16QAM	12	13	22.38	22.41	22.31		
5	16QAM	25	0	22.10	22.20	22.19		
5	64QAM	1	0	22.12	22.32	22.42	22.5	2
5	64QAM	1	12	22.25	22.47	22.34		
5	64QAM	1	24	22.21	22.08	22.25		
5	64QAM	12	0	21.08	21.38	21.38	21.5	3
5	64QAM	12	7	21.24	21.36	21.42		
5	64QAM	12	13	21.26	21.41	21.34		
5	64QAM	25	0	21.27	21.40	21.27		

Channel				19965	20175	20385	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1732.5	1753.5		
3	QPSK	1	0	23.89	24.05	24.10	24.5	0
3	QPSK	1	8	23.93	24.07	24.08		
3	QPSK	1	14	24.01	24.03	23.99		
3	QPSK	8	0	22.93	23.32	23.40	23.5	1
3	QPSK	8	4	23.12	23.33	23.23		
3	QPSK	8	7	23.13	23.33	23.24		
3	QPSK	15	0	23.11	23.17	23.15		
3	16QAM	1	0	23.01	23.28	23.41	23.5	1
3	16QAM	1	8	23.28	23.45	23.36		
3	16QAM	1	14	23.38	23.11	23.23		
3	16QAM	8	0	22.03	22.36	22.36	22.5	2
3	16QAM	8	4	22.34	22.40	22.20		
3	16QAM	8	7	22.34	22.24	22.28		
3	16QAM	15	0	22.15	22.26	22.21		
3	64QAM	1	0	21.98	22.34	22.47	22.5	2
3	64QAM	1	8	22.09	22.49	22.42		
3	64QAM	1	14	22.24	22.07	22.18		
3	64QAM	8	0	21.17	21.29	21.45	21.5	3
3	64QAM	8	4	21.22	21.43	21.24		
3	64QAM	8	7	21.38	21.28	21.23		
3	64QAM	15	0	21.27	21.28	21.32		
Channel				19957	20175	20393	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1732.5	1754.3		
1.4	QPSK	1	0	23.77	24.11	23.89	24.5	0
1.4	QPSK	1	3	23.82	24.20	23.99		
1.4	QPSK	1	5	23.74	24.13	23.89		
1.4	QPSK	3	0	23.80	24.17	23.97		
1.4	QPSK	3	1	23.86	24.25	24.01		
1.4	QPSK	3	3	23.78	24.18	23.95		
1.4	QPSK	6	0	22.84	23.23	22.99	23.5	1
1.4	16QAM	1	0	22.95	23.32	23.14	23.5	1
1.4	16QAM	1	3	23.02	23.36	23.21		
1.4	16QAM	1	5	22.91	23.30	23.14		
1.4	16QAM	3	0	22.77	23.16	22.99		
1.4	16QAM	3	1	22.85	23.21	23.02		
1.4	16QAM	3	3	22.78	23.13	22.98		
1.4	16QAM	6	0	21.95	22.31	22.12	22.5	2
1.4	64QAM	1	0	21.93	22.31	22.14	22.5	2
1.4	64QAM	1	3	22.00	22.34	22.18		
1.4	64QAM	1	5	21.90	22.31	22.13		
1.4	64QAM	3	0	21.95	22.32	22.13		
1.4	64QAM	3	1	21.97	22.35	22.17		
1.4	64QAM	3	3	21.94	22.31	22.13		
1.4	64QAM	6	0	20.90	21.26	21.06	21.5	3

<LTE Band 5>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20450	20525	20600		
Frequency (MHz)				829	836.5	844		
10	QPSK	1	0	24.35	24.24	24.15	24.5	0
10	QPSK	1	25	24.28	24.21	24.13		
10	QPSK	1	49	24.20	24.12	24.09		
10	QPSK	25	0	23.32	23.30	23.22	23.5	1
10	QPSK	25	12	23.36	23.29	23.21		
10	QPSK	25	25	23.28	23.21	23.20		
10	QPSK	50	0	23.33	23.28	23.12		
10	16QAM	1	0	23.42	23.32	23.16	23.5	1
10	16QAM	1	25	23.37	23.26	23.14		
10	16QAM	1	49	23.27	23.16	22.93		
10	16QAM	25	0	22.29	22.19	22.03	22.5	2
10	16QAM	25	12	22.28	22.19	22.11		
10	16QAM	25	25	22.20	22.13	22.00		
10	16QAM	50	0	22.26	22.19	22.00		
10	64QAM	1	0	22.41	22.33	22.16	22.5	2
10	64QAM	1	25	22.38	22.28	22.17		
10	64QAM	1	49	22.27	22.18	21.93		
10	64QAM	25	0	21.31	21.20	21.04	21.5	3
10	64QAM	25	12	21.31	21.21	21.14		
10	64QAM	25	25	21.23	21.16	21.03		
10	64QAM	50	0	21.28	21.19	21.01		
Channel				20425	20525	20625	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				826.5	836.5	846.5		
5	QPSK	1	0	24.32	24.23	24.18	24.5	0
5	QPSK	1	12	24.26	24.23	24.10		
5	QPSK	1	24	24.30	24.17	24.12		
5	QPSK	12	0	23.32	23.35	23.04	23.5	1
5	QPSK	12	7	23.39	23.38	23.16		
5	QPSK	12	13	23.23	23.30	23.15		
5	QPSK	25	0	23.37	23.20	23.10		
5	16QAM	1	0	23.50	23.42	23.20	23.5	1
5	16QAM	1	12	23.34	23.27	23.16		
5	16QAM	1	24	23.19	23.18	22.86		
5	16QAM	12	0	22.29	22.21	22.13	22.5	2
5	16QAM	12	7	22.20	22.10	22.12		
5	16QAM	12	13	22.19	22.17	22.04		
5	16QAM	25	0	22.21	22.16	21.90		
5	64QAM	1	0	22.44	22.38	22.19	22.5	2
5	64QAM	1	12	22.42	22.20	22.18		
5	64QAM	1	24	22.37	22.22	21.83		
5	64QAM	12	0	21.40	21.30	21.03	21.5	3
5	64QAM	12	7	21.28	21.14	21.10		
5	64QAM	12	13	21.14	21.09	21.05		
5	64QAM	25	0	21.24	21.20	20.94		

Channel				20415	20525	20635	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				825.5	836.5	847.5		
3	QPSK	1	0	24.34	24.19	24.00	24.5	0
3	QPSK	1	8	24.31	24.27	24.19		
3	QPSK	1	14	24.20	24.10	23.99		
3	QPSK	8	0	23.31	23.36	23.07	23.5	1
3	QPSK	8	4	23.36	23.33	23.20		
3	QPSK	8	7	23.24	23.25	23.21		
3	QPSK	15	0	23.38	23.18	23.11		
3	16QAM	1	0	23.41	23.41	23.11	23.5	1
3	16QAM	1	8	23.39	23.33	23.21		
3	16QAM	1	14	23.21	23.23	22.92		
3	16QAM	8	0	22.35	22.19	22.01	22.5	2
3	16QAM	8	4	22.20	22.23	22.18		
3	16QAM	8	7	22.21	22.05	22.04		
3	16QAM	15	0	22.16	22.23	21.93		
3	64QAM	1	0	22.31	22.24	22.15	22.5	2
3	64QAM	1	8	22.45	22.24	22.12		
3	64QAM	1	14	22.34	22.26	22.03		
3	64QAM	8	0	21.23	21.26	20.94	21.5	3
3	64QAM	8	4	21.39	21.12	21.06		
3	64QAM	8	7	21.18	21.20	20.98		
3	64QAM	15	0	21.37	21.24	20.91		
Channel				20407	20525	20643	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				824.7	836.5	848.3		
1.4	QPSK	1	0	24.22	24.15	24.05	24.5	0
1.4	QPSK	1	3	24.30	24.22	24.12		
1.4	QPSK	1	5	24.23	24.14	24.06		
1.4	QPSK	3	0	24.30	24.20	24.10		
1.4	QPSK	3	1	24.34	24.24	24.20		
1.4	QPSK	3	3	24.29	24.20	24.09		
1.4	QPSK	6	0	23.29	23.23	23.12	23.5	1
1.4	16QAM	1	0	23.31	23.18	22.91	23.5	1
1.4	16QAM	1	3	23.39	23.25	22.96		
1.4	16QAM	1	5	23.33	23.16	22.88		
1.4	16QAM	3	0	23.16	23.03	22.79		
1.4	16QAM	3	1	23.19	23.07	22.83		
1.4	16QAM	3	3	23.15	23.01	22.78		
1.4	16QAM	6	0	22.31	22.17	21.98	22.5	2
1.4	64QAM	1	0	22.34	22.18	21.94	22.5	2
1.4	64QAM	1	3	22.42	22.28	22.00		
1.4	64QAM	1	5	22.34	22.20	21.91		
1.4	64QAM	3	0	22.36	22.22	21.96		
1.4	64QAM	3	1	22.38	22.25	22.01		
1.4	64QAM	3	3	22.36	22.22	21.96		
1.4	64QAM	6	0	21.22	21.10	20.97	21.5	3

<LTE Band 7>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20850	21100	21350		
Frequency (MHz)				2510	2535	2560		
20	QPSK	1	0	24.31	24.41	24.38	24.5	0
20	QPSK	1	49	24.37	24.42	24.45		
20	QPSK	1	99	24.36	24.22	24.26		
20	QPSK	50	0	23.37	23.42	23.43	23.5	1
20	QPSK	50	24	23.33	23.38	23.41		
20	QPSK	50	50	23.30	23.36	23.42		
20	QPSK	100	0	23.41	23.45	23.46		
20	16QAM	1	0	23.41	23.42	23.47	23.5	1
20	16QAM	1	49	23.32	23.29	23.42		
20	16QAM	1	99	23.35	23.43	23.40		
20	16QAM	50	0	22.09	22.06	22.12	22.5	2
20	16QAM	50	24	22.11	22.12	22.16		
20	16QAM	50	50	22.12	22.10	22.29		
20	16QAM	100	0	22.09	22.06	22.15		
20	64QAM	1	0	22.18	22.15	22.23	22.5	2
20	64QAM	1	49	22.25	22.20	22.39		
20	64QAM	1	99	22.23	22.34	22.39		
20	64QAM	50	0	21.29	21.30	21.34	21.5	3
20	64QAM	50	24	21.32	21.34	21.39		
20	64QAM	50	50	21.35	21.30	21.48		
20	64QAM	100	0	21.30	21.29	21.36		
Channel				20825	21100	21375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	24.19	23.97	24.26	24.5	0
15	QPSK	1	37	24.11	24.06	24.26		
15	QPSK	1	74	24.20	24.23	24.13		
15	QPSK	36	0	23.11	23.16	23.21	23.5	1
15	QPSK	36	20	23.20	23.08	23.22		
15	QPSK	36	39	23.26	23.28	23.22		
15	QPSK	75	0	23.15	23.16	23.21		
15	16QAM	1	0	23.13	23.23	23.23	23.5	1
15	16QAM	1	37	23.04	23.09	23.24		
15	16QAM	1	74	23.11	23.16	23.29		
15	16QAM	36	0	21.84	21.93	22.02	22.5	2
15	16QAM	36	20	21.84	21.93	22.04		
15	16QAM	36	39	21.96	21.83	22.12		
15	16QAM	75	0	21.83	21.89	22.03		
15	64QAM	1	0	22.03	21.93	22.05	22.5	2
15	64QAM	1	37	22.07	22.10	22.26		
15	64QAM	1	74	22.08	22.09	22.26		
15	64QAM	36	0	21.02	21.14	21.10	21.5	3
15	64QAM	36	20	21.13	21.22	21.12		
15	64QAM	36	39	21.22	21.14	21.30		
15	64QAM	75	0	21.09	21.05	21.16		

Channel				20800	21100	21400	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	24.19	23.97	24.26	24.5	0
10	QPSK	1	25	24.11	24.06	24.26		
10	QPSK	1	49	24.20	24.23	24.13		
10	QPSK	25	0	23.11	23.16	23.21	23.5	1
10	QPSK	25	12	23.20	23.08	23.22		
10	QPSK	25	25	23.26	23.28	23.22		
10	QPSK	50	0	23.15	23.16	23.21		
10	16QAM	1	0	23.13	23.23	23.23	23.5	1
10	16QAM	1	25	23.04	23.09	23.24		
10	16QAM	1	49	23.11	23.16	23.29		
10	16QAM	25	0	21.84	21.93	22.02	22.5	2
10	16QAM	25	12	21.84	21.93	22.04		
10	16QAM	25	25	21.96	21.83	22.12		
10	16QAM	50	0	21.83	21.89	22.03		
10	64QAM	1	0	22.03	21.93	22.05	22.5	2
10	64QAM	1	25	22.07	22.10	22.26		
10	64QAM	1	49	22.08	22.09	22.26		
10	64QAM	25	0	21.02	21.14	21.10	21.5	3
10	64QAM	25	12	21.13	21.22	21.12		
10	64QAM	25	25	21.22	21.14	21.30		
10	64QAM	50	0	21.09	21.05	21.16		
Channel				20775	21100	21425	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	24.19	23.97	24.26	24.5	0
5	QPSK	1	12	24.11	24.06	24.26		
5	QPSK	1	24	24.20	24.23	24.13		
5	QPSK	12	0	23.11	23.16	23.21	23.5	1
5	QPSK	12	7	23.20	23.08	23.22		
5	QPSK	12	13	23.26	23.28	23.22		
5	QPSK	25	0	23.15	23.16	23.21		
5	16QAM	1	0	23.13	23.23	23.23	23.5	1
5	16QAM	1	12	23.04	23.09	23.24		
5	16QAM	1	24	23.11	23.16	23.29		
5	16QAM	12	0	21.84	21.93	22.02	22.5	2
5	16QAM	12	7	21.84	21.93	22.04		
5	16QAM	12	13	21.96	21.83	22.12		
5	16QAM	25	0	21.83	21.89	22.03		
5	64QAM	1	0	22.03	21.93	22.05	22.5	2
5	64QAM	1	12	22.07	22.10	22.26		
5	64QAM	1	24	22.08	22.09	22.26		
5	64QAM	12	0	21.02	21.14	21.10	21.5	3
5	64QAM	12	7	21.13	21.22	21.12		
5	64QAM	12	13	21.22	21.14	21.30		
5	64QAM	25	0	21.09	21.05	21.16		

<LTE Band 12>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				23060	23095	23130		
Frequency (MHz)				704	707.5	711		
10	QPSK	1	0	24.48	24.41	24.37	24.5	0
10	QPSK	1	25	24.41	24.31	24.30		
10	QPSK	1	49	24.35	24.31	24.38		
10	QPSK	25	0	23.48	23.31	23.34	23.5	1
10	QPSK	25	12	23.47	23.25	23.34		
10	QPSK	25	25	23.42	23.29	23.33		
10	QPSK	50	0	23.44	23.39	23.36		
10	16QAM	1	0	23.36	23.29	23.32	23.5	1
10	16QAM	1	25	23.47	23.44	23.48		
10	16QAM	1	49	23.49	23.47	23.42		
10	16QAM	25	0	22.32	22.22	22.21	22.5	2
10	16QAM	25	12	22.34	22.26	22.27		
10	16QAM	25	25	22.27	22.26	22.22		
10	16QAM	50	0	22.29	22.26	22.25		
10	64QAM	1	0	22.31	22.24	22.31	22.5	2
10	64QAM	1	25	22.40	22.37	22.42		
10	64QAM	1	49	22.44	22.44	22.40		
10	64QAM	25	0	21.30	21.28	21.27	21.5	3
10	64QAM	25	12	21.35	21.31	21.28		
10	64QAM	25	25	21.29	21.31	21.26		
10	64QAM	50	0	21.32	21.26	21.25		
Channel				23035	23095	23155	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				701.5	707.5	713.5		
5	QPSK	1	0	24.18	24.23	24.17	24.5	0
5	QPSK	1	12	24.33	24.24	24.20		
5	QPSK	1	24	24.44	24.27	24.29		
5	QPSK	12	0	23.50	23.37	23.41	23.5	1
5	QPSK	12	7	23.48	23.27	23.38		
5	QPSK	12	13	23.44	23.34	23.43		
5	QPSK	25	0	23.40	23.40	23.33		
5	16QAM	1	0	23.30	23.23	23.33	23.5	1
5	16QAM	1	12	23.46	23.38	23.22		
5	16QAM	1	24	23.47	23.42	23.44		
5	16QAM	12	0	22.33	22.18	22.24	22.5	2
5	16QAM	12	7	22.43	22.18	22.36		
5	16QAM	12	13	22.18	22.28	22.15		
5	16QAM	25	0	22.27	22.23	22.22		
5	64QAM	1	0	22.28	22.25	22.34	22.5	2
5	64QAM	1	12	22.31	22.32	22.39		
5	64QAM	1	24	22.42	22.50	22.39		
5	64QAM	12	0	21.31	21.33	21.31	21.5	3
5	64QAM	12	7	21.43	21.37	21.19		
5	64QAM	12	13	21.28	21.33	21.20		
5	64QAM	25	0	21.36	21.36	21.17		

Channel				23025	23095	23165	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				700.5	707.5	714.5		
3	QPSK	1	0	24.34	24.11	24.18	24.5	0
3	QPSK	1	8	24.38	24.21	24.36		
3	QPSK	1	14	24.43	24.36	24.29		
3	QPSK	8	0	23.44	23.21	23.36	23.5	1
3	QPSK	8	4	23.41	23.29	23.28		
3	QPSK	8	7	23.48	23.48	23.33		
3	QPSK	15	0	23.36	23.40	23.26		
3	16QAM	1	0	23.39	23.36	23.30	23.5	1
3	16QAM	1	8	23.41	23.42	23.48		
3	16QAM	1	14	23.40	23.42	23.46		
3	16QAM	8	0	22.25	22.26	22.29	22.5	2
3	16QAM	8	4	22.27	22.27	22.25		
3	16QAM	8	7	22.22	22.25	22.19		
3	16QAM	15	0	22.38	22.29	22.33		
3	64QAM	1	0	22.37	22.14	22.28	22.5	2
3	64QAM	1	8	22.39	22.44	22.34		
3	64QAM	1	14	22.45	22.42	22.43		
3	64QAM	8	0	21.22	21.20	21.26	21.5	3
3	64QAM	8	4	21.39	21.28	21.33		
3	64QAM	8	7	21.21	21.35	21.28		
3	64QAM	15	0	21.38	21.30	21.34		
Channel				23017	23095	23173	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				699.7	707.5	715.3		
1.4	QPSK	1	0	24.25	24.26	24.30	24.5	0
1.4	QPSK	1	3	24.34	24.33	24.37		
1.4	QPSK	1	5	24.24	24.25	24.28		
1.4	QPSK	3	0	24.30	24.31	24.34		
1.4	QPSK	3	1	24.36	24.36	24.39		
1.4	QPSK	3	3	24.33	24.33	24.35		
1.4	QPSK	6	0	23.34	23.32	23.37	23.5	1
1.4	16QAM	1	0	23.57	23.51	23.53	23.5	1
1.4	16QAM	1	3	23.62	23.56	23.61		
1.4	16QAM	1	5	23.56	23.52	23.51		
1.4	16QAM	3	0	23.39	23.35	23.38		
1.4	16QAM	3	1	23.43	23.42	23.40		
1.4	16QAM	3	3	23.36	23.38	23.35		
1.4	16QAM	6	0	22.49	22.45	22.50	22.5	2
1.4	64QAM	1	0	22.55	22.52	22.53	22.5	2
1.4	64QAM	1	3	22.60	22.56	22.59		
1.4	64QAM	1	5	22.49	22.51	22.51		
1.4	64QAM	3	0	22.53	22.51	22.53		
1.4	64QAM	3	1	22.57	22.57	22.56		
1.4	64QAM	3	3	22.54	22.50	22.55		
1.4	64QAM	6	0	21.40	21.41	21.44	21.5	3

<LTE Band 13>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				23230				
Frequency (MHz)				782				
10	QPSK	1	0	24.36			24.5	0
10	QPSK	1	25	24.28				
10	QPSK	1	49	24.27				
10	QPSK	25	0	23.42			23.5	1
10	QPSK	25	12	23.43				
10	QPSK	25	25	23.40				
10	QPSK	50	0	23.41				
10	16QAM	1	0	23.38			23.5	1
10	16QAM	1	25	23.35				
10	16QAM	1	49	23.20				
10	16QAM	25	0	22.14			22.5	2
10	16QAM	25	12	22.16				
10	16QAM	25	25	22.11				
10	16QAM	50	0	22.15				
10	64QAM	1	0	22.23			22.5	2
10	64QAM	1	25	22.33				
10	64QAM	1	49	22.19				
10	64QAM	25	0	21.21			21.5	3
10	64QAM	25	12	21.22				
10	64QAM	25	25	21.13				
10	64QAM	50	0	21.16				
Channel				23205	23230	23255	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				779.5	782	784.5		
5	QPSK	1	0	24.26	24.34	24.22	24.5	0
5	QPSK	1	12	24.27	24.34	24.21		
5	QPSK	1	24	24.32	24.30	24.18		
5	QPSK	12	0	23.36	23.42	23.32	23.5	1
5	QPSK	12	7	23.46	23.44	23.33		
5	QPSK	12	13	23.42	23.40	23.31		
5	QPSK	25	0	23.40	23.36	23.29		
5	16QAM	1	0	23.40	23.38	23.44	23.5	1
5	16QAM	1	12	23.47	23.43	23.39		
5	16QAM	1	24	23.42	23.48	23.28		
5	16QAM	12	0	22.29	22.39	22.25	22.5	2
5	16QAM	12	7	22.44	22.40	22.27		
5	16QAM	12	13	22.39	22.35	22.22		
5	16QAM	25	0	22.36	22.34	22.22		
5	64QAM	1	0	22.40	22.41	22.39	22.5	2
5	64QAM	1	12	22.43	22.43	22.37		
5	64QAM	1	24	22.43	22.45	22.26		
5	64QAM	12	0	21.38	21.46	21.30	21.5	3
5	64QAM	12	7	21.46	21.46	21.34		
5	64QAM	12	13	21.45	21.42	21.26		
5	64QAM	25	0	21.37	21.36	21.23		

<LTE Band 17>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				23780	23790	23800		
Frequency (MHz)				709	710	711		
10	QPSK	1	0	24.35	24.29	24.38	24.5	0
10	QPSK	1	25	24.30	24.27	24.28		
10	QPSK	1	49	24.28	24.26	24.24		
10	QPSK	25	0	23.37	23.33	23.31	23.5	1
10	QPSK	25	12	23.40	23.38	23.35		
10	QPSK	25	25	23.37	23.33	23.30		
10	QPSK	50	0	23.36	23.33	23.37		
10	16QAM	1	0	23.35	23.30	23.30	23.5	1
10	16QAM	1	25	23.42	23.46	23.46		
10	16QAM	1	49	23.41	23.37	23.31		
10	16QAM	25	0	22.22	22.23	22.22	22.5	2
10	16QAM	25	12	22.27	22.25	22.26		
10	16QAM	25	25	22.26	22.23	22.22		
10	16QAM	50	0	22.25	22.22	22.23		
10	64QAM	1	0	22.29	22.26	22.29	22.5	2
10	64QAM	1	25	22.38	22.40	22.39		
10	64QAM	1	49	22.40	22.32	22.29		
10	64QAM	25	0	21.24	21.26	21.25	21.5	3
10	64QAM	25	12	21.28	21.30	21.29		
10	64QAM	25	25	21.29	21.25	21.24		
10	64QAM	50	0	21.26	21.28	21.22		
Channel				23755	23790	23825	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				706.5	710	713.5		
5	QPSK	1	0	24.36	24.21	24.14	24.5	0
5	QPSK	1	12	24.35	24.25	24.36		
5	QPSK	1	24	24.35	24.36	24.22		
5	QPSK	12	0	23.39	23.25	23.34	23.5	1
5	QPSK	12	7	23.33	23.37	23.37		
5	QPSK	12	13	23.33	23.28	23.32		
5	QPSK	25	0	23.44	23.28	23.41		
5	16QAM	1	0	23.35	23.26	23.40	23.5	1
5	16QAM	1	12	23.38	23.40	23.45		
5	16QAM	1	24	23.40	23.31	23.38		
5	16QAM	12	0	22.23	22.18	22.19	22.5	2
5	16QAM	12	7	22.18	22.20	22.19		
5	16QAM	12	13	22.30	22.31	22.22		
5	16QAM	25	0	22.26	22.19	22.32		
5	64QAM	1	0	22.29	22.27	22.35	22.5	2
5	64QAM	1	12	22.42	22.49	22.33		
5	64QAM	1	24	22.42	22.32	22.33		
5	64QAM	12	0	21.20	21.23	21.32	21.5	3
5	64QAM	12	7	21.25	21.35	21.29		
5	64QAM	12	13	21.39	21.30	21.20		
5	64QAM	25	0	21.24	21.31	21.19		

<LTE Band 25>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				26140	26340	26590		
Frequency (MHz)				1860	1880	1905		
20	QPSK	1	0	22.40	22.83	22.34	23	0
20	QPSK	1	49	22.29	22.47	22.32		
20	QPSK	1	99	22.35	22.36	22.16		
20	QPSK	50	0	21.42	21.51	21.32	22	1
20	QPSK	50	24	21.41	21.50	21.31		
20	QPSK	50	50	21.35	21.47	21.30		
20	QPSK	100	0	21.40	21.47	21.30		
20	16QAM	1	0	21.72	21.98	21.74	22	1
20	16QAM	1	49	21.71	21.90	21.79		
20	16QAM	1	99	21.82	21.77	21.57		
20	16QAM	50	0	20.43	20.65	20.48	21	2
20	16QAM	50	24	20.60	20.69	20.50		
20	16QAM	50	50	20.56	20.66	20.49		
20	16QAM	100	0	20.56	20.68	20.48		
20	64QAM	1	0	20.66	20.91	20.65	21	2
20	64QAM	1	49	20.67	20.85	20.76		
20	64QAM	1	99	20.73	20.78	20.51		
20	64QAM	50	0	19.47	19.67	19.53	20	3
20	64QAM	50	24	19.63	19.69	19.54		
20	64QAM	50	50	19.54	19.65	19.53		
20	64QAM	100	0	19.56	19.65	19.54		
Channel				26115	26340	26615	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1907.5		
15	QPSK	1	0	22.28	22.43	22.32	23	0
15	QPSK	1	37	22.33	22.54	22.25		
15	QPSK	1	74	22.31	22.36	22.16		
15	QPSK	36	0	21.33	21.52	21.33	22	1
15	QPSK	36	20	21.37	21.57	21.38		
15	QPSK	36	39	21.41	21.51	21.23		
15	QPSK	75	0	21.38	21.55	21.31		
15	16QAM	1	0	21.67	21.92	21.80	22	1
15	16QAM	1	37	21.66	21.94	21.71		
15	16QAM	1	74	21.75	21.77	21.58		
15	16QAM	36	0	20.49	20.68	20.52	21	2
15	16QAM	36	20	20.55	20.74	20.59		
15	16QAM	36	39	20.57	20.69	20.44		
15	16QAM	75	0	20.58	20.66	20.56		
15	64QAM	1	0	20.64	20.88	20.75	21	2
15	64QAM	1	37	20.66	20.84	20.65		
15	64QAM	1	74	20.70	20.70	20.53		
15	64QAM	36	0	19.54	19.76	19.60	20	3
15	64QAM	36	20	19.56	19.81	19.69		
15	64QAM	36	39	19.63	19.75	19.52		
15	64QAM	75	0	19.60	19.78	19.59		

Channel				26090	26340	26640	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1910		
10	QPSK	1	0	22.24	22.43	22.23	23	0
10	QPSK	1	25	22.33	22.51	22.24		
10	QPSK	1	49	22.31	22.28	22.15		
10	QPSK	25	0	21.29	21.51	21.25	22	1
10	QPSK	25	12	21.28	21.49	21.28		
10	QPSK	25	25	21.38	21.44	21.17		
10	QPSK	50	0	21.33	21.54	21.24		
10	16QAM	1	0	21.61	21.83	21.73	22	1
10	16QAM	1	25	21.63	21.84	21.67		
10	16QAM	1	49	21.65	21.76	21.58		
10	16QAM	25	0	20.47	20.64	20.52	21	2
10	16QAM	25	12	20.53	20.65	20.51		
10	16QAM	25	25	20.55	20.65	20.43		
10	16QAM	50	0	20.54	20.62	20.51		
10	64QAM	1	0	20.58	20.84	20.69	21	2
10	64QAM	1	25	20.66	20.82	20.64		
10	64QAM	1	49	20.60	20.70	20.46		
10	64QAM	25	0	19.54	19.72	19.54	20	3
10	64QAM	25	12	19.55	19.78	19.62		
10	64QAM	25	25	19.63	19.70	19.50		
10	64QAM	50	0	19.51	19.75	19.56		
Channel				26065	26340	26665	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1912.5		
5	QPSK	1	0	22.21	22.38	22.25	23	0
5	QPSK	1	12	22.29	22.49	22.20		
5	QPSK	1	24	22.25	22.28	22.12		
5	QPSK	12	0	21.27	21.51	21.25	22	1
5	QPSK	12	7	21.29	21.51	21.31		
5	QPSK	12	13	21.38	21.46	21.22		
5	QPSK	25	0	21.30	21.53	21.27		
5	16QAM	1	0	21.67	21.87	21.72	22	1
5	16QAM	1	12	21.56	21.85	21.71		
5	16QAM	1	24	21.71	21.67	21.58		
5	16QAM	12	0	20.42	20.67	20.46	21	2
5	16QAM	12	7	20.51	20.64	20.55		
5	16QAM	12	13	20.50	20.61	20.36		
5	16QAM	25	0	20.58	20.57	20.53		
5	64QAM	1	0	20.64	20.80	20.66	21	2
5	64QAM	1	12	20.66	20.79	20.55		
5	64QAM	1	24	20.65	20.64	20.49		
5	64QAM	12	0	19.53	19.74	19.57	20	3
5	64QAM	12	7	19.49	19.78	19.59		
5	64QAM	12	13	19.53	19.67	19.43		
5	64QAM	25	0	19.53	19.75	19.59		

Channel				26055	26340	26675	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1913.5		
3	QPSK	1	0	22.20	22.41	22.27	23	0
3	QPSK	1	8	22.29	22.46	22.16		
3	QPSK	1	14	22.29	22.29	22.12		
3	QPSK	8	0	21.26	21.50	21.26	22	1
3	QPSK	8	4	21.28	21.55	21.33		
3	QPSK	8	7	21.36	21.49	21.21		
3	QPSK	15	0	21.33	21.48	21.22		
3	16QAM	1	0	21.65	21.86	21.77	22	1
3	16QAM	1	8	21.60	21.93	21.65		
3	16QAM	1	14	21.70	21.75	21.51		
3	16QAM	8	0	20.42	20.67	20.49	21	2
3	16QAM	8	4	20.53	20.69	20.59		
3	16QAM	8	7	20.48	20.66	20.40		
3	16QAM	15	0	20.51	20.66	20.50		
3	64QAM	1	0	20.55	20.84	20.70	21	2
3	64QAM	1	8	20.56	20.81	20.59		
3	64QAM	1	14	20.64	20.63	20.51		
3	64QAM	8	0	19.50	19.68	19.53	20	3
3	64QAM	8	4	19.46	19.81	19.63		
3	64QAM	8	7	19.61	19.66	19.52		
3	64QAM	15	0	19.53	19.71	19.56		
Channel				26047	26340	26683	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1914.3		
1.4	QPSK	1	0	22.04	22.38	22.09	23	0
1.4	QPSK	1	3	22.11	22.46	22.24		
1.4	QPSK	1	5	22.01	22.40	22.06		
1.4	QPSK	3	0	22.05	22.41	22.21		
1.4	QPSK	3	1	22.12	22.49	22.21		
1.4	QPSK	3	3	22.06	22.42	22.18		
1.4	QPSK	6	0	21.07	21.40	21.15	22	1
1.4	16QAM	1	0	21.47	21.79	21.54	22	1
1.4	16QAM	1	3	21.54	21.91	21.62		
1.4	16QAM	1	5	21.50	21.85	21.44		
1.4	16QAM	3	0	21.22	21.60	21.30		
1.4	16QAM	3	1	21.28	21.64	21.35		
1.4	16QAM	3	3	21.24	21.59	21.33		
1.4	16QAM	6	0	20.30	20.64	20.40	21	2
1.4	64QAM	1	0	20.44	20.80	20.55	21	2
1.4	64QAM	1	3	20.48	20.83	20.57		
1.4	64QAM	1	5	20.43	20.77	20.44		
1.4	64QAM	3	0	20.39	20.73	20.47		
1.4	64QAM	3	1	20.46	20.82	20.53		
1.4	64QAM	3	3	20.41	20.77	20.51		
1.4	64QAM	6	0	19.27	19.60	19.35	20	3

<LTE Band 26>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				26765	26865	26965		
Frequency (MHz)				821.5	831.5	841.5		
15	QPSK	1	0	23.85	23.88	23.92	24	0
15	QPSK	1	37	23.78	23.86	23.91		
15	QPSK	1	74	23.81	23.86	23.89		
15	QPSK	36	0	22.86	22.90	22.96	23	1
15	QPSK	36	20	22.82	22.88	22.92		
15	QPSK	36	39	22.84	22.85	22.92		
15	QPSK	75	0	22.83	22.87	22.90		
15	16QAM	1	0	22.79	22.94	22.97	23	1
15	16QAM	1	37	22.89	23.00	22.96		
15	16QAM	1	74	22.97	22.95	22.73		
15	16QAM	36	0	21.75	21.84	21.83	22	2
15	16QAM	36	20	21.75	21.83	21.80		
15	16QAM	36	39	21.83	21.77	21.82		
15	16QAM	75	0	21.74	21.81	21.79		
15	64QAM	1	0	21.75	21.90	21.97	22	2
15	64QAM	1	37	21.88	22.00	21.97		
15	64QAM	1	74	21.95	21.95	21.76		
15	64QAM	36	0	20.78	20.89	20.84	21	3
15	64QAM	36	20	20.78	20.86	20.82		
15	64QAM	36	39	20.84	20.78	20.83		
15	64QAM	75	0	20.77	20.84	20.80		
Channel				26740	26865	26990	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				819	831.5	844		
10	QPSK	1	0	23.73	23.71	23.87	24	0
10	QPSK	1	25	23.85	23.78	23.91		
10	QPSK	1	49	23.90	23.86	22.87		
10	QPSK	25	0	22.79	22.98	22.79	23	1
10	QPSK	25	12	22.90	22.81	22.92		
10	QPSK	25	25	22.94	22.88	22.99		
10	QPSK	50	0	22.79	22.84	22.93		
10	16QAM	1	0	22.84	23.00	22.88	23	1
10	16QAM	1	25	22.95	22.90	23.00		
10	16QAM	1	49	22.89	22.91	22.63		
10	16QAM	25	0	21.65	21.75	21.75	22	2
10	16QAM	25	12	21.66	21.82	21.90		
10	16QAM	25	25	21.93	21.83	21.83		
10	16QAM	50	0	21.79	21.73	21.83		
10	64QAM	1	0	21.69	21.94	21.93	22	2
10	64QAM	1	25	21.96	21.96	21.94		
10	64QAM	1	49	21.88	21.96	21.72		
10	64QAM	25	0	20.85	20.95	20.75	21	3
10	64QAM	25	12	20.88	20.92	20.88		
10	64QAM	25	25	20.84	20.71	20.77		
10	64QAM	50	0	20.74	20.80	20.73		

Channel				26715	26865	27015	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				816.5	831.5	846.5		
5	QPSK	1	0	23.61	23.71	23.89	24	0
5	QPSK	1	12	23.84	23.85	23.84		
5	QPSK	1	24	23.82	23.81	23.86		
5	QPSK	12	0	22.90	22.97	22.82	23	1
5	QPSK	12	7	22.87	22.78	22.99		
5	QPSK	12	13	22.96	22.80	22.95		
5	QPSK	25	0	22.81	22.91	22.98		
5	16QAM	1	0	22.76	22.96	22.91	23	1
5	16QAM	1	12	22.97	22.92	22.97		
5	16QAM	1	24	22.89	22.97	22.74		
5	16QAM	12	0	21.67	21.91	21.88	22	2
5	16QAM	12	7	21.66	21.87	21.89		
5	16QAM	12	13	21.85	21.79	21.80		
5	16QAM	25	0	21.80	21.82	21.84		
5	64QAM	1	0	21.77	21.88	21.92	22	2
5	64QAM	1	12	21.93	21.97	21.96		
5	64QAM	1	24	21.92	21.95	21.72		
5	64QAM	12	0	20.79	20.82	20.91	21	3
5	64QAM	12	7	20.83	20.78	20.78		
5	64QAM	12	13	20.83	20.87	20.76		
5	64QAM	25	0	20.75	20.77	20.88		
Channel				26705	26865	27025	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				815.5	831.5	847.5		
3	QPSK	1	0	21.17	21.32	21.16	21.5	0
3	QPSK	1	8	21.15	21.29	21.12		
3	QPSK	1	14	21.14	21.28	21.12		
3	QPSK	8	0	20.22	20.37	20.21	21.5	0
3	QPSK	8	4	20.26	20.39	20.23		
3	QPSK	8	7	20.22	20.35	20.23		
3	QPSK	15	0	20.20	20.33	20.20		
3	16QAM	1	0	20.83	21.07	20.78	21.5	0
3	16QAM	1	8	20.84	21.08	20.81		
3	16QAM	1	14	20.82	21.04	20.76		
3	16QAM	8	0	19.69	19.89	19.65	21.5	0
3	16QAM	8	4	19.71	19.90	19.69		
3	16QAM	8	7	19.69	19.86	19.68		
3	16QAM	15	0	19.63	19.79	19.61		
3	64QAM	1	0	21.41	21.49	21.31	21.5	0
3	64QAM	1	8	21.43	21.48	21.29		
3	64QAM	1	14	21.41	21.41	21.27		
3	64QAM	8	0	20.88	21.09	20.78	21.5	0
3	64QAM	8	4	20.93	21.10	20.81		
3	64QAM	8	7	20.89	21.06	20.81		
3	64QAM	15	0	20.84	21.00	20.81		

Channel				26697	26865	27033	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				814.7	831.5	848.3		
1.4	QPSK	1	0	21.07	21.25	21.07	21.5	0
1.4	QPSK	1	3	21.14	21.30	21.15		
1.4	QPSK	1	5	21.08	21.25	21.07		
1.4	QPSK	3	0	21.13	21.27	21.09		
1.4	QPSK	3	1	21.14	21.29	21.14		
1.4	QPSK	3	3	21.13	21.28	21.13		
1.4	QPSK	6	0	20.14	20.28	20.15	21.5	0
1.4	16QAM	1	0	20.79	20.99	20.72	21.5	0
1.4	16QAM	1	3	20.85	21.07	20.80		
1.4	16QAM	1	5	20.81	20.97	20.72		
1.4	16QAM	3	0	20.57	20.75	20.52		
1.4	16QAM	3	1	20.59	20.78	20.54		
1.4	16QAM	3	3	20.58	20.76	20.52		
1.4	16QAM	6	0	19.62	19.79	19.62	21.5	0
1.4	64QAM	1	0	21.15	21.40	21.03	21.5	0
1.4	64QAM	1	3	21.22	21.44	21.08		
1.4	64QAM	1	5	21.19	21.37	21.02		
1.4	64QAM	3	0	21.17	21.37	21.07		
1.4	64QAM	3	1	21.20	21.42	21.09		
1.4	64QAM	3	3	21.16	21.36	21.08		
1.4	64QAM	6	0	20.07	20.23	20.03	21.5	0

<LTE Band 66>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				132072	132322	132572		
Frequency (MHz)				1720	1745	1770		
20	QPSK	1	0	23.54	23.72	23.62	24	0
20	QPSK	1	49	23.44	23.64	23.57		
20	QPSK	1	99	23.39	23.55	23.37		
20	QPSK	50	0	22.43	22.73	22.61	23	1
20	QPSK	50	24	22.42	22.72	22.55		
20	QPSK	50	50	22.40	22.68	22.43		
20	QPSK	100	0	22.41	22.70	22.58		
20	16QAM	1	0	22.56	22.88	22.90	23	1
20	16QAM	1	49	22.64	23.00	22.87		
20	16QAM	1	99	22.58	22.84	22.63		
20	16QAM	50	0	21.33	21.80	21.68	22	2
20	16QAM	50	24	21.42	21.78	21.66		
20	16QAM	50	50	21.39	21.78	21.53		
20	16QAM	100	0	21.38	21.77	21.63		
20	64QAM	1	0	21.51	21.84	21.87	22	2
20	64QAM	1	49	21.61	22.00	21.83		
20	64QAM	1	99	21.55	21.80	21.63		
20	64QAM	50	0	20.37	20.82	20.71	21	3
20	64QAM	50	24	20.45	20.81	20.70		
20	64QAM	50	50	20.44	20.79	20.56		
20	64QAM	100	0	20.45	20.77	20.69		
Channel				132047	132322	132597	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1745	1772.5		
15	QPSK	1	0	23.32	23.70	23.58	24	0
15	QPSK	1	37	23.45	23.60	23.48		
15	QPSK	1	74	23.47	23.47	23.31		
15	QPSK	36	0	22.48	22.64	22.60	23	1
15	QPSK	36	20	22.45	22.73	22.48		
15	QPSK	36	39	22.41	22.78	22.49		
15	QPSK	75	0	22.38	22.62	22.54		
15	16QAM	1	0	22.53	22.88	22.97	23	1
15	16QAM	1	37	22.73	22.90	22.79		
15	16QAM	1	74	22.65	22.81	22.69		
15	16QAM	36	0	21.35	21.79	21.63	22	2
15	16QAM	36	20	21.50	21.82	21.74		
15	16QAM	36	39	21.29	21.81	21.47		
15	16QAM	75	0	21.47	21.86	21.58		
15	64QAM	1	0	21.48	21.80	21.78	22	2
15	64QAM	1	37	21.68	22.00	21.91		
15	64QAM	1	74	21.64	21.79	21.57		
15	64QAM	36	0	20.39	20.76	20.62	21	3
15	64QAM	36	20	20.54	20.74	20.64		
15	64QAM	36	39	20.39	20.86	20.58		
15	64QAM	75	0	20.44	20.73	20.63		

Channel				132022	132322	132622	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1745	1775		
10	QPSK	1	0	23.27	23.71	23.71	24	0
10	QPSK	1	25	23.34	23.66	23.57		
10	QPSK	1	49	23.40	23.50	23.33		
10	QPSK	25	0	22.49	22.76	22.55	23	1
10	QPSK	25	12	22.49	22.68	22.63		
10	QPSK	25	25	22.37	22.76	22.52		
10	QPSK	50	0	22.32	22.71	22.48		
10	16QAM	1	0	22.48	22.87	22.84	23	1
10	16QAM	1	25	22.65	23.00	22.86		
10	16QAM	1	49	22.53	22.82	22.58		
10	16QAM	25	0	21.43	21.83	21.67	22	2
10	16QAM	25	12	21.50	21.87	21.71		
10	16QAM	25	25	21.49	21.77	21.57		
10	16QAM	50	0	21.31	21.74	21.70		
10	64QAM	1	0	21.58	21.85	21.84	22	2
10	64QAM	1	25	21.59	21.93	21.81		
10	64QAM	1	49	21.57	21.87	21.66		
10	64QAM	25	0	20.30	20.74	20.61	21	3
10	64QAM	25	12	20.35	20.80	20.65		
10	64QAM	25	25	20.48	20.88	20.62		
10	64QAM	50	0	20.45	20.84	20.71		
Channel				131997	132322	132647	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1745	1777.5		
5	QPSK	1	0	23.31	23.71	23.66	24	0
5	QPSK	1	12	23.42	23.60	23.56		
5	QPSK	1	24	23.36	23.52	23.45		
5	QPSK	12	0	22.53	22.76	22.63	23	1
5	QPSK	12	7	22.34	22.81	22.52		
5	QPSK	12	13	22.31	22.60	22.38		
5	QPSK	25	0	22.38	22.70	22.51		
5	16QAM	1	0	22.54	22.79	22.82	23	1
5	16QAM	1	12	22.63	22.94	22.94		
5	16QAM	1	24	22.61	22.90	22.62		
5	16QAM	12	0	21.28	21.70	21.63	22	2
5	16QAM	12	7	21.34	21.81	21.60		
5	16QAM	12	13	21.34	21.76	21.62		
5	16QAM	25	0	21.41	21.85	21.65		
5	64QAM	1	0	21.47	21.86	21.93	22	2
5	64QAM	1	12	21.68	21.92	21.86		
5	64QAM	1	24	21.55	21.88	21.70		
5	64QAM	12	0	20.43	20.76	20.67	21	3
5	64QAM	12	7	20.36	20.82	20.79		
5	64QAM	12	13	20.45	20.88	20.66		
5	64QAM	25	0	20.43	20.83	20.69		

Channel				131987	132322	132657	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1745	1778.5		
3	QPSK	1	0	23.42	23.67	23.59	24	0
3	QPSK	1	8	23.49	23.61	23.50		
3	QPSK	1	14	23.44	23.50	23.44		
3	QPSK	8	0	22.50	22.80	22.57	23	1
3	QPSK	8	4	22.50	22.64	22.55		
3	QPSK	8	7	22.44	22.59	22.33		
3	QPSK	15	0	22.31	22.75	22.63		
3	16QAM	1	0	22.58	22.78	22.90	23	1
3	16QAM	1	8	22.62	23.00	22.79		
3	16QAM	1	14	22.62	22.88	22.56		
3	16QAM	8	0	21.36	21.78	21.76	22	2
3	16QAM	8	4	21.35	21.84	21.56		
3	16QAM	8	7	21.33	21.73	21.52		
3	16QAM	15	0	21.29	21.75	21.64		
3	64QAM	1	0	21.49	21.78	21.79	22	2
3	64QAM	1	8	21.53	22.00	21.91		
3	64QAM	1	14	21.53	21.76	21.72		
3	64QAM	8	0	20.29	20.89	20.66	21	3
3	64QAM	8	4	20.42	20.76	20.63		
3	64QAM	8	7	20.46	20.76	20.49		
3	64QAM	15	0	20.41	20.72	20.66		
Channel				131979	132322	132665	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1745	1779.3		
1.4	QPSK	1	0	23.10	23.61	23.40	24	0
1.4	QPSK	1	3	23.22	23.70	23.51		
1.4	QPSK	1	5	23.08	23.60	23.39		
1.4	QPSK	3	0	23.16	23.69	23.46		
1.4	QPSK	3	1	23.20	23.71	23.53		
1.4	QPSK	3	3	23.17	23.70	23.47		
1.4	QPSK	6	0	22.15	22.69	22.49	23	1
1.4	16QAM	1	0	22.34	22.86	22.61	23	1
1.4	16QAM	1	3	22.45	22.93	22.70		
1.4	16QAM	1	5	22.32	22.81	22.59		
1.4	16QAM	3	0	22.18	22.68	22.46		
1.4	16QAM	3	1	22.23	22.74	22.51		
1.4	16QAM	3	3	22.18	22.66	22.45		
1.4	16QAM	6	0	21.31	21.83	21.61	22	2
1.4	64QAM	1	0	21.30	21.83	21.61	22	2
1.4	64QAM	1	3	21.41	21.91	21.69		
1.4	64QAM	1	5	21.34	21.81	21.58		
1.4	64QAM	3	0	21.33	21.83	21.64		
1.4	64QAM	3	1	21.40	21.88	21.68		
1.4	64QAM	3	3	21.33	21.85	21.62		
1.4	64QAM	6	0	20.24	20.79	20.57	21	3

Reduced Power Mode

<LTE Band 2>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				18700	18900	19100		
Frequency (MHz)				1860	1880	1900		
20	QPSK	1	0	21.18	21.20	21.01	22	0
20	QPSK	1	49	21.13	21.19	21.00		
20	QPSK	1	99	21.08	21.07	20.84		
20	QPSK	50	0	20.04	20.14	20.02	21	1
20	QPSK	50	24	20.10	20.18	20.03		
20	QPSK	50	50	20.04	20.14	20.01		
20	QPSK	100	0	20.05	20.14	20.00		
20	16QAM	1	0	20.54	20.68	20.47	21	1
20	16QAM	1	49	20.58	20.70	20.58		
20	16QAM	1	99	20.58	20.57	20.42		
20	16QAM	50	0	19.28	19.32	19.19	20	2
20	16QAM	50	24	19.29	19.37	19.15		
20	16QAM	50	50	19.26	19.31	19.12		
20	16QAM	100	0	19.23	19.37	19.16		
20	64QAM	1	0	19.50	19.62	19.40	20	2
20	64QAM	1	49	19.48	19.61	19.39		
20	64QAM	1	99	19.48	19.47	19.35		
20	64QAM	50	0	18.25	18.34	18.15	19	3
20	64QAM	50	24	18.29	18.40	18.18		
20	64QAM	50	50	18.24	18.29	18.18		
20	64QAM	100	0	18.30	18.36	18.16		
Channel				18675	18900	19125	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	20.94	21.18	20.98	22	0
15	QPSK	1	37	20.99	21.18	20.92		
15	QPSK	1	74	20.93	21.10	20.89		
15	QPSK	36	0	19.99	20.22	20.00	21	1
15	QPSK	36	20	20.03	20.26	20.02		
15	QPSK	36	39	19.98	20.18	19.96		
15	QPSK	75	0	19.99	20.19	20.02		
15	16QAM	1	0	20.45	20.67	20.55	21	1
15	16QAM	1	37	20.42	20.67	20.47		
15	16QAM	1	74	20.41	20.63	20.47		
15	16QAM	36	0	19.22	19.39	19.22	20	2
15	16QAM	36	20	19.22	19.44	19.26		
15	16QAM	36	39	19.20	19.41	19.14		
15	16QAM	75	0	19.17	19.36	19.20		
15	64QAM	1	0	19.38	19.61	19.42	20	2
15	64QAM	1	37	19.38	19.61	19.37		
15	64QAM	1	74	19.32	19.55	19.34		
15	64QAM	36	0	18.19	18.42	18.29	19	3
15	64QAM	36	20	18.27	18.45	18.31		
15	64QAM	36	39	18.23	18.41	18.20		
15	64QAM	75	0	18.17	18.40	18.21		

Channel				18650	18900	19150	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	20.91	21.09	20.98	22	0
10	QPSK	1	25	20.97	21.13	20.89		
10	QPSK	1	49	20.93	21.03	20.88		
10	QPSK	25	0	19.96	20.20	19.98	21	1
10	QPSK	25	12	19.96	20.25	20.00		
10	QPSK	25	25	19.88	20.15	19.93		
10	QPSK	50	0	19.90	20.14	20.01		
10	16QAM	1	0	20.37	20.58	20.51	21	1
10	16QAM	1	25	20.34	20.63	20.47		
10	16QAM	1	49	20.32	20.63	20.41		
10	16QAM	25	0	19.22	19.35	19.18	20	2
10	16QAM	25	12	19.17	19.35	19.26		
10	16QAM	25	25	19.20	19.35	19.10		
10	16QAM	50	0	19.07	19.26	19.15		
10	64QAM	1	0	19.33	19.57	19.38	20	2
10	64QAM	1	25	19.36	19.51	19.36		
10	64QAM	1	49	19.26	19.46	19.33		
10	64QAM	25	0	18.12	18.42	18.29	19	3
10	64QAM	25	12	18.22	18.39	18.26		
10	64QAM	25	25	18.21	18.31	18.12		
10	64QAM	50	0	18.13	18.30	18.11		
Channel				18625	18900	19175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	20.88	21.08	20.88	22	0
5	QPSK	1	12	20.96	21.09	20.89		
5	QPSK	1	24	20.87	21.05	20.83		
5	QPSK	12	0	19.98	20.21	19.91	21	1
5	QPSK	12	7	19.98	20.26	19.92		
5	QPSK	12	13	19.93	20.16	19.94		
5	QPSK	25	0	19.94	20.12	19.92		
5	16QAM	1	0	20.42	20.62	20.46	21	1
5	16QAM	1	12	20.39	20.61	20.47		
5	16QAM	1	24	20.33	20.61	20.39		
5	16QAM	12	0	19.12	19.34	19.14	20	2
5	16QAM	12	7	19.14	19.42	19.25		
5	16QAM	12	13	19.10	19.33	19.08		
5	16QAM	25	0	19.08	19.34	19.19		
5	64QAM	1	0	19.38	19.58	19.35	20	2
5	64QAM	1	12	19.33	19.59	19.36		
5	64QAM	1	24	19.22	19.46	19.28		
5	64QAM	12	0	18.14	18.42	18.20	19	3
5	64QAM	12	7	18.23	18.37	18.24		
5	64QAM	12	13	18.23	18.37	18.17		
5	64QAM	25	0	18.07	18.35	18.19		

Channel				18615	18900	19185	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	20.92	21.15	20.89	22	0
3	QPSK	1	8	20.95	21.13	20.87		
3	QPSK	1	14	20.91	21.04	20.89		
3	QPSK	8	0	19.98	20.17	19.91	21	1
3	QPSK	8	4	19.97	20.26	19.97		
3	QPSK	8	7	19.92	20.16	19.88		
3	QPSK	15	0	19.99	20.16	19.96		
3	16QAM	1	0	20.42	20.66	20.46	21	1
3	16QAM	1	8	20.34	20.65	20.46		
3	16QAM	1	14	20.41	20.54	20.45		
3	16QAM	8	0	19.12	19.31	19.17	20	2
3	16QAM	8	4	19.18	19.37	19.20		
3	16QAM	8	7	19.11	19.38	19.12		
3	16QAM	15	0	19.16	19.27	19.13		
3	64QAM	1	0	19.34	19.53	19.36	20	2
3	64QAM	1	8	19.36	19.54	19.37		
3	64QAM	1	14	19.23	19.51	19.31		
3	64QAM	8	0	18.11	18.35	18.29	19	3
3	64QAM	8	4	18.21	18.38	18.24		
3	64QAM	8	7	18.22	18.35	18.14		
3	64QAM	15	0	18.08	18.37	18.15		
Channel				18607	18900	19193	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3		
1.4	QPSK	1	0	20.85	21.08	20.79	22	0
1.4	QPSK	1	3	20.93	21.16	20.90		
1.4	QPSK	1	5	20.85	21.07	20.81		
1.4	QPSK	3	0	20.88	21.11	20.88		
1.4	QPSK	3	1	20.93	21.13	20.87		
1.4	QPSK	3	3	20.88	21.08	20.88		
1.4	QPSK	6	0	19.85	20.10	19.83	21	1
1.4	16QAM	1	0	20.30	20.56	20.35	21	1
1.4	16QAM	1	3	20.40	20.66	20.41		
1.4	16QAM	1	5	20.31	20.57	20.35		
1.4	16QAM	3	0	20.09	20.31	20.09		
1.4	16QAM	3	1	20.15	20.40	20.08		
1.4	16QAM	3	3	20.05	20.32	20.09		
1.4	16QAM	6	0	19.11	19.33	19.12	20	2
1.4	64QAM	1	0	19.31	19.54	19.30	20	2
1.4	64QAM	1	3	19.34	19.58	19.35		
1.4	64QAM	1	5	19.27	19.52	19.31		
1.4	64QAM	3	0	19.25	19.49	19.27		
1.4	64QAM	3	1	19.31	19.53	19.30		
1.4	64QAM	3	3	19.22	19.49	19.26		
1.4	64QAM	6	0	18.05	18.26	18.05	19	3

<LTE Band 25>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				26140	26340	26590		
Frequency (MHz)				1860	1880	1905		
20	QPSK	1	0	20.76	20.97	20.78	22	0
20	QPSK	1	49	20.83	20.96	20.83		
20	QPSK	1	99	20.86	20.83	20.66		
20	QPSK	50	0	19.78	19.96	19.79	21	1
20	QPSK	50	24	19.90	19.97	19.80		
20	QPSK	50	50	19.83	19.94	19.79		
20	QPSK	100	0	19.87	19.96	19.81		
20	16QAM	1	0	20.28	20.47	20.32	21	1
20	16QAM	1	49	20.28	20.47	20.42		
20	16QAM	1	99	20.37	20.36	20.14		
20	16QAM	50	0	19.00	19.13	18.96	20	2
20	16QAM	50	24	19.08	19.15	19.02		
20	16QAM	50	50	19.06	19.13	18.99		
20	16QAM	100	0	19.05	19.10	18.98		
20	64QAM	1	0	19.19	19.38	19.21	20	2
20	64QAM	1	49	19.20	19.40	19.28		
20	64QAM	1	99	19.29	19.30	19.17		
20	64QAM	50	0	17.96	18.14	17.99	19	3
20	64QAM	50	24	18.08	18.15	18.04		
20	64QAM	50	50	18.06	18.13	18.03		
20	64QAM	100	0	18.07	18.15	18.04		
Channel				26115	26340	26615	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1907.5		
15	QPSK	1	0	20.79	20.92	20.78	22	0
15	QPSK	1	37	20.78	20.95	20.71		
15	QPSK	1	74	20.85	20.82	20.65		
15	QPSK	36	0	19.79	20.00	19.83	21	1
15	QPSK	36	20	19.83	20.04	19.88		
15	QPSK	36	39	19.91	20.00	19.77		
15	QPSK	75	0	19.92	19.98	19.85		
15	16QAM	1	0	20.27	20.48	20.38	21	1
15	16QAM	1	37	20.26	20.46	20.27		
15	16QAM	1	74	20.33	20.34	20.22		
15	16QAM	36	0	19.03	19.17	19.07	20	2
15	16QAM	36	20	19.07	19.24	19.10		
15	16QAM	36	39	19.10	19.19	19.01		
15	16QAM	75	0	19.06	19.17	19.08		
15	64QAM	1	0	19.21	19.41	19.29	20	2
15	64QAM	1	37	19.19	19.39	19.22		
15	64QAM	1	74	19.25	19.25	19.12		
15	64QAM	36	0	18.04	18.20	18.11	19	3
15	64QAM	36	20	18.10	18.25	18.16		
15	64QAM	36	39	18.13	18.22	18.03		
15	64QAM	75	0	18.09	18.17	18.05		

Channel				26090	26340	26640	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1910		
10	QPSK	1	0	20.71	20.83	20.77	22	0
10	QPSK	1	25	20.68	20.88	20.63		
10	QPSK	1	49	20.75	20.75	20.55		
10	QPSK	25	0	19.74	19.93	19.76	21	1
10	QPSK	25	12	19.82	19.98	19.84		
10	QPSK	25	25	19.86	19.92	19.70		
10	QPSK	50	0	19.88	19.98	19.83		
10	16QAM	1	0	20.25	20.47	20.33	21	1
10	16QAM	1	25	20.19	20.46	20.27		
10	16QAM	1	49	20.32	20.34	20.20		
10	16QAM	25	0	18.94	19.14	19.00	20	2
10	16QAM	25	12	19.05	19.24	19.05		
10	16QAM	25	25	19.04	19.09	18.92		
10	16QAM	50	0	18.96	19.12	18.98		
10	64QAM	1	0	19.18	19.37	19.28	20	2
10	64QAM	1	25	19.10	19.30	19.15		
10	64QAM	1	49	19.17	19.17	19.12		
10	64QAM	25	0	17.99	18.20	18.08	19	3
10	64QAM	25	12	18.01	18.18	18.14		
10	64QAM	25	25	18.06	18.18	18.03		
10	64QAM	50	0	17.99	18.11	17.99		
Channel				26065	26340	26665	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1912.5		
5	QPSK	1	0	20.76	20.88	20.76	22	0
5	QPSK	1	12	20.68	20.90	20.66		
5	QPSK	1	24	20.82	20.72	20.57		
5	QPSK	12	0	19.72	19.94	19.75	21	1
5	QPSK	12	7	19.82	20.02	19.79		
5	QPSK	12	13	19.85	19.92	19.75		
5	QPSK	25	0	19.84	19.88	19.79		
5	16QAM	1	0	20.27	20.38	20.34	21	1
5	16QAM	1	12	20.21	20.42	20.24		
5	16QAM	1	24	20.23	20.34	20.17		
5	16QAM	12	0	19.01	19.15	19.02	20	2
5	16QAM	12	7	18.99	19.20	19.03		
5	16QAM	12	13	19.00	19.17	18.99		
5	16QAM	25	0	19.02	19.13	19.06		
5	64QAM	1	0	19.13	19.38	19.28	20	2
5	64QAM	1	12	19.11	19.36	19.22		
5	64QAM	1	24	19.15	19.21	19.03		
5	64QAM	12	0	18.04	18.16	18.07	19	3
5	64QAM	12	7	18.05	18.22	18.13		
5	64QAM	12	13	18.07	18.17	17.98		
5	64QAM	25	0	18.09	18.11	17.97		

Channel				26055	26340	26675	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1913.5		
3	QPSK	1	0	20.70	20.83	20.78	22	0
3	QPSK	1	8	20.71	20.86	20.63		
3	QPSK	1	14	20.77	20.73	20.59		
3	QPSK	8	0	19.75	19.91	19.73	21	1
3	QPSK	8	4	19.76	20.00	19.84		
3	QPSK	8	7	19.88	19.95	19.76		
3	QPSK	15	0	19.92	19.93	19.82		
3	16QAM	1	0	20.24	20.45	20.29	21	1
3	16QAM	1	8	20.19	20.42	20.23		
3	16QAM	1	14	20.28	20.24	20.21		
3	16QAM	8	0	18.97	19.15	19.07	20	2
3	16QAM	8	4	18.98	19.15	19.00		
3	16QAM	8	7	19.01	19.13	18.92		
3	16QAM	15	0	19.01	19.15	19.03		
3	64QAM	1	0	19.17	19.33	19.21	20	2
3	64QAM	1	8	19.15	19.36	19.12		
3	64QAM	1	14	19.21	19.21	19.07		
3	64QAM	8	0	17.98	18.17	18.05	19	3
3	64QAM	8	4	18.10	18.24	18.14		
3	64QAM	8	7	18.08	18.13	17.96		
3	64QAM	15	0	18.02	18.10	17.97		
Channel				26047	26340	26683	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1914.3		
1.4	QPSK	1	0	20.58	20.88	20.59	22	0
1.4	QPSK	1	3	20.67	20.96	20.66		
1.4	QPSK	1	5	20.56	20.87	20.60		
1.4	QPSK	3	0	20.61	20.92	20.66		
1.4	QPSK	3	1	20.66	20.94	20.66		
1.4	QPSK	3	3	20.63	20.90	20.65		
1.4	QPSK	6	0	19.60	19.89	19.65	21	1
1.4	16QAM	1	0	20.02	20.37	20.15	21	1
1.4	16QAM	1	3	20.14	20.48	20.24		
1.4	16QAM	1	5	20.01	20.38	20.09		
1.4	16QAM	3	0	19.80	20.10	19.92		
1.4	16QAM	3	1	19.85	20.18	19.89		
1.4	16QAM	3	3	19.78	20.13	19.87		
1.4	16QAM	6	0	18.84	19.14	18.93	20	2
1.4	64QAM	1	0	19.03	19.35	19.11	20	2
1.4	64QAM	1	3	19.05	19.38	19.19		
1.4	64QAM	1	5	18.98	19.30	19.12		
1.4	64QAM	3	0	18.96	19.25	19.08		
1.4	64QAM	3	1	18.99	19.32	19.09		
1.4	64QAM	3	3	18.92	19.28	19.04		
1.4	64QAM	6	0	17.77	18.10	17.88	22	0

<LTE Carrier Aggregation combinations>

General Note:

1. This device supports Carrier Aggregation on downlink only for inter and intra band, on uplink for intra band. For the device supports combination bands and configurations are provided as follow table.
2. In applying the existing power measurement procedure of KDB 941225 D05A for DL CA SAR test exclusion, only the subset with the largest number of combinations of the frequency band and CCs in each row need consideration, and that configurations require power measurement should be highlighted in the below table.
3. All permutations exist. No restrictions on Pcell & Scell combinations. Only LTE Band 29A is limited to Scell.

<Inter-Band combinations>

2 bands / 2 CC	2 bands / 3 CC	3 bands / 3 CC
CA_2A-4A CA_2A-5A CA_2A-7A CA_4A-5A	CA_2A-7A-7A	CA_2A-4A-5A CA_2A-4A-7A CA_2A-7A-12A
CA_2A-12A CA_2A-29A CA_4A-29A	CA_2A-12B CA_4A-4A-29A	CA_2A-4A-12A CA_2A-4A-29A
CA_4A-7A CA_4A-12A	CA_4A-4A-12A CA_4A-12B CA_4A-7A-7A	CA_4A-7A-12A
CA_12A-66A	CA_12A-66A-66A CA_12A-66C	
CA_2A-13A CA_2A-17A CA_4A-13A CA_4A-17A CA_5A-7A CA_5A-25A CA_12A-25A		

<Intra-Band combinations>

Intra-Band Contigous	Intra-Band Non-Contigous
7C 12B 66C	CA_2A-2A CA_7A-7A CA_4A-4A CA_25A-25A CA_66A-66A

<Power verification when LTE Carrier Aggregation Active>

General Note:

i. According to KDB941225 D05A v01r02, Uplink maximum output power measurement with downlink carrier aggregation active should be measured, using the highest output channel measured without downlink carrier aggregation, to confirm that uplink maximum output power with downlink carrier aggregation active remains within the specified tune-up tolerance limits and not more than ¼ dB higher than the maximum output measured without downlink carrier aggregation active.

ii. Uplink maximum output power with downlink carrier aggregation active does not show more than ¼ dB higher than the maximum output power without downlink carrier aggregation active, therefore SAR evaluation with downlink carrier aggregation active can be excluded.

iii. The device supports downlink two carrier aggregation. For power measurement were control and acknowledge data is sent on uplink channels that operate identical to specifications when downlink carrier aggregation is inactive.

iv. Selected highest measured power when downlink carrier aggregation is inactive for conducted power comparison with downlink carrier aggregation is active, to confirm that when downlink carrier aggregation is active uplink maximum output power remains within the specified tune-up tolerance limits and not more than ¼ dB higher than the maximum output power measured when downlink carrier aggregation inactive.

v. For non-contiguous intra-band CA, the SCC selected to provide maximum separation from the PCC and must remain fully within the downlink transmission band.

vi. The device supports uplink carrier aggregation for LTE B41C with a maximum of two 20MHz component carriers. For intra band contiguous carrier aggregation scenarios, 3GPP 36.101 table 6.2.2A-1 specifies that the aggregate maximum allowed output power is equivalent to the single carrier scenario. 3GPP 36.101 6.2.3A allows for several dB of MPR to be applied when not-contiguous RB allocation is implemented. The conducted power and MPR setting in this device are permanently implemented pre the above 3GPP requirement.

vii. According TCB workshop, the output power with uplink CA active was measured for the configuration with the highest reported SAR with single carrier for each exposure condition. The power was measured with wideband signal integration over both component carriers.

viii. Uplink CA is only operating LTE B7, and additional SAR measurement for TLE UL CA whit other DL CA combinations active were not required since the maximum output power for this configuration was not > 0.25dB higher than the maximum output power for UL CA _7C active.

ix. For inter-band CA, the SCC selected highest bandwidth and near the middle of its transmission band.

x. For Intra-band, contiguous CA, the downlink channels selected to perform the uplink power measurement must satisfy 3GPP channel spacing (5.4.1A of 3GPP TS 36.521 or equivalent) and channel bandwidth (5.4.2A) requirements.

$$\text{Nominal channel spacing} = \left\lfloor \frac{BW_{Channel(1)} + BW_{Channel(2)} - 0.1\left|BW_{Channel(1)} - BW_{Channel(2)}\right|}{0.6} \right\rfloor 0.3 \ \ [\text{MHz}]$$

<Two Carrier power verification>

Configure		PCC							SCC				Power	
		LTE Band	BW (MHz)	UL Freq. (MHz)	UL Channel	Mod.	UL# RB	UL RB Offset	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	With CA Tx.Power (dBm)	W/O CA Tx.Power (dBm)
Inter-Band		2	20	1880	18900	QPSK	1	0	13	10	751	5230	22.81	22.82
		13	10	782	23230	QPSK	1	0	2	20	1960	900	24.30	24.36
		2	10	1880	18900	QPSK	1	0	17	10	740	5790	22.80	22.82
		17	10	711	23800	QPSK	1	0	2	10	1960	900	24.33	24.38
		4	20	1745	20300	QPSK	1	0	13	10	751	5230	24.32	24.32
		13	10	782	23230	QPSK	1	0	4	20	2132.5	2175	24.32	24.36
		4	10	1750	20350	QPSK	1	0	17	10	740	5790	24.20	24.27
		17	10	711	23800	QPSK	1	0	4	10	2132.5	2175	24.30	24.38
		5	10	829	20450	QPSK	1	0	7	20	2655	3100	24.31	24.35
		7	20	2560	21350	QPSK	1	49	5	10	881.5	2525	24.38	24.45
		5	10	829	20450	QPSK	1	0	25	20	1960	8340	24.32	24.35
		25	20	1880	26340	QPSK	1	0	5	10	881.5	2525	22.82	22.83
		12	10	704	23060	QPSK	1	0	25	20	1960	8340	24.45	24.48
		25	20	1880	26340	QPSK	1	0	12	10	737.5	5095	22.80	22.83
Intra-Band	Non-Contiguous	2	20	1880	18900	QPSK	1	0	2	5	1987.5	1175	22.81	22.82
		7	20	2560	21350	QPSK	1	49	7	5	2622.5	2775	24.38	24.45
		4	20	1745	20300	QPSK	1	0	4	5	2152.5	2375	24.29	24.32
		25	20	1880	26340	QPSK	1	0	25	5	1992.5	8665	22.82	22.83
		66	20	1745	132322	QPSK	1	0	66	5	2197.5	67311	23.63	23.72
	Contiguous	7	20	2560	21350	QPSK	1	49	7	20	2660.20	3152	24.43	24.45
		12	10	704	23060	QPSK	1	0	12	5	741.20	5132	24.40	24.48
		66	20	1745	132322	QPSK	1	0	66	20	2164.80	66984	23.71	23.72

<Three Carrier power verification>

Configure	PCC							SCC1				SCC2				Power	
	LTE Band	BW (MHz)	UL Freq. (MHz)	UL Channel	Mod.	UL# RB	UL RB Offset	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	With CA Tx.Power (dBm)	W/O CA Tx.Power (dBm)
Inter-Band	2	20	1880	18900	QPSK	1	0	4	20	2132.5	2175	5	10	881.5	2525	22.79	22.82
	4	20	1745	20300	QPSK	1	0	2	20	1960	900	5	10	881.5	2525	24.22	24.32
	5	10	829	20450	QPSK	1	0	2	20	1960	900	4	20	2132.5	2175	24.25	24.35
	2	20	1880	18900	QPSK	1	0	4	20	2132.5	2175	7	20	2655	3100	22.76	22.82
	4	20	1745	20300	QPSK	1	0	2	20	1960	900	7	20	2655	3100	24.29	24.32
	7	20	2560	21350	QPSK	1	49	2	20	1960	900	4	20	2132.5	2175	24.38	24.45
	2	20	1880	18900	QPSK	1	0	4	20	2132.5	2175	12	10	737.5	5095	22.74	22.82
	4	20	1745	20300	QPSK	1	0	2	20	1960	900	12	10	737.5	5095	24.23	24.32
	12	10	704	23060	QPSK	1	0	2	20	1960	900	4	20	2132.5	2175	24.46	24.48
	2	20	1880	18900	QPSK	1	0	4	20	2132.5	2175	29	10	722.5	9715	22.76	22.82
	4	20	1745	20300	QPSK	1	0	2	20	1960	900	29	10	722.5	9715	24.26	24.32
	2	20	1880	18900	QPSK	1	0	7	20	2655	3100	12	10	737.5	5095	22.82	22.82
	7	20	2560	21350	QPSK	1	49	2	20	1960	900	12	10	737.5	5095	24.43	24.45
	12	10	704	23060	QPSK	1	0	2	20	1960	900	7	20	2655	3100	24.48	24.48
	4	20	1745	20300	QPSK	1	0	7	20	2655	3100	12	10	737.5	5095	24.22	24.32
	7	20	2560	21350	QPSK	1	49	4	20	2132.5	2175	12	10	737.5	5095	24.36	24.45
	12	10	704	23060	QPSK	1	0	4	20	2132.5	2175	7	20	2655	3100	24.44	24.48
	12	10	704	23060	QPSK	1	0	66	20	2155	66886	66	5	2197.5	67311	24.40	24.48
	66	20	1745	132322	QPSK	1	0	66	5	2197.5	67311	12	10	737.5	5095	23.71	23.72
	12	10	704	23060	QPSK	1	0	66	20	2155	66886	66	20	2174.8	67084	24.48	24.48
	66	20	1745	132322	QPSK	1	0	66	20	2164.8	66984	12	10	737.5	5095	23.65	23.72

<Uplink carrier aggregation power measurement>

CA_7C									
Combination 20MHz+20MHz (100RB+100RB)									
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
20850	21048	QPSK	1	0	0	0	1	0	24.36	24.5
21100	20902	QPSK	1	0	1	99	2	0	24.12	24.5
21350	21152	QPSK	1	0	1	99	2	0	24.19	24.5

<WLAN Conducted Power>

General Note:

4. Per KDB 248227 D01v02r02, SAR test reduction is determined according to 802.11 transmission mode configurations and certain exposure conditions with multiple test positions. In the 2.4 GHz band, separate SAR procedures are applied to DSSS and OFDM configurations to simplify DSSS test requirements. For OFDM, in both 2.4 and 5 GHz bands, an initial test configuration must be determined for each standalone and aggregated frequency band, according to the transmission mode configuration with the highest maximum output power specified for production units to perform SAR measurements. If the same highest maximum output power applies to different combinations of channel bandwidths, modulations and data rates, additional procedures are applied to determine which test configurations require SAR measurement. When applicable, an initial test position may be applied to reduce the number of SAR measurements required for next to the ear, UMPC mini-tablet or hotspot mode configurations with multiple test positions.
5. For 2.4 GHz 802.11b DSSS, either the initial test position procedure for multiple exposure test positions or the DSSS procedure for fixed exposure position is applied; these are mutually exclusive. For 2.4 GHz and 5 GHz OFDM configurations, the initial test configuration is applied to measure SAR using either the initial test position procedure for multiple exposure test position configurations or the initial test configuration procedures for fixed exposure test conditions. Based on the reported SAR of the measured configurations and maximum output power of the transmission mode configurations that are not included in the initial test configuration, the subsequent test configuration and initial test position procedures are applied to determine if SAR measurements are required for the remaining OFDM transmission configurations. In general, the number of test channels that require SAR measurement is minimized based on maximum output power measured for the test sample(s).
6. For OFDM transmission configurations in the 2.4 GHz and 5 GHz bands, When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel for each frequency band.
7. DSSS and OFDM configurations are considered separately according to the required SAR procedures. SAR is measured in the initial test position using the 802.11 transmission mode configuration required by the DSSS procedure or initial test configuration and subsequent test configuration(s) according to the OFDM procedures.18 The initial test position procedure is described in the following:
    a. When the reported SAR of 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 802.11 transmission mode combinations within the frequency band or aggregated band.
    b. When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode 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 report SAR is ≤ 0.8 W/kg or all required test position are tested.
    c. For all positions/configurations, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

<2.4GHz WLAN>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	18.46	18.50	99.04
		6	2437	18.48	18.50	
		11	2462	18.24	18.50	
	802.11g 6Mbps	1	2412	13.99	14.00	94.77
		6	2437	13.91	14.00	
		11	2462	13.85	14.00	
	802.11n-HT20 MCS0	1	2412	13.99	14.00	94.50
		6	2437	13.78	14.00	
		11	2462	13.72	14.00	

<5GHz WLAN>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11a 6Mbps	36	5180	14.95	15.00	94.86
		40	5200	14.85	15.00	
		44	5220	14.99	15.00	
		48	5240	14.88	15.00	
	802.11n-HT20 MCS0	36	5180	13.87	14.00	95.45
		40	5200	13.66	14.00	
		44	5220	13.93	14.00	
		48	5240	13.99	14.00	
	802.11n-HT40 MCS0	38	5190	12.73	13.00	90.64
		46	5230	12.98	13.00	
	802.11ac-VHT20 MCS0	36	5180	13.80	14.00	95.02
		40	5200	13.65	14.00	
		44	5220	13.92	14.00	
		48	5240	13.98	14.00	
	802.11ac-VHT40 MCS0	38	5190	12.67	13.00	91.72
		46	5230	12.97	13.00	
	802.11ac-VHT80 MCS0	42	5210	11.65	12.00	91.03

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN	802.11a 6Mbps	52	5260	14.76	15.00	94.86
		56	5280	14.61	15.00	
		60	5300	14.75	15.00	
		64	5320	14.84	15.00	
	802.11n-HT20 MCS0	52	5260	13.81	14.00	95.45
		56	5280	13.98	14.00	
		60	5300	13.73	14.00	
		64	5320	13.87	14.00	
	802.11n-HT40 MCS0	54	5270	12.80	13.00	90.64
		62	5310	12.67	13.00	
	802.11ac-VHT20 MCS0	52	5260	13.80	14.00	95.02
		56	5280	13.97	14.00	
		60	5300	13.72	14.00	
		64	5320	13.86	14.00	
	802.11ac-VHT40 MCS0	54	5270	12.76	13.00	91.72
		62	5310	12.62	13.00	
	802.11ac-VHT80 MCS0	58	5290	11.83	12.00	91.03

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN	802.11a 6Mbps	100	5500	16.48	16.50	94.86
		116	5580	16.49	16.50	
		124	5620	16.32	16.50	
		132	5660	16.47	16.50	
		144	5720	16.19	16.50	
	802.11n-HT20 MCS0	100	5500	13.70	14.00	95.45
		116	5580	13.75	14.00	
		124	5620	13.92	14.00	
		132	5660	13.91	14.00	
		144	5720	13.99	14.00	
	802.11n-HT40 MCS0	102	5510	12.94	13.00	90.64
		110	5550	12.79	13.00	
		126	5630	12.93	13.00	
		134	5670	12.78	13.00	
		142	5710	12.98	13.00	
	802.11ac-VHT20 MCS0	100	5500	13.66	14.00	95.02
		116	5580	13.74	14.00	
		124	5620	13.91	14.00	
		132	5660	13.90	14.00	
		144	5720	13.98	14.00	
	802.11ac-VHT40 MCS0	102	5510	12.93	13.00	91.72
		110	5550	12.68	13.00	
		126	5630	12.88	13.00	
		134	5670	12.76	13.00	
		142	5710	12.97	13.00	
	802.11ac-VHT80 MCS0	106	5530	11.98	12.00	91.03
		122	5610	11.99	12.00	
		138	5690	11.96	12.00	

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
0.8	802.11a 6Mbps	149	5745	16.36	16.50	94.86
		157	5785	16.21	16.50	
		165	5825	16.46	16.50	
	802.11n-HT20 MCS0	149	5745	13.90	14.00	95.45
		157	5785	13.77	14.00	
		165	5825	13.96	14.00	
	802.11n-HT40 MCS0	151	5755	12.89	13.00	90.64
		159	5795	12.99	13.00	
	802.11ac-VHT20 MCS0	149	5745	13.89	14.00	95.02
		157	5785	13.76	14.00	
		165	5825	13.95	14.00	
	802.11ac-VHT40 MCS0	151	5755	12.87	13.00	91.72
		159	5795	12.96	13.00	
	802.11ac-VHT80 MCS0	155	5775	11.72	12.00	91.03

<2.4GHz Bluetooth>

Mode	Channel	Frequency (MHz)	Average power (dBm)		
			1Mbps	2Mbps	3Mbps
BR / EDR	CH 00	2402	9.23	6.23	6.28
	CH 39	2441	8.62	5.56	5.60
	CH 78	2480	8.69	5.68	5.74
Tune-up Limit			10.50	7.00	7.00

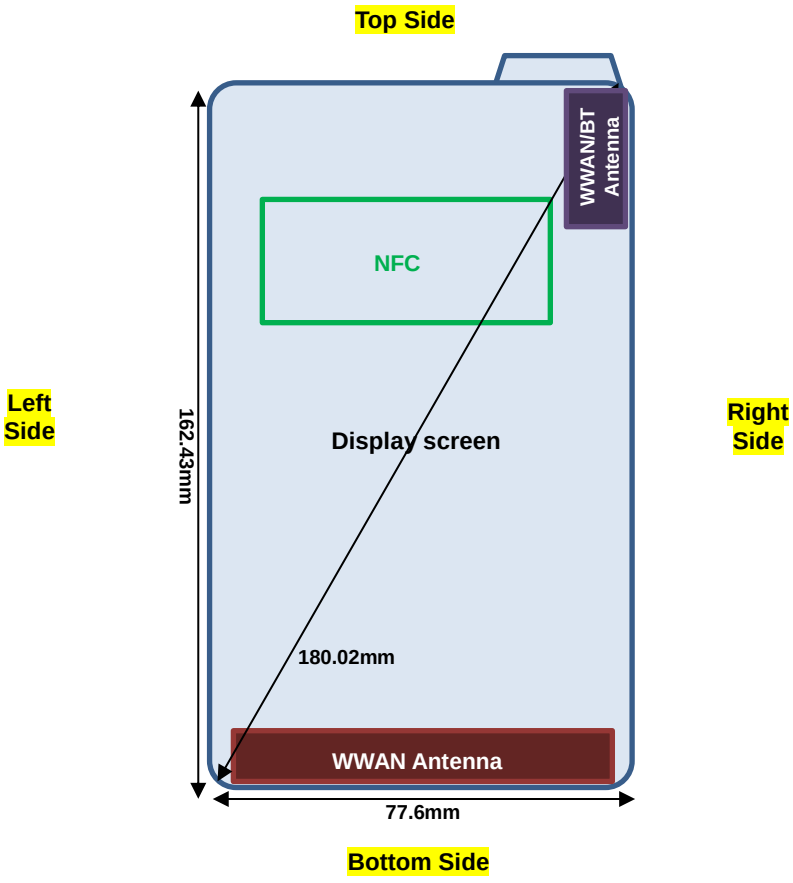
Mode	Channel	Frequency (MHz)	Average power (dBm)	
			1Mbps	2Mbps
LE	CH 00	2402	0.45	0.45
	CH 19	2440	0.47	0.48
	CH 39	2480	0.96	0.98
Tune-up Limit			1.50	1.50

General Note:

1. For 2.4GHz Bluetooth SAR testing was selected 1Mbps due to its highest average power and duty cycle is 77.13% considered in SAR testing.

13. Antenna Location

<Mobile Phone>



Front View

Distance of the Antenna to the EUT surface/edge						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN Main	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	≤ 25mm	≤ 25mm
BT&WLAN	≤ 25mm	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	>25mm

Positions for SAR tests; Hotspot mode						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN Main	Yes	Yes	No	Yes	Yes	Yes
BT&WLAN	Yes	Yes	Yes	No	Yes	No

General Note:

1. Referring to KDB 941225 D06 v02r01, when the overall device length and width are ≥ 9cm*5cm, the test distance is 10 mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge

14. SAR Test Results

General Note:

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
   a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
   b. For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
   c. For WWAN/Bluetooth: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
   d. For WLAN: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
2. Per KDB 447498 D01v06, for each exposure position, 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
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.
4. Per KDB 648474 D04v01r03, when the reported SAR for a body-worn accessory measured without a headset connected to the handset is ≤ 1.2 W/kg, SAR testing with a headset connected to the handset is not required.
5. Per KDB648474 D04v01r03, for smart phones with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm, when hotspot mode applies, 10-g product specific SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg, however, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold, for WWAN transmitter scaled to maximum output power is higher than 1.2W/kg of WCDMA B2 and LTE B25, therefore product specific SAR is necessary.
6. For 5.3GHz / 5.5GHz WLAN product specific SAR is necessary too, due to an overall diagonal dimension is > 16cm.

GSM Note:

1. Per KDB 941225 D01v03r01, for SAR test reduction for GSM / GPRS / EDGE / DTM modes is determined by the source-based time-averaged output power including tune-up tolerance. The mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested. Therefore, the GPRS (4Tx slots) for GSM850/GSM1900 is considered as the primary mode.
2. Other configurations of GSM / GPRS / EDGE / DTM are considered as secondary modes. The 3G SAR test reduction procedure is applied, when the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode, SAR measurement is not required for the secondary mode.
3. Power reduction which is triggered by hotspot mode is implemented in GSM1900 band, for hotspot mode SAR testing EUT was set in reduced power mode and GPRS 4 Tx slot due to its highest frame-average power.

UMTS Note:

1. Per KDB 941225 D01v03r01, for SAR testing is measured using a 12.2 kbps RMC with TPC bits configured to all “1’s”.
2. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. The maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA is ≤ ¼ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA, and according to the following RF output power, the output power results of the secondary modes (HSUPA, HSDPA, DC-HSDPA) are less than ¼ dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA.

LTE Note:

1. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
2. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
3. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
4. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
5. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
6. For LTE B12 / B5 / B4 / B17 / B26 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
7. LTE band 2 / 17 SAR test was covered by Band 25 / 12; according to TCB workshop, SAR test for overlapping LTE bands can be reduced if
   a. The maximum output power, including tolerance, for the smaller band is ≤ the larger band to qualify for the SAR test exclusion.
   b. The channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band.

WLAN Note:

1. Per KDB 248227 D01v02r02, for 2.4GHz 802.11g/n SAR testing is not required 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.
2. Per KDB 248227 D01v02r02, U-NII-1 SAR testing is not required when the U-NII-2A band highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band.
3. When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode 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 report SAR is ≤ 0.8 W/kg or all required test position are tested.
4. For all positions / configurations, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions / configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.
5. During SAR testing the WLAN transmission was verified using a spectrum analyzer.

14.1 Head SAR

<GSM SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	GSM850	GPRS (4 Tx slots)	Right Cheek	0mm	251	848.8	28.30	28.50	1.047	0.12	0.194	0.203
01	GSM850	GPRS (4 Tx slots)	Right Cheek	0mm	128	824.2	27.94	28.50	1.138	0.07	0.297	0.338
	GSM850	GPRS (4 Tx slots)	Right Cheek	0mm	189	836.4	28.05	28.50	1.109	0.07	0.245	0.272
	GSM850	GPRS (4 Tx slots)	Right Tilted	0mm	251	848.8	28.30	28.50	1.047	-0.07	0.091	0.095
	GSM850	GPRS (4 Tx slots)	Left Cheek	0mm	251	848.8	28.30	28.50	1.047	0.1	0.131	0.137
	GSM850	GPRS (4 Tx slots)	Left Tilted	0mm	251	848.8	28.30	28.50	1.047	0.06	0.099	0.104
	GSM1900	GPRS (4 Tx slots)	Right Cheek	0mm	810	1909.8	24.42	25.00	1.143	0.19	0.152	0.174
	GSM1900	GPRS (4 Tx slots)	Right Tilted	0mm	810	1909.8	24.42	25.00	1.143	0.07	0.133	0.152
	GSM1900	GPRS (4 Tx slots)	Left Cheek	0mm	810	1909.8	24.42	25.00	1.143	0.01	0.314	0.359
02	GSM1900	GPRS (4 Tx slots)	Left Cheek	0mm	512	1850.2	24.26	25.00	1.186	0.06	0.571	0.677
	GSM1900	GPRS (4 Tx slots)	Left Cheek	0mm	661	1880	24.40	25.00	1.148	-0.01	0.473	0.543
	GSM1900	GPRS (4 Tx slots)	Left Tilted	0mm	810	1909.8	24.42	25.00	1.143	0.18	0.173	0.198

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WCDMA II	RMC 12.2Kbps	Right Cheek	0mm	9400	1880	22.77	23.00	1.054	0.18	0.417	0.440
	WCDMA II	RMC 12.2Kbps	Right Tilted	0mm	9400	1880	22.77	23.00	1.054	0.1	0.257	0.271
	WCDMA II	RMC 12.2Kbps	Left Cheek	0mm	9400	1880	22.77	23.00	1.054	0.08	0.533	0.562
03	WCDMA II	RMC 12.2Kbps	Left Cheek	0mm	9262	1852.4	22.68	23.00	1.076	-0.11	0.630	0.678
	WCDMA II	RMC 12.2Kbps	Left Cheek	0mm	9538	1907.6	22.54	23.00	1.112	0.07	0.350	0.389
	WCDMA II	RMC 12.2Kbps	Left Tilted	0mm	9400	1880	22.77	23.00	1.054	-0.07	0.266	0.280
	WCDMA IV	RMC 12.2Kbps	Right Cheek	0mm	1413	1732.6	24.29	24.50	1.050	-0.09	0.583	0.612
	WCDMA IV	RMC 12.2Kbps	Right Tilted	0mm	1413	1732.6	24.29	24.50	1.050	0.03	0.321	0.337
	WCDMA IV	RMC 12.2Kbps	Left Cheek	0mm	1413	1732.6	24.29	24.50	1.050	0.13	0.735	0.771
	WCDMA IV	RMC 12.2Kbps	Left Cheek	0mm	1312	1712.4	24.18	24.50	1.076	0.03	0.670	0.721
04	WCDMA IV	RMC 12.2Kbps	Left Cheek	0mm	1513	1752.6	24.18	24.50	1.076	-0.05	0.732	0.788
	WCDMA IV	RMC 12.2Kbps	Left Tilted	0mm	1413	1732.6	24.29	24.50	1.050	0.03	0.368	0.386
	WCDMA V	RMC 12.2Kbps	Right Cheek	0mm	4182	836.4	24.79	25.00	1.050	0.07	0.294	0.309
05	WCDMA V	RMC 12.2Kbps	Right Cheek	0mm	4132	826.4	24.40	25.00	1.148	0.05	0.298	0.342
	WCDMA V	RMC 12.2Kbps	Right Cheek	0mm	4233	846.6	24.70	25.00	1.072	0.16	0.311	0.333
	WCDMA V	RMC 12.2Kbps	Right Tilted	0mm	4182	836.4	24.79	25.00	1.050	0.03	0.146	0.153
	WCDMA V	RMC 12.2Kbps	Left Cheek	0mm	4182	836.4	24.79	25.00	1.050	0.12	0.201	0.211
	WCDMA V	RMC 12.2Kbps	Left Tilted	0mm	4182	836.4	24.79	25.00	1.050	0.08	0.126	0.132

<LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 4	20M	QPSK	1	0	Right Cheek	0mm	20175	1732.5	24.18	24.50	1.076	-0.02	0.609	0.656
	LTE Band 4	20M	QPSK	50	0	Right Cheek	0mm	20175	1732.5	23.28	23.50	1.052	0.1	0.525	0.552
	LTE Band 4	20M	QPSK	1	0	Right Tilted	0mm	20175	1732.5	24.18	24.50	1.076	-0.11	0.239	0.257
	LTE Band 4	20M	QPSK	50	0	Right Tilted	0mm	20175	1732.5	23.28	23.50	1.052	0	0.207	0.218
06	LTE Band 4	20M	QPSK	1	0	Left Cheek	0mm	20175	1732.5	24.18	24.50	1.076	-0.11	0.678	0.730
	LTE Band 4	20M	QPSK	50	0	Left Cheek	0mm	20175	1732.5	23.28	23.50	1.052	0.09	0.557	0.586
	LTE Band 4	20M	QPSK	1	0	Left Tilted	0mm	20175	1732.5	24.18	24.50	1.076	0.02	0.247	0.266
	LTE Band 4	20M	QPSK	50	0	Left Tilted	0mm	20175	1732.5	23.28	23.50	1.052	0.13	0.212	0.223
07	LTE Band 5	10M	QPSK	1	0	Right Cheek	0mm	20525	836.5	24.24	24.50	1.062	-0.08	0.210	0.223
	LTE Band 5	10M	QPSK	25	0	Right Cheek	0mm	20525	836.5	23.30	23.50	1.047	0.05	0.198	0.207
	LTE Band 5	10M	QPSK	1	0	Right Tilted	0mm	20525	836.5	24.24	24.50	1.062	-0.01	0.124	0.132
	LTE Band 5	10M	QPSK	25	0	Right Tilted	0mm	20525	836.5	23.30	23.50	1.047	0.04	0.120	0.126
	LTE Band 5	10M	QPSK	1	0	Left Cheek	0mm	20525	836.5	24.24	24.50	1.062	0.15	0.164	0.174
	LTE Band 5	10M	QPSK	25	0	Left Cheek	0mm	20525	836.5	23.30	23.50	1.047	0.12	0.154	0.161
	LTE Band 5	10M	QPSK	1	0	Left Tilted	0mm	20525	836.5	24.24	24.50	1.062	-0.02	0.151	0.160
	LTE Band 5	10M	QPSK	25	0	Left Tilted	0mm	20525	836.5	23.30	23.50	1.047	0.12	0.144	0.151
	LTE Band 7	20M	QPSK	1	49	Right Cheek	0mm	21350	2560	24.45	24.50	1.012	0.15	0.349	0.353
08	LTE Band 7	20M	QPSK	1	49	Right Cheek	0mm	20850	2510	24.37	24.50	1.030	-0.09	0.555	0.572
	LTE Band 7	20M	QPSK	1	49	Right Cheek	0mm	21100	2535	24.42	24.50	1.019	0.13	0.467	0.476
	LTE Band 7	20M	QPSK	50	0	Right Cheek	0mm	21350	2560	23.43	23.50	1.016	0.18	0.291	0.296
	LTE Band 7	20M	QPSK	1	49	Right Tilted	0mm	21350	2560	24.45	24.50	1.012	0.16	0.036	0.036
	LTE Band 7	20M	QPSK	50	0	Right Tilted	0mm	21350	2560	23.43	23.50	1.016	0.18	0.025	0.025
	LTE Band 7	20M	QPSK	1	49	Left Cheek	0mm	21350	2560	24.45	24.50	1.012	0.15	0.114	0.115
	LTE Band 7	20M	QPSK	50	0	Left Cheek	0mm	21350	2560	23.43	23.50	1.016	0.11	0.090	0.091
	LTE Band 7	20M	QPSK	1	49	Left Tilted	0mm	21350	2560	24.45	24.50	1.012	0.17	0.051	0.052
	LTE Band 7	20M	QPSK	50	0	Left Tilted	0mm	21350	2560	23.43	23.50	1.016	0.08	0.038	0.039
	LTE Band 7_UL CA	20M	QPSK	1	0	Right Cheek	0mm	20850+21048	2510+2529.8	24.36	24.50	1.033	0.16	0.476	0.492
09	LTE Band 12	10M	QPSK	1	0	Right Cheek	0mm	23095	707.5	24.41	24.50	1.021	0.06	0.125	0.128
	LTE Band 12	10M	QPSK	25	0	Right Cheek	0mm	23095	707.5	23.31	23.50	1.045	0.09	0.122	0.127
	LTE Band 12	10M	QPSK	1	0	Right Tilted	0mm	23095	707.5	24.41	24.50	1.021	0.03	0.078	0.080
	LTE Band 12	10M	QPSK	25	0	Right Tilted	0mm	23095	707.5	23.31	23.50	1.045	0.11	0.070	0.073
	LTE Band 12	10M	QPSK	1	0	Left Cheek	0mm	23095	707.5	24.41	24.50	1.021	0.06	0.112	0.114
	LTE Band 12	10M	QPSK	25	0	Left Cheek	0mm	23095	707.5	23.31	23.50	1.045	0.08	0.101	0.106
	LTE Band 12	10M	QPSK	1	0	Left Tilted	0mm	23095	707.5	24.41	24.50	1.021	0.05	0.079	0.081
	LTE Band 12	10M	QPSK	25	0	Left Tilted	0mm	23095	707.5	23.31	23.50	1.045	0.04	0.071	0.074

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
10	LTE Band 13	10M	QPSK	1	0	Right Cheek	0mm	23230	782	24.36	24.50	1.033	0.04	0.160	0.165
	LTE Band 13	10M	QPSK	25	0	Right Cheek	0mm	23230	782	23.42	23.50	1.019	0.09	0.142	0.145
	LTE Band 13	10M	QPSK	1	0	Right Tilted	0mm	23230	782	24.36	24.50	1.033	0.06	0.085	0.088
	LTE Band 13	10M	QPSK	25	0	Right Tilted	0mm	23230	782	23.42	23.50	1.019	0.02	0.076	0.077
	LTE Band 13	10M	QPSK	1	0	Left Cheek	0mm	23230	782	24.36	24.50	1.033	0.09	0.122	0.126
	LTE Band 13	10M	QPSK	25	0	Left Cheek	0mm	23230	782	23.42	23.50	1.019	0.15	0.110	0.112
	LTE Band 13	10M	QPSK	1	0	Left Tilted	0mm	23230	782	24.36	24.50	1.033	0.14	0.086	0.089
	LTE Band 13	10M	QPSK	25	0	Left Tilted	0mm	23230	782	23.42	23.50	1.019	0.07	0.077	0.078
	LTE Band 25	20M	QPSK	1	0	Right Cheek	0mm	26340	1880	22.83	23.00	1.040	0.1	0.518	0.539
	LTE Band 25	20M	QPSK	50	0	Right Cheek	0mm	26340	1880	21.51	22.00	1.119	-0.06	0.398	0.446
	LTE Band 25	20M	QPSK	1	0	Right Tilted	0mm	26340	1880	22.83	23.00	1.040	0	0.327	0.340
	LTE Band 25	20M	QPSK	50	0	Right Tilted	0mm	26340	1880	21.51	22.00	1.119	0.09	0.268	0.300
	LTE Band 25	20M	QPSK	1	0	Left Cheek	0mm	26340	1880	22.83	23.00	1.040	-0.05	0.691	0.719
11	LTE Band 25	20M	QPSK	1	0	Left Cheek	0mm	26140	1860	22.40	23.00	1.148	0.06	0.681	0.782
	LTE Band 25	20M	QPSK	1	0	Left Cheek	0mm	26590	1905	22.34	23.00	1.164	0	0.596	0.694
	LTE Band 25	20M	QPSK	50	0	Left Cheek	0mm	26340	1880	21.51	22.00	1.119	0.15	0.533	0.597
	LTE Band 25	20M	QPSK	1	0	Left Tilted	0mm	26340	1880	22.83	23.00	1.040	-0.17	0.395	0.411
	LTE Band 25	20M	QPSK	50	0	Left Tilted	0mm	26340	1880	21.51	22.00	1.119	-0.09	0.318	0.356
12	LTE Band 26	15M	QPSK	1	0	Right Cheek	0mm	26865	831.5	23.88	24.00	1.028	0.19	0.119	0.122
	LTE Band 26	15M	QPSK	36	0	Right Cheek	0mm	26865	831.5	22.90	23.00	1.023	0.13	0.091	0.093
	LTE Band 26	15M	QPSK	1	0	Right Tilted	0mm	26865	831.5	23.88	24.00	1.028	0.11	0.067	0.069
	LTE Band 26	15M	QPSK	36	0	Right Tilted	0mm	26865	831.5	22.90	23.00	1.023	0.13	0.052	0.053
	LTE Band 26	15M	QPSK	1	0	Left Cheek	0mm	26865	831.5	23.88	24.00	1.028	-0.06	0.093	0.096
	LTE Band 26	15M	QPSK	36	0	Left Cheek	0mm	26865	831.5	22.90	23.00	1.023	0.13	0.069	0.071
	LTE Band 26	15M	QPSK	1	0	Left Tilted	0mm	26865	831.5	23.88	24.00	1.028	0.07	0.082	0.084
	LTE Band 26	15M	QPSK	36	0	Left Tilted	0mm	26865	831.5	22.90	23.00	1.023	0.12	0.061	0.062
	LTE Band 66	20M	QPSK	1	0	Right Cheek	0mm	132322	1745	23.72	24.00	1.067	-0.12	0.519	0.554
	LTE Band 66	20M	QPSK	50	0	Right Cheek	0mm	132322	1745	22.73	23.00	1.064	0.02	0.420	0.447
	LTE Band 66	20M	QPSK	1	0	Right Tilted	0mm	132322	1745	23.72	24.00	1.067	-0.01	0.232	0.247
	LTE Band 66	20M	QPSK	50	0	Right Tilted	0mm	132322	1745	22.73	23.00	1.064	0.09	0.194	0.206
	LTE Band 66	20M	QPSK	1	0	Left Cheek	0mm	132322	1745	23.72	24.00	1.067	-0.18	0.678	0.723
	LTE Band 66	20M	QPSK	1	0	Left Cheek	0mm	132072	1720	23.54	24.00	1.112	-0.14	0.565	0.628
13	LTE Band 66	20M	QPSK	1	0	Left Cheek	0mm	132572	1770	23.62	24.00	1.091	0.11	0.695	0.759
	LTE Band 66	20M	QPSK	50	0	Left Cheek	0mm	132322	1745	22.73	23.00	1.064	0.06	0.530	0.564
	LTE Band 66	20M	QPSK	1	0	Left Tilted	0mm	132322	1745	23.72	24.00	1.067	0.17	0.250	0.267
	LTE Band 66	20M	QPSK	50	0	Left Tilted	0mm	132322	1745	22.73	23.00	1.064	0	0.212	0.226

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	Bluetooth	1Mbps	Right Cheek	0mm	0	2402	9.23	10.50	1.340	0.14	0.039	0.052
	Bluetooth	1Mbps	Right Tilted	0mm	0	2402	9.23	10.50	1.340	0.14	0.043	0.058
	Bluetooth	1Mbps	Left Cheek	0mm	0	2402	9.23	10.50	1.340	0.14	0.155	0.208
14	Bluetooth	1Mbps	Left Cheek	0mm	39	2441	8.62	10.50	1.542	-0.03	0.155	0.239
	Bluetooth	1Mbps	Left Cheek	0mm	78	2480	8.69	10.50	1.517	-0.02	0.111	0.168
	Bluetooth	1Mbps	Left Tilted	0mm	0	2402	9.23	10.50	1.340	-0.09	0.100	0.134

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN2.4GHz	802.11b 1Mbps	Right Cheek	0mm	6	2437	18.48	18.50	1.005	99.04	1.010	-0.03	0.364	0.369
	WLAN2.4GHz	802.11b 1Mbps	Right Tilted	0mm	6	2437	18.48	18.50	1.005	99.04	1.010	0.05	0.334	0.339
15	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	6	2437	18.48	18.50	1.005	99.04	1.010	0.04	1.150	1.167
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	1	2412	18.46	18.50	1.009	99.04	1.010	0.06	1.060	1.081
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	11	2462	18.24	18.50	1.062	99.04	1.010	-0.05	1.010	1.083
	WLAN2.4GHz	802.11b 1Mbps	Left Tilted	0mm	6	2437	18.48	18.50	1.005	99.04	1.010	0.02	0.849	0.861
	WLAN2.4GHz	802.11b 1Mbps	Left Tilted	0mm	1	2412	18.46	18.50	1.009	99.04	1.010	0.07	0.829	0.845
	WLAN2.4GHz	802.11b 1Mbps	Left Tilted	0mm	11	2462	18.24	18.50	1.062	99.04	1.010	0.12	0.870	0.933
	WLAN5GHz	802.11a 6Mbps	Right Cheek	0mm	64	5320	14.84	15.00	1.038	94.86	1.054	0.02	0.299	0.327
	WLAN5GHz	802.11a 6Mbps	Right Tilted	0mm	64	5320	14.84	15.00	1.038	94.86	1.054	0.05	0.277	0.303
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	64	5320	14.84	15.00	1.038	94.86	1.054	0.02	0.619	0.677
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	52	5260	14.76	15.00	1.057	94.86	1.054	0.02	0.669	0.745
16	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	56	5280	14.61	15.00	1.094	94.86	1.054	-0.06	0.721	0.831
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	60	5300	14.75	15.00	1.059	94.86	1.054	0	0.708	0.791
	WLAN5GHz	802.11a 6Mbps	Left Tilted	0mm	64	5320	14.84	15.00	1.038	94.86	1.054	0.15	0.407	0.445
	WLAN5GHz	802.11a 6Mbps	Right Cheek	0mm	116	5580	16.49	16.50	1.002	94.86	1.054	0.16	0.273	0.288
	WLAN5GHz	802.11a 6Mbps	Right Tilted	0mm	116	5580	16.49	16.50	1.002	94.86	1.054	-0.07	0.270	0.285
17	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	116	5580	16.49	16.50	1.002	94.86	1.054	0.05	0.414	0.437
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	100	5500	16.48	16.50	1.005	94.86	1.054	0.03	0.318	0.337
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	124	5620	16.32	16.50	1.042	94.86	1.054	-0.17	0.188	0.207
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	132	5660	16.47	16.50	1.007	94.86	1.054	-0.03	0.274	0.291
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	144	5720	16.19	16.50	1.074	94.86	1.054	0.06	0.325	0.368
	WLAN5GHz	802.11a 6Mbps	Left Tilted	0mm	116	5580	16.49	16.50	1.002	94.86	1.054	0.16	0.378	0.399
	WLAN5GHz	802.11a 6Mbps	Right Cheek	0mm	165	5825	16.46	16.50	1.009	94.86	1.054	0.09	0.321	0.342
	WLAN5GHz	802.11a 6Mbps	Right Tilted	0mm	165	5825	16.46	16.50	1.009	94.86	1.054	0.15	0.340	0.362
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	165	5825	16.46	16.50	1.009	94.86	1.054	0.17	0.474	0.504
18	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	149	5745	16.36	16.50	1.033	94.86	1.054	0.16	0.511	0.556
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm	157	5785	16.21	16.50	1.069	94.86	1.054	-0.04	0.492	0.554
	WLAN5GHz	802.11a 6Mbps	Left Tilted	0mm	165	5825	16.46	16.50	1.009	94.86	1.054	0.17	0.388	0.413

14.2 Hotspot SAR

<GSM SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	GSM850	GPRS (4 Tx slots)	Front	10mm	OFF	251	848.8	28.30	28.50	1.047	-0.1	0.261	0.273
	GSM850	GPRS (4 Tx slots)	Back	10mm	OFF	251	848.8	28.30	28.50	1.047	-0.11	0.550	0.576
19	GSM850	GPRS (4 Tx slots)	Back	10mm	OFF	128	824.2	27.94	28.50	1.138	-0.04	0.695	0.791
	GSM850	GPRS (4 Tx slots)	Back	10mm	OFF	189	836.4	28.05	28.50	1.109	0.01	0.615	0.682
	GSM850	GPRS (4 Tx slots)	Left Side	10mm	OFF	251	848.8	28.30	28.50	1.047	0.15	0.055	0.058
	GSM850	GPRS (4 Tx slots)	Right Side	10mm	OFF	251	848.8	28.30	28.50	1.047	0.01	0.317	0.332
	GSM850	GPRS (4 Tx slots)	Bottom Side	10mm	OFF	251	848.8	28.30	28.50	1.047	0.19	0.166	0.174
	GSM1900	GPRS (4 Tx slots)	Front	10mm	ON	810	1909.8	23.45	24.00	1.135	0.07	0.345	0.392
20	GSM1900	GPRS (4 Tx slots)	Back	10mm	ON	810	1909.8	23.45	24.00	1.135	0.09	0.823	0.934
	GSM1900	GPRS (4 Tx slots)	Back	10mm	ON	512	1850.2	23.05	24.00	1.245	0.05	0.463	0.576
	GSM1900	GPRS (4 Tx slots)	Back	10mm	ON	661	1880	23.22	24.00	1.197	-0.13	0.641	0.767
	GSM1900	GPRS (4 Tx slots)	Left Side	10mm	ON	810	1909.8	23.45	24.00	1.135	0.02	0.153	0.174
	GSM1900	GPRS (4 Tx slots)	Right Side	10mm	ON	810	1909.8	23.45	24.00	1.135	0.1	0.028	0.032
	GSM1900	GPRS (4 Tx slots)	Bottom Side	10mm	ON	810	1909.8	23.45	24.00	1.135	0.05	0.398	0.452

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WCDMA II	RMC 12.2Kbps	Front	10mm	ON	9400	1880	20.72	21.50	1.197	0.13	0.346	0.414
	WCDMA II	RMC 12.2Kbps	Back	10mm	ON	9400	1880	20.72	21.50	1.197	-0.08	0.840	1.005
	WCDMA II	RMC 12.2Kbps	Back	10mm	ON	9262	1852.4	20.58	21.50	1.236	-0.07	0.678	0.838
21	WCDMA II	RMC 12.2Kbps	Back	10mm	ON	9538	1907.6	20.51	21.50	1.256	-0.09	0.948	1.191
	WCDMA II	RMC 12.2Kbps	Left Side	10mm	ON	9400	1880	20.72	21.50	1.197	0.14	0.170	0.203
	WCDMA II	RMC 12.2Kbps	Right Side	10mm	ON	9400	1880	20.72	21.50	1.197	-0.08	0.037	0.044
	WCDMA II	RMC 12.2Kbps	Bottom Side	10mm	ON	9400	1880	20.72	21.50	1.197	-0.03	0.501	0.600
	WCDMA IV	RMC 12.2Kbps	Front	10mm	OFF	1413	1732.6	24.29	24.50	1.050	0.04	0.388	0.407
	WCDMA IV	RMC 12.2Kbps	Back	10mm	OFF	1413	1732.6	24.29	24.50	1.050	-0.01	1.120	1.175
22	WCDMA IV	RMC 12.2Kbps	Back	10mm	OFF	1312	1712.4	24.18	24.50	1.076	-0.04	1.110	1.195
	WCDMA IV	RMC 12.2Kbps	Back	10mm	OFF	1513	1752.6	24.18	24.50	1.076	0.04	0.961	1.034
	WCDMA IV	RMC 12.2Kbps	Left Side	10mm	OFF	1413	1732.6	24.29	24.50	1.050	0.04	0.077	0.081
	WCDMA IV	RMC 12.2Kbps	Right Side	10mm	OFF	1413	1732.6	24.29	24.50	1.050	0	0.296	0.311
	WCDMA IV	RMC 12.2Kbps	Bottom Side	10mm	OFF	1413	1732.6	24.29	24.50	1.050	0.04	0.602	0.632
	WCDMA V	RMC 12.2Kbps	Front	10mm	OFF	4182	836.4	24.79	25.00	1.050	-0.02	0.462	0.485
	WCDMA V	RMC 12.2Kbps	Back	10mm	OFF	4182	836.4	24.79	25.00	1.050	0.01	0.827	0.868
	WCDMA V	RMC 12.2Kbps	Back	10mm	OFF	4132	826.4	24.40	25.00	1.148	-0.01	0.772	0.886
23	WCDMA V	RMC 12.2Kbps	Back	10mm	OFF	4233	846.6	24.70	25.00	1.072	0.02	0.831	0.890
	WCDMA V	RMC 12.2Kbps	Left Side	10mm	OFF	4182	836.4	24.79	25.00	1.050	0.04	0.123	0.129
	WCDMA V	RMC 12.2Kbps	Right Side	10mm	OFF	4182	836.4	24.79	25.00	1.050	-0.01	0.465	0.488
	WCDMA V	RMC 12.2Kbps	Bottom Side	10mm	OFF	4182	836.4	24.79	25.00	1.050	0.11	0.210	0.220

<LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 4	20M	QPSK	1	0	Front	10mm	OFF	20175	1732.5	24.18	24.50	1.076	0.18	0.384	0.413
	LTE Band 4	20M	QPSK	50	0	Front	10mm	OFF	20175	1732.5	23.28	23.50	1.052	0.18	0.308	0.324
24	LTE Band 4	20M	QPSK	1	0	Back	10mm	OFF	20175	1732.5	24.18	24.50	1.076	-0.11	1.100	1.184
	LTE Band 4	20M	QPSK	50	0	Back	10mm	OFF	20175	1732.5	23.28	23.50	1.052	0.1	0.911	0.958
	LTE Band 4	20M	QPSK	100	0	Back	10mm	OFF	20175	1732.5	23.25	23.50	1.059	-0.09	0.884	0.936
	LTE Band 4	20M	QPSK	1	0	Left Side	10mm	OFF	20175	1732.5	24.18	24.50	1.076	0.1	0.067	0.072
	LTE Band 4	20M	QPSK	50	0	Left Side	10mm	OFF	20175	1732.5	23.28	23.50	1.052	0.01	0.059	0.062
	LTE Band 4	20M	QPSK	1	0	Right Side	10mm	OFF	20175	1732.5	24.18	24.50	1.076	-0.08	0.291	0.313
	LTE Band 4	20M	QPSK	50	0	Right Side	10mm	OFF	20175	1732.5	23.28	23.50	1.052	0	0.247	0.260
	LTE Band 4	20M	QPSK	1	0	Bottom Side	10mm	OFF	20175	1732.5	24.18	24.50	1.076	0.08	0.688	0.741
	LTE Band 4	20M	QPSK	50	0	Bottom Side	10mm	OFF	20175	1732.5	23.28	23.50	1.052	0.05	0.477	0.502
	LTE Band 5	10M	QPSK	1	0	Front	10mm	OFF	20525	836.5	24.24	24.50	1.062	-0.12	0.307	0.326
	LTE Band 5	10M	QPSK	25	0	Front	10mm	OFF	20525	836.5	23.30	23.50	1.047	-0.05	0.291	0.305
25	LTE Band 5	10M	QPSK	1	0	Back	10mm	OFF	20525	836.5	24.24	24.50	1.062	0.04	0.670	0.711
	LTE Band 5	10M	QPSK	25	0	Back	10mm	OFF	20525	836.5	23.30	23.50	1.047	0.05	0.641	0.671
	LTE Band 5	10M	QPSK	1	0	Left Side	10mm	OFF	20525	836.5	24.24	24.50	1.062	0.01	0.053	0.056
	LTE Band 5	10M	QPSK	25	0	Left Side	10mm	OFF	20525	836.5	23.30	23.50	1.047	0.01	0.051	0.053
	LTE Band 5	10M	QPSK	1	0	Right Side	10mm	OFF	20525	836.5	24.24	24.50	1.062	-0.02	0.390	0.414
	LTE Band 5	10M	QPSK	25	0	Right Side	10mm	OFF	20525	836.5	23.30	23.50	1.047	-0.04	0.356	0.373
	LTE Band 5	10M	QPSK	1	0	Bottom Side	10mm	OFF	20525	836.5	24.24	24.50	1.062	0.18	0.200	0.212
	LTE Band 5	10M	QPSK	25	0	Bottom Side	10mm	OFF	20525	836.5	23.30	23.50	1.047	0.14	0.188	0.197
	LTE Band 7	20M	QPSK	1	49	Front	10mm	OFF	21350	2560	24.45	24.50	1.012	-0.16	0.849	0.859
	LTE Band 7	20M	QPSK	1	49	Front	10mm	OFF	20850	2510	24.37	24.50	1.030	0.09	0.627	0.646
	LTE Band 7	20M	QPSK	1	49	Front	10mm	OFF	21100	2535	24.42	24.50	1.019	0.07	0.738	0.752
	LTE Band 7	20M	QPSK	50	0	Front	10mm	OFF	21350	2560	23.43	23.50	1.016	0.14	0.666	0.677
	LTE Band 7	20M	QPSK	100	0	Front	10mm	OFF	21350	2560	23.46	23.50	1.009	-0.01	0.671	0.677
	LTE Band 7	20M	QPSK	1	49	Back	10mm	OFF	21350	2560	24.45	24.50	1.012	0.1	0.755	0.764
	LTE Band 7	20M	QPSK	50	0	Back	10mm	OFF	21350	2560	23.43	23.50	1.016	-0.1	0.604	0.614
	LTE Band 7	20M	QPSK	1	49	Left Side	10mm	OFF	21350	2560	24.45	24.50	1.012	-0.13	0.062	0.063
	LTE Band 7	20M	QPSK	50	0	Left Side	10mm	OFF	21350	2560	23.43	23.50	1.016	0.12	0.044	0.045
	LTE Band 7	20M	QPSK	1	49	Right Side	10mm	OFF	21350	2560	24.45	24.50	1.012	-0.15	0.254	0.257
	LTE Band 7	20M	QPSK	50	0	Right Side	10mm	OFF	21350	2560	23.43	23.50	1.016	0.09	0.215	0.218
26	LTE Band 7	20M	QPSK	1	49	Bottom Side	10mm	OFF	21350	2560	24.45	24.50	1.012	-0.02	1.130	1.143
	LTE Band 7	20M	QPSK	1	49	Bottom Side	10mm	OFF	20850	2510	24.37	24.50	1.030	-0.05	0.839	0.864
	LTE Band 7	20M	QPSK	1	49	Bottom Side	10mm	OFF	21100	2535	24.42	24.50	1.019	-0.04	0.939	0.956
	LTE Band 7	20M	QPSK	50	0	Bottom Side	10mm	OFF	21350	2560	23.43	23.50	1.016	-0.1	0.856	0.870
	LTE Band 7	20M	QPSK	50	0	Bottom Side	10mm	OFF	20850	2510	23.37	23.50	1.030	-0.03	0.664	0.684
	LTE Band 7	20M	QPSK	50	0	Bottom Side	10mm	OFF	21100	2535	23.42	23.50	1.019	-0.04	0.733	0.747
	LTE Band 7	20M	QPSK	100	0	Bottom Side	10mm	OFF	21350	2560	23.46	23.50	1.009	-0.02	0.872	0.880
	LTE Band 7_UL CA	20M	QPSK	1	0	Bottom Side	10mm	OFF	20850+21048	2510+2529.8	24.36	24.50	1.033	-0.08	0.845	0.873

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 12	10M	QPSK	1	0	Front	10mm	OFF	23095	707.5	24.41	24.50	1.021	0.04	0.195	0.199
	LTE Band 12	10M	QPSK	25	0	Front	10mm	OFF	23095	707.5	23.31	23.50	1.045	0.03	0.193	0.202
	LTE Band 12	10M	QPSK	1	0	Back	10mm	OFF	23095	707.5	24.41	24.50	1.021	-0.01	0.357	0.364
27	LTE Band 12	10M	QPSK	25	0	Back	10mm	OFF	23095	707.5	23.31	23.50	1.045	0.04	0.354	0.370
	LTE Band 12	10M	QPSK	1	0	Left Side	10mm	OFF	23095	707.5	24.41	24.50	1.021	0.01	0.148	0.151
	LTE Band 12	10M	QPSK	25	0	Left Side	10mm	OFF	23095	707.5	23.31	23.50	1.045	-0.01	0.144	0.150
	LTE Band 12	10M	QPSK	1	0	Right Side	10mm	OFF	23095	707.5	24.41	24.50	1.021	-0.01	0.264	0.270
	LTE Band 12	10M	QPSK	25	0	Right Side	10mm	OFF	23095	707.5	23.31	23.50	1.045	-0.01	0.255	0.266
	LTE Band 12	10M	QPSK	1	0	Bottom Side	10mm	OFF	23095	707.5	24.41	24.50	1.021	0.03	0.085	0.087
	LTE Band 12	10M	QPSK	25	0	Bottom Side	10mm	OFF	23095	707.5	23.31	23.50	1.045	0.04	0.083	0.087
	LTE Band 13	10M	QPSK	1	0	Front	10mm	OFF	23230	782	24.36	24.50	1.033	-0.03	0.238	0.246
	LTE Band 13	10M	QPSK	25	0	Front	10mm	OFF	23230	782	23.42	23.50	1.019	0.01	0.215	0.219
28	LTE Band 13	10M	QPSK	1	0	Back	10mm	OFF	23230	782	24.36	24.50	1.033	-0.01	0.434	0.448
	LTE Band 13	10M	QPSK	25	0	Back	10mm	OFF	23230	782	23.42	23.50	1.019	0.05	0.404	0.412
	LTE Band 13	10M	QPSK	1	0	Left Side	10mm	OFF	23230	782	24.36	24.50	1.033	-0.01	0.148	0.153
	LTE Band 13	10M	QPSK	25	0	Left Side	10mm	OFF	23230	782	23.42	23.50	1.019	-0.02	0.131	0.133
	LTE Band 13	10M	QPSK	1	0	Right Side	10mm	OFF	23230	782	24.36	24.50	1.033	0.03	0.359	0.371
	LTE Band 13	10M	QPSK	25	0	Right Side	10mm	OFF	23230	782	23.42	23.50	1.019	-0.01	0.328	0.334
	LTE Band 13	10M	QPSK	1	0	Bottom Side	10mm	OFF	23230	782	24.36	24.50	1.033	0.06	0.139	0.144
	LTE Band 13	10M	QPSK	25	0	Bottom Side	10mm	OFF	23230	782	23.42	23.50	1.019	0.13	0.126	0.128
	LTE Band 25	20M	QPSK	1	0	Front	10mm	ON	26340	1880	20.97	22.00	1.268	0.09	0.280	0.355
	LTE Band 25	20M	QPSK	50	24	Front	10mm	ON	26340	1880	19.97	21.00	1.268	-0.05	0.234	0.297
	LTE Band 25	20M	QPSK	1	0	Back	10mm	ON	26340	1880	20.97	22.00	1.268	-0.17	0.704	0.892
	LTE Band 25	20M	QPSK	1	99	Back	10mm	ON	26140	1860	20.86	22.00	1.300	-0.07	0.715	0.930
29	LTE Band 25	20M	QPSK	1	49	Back	10mm	ON	26590	1905	20.83	22.00	1.309	-0.15	0.880	1.152
	LTE Band 25	20M	QPSK	50	24	Back	10mm	ON	26340	1880	19.97	21.00	1.268	-0.07	0.597	0.757
	LTE Band 25	20M	QPSK	100	0	Back	10mm	ON	26340	1880	19.96	21.00	1.271	-0.02	0.546	0.694
	LTE Band 25	20M	QPSK	1	0	Left Side	10mm	ON	26340	1880	20.97	22.00	1.268	0.01	0.153	0.194
	LTE Band 25	20M	QPSK	50	24	Left Side	10mm	ON	26340	1880	19.97	21.00	1.268	0.06	0.132	0.167
	LTE Band 25	20M	QPSK	1	0	Right Side	10mm	ON	26340	1880	20.97	22.00	1.268	-0.08	0.089	0.113
	LTE Band 25	20M	QPSK	50	24	Right Side	10mm	ON	26340	1880	19.97	21.00	1.268	0.14	0.062	0.079
	LTE Band 25	20M	QPSK	1	0	Bottom Side	10mm	ON	26340	1880	20.97	22.00	1.268	0.02	0.452	0.573
	LTE Band 25	20M	QPSK	50	24	Bottom Side	10mm	ON	26340	1880	19.97	21.00	1.268	-0.02	0.376	0.477
	LTE Band 26	15M	QPSK	1	0	Front	10mm	OFF	26865	831.5	23.88	24.00	1.028	-0.03	0.186	0.191
	LTE Band 26	15M	QPSK	36	0	Front	10mm	OFF	26865	831.5	22.90	23.00	1.023	0.01	0.144	0.147
30	LTE Band 26	15M	QPSK	1	0	Back	10mm	OFF	26865	831.5	23.88	24.00	1.028	0.03	0.399	0.410
	LTE Band 26	15M	QPSK	36	0	Back	10mm	OFF	26865	831.5	22.90	23.00	1.023	0.03	0.323	0.331
	LTE Band 26	15M	QPSK	1	0	Left Side	10mm	OFF	26865	831.5	23.88	24.00	1.028	-0.04	0.042	0.043
	LTE Band 26	15M	QPSK	36	0	Left Side	10mm	OFF	26865	831.5	22.90	23.00	1.023	0.08	0.026	0.027
	LTE Band 26	15M	QPSK	1	0	Right Side	10mm	OFF	26865	831.5	23.88	24.00	1.028	-0.03	0.196	0.201
	LTE Band 26	15M	QPSK	36	0	Right Side	10mm	OFF	26865	831.5	22.90	23.00	1.023	-0.04	0.187	0.191
	LTE Band 26	15M	QPSK	1	0	Bottom Side	10mm	OFF	26865	831.5	23.88	24.00	1.028	0.19	0.115	0.118
	LTE Band 26	15M	QPSK	36	0	Bottom Side	10mm	OFF	26865	831.5	22.90	23.00	1.023	0.11	0.090	0.092

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 66	20M	QPSK	1	0	Front	10mm	OFF	132322	1745	23.72	24.00	1.067	0.08	0.312	0.333
	LTE Band 66	20M	QPSK	50	0	Front	10mm	OFF	132322	1745	22.73	23.00	1.064	0.19	0.252	0.268
	LTE Band 66	20M	QPSK	1	0	Back	10mm	OFF	132322	1745	23.72	24.00	1.067	-0.09	0.905	0.965
31	LTE Band 66	20M	QPSK	1	0	Back	10mm	OFF	132072	1720	23.54	24.00	1.112	-0.05	0.945	1.051
	LTE Band 66	20M	QPSK	1	0	Back	10mm	OFF	132572	1770	23.62	24.00	1.091	-0.1	0.895	0.977
	LTE Band 66	20M	QPSK	50	0	Back	10mm	OFF	132322	1745	22.73	23.00	1.064	-0.13	0.742	0.790
	LTE Band 66	20M	QPSK	100	0	Back	10mm	OFF	132322	1745	22.70	23.00	1.072	-0.05	0.722	0.774
	LTE Band 66	20M	QPSK	1	0	Left Side	10mm	OFF	132322	1745	23.72	24.00	1.067	0.02	0.073	0.078
	LTE Band 66	20M	QPSK	50	0	Left Side	10mm	OFF	132322	1745	22.73	23.00	1.064	-0.03	0.061	0.065
	LTE Band 66	20M	QPSK	1	0	Right Side	10mm	OFF	132322	1745	23.72	24.00	1.067	-0.09	0.273	0.291
	LTE Band 66	20M	QPSK	50	0	Right Side	10mm	OFF	132322	1745	22.73	23.00	1.064	0.03	0.208	0.221
	LTE Band 66	20M	QPSK	1	0	Bottom Side	10mm	OFF	132322	1745	23.72	24.00	1.067	0.11	0.636	0.678
	LTE Band 66	20M	QPSK	50	0	Bottom Side	10mm	OFF	132322	1745	22.73	23.00	1.064	0.08	0.483	0.514

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	Bluetooth	1Mbps	Front	10mm	0	2402	9.23	10.50	1.340	-0.11	0.033	0.044
	Bluetooth	1Mbps	Back	10mm	0	2402	9.23	10.50	1.340	-0.07	0.020	0.027
	Bluetooth	1Mbps	Right Side	10mm	0	2402	9.23	10.50	1.340	0.02	0.047	0.063
32	Bluetooth	1Mbps	Right Side	10mm	39	2441	8.62	10.50	1.542	0	0.048	0.074
	Bluetooth	1Mbps	Right Side	10mm	78	2480	8.69	10.50	1.517	0.03	0.035	0.053
	Bluetooth	1Mbps	Top Side	10mm	0	2402	9.23	10.50	1.340	0.13	0.005	0.007

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN2.4GHz	802.11b 1Mbps	Front	10mm	6	2437	18.48	18.50	1.005	99.04	1.010	-0.02	0.182	0.185
33	WLAN2.4GHz	802.11b 1Mbps	Front	10mm	1	2412	18.46	18.50	1.009	99.04	1.010	0.02	0.227	0.231
	WLAN2.4GHz	802.11b 1Mbps	Front	10mm	11	2462	18.24	18.50	1.062	99.04	1.010	-0.04	0.173	0.186
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	6	2437	18.48	18.50	1.005	99.04	1.010	0.02	0.145	0.147
	WLAN2.4GHz	802.11b 1Mbps	Right Side	10mm	6	2437	18.48	18.50	1.005	99.04	1.010	0.07	0.167	0.169
	WLAN2.4GHz	802.11b 1Mbps	Top Side	10mm	6	2437	18.48	18.50	1.005	99.04	1.010	0.04	0.064	0.065
	WLAN5GHz	802.11a 6Mbps	Front	10mm	44	5220	14.99	15.00	1.002	94.86	1.054	0.07	0.071	0.075
	WLAN5GHz	802.11a 6Mbps	Back	10mm	44	5220	14.99	15.00	1.002	94.86	1.054	0.06	0.700	0.740
	WLAN5GHz	802.11a 6Mbps	Back	10mm	36	5180	14.95	15.00	1.012	94.86	1.054	0.06	0.576	0.614
34	WLAN5GHz	802.11a 6Mbps	Back	10mm	40	5200	14.85	15.00	1.035	94.86	1.054	0.08	0.781	0.852
	WLAN5GHz	802.11a 6Mbps	Back	10mm	48	5240	14.88	15.00	1.028	94.86	1.054	0.07	0.724	0.785
	WLAN5GHz	802.11a 6Mbps	Right Side	10mm	44	5220	14.99	15.00	1.002	94.86	1.054	-0.06	0.137	0.145
	WLAN5GHz	802.11a 6Mbps	Top Side	10mm	44	5220	14.99	15.00	1.002	94.86	1.054	-0.17	0.026	0.027
	WLAN5GHz	802.11a 6Mbps	Front	10mm	165	5825	16.46	16.50	1.009	94.86	1.054	0.06	0.064	0.068
35	WLAN5GHz	802.11a 6Mbps	Back	10mm	165	5825	16.46	16.50	1.009	94.86	1.054	0.19	0.838	0.892
	WLAN5GHz	802.11a 6Mbps	Back	10mm	149	5745	16.36	16.50	1.033	94.86	1.054	-0.17	0.793	0.863
	WLAN5GHz	802.11a 6Mbps	Back	10mm	157	5785	16.21	16.50	1.069	94.86	1.054	0.07	0.758	0.854
	WLAN5GHz	802.11a 6Mbps	Right Side	10mm	165	5825	16.46	16.50	1.009	94.86	1.054	-0.18	0.204	0.217
	WLAN5GHz	802.11a 6Mbps	Top Side	10mm	165	5825	16.46	16.50	1.009	94.86	1.054	0.12	0.101	0.107

14.3 Body Worn Accessory SAR

<GSM SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	GSM850	GPRS (4 Tx slots)	Front	15mm	251	848.8	28.30	28.50	1.047	0.03	0.178	0.186
	GSM850	GPRS (4 Tx slots)	Back	15mm	251	848.8	28.30	28.50	1.047	0.08	0.285	0.298
36	GSM850	GPRS (4 Tx slots)	Back	15mm	128	824.2	27.94	28.50	1.138	0.06	0.461	0.524
	GSM850	GPRS (4 Tx slots)	Back	15mm	189	836.4	28.05	28.50	1.109	-0.04	0.362	0.402
	GSM1900	GPRS (4 Tx slots)	Front	15mm	810	1909.8	24.42	25.00	1.143	0.1	0.246	0.281
37	GSM1900	GPRS (4 Tx slots)	Back	15mm	810	1909.8	24.42	25.00	1.143	-0.09	0.483	0.552
	GSM1900	GPRS (4 Tx slots)	Back	15mm	512	1850.2	24.26	25.00	1.186	-0.13	0.295	0.350
	GSM1900	GPRS (4 Tx slots)	Back	15mm	661	1880	24.40	25.00	1.148	-0.15	0.384	0.441

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WCDMA II	RMC 12.2Kbps	Front	15mm	9400	1880	22.77	23.00	1.054	0.09	0.271	0.286
	WCDMA II	RMC 12.2Kbps	Back	15mm	9400	1880	22.77	23.00	1.054	-0.07	0.618	0.652
	WCDMA II	RMC 12.2Kbps	Back	15mm	9262	1852.4	22.68	23.00	1.076	-0.1	0.472	0.508
38	WCDMA II	RMC 12.2Kbps	Back	15mm	9538	1907.6	22.54	23.00	1.112	-0.11	0.755	0.839
	WCDMA IV	RMC 12.2Kbps	Front	15mm	1413	1732.6	24.29	24.50	1.050	0.04	0.244	0.256
	WCDMA IV	RMC 12.2Kbps	Back	15mm	1413	1732.6	24.29	24.50	1.050	0.03	0.529	0.555
39	WCDMA IV	RMC 12.2Kbps	Back	15mm	1312	1712.4	24.18	24.50	1.076	-0.17	0.565	0.608
	WCDMA IV	RMC 12.2Kbps	Back	15mm	1513	1752.6	24.18	24.50	1.076	0.06	0.447	0.481
	WCDMA V	RMC 12.2Kbps	Front	15mm	4182	836.4	24.79	25.00	1.050	-0.02	0.338	0.355
	WCDMA V	RMC 12.2Kbps	Back	15mm	4182	836.4	24.79	25.00	1.050	0.04	0.504	0.529
40	WCDMA V	RMC 12.2Kbps	Back	15mm	4132	826.4	24.40	25.00	1.148	0.17	0.497	0.571
	WCDMA V	RMC 12.2Kbps	Back	15mm	4233	846.6	24.70	25.00	1.072	0.07	0.511	0.548

<LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 4	20M	QPSK	1	0	Front	15mm	20175	1732.5	24.18	24.50	1.076	0.1	0.227	0.244
	LTE Band 4	20M	QPSK	50	0	Front	15mm	20175	1732.5	23.28	23.50	1.052	0.14	0.187	0.197
41	LTE Band 4	20M	QPSK	1	0	Back	15mm	20175	1732.5	24.18	24.50	1.076	-0.04	0.529	0.569
	LTE Band 4	20M	QPSK	50	0	Back	15mm	20175	1732.5	23.28	23.50	1.052	0.05	0.432	0.454
	LTE Band 5	10M	QPSK	1	0	Front	15mm	20525	836.5	24.24	24.50	1.062	-0.04	0.218	0.231
	LTE Band 5	10M	QPSK	25	0	Front	15mm	20525	836.5	23.30	23.50	1.047	-0.04	0.204	0.214
42	LTE Band 5	10M	QPSK	1	0	Back	15mm	20525	836.5	24.24	24.50	1.062	0.04	0.334	0.355
	LTE Band 5	10M	QPSK	25	0	Back	15mm	20525	836.5	23.30	23.50	1.047	0.03	0.311	0.326
43	LTE Band 7	20M	QPSK	1	49	Front	15mm	21350	2560	24.45	24.50	1.012	0.07	0.425	0.430
	LTE Band 7	20M	QPSK	1	49	Front	15mm	20850	2510	24.37	24.50	1.030	0.12	0.315	0.325
	LTE Band 7	20M	QPSK	1	49	Front	15mm	21100	2535	24.42	24.50	1.019	0.11	0.345	0.351
	LTE Band 7	20M	QPSK	50	0	Front	15mm	21350	2560	23.43	23.50	1.016	0.13	0.328	0.333
	LTE Band 7	20M	QPSK	1	49	Back	15mm	21350	2560	24.45	24.50	1.012	-0.07	0.379	0.383
	LTE Band 7	20M	QPSK	50	0	Back	15mm	21350	2560	23.43	23.50	1.016	-0.15	0.291	0.296
	LTE Band 7_UL CA	20M	QPSK	1	0	Front	15mm	20850+21048	2510+2529.8	24.36	24.50	1.033	0.14	0.345	0.356
	LTE Band 12	10M	QPSK	1	0	Front	15mm	23095	707.5	24.41	24.50	1.021	0.13	0.160	0.163
	LTE Band 12	10M	QPSK	25	0	Front	15mm	23095	707.5	23.31	23.50	1.045	0.05	0.156	0.163
44	LTE Band 12	10M	QPSK	1	0	Back	15mm	23095	707.5	24.41	24.50	1.021	0	0.287	0.293
	LTE Band 12	10M	QPSK	25	0	Back	15mm	23095	707.5	23.31	23.50	1.045	-0.02	0.279	0.291
	LTE Band 13	10M	QPSK	1	0	Front	15mm	23230	782	24.36	24.50	1.033	0.05	0.188	0.194
	LTE Band 13	10M	QPSK	25	0	Front	15mm	23230	782	23.42	23.50	1.019	-0.01	0.169	0.172
45	LTE Band 13	10M	QPSK	1	0	Back	15mm	23230	782	24.36	24.50	1.033	0.02	0.323	0.334
	LTE Band 13	10M	QPSK	25	0	Back	15mm	23230	782	23.42	23.50	1.019	0.01	0.292	0.297
	LTE Band 25	20M	QPSK	1	0	Front	15mm	26340	1880	22.83	23.00	1.040	-0.07	0.191	0.199
	LTE Band 25	20M	QPSK	50	0	Front	15mm	26340	1880	21.51	22.00	1.119	0.06	0.159	0.178
	LTE Band 25	20M	QPSK	1	0	Back	15mm	26340	1880	22.83	23.00	1.040	-0.08	0.452	0.470
	LTE Band 25	20M	QPSK	1	0	Back	15mm	26140	1860	22.40	23.00	1.148	-0.06	0.385	0.442
46	LTE Band 25	20M	QPSK	1	0	Back	15mm	26590	1905	22.34	23.00	1.164	-0.16	0.542	0.631
	LTE Band 25	20M	QPSK	50	0	Back	15mm	26340	1880	21.51	22.00	1.119	-0.1	0.372	0.416
	LTE Band 26	15M	QPSK	1	0	Front	15mm	26865	831.5	23.88	24.00	1.028	-0.01	0.135	0.139
	LTE Band 26	15M	QPSK	36	0	Front	15mm	26865	831.5	22.90	23.00	1.023	-0.02	0.103	0.105
47	LTE Band 26	15M	QPSK	1	0	Back	15mm	26865	831.5	23.88	24.00	1.028	0.06	0.224	0.230
	LTE Band 26	15M	QPSK	36	0	Back	15mm	26865	831.5	22.90	23.00	1.023	0.06	0.170	0.174
	LTE Band 66	20M	QPSK	1	0	Front	15mm	132322	1745	23.72	24.00	1.067	0.07	0.207	0.221
	LTE Band 66	20M	QPSK	50	0	Front	15mm	132322	1745	22.73	23.00	1.064	0.09	0.158	0.168
	LTE Band 66	20M	QPSK	1	0	Back	15mm	132322	1745	23.72	24.00	1.067	-0.14	0.445	0.475
48	LTE Band 66	20M	QPSK	1	0	Back	15mm	132072	1720	23.54	24.00	1.112	0.09	0.469	0.521
	LTE Band 66	20M	QPSK	1	0	Back	15mm	132572	1770	23.62	24.00	1.091	-0.02	0.414	0.452
	LTE Band 66	20M	QPSK	50	0	Back	15mm	132322	1745	22.73	23.00	1.064	-0.1	0.335	0.356

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
49	Bluetooth	1Mbps	Front	15mm	0	2402	9.23	10.50	1.340	-0.19	0.017	0.023
	Bluetooth	1Mbps	Front	15mm	39	2441	8.62	10.50	1.542	0.01	0.013	0.020
	Bluetooth	1Mbps	Front	15mm	78	2480	8.69	10.50	1.517	-0.19	0.010	0.015
	Bluetooth	1Mbps	Back	15mm	0	2402	9.23	10.50	1.340	-0.08	0.012	0.016

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN2.4GHz	802.11b 1Mbps	Front	15mm	6	2437	18.48	18.50	1.005	99.04	1.010	-0.01	0.099	0.100
50	WLAN2.4GHz	802.11b 1Mbps	Front	15mm	1	2412	18.46	18.50	1.009	99.04	1.010	0.01	0.121	0.123
	WLAN2.4GHz	802.11b 1Mbps	Front	15mm	11	2462	18.24	18.50	1.062	99.04	1.010	-0.07	0.091	0.098
	WLAN2.4GHz	802.11b 1Mbps	Back	15mm	6	2437	18.48	18.50	1.005	99.04	1.010	0.05	0.075	0.076
	WLAN5GHz	802.11a 6Mbps	Front	15mm	64	5320	14.84	15.00	1.038	94.86	1.054	0.01	0.049	0.054
	WLAN5GHz	802.11a 6Mbps	Back	15mm	64	5320	14.84	15.00	1.038	94.86	1.054	0.06	0.442	0.483
51	WLAN5GHz	802.11a 6Mbps	Back	15mm	52	5260	14.76	15.00	1.057	94.86	1.054	0.07	0.545	0.607
	WLAN5GHz	802.11a 6Mbps	Back	15mm	56	5280	14.61	15.00	1.094	94.86	1.054	-0.12	0.511	0.589
	WLAN5GHz	802.11a 6Mbps	Back	15mm	60	5300	14.75	15.00	1.059	94.86	1.054	-0.04	0.485	0.542
	WLAN5GHz	802.11a 6Mbps	Front	15mm	116	5580	16.49	16.50	1.002	94.86	1.054	0.12	0.025	0.026
	WLAN5GHz	802.11a 6Mbps	Back	15mm	116	5580	16.49	16.50	1.002	94.86	1.054	-0.1	0.369	0.390
	WLAN5GHz	802.11a 6Mbps	Back	15mm	100	5500	16.48	16.50	1.005	94.86	1.054	0.14	0.353	0.374
	WLAN5GHz	802.11a 6Mbps	Back	15mm	124	5620	16.32	16.50	1.042	94.86	1.054	-0.05	0.378	0.415
	WLAN5GHz	802.11a 6Mbps	Back	15mm	132	5660	16.47	16.50	1.007	94.86	1.054	0.06	0.505	0.536
52	WLAN5GHz	802.11a 6Mbps	Back	15mm	144	5720	16.19	16.50	1.074	94.86	1.054	0.09	0.524	0.593
	WLAN5GHz	802.11a 6Mbps	Front	15mm	165	5825	16.46	16.50	1.009	94.86	1.054	0.11	0.051	0.054
	WLAN5GHz	802.11a 6Mbps	Back	15mm	165	5825	16.46	16.50	1.009	94.86	1.054	0.17	0.529	0.563
53	WLAN5GHz	802.11a 6Mbps	Back	15mm	149	5745	16.36	16.50	1.033	94.86	1.054	-0.03	0.540	0.588
	WLAN5GHz	802.11a 6Mbps	Back	15mm	157	5785	16.21	16.50	1.069	94.86	1.054	-0.14	0.498	0.561

14.4 Product Specific SAR

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	WCDMA II	RMC 12.2Kbps	Back	0mm	9538	1907.6	22.54	23.00	1.112	-0.02	2.870	3.191
54	WCDMA II	RMC 12.2Kbps	Back	0mm	9262	1852.4	22.68	23.00	1.076	-0.04	3.050	3.283
	WCDMA II	RMC 12.2Kbps	Back	0mm	9400	1880	22.77	23.00	1.054	-0.02	3.010	3.174

<LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	LTE Band 25	20M	QPSK	1	0	Back	0mm	26340	1880	22.83	23.00	1.040	0.04	2.630	2.735
55	LTE Band 25	20M	QPSK	1	0	Back	0mm	26140	1860	22.40	23.00	1.148	0.1	2.630	3.020
	LTE Band 25	20M	QPSK	1	0	Back	0mm	26590	1905	22.34	23.00	1.164	0.07	2.380	2.771

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	WLAN5GHz	802.11a 6Mbps	Front	0mm	64	5320	14.84	15.00	1.038	94.86	1.054	0	0.268	0.293
	WLAN5GHz	802.11a 6Mbps	Back	0mm	64	5320	14.84	15.00	1.038	94.86	1.054	-0.16	1.790	1.958
56	WLAN5GHz	802.11a 6Mbps	Back	0mm	52	5260	14.76	15.00	1.057	94.86	1.054	0.05	2.060	2.295
	WLAN5GHz	802.11a 6Mbps	Back	0mm	56	5280	14.61	15.00	1.094	94.86	1.054	0.19	1.980	2.283
	WLAN5GHz	802.11a 6Mbps	Back	0mm	60	5300	14.75	15.00	1.059	94.86	1.054	-0.04	1.930	2.155
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	64	5320	14.84	15.00	1.038	94.86	1.054	0.19	0.356	0.389
	WLAN5GHz	802.11a 6Mbps	Top Side	0mm	64	5320	14.84	15.00	1.038	94.86	1.054	0.13	0.051	0.056
	WLAN5GHz	802.11a 6Mbps	Front	0mm	116	5580	16.49	16.50	1.002	94.86	1.054	0.03	0.155	0.164
	WLAN5GHz	802.11a 6Mbps	Back	0mm	116	5580	16.49	16.50	1.002	94.86	1.054	0.01	1.570	1.659
	WLAN5GHz	802.11a 6Mbps	Back	0mm	100	5500	16.48	16.50	1.005	94.86	1.054	-0.02	1.540	1.631
	WLAN5GHz	802.11a 6Mbps	Back	0mm	124	5620	16.32	16.50	1.042	94.86	1.054	0.07	1.570	1.725
	WLAN5GHz	802.11a 6Mbps	Back	0mm	132	5660	16.47	16.50	1.007	94.86	1.054	0.06	1.990	2.112
57	WLAN5GHz	802.11a 6Mbps	Back	0mm	144	5720	16.19	16.50	1.074	94.86	1.054	0	1.940	2.196
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	116	5580	16.49	16.50	1.002	94.86	1.054	0.08	0.239	0.253
	WLAN5GHz	802.11a 6Mbps	Top Side	0mm	116	5580	16.49	16.50	1.002	94.86	1.054	0.12	0.036	0.038

14.5 Repeated SAR Measurement

No.	Band	Mode	Test Position	Gap (mm)	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Ratio	Reported 1g SAR (W/kg)
1st	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	-	6	2437	18.48	18.50	1.005	99.04	1.010	0.04	1.150		1.167
2nd	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	-	6	2437	18.48	18.50	1.005	99.04	1.010	0.06	1.080	1.06	1.096
1st	WCDMA II	RMC 12.2Kbps	Back	10mm	ON	9538	1907.6	20.51	21.50	1.256	-	-	-0.09	0.948		1.191
2nd	WCDMA II	RMC 12.2Kbps	Back	10mm	ON	9538	1907.6	20.51	21.50	1.256	-	-	0.06	0.904	1.05	1.135
1st	WCDMA IV	RMC 12.2Kbps	Back	10mm	OFF	1413	1732.6	24.29	24.50	1.050	-	-	-0.01	1.120		1.175
2nd	WCDMA IV	RMC 12.2Kbps	Back	10mm	OFF	1413	1732.6	24.29	24.50	1.050	-	-	-0.15	1.090	1.03	1.144
1st	WCDMA V	RMC 12.2Kbps	Back	10mm	OFF	4233	846.6	24.70	25.00	1.072	-	-	0.02	0.831		0.890
2nd	WCDMA V	RMC 12.2Kbps	Back	10mm	OFF	4233	846.6	24.70	25.00	1.072	-	-	0.03	0.817	1.02	0.875
1st	LTE Band 7	20M_QPSK_1_49	Bottom Side	10mm	OFF	21350	2560	24.45	24.50	1.012	-	-	-0.02	1.130		1.143
2nd	LTE Band 7	20M_QPSK_1_49	Bottom Side	10mm	OFF	21350	2560	24.45	24.50	1.012	-	-	-0.01	1.110	1.02	1.123
1st	WLAN5GHz	802.11a 6Mbps	Back	10mm	-	165	5825	16.46	16.50	1.009	94.86	1.054	0.19	0.838		0.892
2nd	WLAN5GHz	802.11a 6Mbps	Back	10mm	-	165	5825	16.46	16.50	1.009	94.86	1.054	0.17	0.795	1.05	0.846

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Ratio	Reported 10g SAR (W/kg)
1st	WCDMA II	RMC 12.2Kbps	Back	0mm	9262	1852.4	22.68	23.00	1.076	-	-	-0.04	3.050		3.283
2nd	WCDMA II	RMC 12.2Kbps	Back	0mm	9262	1852.4	22.68	23.00	1.076	-	-	-0.02	3.010	1.01	3.240
1st	WLAN5GHz	802.11a 6Mbps	Back	0mm	52	5260	14.76	15.00	1.057	94.86	1.054	0.05	2.060		2.295
2nd	WLAN5GHz	802.11a 6Mbps	Back	0mm	52	5260	14.76	15.00	1.057	94.86	1.054	0.03	2.030	1.01	2.261

General Note:

1. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.
2. Per KDB 865664 D01v01r04, if the ratio among the repeated measurement is ≤ 1.2 and the measured SAR <1.45W/kg, only one repeated measurement is required.
3. Per KDB 865664 D01v01r04, if the extremity repeated SAR is necessary, the same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.
4. The ratio is the difference in percentage between original and repeated *measured SAR*.
5. All measurement SAR result is scaled-up to account for tune-up tolerance and is compliant.

15. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Portable Handset			
		Head	Body-worn	Hotspot	Product Specific
1.	GSM Voice + WLAN2.4GHz	Yes	Yes		Yes
2.	GPRS/EDGE + WLAN2.4GHz	Yes	Yes	Yes	Yes
3.	WCDMA + WLAN2.4GHz	Yes	Yes	Yes	Yes
4.	LTE + WLAN2.4GHz	Yes	Yes	Yes	Yes
5.	GSM Voice + Bluetooth	Yes	Yes		Yes
6.	GPRS/EDGE + Bluetooth	Yes	Yes	Yes	Yes
7.	WCDMA+ Bluetooth	Yes	Yes	Yes	Yes
8.	LTE + Bluetooth	Yes	Yes	Yes	Yes
9.	GSM Voice + WLAN5GHz	Yes	Yes		Yes
10.	GPRS/EDGE + WLAN5GHz	Yes	Yes	Yes	Yes
11.	WCDMA + WLAN5GHz	Yes	Yes	Yes	Yes
12.	LTE + WLAN5GHz	Yes	Yes	Yes	Yes

General Note:

1. This device WLAN 2.4GHz / 5.2GHz / 5.8GHz supports Hotspot operation and Bluetooth support tethering applications.
2. WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.
3. EUT will choose either WLAN 2.4GHz or WLAN 5GHz according to the network signal condition; therefore, 2.4GHz WLAN and 5GHz WLAN will not operate simultaneously at any moment.
4. The Scaled SAR summation is calculated based on the same configuration and test position.
5. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
   i) Scalar SAR summation < 1.6W/kg.
   ii) SPLSR = (SAR1 + SAR2)^1.5 / (min. separation distance, mm), and the peak separation distance is determined from the square root of [(x1-x2)2 + (y1-y2)2 + (z1-z2)2], where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
   iii) If SPLSR ≤ 0.04 for 1g SAR, ≤ 0.1 for 10g SAR simultaneously transmission SAR measurement is not necessary.
   iv) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.
   v) The SPLSR calculated results please refer to section 15.5.

15.1 Head Exposure Conditions

WWAN Band		Exposure Position	1 WWAN 1g SAR (W/kg)	2 2.4GHz WLAN 1g SAR (W/kg)	3 5GHz WLAN 1g SAR (W/kg)	4 Bluetooth 1g SAR (W/kg)	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+4 Summed 1g SAR (W/kg)	1+2 SPLSR	1+2 Case No	1+3 SPLSR	1+3 Case No
GSM	GSM850	Right Cheek	0.338	0.369	0.342	0.052	**0.707**	**0.680**	**0.390**				
		Right Tilted	0.095	0.339	0.362	0.058	**0.434**	**0.457**	**0.153**				
		Left Cheek	0.137	1.167	0.831	0.239	**1.304**	**0.968**	**0.376**				
		Left Tilted	0.104	0.933	0.445	0.134	**1.037**	**0.549**	**0.238**				
	GSM1900	Right Cheek	0.174	0.369	0.342	0.052	**0.543**	**0.516**	**0.226**				
		Right Tilted	0.152	0.339	0.362	0.058	**0.491**	**0.514**	**0.210**				
		Left Cheek	0.677	1.167	0.831	0.239	**1.844**	**1.508**	**0.916**	0.030	Case 1		
		Left Tilted	0.198	0.933	0.445	0.134	**1.131**	**0.643**	**0.332**				
WCDMA	WCDMA II	Right Cheek	0.440	0.369	0.342	0.052	**0.809**	**0.782**	**0.492**				
		Right Tilted	0.271	0.339	0.362	0.058	**0.610**	**0.633**	**0.329**				
		Left Cheek	0.678	1.167	0.831	0.239	**1.845**	**1.509**	**0.917**	0.030	Case 2		
		Left Tilted	0.280	0.933	0.445	0.134	**1.213**	**0.725**	**0.414**				
	WCDMA IV	Right Cheek	0.612	0.369	0.342	0.052	**0.981**	**0.954**	**0.664**				
		Right Tilted	0.337	0.339	0.362	0.058	**0.676**	**0.699**	**0.395**				
		Left Cheek	0.788	1.167	0.831	0.239	**1.955**	**1.619**	**1.027**	0.030	Case 3	0.020	Case 7
		Left Tilted	0.386	0.933	0.445	0.134	**1.319**	**0.831**	**0.520**				
	WCDMA V	Right Cheek	0.342	0.369	0.342	0.052	**0.711**	**0.684**	**0.394**				
		Right Tilted	0.153	0.339	0.362	0.058	**0.492**	**0.515**	**0.211**				
		Left Cheek	0.211	1.167	0.831	0.239	**1.378**	**1.042**	**0.450**				
		Left Tilted	0.132	0.933	0.445	0.134	**1.065**	**0.577**	**0.266**				
LTE	LTE Band 4	Right Cheek	0.656	0.369	0.342	0.052	**1.025**	**0.998**	**0.708**				
		Right Tilted	0.257	0.339	0.362	0.058	**0.596**	**0.619**	**0.315**				
		Left Cheek	0.730	1.167	0.831	0.239	**1.897**	**1.561**	**0.969**	0.030	Case 4		
		Left Tilted	0.266	0.933	0.445	0.134	**1.199**	**0.711**	**0.400**				
	LTE Band 5	Right Cheek	0.223	0.369	0.342	0.052	**0.592**	**0.565**	**0.275**				
		Right Tilted	0.132	0.339	0.362	0.058	**0.471**	**0.494**	**0.190**				
		Left Cheek	0.174	1.167	0.831	0.239	**1.341**	**1.005**	**0.413**				
		Left Tilted	0.160	0.933	0.445	0.134	**1.093**	**0.605**	**0.294**				
	LTE Band 7	Right Cheek	0.572	0.369	0.342	0.052	**0.941**	**0.914**	**0.624**				
		Right Tilted	0.036	0.339	0.362	0.058	**0.375**	**0.398**	**0.094**				
		Left Cheek	0.115	1.167	0.831	0.239	**1.282**	**0.946**	**0.354**				
		Left Tilted	0.052	0.933	0.445	0.134	**0.985**	**0.497**	**0.186**				
	LTE Band 12	Right Cheek	0.128	0.369	0.342	0.052	**0.497**	**0.470**	**0.180**				
		Right Tilted	0.080	0.339	0.362	0.058	**0.419**	**0.442**	**0.138**				
		Left Cheek	0.114	1.167	0.831	0.239	**1.281**	**0.945**	**0.353**				
		Left Tilted	0.081	0.933	0.445	0.134	**1.014**	**0.526**	**0.215**				
	LTE Band 13	Right Cheek	0.165	0.369	0.342	0.052	**0.534**	**0.507**	**0.217**				
		Right Tilted	0.088	0.339	0.362	0.058	**0.427**	**0.450**	**0.146**				
		Left Cheek	0.126	1.167	0.831	0.239	**1.293**	**0.957**	**0.365**				
		Left Tilted	0.089	0.933	0.445	0.134	**1.022**	**0.534**	**0.223**				
	LTE Band 25	Right Cheek	0.539	0.369	0.342	0.052	**0.908**	**0.881**	**0.591**				
		Right Tilted	0.340	0.339	0.362	0.058	**0.679**	**0.702**	**0.398**				
		Left Cheek	0.782	1.167	0.831	0.239	**1.949**	**1.613**	**1.021**	0.030	Case 5	0.020	Case 8
		Left Tilted	0.411	0.933	0.445	0.134	**1.344**	**0.856**	**0.545**				
	LTE Band 26	Right Cheek	0.122	0.369	0.342	0.052	**0.491**	**0.464**	**0.174**				
		Right Tilted	0.069	0.339	0.362	0.058	**0.408**	**0.431**	**0.127**				
		Left Cheek	0.096	1.167	0.831	0.239	**1.263**	**0.927**	**0.335**				
		Left Tilted	0.084	0.933	0.445	0.134	**1.017**	**0.529**	**0.218**				
	LTE Band 66	Right Cheek	0.554	0.369	0.342	0.052	**0.923**	**0.896**	**0.606**				
		Right Tilted	0.247	0.339	0.362	0.058	**0.586**	**0.609**	**0.305**				
		Left Cheek	0.759	1.167	0.831	0.239	**1.926**	**1.590**	**0.998**	0.030	Case 6		
		Left Tilted	0.267	0.933	0.445	0.134	**1.200**	**0.712**	**0.401**				

15.2 Hotspot Exposure Conditions

WWAN Band		Exposure Position	1 WWAN 1g SAR (W/kg)	2 2.4GHz WLAN 1g SAR (W/kg)	3 5GHz WLAN 1g SAR (W/kg)	4 Bluetooth 1g SAR (W/kg)	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+4 Summed 1g SAR (W/kg)	SPLSR	Case No
GSM	GSM850	Front	0.273	0.231	0.075	0.044	**0.504**	**0.348**	**0.317**		
		Back	0.791	0.147	0.892	0.027	**0.938**	**1.683**	**0.818**	0.02	Case 9
		Left side	0.058				**0.058**	**0.058**	**0.058**		
		Right side	0.332	0.169	0.217	0.074	**0.501**	**0.549**	**0.406**		
		Top side		0.065	0.107	0.007	**0.065**	**0.107**	**0.007**		
		Bottom side	0.174				**0.174**	**0.174**	**0.174**		
	GSM1900	Front	0.392	0.231	0.075	0.044	**0.623**	**0.467**	**0.436**		
		Back	0.934	0.147	0.892	0.027	**1.081**	**1.826**	**0.961**	0.02	Case 10
		Left side	0.174				**0.174**	**0.174**	**0.174**		
		Right side	0.032	0.169	0.217	0.074	**0.201**	**0.249**	**0.106**		
		Top side		0.065	0.107	0.007	**0.065**	**0.107**	**0.007**		
		Bottom side	0.452				**0.452**	**0.452**	**0.452**		
WCDMA	WCDMA II	Front	0.414	0.231	0.075	0.044	**0.645**	**0.489**	**0.458**		
		Back	1.191	0.147	0.892	0.027	**1.338**	**2.083**	**1.218**	0.02	Case 11
		Left side	0.203				**0.203**	**0.203**	**0.203**		
		Right side	0.044	0.169	0.217	0.074	**0.213**	**0.261**	**0.118**		
		Top side		0.065	0.107	0.007	**0.065**	**0.107**	**0.007**		
		Bottom side	0.600				**0.600**	**0.600**	**0.600**		
	WCDMA IV	Front	0.407	0.231	0.075	0.044	**0.638**	**0.482**	**0.451**		
		Back	1.195	0.147	0.892	0.027	**1.342**	**2.087**	**1.222**	0.02	Case 12
		Left side	0.081				**0.081**	**0.081**	**0.081**		
		Right side	0.311	0.169	0.217	0.074	**0.480**	**0.528**	**0.385**		
		Top side		0.065	0.107	0.007	**0.065**	**0.107**	**0.007**		
		Bottom side	0.632				**0.632**	**0.632**	**0.632**		
	WCDMA V	Front	0.485	0.231	0.075	0.044	**0.716**	**0.560**	**0.529**		
		Back	0.890	0.147	0.892	0.027	**1.037**	**1.782**	**0.917**	0.02	Case 13
		Left side	0.129				**0.129**	**0.129**	**0.129**		
		Right side	0.488	0.169	0.217	0.074	**0.657**	**0.705**	**0.562**		
		Top side		0.065	0.107	0.007	**0.065**	**0.107**	**0.007**		
		Bottom side	0.220				**0.220**	**0.220**	**0.220**		
LTE	LTE Band 4	Front	0.413	0.231	0.075	0.044	**0.644**	**0.488**	**0.457**		
		Back	1.184	0.147	0.892	0.027	**1.331**	**2.076**	**1.211**	0.02	Case 14
		Left side	0.072				**0.072**	**0.072**	**0.072**		
		Right side	0.313	0.169	0.217	0.074	**0.482**	**0.530**	**0.387**		
		Top side		0.065	0.107	0.007	**0.065**	**0.107**	**0.007**		
		Bottom side	0.741				**0.741**	**0.741**	**0.741**		
	LTE Band 5	Front	0.326	0.231	0.075	0.044	**0.557**	**0.401**	**0.370**		
		Back	0.711	0.147	0.892	0.027	**0.858**	**1.603**	**0.738**	0.01	Case 15
		Left side	0.056				**0.056**	**0.056**	**0.056**		
		Right side	0.414	0.169	0.217	0.074	**0.583**	**0.631**	**0.488**		
		Top side		0.065	0.107	0.007	**0.065**	**0.107**	**0.007**		
		Bottom side	0.212				**0.212**	**0.212**	**0.212**		
	LTE Band 7	Front	0.859	0.231	0.075	0.044	**1.090**	**0.934**	**0.903**		
		Back	0.764	0.147	0.892	0.027	**0.911**	**1.656**	**0.791**	0.02	Case 16
		Left side	0.063				**0.063**	**0.063**	**0.063**		
		Right side	0.257	0.169	0.217	0.074	**0.426**	**0.474**	**0.331**		
		Top side		0.065	0.107	0.007	**0.065**	**0.107**	**0.007**		
		Bottom side	1.143				**1.143**	**1.143**	**1.143**		
	LTE Band 12	Front	0.202	0.231	0.075	0.044	**0.433**	**0.277**	**0.246**		
		Back	0.370	0.147	0.892	0.027	**0.517**	**1.262**	**0.397**		
		Left side	0.151				**0.151**	**0.151**	**0.151**		
		Right side	0.270	0.169	0.217	0.074	**0.439**	**0.487**	**0.344**		
		Top side		0.065	0.107	0.007	**0.065**	**0.107**	**0.007**		
		Bottom side	0.087				**0.087**	**0.087**	**0.087**		

WWAN Band		Exposure Position	1 WWAN 1g SAR (W/kg)	2 2.4GHz WLAN 1g SAR (W/kg)	3 5GHz WLAN 1g SAR (W/kg)	4 Bluetooth 1g SAR (W/kg)	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+4 Summed 1g SAR (W/kg)	SPLSR	Case No
	LTE Band 13	Front	0.246	0.231	0.075	0.044	**0.477**	**0.321**	**0.290**		
		Back	0.448	0.147	0.892	0.027	**0.595**	**1.340**	**0.475**		
		Left side	0.153				**0.153**	**0.153**	**0.153**		
		Right side	0.371	0.169	0.217	0.074	**0.540**	**0.588**	**0.445**		
		Top side		0.065	0.107	0.007	**0.065**	**0.107**	**0.007**		
		Bottom side	0.144				**0.144**	**0.144**	**0.144**		
	LTE Band 25	Front	0.355	0.231	0.075	0.044	**0.586**	**0.430**	**0.399**		
		Back	1.152	0.147	0.892	0.027	**1.299**	**2.044**	**1.179**	0.02	Case 17
		Left side	0.194				**0.194**	**0.194**	**0.194**		
		Right side	0.113	0.169	0.217	0.074	**0.282**	**0.330**	**0.187**		
		Top side		0.065	0.107	0.007	**0.065**	**0.107**	**0.007**		
		Bottom side	0.573				**0.573**	**0.573**	**0.573**		
	LTE Band 26	Front	0.191	0.231	0.075	0.044	**0.422**	**0.266**	**0.235**		
		Back	0.410	0.147	0.892	0.027	**0.557**	**1.302**	**0.437**		
		Left side	0.043				**0.043**	**0.043**	**0.043**		
		Right side	0.201	0.169	0.217	0.074	**0.370**	**0.418**	**0.275**		
		Top side		0.065	0.107	0.007	**0.065**	**0.107**	**0.007**		
		Bottom side	0.118				**0.118**	**0.118**	**0.118**		
	LTE Band 66	Front	0.333	0.231	0.075	0.044	**0.564**	**0.408**	**0.377**		
		Back	1.051	0.147	0.892	0.027	**1.198**	**1.943**	**1.078**	0.02	Case 18
		Left side	0.078				**0.078**	**0.078**	**0.078**		
		Right side	0.291	0.169	0.217	0.074	**0.460**	**0.508**	**0.365**		
		Top side		0.065	0.107	0.007	**0.065**	**0.107**	**0.007**		
		Bottom side	0.678				**0.678**	**0.678**	**0.678**		

15.3 Body-Worn Accessory Exposure Conditions

WWAN Band		Exposure Position	1 WWAN 1g SAR (W/kg)	2 2.4GHz WLAN 1g SAR (W/kg)	3 5GHz WLAN 1g SAR (W/kg)	4 Bluetooth 1g SAR (W/kg)	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+4 Summed 1g SAR (W/kg)
GSM	GSM850	Front	0.186	0.123	0.054	0.023	**0.309**	**0.240**	**0.209**
		Back	0.524	0.076	0.607	0.016	**0.600**	**1.131**	**0.540**
	GSM1900	Front	0.281	0.123	0.054	0.023	**0.404**	**0.335**	**0.304**
		Back	0.552	0.076	0.607	0.016	**0.628**	**1.159**	**0.568**
WCDMA	WCDMA II	Front	0.286	0.123	0.054	0.023	**0.409**	**0.340**	**0.309**
		Back	0.839	0.076	0.607	0.016	**0.915**	**1.446**	**0.855**
	WCDMA IV	Front	0.256	0.123	0.054	0.023	**0.379**	**0.310**	**0.279**
		Back	0.608	0.076	0.607	0.016	**0.684**	**1.215**	**0.624**
	WCDMA V	Front	0.355	0.123	0.054	0.023	**0.478**	**0.409**	**0.378**
		Back	0.571	0.076	0.607	0.016	**0.647**	**1.178**	**0.587**
LTE	LTE Band 4	Front	0.244	0.123	0.054	0.023	**0.367**	**0.298**	**0.267**
		Back	0.569	0.076	0.607	0.016	**0.645**	**1.176**	**0.585**
	LTE Band 5	Front	0.231	0.123	0.054	0.023	**0.354**	**0.285**	**0.254**
		Back	0.355	0.076	0.607	0.016	**0.431**	**0.962**	**0.371**
	LTE Band 7	Front	0.430	0.123	0.054	0.023	**0.553**	**0.484**	**0.453**
		Back	0.383	0.076	0.607	0.016	**0.459**	**0.990**	**0.399**
	LTE Band 12	Front	0.163	0.123	0.054	0.023	**0.286**	**0.217**	**0.186**
		Back	0.293	0.076	0.607	0.016	**0.369**	**0.900**	**0.309**
	LTE Band 13	Front	0.194	0.123	0.054	0.023	**0.317**	**0.248**	**0.217**
		Back	0.334	0.076	0.607	0.016	**0.410**	**0.941**	**0.350**
	LTE Band 25	Front	0.199	0.123	0.054	0.023	**0.322**	**0.253**	**0.222**
		Back	0.631	0.076	0.607	0.016	**0.707**	**1.238**	**0.647**
	LTE Band 26	Front	0.139	0.123	0.054	0.023	**0.262**	**0.193**	**0.162**
		Back	0.230	0.076	0.607	0.016	**0.306**	**0.837**	**0.246**
	LTE Band 66	Front	0.221	0.123	0.054	0.023	**0.344**	**0.275**	**0.244**
		Back	0.521	0.076	0.607	0.016	**0.597**	**1.128**	**0.537**

15.4 Product Specific Exposure Conditions

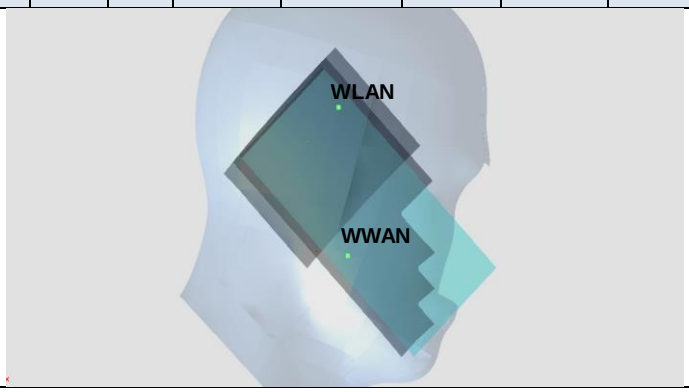
WWAN Band		Exposure Position	1 WWAN 10g SAR (W/kg)	2 2.4GHz WLAN 10g SAR (W/kg)	3 5GHz WLAN 10g SAR (W/kg)	4 Bluetooth 10g SAR (W/kg)	1+2 Summed 10g SAR (W/kg)	1+3 Summed 10g SAR (W/kg)	1+4 Summed 10g SAR (W/kg)	SPLSR	Case No
WCDMA	WCDMA II	Front	-	-	0.293	-	-	0.293			
		Back	3.283	-	2.295	-	3.283	5.578	3.283	0.10	Case 19
		Right side	-	-	0.389	-	-	0.389			
		Top side	-	-	0.056	-	-	0.056			
LTE	LTE 25	Front	-	-	0.293	-	-	0.293			
		Back	3.020	-	2.295	-	3.020	5.315	3.020	0.09	Case 20
		Right side	-	-	0.389	-	-	0.389			
		Top side	-	-	0.056	-	-	0.056			

15.5 SPLSR Evaluation and Analysis

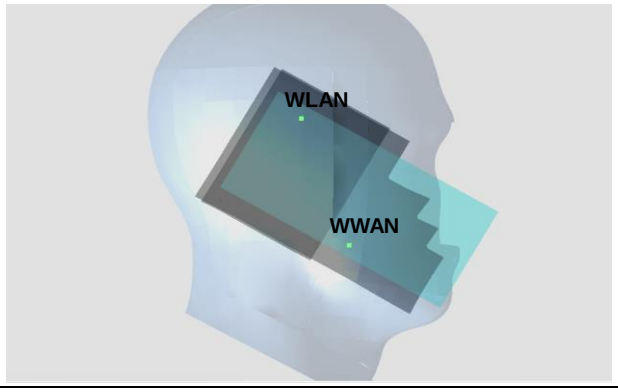
General Note:

1. SPLSR = $(SAR_1 + SAR_2)^{1.5}$ / (*min. separation distance, mm*). If SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary

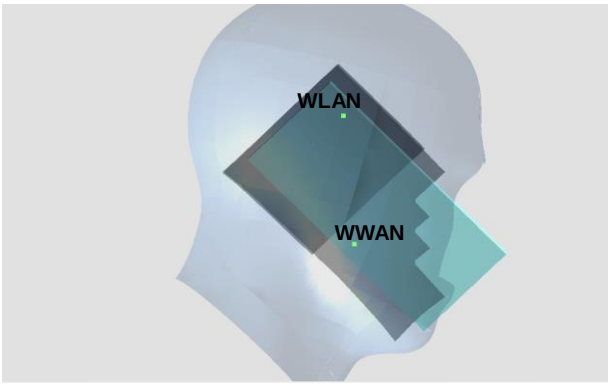
Case 1	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	GSM1900	Left Cheek	0.677	0	41.79	-54.13	-1.94	83.1	1.84	0.03	Not required
	WLAN2.4		1.167	0	20.61	26.18	-1.04				



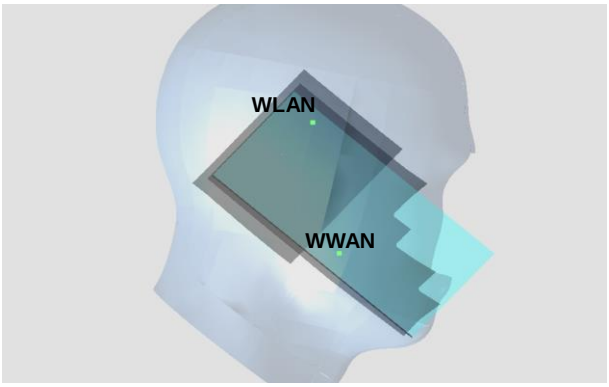
Case 2	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	WCDMA II	Left Cheek	0.678	0	44.51	-61.04	-1.86	90.4	1.85	0.03	Not required
	WLAN2.4		1.167	0	20.61	26.18	-1.04				



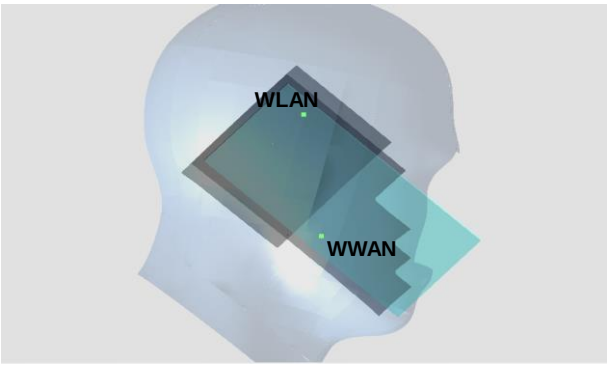
Case 3	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (cm) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	WCDMA IV	Left Cheek	0.788	0	45.22	-58.01	-2.31	87.7	1.96	0.03	Not required
	WLAN2.4		1.167	0	20.61	26.18	-1.04				



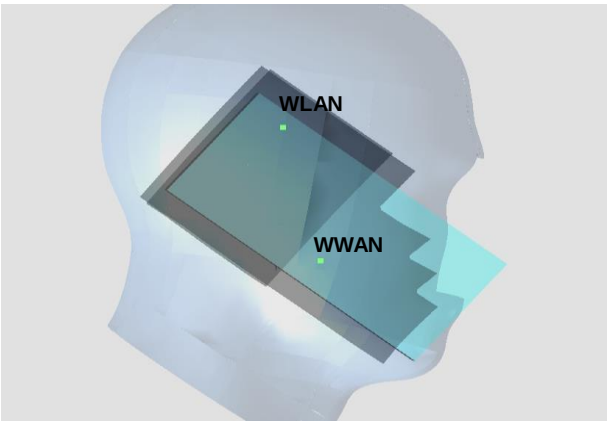
Case 4	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (cm) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE 4	Left Cheek	0.73	0	47.45	-61.23	-1.61	91.4	1.90	0.03	Not required
	WLAN2.4		1.167	0	20.61	26.18	-1.04				



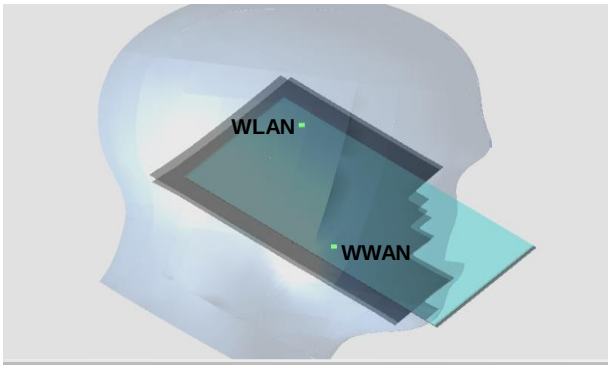
Case 5	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (cm) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE 25	Left Cheek	0.782	0	44.92	-61.45	-1.03	90.9	1.95	0.03	Not required
	WLAN2.4		1.167	0	20.61	26.18	-1.04				



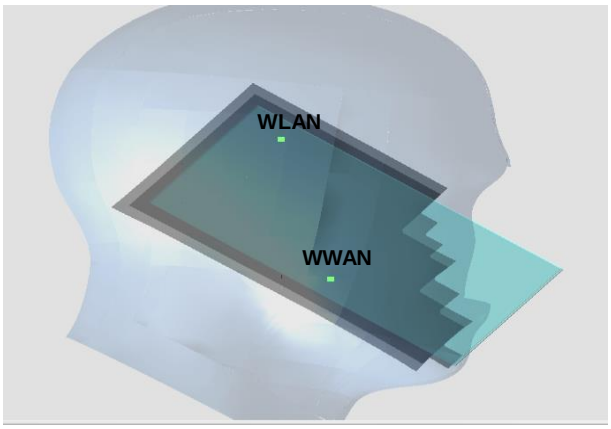
Case 6	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (cm) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE 66	Left Cheek	0.759	0	46.27	-55.28	-2.29	85.4	1.93	0.03	Not required
	WLAN2.4		1.167	0	20.61	26.18	-1.04				



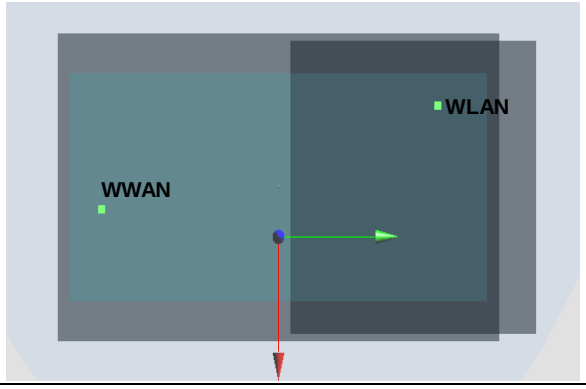
Case 7	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (cm) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	WCDMA IV	Left Cheek	0.788	0	45.22	-58.01	-2.31	92.0	1.62	0.02	Not required
	WLAN 5		0.831	0	15.86	29.18	-1.05				



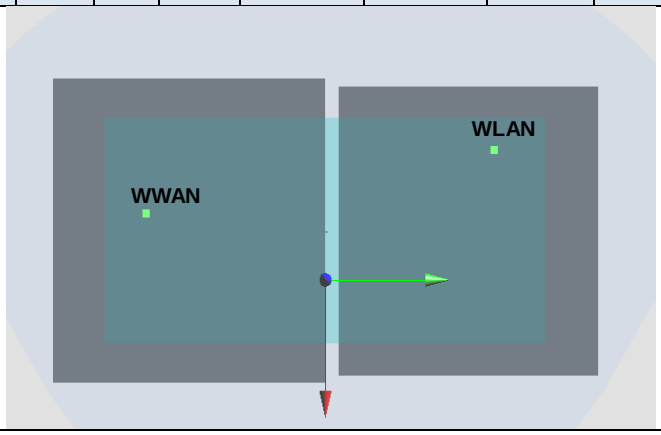
Case 8	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (cm) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE 25	Left Cheek	0.782	0	44.92	-61.45	-1.03	95.2	1.61	0.02	Not required
	WLAN 5		0.831	0	15.86	29.18	-1.05				



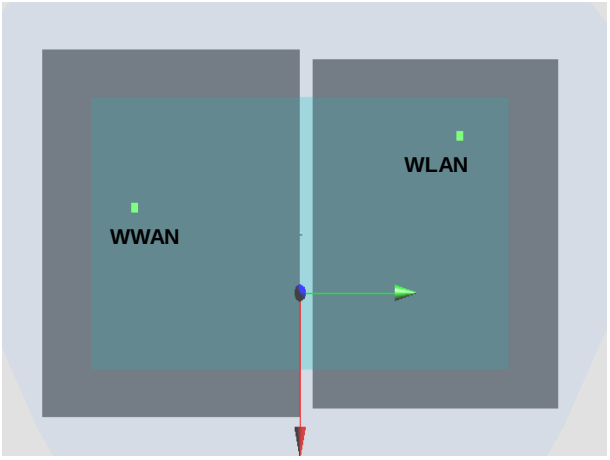
Case 9	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (cm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	GSM850	Back	0.791	10	6.5	-71	-1.37	140.0	1.68	0.02	Not required
	WLAN 5		0.892	10	-29	64.4	-1.73				



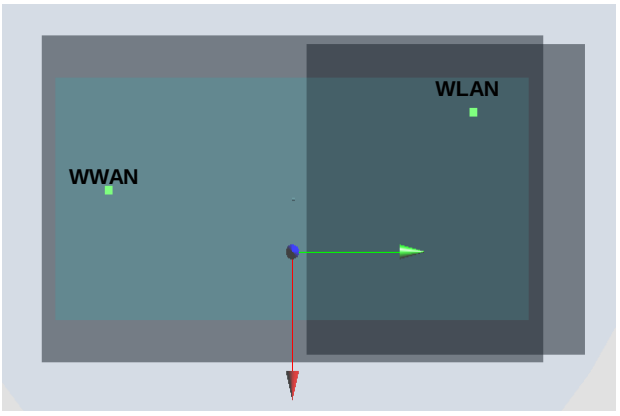
Case 10	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (cm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	GSM1900	Back	0.934	10	-7	-64.8	-1.06	131.1	1.83	0.02	Not required
	WLAN 5		0.892	10	-29	64.4	-1.73				



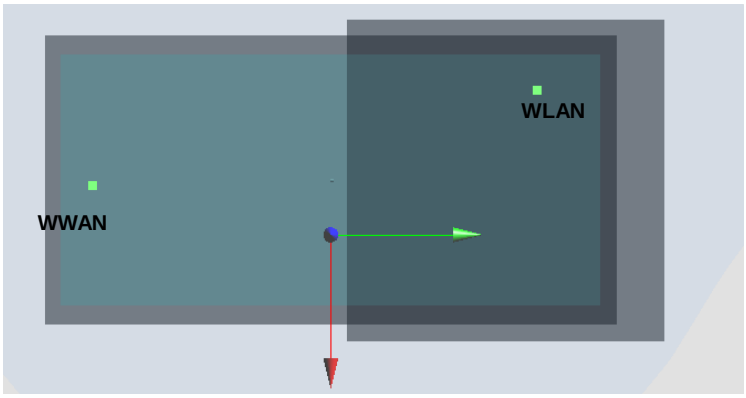
	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (cm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
Case 11	WCDMA II	Back	1.191	10	-8.5	-68.1	-1.05	134.1	2.08	0.02	Not required
	WLAN 5		0.892	10	-29	64.4	-1.73				



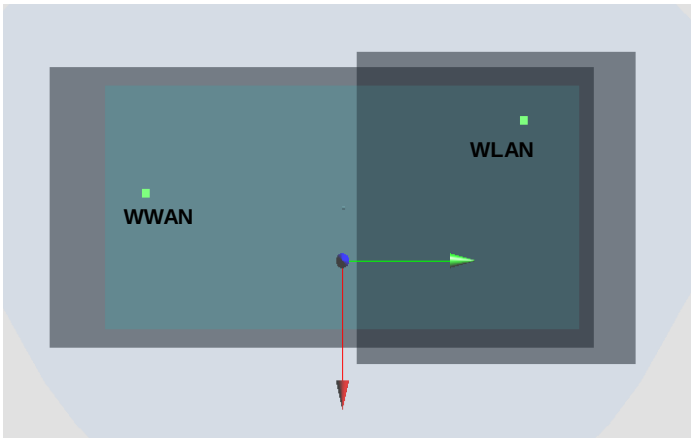
	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (cm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
Case 12	WCDMA IV	Back	1.195	10	-4	-65	-1.12	131.8	2.09	0.02	Not required
	WLAN 5		0.892	10	-29	64.4	-1.73				



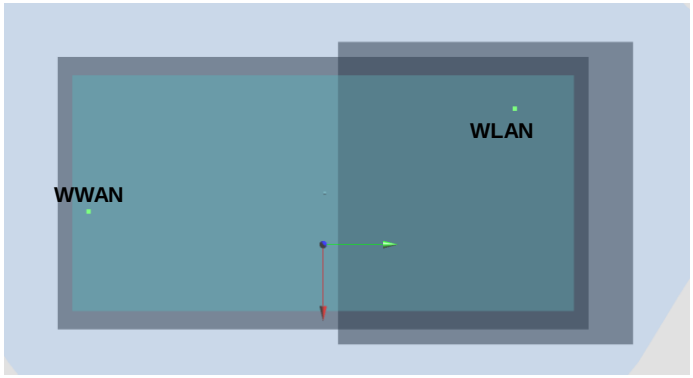
	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (cm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
Case 13	WCDMA V	Back	0.89	10	5.3	-75.6	-1.02	144.1	1.78	0.02	Not required
	WLAN 5		0.892	10	-29	64.4	-1.73				



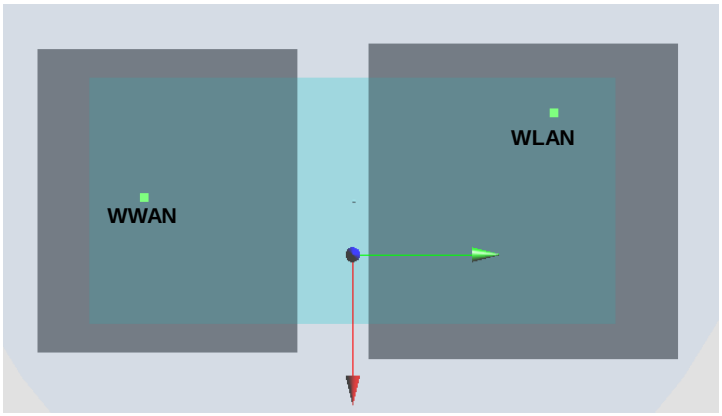
	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (cm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
Case 14	LTE 4	Back	1.184	10	-5.5	-69.5	-1.67	135.9	2.08	0.02	Not required
	WLAN 5		0.892	10	-29	64.4	-1.73				



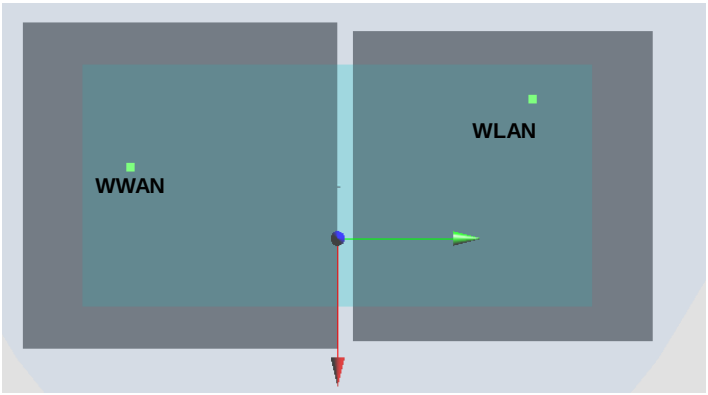
Case 15	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (cm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	LTE 5	Back	0.711	10	5	-80	-1.03	148.4	1.60	0.01	Not required
	WLAN 5		0.892	10	-29	64.4	-1.73				



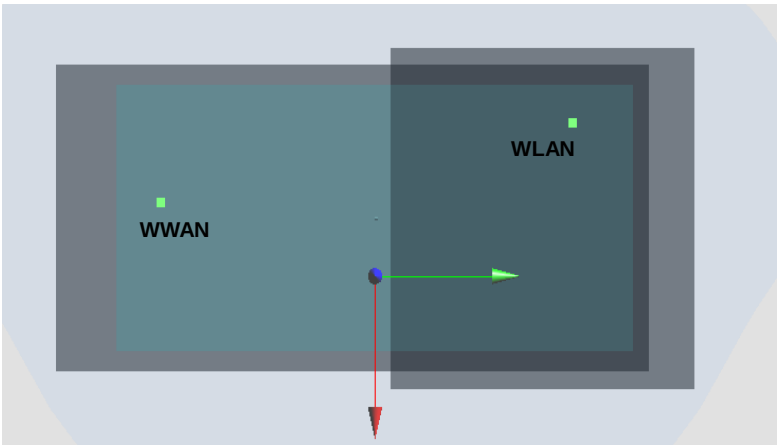
Case 16	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (cm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	LTE 7	Back	0.764	10	1.8	-65.2	-1.3	133.2	1.66	0.02	Not required
	WLAN 5		0.892	10	-29	64.4	-1.73				



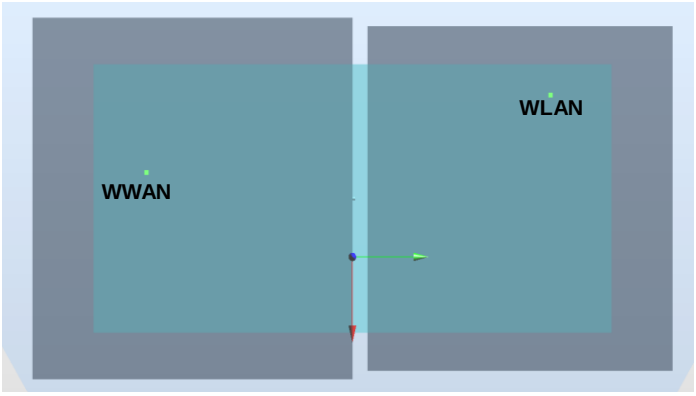
Case 17	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (cm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	LTE 25	Back	1.152	10	-7	-64.8	-1.06	131.1	2.04	0.02	Not required
	WLAN 5		0.892	10	-29	64.4	-1.73				



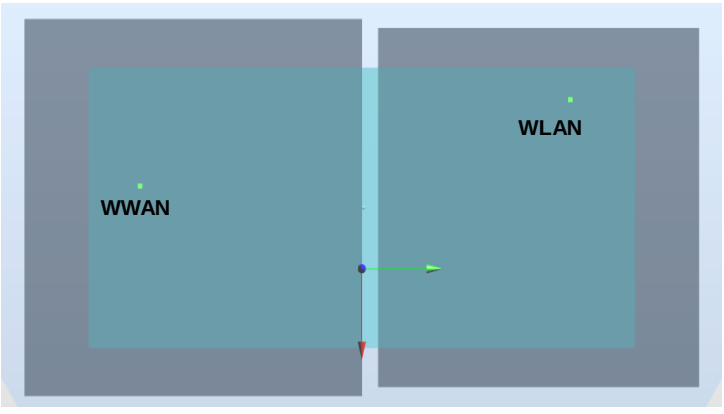
Case 18	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (cm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	LTE 66	Back	1.051	10	-5.5	-69.5	-1.65	135.9	1.94	0.02	Not required
	WLAN 5		0.892	10	-29	64.4	-1.73				



	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (cm) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case 19	WCDMA II	Back	3.283	0mm	-8.5	-66.5	-0.94	129.4	5.58	0.10	Not required
	WLAN5G		2.295	0mm	-29.4	61.2	-1.62				



	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (cm) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case 20	LTE B25	Back	3.02	0mm	-8.6	-68	-1.36	130.9	5.32	0.09	Not required
	WLAN5G		2.295	0mm	-29.4	61.2	-1.62				



16. Supplemental tuner tests results

General Note:

1. The following test procedure was followed to demonstrate that the SAR results in this report represent the appropriate SAR test conditions. For bands with dynamic tuning implemented, SAR will be measured according to the required FCC SAR test procedures with the dynamic tuner active to allow the device to automatically tune to the antenna state for the respective RF exposure test configurations. Additional single point SAR time-sweep measurements will be evaluated for other tuner states to determine that the other tuner configurations would result in equivalent or lower SAR values. The additional tuner hardware has no influence to the antenna characteristics, other than impedance matching.
2. To evaluate all of the tuner states, the 103 tuner states are divided evenly among band, mode and exposure combinations so that at least one single point SAR measurement is measured in each configuration. Single point time-sweep measurements will be performed at the peak SAR location determined by the zoom scan of the configuration with the highest reported SAR for each combination. The tuner state will be established remotely so that the device is not moved for the entire series of single point SAR for the tuner states in each combination. The SAR probe will remain stationary at the same position throughout the entire series of single point measurements for each combination. The bands which are dynamically tuned are split into single antenna, so the antenna system will have its own test plan to cover the corresponding 103 tuner states.
3. The operational decryption contains more information about the design and implementation of the dynamic antenna tuning.

16.1 Supplemental Head SAR results

Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)								
									Auto-Tune (State 7)	0	15	30	45	60	75	90	38
GSM850	GPRS (4 Tx slots)	824.2	128	N/A	N/A	Right Cheek	0mm	0.297	0.315	0.025	0.01	0.015	0.061	0.188	0.002	0.044	0.056
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)								
									Auto-Tune (State 37)	1	16	31	46	61	76	91	53
GSM1900	GPRS (4 Tx slots)	1850.2	512	N/A	N/A	Left Cheek	0mm	0.571	0.797	0.266	0.367	0.413	0.594	0.685	0.235	0.253	0.268
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)								
									Auto-Tune (State 37)	2	17	32	47	62	77	92	68
WCDMA B2	RMC12.2K	1852.4	9262	N/A	N/A	Left Cheek	0mm	0.63	0.802	0.619	0.781	0.75	0.722	0.733	0.52	0.571	0.591
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)								
									Auto-Tune (State 37)	3	18	33	48	63	78	93	83
WCDMA B4	RMC12.2K	1752.6	1513	N/A	N/A	Left Cheek	0mm	0.732	1.04	0.384	0.539	0.795	1.03	0.259	0.544	0.625	0.796
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)								
									Auto-Tune (State 7)	4	19	34	49	64	79	94	98
WCDMA B5	RMC12.2K	826.4	4132	N/A	N/A	Right Cheek	0mm	0.298	0.311	0.153	0.214	0.051	0.027	0.021	0.014	0.007	0.117
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)								
									Auto-Tune (State 37)	5	20	35	50	65	80	95	
LTE B2	QPSK	1880	18900	1	0	Left Cheek	0mm	0.755	0.985	0.667	0.864	0.889	0.94	0.543	0.843	0.906	
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)								
									Auto-Tune (State 37)	6	21	36	51	66	81	96	
LTE B4	QPSK	1732.5	20175	1	0	Left Cheek	0mm	0.678	0.906	0.377	0.672	0.82	0.158	0.432	0.683	0.798	
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)								
									Auto-Tune (State 7)	7	22	37	52	67	82	97	
LTE B5	QPSK	836.5	20525	1	0	Right Cheek	0mm	0.21	0.223	0.201	0.15	0.051	0.027	0.124	0.036	0.052	
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)								
									Auto-Tune (State 61)	9	24	39	54	69	84	99	
LTE B12	QPSK	707.5	23095	1	0	Right Cheek	0mm	0.125	0.129	0.04	0.07	0.008	0.029	0.035	0.114	0.087	

Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)								
									Auto-Tune (State 61)	10	25	40	55	70	85	100	
LTE B13	QPSK	782	23230	1	0	Right Cheek	0mm	0.16	0.156	0.123	0.096	0.006	0.047	0.145	0.075	0.12	
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)								
									Auto-Tune (State 61)	11	26	41	56	71	86	101	
LTE B17	QPSK	710	23790	1	0	Right Cheek	0mm	0.13	0.134	0.065	0.128	0.044	0.048	0.072	0.127	0.042	
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)								
									Auto-Tune (State 37)	12	27	42	57	72	87	102	
LTE B25	QPSK	1860	26140	1	0	Left Cheek	0mm	0.681	0.912	0.806	0.372	0.761	0.673	0.876	0.884	0.845	
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)								
									Auto-Tune (State 61)	13	28	43	58	73	88	8	
LTE B26	QPSK	831.5	26865	1	0	Right Cheek	0mm	0.122	0.107	0.102	0.056	0.017	0.1	0.04	0.093	0.105	
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)								
									Auto-Tune (State 37)	14	29	44	59	74	89	23	
LTE B66	QPSK	1770	132572	1	0	Left Cheek	0mm	0.695	0.975	0.86	0.442	0.894	0.725	0.92	0.965	0.828	

16.2 Supplemental Body SAR results

Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)								
									Auto-Tune (State 7)	0	15	30	45	60	75	90	38
GSM850	GPRS (4 Tx slots)	824.2	128	N/A	N/A	Back	10mm	0.695	1.019	0.115	0.047	0.065	0.261	0.713	0.012	0.186	0.267
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)								
									Auto-Tune (State 37)	1	16	31	46	61	76	91	53
GSM1900	GPRS (4 Tx slots)	1909.8	810	N/A	N/A	Back	10mm	0.823	1.214	0.286	0.383	0.728	0.181	1.114	0.393	0.374	0.332
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)								
									Auto-Tune (State 37)	2	17	32	47	62	77	92	68
WCDMA B2	RMC12.2K	1907.6	9538	N/A	N/A	Back	10mm	0.948	1.404	0.607	0.831	1.139	1.392	1.275	0.792	0.885	1.09
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)								
									Auto-Tune (State 37)	3	18	33	48	63	78	93	83
WCDMA B4	RMC12.2K	1712.4	1312	N/A	N/A	Back	10mm	1.11	1.458	0.724	0.977	1.244	1.442	0.542	0.927	1.07	1.221
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)								
									Auto-Tune (State 7)	4	19	34	49	64	79	94	98
WCDMA B5	RMC12.2K	846.6	4233	N/A	N/A	Back	10mm	0.831	0.954	0.676	0.819	0.199	0.101	0.105	0.063	0.035	0.287
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)								
									Auto-Tune (State 37)	5	20	35	50	65	80	95	
LTE Band 2	QPSK	1880	18900	1	0	Back	10mm	0.745	1.041	0.798	0.951	1.019	0.997	0.763	0.929	0.984	
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)								
									Auto-Tune (State 37)	6	21	36	51	66	81	96	
LTE B4	QPSK	1732.5	20175	1	0	Back	10mm	1.1	1.346	0.743	1.017	1.225	0.451	0.748	1.063	1.222	
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)								
									Auto-Tune (State 7)	7	22	37	52	67	82	97	
LTE B5	QPSK	836.5	20525	1	0	Back	10mm	0.67	0.811	0.733	0.588	0.216	0.113	0.485	0.146	0.218	
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)								
									Auto-Tune (State 61)	9	24	39	54	69	84	99	
LTE B12	QPSK	707.5	23095	25	0	Back	10mm	0.354	0.393	0.14	0.234	0.152	0.089	0.12	0.316	0.272	

Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)								
									Auto-Tune (State 61)	10	25	40	55	70	85	100	
LTE B13	QPSK	782	23230	1	0	Back	10mm	0.434	0.52	0.434	0.323	0.016	0.175	0.508	0.247	0.357	
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)								
									Auto-Tune (State 61)	11	26	41	56	71	86	101	
LTE B17	QPSK	710	23790	1	0	Back	10mm	0.378	0.426	0.22	0.402	0.051	0.16	0.24	0.353	0.131	
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)								
									Auto-Tune (State 37)	12	27	42	57	72	87	102	
LTE B25	QPSK	1905	26590	1	49	Back	10mm	0.88	1.221	0.934	0.693	1.106	0.784	1.029	1.119	1.139	
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)								
									Auto-Tune (State 61)	13	28	43	58	73	88	8	
LTE B26	QPSK	831.5	26865	1	0	Back	10mm	0.399	0.379	0.375	0.015	0.062	0.37	0.149	0.144	0.367	
Mode	Service/ Modulation	Frequency (MHz)	Channel	RB Size	RB Offset	Test Position	Spacing	Measured 1g SAR (W/kg)	Average Value of Time Sweep (W/kg)								
									Auto-Tune (State 37)	14	29	44	59	74	89	23	
LTE B66	QPSK	1720	132072	1	0	Back	10mm	0.945	1.121	0.834	0.593	1.006	0.684	1.029	1.119	0.926	

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17. Uncertainty Assessment

Per KDB 865664 D01 SAR measurement 100MHz to 6GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg and the measured 10-g SAR within a frequency band is < 3.75 W/kg. The expanded SAR measurement uncertainty must be ≤ 30%, for a confidence interval of k = 2. If these conditions are met, extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval. For this device, the highest measured 1-g SAR is less 1.5W/kg and highest measured 10-g SAR is less 3.75W/kg. Therefore, the measurement uncertainty table is not required in this report.

18. References

[1] FCC 47 CFR Part 2 “Frequency Allocations and Radio Treaty Matters; General Rules and Regulations”

[2] ANSI/IEEE Std. C95.1-1992, “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz”, September 1992

[3] IEEE Std. 1528-2013, “IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, Sep 2013

[4] SPEAG DASY System Handbook

[5] FCC KDB 248227 D01 v02r02, “SAR Guidance for IEEE 802.11 (WiFi) Transmitters”, Oct 2015.

[6] FCC KDB 447498 D01 v06, “Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies”, Oct 2015

[7] FCC KDB 648474 D04 v01r03, “SAR Evaluation Considerations for Wireless Handsets”, Oct 2015.

[8] FCC KDB 941225 D01 v03r01, “3G SAR MEAUREMENT PROCEDURES”, Oct 2015

[9] FCC KDB 941225 D05 v02r05, “SAR Evaluation Considerations for LTE Devices”, Dec 2015

[10] FCC KDB 941225 D05A v01r02, “Rel. 10 LTE SAR Test Guidance and KDB Inquiries”, Oct 2015

[11] FCC KDB 941225 D06 v02r01, "SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities", Oct 2015.

[12] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.

[13] FCC KDB 865664 D02 v01r02, “RF Exposure Compliance Reporting and Documentation Considerations” Oct 2015.