FCC SAR TEST REPORT

FCC ID	:	**PY7-77310Z**
Equipment	:	**GSM/WCDMA/LTE Phone with BT, DTS/UNII a/b/g/n/ac/ax, GPS, and NFC**
Brand Name	:	**Sony**
Applicant	:	**Sony Mobile Communications Inc. 4-12-3 Higashi-Shinagawa, Shinagawa-ku, Tokyo, 140-0002, Japan**
Manufacturer	:	**Sony Mobile Communications Inc. 4-12-3 Higashi-Shinagawa, Shinagawa-ku, Tokyo, 140-0002, Japan**
Standard	:	**FCC 47 CFR Part 2 (2.1093)**

The product was received on Jul. 07, 2020 and testing was started from Aug. 01, 2020 and completed on Aug. 10, 2020. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample provide by manufacturer and the test data has been evaluated in accordance with the test procedures given in 47 CFR Part 2.1093 and FCC KDB and has been pass the FCC requirement.

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

Approved by: Cona Huang / Deputy Manager

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History of this test report

Report No.	Version	Description	Issued Date
FA042237-02	01	Initial issue of report	Aug. 25, 2020
FA042237-02	02	Update section 15	Sep. 03, 2020

1. Statement of Compliance

Applicant Name	Sony Mobile Communications Inc.			
EUT Description	GSM/WCDMA/LTE Phone with BT, DTS/UNII a/b/g/n/ac/ax, GPS, and NFC			
Brand Name	Sony			
FCC ID	PY7-77310Z			
HW Version	A			
SW Version	5.108			
RF Exposure Conditions	**Equipment Class**			
	Licensed	**DTS**	**NII**	**DSS**
Head (1g SAR W/kg)	0.32	0.48	0.24	0.49
Body-Worn (1g SAR W/kg)	0.36	0.05	0.09	0.07
Wireless Router (1g SAR W/kg)	0.73	0.14		0.15
Product Specific (10g SAR W/kg)			0.50	
Highest Simultaneous Transmission (1g SAR W/kg)	Head: 1.25 Body-worn: 0.56 Hotspot: 0.73	Head: 1.25 Body-worn: 0.55 Hotspot:0.73	Head: 1.25 Body-worn: 0.56 Hotspot:NA	Head: 1.18 Body-worn:0.56 Hotspot:0.73
Highest Simultaneous Transmission (10g SAR W/kg)			Product Specific: 0.73	
Date Tested	2020/8/1 ~ 2020/8/10			
Test Result	Pass			
Remark: 1. This device 2.4GHz WLAN support Hotspot operation and Bluetooth support tethering applications.				

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. This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) 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.

Reviewed by: Jason Wang
Report Producer: Daisy Peng

2. Guidance Applied

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards, if the KDB standards were not list within TAF approval, because it is include in the FCC KDB 447498.

- 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 D06 Hotspot Mode SAR v02r01
- FCC KDB 941225 D07 UMPC Mini Tablet v01r02

3. Equipment Under Test (EUT) Information

3.1 General Information

Wireless Technologies	Frequency	Operating Mode	
GSM	850 1900	· GSM Voice · GPRS (GMSK) · EDGE (8PSK)	Multi-Slot Class: Class 33
	Does device support dual transfer mode? (Yes)		
W-CDMA (UMTS)	Band 2 Band 4 Band 5	· AMR / RMC 12.2Kbps · HSDPA(Rel.9) · HSUPA(Rel.9) · DC-HSDPA(Rel.9)	
LTE (FDD)	Band 2 Band 4 Band 5 Band 7 Band 12 Band 13 Band 66	· QPSK · 16QAM · 64QAM	
LTE (TDD)	Band 48		
WiFi	2.4GHz: 2412 MHz ~ 2462 MHz	· 11b · 11g · 11n (HT20) · 11ax (HE20)	
	5GHz: 5.2GHz: 5180 MHz ~ 5240 MHz 5.3GHz: 5260 MHz ~ 5320 MHz 5.5GHz: 5500 MHz ~ 5720 MHz 5.8GHz: 5745 MHz ~ 5825 MHz	· 11a · 11n (HT20) · 11n (HT40) · 11ac (VHT20) · 11ac (VHT40) · 11ac (VHT80) · 11ax (HE20) · 11ax (HE40) · 11ax (HE80)	
Bluetooth	2.4GHz	· BR / EDR / LE	
NFC	13.56MHz	· ASK	

3.2 Device Serial Number

Band	SN
WWAN	QV7100G73Y
	QV7100JX3Y
	QV7100KQ3Y
	QV7100FW3Y
WLAN	QV7100GU3Y
	QV7100X43Y
	QV7100X33Y

Note: Several samples were used with identical hardware to support SAR testing. The manufacturer has confirmed that the device tested gave the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.

3.3 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05	
FCC ID	PY7-77310Z
Equipment Name	GSM/WCDMA/LTE Phone with BT, DTS/UNII a/b/g/n/ac/ax, GPS, and NFC
Operating Frequency Range of each LTE transmission band	LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 1710 MHz ~ 1780 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 48: 5MHz, 10MHz, 15MHz, 20MHz 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})						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2
64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3
256 QAM	≥ 1						≤ 5

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.

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 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

LTE Band 48

	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	55265	3552.5	55290	3555	55315	3557.5	55340	3560
L M	55810	3607	55815	3607.5	55820	3608	55830	3609
M H	56170	3643	56165	3642.5	56160	3642	56150	3641
H	56715	3697.5	56690	3695	56665	3692.5	56640	3690

4. RF Exposure Limits

4.1 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.

4.2 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.

5. Specific Absorption Rate (SAR)

5.1 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.

5.2 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:

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

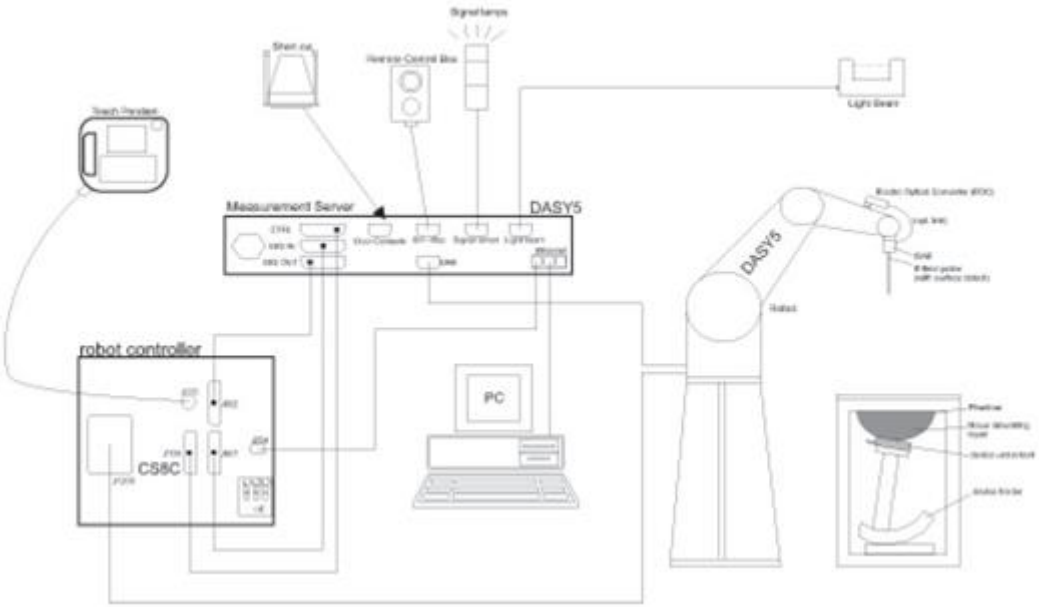
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

6. 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.

6.1 Test Side Location

Sporton Lab and below test site location are accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190 and 0007) and the FCC designation No. TW1190 and TW0007 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC test.

Test Site	SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory			
Test Site Location	TW1190 No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, CHINESE TAIPEI		TW0007 No. 58, Aly. 75, Ln. 564, Wehnua 3rd, Rd., Guishan Dist., Taoyuan City, CHINESE TAIPEI	
Test Site No.	SAR01-HY	SAR03-HY	SAR08-HY	SAR09-HY
	SAR04-HY	SAR05-HY	SAR11-HY	SAR12-HY
	SAR06-HY	SAR10-HY		

6.2 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	

6.3 Data Acquisition Electronics (DAE)

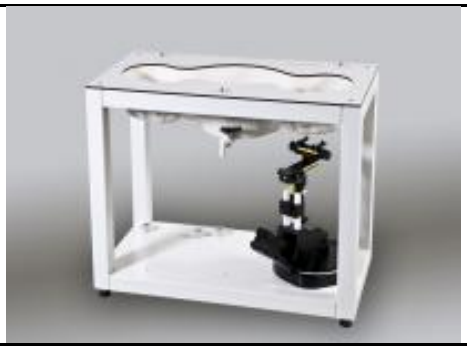
The data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an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

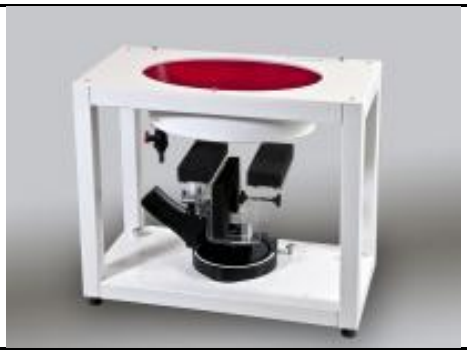
6.4 Phantom

<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.

6.5 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

7. 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

7.1 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

7.2 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.

7.3 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.	

7.4 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	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

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

* When zoom scan is required and the *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.

7.5 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.

7.6 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.

8. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	750MHz System Validation Kit	D750V3(2)	1107	Mar. 08, 2019	Mar. 06, 2021
SPEAG	835MHz System Validation Kit	D835V2	4d167	Nov. 25, 2019	Nov. 24, 2020
SPEAG	1750MHz System Validation Kit	D1750V2(2)	1112	Mar. 07, 2019	Mar. 05, 2021
SPEAG	1900MHz System Validation Kit	D1900V2(2)	5d185	Mar. 07, 2019	Mar. 05, 2021
SPEAG	2450MHz System Validation Kit	D2450V2	929	Nov. 21, 2019	Nov. 20, 2020
SPEAG	2600MHz System Validation Kit	D2600V2(2)	1078	Mar. 06, 2019	Mar. 04, 2021
SPEAG	3500MHz System Validation Kit	D3500V2(2)	1014	Jan. 29, 2019	Jan. 27, 2021
SPEAG	3700MHz System Validation Kit	D3700V2(2)	1006	Mar. 05, 2019	Mar. 03, 2021
SPEAG	5GHz System Validation Kit	D5GHzV2(2)	1006	Sep. 27, 2018	Sep. 25, 2020
SPEAG	Data Acquisition Electronics	DAE4	376	Dec. 06, 2019	Dec. 05, 2020
SPEAG	Data Acquisition Electronics	DAE4	916	Dec. 17, 2019	Dec. 16, 2020
SPEAG	Data Acquisition Electronics	DAE4	1399	Feb. 18, 2020	Feb. 17, 2021
SPEAG	Dosimetric E-Field Probe	ES3DV3	3184	Sep. 25, 2019	Sep. 24, 2020
SPEAG	Dosimetric E-Field Probe	ES3DV3	3270	Sep. 25, 2019	Sep. 24, 2020
SPEAG	Dosimetric E-Field Probe	EX3DV4	3642	Apr. 29, 2020	Apr. 28, 2021
RCPTWN	Thermometer	HTC-1	TM685-1	Nov. 12, 2019	Nov. 11, 2020
RCPTWN	Thermometer	HTC-1	TM560-2	Nov. 12, 2019	Nov. 11, 2020
Anritsu	Radio Communication Analyzer	MT8821C	6201341950	Oct. 31, 2019	Oct. 30, 2020
Agilent	Wireless Communication Test Set	E5515C	MY50267236	Mar. 18, 2020	Mar. 17, 2021
R&S	BT Base Station	CBT	100815	Feb. 15, 2020	Feb. 14, 2021
SPEAG	Device Holder	N/A	N/A	N/A	N/A
Anritsu	Signal Generator	MG3710A	6201502524	Nov. 20, 2019	Nov. 19, 2020
Agilent	ENA Network Analyzer	E5071C	MY46104758	Sep. 06, 2019	Sep. 05, 2020
SPEAG	Dielectric Probe Kit	DAK-3.5	1126	Sep. 18, 2019	Sep. 17, 2020
LINE SEIKI	Digital Thermometer	DTM3000-spezial	2942	Nov. 18, 2019	Nov. 17, 2020
Anritsu	Power Meter	ML2495A	932001	Oct. 03, 2019	Oct. 02, 2020
Anritsu	Power Sensor	MA2411B	846202	Oct. 03, 2019	Oct. 02, 2020
Anritsu	Power Meter	ML2495A	1218006	Oct. 14, 2019	Oct. 13, 2020
Anritsu	Power Sensor	MA2411B	1207363	Oct. 14, 2019	Oct. 13, 2020
Agilent	Spectrum Analyzer	E4408B	MY44211028	Aug. 27, 2019	Aug. 26, 2020
Anritsu	Spectrum Analyzer	N9010A	MY53470118	Mar. 12, 2020	Mar. 11, 2021
Mini-Circuits	Power Amplifier	ZVE-8G+	6418	Oct. 16, 2019	Oct. 15, 2020
Mini-Circuits	Power Amplifier	ZHL-42W+	715701915	May. 07, 2020	May. 06, 2021
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.
2. The dipole calibration interval can be extended to 3 years with justification according to KDB 865664 D01. The dipoles are also not physically damaged, or repaired during the interval. The justification data in appendix C can be found which the return loss is < -20dB, within 20% of prior calibration, the impedance is within 5 ohm of prior calibration for each dipole.

9. System Verification

9.1 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.

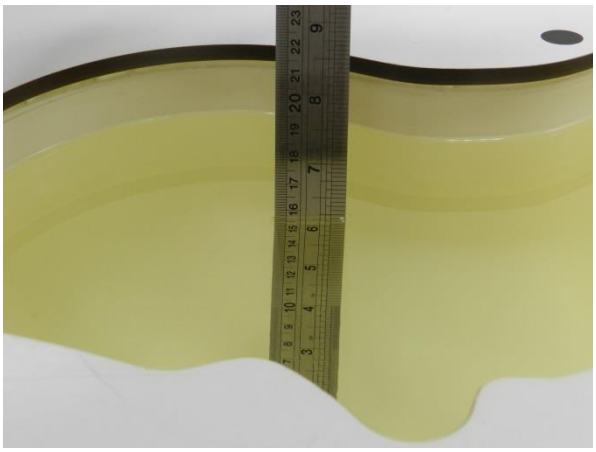


Fig 10.1Photo of Liquid Height for Head SAR

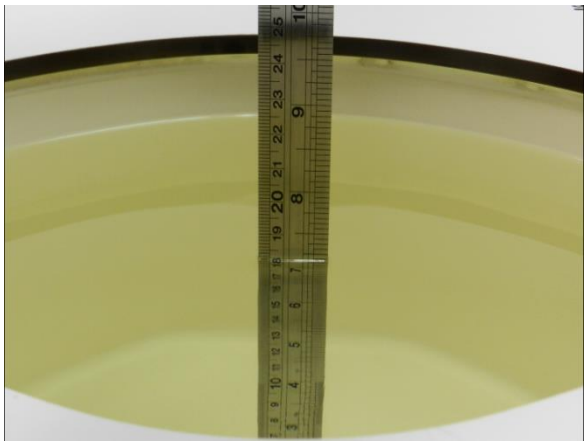


Fig 10.2 Photo of Liquid Height for Body SAR

9.2 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.

Tissue check appears that head liquid is also used for body SAR test

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (εr)
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

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)	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
750	22.6	0.894	41.386	0.89	41.90	0.45	-1.23	±5	2020/8/6
835	22.4	0.924	41.368	0.90	41.50	2.67	-0.32	±5	2020/8/5
1750	22.6	1.387	40.421	1.37	40.10	1.24	0.80	±5	2020/8/3
1900	22.4	1.407	40.395	1.40	40.00	0.50	0.99	±5	2020/8/4
2450	22.8	1.840	38.935	1.80	39.20	2.22	-0.68	±5	2020/8/8
2600	22.3	2.012	38.321	1.96	39.00	2.65	-1.74	±5	2020/8/1
2600	22.5	2.009	38.341	1.96	39.00	2.50	-1.69	±5	2020/8/3
3500	22.5	2.891	37.810	2.91	37.90	-0.65	-0.24	±5	2020/8/7
3700	22.5	3.099	37.608	3.12	37.70	-0.67	-0.24	±5	2020/8/7
5250	22.2	4.660	36.496	4.71	35.95	-1.06	1.52	±5	2020/8/9
5600	22.2	5.022	36.014	5.07	35.50	-0.95	1.45	±5	2020/8/9
5750	22.4	5.148	35.818	5.22	35.35	-1.38	1.32	±5	2020/8/10

9.3 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)	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 (%)
2020/8/6	750	250	D750V3-1107	ES3DV3 - SN3270	DAE4 Sn1399	2.12	8.32	8.48	1.92
2020/8/5	835	250	D835V2-4d167	ES3DV3 - SN3270	DAE4 Sn1399	2.49	9.55	9.96	4.29
2020/8/3	1750	250	D1750V2-1112	ES3DV3 - SN3184	DAE4 Sn916	8.92	36.70	35.68	-2.78
2020/8/4	1900	250	D1900V2-5d185	ES3DV3 - SN3184	DAE4 Sn916	9.55	39.40	38.2	-3.05
2020/8/8	2450	250	D2450V2-929	ES3DV3 - SN3184	DAE4 Sn916	12.90	53.10	51.6	-2.82
2020/8/1	2600	250	D2600V2-1078	ES3DV3 - SN3184	DAE4 Sn916	13.90	57.60	55.6	-3.47
2020/8/3	2600	250	D2600V2-1078	ES3DV3 - SN3184	DAE4 Sn916	13.30	57.60	53.2	-7.64
2020/8/7	3500	100	D3500V2-1014	EX3DV4 - SN3642	DAE4 Sn376	6.35	67.90	63.5	-6.48
2020/8/7	3700	100	D3700V2-1006	EX3DV4 - SN3642	DAE4 Sn376	6.31	67.30	63.1	-6.24
2020/8/9	5250	100	D5GHzV2-1006-5600	EX3DV4 - SN3642	DAE4 Sn376	8.77	83.30	87.7	5.28
2020/8/9	5600	100	D5GHzV2-1006-5250	EX3DV4 - SN3642	DAE4 Sn376	8.86	80.70	88.6	9.79
2020/8/10	5750	100	D5GHzV2-1006-5750	EX3DV4 - SN3642	DAE4 Sn376	8.58	80.40	85.8	6.72

Date	Frequency (MHz)	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 (%)
2020/8/9	5250	100	D5GHzV2-1006-5600	EX3DV4 - SN3642	DAE4 Sn376	2.37	23.80	23.7	-0.42
2020/8/9	5600	100	D5GHzV2-1006-5250	EX3DV4 - SN3642	DAE4 Sn376	2.47	23.20	24.7	6.47
2020/8/10	5750	100	D5GHzV2-1006-5750	EX3DV4 - SN3642	DAE4 Sn376	2.39	22.90	23.9	4.37

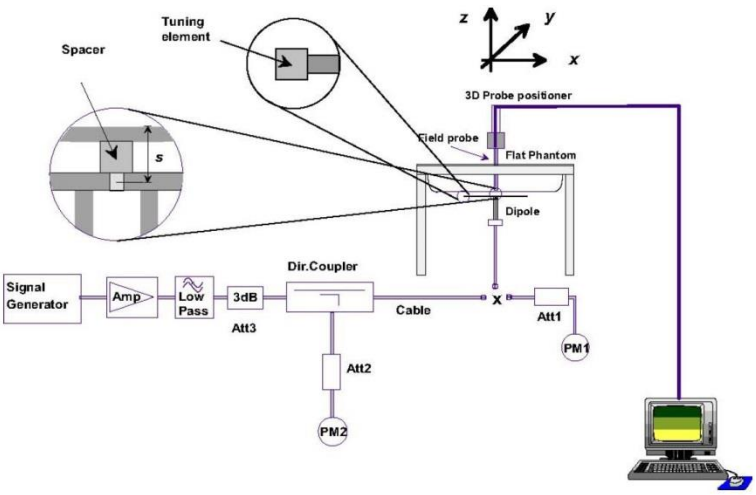


Fig 8.3.1 System Performance Check Setup

Fig 8.3.2 Setup Photo

10. RF Exposure Positions

10.1 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.

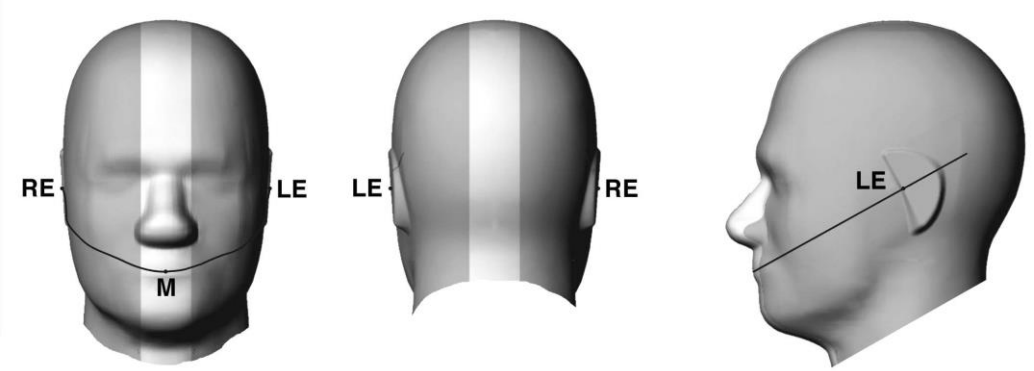


Fig 9.1.1 Front, back, and side views of SAM twin phantom

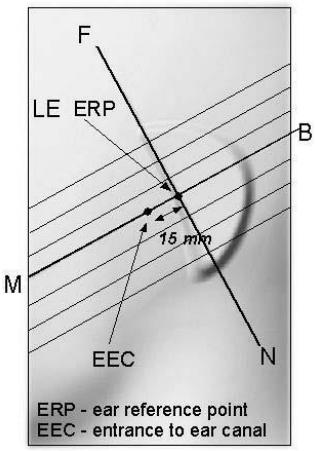


Fig 9.1.2 Close-up side view of phantom showing the ear region.

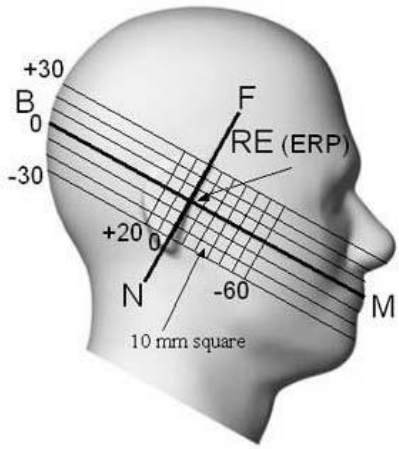


Fig 9.1.3 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

10.2 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.

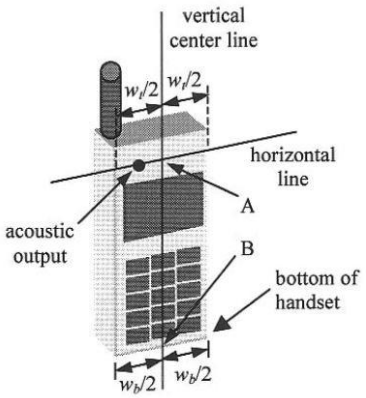


Fig 9.2.1 Handset vertical and horizontal reference lines—"fixed case

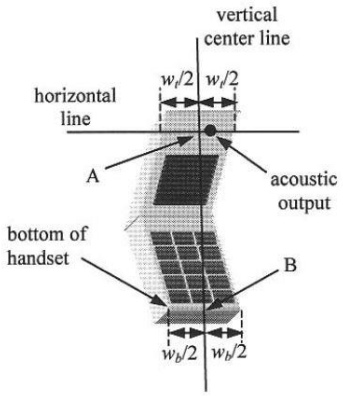


Fig 9.2.2 Handset vertical and horizontal reference lines—"clam-shell case"

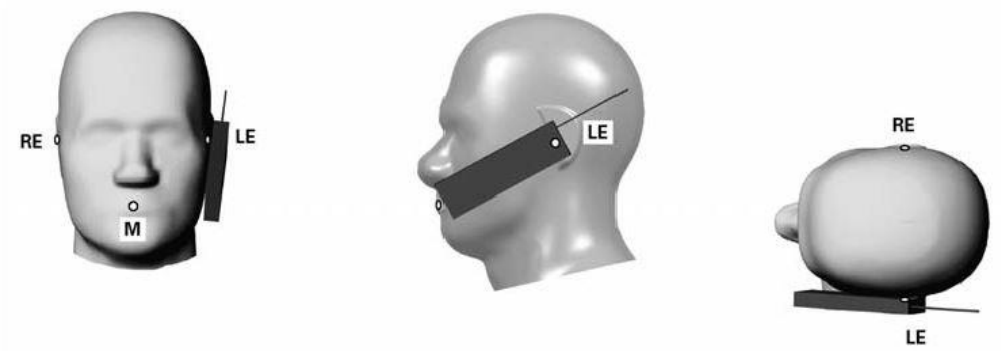


Fig 9.2.3 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

10.3 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

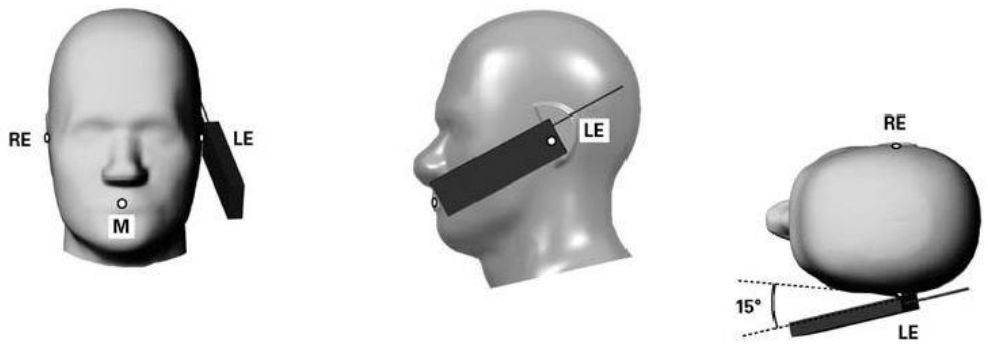


Fig 9.3.1 Tilt position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which define the Reference Plane for handset positioning, are indicated.

10.4 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.

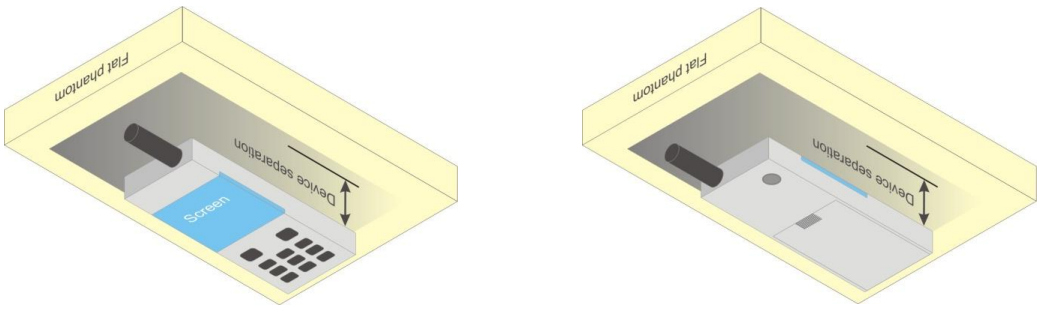


Fig 9.4 Body Worn Position

10.5 Product Specific Exposure

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.

10.6 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.

11. GSM/UMTS/LTE 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 below, 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

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		31.98	32.18	32.05	33.20	22.98	23.18	23.05	24.20
GPRS 1 Tx slot		32.00	32.21	32.07	33.20	23.00	23.21	23.07	24.20
GPRS 2 Tx slots		30.05	29.98	30.05	31.20	24.05	23.98	24.05	25.20
GPRS 3 Tx slots		27.96	27.88	27.82	29.20	23.70	23.62	23.56	24.94
GPRS 4 Tx slots		26.47	26.37	26.67	28.20	23.47	23.37	23.67	25.20
EDGE 1 Tx slot		26.42	26.32	26.45	28.00	17.42	17.32	17.45	19.00
EDGE 2 Tx slots		25.11	25.00	25.02	26.50	19.11	19.00	19.02	20.50
EDGE 3 Tx slots		22.70	23.06	23.02	24.50	18.44	18.80	18.76	20.24
EDGE 4 Tx slots		21.63	22.08	21.25	23.50	18.63	19.08	18.25	20.50
DTM Multi-slot class 5	GSM 1 Tx slot	29.97	29.89	30.05	31.20	23.97	23.91	24.03	25.18
	GPRS 1 Tx slot	30.01	29.98	30.05	31.20				
DTM Multi-slot class 9	GSM 1 Tx slot	30.03	29.90	29.98	31.20	24.01	23.87	23.94	25.18
	GPRS 1 Tx slot	30.04	29.88	29.95	31.20				
DTM Multi-slot class 11	GSM 1 Tx slot	27.90	27.82	27.80	29.20	23.65	23.55	23.53	24.94
	GPRS 2 Tx slots	27.92	27.81	27.78	29.20				
DTM Multi-slot class 5	GSM 1 Tx slot	30.01	29.97	29.96	31.20	22.18	22.12	22.13	23.44
	EDGE 1 Tx slot	25.04	24.91	25.00	26.50				
DTM Multi-slot class 9	GSM 1 Tx slot	29.95	29.98	30.04	31.20	22.15	22.13	22.18	23.44
	EDGE 1 Tx slot	25.11	24.93	24.93	26.50				
DTM Multi-slot class 11	GSM 1 Tx slot	27.92	27.80	27.72	29.20	20.91	20.99	20.92	22.42
	EDGE 2 Tx slots	22.64	23.04	22.97	24.50				

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		27.30	27.74	27.67	28.70	18.30	18.74	18.67	19.70
GPRS 1 Tx slot		27.33	27.79	27.67	28.70	18.33	18.79	18.67	19.70
GPRS 2 Tx slots		24.54	24.70	24.65	25.70	18.54	18.70	18.65	19.70
GPRS 3 Tx slots		22.47	22.72	22.57	23.70	18.21	18.46	18.31	19.44
GPRS 4 Tx slots		21.34	21.55	21.40	22.70	18.34	18.55	18.40	19.70
EDGE 1 Tx slot		25.72	25.95	25.51	27.00	16.72	16.95	16.51	18.00
EDGE 2 Tx slots		23.85	24.16	23.94	25.50	17.85	18.16	17.94	19.50
EDGE 3 Tx slots		22.05	22.11	21.91	23.50	17.79	17.85	17.65	19.24
EDGE 4 Tx slots		20.83	20.90	20.77	22.50	17.83	17.90	17.77	19.50
DTM Multi-slot class 5	GSM 1 Tx slot	24.45	24.70	24.59	25.70	18.44	18.67	18.58	19.68
	GPRS 1 Tx slot	24.48	24.68	24.61	25.70				
DTM Multi-slot class 9	GSM 1 Tx slot	24.44	24.65	24.64	25.70	18.46	18.64	18.60	19.68
	GPRS 1 Tx slot	24.53	24.68	24.61	25.70				
DTM Multi-slot class 11	GSM 1 Tx slot	22.39	22.67	22.52	23.70	18.12	18.44	18.23	19.44
	GPRS 2 Tx slots	22.38	22.72	22.48	23.70				
DTM Multi-slot class 5	GSM 1 Tx slot	24.54	24.63	24.65	25.70	18.18	18.37	18.27	19.58
	EDGE 1 Tx slot	23.83	24.14	23.89	25.50				
DTM Multi-slot class 9	GSM 1 Tx slot	24.48	24.69	24.58	25.70	18.14	18.39	18.24	19.58
	EDGE 1 Tx slot	23.82	24.12	23.91	25.50				
DTM Multi-slot class 11	GSM 1 Tx slot	22.38	22.65	22.51	23.70	17.85	18.00	17.86	19.31
	EDGE 2 Tx slots	21.97	22.05	21.91	23.50				

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

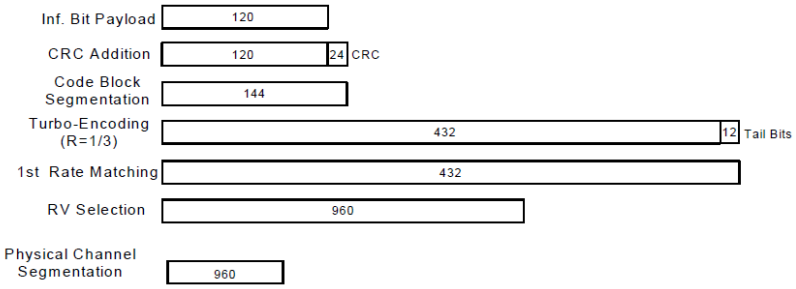


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

Setup Configuration

<WCDMA Conducted Power>

General Note:

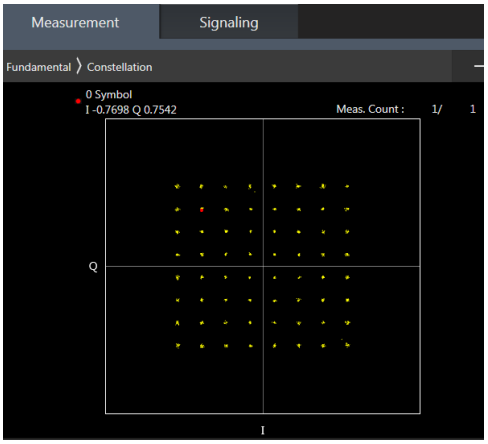
1. Per KDB 941225 D01v03r01, for SAR testing is measured using a 12.2 kbps RMC with TPC bits configured to all "1's".
2. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. The maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA is ≤ 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.

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	19.95	20.13	20.01	20.70	20.01	20.05	20.11	20.70	23.68	23.71	23.73	24.70
3GPP Rel 99	RMC 12.2Kbps	20.08	20.24	20.07	20.70	20.04	20.09	20.19	20.70	23.78	23.79	23.87	24.70
3GPP Rel 6	HSDPA Subtest-1	19.11	19.19	19.16	20.00	18.99	19.10	19.15	20.00	22.78	22.86	22.88	24.00
3GPP Rel 6	HSDPA Subtest-2	19.15	19.26	19.14	20.00	18.98	19.07	19.19	20.00	22.77	22.81	22.89	24.00
3GPP Rel 6	HSDPA Subtest-3	18.62	18.75	18.66	19.50	18.46	18.56	18.67	19.50	22.25	22.30	22.37	23.50
3GPP Rel 6	HSDPA Subtest-4	18.55	18.69	18.61	19.50	18.53	18.59	18.31	19.50	22.26	22.29	22.36	23.50
3GPP Rel 8	DC-HSDPA Subtest-1	19.06	19.14	19.15	20.00	18.91	19.05	19.14	20.00	22.72	22.84	22.84	24.00
3GPP Rel 8	DC-HSDPA Subtest-2	19.13	19.21	19.05	20.00	18.92	19.04	19.16	20.00	22.73	22.74	22.79	24.00
3GPP Rel 8	DC-HSDPA Subtest-3	18.55	18.73	18.64	19.50	18.44	18.48	18.61	19.50	22.22	22.30	22.33	23.50
3GPP Rel 8	DC-HSDPA Subtest-4	18.52	18.67	18.56	19.50	18.50	18.53	18.28	19.50	22.18	22.20	22.36	23.50
3GPP Rel 6	HSUPA Subtest-1	19.10	19.17	19.17	20.00	19.03	19.07	19.13	20.00	22.80	22.81	22.85	24.00
3GPP Rel 6	HSUPA Subtest-2	17.14	17.22	17.11	18.00	17.00	17.08	17.14	18.00	20.78	20.81	20.82	22.00
3GPP Rel 6	HSUPA Subtest-3	18.09	18.19	18.19	19.00	18.01	18.13	18.14	19.00	21.78	21.83	21.87	23.00
3GPP Rel 6	HSUPA Subtest-4	17.10	17.20	17.12	18.00	16.98	17.07	17.17	18.00	20.78	20.84	20.72	22.00
3GPP Rel 6	HSUPA Subtest-5	19.10	19.30	19.20	20.00	19.00	19.10	19.20	20.00	22.80	22.90	22.90	24.00

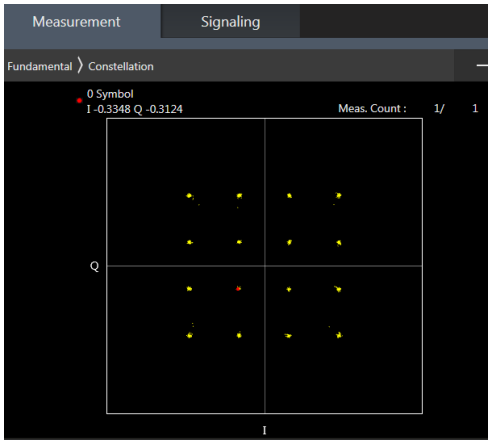
<LTE Conducted Power>

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 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 4 SAR test was covered by Band 66; 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

<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	20.17	20.17	20.23	21	0
20	QPSK	1	49	20.12	20.18	20.22		
20	QPSK	1	99	20.17	20.29	20.25		
20	QPSK	50	0	20.21	20.30	20.24	21	0
20	QPSK	50	24	20.31	20.33	20.25		
20	QPSK	50	50	20.31	20.41	20.36		
20	QPSK	100	0	20.35	20.28	20.29		
20	16QAM	1	0	20.49	20.65	20.49	21	0
20	16QAM	1	49	20.49	20.64	20.62		
20	16QAM	1	99	20.45	20.62	20.51		
20	16QAM	50	0	20.20	20.27	20.25	21	0
20	16QAM	50	24	20.31	20.35	20.27		
20	16QAM	50	50	20.33	20.42	20.38		
20	16QAM	100	0	20.34	20.28	20.27		
20	64QAM	1	0	20.39	20.36	20.45	21	0
20	64QAM	1	49	20.36	20.32	20.36		
20	64QAM	1	99	20.44	20.55	20.44		
20	64QAM	50	0	20.22	20.27	20.22	21	0
20	64QAM	50	24	20.32	20.31	20.29		
20	64QAM	50	50	20.34	20.46	20.33		
20	64QAM	100	0	20.27	20.34	20.21		
Channel				18675	18900	19125	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	20.10	20.17	20.22	21	0
15	QPSK	1	37	20.09	20.18	20.18		
15	QPSK	1	74	20.13	20.26	20.16		
15	QPSK	36	0	20.21	20.21	20.23	21	0
15	QPSK	36	20	20.27	20.25	20.19		
15	QPSK	36	39	20.23	20.40	20.29		
15	QPSK	75	0	20.34	20.21	20.25		
15	16QAM	1	0	20.47	20.61	20.40	21	0
15	16QAM	1	37	20.49	20.62	20.55		
15	16QAM	1	74	20.40	20.55	20.46		
15	16QAM	36	0	20.15	20.24	20.21	21	0
15	16QAM	36	20	20.22	20.32	20.25		
15	16QAM	36	39	20.23	20.35	20.36		
15	16QAM	75	0	20.30	20.21	20.20		
15	64QAM	1	0	20.35	20.36	20.38	21	0
15	64QAM	1	37	20.29	20.24	20.26		
15	64QAM	1	74	20.39	20.45	20.42		
15	64QAM	36	0	20.20	20.25	20.19	21	0
15	64QAM	36	20	20.23	20.21	20.21		
15	64QAM	36	39	20.31	20.44	20.29		
15	64QAM	75	0	20.24	20.34	20.11		
Channel				18650	18900	19150	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	20.14	20.17	20.13	21	0
10	QPSK	1	25	20.08	20.15	20.13		
10	QPSK	1	49	20.11	20.27	20.25		
10	QPSK	25	0	20.11	20.26	20.17	21	0
10	QPSK	25	12	20.29	20.32	20.15		

10	QPSK	25	25	20.27	20.33	20.31		
10	QPSK	50	0	20.32	20.21	20.20		
10	16QAM	1	0	20.42	20.56	20.39	21	0
10	16QAM	1	25	20.42	20.59	20.55		
10	16QAM	1	49	20.38	20.60	20.43		
10	16QAM	25	0	20.12	20.18	20.18	21	0
10	16QAM	25	12	20.22	20.25	20.22		
10	16QAM	25	25	20.26	20.42	20.29		
10	16QAM	50	0	20.30	20.20	20.24		
10	64QAM	1	0	20.32	20.36	20.41	21	0
10	64QAM	1	25	20.33	20.23	20.33		
10	64QAM	1	49	20.35	20.50	20.43		
10	64QAM	25	0	20.14	20.21	20.16	21	0
10	64QAM	25	12	20.28	20.30	20.20		
10	64QAM	25	25	20.25	20.42	20.31		
10	64QAM	50	0	20.25	20.31	20.13		
Channel				18625	18900	19175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	20.15	20.16	20.21	21	0
5	QPSK	1	12	20.04	20.15	20.16		
5	QPSK	1	24	20.14	20.20	20.18		
5	QPSK	12	0	20.15	20.26	20.23	21	0
5	QPSK	12	7	20.23	20.29	20.24		
5	QPSK	12	13	20.30	20.33	20.27		
5	QPSK	25	0	20.28	20.18	20.28		
5	16QAM	1	0	20.41	20.63	20.47	21	0
5	16QAM	1	12	20.40	20.62	20.56		
5	16QAM	1	24	20.40	20.56	20.42		
5	16QAM	12	0	20.11	20.19	20.16	21	0
5	16QAM	12	7	20.29	20.32	20.24		
5	16QAM	12	13	20.29	20.38	20.34		
5	16QAM	25	0	20.33	20.25	20.22		
5	64QAM	1	0	20.32	20.29	20.36	21	0
5	64QAM	1	12	20.28	20.28	20.27		
5	64QAM	1	24	20.44	20.48	20.38		
5	64QAM	12	0	20.21	20.24	20.18	21	0
5	64QAM	12	7	20.23	20.21	20.22		
5	64QAM	12	13	20.34	20.45	20.27		
5	64QAM	25	0	20.23	20.34	20.18		
Channel				18615	18900	19185	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	20.07	20.09	20.17	21	0
3	QPSK	1	8	20.03	20.10	20.14		
3	QPSK	1	14	20.16	20.26	20.22		
3	QPSK	8	0	20.17	20.28	20.14	21	0
3	QPSK	8	4	20.30	20.29	20.16		
3	QPSK	8	7	20.28	20.38	20.26		
3	QPSK	15	0	20.35	20.22	20.29		
3	16QAM	1	0	20.39	20.57	20.44	21	0
3	16QAM	1	8	20.41	20.56	20.62		
3	16QAM	1	14	20.42	20.53	20.47		
3	16QAM	8	0	20.18	20.17	20.25	21	0
3	16QAM	8	4	20.29	20.33	20.22		
3	16QAM	8	7	20.30	20.39	20.31		
3	16QAM	15	0	20.27	20.20	20.17		
3	64QAM	1	0	20.30	20.31	20.43	21	0

3	64QAM	1	8	20.36	20.22	20.26		
3	64QAM	1	14	20.34	20.52	20.38		
3	64QAM	8	0	20.22	20.19	20.13	21	0
3	64QAM	8	4	20.29	20.25	20.24		
3	64QAM	8	7	20.29	20.36	20.24		
3	64QAM	15	0	20.26	20.26	20.12		
Channel				18607	18900	19193	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3		
1.4	QPSK	1	0	20.12	20.16	20.20	21	0
1.4	QPSK	1	3	20.06	20.09	20.14		
1.4	QPSK	1	5	20.17	20.27	20.20		
1.4	QPSK	3	0	20.12	20.22	20.19		
1.4	QPSK	3	1	20.21	20.31	20.21		
1.4	QPSK	3	3	20.30	20.35	20.30		
1.4	QPSK	6	0	20.29	20.28	20.27	21	0
1.4	16QAM	1	0	20.39	20.57	20.42	21	0
1.4	16QAM	1	3	20.48	20.64	20.62		
1.4	16QAM	1	5	20.35	20.60	20.46		
1.4	16QAM	3	0	20.17	20.27	20.21		
1.4	16QAM	3	1	20.23	20.28	20.20		
1.4	16QAM	3	3	20.28	20.41	20.37		
1.4	16QAM	6	0	20.30	20.23	20.24	21	0
1.4	64QAM	1	0	20.32	20.30	20.43	21	0
1.4	64QAM	1	3	20.35	20.25	20.27		
1.4	64QAM	1	5	20.43	20.55	20.41		
1.4	64QAM	3	0	20.15	20.19	20.14		
1.4	64QAM	3	1	20.25	20.22	20.25		
1.4	64QAM	3	3	20.30	20.43	20.31		
1.4	64QAM	6	0	20.17	20.34	20.21	21	0

<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	20.04	19.98	20.10	21	0
20	QPSK	1	49	19.91	19.96	20.05		
20	QPSK	1	99	20.07	20.02	20.11		
20	QPSK	50	0	20.06	20.17	20.17	21	0
20	QPSK	50	24	20.18	20.12	20.15		
20	QPSK	50	50	20.09	20.15	20.21		
20	QPSK	100	0	20.15	20.16	20.15		
20	16QAM	1	0	20.35	20.35	20.41	21	0
20	16QAM	1	49	20.27	20.36	20.36		
20	16QAM	1	99	20.35	20.39	20.42		
20	16QAM	50	0	20.10	20.14	20.18	21	0
20	16QAM	50	24	20.19	20.14	20.23		
20	16QAM	50	50	20.15	20.19	20.21		
20	16QAM	100	0	20.16	20.14	20.18		
20	64QAM	1	0	20.13	20.20	20.29	21	0
20	64QAM	1	49	20.17	20.18	20.27		
20	64QAM	1	99	20.40	20.35	20.39		
20	64QAM	50	0	20.14	20.19	20.23	21	0
20	64QAM	50	24	20.18	20.18	20.23		
20	64QAM	50	50	20.16	20.23	20.26		
20	64QAM	100	0	20.18	20.15	20.13		
Channel				20025	20175	20325	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1732.5	1747.5		
15	QPSK	1	0	19.94	19.92	20.03	21	0
15	QPSK	1	37	19.84	19.95	19.96		
15	QPSK	1	74	20.05	19.95	20.06		
15	QPSK	36	0	20.03	20.15	20.08	21	0
15	QPSK	36	20	20.15	20.10	20.06		
15	QPSK	36	39	20.04	20.13	20.21		
15	QPSK	75	0	20.15	20.10	20.10		
15	16QAM	1	0	20.28	20.31	20.38	21	0
15	16QAM	1	37	20.22	20.36	20.34		
15	16QAM	1	74	20.35	20.33	20.38		
15	16QAM	36	0	20.00	20.05	20.08	21	0
15	16QAM	36	20	20.15	20.09	20.17		
15	16QAM	36	39	20.08	20.15	20.20		
15	16QAM	75	0	20.13	20.12	20.13		
15	64QAM	1	0	20.05	20.12	20.25	21	0
15	64QAM	1	37	20.08	20.14	20.19		
15	64QAM	1	74	20.38	20.26	20.30		
15	64QAM	36	0	20.09	20.11	20.23	21	0
15	64QAM	36	20	20.10	20.16	20.20		
15	64QAM	36	39	20.09	20.22	20.21		
15	64QAM	75	0	20.13	20.13	20.04		
Channel				20000	20175	20350	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1732.5	1750		
10	QPSK	1	0	19.98	19.90	20.04	21	0
10	QPSK	1	25	19.85	19.91	20.01		
10	QPSK	1	49	20.03	19.94	20.08		
10	QPSK	25	0	20.02	20.11	20.07	21	0
10	QPSK	25	12	20.17	20.06	20.14		

10	QPSK	25	25	20.05	20.07	20.14		
10	QPSK	50	0	20.13	20.11	20.12		
10	16QAM	1	0	20.34	20.31	20.32	21	0
10	16QAM	1	25	20.25	20.35	20.27		
10	16QAM	1	49	20.25	20.36	20.36		
10	16QAM	25	0	20.05	20.14	20.16	21	0
10	16QAM	25	12	20.10	20.14	20.14		
10	16QAM	25	25	20.07	20.14	20.12		
10	16QAM	50	0	20.11	20.09	20.11		
10	64QAM	1	0	20.06	20.19	20.26	21	0
10	64QAM	1	25	20.11	20.10	20.18		
10	64QAM	1	49	20.34	20.31	20.33		
10	64QAM	25	0	20.08	20.17	20.18	21	0
10	64QAM	25	12	20.10	20.16	20.18		
10	64QAM	25	25	20.15	20.22	20.25		
10	64QAM	50	0	20.14	20.11	20.11		
Channel				19975	20175	20375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1732.5	1752.5		
5	QPSK	1	0	19.99	19.93	20.09	21	0
5	QPSK	1	12	19.91	19.87	20.04		
5	QPSK	1	24	19.98	20.02	20.06		
5	QPSK	12	0	20.00	20.17	20.07	21	0
5	QPSK	12	7	20.15	20.11	20.10		
5	QPSK	12	13	20.09	20.12	20.19		
5	QPSK	25	0	20.11	20.06	20.05		
5	16QAM	1	0	20.34	20.31	20.41	21	0
5	16QAM	1	12	20.22	20.35	20.28		
5	16QAM	1	24	20.32	20.38	20.34		
5	16QAM	12	0	20.10	20.14	20.09	21	0
5	16QAM	12	7	20.18	20.06	20.20		
5	16QAM	12	13	20.13	20.19	20.18		
5	16QAM	25	0	20.08	20.10	20.15		
5	64QAM	1	0	20.13	20.11	20.20	21	0
5	64QAM	1	12	20.11	20.17	20.21		
5	64QAM	1	24	20.38	20.34	20.31		
5	64QAM	12	0	20.07	20.19	20.13	21	0
5	64QAM	12	7	20.08	20.10	20.19		
5	64QAM	12	13	20.12	20.23	20.23		
5	64QAM	25	0	20.14	20.08	20.03		
Channel				19965	20175	20385	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1732.5	1753.5		
3	QPSK	1	0	19.94	19.94	20.06	21	0
3	QPSK	1	8	19.89	19.86	20.03		
3	QPSK	1	14	20.03	20.02	20.04		
3	QPSK	8	0	19.99	20.07	20.11	21	0
3	QPSK	8	4	20.16	20.05	20.07		
3	QPSK	8	7	20.06	20.09	20.17		
3	QPSK	15	0	20.07	20.09	20.12		
3	16QAM	1	0	20.27	20.31	20.39	21	0
3	16QAM	1	8	20.18	20.29	20.28		
3	16QAM	1	14	20.33	20.30	20.35		
3	16QAM	8	0	20.02	20.13	20.13	21	0
3	16QAM	8	4	20.10	20.10	20.15		
3	16QAM	8	7	20.10	20.17	20.15		
3	16QAM	15	0	20.15	20.04	20.12		
3	64QAM	1	0	20.12	20.17	20.21	21	0

3	64QAM	1	8	20.07	20.18	20.17		
3	64QAM	1	14	20.35	20.34	20.38		
3	64QAM	8	0	20.10	20.14	20.23	21	0
3	64QAM	8	4	20.10	20.08	20.13		
3	64QAM	8	7	20.16	20.19	20.22		
3	64QAM	15	0	20.17	20.11	20.08		
Channel				19957	20175	20393	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1732.5	1754.3		
1.4	QPSK	1	0	20.04	19.93	20.08	21	0
1.4	QPSK	1	3	19.90	19.96	20.01		
1.4	QPSK	1	5	20.03	20.00	20.05		
1.4	QPSK	3	0	19.96	20.10	20.11		
1.4	QPSK	3	1	20.17	20.05	20.07		
1.4	QPSK	3	3	20.03	20.05	20.20		
1.4	QPSK	6	0	20.15	20.16	20.05	21	0
1.4	16QAM	1	0	20.32	20.35	20.33	21	0
1.4	16QAM	1	3	20.18	20.30	20.27		
1.4	16QAM	1	5	20.30	20.33	20.35		
1.4	16QAM	3	0	20.08	20.04	20.12		
1.4	16QAM	3	1	20.15	20.04	20.23		
1.4	16QAM	3	3	20.12	20.19	20.14		
1.4	16QAM	6	0	20.12	20.08	20.13	21	0
1.4	64QAM	1	0	20.09	20.14	20.19	21	0
1.4	64QAM	1	3	20.07	20.11	20.20		
1.4	64QAM	1	5	20.31	20.26	20.39		
1.4	64QAM	3	0	20.14	20.16	20.22		
1.4	64QAM	3	1	20.10	20.11	20.17		
1.4	64QAM	3	3	20.07	20.23	20.20		
1.4	64QAM	6	0	20.13	20.13	20.03	21	0

<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	23.79	23.65	23.59	25	0
10	QPSK	1	25	23.66	23.59	23.53		
10	QPSK	1	49	23.65	23.56	23.48		
10	QPSK	25	0	22.87	22.76	22.65	24	1
10	QPSK	25	12	22.86	22.75	22.64		
10	QPSK	25	25	22.84	22.74	22.68		
10	QPSK	50	0	22.88	22.77	22.63		
10	16QAM	1	0	23.16	23.03	22.96	24	1
10	16QAM	1	25	23.08	23.00	22.94		
10	16QAM	1	49	23.05	22.98	22.86		
10	16QAM	25	0	21.82	21.67	21.64	23	2
10	16QAM	25	12	21.87	21.77	21.63		
10	16QAM	25	25	21.80	21.74	21.66		
10	16QAM	50	0	21.86	21.81	21.66		
10	64QAM	1	0	22.03	21.91	21.86	23	2
10	64QAM	1	25	21.99	21.90	21.88		
10	64QAM	1	49	21.95	21.86	21.81		
10	64QAM	25	0	20.90	20.77	20.70	22	3
10	64QAM	25	12	20.91	20.81	20.70		
10	64QAM	25	25	20.85	20.77	20.71		
10	64QAM	50	0	20.91	20.82	20.66		
Channel				20425	20525	20625	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				826.5	836.5	846.5		
5	QPSK	1	0	23.78	23.66	23.63	25	0
5	QPSK	1	12	23.77	23.67	23.52		
5	QPSK	1	24	23.67	23.61	23.44		
5	QPSK	12	0	22.85	22.73	22.67	24	1
5	QPSK	12	7	22.86	22.70	22.61		
5	QPSK	12	13	22.80	22.67	22.56		
5	QPSK	25	0	22.82	22.74	22.62		
5	16QAM	1	0	23.18	23.03	23.00	24	1
5	16QAM	1	12	23.08	22.97	22.85		
5	16QAM	1	24	23.06	22.95	22.80		
5	16QAM	12	0	21.90	21.76	21.69	23	2
5	16QAM	12	7	21.86	21.76	21.67		
5	16QAM	12	13	21.82	21.69	21.60		
5	16QAM	25	0	21.83	21.73	21.64		
5	64QAM	1	0	22.13	21.93	21.90	23	2
5	64QAM	1	12	21.98	21.87	21.69		
5	64QAM	1	24	21.97	21.90	21.74		
5	64QAM	12	0	20.98	20.82	20.71	22	3
5	64QAM	12	7	20.92	20.81	20.71		
5	64QAM	12	13	20.84	20.74	20.65		
5	64QAM	25	0	20.87	20.75	20.68		
Channel				20415	20525	20635	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				825.5	836.5	847.5		
3	QPSK	1	0	23.77	23.64	23.54	25	0
3	QPSK	1	8	23.77	23.67	23.53		
3	QPSK	1	14	23.69	23.58	23.43		
3	QPSK	8	0	22.86	22.65	22.64	24	1
3	QPSK	8	4	22.86	22.70	22.61		

3	QPSK	8	7	22.77	22.70	22.56		
3	QPSK	15	0	22.84	22.70	22.58		
3	16QAM	1	0	23.14	22.97	22.88	24	1
3	16QAM	1	8	23.17	23.06	22.86		
3	16QAM	1	14	23.04	22.91	22.75		
3	16QAM	8	0	21.93	21.76	21.65	23	2
3	16QAM	8	4	21.94	21.80	21.70		
3	16QAM	8	7	21.83	21.73	21.64		
3	16QAM	15	0	21.85	21.77	21.63		
3	64QAM	1	0	22.05	21.89	21.72	23	2
3	64QAM	1	8	22.10	21.97	21.83		
3	64QAM	1	14	21.97	21.86	21.73		
3	64QAM	8	0	20.96	20.76	20.69	22	3
3	64QAM	8	4	20.92	20.79	20.68		
3	64QAM	8	7	20.84	20.74	20.63		
3	64QAM	15	0	20.89	20.78	20.64		
Channel				20407	20525	20643	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				824.7	836.5	848.3		
1.4	QPSK	1	0	23.68	23.57	23.42	25	0
1.4	QPSK	1	3	23.71	23.58	23.45		
1.4	QPSK	1	5	23.67	23.50	23.34		
1.4	QPSK	3	0	23.72	23.57	23.44		
1.4	QPSK	3	1	23.76	23.64	23.48		
1.4	QPSK	3	3	23.70	23.54	23.40		
1.4	QPSK	6	0	22.78	22.62	22.48	24	1
1.4	16QAM	1	0	23.04	22.88	22.73	24	1
1.4	16QAM	1	3	23.07	22.95	22.80		
1.4	16QAM	1	5	22.99	22.86	22.68		
1.4	16QAM	3	0	22.82	22.69	22.50		
1.4	16QAM	3	1	22.86	22.71	22.56		
1.4	16QAM	3	3	22.79	22.64	22.48		
1.4	16QAM	6	0	21.86	21.73	21.54	23	2
1.4	64QAM	1	0	21.98	21.83	21.64	23	2
1.4	64QAM	1	3	22.05	21.87	21.70		
1.4	64QAM	1	5	21.91	21.78	21.63		
1.4	64QAM	3	0	21.90	21.80	21.65		
1.4	64QAM	3	1	21.97	21.84	21.68		
1.4	64QAM	3	3	21.88	21.75	21.63		
1.4	64QAM	6	0	20.80	20.66	20.49	22	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	19.06	19.20	19.29	20	0
20	QPSK	1	49	19.05	19.15	19.17		
20	QPSK	1	99	19.10	19.15	19.05		
20	QPSK	50	0	19.16	19.27	19.27	20	0
20	QPSK	50	24	19.26	19.26	19.31		
20	QPSK	50	50	19.22	19.26	19.19		
20	QPSK	100	0	19.27	19.28	19.29		
20	16QAM	1	0	19.44	19.57	19.61	20	0
20	16QAM	1	49	19.50	19.55	19.52		
20	16QAM	1	99	19.47	19.43	19.38		
20	16QAM	50	0	19.20	19.31	19.27	20	0
20	16QAM	50	24	19.24	19.27	19.34		
20	16QAM	50	50	19.23	19.32	19.28		
20	16QAM	100	0	19.25	19.20	19.31		
20	64QAM	1	0	19.39	19.36	19.49	20	0
20	64QAM	1	49	19.30	19.44	19.43		
20	64QAM	1	99	19.41	19.42	19.23		
20	64QAM	50	0	19.20	19.32	19.31	20	0
20	64QAM	50	24	19.28	19.34	19.37		
20	64QAM	50	50	19.23	19.37	19.28		
20	64QAM	100	0	19.26	19.28	19.32		
Channel				20825	21100	21375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	19.03	19.10	19.24	20	0
15	QPSK	1	37	19.00	19.05	19.12		
15	QPSK	1	74	19.03	19.06	19.00		
15	QPSK	36	0	19.11	19.24	19.25	20	0
15	QPSK	36	20	19.20	19.18	19.29		
15	QPSK	36	39	19.17	19.25	19.18		
15	QPSK	75	0	19.17	19.26	19.25		
15	16QAM	1	0	19.41	19.54	19.60	20	0
15	16QAM	1	37	19.44	19.45	19.47		
15	16QAM	1	74	19.41	19.38	19.38		
15	16QAM	36	0	19.14	19.23	19.24	20	0
15	16QAM	36	20	19.16	19.19	19.33		
15	16QAM	36	39	19.16	19.28	19.28		
15	16QAM	75	0	19.18	19.14	19.24		
15	64QAM	1	0	19.29	19.27	19.46	20	0
15	64QAM	1	37	19.26	19.35	19.43		
15	64QAM	1	74	19.32	19.36	19.23		
15	64QAM	36	0	19.11	19.27	19.22	20	0
15	64QAM	36	20	19.25	19.28	19.27		
15	64QAM	36	39	19.22	19.32	19.18		
15	64QAM	75	0	19.22	19.24	19.25		
Channel				20800	21100	21400	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	19.02	19.14	19.23	20	0
10	QPSK	1	25	19.02	19.07	19.15		
10	QPSK	1	49	19.03	19.12	18.95		
10	QPSK	25	0	19.08	19.21	19.21	20	0
10	QPSK	25	12	19.23	19.25	19.21		

10	QPSK	25	25	19.17	19.22	19.15		
10	QPSK	50	0	19.17	19.26	19.28		
10	16QAM	1	0	19.43	19.55	19.57	20	0
10	16QAM	1	25	19.42	19.53	19.46		
10	16QAM	1	49	19.46	19.35	19.32		
10	16QAM	25	0	19.17	19.31	19.21	20	0
10	16QAM	25	12	19.15	19.21	19.26		
10	16QAM	25	25	19.16	19.25	19.24		
10	16QAM	50	0	19.25	19.11	19.26		
10	64QAM	1	0	19.35	19.26	19.45	20	0
10	64QAM	1	25	19.26	19.34	19.38		
10	64QAM	1	49	19.38	19.39	19.15		
10	64QAM	25	0	19.18	19.23	19.28	20	0
10	64QAM	25	12	19.22	19.25	19.28		
10	64QAM	25	25	19.20	19.28	19.27		
10	64QAM	50	0	19.22	19.25	19.23		
Channel				20775	21100	21425	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	18.97	19.10	19.23	20	0
5	QPSK	1	12	18.97	19.08	19.07		
5	QPSK	1	24	19.06	19.14	19.00		
5	QPSK	12	0	19.12	19.23	19.21	20	0
5	QPSK	12	7	19.16	19.24	19.27		
5	QPSK	12	13	19.15	19.22	19.17		
5	QPSK	25	0	19.20	19.22	19.19		
5	16QAM	1	0	19.34	19.55	19.56	20	0
5	16QAM	1	12	19.44	19.49	19.52		
5	16QAM	1	24	19.44	19.33	19.37		
5	16QAM	12	0	19.19	19.28	19.26	20	0
5	16QAM	12	7	19.14	19.24	19.33		
5	16QAM	12	13	19.13	19.30	19.20		
5	16QAM	25	0	19.19	19.15	19.21		
5	64QAM	1	0	19.37	19.28	19.39	20	0
5	64QAM	1	12	19.30	19.36	19.34		
5	64QAM	1	24	19.31	19.42	19.19		
5	64QAM	12	0	19.15	19.27	19.22	20	0
5	64QAM	12	7	19.25	19.33	19.29		
5	64QAM	12	13	19.20	19.37	19.23		
5	64QAM	25	0	19.23	19.26	19.31		

<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	23.82	23.71	23.68	25	0
10	QPSK	1	25	23.64	23.70	23.64		
10	QPSK	1	49	23.76	23.69	23.67		
10	QPSK	25	0	22.88	22.84	22.78	24	1
10	QPSK	25	12	22.87	22.79	22.77		
10	QPSK	25	25	22.84	22.83	22.81		
10	QPSK	50	0	22.90	22.82	22.77		
10	16QAM	1	0	23.13	23.06	23.09	24	1
10	16QAM	1	25	23.09	23.11	23.05		
10	16QAM	1	49	23.13	23.08	23.04		
10	16QAM	25	0	21.90	21.85	21.79	23	2
10	16QAM	25	12	21.87	21.82	21.76		
10	16QAM	25	25	21.82	21.84	21.77		
10	16QAM	50	0	21.89	21.78	21.75		
10	64QAM	1	0	21.57	21.96	21.90	23	2
10	64QAM	1	25	21.97	21.99	21.96		
10	64QAM	1	49	22.06	21.99	21.90		
10	64QAM	25	0	20.61	20.84	20.82	22	3
10	64QAM	25	12	20.90	20.85	20.82		
10	64QAM	25	25	20.89	20.89	20.85		
10	64QAM	50	0	20.93	20.84	20.80		
Channel				23035	23095	23155	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				701.5	707.5	713.5		
5	QPSK	1	0	23.81	23.71	23.69	25	0
5	QPSK	1	12	23.78	23.78	23.64		
5	QPSK	1	24	23.74	23.76	23.61		
5	QPSK	12	0	22.91	22.80	22.77	24	1
5	QPSK	12	7	22.88	22.78	22.77		
5	QPSK	12	13	22.81	22.81	22.71		
5	QPSK	25	0	22.84	22.78	22.75		
5	16QAM	1	0	23.17	23.04	23.01	24	1
5	16QAM	1	12	23.06	23.03	22.95		
5	16QAM	1	24	23.08	23.03	22.92		
5	16QAM	12	0	21.94	21.86	21.88	23	2
5	16QAM	12	7	21.93	21.80	21.77		
5	16QAM	12	13	21.84	21.81	21.72		
5	16QAM	25	0	21.90	21.81	21.75		
5	64QAM	1	0	21.41	22.00	21.93	23	2
5	64QAM	1	12	21.71	21.96	21.85		
5	64QAM	1	24	21.93	21.98	21.87		
5	64QAM	12	0	20.54	20.90	20.89	22	3
5	64QAM	12	7	20.71	20.88	20.73		
5	64QAM	12	13	20.88	20.85	20.78		
5	64QAM	25	0	20.62	20.82	20.80		
Channel				23025	23095	23165	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				700.5	707.5	714.5		
3	QPSK	1	0	23.74	23.59	23.53	25	0
3	QPSK	1	8	23.72	23.62	23.49		
3	QPSK	1	14	23.63	23.53	23.41		
3	QPSK	8	0	22.82	22.61	22.58	24	1
3	QPSK	8	4	22.82	22.65	22.55		

3	QPSK	8	7	22.72	22.66	22.52		
3	QPSK	15	0	22.77	22.66	22.54		
3	16QAM	1	0	23.08	22.91	22.84	24	1
3	16QAM	1	8	23.12	23.01	22.84		
3	16QAM	1	14	22.96	22.89	22.69		
3	16QAM	8	0	21.89	21.71	21.60	23	2
3	16QAM	8	4	21.84	21.79	21.65		
3	16QAM	8	7	21.79	21.68	21.57		
3	16QAM	15	0	21.80	21.72	21.59		
3	64QAM	1	0	22.05	21.85	21.57	23	2
3	64QAM	1	8	22.04	21.93	21.72		
3	64QAM	1	14	21.94	21.85	21.68		
3	64QAM	8	0	20.87	20.71	20.61	22	3
3	64QAM	8	4	20.89	20.74	20.58		
3	64QAM	8	7	20.81	20.70	20.58		
3	64QAM	15	0	20.80	20.69	20.59		
Channel				23017	23095	23173	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				699.7	707.5	715.3		
1.4	QPSK	1	0	23.64	23.51	23.39	25	0
1.4	QPSK	1	3	23.68	23.53	23.42		
1.4	QPSK	1	5	23.59	23.47	23.30		
1.4	QPSK	3	0	23.71	23.56	23.41		
1.4	QPSK	3	1	23.69	23.57	23.42		
1.4	QPSK	3	3	23.68	23.53	23.36		
1.4	QPSK	6	0	22.72	22.59	22.44	24	1
1.4	16QAM	1	0	23.00	22.86	22.70	24	1
1.4	16QAM	1	3	23.04	22.88	22.77		
1.4	16QAM	1	5	22.95	22.79	22.66		
1.4	16QAM	3	0	22.77	22.63	22.47		
1.4	16QAM	3	1	22.81	22.66	22.52		
1.4	16QAM	3	3	22.73	22.60	22.44		
1.4	16QAM	6	0	21.79	21.64	21.51	23	2
1.4	64QAM	1	0	21.94	21.77	21.62	23	2
1.4	64QAM	1	3	21.97	21.83	21.69		
1.4	64QAM	1	5	21.86	21.76	21.60		
1.4	64QAM	3	0	21.90	21.78	21.62		
1.4	64QAM	3	1	21.93	21.81	21.63		
1.4	64QAM	3	3	21.87	21.71	21.57		
1.4	64QAM	6	0	20.76	20.62	20.46	22	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		23.83		25	0
10	QPSK	1	25		23.80			
10	QPSK	1	49		23.92			
10	QPSK	25	0		22.91		24	1
10	QPSK	25	12		22.91			
10	QPSK	25	25		22.93			
10	QPSK	50	0		22.91			
10	16QAM	1	0		23.14		24	1
10	16QAM	1	25		23.21			
10	16QAM	1	49		23.15			
10	16QAM	25	0		21.91		23	2
10	16QAM	25	12		21.94			
10	16QAM	25	25		21.97			
10	16QAM	50	0		21.93			
10	64QAM	1	0		22.00		23	2
10	64QAM	1	25		22.11			
10	64QAM	1	49		22.09			
10	64QAM	25	0		20.98		22	3
10	64QAM	25	12		20.98			
10	64QAM	25	25		21.02			
10	64QAM	50	0		20.99			
Channel				23205	23230	23255	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				779.5	782	784.5		
5	QPSK	1	0	23.91	23.81	23.79	25	0
5	QPSK	1	12	23.83	23.89	23.85		
5	QPSK	1	24	23.86	23.87	23.89		
5	QPSK	12	0	22.87	22.94	22.90	24	1
5	QPSK	12	7	22.96	22.92	22.97		
5	QPSK	12	13	22.96	22.97	22.94		
5	QPSK	25	0	22.96	22.91	22.93		
5	16QAM	1	0	23.01	23.09	23.15	24	1
5	16QAM	1	12	23.14	23.18	23.09		
5	16QAM	1	24	23.22	23.16	23.15		
5	16QAM	12	0	21.94	21.95	21.99	23	2
5	16QAM	12	7	21.97	21.97	21.99		
5	16QAM	12	13	21.99	22.00	21.95		
5	16QAM	25	0	21.99	21.98	21.99		
5	64QAM	1	0	21.92	22.03	22.06	23	2
5	64QAM	1	12	22.04	22.09	22.04		
5	64QAM	1	24	22.14	22.12	22.03		
5	64QAM	12	0	20.99	21.01	21.03	22	3
5	64QAM	12	7	21.02	20.99	21.03		
5	64QAM	12	13	21.01	21.03	21.02		
5	64QAM	25	0	21.01	20.96	21.00		

<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	20.06	20.05	20.12	21	0
20	QPSK	1	49	20.01	20.18	20.01		
20	QPSK	1	99	20.14	20.20	20.05		
20	QPSK	50	0	20.06	20.17	20.13	21	0
20	QPSK	50	24	20.15	20.19	20.13		
20	QPSK	50	50	20.12	20.26	20.20		
20	QPSK	100	0	20.14	20.18	20.16		
20	16QAM	1	0	20.33	20.40	20.46	21	0
20	16QAM	1	49	20.39	20.51	20.30		
20	16QAM	1	99	20.47	20.46	20.38		
20	16QAM	50	0	20.08	20.19	20.18	21	0
20	16QAM	50	24	20.17	20.23	20.15		
20	16QAM	50	50	20.19	20.31	20.22		
20	16QAM	100	0	20.16	20.23	20.13		
20	64QAM	1	0	20.29	20.38	20.45	21	0
20	64QAM	1	49	20.35	20.44	20.23		
20	64QAM	1	99	20.47	20.36	20.31		
20	64QAM	50	0	20.01	20.15	20.10	21	0
20	64QAM	50	24	20.15	20.14	20.09		
20	64QAM	50	50	20.15	20.31	20.16		
20	64QAM	100	0	20.12	20.13	20.11		
Channel				132047	132322	132597	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1745	1772.5		
15	QPSK	1	0	20.02	19.98	20.06	21	0
15	QPSK	1	37	19.93	20.13	19.97		
15	QPSK	1	74	20.08	20.18	19.97		
15	QPSK	36	0	19.96	20.13	20.06	21	0
15	QPSK	36	20	20.09	20.19	20.13		
15	QPSK	36	39	20.02	20.25	20.16		
15	QPSK	75	0	20.12	20.18	20.12		
15	16QAM	1	0	20.29	20.39	20.45	21	0
15	16QAM	1	37	20.32	20.46	20.29		
15	16QAM	1	74	20.40	20.38	20.29		
15	16QAM	36	0	20.01	20.17	20.10	21	0
15	16QAM	36	20	20.13	20.17	20.05		
15	16QAM	36	39	20.18	20.22	20.15		
15	16QAM	75	0	20.14	20.21	20.10		
15	64QAM	1	0	20.24	20.32	20.43	21	0
15	64QAM	1	37	20.26	20.40	20.18		
15	64QAM	1	74	20.40	20.36	20.28		
15	64QAM	36	0	19.91	20.05	20.08	21	0
15	64QAM	36	20	20.05	20.13	20.05		
15	64QAM	36	39	20.15	20.30	20.14		
15	64QAM	75	0	20.04	20.04	20.09		
Channel				132022	132322	132622	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1745	1775		
10	QPSK	1	0	20.02	20.04	20.04	21	0
10	QPSK	1	25	19.91	20.18	19.94		
10	QPSK	1	49	20.13	20.19	20.05		
10	QPSK	25	0	20.05	20.08	20.08	21	0
10	QPSK	25	12	20.05	20.12	20.06		

10	QPSK	25	25	20.07	20.18	20.15		
10	QPSK	50	0	20.13	20.14	20.09		
10	16QAM	1	0	20.31	20.30	20.39	21	0
10	16QAM	1	25	20.35	20.44	20.20		
10	16QAM	1	49	20.45	20.39	20.31		
10	16QAM	25	0	20.00	20.15	20.13	21	0
10	16QAM	25	12	20.09	20.14	20.11		
10	16QAM	25	25	20.17	20.22	20.22		
10	16QAM	50	0	20.13	20.16	20.04		
10	64QAM	1	0	20.26	20.33	20.35	21	0
10	64QAM	1	25	20.31	20.35	20.16		
10	64QAM	1	49	20.39	20.35	20.21		
10	64QAM	25	0	19.94	20.11	20.04	21	0
10	64QAM	25	12	20.09	20.12	20.05		
10	64QAM	25	25	20.09	20.29	20.13		
10	64QAM	50	0	20.03	20.08	20.02		
Channel				131997	132322	132647	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1745	1777.5		
5	QPSK	1	0	20.00	19.97	20.10	21	0
5	QPSK	1	12	19.93	20.15	19.96		
5	QPSK	1	24	20.09	20.17	19.96		
5	QPSK	12	0	20.04	20.15	20.13	21	0
5	QPSK	12	7	20.06	20.12	20.05		
5	QPSK	12	13	20.07	20.18	20.12		
5	QPSK	25	0	20.14	20.11	20.10		
5	16QAM	1	0	20.32	20.38	20.37	21	0
5	16QAM	1	12	20.38	20.48	20.22		
5	16QAM	1	24	20.40	20.42	20.37		
5	16QAM	12	0	19.98	20.19	20.16	21	0
5	16QAM	12	7	20.11	20.13	20.13		
5	16QAM	12	13	20.16	20.29	20.14		
5	16QAM	25	0	20.12	20.21	20.05		
5	64QAM	1	0	20.22	20.33	20.42	21	0
5	64QAM	1	12	20.26	20.44	20.23		
5	64QAM	1	24	20.41	20.33	20.24		
5	64QAM	12	0	20.01	20.15	20.02	21	0
5	64QAM	12	7	20.13	20.04	20.09		
5	64QAM	12	13	20.12	20.31	20.15		
5	64QAM	25	0	20.07	20.10	20.10		
Channel				131987	132322	132657	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1745	1778.5		
3	QPSK	1	0	20.05	20.02	20.04	21	0
3	QPSK	1	8	19.96	20.13	19.97		
3	QPSK	1	14	20.06	20.13	20.04		
3	QPSK	8	0	19.98	20.13	20.08	21	0
3	QPSK	8	4	20.07	20.18	20.12		
3	QPSK	8	7	20.02	20.16	20.17		
3	QPSK	15	0	20.08	20.08	20.12		
3	16QAM	1	0	20.25	20.31	20.43	21	0
3	16QAM	1	8	20.38	20.44	20.27		
3	16QAM	1	14	20.41	20.44	20.37		
3	16QAM	8	0	19.98	20.12	20.11	21	0
3	16QAM	8	4	20.09	20.19	20.07		
3	16QAM	8	7	20.17	20.22	20.17		
3	16QAM	15	0	20.11	20.23	20.12		
3	64QAM	1	0	20.23	20.33	20.38	21	0

3	64QAM	1	8	20.28	20.44	20.17		
3	64QAM	1	14	20.44	20.29	20.29		
3	64QAM	8	0	19.99	20.07	20.03	21	0
3	64QAM	8	4	20.12	20.04	20.09		
3	64QAM	8	7	20.07	20.22	20.15		
3	64QAM	15	0	20.06	20.12	20.02		
Channel				131979	132322	132665	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1745	1779.3		
1.4	QPSK	1	0	20.00	20.01	20.07	21	0
1.4	QPSK	1	3	19.92	20.14	19.99		
1.4	QPSK	1	5	20.11	20.14	20.04		
1.4	QPSK	3	0	20.06	20.16	20.12		
1.4	QPSK	3	1	20.13	20.16	20.09		
1.4	QPSK	3	3	20.10	20.16	20.17		
1.4	QPSK	6	0	20.11	20.12	20.07	21	0
1.4	16QAM	1	0	20.33	20.31	20.43	21	0
1.4	16QAM	1	3	20.38	20.46	20.22		
1.4	16QAM	1	5	20.41	20.37	20.35		
1.4	16QAM	3	0	20.04	20.17	20.14		
1.4	16QAM	3	1	20.09	20.21	20.09		
1.4	16QAM	3	3	20.14	20.27	20.16		
1.4	16QAM	6	0	20.11	20.18	20.04	21	0
1.4	64QAM	1	0	20.25	20.34	20.36	21	0
1.4	64QAM	1	3	20.33	20.41	20.16		
1.4	64QAM	1	5	20.45	20.30	20.25		
1.4	64QAM	3	0	19.94	20.06	20.02		
1.4	64QAM	3	1	20.07	20.12	20.09		
1.4	64QAM	3	3	20.06	20.24	20.14		
1.4	64QAM	6	0	20.09	20.06	20.02	21	0

<TDD LTE SAR Measurement>

TDD LTE configuration setup for SAR measurement

SAR was tested with a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by 3GPP.

a. 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations
b. "special subframe S" contains both uplink and downlink transmissions, it has been taken into consideration to determine the transmission duty factor according to the worst case uplink and downlink cyclic prefix requirements for UpPTS
c. Establishing connections with base station simulators ensure a consistent means for testing SAR and recommended for evaluating SAR. The Anritsu MT8820C (firmware: #22.52#004) was used for LTE output power measurements and SAR testing.

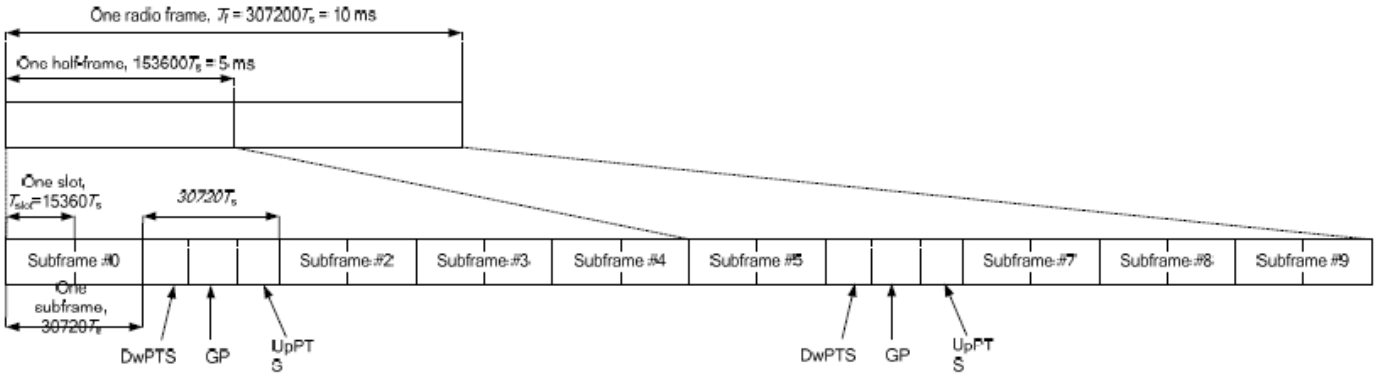


Figure 4.2-1: Frame structure type 2 (for 5 ms switch-point periodicity).

Table 4.2-2: Uplink-downlink configurations.

Uplink-downlink configuration	Downlink-to-Uplink Switch-point periodicity	Subframe number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U	U	D	S	U	U	D

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

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

Special subframe (30720·T_s): Normal cyclic prefix in downlink (UpPTS)			
	Special subframe configuration	**Normal cyclic prefix in uplink**	**Extended cyclic prefix in uplink**
Uplink duty factor in one special subframe	**0~4**	7.13%	8.33%
	5~9	14.3%	16.7%

Special subframe(30720·T_s): Extended cyclic prefix in downlink (UpPTS)			
	Special subframe configuration	**Normal cyclic prefix in uplink**	**Extended cyclic prefix in uplink**
Uplink duty factor in one special subframe	**0~3**	7.13%	8.33%
	4~7	14.3%	16.7%

The highest duty factor is resulted from:

i. Uplink-downlink configuration: 0. In a half-frame consisted of 5 subfames, uplink operation is in 3 uplink subframes and 1 special subframe.

ii. special subframe configuration: 5-9 for normal cyclic prefix in downlink, 4-7 for extended cyclic prefix in downlink

iii. for special subframe with extended cyclic prefix in uplink, the total uplink duty factor in one half-frame is: (3+0.167)/5 = 63.3%

iv. for special subframe with normal cyclic prefix in uplink, the total uplink duty factor in one half-frame is: (3+0.143)/5 = 62.9%

v. For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix 63.3%/62.9% = 1.006 is applied to scale-up the measured SAR result. The scaled TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.

<LTE Band 48>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Low Middle Ch. / Freq.	Power High Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				55340	55830	56150	56640		
Frequency (MHz)				3560	3609	3641	3690		
20	QPSK	1	0	16.66	16.49	16.57	16.57	18	0
20	QPSK	1	49	16.52	16.40	16.54	16.47		
20	QPSK	1	99	16.54	16.53	16.64	16.57		
20	QPSK	50	0	16.68	16.55	16.58	16.57	18	0
20	QPSK	50	24	16.58	16.56	16.60	16.64		
20	QPSK	50	50	16.55	16.49	16.68	16.62		
20	QPSK	100	0	16.58	16.57	16.60	16.64		
20	16QAM	1	0	16.82	16.62	16.69	16.71	18	0
20	16QAM	1	49	16.62	16.52	16.63	16.54		
20	16QAM	1	99	16.67	16.64	16.75	16.71		
20	16QAM	50	0	16.73	16.60	16.63	16.61	18	0
20	16QAM	50	24	16.62	16.62	16.65	16.66		
20	16QAM	50	50	16.60	16.55	16.74	16.68		
20	16QAM	100	0	16.62	16.63	16.64	16.69		
20	64QAM	1	0	16.37	16.21	16.26	16.23	18	0
20	64QAM	1	49	16.23	16.14	16.26	16.20		
20	64QAM	1	99	16.27	16.23	16.41	16.39		
20	64QAM	50	0	16.75	16.61	16.64	16.61	18	0
20	64QAM	50	24	16.62	16.61	16.64	16.69		
20	64QAM	50	50	16.59	16.55	16.74	16.69		
20	64QAM	100	0	16.63	16.64	16.65	16.69		
Channel				55315	55820	56160	56665	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3557.5	3608	3642	3692.5		
15	QPSK	1	0	16.60	16.45	16.52	16.49	18	0
15	QPSK	1	37	16.49	16.38	16.52	16.47		
15	QPSK	1	74	16.54	16.49	16.62	16.59		
15	QPSK	36	0	16.67	16.54	16.58	16.55	18	0
15	QPSK	36	20	16.63	16.46	16.57	16.52		
15	QPSK	36	39	16.53	16.47	16.63	16.59		
15	QPSK	75	0	16.64	16.49	16.59	16.55		
15	16QAM	1	0	16.74	16.58	16.66	16.69	18	0
15	16QAM	1	37	16.56	16.43	16.50	16.52		
15	16QAM	1	74	16.72	16.70	16.78	16.73		
15	16QAM	36	0	16.67	16.54	16.58	16.55	18	0
15	16QAM	36	20	16.63	16.46	16.57	16.51		
15	16QAM	36	39	16.50	16.46	16.64	16.61		
15	16QAM	75	0	16.68	16.52	16.62	16.59		
15	64QAM	1	0	16.33	16.17	16.24	16.19	18	0
15	64QAM	1	37	16.20	16.14	16.27	16.22		
15	64QAM	1	74	16.24	16.24	16.42	16.41		
15	64QAM	36	0	16.70	16.57	16.63	16.58	18	0
15	64QAM	36	20	16.67	16.49	16.60	16.57		
15	64QAM	36	39	16.56	16.51	16.69	16.64		
15	64QAM	75	0	16.69	16.52	16.65	16.60		
Channel				55290	55815	56165	56690	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3555	3607.5	3642.5	3695		
10	QPSK	1	0	16.59	16.45	16.55	16.51	18	0
10	QPSK	1	25	16.52	16.38	16.49	16.43		
10	QPSK	1	49	16.48	16.43	16.51	16.46		
10	QPSK	25	0	16.68	16.56	16.56	16.55	18	0

10	QPSK	25	12	16.70	16.49	16.60	16.65		
10	QPSK	25	25	16.61	16.50	16.67	16.64		
10	QPSK	50	0	16.60	16.49	16.59	16.55		
10	16QAM	1	0	16.76	16.58	16.67	16.67	18	0
10	16QAM	1	25	16.66	16.57	16.66	16.60		
10	16QAM	1	49	16.70	16.61	16.72	16.64		
10	16QAM	25	0	16.66	16.53	16.57	16.53	18	0
10	16QAM	25	12	16.71	16.50	16.61	16.65		
10	16QAM	25	25	16.56	16.47	16.65	16.61		
10	16QAM	50	0	16.66	16.54	16.65	16.61		
10	64QAM	1	0	16.26	16.13	16.18	16.12	18	0
10	64QAM	1	25	16.22	16.13	16.26	16.27		
10	64QAM	1	49	16.14	16.10	16.28	16.30		
10	64QAM	25	0	16.73	16.62	16.64	16.60	18	0
10	64QAM	25	12	16.78	16.57	16.67	16.72		
10	64QAM	25	25	16.66	16.56	16.74	16.72		
10	64QAM	50	0	16.63	16.54	16.62	16.59		
Channel				55265	55810	56170	56715	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3552.5	3607	3643	3697.5		
5	QPSK	1	0	16.64	16.47	16.51	16.54	18	0
5	QPSK	1	12	16.53	16.44	16.48	16.44		
5	QPSK	1	24	16.59	16.42	16.62	16.56		
5	QPSK	12	0	16.70	16.54	16.59	16.63	18	0
5	QPSK	12	7	16.68	16.54	16.67	16.62		
5	QPSK	12	13	16.70	16.52	16.69	16.62		
5	QPSK	25	0	16.67	16.48	16.58	16.59		
5	16QAM	1	0	16.76	16.63	16.73	16.70	18	0
5	16QAM	1	12	16.78	16.67	16.74	16.74		
5	16QAM	1	24	16.78	16.62	16.80	16.70		
5	16QAM	12	0	16.66	16.54	16.59	16.59	18	0
5	16QAM	12	7	16.66	16.54	16.64	16.57		
5	16QAM	12	13	16.66	16.47	16.63	16.61		
5	16QAM	25	0	16.67	16.54	16.64	16.66		
5	64QAM	1	0	16.39	16.24	16.29	16.31	18	0
5	64QAM	1	12	16.28	16.19	16.29	16.24		
5	64QAM	1	24	16.37	16.26	16.39	16.34		
5	64QAM	12	0	16.72	16.60	16.64	16.67	18	0
5	64QAM	12	7	16.71	16.65	16.72	16.64		
5	64QAM	12	13	16.71	16.58	16.72	16.67		
5	64QAM	25	0	16.72	16.56	16.67	16.66		

12. WiFi/Bluetooth Output Power (Unit: dBm)

General Note:

1. For each antenna, transmit power in SISO operation is larger than (or equal to) the power in MIMO operation, RF exposure compliance of MIMO mode can be deduced from the compliance simultaneous transmission of antennas operating in SISO mode.
2. Per KDB 248227 D01v02r02, the simultaneous SAR provisions in KDB publication 447498 should be applied to determine simultaneous transmission SAR test exclusion for WiFi MIMO. If the sum of 1g single transmission chain SAR measurements is < 1.6W/kg and SAR peak to location ratio ≤ 0.04, no additional SAR measurements for MIMO.
3. 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.
4. 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).
5. 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.
6. 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.
7. Per 201904 TCBC workshops, General principles of FCC KDB Publication 248227 D01 can be applied to determine the SAR Initial Test Configurations and test reduction for 802.11ax SAR testing. For the table below the 802.11ax maximum power is SU (non-OFDMA)
8. In applying the test guidance, the IEEE 802.11 mode with the maximum output power (out of all modes) should be considered for testing
9. For modes with the same maximum output power, the guidance from section 5.3.2 a) of FCC KDB Publication 248227 D01 should be applied, with 802.11ax being considered as the highest 802.11 mode for the appropriate frequency bands
10. When SAR testing for 802.11ax is required
    a. If the maximum output power is highest for OFDMA scenarios, choose the tone size with the maximum number of tones and the highest maximum output power
    b. Otherwise, consider the fully allocated channel for SAR testing
    c. When SAR testing is required on RU sizes less than the fully allocated channel, use the RU number closest to the middle of the channel, choosing the higher RU number when two RUs are equidistant to the middle of the channel

<2.4GHz WLAN Chain 0>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	13.58	14.00	100.00
		6	2437	13.40	14.00	
		11	2462	13.41	14.00	
	802.11g 6Mbps	1	2412	11.61	12.00	98.74
		6	2437	13.54	14.00	
		11	2462	13.89	14.00	
	802.11n-HT20 MCS0	1	2412	11.39	12.00	100.00
		6	2437	13.35	14.00	
		11	2462	13.68	14.00	
	802.11ax-HE20 MCS0	1	2412	12.43	13.00	100.00
		6	2437	14.37	15.00	
		11	2462	13.85	14.00	

<2.4GHz WLAN Chain 1>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	6.40	7.00	100.00
		6	2437	6.72	7.00	
		11	2462	6.56	7.00	
	802.11g 6Mbps	1	2412	12.72	13.00	99.25
		6	2437	15.70	16.00	
		11	2462	15.61	16.00	
	802.11n-HT20 MCS0	1	2412	12.43	13.00	100.00
		6	2437	15.52	16.00	
		11	2462	15.41	16.00	
	802.11ax-HE20 MCS0	1	2412	12.55	13.00	100.00
		6	2437	15.61	16.00	
		11	2462	15.45	16.00	

<5GHz WLAN Chain 0>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11a 6Mbps	36	5180	11.00	11.50	99.00
		40	5200	11.00	11.50	
		44	5220	11.00	11.50	
		48	5240	11.10	11.50	
	802.11n-HT20 MCS0	36	5180	11.00	11.50	100.00
		40	5200	11.00	11.50	
		44	5220	10.90	11.50	
		48	5240	11.10	11.50	
	802.11n-HT40 MCS0	38	5190	11.00	11.50	100.00
		46	5230	11.00	11.50	
	802.11ac-VHT20 MCS0	36	5180	10.90	11.50	100.00
		40	5200	10.90	11.50	
		44	5220	10.80	11.50	
		48	5240	11.00	11.50	
	802.11ac-VHT40 MCS0	38	5190	10.90	11.50	100.00
		46	5230	10.90	11.50	
	802.11ac-VHT80 MCS0	42	5210	11.00	11.50	100.00
	802.11ax-HE20 MCS0	36	5180	11.00	11.50	100.00
		40	5200	11.00	11.50	
		44	5220	11.00	11.50	
		48	5240	11.10	11.50	
	802.11ax-HE40 MCS0	38	5190	11.10	11.50	100.00
		46	5230	11.20	11.50	
	802.11ax-HE80 MCS0	42	5210	10.90	11.50	100.00

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN	802.11a 6Mbps	52	5260	11.10	11.50	99.00
		56	5280	11.10	11.50	
		60	5300	11.00	11.50	
		64	5320	11.00	11.50	
	802.11n-HT20 MCS0	52	5260	11.00	11.50	100.00
		56	5280	11.00	11.50	
		60	5300	11.00	11.50	
		64	5320	11.00	11.50	
	802.11n-HT40 MCS0	54	5270	11.10	11.50	100.00
		62	5310	10.90	11.50	
	802.11ac-VHT20 MCS0	52	5260	10.90	11.50	100.00
		56	5280	10.90	11.50	
		60	5300	10.90	11.50	
		64	5320	10.90	11.50	
	802.11ac-VHT40 MCS0	54	5270	11.00	11.50	100.00
		62	5310	10.80	11.50	
	802.11ac-VHT80 MCS0	58	5290	10.90	11.50	100.00
	802.11ax-HE20 MCS0	52	5260	11.10	11.50	100.00
		56	5280	11.00	11.50	
		60	5300	11.00	11.50	
		64	5320	11.10	11.50	
	802.11ax-HE40 MCS0	54	5270	11.20	11.50	100.00
		62	5310	11.10	11.50	
	802.11ax-HE80 MCS0	58	5290	10.80	11.50	100.00

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN	802.11a 6Mbps	100	5500	11.20	11.50	99.00
		116	5580	11.10	11.50	
		124	5620	11.10	11.50	
		132	5660	11.00	11.50	
		144	5720	11.00	11.50	
	802.11n-HT20 MCS0	100	5500	11.20	11.50	100.00
		116	5580	11.10	11.50	
		124	5620	11.10	11.50	
		132	5660	11.10	11.50	
		144	5720	11.10	11.50	
	802.11n-HT40 MCS0	102	5510	11.20	11.50	100.00
		110	5550	11.20	11.50	
		126	5630	11.10	11.50	
		134	5670	11.10	11.50	
		142	5710	11.20	11.50	
	802.11ac-VHT20 MCS0	100	5500	11.10	11.50	100.00
		116	5580	11.00	11.50	
		124	5620	11.00	11.50	
		132	5660	11.00	11.50	
		144	5720	11.00	11.50	
	802.11ac-VHT40 MCS0	102	5510	11.10	11.50	100.00
		110	5550	11.10	11.50	
		126	5630	11.00	11.50	
		134	5670	11.00	11.50	
		142	5710	11.10	11.50	
	802.11ac-VHT80 MCS0	106	5530	11.20	11.50	100.00
		122	5610	11.20	11.50	
		138	5690	11.00	11.50	
	802.11ax-HE20 MCS0	100	5500	11.20	11.50	100.00
		116	5580	11.00	11.50	
		124	5620	11.00	11.50	
		132	5660	11.00	11.50	
		144	5720	11.00	11.50	
	802.11ax-HE40 MCS0	102	5510	10.90	11.50	100.00
		110	5550	10.90	11.50	
		126	5630	11.10	11.50	
		134	5670	11.20	11.50	
		142	5710	11.00	11.50	
	802.11ax-HE80 MCS0	106	5530	11.20	11.50	100.00
		122	5610	10.90	11.50	
		138	5690	11.00	11.50	

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN	802.11a 6Mbps	149	5745	11.00	11.50	99.00
		157	5785	11.10	11.50	
		165	5825	11.00	11.50	
	802.11n-HT20 MCS0	149	5745	11.20	11.50	100.00
		157	5785	11.20	11.50	
		165	5825	11.00	11.50	
	802.11n-HT40 MCS0	151	5755	11.00	11.50	100.00
		159	5795	11.00	11.50	
	802.11ac-VHT20 MCS0	149	5745	11.10	11.50	100.00
		157	5785	11.10	11.50	
		165	5825	10.90	11.50	
	802.11ac-VHT40 MCS0	151	5755	10.90	11.50	100.00
		159	5795	10.90	11.50	
	802.11ac-VHT80 MCS0	155	5775	11.00	11.50	100.00
	802.11ax-HE20 MCS0	149	5745	11.00	11.50	100.00
		157	5785	11.10	11.50	
		165	5825	11.00	11.50	
	802.11ax-HE40 MCS0	151	5755	11.00	11.50	100.00
		159	5795	11.00	11.50	
	802.11ax-HE80 MCS0	155	5775	11.10	11.50	100.00

<5GHz WLAN Chain 1>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11a 6Mbps	36	5180	11.00	11.50	99.00
		40	5200	11.00	11.50	
		44	5220	11.00	11.50	
		48	5240	11.00	11.50	
	802.11n-HT20 MCS0	36	5180	11.10	11.50	100.00
		40	5200	11.00	11.50	
		44	5220	11.00	11.50	
		48	5240	10.90	11.50	
	802.11n-HT40 MCS0	38	5190	11.10	11.50	100.00
		46	5230	11.00	11.50	
	802.11ac-VHT20 MCS0	36	5180	11.00	11.50	100.00
		40	5200	10.90	11.50	
		44	5220	10.90	11.50	
		48	5240	10.80	11.50	
	802.11ac-VHT40 MCS0	38	5190	11.00	11.50	100.00
		46	5230	10.90	11.50	
	802.11ac-VHT80 MCS0	42	5210	11.10	11.50	100.00
	802.11ax-HE20 MCS0	36	5180	11.10	11.50	100.00
		40	5200	11.00	11.50	
		44	5220	11.00	11.50	
		48	5240	11.00	11.50	
	802.11ax-HE40 MCS0	38	5190	10.90	11.50	100.00
		46	5230	10.90	11.50	
	802.11ax-HE80 MCS0	42	5210	11.00	11.50	100.00

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN	802.11a 6Mbps	52	5260	10.90	11.50	99.00
		56	5280	10.90	11.50	
		60	5300	10.90	11.50	
		64	5320	10.90	11.50	
	802.11n-HT20 MCS0	52	5260	10.90	11.50	100.00
		56	5280	10.90	11.50	
		60	5300	10.90	11.50	
		64	5320	11.10	11.50	
	802.11n-HT40 MCS0	54	5270	11.20	11.50	100.00
		62	5310	11.00	11.50	
	802.11ac-VHT20 MCS0	52	5260	10.80	11.50	100.00
		56	5280	10.80	11.50	
		60	5300	10.80	11.50	
		64	5320	10.90	11.50	
	802.11ac-VHT40 MCS0	54	5270	11.10	11.50	100.00
		62	5310	10.90	11.50	
	802.11ac-VHT80 MCS0	58	5290	10.90	11.50	100.00
	802.11ax-HE20 MCS0	52	5260	10.90	11.50	100.00
		56	5280	10.90	11.50	
		60	5300	11.00	11.50	
		64	5320	11.00	11.50	
	802.11ax-HE40 MCS0	54	5270	10.90	11.50	100.00
		62	5310	11.10	11.50	
	802.11ax-HE80 MCS0	58	5290	10.90	11.50	100.00

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN	802.11a 6Mbps	100	5500	10.80	11.50	99.00
		116	5580	11.00	11.50	
		124	5620	11.00	11.50	
		132	5660	11.00	11.50	
		144	5720	11.20	11.50	
	802.11n-HT20 MCS0	100	5500	10.90	11.50	100.00
		116	5580	11.00	11.50	
		124	5620	11.00	11.50	
		132	5660	11.00	11.50	
		144	5720	11.00	11.50	
	802.11n-HT40 MCS0	102	5510	11.00	11.50	100.00
		110	5550	11.10	11.50	
		126	5630	11.00	11.50	
		134	5670	11.00	11.50	
		142	5710	11.00	11.50	
	802.11ac-VHT20 MCS0	100	5500	10.80	11.50	100.00
		116	5580	10.90	11.50	
		124	5620	10.90	11.50	
		132	5660	10.90	11.50	
		144	5720	10.90	11.50	
	802.11ac-VHT40 MCS0	102	5510	10.90	11.50	100.00
		110	5550	11.00	11.50	
		126	5630	11.00	11.50	
		134	5670	10.90	11.50	
		142	5710	10.90	11.50	
	802.11ac-VHT80 MCS0	106	5530	11.10	11.50	100.00
		122	5610	11.00	11.50	
		138	5690	11.00	11.50	
	802.11ax-HE20 MCS0	100	5500	11.00	11.50	100.00
		116	5580	11.10	11.50	
		124	5620	11.10	11.50	
		132	5660	11.00	11.50	
		144	5720	11.10	11.50	
	802.11ax-HE40 MCS0	102	5510	11.00	11.50	100.00
		110	5550	11.00	11.50	
		126	5630	11.00	11.50	
		134	5670	11.10	11.50	
		142	5710	10.90	11.50	
	802.11ax-HE80 MCS0	106	5530	11.00	11.50	100.00
		122	5610	10.90	11.50	
		138	5690	10.90	11.50	

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN	802.11a 6Mbps	149	5745	10.90	11.50	99.00
		157	5785	11.10	11.50	
		165	5825	11.00	11.50	
	802.11n-HT20 MCS0	149	5745	11.00	11.50	100.00
		157	5785	11.00	11.50	
		165	5825	11.10	11.50	
	802.11n-HT40 MCS0	151	5755	10.90	11.50	100.00
		159	5795	11.10	11.50	
	802.11ac-VHT20 MCS0	149	5745	10.90	11.50	100.00
		157	5785	10.90	11.50	
		165	5825	11.00	11.50	
	802.11ac-VHT40 MCS0	151	5755	10.80	11.50	100.00
		159	5795	11.00	11.50	
	802.11ac-VHT80 MCS0	155	5775	11.00	11.50	100.00
	802.11ax-HE20 MCS0	149	5745	11.00	11.50	100.00
		157	5785	11.10	11.50	
		165	5825	10.90	11.50	
	802.11ax-HE40 MCS0	151	5755	10.90	11.50	100.00
		159	5795	11.10	11.50	
	802.11ax-HE80 MCS0	155	5775	10.90	11.50	100.00

<2.4GHz Bluetooth>

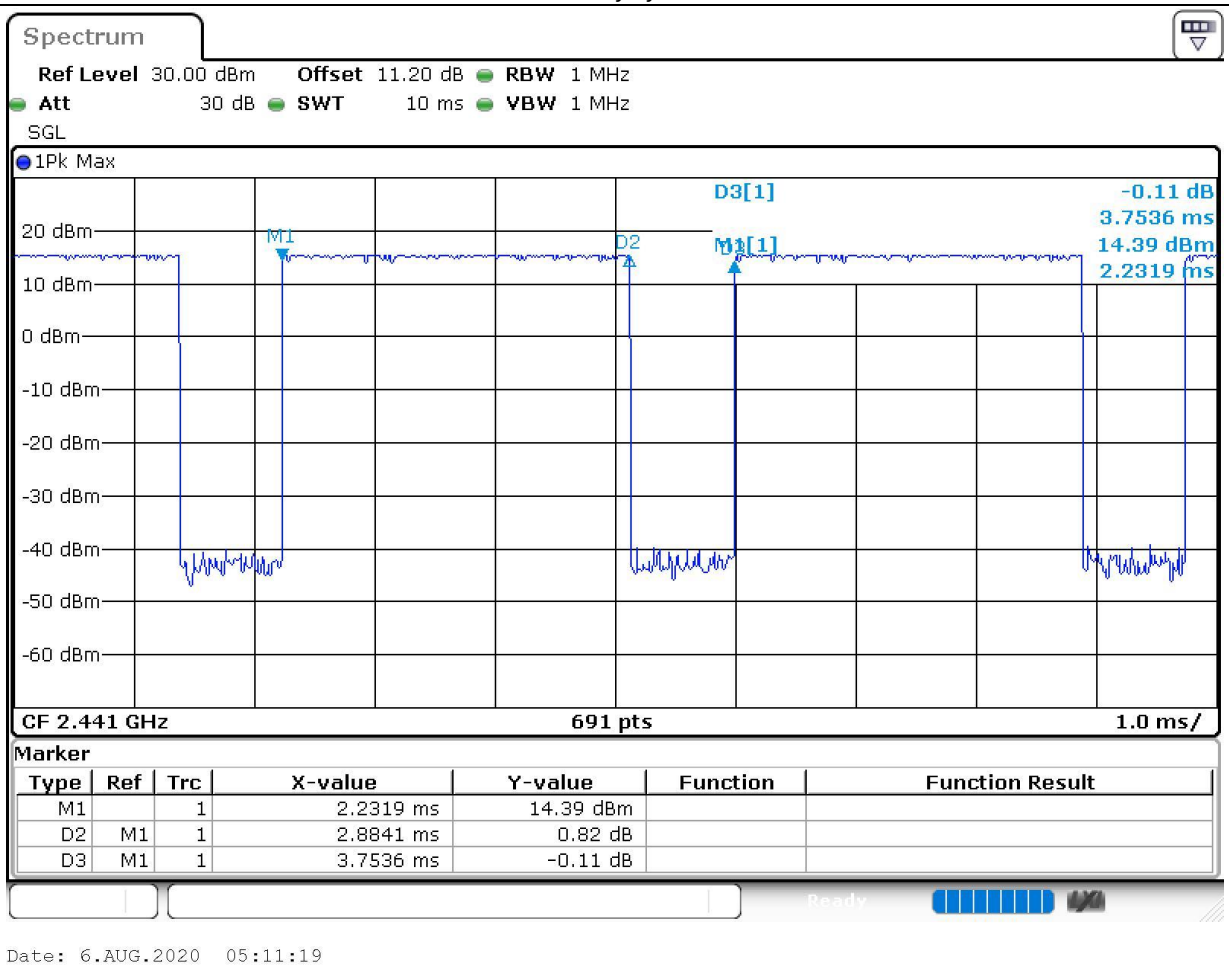
Mode	Channel	Frequency (MHz)	Average power (dBm)			Tune-up		
			1Mbps	2Mbps	3Mbps	1Mbps	2Mbps	3Mbps
BR / EDR	CH 00	2402	13.75	13.45	13.39	15.70	14.70	14.70
	CH 39	2441	14.43	14.40	14.22	15.70	14.70	14.70
	CH 78	2480	14.09	13.94	13.83	15.70	14.70	14.70

Mode	Channel	Frequency (MHz)	Average power (dBm)		Tune-up	
			1Mbps	2Mbps	1Mbps	2Mbps
LE	CH 00	2402	8.50	8.60	10.79	10.79
	CH 19	2440	8.80	8.90	10.79	10.79
	CH 39	2480	8.50	8.60	10.79	10.79

General Note:

1. For 2.4GHz Bluetooth SAR testing was selected BR/EDR 1Mbps, due to its highest average power.

BT Duty cycle



13. RF Exposure Conditions

Distance of the Antenna to the EUT surface/edge						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	≤ 25mm	≤ 25mm
BT&WLAN Chain 0	≤ 25mm	≤ 25mm	≤ 25mm	>25mm	>25mm	≤ 25mm
WLAN Chain 1	≤ 25mm	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	≤ 25mm

Positions for SAR tests; Hotspot mode						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN	Yes	Yes	No	Yes	Yes	Yes
BT&WLAN Chain 0	Yes	Yes	Yes	No	No	Yes
WLAN Chain 1	Yes	Yes	Yes	No	Yes	Yes

General Note:

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, The detail antenna location please refers to Appendix D.

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: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
   d. For WLAN/Bluetooth: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
   e. For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix 63.3%/62.9% = 1.006 is applied to scale-up the measured SAR result. The Reported TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.
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. 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.

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 B4/B5/B12 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 4 SAR test was covered by Band 66; 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. Add 802.11g mode for chain 1 just verify, due to the output power is higher.
4. 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.
5. 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.
6. 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)
01	GSM850	GPRS (4 Tx slots)	Right Cheek	0mm	251	848.8	26.67	28.20	1.422	-0.07	0.223	0.317
	GSM850	GPRS (4 Tx slots)	Right Tilted	0mm	251	848.8	26.67	28.20	1.422	0	0.092	0.131
	GSM850	GPRS (4 Tx slots)	Left Cheek	0mm	251	848.8	26.67	28.20	1.422	-0.01	0.217	0.309
	GSM850	GPRS (4 Tx slots)	Left Tilted	0mm	251	848.8	26.67	28.20	1.422	0.04	0.092	0.131
02	GSM1900	GPRS (4 Tx slots)	Right Cheek	0mm	661	1880	21.55	22.70	1.303	-0.13	0.026	0.034
	GSM1900	GPRS (4 Tx slots)	Right Tilted	0mm	661	1880	21.55	22.70	1.303	0.1	0.008	0.010
	GSM1900	GPRS (4 Tx slots)	Left Cheek	0mm	661	1880	21.55	22.70	1.303	-0.1	0.021	0.027
	GSM1900	GPRS (4 Tx slots)	Left Tilted	0mm	661	1880	21.55	22.70	1.303	0.17	0.014	0.018

<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)
03	WCDMA II	RMC 12.2Kbps	Right Cheek	0mm	9400	1880	20.24	20.70	1.112	0.04	0.056	0.062
	WCDMA II	RMC 12.2Kbps	Right Tilted	0mm	9400	1880	20.24	20.70	1.112	0.1	0.019	0.021
	WCDMA II	RMC 12.2Kbps	Left Cheek	0mm	9400	1880	20.24	20.70	1.112	0.09	0.031	0.034
	WCDMA II	RMC 12.2Kbps	Left Tilted	0mm	9400	1880	20.24	20.70	1.112	0.13	0.023	0.026
	WCDMA IV	RMC 12.2Kbps	Right Cheek	0mm	1513	1752.6	20.19	20.70	1.125	0.03	0.045	0.051
	WCDMA IV	RMC 12.2Kbps	Right Tilted	0mm	1513	1752.6	20.19	20.70	1.125	-0.1	0.036	0.040
04	WCDMA IV	RMC 12.2Kbps	Left Cheek	0mm	1513	1752.6	20.19	20.70	1.125	-0.1	0.046	0.052
	WCDMA IV	RMC 12.2Kbps	Left Tilted	0mm	1513	1752.6	20.19	20.70	1.125	0.09	0.029	0.033
05	WCDMA V	RMC 12.2Kbps	Right Cheek	0mm	4233	846.6	23.87	24.70	1.211	-0.12	0.239	0.289
	WCDMA V	RMC 12.2Kbps	Right Tilted	0mm	4233	846.6	23.87	24.70	1.211	0.02	0.094	0.114
	WCDMA V	RMC 12.2Kbps	Left Cheek	0mm	4233	846.6	23.87	24.70	1.211	-0.04	0.238	0.288
	WCDMA V	RMC 12.2Kbps	Left Tilted	0mm	4233	846.6	23.87	24.70	1.211	0.01	0.108	0.131

<FDD 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 2	20M	QPSK	1	99	Right Cheek	0mm	18900	1880	20.29	21.00	1.178	0.1	0.050	0.059
06	LTE Band 2	20M	QPSK	50	50	Right Cheek	0mm	18900	1880	20.41	21.00	1.146	0.13	0.057	0.065
	LTE Band 2	20M	QPSK	1	99	Right Tilted	0mm	18900	1880	20.29	21.00	1.178	0.19	0.034	0.040
	LTE Band 2	20M	QPSK	50	50	Right Tilted	0mm	18900	1880	20.41	21.00	1.146	0.19	0.036	0.041
	LTE Band 2	20M	QPSK	1	99	Left Cheek	0mm	18900	1880	20.29	21.00	1.178	0.02	0.033	0.039
	LTE Band 2	20M	QPSK	50	50	Left Cheek	0mm	18900	1880	20.41	21.00	1.146	-0.04	0.035	0.040
	LTE Band 2	20M	QPSK	1	99	Left Tilted	0mm	18900	1880	20.29	21.00	1.178	0.18	0.028	0.033
	LTE Band 2	20M	QPSK	50	50	Left Tilted	0mm	18900	1880	20.41	21.00	1.146	0.07	0.029	0.033
07	LTE Band 5	10M	QPSK	1	0	Right Cheek	0mm	20525	836.5	23.65	25.00	1.365	-0.1	0.189	0.258
	LTE Band 5	10M	QPSK	25	0	Right Cheek	0mm	20525	836.5	22.76	24.00	1.330	-0.07	0.154	0.205
	LTE Band 5	10M	QPSK	1	0	Right Tilted	0mm	20525	836.5	23.65	25.00	1.365	-0.01	0.075	0.102
	LTE Band 5	10M	QPSK	25	0	Right Tilted	0mm	20525	836.5	22.76	24.00	1.330	0.03	0.059	0.078
	LTE Band 5	10M	QPSK	1	0	Left Cheek	0mm	20525	836.5	23.65	25.00	1.365	-0.02	0.138	0.188
	LTE Band 5	10M	QPSK	25	0	Left Cheek	0mm	20525	836.5	22.76	24.00	1.330	-0.01	0.112	0.149
	LTE Band 5	10M	QPSK	1	0	Left Tilted	0mm	20525	836.5	23.65	25.00	1.365	0.07	0.059	0.081
	LTE Band 5	10M	QPSK	25	0	Left Tilted	0mm	20525	836.5	22.76	24.00	1.330	-0.02	0.049	0.065

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 7	20M	QPSK	1	0	Right Cheek	0mm	21350	2560	19.29	20.00	1.178	0.11	0.013	0.015
	LTE Band 7	20M	QPSK	50	24	Right Cheek	0mm	21350	2560	19.31	20.00	1.172	0.11	0.014	0.016
08	LTE Band 7	20M	QPSK	1	0	Right Tilted	0mm	21350	2560	19.29	20.00	1.178	0.09	0.016	0.019
	LTE Band 7	20M	QPSK	50	24	Right Tilted	0mm	21350	2560	19.31	20.00	1.172	0.13	0.019	0.022
	LTE Band 7	20M	QPSK	1	0	Left Cheek	0mm	21350	2560	19.29	20.00	1.178	0.08	0.012	0.014
	LTE Band 7	20M	QPSK	50	24	Left Cheek	0mm	21350	2560	19.31	20.00	1.172	0.06	0.012	0.014
	LTE Band 7	20M	QPSK	1	0	Left Tilted	0mm	21350	2560	19.29	20.00	1.178	0.05	0.007	0.008
	LTE Band 7	20M	QPSK	50	24	Left Tilted	0mm	21350	2560	19.31	20.00	1.172	0.09	0.007	0.009
	LTE Band 12	10M	QPSK	1	0	Right Cheek	0mm	23095	707.5	23.71	25.00	1.346	-0.13	0.114	0.153
	LTE Band 12	10M	QPSK	25	0	Right Cheek	0mm	23095	707.5	22.84	24.00	1.306	-0.12	0.100	0.131
	LTE Band 12	10M	QPSK	1	0	Right Tilted	0mm	23095	707.5	23.71	25.00	1.346	-0.16	0.045	0.061
09	LTE Band 12	10M	QPSK	25	0	Right Tilted	0mm	23095	707.5	22.84	24.00	1.306	0.07	0.038	0.050
	LTE Band 12	10M	QPSK	1	0	Left Cheek	0mm	23095	707.5	23.71	25.00	1.346	-0.01	0.143	0.192
	LTE Band 12	10M	QPSK	25	0	Left Cheek	0mm	23095	707.5	22.84	24.00	1.306	-0.02	0.123	0.161
	LTE Band 12	10M	QPSK	1	0	Left Tilted	0mm	23095	707.5	23.71	25.00	1.346	0.04	0.039	0.052
	LTE Band 12	10M	QPSK	25	0	Left Tilted	0mm	23095	707.5	22.84	24.00	1.306	0.12	0.034	0.044
	LTE Band 13	10M	QPSK	1	49	Right Cheek	0mm	23230	782	23.92	25.00	1.282	-0.1	0.160	0.205
	LTE Band 13	10M	QPSK	25	25	Right Cheek	0mm	23230	782	22.93	24.00	1.279	-0.02	0.145	0.186
	LTE Band 13	10M	QPSK	1	49	Right Tilted	0mm	23230	782	23.92	25.00	1.282	-0.01	0.086	0.110
	LTE Band 13	10M	QPSK	25	25	Right Tilted	0mm	23230	782	22.93	24.00	1.279	-0.05	0.072	0.092
10	LTE Band 13	10M	QPSK	1	49	Left Cheek	0mm	23230	782	23.92	25.00	1.282	-0.07	0.206	0.264
	LTE Band 13	10M	QPSK	25	25	Left Cheek	0mm	23230	782	22.93	24.00	1.279	0.01	0.170	0.217
	LTE Band 13	10M	QPSK	1	49	Left Tilted	0mm	23230	782	23.92	25.00	1.282	0.02	0.104	0.133
	LTE Band 13	10M	QPSK	25	25	Left Tilted	0mm	23230	782	22.93	24.00	1.279	0.02	0.086	0.110
11	LTE Band 66	20M	QPSK	1	99	Right Cheek	0mm	132322	1745	20.20	21.00	1.202	-0.17	0.033	0.040
	LTE Band 66	20M	QPSK	50	50	Right Cheek	0mm	132322	1745	20.26	21.00	1.186	0.11	0.033	0.039
	LTE Band 66	20M	QPSK	1	99	Right Tilted	0mm	132322	1745	20.20	21.00	1.202	0.13	0.016	0.019
	LTE Band 66	20M	QPSK	50	50	Right Tilted	0mm	132322	1745	20.26	21.00	1.186	0.19	0.016	0.019
	LTE Band 66	20M	QPSK	1	99	Left Cheek	0mm	132322	1745	20.20	21.00	1.202	-0.14	0.031	0.037
	LTE Band 66	20M	QPSK	50	50	Left Cheek	0mm	132322	1745	20.26	21.00	1.186	0.16	0.033	0.039
	LTE Band 66	20M	QPSK	1	99	Left Tilted	0mm	132322	1745	20.20	21.00	1.202	0.1	0.019	0.023
	LTE Band 66	20M	QPSK	50	50	Left Tilted	0mm	132322	1745	20.26	21.00	1.186	0.06	0.018	0.021

<TDD 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	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 48	20M	QPSK	1	0	Right Cheek	0mm	55340	3560	16.66	18.00	1.361	62.9	1.006	0	0.001	0.001
	LTE Band 48	20M	QPSK	50	0	Right Cheek	0mm	55340	3560	16.68	18.00	1.355	62.9	1.006	0	0.001	0.001
	LTE Band 48	20M	QPSK	1	0	Right Tilted	0mm	55340	3560	16.66	18.00	1.361	62.9	1.006	0	0.001	0.001
	LTE Band 48	20M	QPSK	50	0	Right Tilted	0mm	55340	3560	16.68	18.00	1.355	62.9	1.006	0	0.001	0.001
12	LTE Band 48	20M	QPSK	1	0	Left Cheek	0mm	55340	3560	16.66	18.00	1.361	62.9	1.006	0.03	0.002	0.003
	LTE Band 48	20M	QPSK	50	0	Left Cheek	0mm	55340	3560	16.68	18.00	1.355	62.9	1.006	0	0.001	0.001
	LTE Band 48	20M	QPSK	1	0	Left Tilted	0mm	55340	3560	16.66	18.00	1.361	62.9	1.006	0	0.001	0.001
	LTE Band 48	20M	QPSK	50	0	Left Tilted	0mm	55340	3560	16.68	18.00	1.355	62.9	1.006	0	0.001	0.001

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	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)
13	WLAN2.4GHz	802.11b 1Mbps	Right Cheek	0mm	Chain 0	1	2412	13.58	14.00	1.102	100	1.000	0.14	0.438	0.482
	WLAN2.4GHz	802.11b 1Mbps	Right Tilted	0mm	Chain 0	1	2412	13.58	14.00	1.102	100	1.000	0.05	0.078	0.086
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Chain 0	1	2412	13.58	14.00	1.102	100	1.000	0.06	0.123	0.135
	WLAN2.4GHz	802.11b 1Mbps	Left Tilted	0mm	Chain 0	1	2412	13.58	14.00	1.102	100	1.000	0.17	0.028	0.031
	WLAN2.4GHz	802.11b 1Mbps	Right Cheek	0mm	Chain 1	6	2437	6.72	7.00	1.067	100	1.000	0.11	0.006	0.006
	WLAN2.4GHz	802.11b 1Mbps	Right Tilted	0mm	Chain 1	6	2437	6.72	7.00	1.067	100	1.000	0.15	0.004	0.005
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Chain 1	6	2437	6.72	7.00	1.067	100	1.000	0.04	0.004	0.004
	WLAN2.4GHz	802.11b 1Mbps	Left Tilted	0mm	Chain 1	6	2437	6.72	7.00	1.067	100	1.000	0.12	0.002	0.002
	WLAN2.4GHz	802.11g 6Mbps	Right Cheek	0mm	Chain 1	6	2437	15.70	16.00	1.072	99.25	1.008	0.18	0.074	0.080
	WLAN2.4GHz	802.11g 6Mbps	Right Tilted	0mm	Chain 1	6	2437	15.70	16.00	1.072	99.25	1.008	0.17	0.056	0.060
	WLAN2.4GHz	802.11g 6Mbps	Left Cheek	0mm	Chain 1	6	2437	15.70	16.00	1.072	99.25	1.008	0.07	0.044	0.048
	WLAN2.4GHz	802.11g 6Mbps	Left Tilted	0mm	Chain 1	6	2437	15.70	16.00	1.072	99.25	1.008	0.13	0.040	0.043
	WLAN5GHz	802.11ac-VHT80 MCS0	Right Cheek	0mm	Chain 0	58	5290	10.90	11.50	1.148	100	1.000	0.05	0.036	0.041
	WLAN5GHz	802.11ac-VHT80 MCS0	Right Tilted	0mm	Chain 0	58	5290	10.90	11.50	1.148	100	1.000	0	0.001	0.001
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Chain 0	58	5290	10.90	11.50	1.148	100	1.000	0.09	0.001	0.001
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Tilted	0mm	Chain 0	58	5290	10.90	11.50	1.148	100	1.000	0	0.001	0.001
14	WLAN5GHz	802.11ac-VHT80 MCS0	Right Cheek	0mm	Chain 1	58	5290	10.90	11.50	1.148	100	1.000	0.03	0.206	0.237
	WLAN5GHz	802.11ac-VHT80 MCS0	Right Tilted	0mm	Chain 1	58	5290	10.90	11.50	1.148	100	1.000	-0.03	0.170	0.195
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Chain 1	58	5290	10.90	11.50	1.148	100	1.000	0	0.073	0.084
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Tilted	0mm	Chain 1	58	5290	10.90	11.50	1.148	100	1.000	0	0.074	0.085
15	WLAN5GHz	802.11ac-VHT80 MCS0	Right Cheek	0mm	Chain 0	106	5530	11.20	11.50	1.072	100	1.000	0.05	0.123	0.132
	WLAN5GHz	802.11ac-VHT80 MCS0	Right Tilted	0mm	Chain 0	106	5530	11.20	11.50	1.072	100	1.000	0	0.001	0.001
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Chain 0	106	5530	11.20	11.50	1.072	100	1.000	0.05	0.022	0.024
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Tilted	0mm	Chain 0	106	5530	11.20	11.50	1.072	100	1.000	0	0.001	0.001
	WLAN5GHz	802.11ac-VHT80 MCS0	Right Cheek	0mm	Chain 1	106	5530	11.10	11.50	1.096	100	1.000	0.17	0.060	0.066
	WLAN5GHz	802.11ac-VHT80 MCS0	Right Tilted	0mm	Chain 1	106	5530	11.10	11.50	1.096	100	1.000	0	0.040	0.044
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Chain 1	106	5530	11.10	11.50	1.096	100	1.000	0.12	0.013	0.014
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Tilted	0mm	Chain 1	106	5530	11.10	11.50	1.096	100	1.000	0	0.004	0.004
16	WLAN5GHz	802.11ac-VHT80 MCS0	Right Cheek	0mm	Chain 0	155	5775	11.00	11.50	1.122	100	1.000	-0.05	0.120	0.135
	WLAN5GHz	802.11ac-VHT80 MCS0	Right Tilted	0mm	Chain 0	155	5775	11.00	11.50	1.122	100	1.000	-0.05	0.003	0.003
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Chain 0	155	5775	11.00	11.50	1.122	100	1.000	-0.13	0.030	0.034
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Tilted	0mm	Chain 0	155	5775	11.00	11.50	1.122	100	1.000	0	0.014	0.016
	WLAN5GHz	802.11ac-VHT80 MCS0	Right Cheek	0mm	Chain 1	155	5775	11.00	11.50	1.122	100	1.000	0	0.031	0.035
	WLAN5GHz	802.11ac-VHT80 MCS0	Right Tilted	0mm	Chain 1	155	5775	11.00	11.50	1.122	100	1.000	0.15	0.001	0.001
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Chain 1	155	5775	11.00	11.50	1.122	100	1.000	0	0.001	0.001
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Tilted	0mm	Chain 1	155	5775	11.00	11.50	1.122	100	1.000	0	0.001	0.001

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	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)
17	Bluetooth	1Mbps	Right Cheek	0mm	Chain 0	39	2441	14.43	15.70	1.340	-0.14	0.364	0.488
	Bluetooth	1Mbps	Right Tilted	0mm	Chain 0	39	2441	14.43	15.70	1.340	-0.08	0.061	0.082
	Bluetooth	1Mbps	Left Cheek	0mm	Chain 0	39	2441	14.43	15.70	1.340	0.05	0.090	0.121
	Bluetooth	1Mbps	Left Tilted	0mm	Chain 0	39	2441	14.43	15.70	1.340	-0.18	0.017	0.023

14.2 Hotspot 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	10mm	251	848.8	26.67	28.20	1.422	0.06	0.204	0.290
	GSM850	GPRS (4 Tx slots)	Back	10mm	251	848.8	26.67	28.20	1.422	-0.07	0.253	0.360
	GSM850	GPRS (4 Tx slots)	Left Side	10mm	251	848.8	26.67	28.20	1.422	0.11	0.208	0.296
18	GSM850	GPRS (4 Tx slots)	Right Side	10mm	251	848.8	26.67	28.20	1.422	-0.1	0.279	0.397
	GSM850	GPRS (4 Tx slots)	Bottom Side	10mm	251	848.8	26.67	28.20	1.422	-0.13	0.046	0.065
	GSM1900	GPRS (4 Tx slots)	Front	10mm	661	1880	21.55	22.70	1.303	-0.11	0.156	0.203
	GSM1900	GPRS (4 Tx slots)	Back	10mm	661	1880	21.55	22.70	1.303	0.14	0.162	0.211
	GSM1900	GPRS (4 Tx slots)	Left Side	10mm	661	1880	21.55	22.70	1.303	-0.13	0.018	0.023
	GSM1900	GPRS (4 Tx slots)	Right Side	10mm	661	1880	21.55	22.70	1.303	-0.04	0.025	0.033
19	GSM1900	GPRS (4 Tx slots)	Bottom Side	10mm	661	1880	21.55	22.70	1.303	-0.11	0.230	0.300

<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	10mm	9400	1880	20.24	20.70	1.112	0.14	0.311	0.346
	WCDMA II	RMC 12.2Kbps	Back	10mm	9400	1880	20.24	20.70	1.112	0.1	0.370	0.411
	WCDMA II	RMC 12.2Kbps	Left Side	10mm	9400	1880	20.24	20.70	1.112	0.17	0.036	0.040
	WCDMA II	RMC 12.2Kbps	Right Side	10mm	9400	1880	20.24	20.70	1.112	-0.08	0.052	0.058
20	WCDMA II	RMC 12.2Kbps	Bottom Side	10mm	9400	1880	20.24	20.70	1.112	-0.13	0.442	0.491
	WCDMA IV	RMC 12.2Kbps	Front	10mm	1513	1752.6	20.19	20.70	1.125	-0.16	0.289	0.325
	WCDMA IV	RMC 12.2Kbps	Back	10mm	1513	1752.6	20.19	20.70	1.125	0.01	0.348	0.391
	WCDMA IV	RMC 12.2Kbps	Left Side	10mm	1513	1752.6	20.19	20.70	1.125	-0.19	0.025	0.028
	WCDMA IV	RMC 12.2Kbps	Right Side	10mm	1513	1752.6	20.19	20.70	1.125	-0.04	0.070	0.079
21	WCDMA IV	RMC 12.2Kbps	Bottom Side	10mm	1513	1752.6	20.19	20.70	1.125	-0.09	0.457	0.514
	WCDMA V	RMC 12.2Kbps	Front	10mm	4233	846.6	23.87	24.70	1.211	-0.13	0.196	0.237
	WCDMA V	RMC 12.2Kbps	Back	10mm	4233	846.6	23.87	24.70	1.211	-0.14	0.249	0.301
	WCDMA V	RMC 12.2Kbps	Left Side	10mm	4233	846.6	23.87	24.70	1.211	-0.04	0.235	0.284
22	WCDMA V	RMC 12.2Kbps	Right Side	10mm	4233	846.6	23.87	24.70	1.211	0.05	0.284	0.344
	WCDMA V	RMC 12.2Kbps	Bottom Side	10mm	4233	846.6	23.87	24.70	1.211	-0.12	0.048	0.058

<FDD 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 2	20M	QPSK	1	99	Front	10mm	18900	1880	20.29	21.00	1.178	-0.08	0.293	0.345
	LTE Band 2	20M	QPSK	50	50	Front	10mm	18900	1880	20.41	21.00	1.146	0.01	0.310	0.355
	LTE Band 2	20M	QPSK	1	99	Back	10mm	18900	1880	20.29	21.00	1.178	0.08	0.349	0.411
	LTE Band 2	20M	QPSK	50	50	Back	10mm	18900	1880	20.41	21.00	1.146	0.01	0.369	0.423
	LTE Band 2	20M	QPSK	1	99	Left Side	10mm	18900	1880	20.29	21.00	1.178	-0.1	0.026	0.031
	LTE Band 2	20M	QPSK	50	50	Left Side	10mm	18900	1880	20.41	21.00	1.146	-0.02	0.027	0.031
	LTE Band 2	20M	QPSK	1	99	Right Side	10mm	18900	1880	20.29	21.00	1.178	-0.1	0.057	0.067
	LTE Band 2	20M	QPSK	50	50	Right Side	10mm	18900	1880	20.41	21.00	1.146	-0.08	0.061	0.070
	LTE Band 2	20M	QPSK	1	99	Bottom Side	10mm	18900	1880	20.29	21.00	1.178	-0.1	0.606	0.714
23	LTE Band 2	20M	QPSK	50	50	Bottom Side	10mm	18900	1880	20.41	21.00	1.146	-0.06	0.635	0.727
	LTE Band 5	10M	QPSK	1	0	Front	10mm	20525	836.5	23.65	25.00	1.365	-0.01	0.186	0.254
	LTE Band 5	10M	QPSK	25	0	Front	10mm	20525	836.5	22.76	24.00	1.330	-0.09	0.148	0.197
	LTE Band 5	10M	QPSK	1	0	Back	10mm	20525	836.5	23.65	25.00	1.365	-0.09	0.209	0.285
	LTE Band 5	10M	QPSK	25	0	Back	10mm	20525	836.5	22.76	24.00	1.330	-0.13	0.172	0.229
	LTE Band 5	10M	QPSK	1	0	Left Side	10mm	20525	836.5	23.65	25.00	1.365	-0.01	0.192	0.262
	LTE Band 5	10M	QPSK	25	0	Left Side	10mm	20525	836.5	22.76	24.00	1.330	-0.06	0.153	0.204
24	LTE Band 5	10M	QPSK	1	0	Right Side	10mm	20525	836.5	23.65	25.00	1.365	-0.08	0.220	0.300
	LTE Band 5	10M	QPSK	25	0	Right Side	10mm	20525	836.5	22.76	24.00	1.330	-0.07	0.178	0.237
	LTE Band 5	10M	QPSK	1	0	Bottom Side	10mm	20525	836.5	23.65	25.00	1.365	0	0.052	0.071
	LTE Band 5	10M	QPSK	25	0	Bottom Side	10mm	20525	836.5	22.76	24.00	1.330	-0.05	0.042	0.056
	LTE Band 7	20M	QPSK	1	0	Front	10mm	21350	2560	19.29	20.00	1.178	0.03	0.108	0.127
	LTE Band 7	20M	QPSK	50	24	Front	10mm	21350	2560	19.31	20.00	1.172	0.02	0.117	0.137
	LTE Band 7	20M	QPSK	1	0	Back	10mm	21350	2560	19.29	20.00	1.178	0.12	0.116	0.137
	LTE Band 7	20M	QPSK	50	24	Back	10mm	21350	2560	19.31	20.00	1.172	-0.04	0.122	0.143
	LTE Band 7	20M	QPSK	1	0	Left Side	10mm	21350	2560	19.29	20.00	1.178	-0.07	0.048	0.057
	LTE Band 7	20M	QPSK	50	24	Left Side	10mm	21350	2560	19.31	20.00	1.172	-0.1	0.055	0.064
	LTE Band 7	20M	QPSK	1	0	Right Side	10mm	21350	2560	19.29	20.00	1.178	0.05	0.024	0.028
	LTE Band 7	20M	QPSK	50	24	Right Side	10mm	21350	2560	19.31	20.00	1.172	0.13	0.026	0.030
	LTE Band 7	20M	QPSK	1	0	Bottom Side	10mm	21350	2560	19.29	20.00	1.178	-0.12	0.204	0.240
25	LTE Band 7	20M	QPSK	50	24	Bottom Side	10mm	21350	2560	19.31	20.00	1.172	-0.1	0.216	0.253
	LTE Band 12	10M	QPSK	1	0	Front	10mm	23095	707.5	23.71	25.00	1.346	-0.14	0.159	0.214
	LTE Band 12	10M	QPSK	25	0	Front	10mm	23095	707.5	22.84	24.00	1.306	-0.1	0.135	0.176
	LTE Band 12	10M	QPSK	1	0	Back	10mm	23095	707.5	23.71	25.00	1.346	-0.09	0.171	0.230
	LTE Band 12	10M	QPSK	25	0	Back	10mm	23095	707.5	22.84	24.00	1.306	-0.04	0.144	0.188
26	LTE Band 12	10M	QPSK	1	0	Left Side	10mm	23095	707.5	23.71	25.00	1.346	-0.02	0.212	0.285
	LTE Band 12	10M	QPSK	25	0	Left Side	10mm	23095	707.5	22.84	24.00	1.306	-0.06	0.171	0.223
	LTE Band 12	10M	QPSK	1	0	Right Side	10mm	23095	707.5	23.71	25.00	1.346	-0.08	0.130	0.175
	LTE Band 12	10M	QPSK	25	0	Right Side	10mm	23095	707.5	22.84	24.00	1.306	-0.03	0.111	0.145
	LTE Band 12	10M	QPSK	1	0	Bottom Side	10mm	23095	707.5	23.71	25.00	1.346	-0.11	0.036	0.048
	LTE Band 12	10M	QPSK	25	0	Bottom Side	10mm	23095	707.5	22.84	24.00	1.306	-0.09	0.029	0.038
	LTE Band 13	10M	QPSK	1	49	Front	10mm	23230	782	23.92	25.00	1.282	-0.1	0.270	0.346
	LTE Band 13	10M	QPSK	25	25	Front	10mm	23230	782	22.93	24.00	1.279	-0.13	0.225	0.288
	LTE Band 13	10M	QPSK	1	49	Back	10mm	23230	782	23.92	25.00	1.282	-0.12	0.284	0.364
	LTE Band 13	10M	QPSK	25	25	Back	10mm	23230	782	22.93	24.00	1.279	-0.08	0.238	0.304
27	LTE Band 13	10M	QPSK	1	49	Left Side	10mm	23230	782	23.92	25.00	1.282	-0.06	0.297	0.381
	LTE Band 13	10M	QPSK	25	25	Left Side	10mm	23230	782	22.93	24.00	1.279	-0.04	0.249	0.319
	LTE Band 13	10M	QPSK	1	49	Right Side	10mm	23230	782	23.92	25.00	1.282	-0.06	0.225	0.289
	LTE Band 13	10M	QPSK	25	25	Right Side	10mm	23230	782	22.93	24.00	1.279	-0.1	0.185	0.237
	LTE Band 13	10M	QPSK	1	49	Bottom Side	10mm	23230	782	23.92	25.00	1.282	0.05	0.033	0.042
	LTE Band 13	10M	QPSK	25	25	Bottom Side	10mm	23230	782	22.93	24.00	1.279	0.02	0.028	0.036

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 66	20M	QPSK	1	99	Front	10mm	132322	1745	20.20	21.00	1.202	0.16	0.273	0.328
	LTE Band 66	20M	QPSK	50	50	Front	10mm	132322	1745	20.26	21.00	1.186	0.1	0.275	0.326
	LTE Band 66	20M	QPSK	1	99	Back	10mm	132322	1745	20.20	21.00	1.202	-0.08	0.285	0.343
	LTE Band 66	20M	QPSK	50	50	Back	10mm	132322	1745	20.26	21.00	1.186	0.1	0.298	0.353
	LTE Band 66	20M	QPSK	1	99	Left Side	10mm	132322	1745	20.20	21.00	1.202	0.1	0.023	0.028
	LTE Band 66	20M	QPSK	50	50	Left Side	10mm	132322	1745	20.26	21.00	1.186	0.17	0.021	0.025
	LTE Band 66	20M	QPSK	1	99	Right Side	10mm	132322	1745	20.20	21.00	1.202	-0.16	0.061	0.073
	LTE Band 66	20M	QPSK	50	50	Right Side	10mm	132322	1745	20.26	21.00	1.186	0.12	0.063	0.075
	LTE Band 66	20M	QPSK	1	99	Bottom Side	10mm	132322	1745	20.20	21.00	1.202	-0.08	0.425	0.511
28	LTE Band 66	20M	QPSK	50	50	Bottom Side	10mm	132322	1745	20.26	21.00	1.186	-0.05	0.434	0.515

<TDD 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	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
29	LTE Band 48	20M	QPSK	1	0	Front	10mm	55340	3560	16.66	18.00	1.361	62.9	1.006	-0.15	0.044	0.060
	LTE Band 48	20M	QPSK	50	0	Front	10mm	55340	3560	16.68	18.00	1.355	62.9	1.006	-0.09	0.042	0.057
	LTE Band 48	20M	QPSK	1	0	Back	10mm	55340	3560	16.66	18.00	1.361	62.9	1.006	-0.16	0.031	0.042
	LTE Band 48	20M	QPSK	50	0	Back	10mm	55340	3560	16.68	18.00	1.355	62.9	1.006	-0.15	0.028	0.038
	LTE Band 48	20M	QPSK	1	0	Left Side	10mm	55340	3560	16.66	18.00	1.361	62.9	1.006	-0.01	0.001	0.001
	LTE Band 48	20M	QPSK	50	0	Left Side	10mm	55340	3560	16.68	18.00	1.355	62.9	1.006	0.01	0.001	0.001
	LTE Band 48	20M	QPSK	1	0	Right Side	10mm	55340	3560	16.66	18.00	1.361	62.9	1.006	-0.11	0.034	0.047
	LTE Band 48	20M	QPSK	50	0	Right Side	10mm	55340	3560	16.68	18.00	1.355	62.9	1.006	-0.15	0.033	0.045
	LTE Band 48	20M	QPSK	1	0	Bottom Side	10mm	55340	3560	16.66	18.00	1.361	62.9	1.006	0.09	0.036	0.049
	LTE Band 48	20M	QPSK	50	0	Bottom Side	10mm	55340	3560	16.68	18.00	1.355	62.9	1.006	0.13	0.034	0.046

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	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	Chain 0	1	2412	13.58	14.00	1.102	100	1.000	-0.04	0.065	0.072
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Chain 0	1	2412	13.58	14.00	1.102	100	1.000	0.05	0.122	0.134
30	WLAN2.4GHz	802.11b 1Mbps	Left Side	10mm	Chain 0	1	2412	13.58	14.00	1.102	100	1.000	0.12	0.129	0.142
	WLAN2.4GHz	802.11b 1Mbps	Front	10mm	Chain 1	6	2437	6.72	7.00	1.067	100	1.000	-0.05	0.001	0.001
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Chain 1	6	2437	6.72	7.00	1.067	100	1.000	0.02	0.002	0.002
	WLAN2.4GHz	802.11b 1Mbps	Left Side	10mm	Chain 1	6	2437	6.72	7.00	1.067	100	1.000	0	0.001	0.001
	WLAN2.4GHz	802.11b 1Mbps	Right Side	10mm	Chain 1	6	2437	6.72	7.00	1.067	100	1.000	0	0.001	0.001
	WLAN2.4GHz	802.11b 1Mbps	Top Side	10mm	Chain 1	6	2437	6.72	7.00	1.067	100	1.000	0.01	0.001	0.001
	WLAN2.4GHz-	802.11g 6Mbps	Front	10mm	Chain 1	6	2437	15.70	16.00	1.072	99.25	1.008	0.13	0.008	0.008
	WLAN2.4GHz-	802.11g 6Mbps	Back	10mm	Chain 1	6	2437	15.70	16.00	1.072	99.25	1.008	0.07	0.024	0.026
	WLAN2.4GHz-	802.11g 6Mbps	Left Side	10mm	Chain 1	6	2437	15.70	16.00	1.072	99.25	1.008	0.02	0.002	0.002
	WLAN2.4GHz-	802.11g 6Mbps	Right Side	10mm	Chain 1	6	2437	15.70	16.00	1.072	99.25	1.008	0.05	0.001	0.001
	WLAN2.4GHz-	802.11g 6Mbps	Top Side	10mm	Chain 1	6	2437	15.70	16.00	1.072	99.25	1.008	0.07	0.003	0.004

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	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	Chain 0	39	2441	14.43	15.70	1.340	0.19	0.052	0.070
	Bluetooth	1Mbps	Back	10mm	Chain 0	39	2441	14.43	15.70	1.340	-0.15	0.109	0.146
31	Bluetooth	1Mbps	Left Side	10mm	Chain 0	39	2441	14.43	15.70	1.340	-0.03	0.115	0.154

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)
32	GSM850	GPRS (4 Tx slots)	Front	15mm	251	848.8	26.67	28.20	1.422	0.1	0.199	0.283
	GSM850	GPRS (4 Tx slots)	Back	15mm	251	848.8	26.67	28.20	1.422	0.08	0.197	0.280
	GSM1900	GPRS (4 Tx slots)	Front	15mm	661	1880	21.55	22.70	1.303	-0.05	0.072	0.094
33	GSM1900	GPRS (4 Tx slots)	Back	15mm	661	1880	21.55	22.70	1.303	0.11	0.099	0.129

<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	20.24	20.70	1.112	0.1	0.150	0.167
34	WCDMA II	RMC 12.2Kbps	Back	15mm	9400	1880	20.24	20.70	1.112	0.06	0.186	0.207
	WCDMA IV	RMC 12.2Kbps	Front	15mm	1513	1752.6	20.19	20.70	1.125	0.08	0.152	0.171
35	WCDMA IV	RMC 12.2Kbps	Back	15mm	1513	1752.6	20.19	20.70	1.125	-0.04	0.182	0.205
	WCDMA V	RMC 12.2Kbps	Front	15mm	4233	846.6	23.87	24.70	1.211	-0.04	0.209	0.253
36	WCDMA V	RMC 12.2Kbps	Back	15mm	4233	846.6	23.87	24.70	1.211	-0.1	0.214	0.259

<FDD 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 2	20M	QPSK	1	99	Front	15mm	18900	1880	20.29	21.00	1.178	-0.02	0.204	0.240
	LTE Band 2	20M	QPSK	50	50	Front	15mm	18900	1880	20.41	21.00	1.146	0.03	0.214	0.245
	LTE Band 2	20M	QPSK	1	99	Back	15mm	18900	1880	20.29	21.00	1.178	-0.09	0.240	0.283
37	LTE Band 2	20M	QPSK	50	50	Back	15mm	18900	1880	20.41	21.00	1.146	-0.07	0.249	0.285
	LTE Band 5	10M	QPSK	1	0	Front	15mm	20525	836.5	23.65	25.00	1.365	-0.03	0.177	0.242
	LTE Band 5	10M	QPSK	25	0	Front	15mm	20525	836.5	22.76	24.00	1.330	-0.04	0.140	0.186
38	LTE Band 5	10M	QPSK	1	0	Back	15mm	20525	836.5	23.65	25.00	1.365	-0.09	0.186	0.254
	LTE Band 5	10M	QPSK	25	0	Back	15mm	20525	836.5	22.76	24.00	1.330	-0.11	0.149	0.198
	LTE Band 7	20M	QPSK	1	0	Front	15mm	21350	2560	19.29	20.00	1.178	0.16	0.043	0.051
	LTE Band 7	20M	QPSK	50	24	Front	15mm	21350	2560	19.31	20.00	1.172	0.09	0.049	0.057
	LTE Band 7	20M	QPSK	1	0	Back	15mm	21350	2560	19.29	20.00	1.178	0.15	0.052	0.061
39	LTE Band 7	20M	QPSK	50	24	Back	15mm	21350	2560	19.31	20.00	1.172	0.18	0.053	0.062
40	LTE Band 12	10M	QPSK	1	0	Front	15mm	23095	707.5	23.71	25.00	1.346	-0.16	0.141	0.190
	LTE Band 12	10M	QPSK	25	0	Front	15mm	23095	707.5	22.84	24.00	1.306	-0.06	0.121	0.158
	LTE Band 12	10M	QPSK	1	0	Back	15mm	23095	707.5	23.71	25.00	1.346	-0.05	0.140	0.188
	LTE Band 12	10M	QPSK	25	0	Back	15mm	23095	707.5	22.84	24.00	1.306	-0.04	0.118	0.154
41	LTE Band 13	10M	QPSK	1	49	Front	15mm	23230	782	23.92	25.00	1.282	-0.13	0.284	0.364
	LTE Band 13	10M	QPSK	25	25	Front	15mm	23230	782	22.93	24.00	1.279	-0.13	0.238	0.304
	LTE Band 13	10M	QPSK	1	49	Back	15mm	23230	782	23.92	25.00	1.282	-0.03	0.282	0.362
	LTE Band 13	10M	QPSK	25	25	Back	15mm	23230	782	22.93	24.00	1.279	-0.1	0.235	0.301
	LTE Band 66	20M	QPSK	1	99	Front	15mm	132322	1745	20.20	21.00	1.202	-0.01	0.146	0.176
	LTE Band 66	20M	QPSK	50	50	Front	15mm	132322	1745	20.26	21.00	1.186	0	0.149	0.177
	LTE Band 66	20M	QPSK	1	99	Back	15mm	132322	1745	20.20	21.00	1.202	0.06	0.150	0.180
42	LTE Band 66	20M	QPSK	50	50	Back	15mm	132322	1745	20.26	21.00	1.186	0.1	0.157	0.186

<TDD 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	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
43	LTE Band 48	20M	QPSK	1	0	Front	15mm	55340	3560	16.66	18.00	1.361	62.9	1.006	0.16	0.018	0.025
	LTE Band 48	20M	QPSK	50	0	Front	15mm	55340	3560	16.68	18.00	1.355	62.9	1.006	0.12	0.016	0.022
	LTE Band 48	20M	QPSK	1	0	Back	15mm	55340	3560	16.66	18.00	1.361	62.9	1.006	0.12	0.011	0.015
	LTE Band 48	20M	QPSK	50	0	Back	15mm	55340	3560	16.68	18.00	1.355	62.9	1.006	-0.08	0.012	0.016

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	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	Chain 0	1	2412	13.58	14.00	1.102	100	1.000	0.18	0.026	0.029
44	WLAN2.4GHz	802.11b 1Mbps	Back	15mm	Chain 0	1	2412	13.58	14.00	1.102	100	1.000	0.13	0.048	0.053
	WLAN2.4GHz	802.11b 1Mbps	Front	15mm	Chain 1	6	2437	6.72	7.00	1.067	100	1.000	0	0.001	0.001
	WLAN2.4GHz	802.11b 1Mbps	Back	15mm	Chain 1	6	2437	6.72	7.00	1.067	100	1.000	0	0.001	0.001
	WLAN2.4GHz	802.11g 6Mbps	Front	15mm	Chain 1	6	2437	15.70	16.00	1.072	99.25	1.008	0.05	0.004	0.004
	WLAN2.4GHz	802.11g 6Mbps	Back	15mm	Chain 1	6	2437	15.70	16.00	1.072	99.25	1.008	0.11	0.008	0.009
	WLAN5GHz	802.11ac-VHT80 MCS0	Front	15mm	Chain 0	58	5290	10.90	11.50	1.148	100	1.000	0	0.001	0.001
	WLAN5GHz	802.11ac-VHT80 MCS0	Back	15mm	Chain 0	58	5290	10.90	11.50	1.148	100	1.000	-0.06	0.001	0.001
	WLAN5GHz	802.11ac-VHT80 MCS0	Front	15mm	Chain 1	58	5290	10.90	11.50	1.148	100	1.000	0	0.001	0.001
45	WLAN5GHz	802.11ac-VHT80 MCS0	Back	15mm	Chain 1	58	5290	10.90	11.50	1.148	100	1.000	-0.17	0.075	0.086
	WLAN5GHz	802.11ac-VHT80 MCS0	Front	15mm	Chain 0	106	5530	11.20	11.50	1.072	100	1.000	0	0.001	0.001
	WLAN5GHz	802.11ac-VHT80 MCS0	Back	15mm	Chain 0	106	5530	11.20	11.50	1.072	100	1.000	-0.03	0.027	0.029
	WLAN5GHz	802.11ac-VHT80 MCS0	Front	15mm	Chain 1	106	5530	11.10	11.50	1.096	100	1.000	0	0.001	0.001
46	WLAN5GHz	802.11ac-VHT80 MCS0	Back	15mm	Chain 1	106	5530	11.10	11.50	1.096	100	1.000	-0.01	0.043	0.047
	WLAN5GHz	802.11ac-VHT80 MCS0	Front	15mm	Chain 0	155	5775	11.00	11.50	1.122	100	1.000	0	0.001	0.001
	WLAN5GHz	802.11ac-VHT80 MCS0	Back	15mm	Chain 0	155	5775	11.00	11.50	1.122	100	1.000	-0.19	0.038	0.043
	WLAN5GHz	802.11ac-VHT80 MCS0	Front	15mm	Chain 1	155	5775	11.00	11.50	1.122	100	1.000	0	0.001	0.001
47	WLAN5GHz	802.11ac-VHT80 MCS0	Back	15mm	Chain 1	155	5775	11.00	11.50	1.122	100	1.000	0.1	0.044	0.049

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	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	15mm	Chain 0	39	2441	14.43	15.70	1.340	0.12	0.024	0.032
48	Bluetooth	1Mbps	Back	15mm	Chain 0	39	2441	14.43	15.70	1.340	0.15	0.051	0.068

14.4 Product Specific SAR

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	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	802.11ac-VHT80 MCS0	Front	0mm	Chain 0	58	5290	10.90	11.50	1.148	100	1.000	-0.07	0.033	0.038
	WLAN5GHz	802.11ac-VHT80 MCS0	Back	0mm	Chain 0	58	5290	10.90	11.50	1.148	100	1.000	-0.08	0.147	0.169
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Side	0mm	Chain 0	58	5290	10.90	11.50	1.148	100	1.000	0.04	0.067	0.077
	WLAN5GHz	802.11ac-VHT80 MCS0	Front	0mm	Chain 1	58	5290	10.90	11.50	1.148	100	1.000	0.05	0.093	0.107
49	WLAN5GHz	802.11ac-VHT80 MCS0	Back	0mm	Chain 1	58	5290	10.90	11.50	1.148	100	1.000	-0.04	0.432	0.496
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Side	0mm	Chain 1	58	5290	10.90	11.50	1.148	100	1.000	-0.05	0.043	0.049
	WLAN5GHz	802.11ac-VHT80 MCS0	Right Side	0mm	Chain 1	58	5290	10.90	11.50	1.148	100	1.000	-0.02	0.001	0.001
	WLAN5GHz	802.11ac-VHT80 MCS0	Top Side	0mm	Chain 1	58	5290	10.90	11.50	1.148	100	1.000	-0.05	0.018	0.021
	WLAN5GHz	802.11ac-VHT80 MCS0	Front	0mm	Chain 0	106	5530	11.20	11.50	1.072	100	1.000	-0.03	0.051	0.055
	WLAN5GHz	802.11ac-VHT80 MCS0	Back	0mm	Chain 0	106	5530	11.20	11.50	1.072	100	1.000	-0.08	0.216	0.231
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Side	0mm	Chain 0	106	5530	11.20	11.50	1.072	100	1.000	0.08	0.065	0.070
	WLAN5GHz	802.11ac-VHT80 MCS0	Front	0mm	Chain 1	106	5530	11.10	11.50	1.096	100	1.000	0.07	0.037	0.041
50	WLAN5GHz	802.11ac-VHT80 MCS0	Back	0mm	Chain 1	106	5530	11.10	11.50	1.096	100	1.000	-0.16	0.221	0.242
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Side	0mm	Chain 1	106	5530	11.10	11.50	1.096	100	1.000	-0.07	0.027	0.030
	WLAN5GHz	802.11ac-VHT80 MCS0	Right Side	0mm	Chain 1	106	5530	11.10	11.50	1.096	100	1.000	0	0.001	0.001
	WLAN5GHz	802.11ac-VHT80 MCS0	Top Side	0mm	Chain 1	106	5530	11.10	11.50	1.096	100	1.000	0.1	0.005	0.006
	WLAN5GHz	802.11ac-VHT80 MCS0	Front	0mm	Chain 0	155	5775	11.00	11.50	1.122	100	1.000	0.11	0.055	0.062
	WLAN5GHz	802.11ac-VHT80 MCS0	Back	0mm	Chain 0	155	5775	11.00	11.50	1.122	100	1.000	-0.15	0.182	0.204
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Side	0mm	Chain 0	155	5775	11.00	11.50	1.122	100	1.000	0.13	0.071	0.080
	WLAN5GHz	802.11ac-VHT80 MCS0	Front	0mm	Chain 1	155	5775	11.00	11.50	1.122	100	1.000	0.05	0.012	0.013
51	WLAN5GHz	802.11ac-VHT80 MCS0	Back	0mm	Chain 1	155	5775	11.00	11.50	1.122	100	1.000	-0.07	0.324	0.364
	WLAN5GHz	802.11ac-VHT80 MCS0	Left Side	0mm	Chain 1	155	5775	11.00	11.50	1.122	100	1.000	0.02	0.025	0.028
	WLAN5GHz	802.11ac-VHT80 MCS0	Right Side	0mm	Chain 1	155	5775	11.00	11.50	1.122	100	1.000	0	0.001	0.001
	WLAN5GHz	802.11ac-VHT80 MCS0	Top Side	0mm	Chain 1	155	5775	11.00	11.50	1.122	100	1.000	0	0.004	0.004

15. Simultaneous Transmission Analysis

Case	Cellular	WLAN Chain0 / BT	WLAN Chain1
1	GSM/GPRS/EDGE	BT/BLE	(None)
2	GSM/GPRS/EDGE	WLAN 2.4G	WLAN 2.4G
3	GSM/GPRS/EDGE	WLAN 5G	WLAN 5G
4	UMTS/HSPA	BT/BLE	(None)
5	UMTS/HSPA	WLAN 2.4G	WLAN 2.4G
6	UMTS/HSPA	WLAN 5G	WLAN 5G
7	LTE	BT/BLE	(None)
8	LTE	WLAN 2.4G	WLAN 2.4G
9	LTE	WLAN 5G	WLAN 5G
10	None	BT/BLE WLAN 5G	WLAN 5G
11	GSM/GPRS/EDGE	BT/BLE WLAN 5G	WLAN 5G
12	UMTS/HSPA	BT/BLE WLAN 5G	WLAN 5G
13	LTE	BT/BLE WLAN 5G	WLAN 5G

General Note:

1. This device WLAN 2.4GHz supports Hotspot operation and Bluetooth support tethering applications.
2. WLAN RF exposure assessment of MIMO mode simultaneous transmission exclusion analysis was performed with SAR test results of each antenna in SISO mode.
3. The Scaled SAR summation is calculated based on the same configuration and test position.
4. 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, simultaneously transmission SAR measurement is not necessary.
   iv) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.

15.1 Head Exposure Conditions

WWAN Band	Exposure Position	1	2	3	4	5	6	1+2+3 Summed 1g SAR (W/kg)	1+4+5+6 Summed 1g SAR (W/kg)
		WWAN	2.4GHz WLAN Chain 0	2.4GHz WLAN Chain 1	5GHz WLAN Chain 0	5GHz WLAN Chain 1	Bluetooth Chain 0		
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)		
GSM850	Right Cheek	0.317	0.482	0.080	0.135	0.237	0.488	**0.879**	**1.177**
	Right Tilted	0.131	0.086	0.060	0.003	0.195	0.082	**0.277**	**0.411**
	Left Cheek	0.309	0.135	0.048	0.034	0.084	0.121	**0.492**	**0.548**
	Left Tilted	0.131	0.031	0.043	0.016	0.085	0.023	**0.205**	**0.255**
GSM1900	Right Cheek	0.034	0.482	0.080	0.135	0.237	0.488	**0.596**	**0.894**
	Right Tilted	0.010	0.086	0.060	0.003	0.195	0.082	**0.156**	**0.290**
	Left Cheek	0.027	0.135	0.048	0.034	0.084	0.121	**0.210**	**0.266**
	Left Tilted	0.018	0.031	0.043	0.016	0.085	0.023	**0.092**	**0.142**
WCDMA II	Right Cheek	0.062	0.482	0.080	0.135	0.237	0.488	**0.624**	**0.922**
	Right Tilted	0.021	0.086	0.060	0.003	0.195	0.082	**0.167**	**0.301**
	Left Cheek	0.034	0.135	0.048	0.034	0.084	0.121	**0.217**	**0.273**
	Left Tilted	0.026	0.031	0.043	0.016	0.085	0.023	**0.100**	**0.150**
WCDMA IV	Right Cheek	0.051	0.482	0.080	0.135	0.237	0.488	**0.613**	**0.911**
	Right Tilted	0.040	0.086	0.060	0.003	0.195	0.082	**0.186**	**0.320**
	Left Cheek	0.052	0.135	0.048	0.034	0.084	0.121	**0.235**	**0.291**
	Left Tilted	0.033	0.031	0.043	0.016	0.085	0.023	**0.107**	**0.157**
WCDMA V	Right Cheek	0.289	0.482	0.080	0.135	0.237	0.488	**0.851**	**1.149**
	Right Tilted	0.114	0.086	0.060	0.003	0.195	0.082	**0.260**	**0.394**
	Left Cheek	0.288	0.135	0.048	0.034	0.084	0.121	**0.471**	**0.527**
	Left Tilted	0.131	0.031	0.043	0.016	0.085	0.023	**0.205**	**0.255**
LTE Band 2	Right Cheek	0.065	0.482	0.080	0.135	0.237	0.488	**0.627**	**0.925**
	Right Tilted	0.041	0.086	0.060	0.003	0.195	0.082	**0.187**	**0.321**
	Left Cheek	0.040	0.135	0.048	0.034	0.084	0.121	**0.223**	**0.279**
	Left Tilted	0.033	0.031	0.043	0.016	0.085	0.023	**0.107**	**0.157**
LTE Band 5	Right Cheek	0.258	0.482	0.080	0.135	0.237	0.488	**0.820**	**1.118**
	Right Tilted	0.102	0.086	0.060	0.003	0.195	0.082	**0.248**	**0.382**
	Left Cheek	0.188	0.135	0.048	0.034	0.084	0.121	**0.371**	**0.427**
	Left Tilted	0.081	0.031	0.043	0.016	0.085	0.023	**0.155**	**0.205**
LTE Band 7	Right Cheek	0.016	0.482	0.080	0.135	0.237	0.488	**0.578**	**0.876**
	Right Tilted	0.022	0.086	0.060	0.003	0.195	0.082	**0.168**	**0.302**
	Left Cheek	0.014	0.135	0.048	0.034	0.084	0.121	**0.197**	**0.253**
	Left Tilted	0.009	0.031	0.043	0.016	0.085	0.023	**0.083**	**0.133**
LTE Band 12	Right Cheek	0.153	0.482	0.080	0.135	0.237	0.488	**0.715**	**1.013**
	Right Tilted	0.061	0.086	0.060	0.003	0.195	0.082	**0.207**	**0.341**
	Left Cheek	0.192	0.135	0.048	0.034	0.084	0.121	**0.375**	**0.431**
	Left Tilted	0.052	0.031	0.043	0.016	0.085	0.023	**0.126**	**0.176**
LTE Band 13	Right Cheek	0.205	0.482	0.080	0.135	0.237	0.488	**0.767**	**1.065**
	Right Tilted	0.110	0.086	0.060	0.003	0.195	0.082	**0.256**	**0.390**
	Left Cheek	0.264	0.135	0.048	0.034	0.084	0.121	**0.447**	**0.503**
	Left Tilted	0.133	0.031	0.043	0.016	0.085	0.023	**0.207**	**0.257**
LTE Band 48	Right Cheek	0.001	0.482	0.080	0.135	0.237	0.488	**0.563**	**0.861**
	Right Tilted	0.001	0.086	0.060	0.003	0.195	0.082	**0.147**	**0.281**
	Left Cheek	0.003	0.135	0.048	0.034	0.084	0.121	**0.186**	**0.242**
	Left Tilted	0.001	0.031	0.043	0.016	0.085	0.023	**0.075**	**0.125**
LTE Band 66	Right Cheek	0.040	0.482	0.080	0.135	0.237	0.488	**0.602**	**0.900**
	Right Tilted	0.019	0.086	0.060	0.003	0.195	0.082	**0.165**	**0.299**
	Left Cheek	0.039	0.135	0.048	0.034	0.084	0.121	**0.222**	**0.278**
	Left Tilted	0.023	0.031	0.043	0.016	0.085	0.023	**0.097**	**0.147**

15.2 Hotspot Exposure Conditions

WWAN Band	Exposure Position	1 WWAN 1g SAR (W/kg)	2 2.4GHz WLAN Chain 0 1g SAR (W/kg)	3 2.4GHz WLAN Chain 1 1g SAR (W/kg)	6 Bluetooth Chain 0 1g SAR (W/kg)	1+2+3 Summed 1g SAR (W/kg)	1+6 Summed 1g SAR (W/kg)
GSM850	Front	0.290	0.072	0.008	0.070	**0.370**	**0.360**
	Back	0.360	0.134	0.026	0.146	**0.520**	**0.506**
	Left side	0.296	0.142	0.002	0.154	**0.440**	**0.450**
	Right side	0.397		0.001		**0.398**	**0.397**
	Top side			0.004		**0.004**	**0.000**
	Bottom side	0.065				**0.065**	**0.065**
GSM1900	Front	0.203	0.072	0.008	0.070	**0.283**	**0.273**
	Back	0.211	0.134	0.026	0.146	**0.371**	**0.357**
	Left side	0.023	0.142	0.002	0.154	**0.167**	**0.177**
	Right side	0.033		0.001		**0.034**	**0.033**
	Top side			0.004		**0.004**	**0.000**
	Bottom side	0.300				**0.300**	**0.300**
WCDMA II	Front	0.346	0.072	0.008	0.070	**0.426**	**0.416**
	Back	0.411	0.134	0.026	0.146	**0.571**	**0.557**
	Left side	0.040	0.142	0.002	0.154	**0.184**	**0.194**
	Right side	0.058		0.001		**0.059**	**0.058**
	Top side			0.004		**0.004**	**0.000**
	Bottom side	0.491				**0.491**	**0.491**
WCDMA IV	Front	0.325	0.072	0.008	0.070	**0.405**	**0.395**
	Back	0.391	0.134	0.026	0.146	**0.551**	**0.537**
	Left side	0.028	0.142	0.002	0.154	**0.172**	**0.182**
	Right side	0.079		0.001		**0.080**	**0.079**
	Top side			0.004		**0.004**	**0.000**
	Bottom side	0.514				**0.514**	**0.514**
WCDMA V	Front	0.237	0.072	0.008	0.070	**0.317**	**0.307**
	Back	0.301	0.134	0.026	0.146	**0.461**	**0.447**
	Left side	0.284	0.142	0.002	0.154	**0.428**	**0.438**
	Right side	0.344		0.001		**0.345**	**0.344**
	Top side			0.004		**0.004**	**0.000**
	Bottom side	0.058				**0.058**	**0.058**
LTE Band 2	Front	0.355	0.072	0.008	0.070	**0.435**	**0.425**
	Back	0.423	0.134	0.026	0.146	**0.583**	**0.569**
	Left side	0.031	0.142	0.002	0.154	**0.175**	**0.185**
	Right side	0.070		0.001		**0.071**	**0.070**
	Top side			0.004		**0.004**	**0.000**
	Bottom side	0.727				**0.727**	**0.727**
LTE Band 5	Front	0.254	0.072	0.008	0.070	**0.334**	**0.324**
	Back	0.285	0.134	0.026	0.146	**0.445**	**0.431**
	Left side	0.262	0.142	0.002	0.154	**0.406**	**0.416**
	Right side	0.300		0.001		**0.301**	**0.300**
	Top side			0.004		**0.004**	**0.000**
	Bottom side	0.071				**0.071**	**0.071**
LTE Band 7	Front	0.137	0.072	0.008	0.070	**0.217**	**0.207**
	Back	0.137	0.134	0.026	0.146	**0.297**	**0.283**
	Left side	0.064	0.142	0.002	0.154	**0.208**	**0.218**
	Right side	0.030		0.001		**0.031**	**0.030**
	Top side			0.004		**0.004**	**0.000**
	Bottom side	0.253				**0.253**	**0.253**

WWAN Band	Exposure Position	1	2	3	6	1+2+3 Summed 1g SAR (W/kg)	1+6 Summed 1g SAR (W/kg)
		WWAN	2.4GHz WLAN Chain 0	2.4GHz WLAN Chain 1	Bluetooth Chain 0		
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)		
LTE Band 12	Front	0.214	0.072	0.008	0.070	**0.294**	**0.284**
	Back	0.230	0.134	0.026	0.146	**0.390**	**0.376**
	Left side	0.285	0.142	0.002	0.154	**0.429**	**0.439**
	Right side	0.175		0.001		**0.176**	**0.175**
	Top side			0.004		**0.004**	**0.000**
	Bottom side	0.048				**0.048**	**0.048**
LTE Band 13	Front	0.346	0.072	0.008	0.070	**0.426**	**0.416**
	Back	0.364	0.134	0.026	0.146	**0.524**	**0.510**
	Left side	0.381	0.142	0.002	0.154	**0.525**	**0.535**
	Right side	0.289		0.001		**0.290**	**0.289**
	Top side			0.004		**0.004**	**0.000**
	Bottom side	0.042				**0.042**	**0.042**
LTE Band 48	Front	0.060	0.072	0.008	0.070	**0.140**	**0.130**
	Back	0.042	0.134	0.026	0.146	**0.202**	**0.188**
	Left side	0.001	0.142	0.002	0.154	**0.145**	**0.155**
	Right side	0.047		0.001		**0.048**	**0.047**
	Top side			0.004		**0.004**	**0.000**
	Bottom side	0.049				**0.049**	**0.049**
LTE Band 66	Front	0.328	0.072	0.008	0.070	**0.408**	**0.398**
	Back	0.353	0.134	0.026	0.146	**0.513**	**0.499**
	Left side	0.028	0.142	0.002	0.154	**0.172**	**0.182**
	Right side	0.075		0.001		**0.076**	**0.075**
	Top side			0.004		**0.004**	**0.000**
	Bottom side	0.515				**0.515**	**0.515**

15.3 Body-Worn Accessory Exposure Conditions

WWAN Band	Exposure Position	1 WWAN 1g SAR (W/kg)	2 2.4GHz WLAN Chain 0 1g SAR (W/kg)	3 2.4GHz WLAN Chain 1 1g SAR (W/kg)	4 5GHz WLAN Chain 0 1g SAR (W/kg)	5 5GHz WLAN Chain 1 1g SAR (W/kg)	6 Bluetooth Chain 0 1g SAR (W/kg)	1+2+3 Summed 1g SAR (W/kg)	1+4+5+6 Summed 1g SAR (W/kg)
GSM850	Front	0.283	0.029	0.004	0.001	0.001	0.032	**0.316**	**0.317**
	Back	0.280	0.053	0.009	0.043	0.086	0.068	**0.342**	**0.477**
GSM1900	Front	0.094	0.029	0.004	0.001	0.001	0.032	**0.127**	**0.128**
	Back	0.129	0.053	0.009	0.043	0.086	0.068	**0.191**	**0.326**
WCDMA II	Front	0.167	0.029	0.004	0.001	0.001	0.032	**0.200**	**0.201**
	Back	0.207	0.053	0.009	0.043	0.086	0.068	**0.269**	**0.404**
WCDMA IV	Front	0.171	0.029	0.004	0.001	0.001	0.032	**0.204**	**0.205**
	Back	0.205	0.053	0.009	0.043	0.086	0.068	**0.267**	**0.402**
WCDMA V	Front	0.253	0.029	0.004	0.001	0.001	0.032	**0.286**	**0.287**
	Back	0.259	0.053	0.009	0.043	0.086	0.068	**0.321**	**0.456**
LTE Band 2	Front	0.245	0.029	0.004	0.001	0.001	0.032	**0.278**	**0.279**
	Back	0.285	0.053	0.009	0.043	0.086	0.068	**0.347**	**0.482**
LTE Band 5	Front	0.242	0.029	0.004	0.001	0.001	0.032	**0.275**	**0.276**
	Back	0.254	0.053	0.009	0.043	0.086	0.068	**0.316**	**0.451**
LTE Band 7	Front	0.057	0.029	0.004	0.001	0.001	0.032	**0.090**	**0.091**
	Back	0.062	0.053	0.009	0.043	0.086	0.068	**0.124**	**0.259**
LTE Band 12	Front	0.190	0.029	0.004	0.001	0.001	0.032	**0.223**	**0.224**
	Back	0.188	0.053	0.009	0.043	0.086	0.068	**0.250**	**0.385**
LTE Band 13	Front	0.364	0.029	0.004	0.001	0.001	0.032	**0.397**	**0.398**
	Back	0.362	0.053	0.009	0.043	0.086	0.068	**0.424**	**0.559**
LTE Band 48	Front	0.025	0.029	0.004	0.001	0.001	0.032	**0.058**	**0.059**
	Back	0.016	0.053	0.009	0.043	0.086	0.068	**0.078**	**0.213**
LTE Band 66	Front	0.177	0.029	0.004	0.001	0.001	0.032	**0.210**	**0.211**
	Back	0.186	0.053	0.009	0.043	0.086	0.068	**0.248**	**0.383**

15.4 Product Specific Exposure Conditions

Exposure Position	1 WWAN 10g SAR (W/kg)	2 2.4GHz WLAN Chain 0 10g SAR (W/kg)	3 2.4GHz WLAN Chain 1 10g SAR (W/kg)	4 5GHz WLAN Chain 0 10g SAR (W/kg)	5 5GHz WLAN Chain 1 10g SAR (W/kg)	6 Bluetooth Chain 0 10g SAR (W/kg)	1+2+3 Summed 10g SAR (W/kg)	1+4+5+6 Summed 10g SAR (W/kg)
Front				0.062	0.107		**0.000**	**0.169**
Back				0.231	0.496		**0.000**	**0.727**
Left side				0.080	0.049		**0.000**	**0.129**
Right side					0.001		**0.000**	**0.001**
Top side					0.021		**0.000**	**0.021**
Bottom side							**0.000**	**0.000**

Test Engineer： Ginger Chiang, Ray Sun, Jordar Jhuang, Willy Yu, Jeff Tsao and York Lu

16. 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.
Declaration of Conformity:
The test results with all measurement uncertainty excluded is presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

17. 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 D06 v02r01, "SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities", Oct 2015.

[11] FCC KDB 941225 D07 v01r02, " SAR Evaluation Procedures for UMPC Mini-Tablet Devices", 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.