FCC SAR TEST REPORT

FCC ID	:	A4RGBDU9
Equipment	:	Wireless Device
Model Name	:	GBDU9
Applicant	:	Google LLC 1600 Amphitheatre Parkway, Mountain View, California, 94043 USA
Standard	:	FCC 47 CFR Part 2 (2.1093)

The product was received on Feb. 15, 2024 and testing was started from Feb. 28, 2024 and completed on Mar. 21, 2024. 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. Laboratory, the test report shall not be reproduced except in full.

Approved by: Cona Huang / Deputy Manager

Sporton International Inc. Wensan Laboratory
No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan

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History of this test report

Report No.	Version	Description	Issued Date
FA412509	01	Initial issue of report	Apr. 22, 2024
FA412509	02	Updated section 1, section 3.1 and section 13.	Apr. 25, 2024
FA412509	03	Updated section 11 and section 12.	Jun. 26, 2024

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) for **Google LLC, Wireless Device, GBDU9**, are as follows.

Equipment Class	Frequency Band		Highest SAR Summary		Highest Simultaneous Transmission 1g SAR (W/kg)	Highest Simultaneous Transmission 10g SAR (W/kg)
			Next to mouth (Separation 10mm)	Extremity (Separation 0mm)		
			1g SAR (W/kg)	10g SAR (W/kg)		
Licensed	WCDMA	WCDMA II	0.12	0.08	0.53	0.88
		WCDMA IV	0.16	0.18		
		WCDMA V	< 0.01	0.34		
	LTE	LTE Band 7	0.28	0.25		
		LTE Band 12 / 17	< 0.01	0.43		
		LTE Band 13	< 0.01	0.46		
		LTE Band 2 / 25	0.14	0.13		
		LTE Band 5 / 26	< 0.01	0.48		
		LTE Band 4 / 66	0.15	0.12		
		LTE Band 71	< 0.01	0.80		
DTS	WLAN	2.4GHz WLAN	0.08	0.08	0.35	0.88
NII		5GHz WLAN	0.20	0.02	0.53	0.87
DSS	2.4GHz Band	Bluetooth	0.06	0.06	0.53	0.87
Date of Testing:			2024/02/28 ~ 2024/03/21			

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation and the FCC designation No. TW3786 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 for Next to mouth 1g SAR, 4.0 W/kg for Extremity 10g SAR) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013 and FCC KDB publications

2. Guidance Applied

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards, the below KDB standard may not including in the TAF code without accreditation.

- 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 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

3. Equipment Under Test (EUT) Information

3.1 General Information

Product Feature & Specification	
Equipment Name	Wireless Device
Model Name	GBDU9
FCC ID	A4RGBDU9
S / N	41291JEAVL007G, 41291JEAVL008D
Wireless Technology and Frequency Range	WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band IV: 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 MHz 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 17: 704 MHz ~ 716 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 66: 1710 MHz ~ 1780 MHz LTE Band 71: 663 MHz ~ 698 MHz WLAN 2.4 GHz Band: 2400 MHz ~ 2483.5 MHz WLAN 5.2 GHz Band: 5150 MHz ~ 5250 MHz WLAN 5.3 GHz Band: 5250 MHz ~ 5350 MHz WLAN 5.6 GHz Band: 5470 MHz ~ 5725 MHz WLAN 5.8 GHz Band: 5725 MHz ~ 5850 MHz WLAN 5.9 GHz Band: 5850 MHz ~ 5895 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz NFC : 13.56 MHz(Rx only) UWB: 6489.6MHz, 7987.2MHz
Mode	RMC/AMR 12.2Kbps HSDPA HSUPA DC-HSDPA LTE: QPSK, 16QAM WLAN: 802.11a/b/g/n/ac/ax HT20/HT40/VHT20/VHT40/VHT80/HE20/HE40/HE80 Bluetooth BR/EDR/LE/BLE (CH2-76) NFC: ASK UWB: BPM-BPSK
Remark: 1. 2.4GHz WLAN and Bluetooth cannot transmit simultaneously. 2. The strap 1/2/3 were perform full RF exposure evaluation, other strap 4/5/6/7/8 were spot check worst case band and configuration. 3. The UWB output power is -13.8dBm and it is less than 1mW and exempt from power density testing.	

3.2 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05	
FCC ID	A4RGBDU9
Equipment Name	WIRELESS Device
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 17: 704 MHz ~ 716 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 66: 1710 MHz ~ 1780 MHz LTE Band 71: 663 MHz ~ 698 MHz
Channel Bandwidth	LTE Band 2:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 4:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 5:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 7: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 12:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 13: 5MHz, 10MHz LTE Band 17: 5MHz, 10MHz LTE Band 25:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 26:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz LTE Band 66:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 71: 5MHz, 10MHz, 15MHz, 20MHz
uplink modulations used	QPSK / 16QAM
LTE Voice / Data requirements	Data only
LTE MPR permanently built-in by design	**Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3**
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.

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

Transmission (H, M, L) channel numbers and frequencies in each LTE band

LTE Band 2

	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	18607	1850.7	18615	1851.5	18625	1852.5	18650	1855	18675	1857.5	18700	1860
M	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880
H	19193	1909.3	19185	1908.5	19175	1907.5	19150	1905	19125	1902.5	19100	1900

LTE Band 4

	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	19957	1710.7	19965	1711.5	19975	1712.5	20000	1715	20025	1717.5	20050	1720
M	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5
H	20393	1754.3	20385	1753.5	20375	1752.5	20350	1750	20325	1747.5	20300	1745

LTE Band 5

	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20407	824.7	20415	825.5	20425	826.5	20450	829
M	20525	836.5	20525	836.5	20525	836.5	20525	836.5
H	20643	848.3	20635	847.5	20625	846.5	20600	844

LTE Band 7								
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20775	2502.5	20800	2505	20825	2507.5	20850	2510
M	21100	2535	21100	2535	21100	2535	21100	2535
H	21425	2567.5	21400	2565	21375	2562.5	21350	2560

LTE Band 12								
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	23017	699.7	23025	700.5	23035	701.5	23060	704
M	23095	707.5	23095	707.5	23095	707.5	23095	707.5
H	23173	715.3	23165	714.5	23155	713.5	23130	711

LTE Band 13				
	Bandwidth 5 MHz		Bandwidth 10 MHz	
	Channel #	Freq.(MHz)	Channel #	Freq.(MHz)
L	23205	779.5	23230	782
M	23230	782		
H	23255	784.5		

LTE Band 17				
	Bandwidth 5 MHz		Bandwidth 10 MHz	
	Channel #	Freq.(MHz)	Channel #	Freq. (MHz)
L	23755	706.5	23780	709
M	23790	710	23790	710
H	23825	713.5	23800	711

LTE Band 25												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	26047	1850.7	26055	1851.5	26065	1852.5	26090	1855	26115	1857.5	26140	1860
M	26340	1880	26340	1880	26340	1880	26340	1880	26340	1880	26340	1880
H	26683	1914.3	26675	1913.5	26665	1912.5	26640	1910	26615	1907.5	26590	1905

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

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

LTE Band 71								
	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	133147	665.5	133172	668	133197	670.5	133222	673
M	133297	680.5	133297	680.5	133297	680.5	133297	680.5
H	133447	695.5	133422	693	133397	690.5	133372	688

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:

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

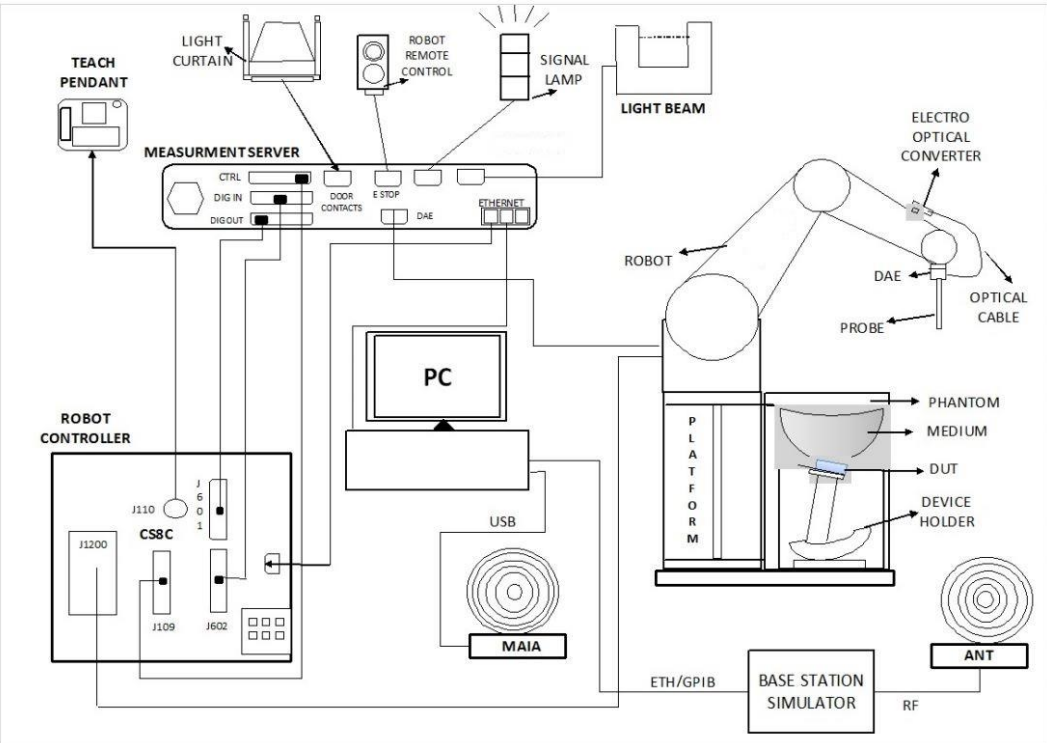
SAR is expressed in units of Watts per kilogram (W/kg)

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

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:



- The DASY system in SAR Configuration is shown above
- 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 windows software and the DASY 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 Site Location

The SAR measurement facilities used to collect data are within both Sporton Lab list below test site location are accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190 and 3786) and the FCC designation No. TW1190 and TW3786 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC test.

Laboratory	EMC & Wireless Communications Laboratory		Wensan Laboratory				
Test Site Location	TW1190 No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan		TW3786 No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan				
Test Site No.	SAR01-HY	SAR03-HY	SAR08-HY	SAR09-HY	SAR15-HY	SAR18-HY	SAR21-HY
	SAR04-HY	SAR05-HY	SAR11-HY	SAR12-HY	SAR16-HY	SAR19-HY	SAR22-HY
	SAR06-HY	SAR10-HY	SAR13-HY	SAR14-HY	SAR17-HY	SAR20-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	4 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	4 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.

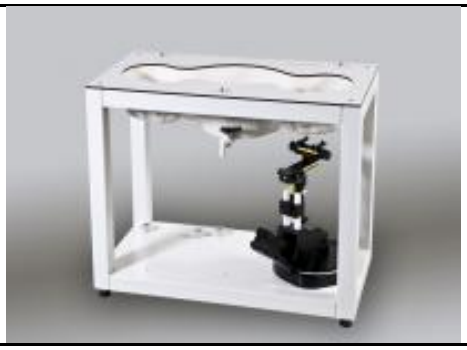
The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

Fig 5.1 Photo of DAE

6.4 Phantom

<SAM Twin Phantom>

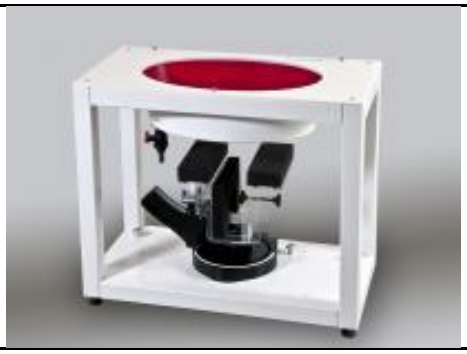
Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm
Filling Volume	Approx. 25 liters
Dimensions	Length: 1000 mm; Width: 500 mm; Height: adjustable feet
Measurement Areas	Left Hand, Right Hand, Flat Phantom



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:

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

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

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

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[2)]	D750V3	1012	Aug. 18, 2021	Aug. 15, 2024
SPEAG	750MHz System Validation Kit[2)]	D750V3	1107	Jun. 22, 2022	Jun. 20, 2024
SPEAG	835MHz System Validation Kit[2)]	D835V2	499	Aug. 18, 2021	Aug. 15, 2024
SPEAG	835MHz System Validation Kit[2)]	D835V2	4d060	Mar. 24, 2022	Mar. 22, 2024
SPEAG	1750MHz System Validation Kit[2)]	D1750V2	1068	Nov. 21, 2022	Nov. 19, 2024
SPEAG	1900MHz System Validation Kit[2)]	D1900V2	5d041	Aug. 19, 2021	Aug. 16, 2024
SPEAG	1900MHz System Validation Kit[2)]	D1900V2	5d093	Mar. 25, 2022	Mar. 23, 2024
SPEAG	2450MHz System Validation Kit[2)]	D2450V2	736	Aug. 17, 2021	Aug. 14, 2024
SPEAG	2600MHz System Validation Kit[2)]	D2600V2	1008	Aug. 17, 2021	Aug. 14, 2024
SPEAG	5GHz System Validation Kit	D5GHzV2	1128	Feb. 22, 2023	Feb. 20, 2025
SPEAG	5GHz System Validation Kit	D5GHzV2	1171	Apr. 20, 2021	Apr. 17, 2024
SPEAG	Data Acquisition Electronics	DAE4	1424	Dec. 07, 2023	Dec. 06, 2024
SPEAG	Data Acquisition Electronics	DAE4	1647	Dec. 27, 2023	Dec. 26, 2024
SPEAG	Data Acquisition Electronics	DAE4	1696	Oct. 23, 2023	Oct. 22, 2024
SPEAG	Dosimetric E-Field Probe	ES3DV3	3184	Sep. 18, 2023	Sep. 17, 2024
SPEAG	Dosimetric E-Field Probe	EX3DV4	3976	Jan. 22, 2024	Jan. 21, 2025
SPEAG	Dosimetric E-Field Probe	EX3DV4	7625	Dec. 14, 2023	Dec. 13, 2024
SPEAG	Dosimetric E-Field Probe	EX3DV4	7813	May. 24, 2023	May. 23, 2024
Testo	Hygro meter	608-H1	45196600	Nov. 02, 2023	Nov. 01, 2024
Anritsu	Radio Communication Analyzer	MT8821C	6201341950	Nov. 13, 2023	Nov. 12, 2024
R&S	BT Base Station	CBT	101136	Oct. 22, 2023	Oct. 21, 2024
SPEAG	Device Holder	N/A	N/A	N/A	N/A
Anritsu	Signal Generator	MG3710A	6201502524	Sep. 27, 2023	Sep. 26, 2024
Keysight	ENA Network Analyzer	E5071C	MY46104758	Oct. 30, 2023	Oct. 29, 2024
SPEAG	Dielectric Probe Kit	DAK-3.5	1126	Sep. 19, 2023	Sep. 18, 2024
LINE SEIKI	Digital Thermometer	DTM3000-spezial	3690	Aug. 09, 2023	Aug. 08, 2024
Anritsu	Power Meter	ML2495A	1419002	Aug. 17, 2023	Aug. 16, 2024
Anritsu	Power Sensor	MA2411B	1911176	Aug. 18, 2023	Aug. 17, 2024
Anritsu	Spectrum Analyzer	MS2830A	6201396378	Jul. 10, 2023	Jul. 09, 2024
Mini-Circuits	Power Amplifier	ZVE-8G+	6418	Oct. 16, 2023	Oct. 15, 2024
ATM	Dual Directional Coupler	C122H-10	P610410z-02	Note 1	
Warison	Directional Coupler	WCOU-10-50S-10	WR889BMC4B1	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 Verification

The tissue dielectric parameters of tissue-equivalent media used for SAR measurements must be characterized within a temperature range of 18℃ to 25℃, measured with calibrated instruments and apparatuses, such as network analyzers and temperature probes. The temperature of the tissue-equivalent medium during SAR measurement must also be within 18℃ to 25℃ and within ± 2℃ of the temperature when the tissue parameters are characterized. The tissue dielectric measurement system must be calibrated before use. The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements.
The liquid tissue depth was at least 15cm in the phantom for all SAR testing

<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	22.4	0.895	42.499	0.89	41.90	0.56	1.43	±5	2024/2/28
750	22.4	0.889	41.809	0.89	41.90	-0.11	-0.22	±5	2024/3/4
835	22.4	0.929	42.203	0.90	41.50	3.22	1.69	±5	2024/2/28
835	22.4	0.923	41.513	0.90	41.50	2.56	0.03	±5	2024/3/4
1750	22.6	1.362	40.202	1.37	40.10	-0.58	0.25	±5	2024/3/1
1750	22.5	1.371	40.750	1.37	40.10	0.07	1.62	±5	2024/3/5
1900	22.6	1.438	38.654	1.40	40.00	2.71	-3.36	±5	2024/3/1
1900	22.5	1.449	39.202	1.40	40.00	3.50	-2.00	±5	2024/3/5
2450	22.4	1.780	38.900	1.80	39.20	-1.11	-0.77	±5	2024/3/19
2450	22.2	1.790	39.000	1.80	39.20	-0.56	-0.51	±5	2024/3/20
2600	22.5	2.018	39.154	1.96	39.00	2.96	0.39	±5	2024/2/29
2600	22.6	1.943	38.384	1.96	39.00	-0.87	-1.58	±5	2024/3/6
5250	22.4	4.690	36.600	4.71	35.95	-0.42	1.81	±5	2024/3/19
5600	22.4	5.060	36.100	5.07	35.50	-0.20	1.69	±5	2024/3/19
5750	22.4	5.220	35.900	5.22	35.35	0.00	1.56	±5	2024/3/19
5800	22.1	5.290	35.900	5.27	35.30	0.38	1.70	±5	2024/3/21

9.2 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 (%)	Measured 10g SAR (W/kg)	Targeted 10g SAR (W/kg)	Normalized 10g SAR (W/kg)	Deviation (%)	Test Site
2024/2/28	750	50	D750V3-1107	EX3DV4 - SN7625	DAE4 Sn1424	0.411	8.540	8.22	-3.75	0.272	5.570	5.44	-2.33	SAR-09
2024/3/4	750	50	D750V3-1012	ES3DV3 - SN3184	DAE4 Sn1424	0.393	8.560	7.86	-8.18	0.261	5.560	5.22	-6.12	SAR-08
2024/2/28	835	50	D835V2-499	EX3DV4 - SN7625	DAE4 Sn1424	0.460	9.680	9.2	-4.96	0.302	6.280	6.04	-3.82	SAR-09
2024/3/4	835	50	D835V2-4d060	ES3DV3 - SN3184	DAE4 Sn1424	0.469	9.730	9.38	-3.60	0.305	6.390	6.1	-4.54	SAR-08
2024/3/1	1750	50	D1750V2-1068	EX3DV4 - SN7625	DAE4 Sn1424	1.690	36.700	33.8	-7.90	0.888	19.300	17.76	-7.98	SAR-09
2024/3/5	1750	50	D1750V2-1068	ES3DV3 - SN3184	DAE4 Sn1424	1.700	36.700	34	-7.36	0.918	19.300	18.36	-4.87	SAR-08
2024/3/1	1900	50	D1900V2-5d041	EX3DV4 - SN7625	DAE4 Sn1424	1.970	40.600	39.4	-2.96	1.020	21.100	20.4	-3.32	SAR-09
2024/3/5	1900	50	D1900V2-5d093	ES3DV3 - SN3184	DAE4 Sn1424	1.970	39.900	39.4	-1.25	1.040	20.700	20.8	0.48	SAR-08
2024/3/19	2450	50	D2450V2-736	EX3DV4 - SN7813	DAE4 Sn1647	2.520	54.200	50.4	-7.01	1.180	25.300	23.6	-6.72	SAR-17
2024/3/20	2450	50	D2450V2-736	EX3DV4 - SN7813	DAE4 Sn1647	2.570	54.200	51.4	-5.17	1.190	25.300	23.8	-5.93	SAR-17
2024/2/29	2600	50	D2600V2-1008	EX3DV4 - SN7625	DAE4 Sn1424	2.800	58.000	56	-3.45	1.290	25.800	25.8	0.00	SAR-09
2024/3/6	2600	50	D2600V2-1008	ES3DV3 - SN3184	DAE4 Sn1424	2.790	58.000	55.8	-3.79	1.290	25.800	25.8	0.00	SAR-08
2024/3/19	5250	50	D5GHzV2-1171-5250	EX3DV4 - SN7813	DAE4 Sn1647	4.140	80.300	82.8	3.11	1.180	23.000	23.6	2.61	SAR-17
2024/3/19	5600	50	D5GHzV2-1171-5600	EX3DV4 - SN7813	DAE4 Sn1647	4.580	83.400	91.6	9.83	1.290	23.700	25.8	8.86	SAR-17
2024/3/19	5750	50	D5GHzV2-1171-5750	EX3DV4 - SN7813	DAE4 Sn1647	3.650	80.400	73	-9.20	1.030	22.800	20.6	-9.65	SAR-17
2024/3/21	5800	50	D5GHzV2-1128-5800	EX3DV4 - SN3976	DAE4 Sn1696	3.570	78.700	71.4	-9.28	1.010	22.200	20.2	-9.01	SAR-18

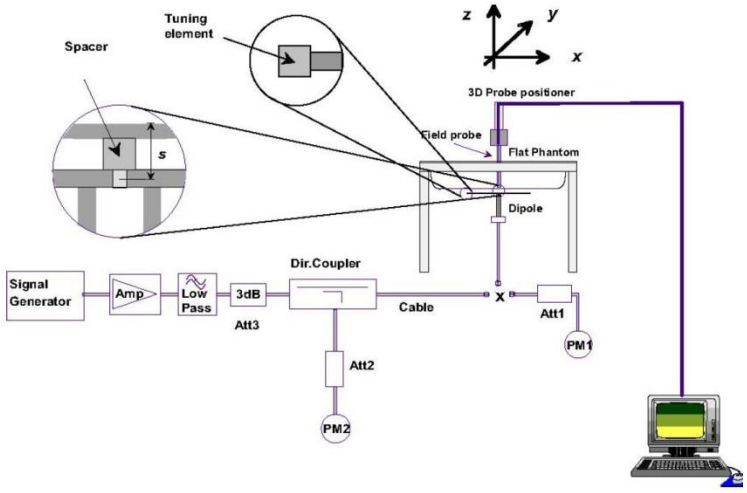


Fig 8.3.1 System Performance Check Setup

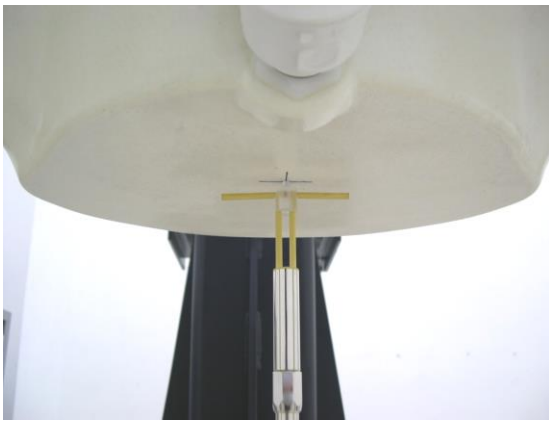


Fig 8.3.2 Setup Photo

10. UMTS/LTE Output Power (Unit: dBm)

<WCDMA Conducted Power>

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

A summary of these settings are illustrated below:

HSDPA Setup Configuration:

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

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

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

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

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

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

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

Setup Configuration

HSUPA Setup Configuration:

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

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

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

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

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

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

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

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

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

Setup Configuration

DC-HSDPA 3GPP release 8 Setup Configuration:

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

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

C.8.1.12 Fixed Reference Channel Definition H-Set 12

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

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

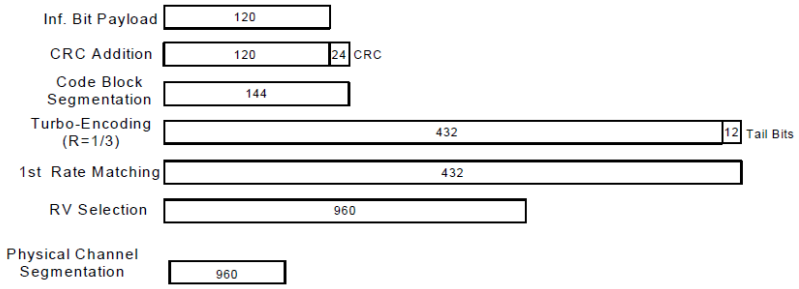


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

Setup Configuration

<WCDMA Conducted Power>

General Note:

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

<WCDMA>

Band		WCDMA II_Ant 0			Tune-up Limit (dBm)	WCDMA IV_Ant 0			Tune-up Limit (dBm)	WCDMA V_Ant 1			Tune-up Limit (dBm)
TX Channel		9262	9400	9538		1312	1413	1513		4132	4182	4233	
Rx Channel		9662	9800	9938		1537	1638	1738		4357	4407	4458	
Frequency (MHz)		1852.4	1880	1907.6		1712.4	1732.6	1752.6		826.4	836.4	846.6	
3GPP Rel 99	AMR 12.2Kbps	22.88	22.97	23.15	24.00	23.51	23.49	23.38	24.00	23.58	23.61	23.54	24.00
3GPP Rel 99	RMC 12.2Kbps	22.97	23.06	23.23	24.00	23.56	23.57	23.43	24.00	23.71	23.79	23.67	24.00
3GPP Rel 6	HSDPA Subtest-1	23.04	23.13	23.21	24.00	23.51	23.55	23.43	24.00	23.62	23.67	23.60	24.00
3GPP Rel 6	HSDPA Subtest-2	23.06	23.11	23.22	24.00	23.47	23.49	23.42	24.00	23.55	23.65	23.56	24.00
3GPP Rel 6	HSDPA Subtest-3	22.51	22.63	22.76	23.50	22.98	23.01	22.95	23.50	23.00	22.68	22.98	23.50
3GPP Rel 6	HSDPA Subtest-4	22.53	22.59	22.69	23.50	22.98	23.04	22.96	23.50	23.08	23.06	23.01	23.50
3GPP Rel 8	DC-HSDPA Subtest-1	22.98	23.08	23.16	24.00	23.44	23.49	23.36	24.00	23.57	23.62	23.52	24.00
3GPP Rel 8	DC-HSDPA Subtest-2	23.01	23.04	23.14	24.00	23.42	23.41	23.37	24.00	23.51	23.59	23.56	24.00
3GPP Rel 8	DC-HSDPA Subtest-3	22.42	22.55	22.68	23.50	22.89	22.94	22.87	23.50	22.95	22.67	22.92	23.50
3GPP Rel 8	DC-HSDPA Subtest-4	22.47	22.50	22.64	23.50	22.88	22.96	22.86	23.50	22.98	23.06	23.00	23.50
3GPP Rel 6	HSUPA Subtest-1	22.15	22.62	22.69	24.00	22.96	22.96	22.89	24.00	22.75	23.37	23.16	24.00
3GPP Rel 6	HSUPA Subtest-2	21.08	21.13	21.26	22.00	21.40	21.41	21.43	22.00	21.62	21.79	21.64	22.00
3GPP Rel 6	HSUPA Subtest-3	22.18	22.13	21.99	23.00	22.44	22.41	22.36	23.00	22.68	22.63	22.60	23.00
3GPP Rel 6	HSUPA Subtest-4	21.08	21.12	21.43	22.00	21.43	21.47	21.36	22.00	21.61	21.71	21.63	22.00
3GPP Rel 6	HSUPA Subtest-5	23.10	23.20	23.00	24.00	23.40	23.50	23.40	24.00	23.60	23.70	23.60	24.00

<LTE Conducted Power>

General Note:

1. A Base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.
2. Per KDB 941225 D05v02r05, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.
3. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
6. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
7. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
8. For LTE B4/B5/B12/B17/B26/B71 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
9. LTE band 2/4/5/17 SAR test was covered by Band 25/66/26/12; according to April 2015 TCB workshop, SAR test for overlapping LTE bands can be reduced if
    a. the maximum output power, including tolerance, for the smaller band is ≤ the larger band to qualify for the SAR test exclusion
    b. the channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band

<LTE Band 2_Ant 0>							
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				18700	18900	19100	
Frequency (MHz)				1860	1880	1900	
20	QPSK	1	0	22.77	22.78	22.66	24
20	QPSK	1	49	22.73	22.74	22.67	
20	QPSK	1	99	22.55	22.51	22.44	
20	QPSK	50	0	21.97	21.93	21.86	23
20	QPSK	50	24	21.98	21.94	21.87	
20	QPSK	50	50	21.88	21.84	21.77	
20	QPSK	100	0	21.91	21.87	21.80	
20	16QAM	1	0	21.86	21.82	21.75	23
20	16QAM	1	13	21.83	21.79	21.72	
20	16QAM	1	26	22.04	22.00	21.93	
20	16QAM	12	0	21.72	21.68	21.61	23
20	16QAM	12	7	21.87	21.83	21.76	
20	16QAM	12	15	21.86	21.82	21.75	
20	16QAM	27	0	21.16	21.12	21.05	22
Channel				18675	18900	19125	Tune-up limit (dBm)
Frequency (MHz)				1857.5	1880	1902.5	
15	QPSK	1	0	22.76	22.73	22.64	24
15	QPSK	1	37	22.65	22.73	22.64	
15	QPSK	1	74	22.46	22.49	22.41	
15	QPSK	36	0	21.90	21.84	21.76	23
15	QPSK	36	20	21.88	21.84	21.83	
15	QPSK	36	39	21.78	21.76	21.75	
15	QPSK	75	0	21.89	21.85	21.78	
15	16QAM	1	0	21.78	21.75	21.74	23
15	16QAM	1	13	21.78	21.79	21.63	
15	16QAM	1	26	21.97	21.91	21.89	
15	16QAM	12	0	21.70	21.66	21.55	23
15	16QAM	12	7	21.86	21.82	21.75	
15	16QAM	12	15	21.81	21.77	21.65	
15	16QAM	27	0	21.15	21.05	20.97	22
Channel				18650	18900	19150	Tune-up limit (dBm)
Frequency (MHz)				1855	1880	1905	
10	QPSK	1	0	22.77	22.71	22.64	24
10	QPSK	1	25	22.63	22.74	22.66	
10	QPSK	1	49	22.47	22.44	22.41	
10	QPSK	25	0	21.94	21.85	21.84	23
10	QPSK	25	12	21.94	21.93	21.83	
10	QPSK	25	25	21.79	21.82	21.67	
10	QPSK	50	0	21.90	21.84	21.72	
10	16QAM	1	0	21.78	21.72	21.65	23
10	16QAM	1	13	21.79	21.79	21.66	
10	16QAM	1	26	22.02	21.99	21.85	
10	16QAM	12	0	21.70	21.65	21.58	23
10	16QAM	12	7	21.85	21.79	21.74	
10	16QAM	12	15	21.76	21.80	21.67	
10	16QAM	27	0	21.06	21.12	21.04	22
Channel				18625	18900	19175	Tune-up limit (dBm)
Frequency (MHz)				1852.5	1880	1907.5	
5	QPSK	1	0	22.71	22.69	22.62	24

5	QPSK	1	12	22.63	22.68	22.60	
5	QPSK	1	24	22.50	22.47	22.43	
5	QPSK	12	0	21.89	21.90	21.77	23
5	QPSK	12	7	21.90	21.91	21.82	
5	QPSK	12	13	21.78	21.83	21.74	
5	QPSK	25	0	21.91	21.84	21.77	
5	16QAM	1	0	21.86	21.73	21.73	23
5	16QAM	1	12	21.80	21.73	21.67	
5	16QAM	1	24	21.94	22.00	21.86	
5	16QAM	12	0	21.70	21.59	21.58	22
5	16QAM	12	7	21.78	21.81	21.73	
5	16QAM	12	13	21.82	21.77	21.69	
5	16QAM	25	0	21.13	21.10	21.09	
Channel				18615	18900	19185	Tune-up limit (dBm)
Frequency (MHz)				1851.5	1880	1908.5	
3	QPSK	1	0	22.68	22.70	22.59	24
3	QPSK	1	8	22.71	22.69	22.58	
3	QPSK	1	14	22.50	22.46	22.37	
3	QPSK	8	0	21.92	21.91	21.84	23
3	QPSK	8	4	21.98	21.91	21.86	
3	QPSK	8	7	21.80	21.84	21.67	
3	QPSK	15	0	21.87	21.82	21.80	
3	16QAM	1	0	21.79	21.73	21.74	23
3	16QAM	1	8	21.79	21.76	21.63	
3	16QAM	1	14	22.03	21.94	21.90	
3	16QAM	8	0	21.72	21.60	21.53	22
3	16QAM	8	4	21.79	21.78	21.75	
3	16QAM	8	7	21.80	21.82	21.68	
3	16QAM	15	0	21.11	21.09	21.08	
Channel				18607	18900	19193	Tune-up limit (dBm)
Frequency (MHz)				1850.7	1880	1909.3	
1.4	QPSK	1	0	22.68	22.70	22.59	24
1.4	QPSK	1	3	22.71	22.69	22.58	
1.4	QPSK	1	5	22.50	22.46	22.37	
1.4	QPSK	3	0	22.68	22.70	22.59	
1.4	QPSK	3	1	22.71	22.69	22.58	
1.4	QPSK	3	3	22.50	22.46	22.37	
1.4	QPSK	6	0	21.92	21.91	21.84	23
1.4	16QAM	1	0	21.79	21.73	21.74	23
1.4	16QAM	1	3	21.79	21.76	21.63	
1.4	16QAM	1	5	22.03	21.94	21.90	
1.4	16QAM	3	0	21.79	21.73	21.74	
1.4	16QAM	3	1	21.79	21.76	21.63	
1.4	16QAM	3	3	22.03	21.94	21.90	
1.4	16QAM	6	0	21.72	21.60	21.53	22

<LTE Band 4_Ant 0>							
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				20050	20175	20300	
Frequency (MHz)				1720	1732.5	1745	
20	QPSK	1	0	22.88	23.35	23.07	24
20	QPSK	1	49	23.17	23.00	23.03	
20	QPSK	1	99	22.99	22.82	23.18	
20	QPSK	50	0	22.31	22.14	22.50	23
20	QPSK	50	24	22.28	22.11	22.47	
20	QPSK	50	50	22.37	22.20	22.56	
20	QPSK	100	0	22.25	22.08	22.44	
20	16QAM	1	0	22.28	22.11	22.47	23
20	16QAM	1	13	22.34	22.17	22.53	
20	16QAM	1	26	22.15	21.98	22.34	
20	16QAM	12	0	22.32	22.15	22.51	23
20	16QAM	12	7	22.25	22.08	22.44	
20	16QAM	12	15	22.40	22.23	22.59	
20	16QAM	27	0	21.22	21.05	21.41	22
Channel				20025	20175	20325	Tune-up limit (dBm)
Frequency (MHz)				1717.5	1732.5	1747.5	
15	QPSK	1	0	22.78	23.31	23.07	24
15	QPSK	1	37	23.07	22.93	23.03	
15	QPSK	1	74	22.95	22.82	23.14	
15	QPSK	36	0	22.21	22.08	22.49	23
15	QPSK	36	20	22.26	22.09	22.39	
15	QPSK	36	39	22.36	22.10	22.47	
15	QPSK	75	0	22.24	22.07	22.40	
15	16QAM	1	0	22.19	22.07	22.43	23
15	16QAM	1	13	22.32	22.16	22.50	
15	16QAM	1	26	22.12	21.98	22.32	
15	16QAM	12	0	22.27	22.09	22.41	23
15	16QAM	12	7	22.18	22.04	22.43	
15	16QAM	12	15	22.34	22.21	22.54	
15	16QAM	27	0	21.14	21.07	21.33	22
Channel				20000	20175	20350	Tune-up limit (dBm)
Frequency (MHz)				1715	1732.5	1750	
10	QPSK	1	0	22.82	23.28	22.99	24
10	QPSK	1	25	23.16	22.91	22.95	
10	QPSK	1	49	22.89	22.77	23.13	
10	QPSK	25	0	22.25	22.06	22.50	23
10	QPSK	25	12	22.19	22.11	22.39	
10	QPSK	25	25	22.34	22.18	22.55	
10	QPSK	50	0	22.19	22.05	22.42	
10	16QAM	1	0	22.23	22.03	22.46	23
10	16QAM	1	13	22.32	22.09	22.49	
10	16QAM	1	26	22.09	21.96	22.30	
10	16QAM	12	0	22.27	22.07	22.44	23
10	16QAM	12	7	22.15	22.08	22.40	
10	16QAM	12	15	22.38	22.14	22.53	
10	16QAM	27	0	21.16	21.09	21.33	22
Channel				19975	20175	20375	Tune-up limit (dBm)
Frequency (MHz)				1712.5	1732.5	1752.5	
5	QPSK	1	0	22.88	23.29	22.99	24

5	QPSK	1	12	23.14	22.95	23.02	
5	QPSK	1	24	22.94	22.80	23.09	
5	QPSK	12	0	22.21	22.12	22.43	23
5	QPSK	12	7	22.25	22.11	22.47	
5	QPSK	12	13	22.35	22.15	22.51	
5	QPSK	25	0	22.15	21.98	22.36	
5	16QAM	1	0	22.19	22.01	22.40	23
5	16QAM	1	12	22.33	22.12	22.46	
5	16QAM	1	24	22.15	21.97	22.31	
5	16QAM	12	0	22.26	22.07	22.44	22
5	16QAM	12	7	22.23	21.99	22.35	
5	16QAM	12	13	22.37	22.23	22.51	
5	16QAM	25	0	21.16	21.05	21.41	
Channel				19965	20175	20385	Tune-up limit (dBm)
Frequency (MHz)				1711.5	1732.5	1753.5	
3	QPSK	1	0	22.87	23.26	23.05	24
3	QPSK	1	8	23.14	22.93	23.02	
3	QPSK	1	14	22.94	22.76	23.10	
3	QPSK	8	0	22.26	22.11	22.45	23
3	QPSK	8	4	22.23	22.08	22.37	
3	QPSK	8	7	22.35	22.19	22.49	
3	QPSK	15	0	22.18	22.03	22.44	
3	16QAM	1	0	22.26	22.04	22.46	23
3	16QAM	1	8	22.33	22.07	22.43	
3	16QAM	1	14	22.07	21.92	22.26	
3	16QAM	8	0	22.26	22.08	22.51	22
3	16QAM	8	4	22.21	22.08	22.36	
3	16QAM	8	7	22.30	22.15	22.52	
3	16QAM	15	0	21.17	21.04	21.32	
Channel				19957	20175	20393	Tune-up limit (dBm)
Frequency (MHz)				1710.7	1732.5	1754.3	
1.4	QPSK	1	0	22.88	23.30	23.07	24
1.4	QPSK	1	3	23.09	22.97	22.98	
1.4	QPSK	1	5	22.96	22.73	23.11	
1.4	QPSK	3	0	22.88	23.30	23.07	
1.4	QPSK	3	1	23.09	22.97	22.98	
1.4	QPSK	3	3	22.96	22.73	23.11	
1.4	QPSK	6	0	22.26	22.07	22.41	23
1.4	16QAM	1	0	22.23	22.04	22.38	23
1.4	16QAM	1	3	22.34	22.07	22.48	
1.4	16QAM	1	5	22.13	21.92	22.34	
1.4	16QAM	3	0	22.23	22.04	22.38	
1.4	16QAM	3	1	22.34	22.07	22.48	
1.4	16QAM	3	3	22.13	21.92	22.34	
1.4	16QAM	6	0	21.90	21.92	21.94	22

<LTE Band 5_Ant 1>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				20450	20525	20600	
Frequency (MHz)				829	836.5	844	
10	QPSK	1	0	22.79	22.74	23.06	24
10	QPSK	1	25	22.63	22.57	22.88	
10	QPSK	1	49	22.97	22.98	22.90	

10	QPSK	25	0	21.62	21.62	21.81	23
10	QPSK	25	12	21.78	21.62	21.88	
10	QPSK	25	25	21.72	21.65	22.02	
10	QPSK	50	0	21.71	21.63	21.78	
10	16QAM	1	0	21.95	21.99	22.13	23
10	16QAM	1	13	21.67	21.92	21.86	
10	16QAM	1	26	22.37	21.91	21.96	
10	16QAM	12	0	21.73	21.50	21.87	23
10	16QAM	12	7	21.74	21.68	21.89	
10	16QAM	12	15	21.67	21.62	21.88	
10	16QAM	27	0	20.71	20.68	20.79	22
Channel				20425	20525	20625	Tune-up limit (dBm)
Frequency (MHz)				826.5	836.5	846.5	
5	QPSK	1	0	22.78	22.57	22.81	24
5	QPSK	1	12	22.60	22.64	22.73	
5	QPSK	1	24	22.71	22.63	22.81	
5	QPSK	12	0	21.81	21.61	21.74	23
5	QPSK	12	7	21.77	21.64	21.79	
5	QPSK	12	13	21.81	21.61	21.75	
5	QPSK	25	0	21.85	21.63	21.70	
5	16QAM	1	0	21.99	21.88	22.33	23
5	16QAM	1	12	22.15	22.25	22.08	
5	16QAM	1	24	21.78	21.88	21.98	
5	16QAM	12	0	20.81	20.57	20.71	22
5	16QAM	12	7	20.72	20.57	20.79	
5	16QAM	12	13	20.74	20.67	20.70	
5	16QAM	25	0	20.78	20.57	20.84	
Channel				20415	20525	20635	Tune-up limit (dBm)
Frequency (MHz)				825.5	836.5	847.5	
3	QPSK	1	0	22.88	22.61	23.00	24
3	QPSK	1	8	22.93	22.58	22.77	
3	QPSK	1	14	22.68	22.57	22.74	
3	QPSK	8	0	21.69	21.63	21.74	23
3	QPSK	8	4	21.70	21.61	21.76	
3	QPSK	8	7	21.63	21.53	21.67	
3	QPSK	15	0	21.79	21.58	21.77	
3	16QAM	1	0	21.65	21.71	22.18	23
3	16QAM	1	8	22.51	21.76	22.09	
3	16QAM	1	14	21.90	22.17	21.66	
3	16QAM	8	0	20.80	20.66	20.79	22
3	16QAM	8	4	20.91	20.81	20.70	
3	16QAM	8	7	20.76	20.80	20.91	
3	16QAM	15	0	20.77	20.64	20.92	
Channel				20407	20525	20643	Tune-up limit (dBm)
Frequency (MHz)				824.7	836.5	848.3	
1.4	QPSK	1	0	22.69	22.73	22.72	24
1.4	QPSK	1	3	22.74	22.54	22.60	
1.4	QPSK	1	5	22.59	22.55	22.64	
1.4	QPSK	3	0	22.80	22.61	22.67	
1.4	QPSK	3	1	22.72	22.62	22.70	
1.4	QPSK	3	3	22.64	22.76	22.60	
1.4	QPSK	6	0	21.75	21.60	21.66	23
1.4	16QAM	1	0	22.41	21.71	22.04	23
1.4	16QAM	1	3	22.36	22.09	22.41	
1.4	16QAM	1	5	22.06	21.82	21.84	
1.4	16QAM	3	0	21.65	21.66	21.87	

1.4	16QAM	3	1	21.76	21.54	21.91	
1.4	16QAM	3	3	21.70	21.75	21.55	
1.4	16QAM	6	0	20.77	20.59	20.73	22

<LTE Band 7_Ant 0>							
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				20850	21100	21350	
Frequency (MHz)				2510	2535	2560	
20	QPSK	1	0	22.79	22.87	22.66	23.5
20	QPSK	1	49	22.53	22.61	22.40	
20	QPSK	1	99	22.52	22.60	22.39	
20	QPSK	50	0	21.94	22.02	21.81	22.5
20	QPSK	50	24	22.04	22.12	21.91	
20	QPSK	50	50	21.92	22.00	21.79	
20	QPSK	100	0	21.87	21.95	21.74	
20	16QAM	1	0	22.27	22.35	22.14	22.5
20	16QAM	1	13	22.18	22.26	22.05	
20	16QAM	1	26	21.99	22.07	21.86	
20	16QAM	12	0	21.75	21.83	21.62	22.5
20	16QAM	12	7	22.08	22.16	21.95	
20	16QAM	12	15	21.92	22.00	21.79	
20	16QAM	27	0	21.00	21.03	21.01	22
Channel				20825	21100	21375	Tune-up limit (dBm)
Frequency (MHz)				2507.5	2535	2562.5	
15	QPSK	1	0	22.78	22.86	22.63	23.5
15	QPSK	1	37	22.46	22.57	22.31	
15	QPSK	1	74	22.52	22.60	22.33	
15	QPSK	36	0	21.84	21.93	21.71	22.5
15	QPSK	36	20	21.94	22.03	21.83	
15	QPSK	36	39	21.82	21.92	21.73	
15	QPSK	75	0	21.78	21.95	21.70	
15	16QAM	1	0	22.23	22.27	22.07	22.5
15	16QAM	1	13	22.14	22.17	22.03	
15	16QAM	1	26	21.91	21.97	21.81	
15	16QAM	12	0	21.69	21.80	21.58	22.5
15	16QAM	12	7	21.99	22.15	21.90	
15	16QAM	12	15	21.87	21.93	21.71	
15	16QAM	27	0	21.04	21.09	21.01	22
Channel				20800	21100	21400	Tune-up limit (dBm)
Frequency (MHz)				2505	2535	2565	
10	QPSK	1	0	22.77	22.82	22.61	23.5
10	QPSK	1	25	22.44	22.52	22.36	
10	QPSK	1	49	22.46	22.54	22.39	
10	QPSK	25	0	21.86	22.02	21.74	22.5
10	QPSK	25	12	21.94	22.03	21.86	
10	QPSK	25	25	21.87	21.99	21.72	
10	QPSK	50	0	21.80	21.85	21.74	
10	16QAM	1	0	22.23	22.25	22.07	22.5
10	16QAM	1	13	22.13	22.25	21.97	
10	16QAM	1	26	21.98	21.97	21.83	
10	16QAM	12	0	21.74	21.81	21.59	22.5
10	16QAM	12	7	22.02	22.11	21.94	
10	16QAM	12	15	21.86	21.90	21.69	
10	16QAM	27	0	21.04	21.00	21.01	22

Channel				20775	21100	21425	Tune-up limit (dBm)
Frequency (MHz)				2502.5	2535	2567.5	
5	QPSK	1	0	22.76	22.78	22.62	23.5
5	QPSK	1	12	22.45	22.60	22.38	
5	QPSK	1	24	22.49	22.55	22.38	
5	QPSK	12	0	21.84	21.94	21.73	22.5
5	QPSK	12	7	21.97	22.05	21.81	
5	QPSK	12	13	21.82	21.94	21.69	
5	QPSK	25	0	21.87	21.85	21.73	
5	16QAM	1	0	22.18	22.35	22.07	22.5
5	16QAM	1	12	22.13	22.24	21.98	
5	16QAM	1	24	21.96	22.01	21.82	
5	16QAM	12	0	21.66	21.81	21.56	22
5	16QAM	12	7	22.00	22.14	21.94	
5	16QAM	12	13	21.86	21.99	21.77	
5	16QAM	25	0	21.08	21.13	21.02	

<LTE Band 12_Ant 1>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				23060	23095	23130	
Frequency (MHz)				704	707.5	711	
10	QPSK	1	0	22.60	23.33	23.32	24
10	QPSK	1	25	23.05	22.95	23.00	
10	QPSK	1	49	23.07	22.82	22.59	
10	QPSK	25	0	22.08	22.09	22.05	23
10	QPSK	25	12	21.97	22.04	22.05	
10	QPSK	25	25	22.07	21.95	21.59	
10	QPSK	50	0	22.19	21.96	22.09	
10	16QAM	1	0	22.10	22.27	22.36	23
10	16QAM	1	13	22.89	22.44	22.49	
10	16QAM	1	26	22.62	21.99	22.30	
10	16QAM	12	0	21.83	22.29	22.06	23
10	16QAM	12	7	22.50	22.03	22.13	
10	16QAM	12	15	22.03	22.03	22.00	
10	16QAM	27	0	21.30	21.05	21.05	22
Channel				23035	23095	23155	Tune-up limit (dBm)
Frequency (MHz)				701.5	707.5	713.5	
5	QPSK	1	0	22.76	22.96	22.85	24
5	QPSK	1	12	23.31	22.99	22.53	
5	QPSK	1	24	23.08	22.85	22.96	
5	QPSK	12	0	21.91	21.99	21.95	23
5	QPSK	12	7	22.05	22.01	22.26	
5	QPSK	12	13	22.01	22.06	22.27	
5	QPSK	25	0	22.01	21.89	22.22	
5	16QAM	1	0	21.54	22.13	22.75	23
5	16QAM	1	12	22.49	22.20	21.70	
5	16QAM	1	24	22.35	22.08	22.34	
5	16QAM	12	0	21.33	20.88	20.60	22
5	16QAM	12	7	21.04	21.02	21.23	
5	16QAM	12	13	21.11	21.02	21.27	
5	16QAM	25	0	21.05	20.95	21.28	
Channel				23025	23095	23165	Tune-up limit (dBm)
Frequency (MHz)				700.5	707.5	714.5	
3	QPSK	1	0	22.73	23.25	22.54	24
3	QPSK	1	8	22.95	23.06	22.60	

3	QPSK	1	14	23.21	22.95	22.92	
3	QPSK	8	0	21.66	22.10	21.94	23
3	QPSK	8	4	21.64	21.95	21.94	
3	QPSK	8	7	22.02	21.93	22.19	
3	QPSK	15	0	21.68	22.02	21.86	
3	16QAM	1	0	21.67	22.43	21.61	23
3	16QAM	1	8	22.31	22.74	21.72	
3	16QAM	1	14	22.10	22.23	21.92	
3	16QAM	8	0	21.33	21.06	21.44	22
3	16QAM	8	4	20.86	21.09	21.10	
3	16QAM	8	7	21.04	21.05	21.25	
3	16QAM	15	0	21.35	20.95	20.91	
Channel				23017	23095	23173	Tune-up limit (dBm)
Frequency (MHz)				699.7	707.5	715.3	
1.4	QPSK	1	0	22.64	23.06	22.62	24
1.4	QPSK	1	3	22.77	22.86	22.79	
1.4	QPSK	1	5	22.76	22.88	22.92	
1.4	QPSK	3	0	22.57	22.93	22.52	
1.4	QPSK	3	1	22.64	23.07	22.65	
1.4	QPSK	3	3	22.62	23.12	22.76	
1.4	QPSK	6	0	22.26	21.97	21.44	23
1.4	16QAM	1	0	21.92	22.80	21.68	23
1.4	16QAM	1	3	22.21	22.68	22.26	
1.4	16QAM	1	5	21.62	22.36	22.31	
1.4	16QAM	3	0	21.57	21.83	21.63	
1.4	16QAM	3	1	21.71	22.08	21.69	
1.4	16QAM	3	3	21.51	22.00	21.86	
1.4	16QAM	6	0	21.48	20.91	20.75	22

<LTE Band 13_Ant 1>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel					23230		
Frequency (MHz)					782		
10	QPSK	1	0		23.18		24
10	QPSK	1	25		23.11		
10	QPSK	1	49		23.15		
10	QPSK	25	0		22.20		23
10	QPSK	25	12		22.23		
10	QPSK	25	25		22.01		
10	QPSK	50	0		22.14		
10	16QAM	1	0		22.33		23
10	16QAM	1	13		22.37		
10	16QAM	1	26		22.41		
10	16QAM	12	0		22.10		23
10	16QAM	12	7		22.19		
10	16QAM	12	15		22.17		
10	16QAM	27	0		21.11		22
Channel				23205	23230	23255	Tune-up limit (dBm)
Frequency (MHz)				779.5	782	784.5	
5	QPSK	1	0	23.14	23.10	23.16	24
5	QPSK	1	12	23.03	23.08	23.04	
5	QPSK	1	24	23.12	23.11	23.11	
5	QPSK	12	0	22.18	22.11	22.17	23
5	QPSK	12	7	22.13	22.20	22.13	
5	QPSK	12	13	22.00	21.91	21.97	

5	QPSK	25	0	22.13	22.12	22.04	
5	16QAM	1	0	22.30	22.23	22.23	23
5	16QAM	1	12	22.36	22.29	22.37	
5	16QAM	1	24	22.38	22.31	22.38	
5	16QAM	12	0	22.02	22.07	22.02	22
5	16QAM	12	7	22.09	22.16	22.16	
5	16QAM	12	13	22.10	22.16	22.14	
5	16QAM	25	0	21.04	21.08	21.10	

<LTE Band 17_Ant 1>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				23780	23790	23800	
Frequency (MHz)				709	710	711	
10	QPSK	1	0	23.48	23.54	23.53	24
10	QPSK	1	25	23.20	23.25	23.26	
10	QPSK	1	49	23.45	23.50	23.51	
10	QPSK	25	0	22.36	22.43	22.42	23
10	QPSK	25	12	22.33	22.38	22.39	
10	QPSK	25	25	22.38	22.42	22.41	
10	QPSK	50	0	22.40	22.45	22.46	
10	16QAM	1	0	22.75	22.80	22.81	23
10	16QAM	1	13	22.69	22.74	22.75	
10	16QAM	1	26	22.62	22.67	22.68	
10	16QAM	12	0	22.37	22.42	22.43	23
10	16QAM	12	7	22.31	22.36	22.37	
10	16QAM	12	15	22.31	22.36	22.37	
10	16QAM	27	0	21.38	21.43	21.44	22
Channel				23755	23790	23825	Tune-up limit (dBm)
Frequency (MHz)				706.5	710	713.5	
5	QPSK	1	0	23.48	23.46	23.48	24
5	QPSK	1	12	23.17	23.15	23.23	
5	QPSK	1	24	23.45	23.48	23.46	
5	QPSK	12	0	22.29	22.36	22.39	23
5	QPSK	12	7	22.32	22.32	22.35	
5	QPSK	12	13	22.33	22.36	22.41	
5	QPSK	25	0	22.39	22.44	22.36	
5	16QAM	1	0	22.73	22.80	22.81	23
5	16QAM	1	12	22.68	22.69	22.69	
5	16QAM	1	24	22.61	22.65	22.68	
5	16QAM	12	0	22.35	22.34	22.37	22
5	16QAM	12	7	22.24	22.30	22.27	
5	16QAM	12	13	22.22	22.31	22.27	
5	16QAM	25	0	21.33	21.37	21.36	

<LTE Band 25_Ant 0>							
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				26140	26340	26590	
Frequency (MHz)				1860	1880	1905	
20	QPSK	1	0	22.93	22.95	22.66	24
20	QPSK	1	49	22.78	22.80	22.51	
20	QPSK	1	99	22.50	22.52	22.23	
20	QPSK	50	0	21.94	21.96	21.67	23
20	QPSK	50	24	21.98	22.00	21.71	
20	QPSK	50	50	21.83	21.85	21.56	
20	QPSK	100	0	21.80	21.82	21.53	
20	16QAM	1	0	22.07	22.09	21.80	23
20	16QAM	1	13	22.23	22.25	21.96	
20	16QAM	1	26	22.28	22.30	22.01	
20	16QAM	12	0	21.90	21.92	21.63	23
20	16QAM	12	7	21.96	21.98	21.69	
20	16QAM	12	15	22.02	22.04	21.75	
20	16QAM	27	0	21.06	21.08	21.02	22
Channel				26115	26340	26615	Tune-up limit (dBm)
Frequency (MHz)				1857.5	1880	1907.5	
15	QPSK	1	0	22.83	22.92	22.66	24
15	QPSK	1	37	22.74	22.71	22.47	
15	QPSK	1	74	22.45	22.50	22.20	
15	QPSK	36	0	21.87	21.92	21.67	23
15	QPSK	36	20	21.90	21.93	21.62	
15	QPSK	36	39	21.78	21.81	21.53	
15	QPSK	75	0	21.73	21.74	21.51	
15	16QAM	1	0	22.02	22.09	21.71	23
15	16QAM	1	13	22.20	22.21	21.87	
15	16QAM	1	26	22.21	22.22	21.99	
15	16QAM	12	0	21.82	21.89	21.60	23
15	16QAM	12	7	21.87	21.98	21.60	
15	16QAM	12	15	21.97	21.99	21.74	
15	16QAM	27	0	21.04	21.01	21.02	22
Channel				26090	26340	26640	Tune-up limit (dBm)
Frequency (MHz)				1855	1880	1910	
10	QPSK	1	0	22.85	22.90	22.58	24
10	QPSK	1	25	22.71	22.71	22.47	
10	QPSK	1	49	22.49	22.46	22.15	
10	QPSK	25	0	21.85	21.94	21.64	23
10	QPSK	25	12	21.89	22.00	21.70	
10	QPSK	25	25	21.83	21.80	21.47	
10	QPSK	50	0	21.73	21.72	21.47	
10	16QAM	1	0	22.02	22.06	21.77	23
10	16QAM	1	13	22.18	22.23	21.86	
10	16QAM	1	26	22.28	22.20	21.98	
10	16QAM	12	0	21.88	21.92	21.57	23
10	16QAM	12	7	21.86	21.88	21.68	
10	16QAM	12	15	22.02	22.04	21.66	
10	16QAM	27	0	21.03	21.00	21.15	22
Channel				26065	26340	26665	Tune-up limit (dBm)
Frequency (MHz)				1852.5	1880	1912.5	
5	QPSK	1	0	22.87	22.87	22.59	24
5	QPSK	1	12	22.70	22.73	22.41	

5	QPSK	1	24	22.46	22.49	22.18	
5	QPSK	12	0	21.87	21.88	21.64	23
5	QPSK	12	7	21.96	21.91	21.62	
5	QPSK	12	13	21.81	21.80	21.53	
5	QPSK	25	0	21.77	21.82	21.49	
5	16QAM	1	0	22.00	22.08	21.72	23
5	16QAM	1	12	22.15	22.22	21.90	
5	16QAM	1	24	22.22	22.26	21.96	
5	16QAM	12	0	21.82	21.87	21.60	22
5	16QAM	12	7	21.89	21.97	21.64	
5	16QAM	12	13	21.96	21.97	21.71	
5	16QAM	25	0	21.01	21.04	21.09	
Channel				26055	26340	26675	Tune-up limit (dBm)
Frequency (MHz)				1851.5	1880	1913.5	
3	QPSK	1	0	22.84	22.94	22.61	24
3	QPSK	1	8	22.72	22.70	22.51	
3	QPSK	1	14	22.44	22.51	22.23	
3	QPSK	8	0	21.89	21.89	21.66	23
3	QPSK	8	4	21.98	21.91	21.61	
3	QPSK	8	7	21.78	21.78	21.54	
3	QPSK	15	0	21.79	21.74	21.43	
3	16QAM	1	0	22.02	22.09	21.75	23
3	16QAM	1	8	22.20	22.15	21.87	
3	16QAM	1	14	22.27	22.30	21.94	
3	16QAM	8	0	21.85	21.83	21.53	22
3	16QAM	8	4	21.91	21.95	21.62	
3	16QAM	8	7	21.97	21.98	21.71	
3	16QAM	15	0	21.00	21.00	21.06	
Channel				26047	26340	26683	Tune-up limit (dBm)
Frequency (MHz)				1850.7	1880	1914.3	
1.4	QPSK	1	0	22.84	22.92	22.61	24
1.4	QPSK	1	3	22.72	22.70	22.51	
1.4	QPSK	1	5	22.44	22.51	22.23	
1.4	QPSK	3	0	22.84	22.93	22.61	
1.4	QPSK	3	1	22.72	22.70	22.51	
1.4	QPSK	3	3	22.44	22.51	22.23	
1.4	QPSK	6	0	21.89	21.89	21.66	23
1.4	16QAM	1	0	22.02	22.09	21.75	23
1.4	16QAM	1	3	22.20	22.15	21.87	
1.4	16QAM	1	5	22.27	22.30	21.94	
1.4	16QAM	3	0	22.02	22.09	21.75	
1.4	16QAM	3	1	22.20	22.15	21.87	
1.4	16QAM	3	3	22.27	22.30	21.94	
1.4	16QAM	6	0	21.85	21.83	21.53	22

<LTE Band 26_Ant 1>							
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				26765	26865	26965	
Frequency (MHz)				821.5	831.5	841.5	
15	QPSK	1	0	22.70	22.71	22.65	24
15	QPSK	1	37	22.59	22.49	22.59	
15	QPSK	1	74	22.69	22.61	22.69	
15	QPSK	36	0	21.67	21.68	21.66	23
15	QPSK	36	20	21.65	21.57	21.55	
15	QPSK	36	39	21.66	21.56	21.56	
15	QPSK	75	0	21.72	21.57	21.63	
15	16QAM	1	0	22.00	22.32	21.64	23
15	16QAM	1	13	21.87	21.66	22.13	
15	16QAM	1	26	21.93	22.12	21.76	
15	16QAM	12	0	21.76	21.71	21.76	23
15	16QAM	12	7	21.71	21.58	21.69	
15	16QAM	12	15	21.50	21.51	21.57	
15	16QAM	27	0	20.50	20.59	20.64	22
Channel				26740	26865	26990	Tune-up limit (dBm)
Frequency (MHz)				819	831.5	844	
10	QPSK	1	0	22.48	22.53	22.47	24
10	QPSK	1	25	22.20	22.14	22.44	
10	QPSK	1	49	22.60	22.46	22.56	
10	QPSK	25	0	21.58	21.64	21.66	23
10	QPSK	25	12	21.29	21.40	21.49	
10	QPSK	25	25	21.23	21.18	21.14	
10	QPSK	50	0	21.36	21.46	21.53	
10	16QAM	1	0	21.97	21.69	21.76	23
10	16QAM	1	13	21.69	22.06	22.12	
10	16QAM	1	26	21.88	21.74	21.98	
10	16QAM	12	0	21.69	21.75	21.53	23
10	16QAM	12	7	21.38	21.66	21.54	
10	16QAM	12	15	21.69	21.74	21.79	
10	16QAM	27	0	20.68	20.63	20.67	22
Channel				26715	26865	27015	Tune-up limit (dBm)
Frequency (MHz)				816.5	831.5	846.5	
5	QPSK	1	0	22.47	22.67	22.66	24
5	QPSK	1	12	22.65	22.30	22.69	
5	QPSK	1	24	22.62	22.41	22.59	
5	QPSK	12	0	21.60	21.61	21.67	23
5	QPSK	12	7	21.80	21.61	21.58	
5	QPSK	12	13	21.76	21.53	21.55	
5	QPSK	25	0	21.62	21.58	21.56	
5	16QAM	1	0	22.11	21.53	21.77	23
5	16QAM	1	12	21.82	21.90	21.64	
5	16QAM	1	24	21.82	22.03	22.01	
5	16QAM	12	0	20.51	20.61	20.55	22
5	16QAM	12	7	20.65	20.46	20.62	
5	16QAM	12	13	20.77	20.59	20.51	
5	16QAM	25	0	20.58	20.65	20.62	
Channel				26705	26865	27025	Tune-up limit (dBm)
Frequency (MHz)				815.5	831.5	847.5	
3	QPSK	1	0	22.49	22.63	22.65	24
3	QPSK	1	8	22.61	22.51	22.38	

3	QPSK	1	14	22.52	22.51	22.28	
3	QPSK	8	0	21.66	21.60	21.58	23
3	QPSK	8	4	21.70	21.58	21.57	
3	QPSK	8	7	21.80	21.55	21.51	
3	QPSK	15	0	21.41	21.47	21.61	
3	16QAM	1	0	21.90	21.65	21.46	23
3	16QAM	1	8	22.06	21.88	21.38	
3	16QAM	1	14	22.04	22.10	21.48	
3	16QAM	8	0	20.52	20.73	20.55	22
3	16QAM	8	4	20.49	20.64	20.68	
3	16QAM	8	7	20.80	20.58	20.62	
3	16QAM	15	0	20.61	20.49	20.49	
Channel				26697	26865	27033	Tune-up limit (dBm)
Frequency (MHz)				814.7	831.5	848.3	
1.4	QPSK	1	0	22.54	22.46	22.52	24
1.4	QPSK	1	3	22.61	22.45	22.39	
1.4	QPSK	1	5	22.65	22.44	22.42	
1.4	QPSK	3	0	22.52	22.52	22.44	
1.4	QPSK	3	1	22.63	22.63	22.61	
1.4	QPSK	3	3	22.68	22.48	22.44	
1.4	QPSK	6	0	21.56	21.42	21.49	23
1.4	16QAM	1	0	22.07	21.71	22.17	23
1.4	16QAM	1	3	22.34	21.51	21.76	
1.4	16QAM	1	5	22.14	21.65	21.84	
1.4	16QAM	3	0	21.54	21.50	21.39	
1.4	16QAM	3	1	21.53	21.62	21.62	
1.4	16QAM	3	3	21.63	21.47	21.43	
1.4	16QAM	6	0	20.63	20.32	20.80	22

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BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				132072	132322	132572	
Frequency (MHz)				1720	1745	1770	
20	QPSK	1	0	22.92	23.43	22.88	24
20	QPSK	1	49	22.83	23.34	22.79	
20	QPSK	1	99	22.49	23.00	22.45	
20	QPSK	50	0	21.83	22.34	21.79	23
20	QPSK	50	24	21.96	22.47	21.92	
20	QPSK	50	50	21.80	22.31	21.76	
20	QPSK	100	0	21.76	22.27	21.72	
20	16QAM	1	0	21.91	22.42	21.87	23
20	16QAM	1	13	22.03	22.54	21.99	
20	16QAM	1	26	22.25	22.76	22.21	
20	16QAM	12	0	21.53	22.04	21.49	23
20	16QAM	12	7	21.60	22.11	21.56	
20	16QAM	12	15	21.84	22.35	21.80	
20	16QAM	27	0	21.10	21.19	21.15	22
Channel				132047	132322	132597	Tune-up limit (dBm)
Frequency (MHz)				1717.5	1745	1772.5	
15	QPSK	1	0	22.89	23.42	22.84	24
15	QPSK	1	37	22.73	23.24	22.69	
15	QPSK	1	74	22.45	22.99	22.42	
15	QPSK	36	0	21.78	22.30	21.77	23
15	QPSK	36	20	21.95	22.37	21.88	
15	QPSK	36	39	21.77	22.23	21.72	

15	QPSK	75	0	21.71	22.20	21.69	
15	16QAM	1	0	21.88	22.37	21.85	23
15	16QAM	1	13	22.00	22.51	21.91	
15	16QAM	1	26	22.23	22.74	22.11	
15	16QAM	12	0	21.47	22.04	21.45	23
15	16QAM	12	7	21.56	22.04	21.51	
15	16QAM	12	15	21.83	22.25	21.75	
15	16QAM	27	0	21.08	21.14	21.07	22
Channel				132022	132322	132622	Tune-up limit (dBm)
Frequency (MHz)				1715	1745	1775	
10	QPSK	1	0	22.90	23.40	22.88	24
10	QPSK	1	25	22.76	23.27	22.70	
10	QPSK	1	49	22.46	22.95	22.42	
10	QPSK	25	0	21.77	22.28	21.79	23
10	QPSK	25	12	21.93	22.41	21.89	
10	QPSK	25	25	21.76	22.24	21.76	
10	QPSK	50	0	21.75	22.26	21.69	
10	16QAM	1	0	21.82	22.42	21.85	23
10	16QAM	1	13	21.94	22.49	21.96	
10	16QAM	1	26	22.22	22.72	22.21	
10	16QAM	12	0	21.46	21.96	21.44	23
10	16QAM	12	7	21.53	22.04	21.54	
10	16QAM	12	15	21.84	22.33	21.74	
10	16QAM	27	0	21.06	21.15	21.07	22
Channel				131997	132322	132647	Tune-up limit (dBm)
Frequency (MHz)				1712.5	1745	1777.5	
5	QPSK	1	0	22.88	23.41	22.82	24
5	QPSK	1	12	22.75	23.27	22.77	
5	QPSK	1	24	22.40	22.91	22.43	
5	QPSK	12	0	21.73	22.24	21.74	23
5	QPSK	12	7	21.93	22.39	21.84	
5	QPSK	12	13	21.79	22.30	21.76	
5	QPSK	25	0	21.69	22.24	21.65	
5	16QAM	1	0	21.90	22.38	21.87	23
5	16QAM	1	12	22.02	22.44	21.91	
5	16QAM	1	24	22.18	22.71	22.17	
5	16QAM	12	0	21.49	21.98	21.39	22
5	16QAM	12	7	21.60	22.05	21.55	
5	16QAM	12	13	21.76	22.28	21.72	
5	16QAM	25	0	21.01	21.09	21.08	
Channel				131987	132322	132657	Tune-up limit (dBm)
Frequency (MHz)				1711.5	1745	1778.5	
3	QPSK	1	0	22.88	23.34	22.86	24
3	QPSK	1	8	22.83	23.24	22.72	
3	QPSK	1	14	22.46	22.99	22.38	
3	QPSK	8	0	21.79	22.27	21.73	23
3	QPSK	8	4	21.94	22.37	21.84	
3	QPSK	8	7	21.75	22.26	21.74	
3	QPSK	15	0	21.75	22.22	21.70	
3	16QAM	1	0	21.87	22.33	21.82	23
3	16QAM	1	8	21.96	22.46	21.89	
3	16QAM	1	14	22.19	22.66	22.16	
3	16QAM	8	0	21.53	21.97	21.42	22
3	16QAM	8	4	21.56	22.03	21.55	
3	16QAM	8	7	21.84	22.35	21.74	
3	16QAM	15	0	21.00	21.17	21.08	

Channel				131979	132322	132665	Tune-up limit (dBm)
Frequency (MHz)				1710.7	1745	1779.3	
1.4	QPSK	1	0	22.88	23.34	22.86	24
1.4	QPSK	1	3	22.83	23.24	22.72	
1.4	QPSK	1	5	22.46	22.99	22.38	
1.4	QPSK	3	0	22.88	23.34	22.86	
1.4	QPSK	3	1	22.83	23.24	22.72	
1.4	QPSK	3	3	22.46	22.99	22.38	
1.4	QPSK	6	0	21.79	22.27	21.73	23
1.4	16QAM	1	0	21.87	22.33	21.82	23
1.4	16QAM	1	3	21.96	22.46	21.89	
1.4	16QAM	1	5	22.19	22.66	22.16	
1.4	16QAM	3	0	21.87	22.33	21.82	
1.4	16QAM	3	1	21.96	22.46	21.89	
1.4	16QAM	3	3	22.19	22.66	22.16	
1.4	16QAM	6	0	21.53	21.97	21.42	22

<LTE Band 71_Ant 1>							
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				133222	133322	133372	
Frequency (MHz)				673	683	688	
20	QPSK	1	0	22.03	22.09	22.00	24
20	QPSK	1	49	23.18	22.68	22.93	
20	QPSK	1	99	22.39	22.65	22.21	
20	QPSK	50	0	21.55	21.47	21.33	23
20	QPSK	50	24	21.79	21.78	21.78	
20	QPSK	50	50	21.71	21.78	21.75	
20	QPSK	100	0	21.61	21.40	21.55	
20	16QAM	1	0	21.11	21.01	21.17	23
20	16QAM	1	13	21.50	21.07	21.41	
20	16QAM	1	26	21.74	21.33	21.84	
20	16QAM	12	0	21.05	21.01	21.00	23
20	16QAM	12	7	21.13	21.00	21.03	
20	16QAM	12	15	21.39	21.26	21.27	
20	16QAM	27	0	20.09	20.10	20.04	22
Channel				133197	133297	133397	Tune-up limit (dBm)
Frequency (MHz)				670.5	680.5	690.5	
15	QPSK	1	0	22.60	22.47	22.25	24
15	QPSK	1	37	23.01	22.51	22.60	
15	QPSK	1	74	22.60	22.64	22.68	
15	QPSK	36	0	21.81	21.54	21.74	23
15	QPSK	36	20	22.04	21.75	21.83	
15	QPSK	36	39	21.80	21.73	21.74	
15	QPSK	75	0	21.92	21.64	21.73	
15	16QAM	1	0	21.93	21.61	21.91	23
15	16QAM	1	13	21.79	21.56	21.87	
15	16QAM	1	26	21.91	22.25	22.21	
15	16QAM	12	0	21.67	21.54	21.56	23
15	16QAM	12	7	21.66	21.37	21.51	
15	16QAM	12	15	21.82	21.66	21.78	
15	16QAM	27	0	20.70	20.44	20.56	22
Channel				133172	133272	133422	Tune-up limit (dBm)
Frequency (MHz)				668	678	693	
10	QPSK	1	0	22.01	22.00	22.03	24
10	QPSK	1	25	22.84	22.70	22.98	

10	QPSK	1	49	23.12	23.16	22.76	
10	QPSK	25	0	21.99	21.62	21.62	23
10	QPSK	25	12	22.12	21.89	21.91	
10	QPSK	25	25	22.01	21.95	21.89	
10	QPSK	50	0	22.08	21.83	21.84	
10	16QAM	1	0	21.35	21.08	21.04	23
10	16QAM	1	12	22.53	21.88	22.11	
10	16QAM	1	24	22.17	22.13	22.05	
10	16QAM	12	0	21.53	21.49	21.46	23
10	16QAM	12	7	22.00	22.12	21.77	
10	16QAM	12	13	22.06	21.91	21.86	
10	16QAM	25	0	20.95	20.74	20.55	22
Channel				133147	133247	133447	Tune-up limit (dBm)
Frequency (MHz)				665.5	675.5	695.5	
5	QPSK	1	0	23.08	22.95	23.00	24
5	QPSK	1	12	23.14	22.95	22.77	
5	QPSK	1	24	23.13	22.68	22.74	
5	QPSK	12	0	22.09	21.88	21.79	23
5	QPSK	12	7	22.20	21.81	21.83	
5	QPSK	12	13	22.09	21.84	21.84	
5	QPSK	25	0	22.34	21.93	21.86	
5	16QAM	1	0	22.30	21.94	22.32	23
5	16QAM	1	12	22.52	22.12	22.45	
5	16QAM	1	24	22.89	22.04	22.06	
5	16QAM	12	0	21.16	20.84	20.73	22
5	16QAM	12	7	21.12	20.85	20.93	
5	16QAM	12	13	21.16	20.70	20.85	
5	16QAM	25	0	21.12	20.84	20.92	

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

General Note:

1. The maximum output power specified for production units are determined for all applicable 802.11 transmission modes in each standalone and aggregated frequency band. Maximum output power is measured for the highest maximum output power configuration(s) in each frequency band according to the default power measurement procedures. For “Not required”, SAR Test reduction was applied from KDB 248227 guidance, Sec. 2.1, b), 1) when the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, additional output power measurements were not necessary.
2. 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.
3. 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).
4. 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.
5. 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.
6. 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), and the SU maximum power also higher than RU (OFDMA)
7. In applying the test guidance, the IEEE 802.11 mode with the maximum output power (out of all modes) should be considered for testing
8. 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
9. 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>						
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	18.20	18.50	98.63
		6	2437	18.30	18.50	
		11	2462	18.40	18.50	
	802.11g 6Mbps	1	2412	18.40	18.50	90.40
		6	2437	18.20	18.50	
		11	2462	17.10	18.50	
	802.11n-HT20 MCS0	1	2412	17.80	18.50	89.78
		6	2437	18.20	18.50	
		11	2462	16.40	16.50	
	802.11ax-HE20 MCS0	1	2412	17.40	18.50	97.13
		6	2437	18.20	18.50	
		11	2462	15.90	16.50	

<5.2GHz WLAN>						
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11a 6Mbps	36	5180	16.90	17.50	90.51
		40	5200	17.10	17.50	
		44	5220	17.30	17.50	
		48	5240	17.20	17.50	
	802.11n-HT20 MCS0	36	5180	17.30	17.50	89.86
		40	5200	17.30	17.50	
		44	5220	17.30	17.50	
		48	5240	17.30	17.50	
	802.11n-HT40 MCS0	38	5190	12.70	13.50	90.07
		46	5230	16.40	16.50	
	802.11ac-VHT20 MCS0	36	5180	17.30	17.50	90.00
		40	5200	17.20	17.50	
		44	5220	17.20	17.50	
		48	5240	17.20	17.50	
	802.11ac-VHT40 MCS0	38	5190	15.10	16.50	89.51
		46	5230	16.40	16.50	
	802.11ac-VHT80 MCS0	42	5210	14.70	15.00	90.45
	802.11ax-HE20 MCS0	36	5180	17.10	17.50	87.39
		40	5200	17.10	17.50	
		44	5220	17.30	17.50	
		48	5240	17.30	17.50	
	802.11ax-HE40 MCS0	38	5190	14.80	16.50	87.18
		46	5230	16.40	16.50	
	802.11ax-HE80 MCS0	42	5210	14.90	15.50	88.72

<5.3GHz WLAN>						
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN	802.11a 6Mbps	52	5260	17.20	17.50	90.51
		56	5280	17.30	17.50	
		60	5300	17.20	17.50	
		64	5320	17.40	17.50	
	802.11n-HT20 MCS0	52	5260	17.40	17.50	89.86
		56	5280	17.40	17.50	
		60	5300	17.30	17.50	
		64	5320	17.40	17.50	
	802.11n-HT40 MCS0	54	5270	16.40	16.50	90.07
		62	5310	16.40	16.50	
	802.11ac-VHT20 MCS0	52	5260	17.20	17.50	90.00
		56	5280	17.30	17.50	
		60	5300	17.30	17.50	
		64	5320	17.40	17.50	
	802.11ac-VHT40 MCS0	54	5270	16.40	16.50	89.51
		62	5310	16.40	16.50	
	802.11ac-VHT80 MCS0	58	5290	15.40	15.50	90.45
	802.11ax-HE20 MCS0	52	5260	17.20	17.50	87.39
		56	5280	17.20	17.50	
		60	5300	17.20	17.50	
		64	5320	17.40	17.50	
	802.11ax-HE40 MCS0	54	5270	16.40	16.50	87.18
		62	5310	15.90	16.50	
	802.11ax-HE80 MCS0	58	5290	15.50	15.50	88.72

<5.5GHz WLAN>						
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN	802.11a 6Mbps	100	5500	17.40	17.50	90.51
		116	5580	17.30	17.50	
		124	5620	17.20	17.50	
		132	5660	17.20	17.50	
		144	5720	17.40	17.50	
	802.11n-HT20 MCS0	100	5500	17.40	17.50	89.86
		116	5580	17.40	17.50	
		124	5620	17.10	17.50	
		132	5660	17.20	17.50	
		144	5720	17.40	17.50	
	802.11n-HT40 MCS0	102	5510	16.40	16.50	90.07
		110	5550	16.40	16.50	
		126	5630	16.40	16.50	
		134	5670	16.40	16.50	
		142	5710	16.40	16.50	
	802.11ac-VHT20 MCS0	100	5500	17.40	17.50	90.00
		116	5580	17.40	17.50	
		124	5620	17.20	17.50	
		132	5660	17.20	17.50	
		144	5720	17.40	17.50	
	802.11ac-VHT40 MCS0	102	5510	16.40	16.50	89.51
		110	5550	16.40	16.50	
		126	5630	16.30	16.50	

		134	5670	16.30	16.50	
		142	5710	16.40	16.50	
	802.11ac-VHT80 MCS0	106	5530	15.10	15.50	90.45
		122	5610	15.40	15.50	
		138	5690	15.10	15.50	
	802.11ax-HE20 MCS0	100	5500	17.40	17.50	87.39
		116	5580	17.40	17.50	
		124	5620	17.20	17.50	
		132	5660	17.20	17.50	
		144	5720	17.10	17.50	
	802.11ax-HE40 MCS0	102	5510	16.30	16.50	87.18
		110	5550	16.40	16.50	
		126	5630	16.20	16.50	
		134	5670	16.20	16.50	
		142	5710	16.40	16.50	
	802.11ax-HE80 MCS0	106	5530	15.30	15.50	88.72
		122	5610	15.40	15.50	
		138	5690	15.10	15.50	

<5.8GHz WLAN>

Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN					
802.11a 6Mbps	149	5745	17.10	17.50	90.51
	157	5785	17.10	17.50	
	165	5825	17.40	17.50	
802.11n-HT20 MCS0	149	5745	17.10	17.50	89.86
	157	5785	17.20	17.50	
	165	5825	17.40	17.50	
802.11n-HT40 MCS0	151	5755	16.40	16.50	90.07
	159	5795	16.30	16.50	
802.11ac-VHT20 MCS0	149	5745	17.40	17.50	90.00
	157	5785	17.20	17.50	
	165	5825	17.40	17.50	
802.11ac-VHT40 MCS0	151	5755	16.20	16.50	89.51
	159	5795	16.30	16.50	
802.11ac-VHT80 MCS0	155	5775	15.30	15.50	90.45
802.11ax-HE20 MCS0	149	5745	17.40	17.50	87.39
	157	5785	17.30	17.50	
	165	5825	17.40	17.50	
802.11ax-HE40 MCS0	151	5755	16.20	16.50	87.18
	159	5795	16.30	16.50	
802.11ax-HE80 MCS0	155	5775	15.30	15.50	88.72

<5.9GHz WLAN UNII 4>

Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.9GHz WLAN UNII 4					
802.11a 6Mbps	169	5845	17.30	17.50	90.51
	173	5865	17.40	17.50	
	177	5885	17.30	17.50	
802.11n-HT20 MCS0	169	5845	17.20	17.50	89.86
	173	5865	17.40	17.50	
	177	5885	17.20	17.50	
802.11n-HT40 MCS0	167	5835	16.10	16.50	90.07
	175	5875	16.10	16.50	

	802.11ac-VHT20 MCS0	169	5845	17.30	17.50	90.00
		173	5865	17.30	17.50	
		177	5885	17.20	17.50	
	802.11ac-VHT40 MCS0	167	5835	16.10	16.50	89.51
		175	5875	16.10	16.50	
	802.11ac-VHT80 MCS0	171	5855	15.10	15.50	90.45
	802.11ax-HE20 MCS0	169	5845	17.30	17.50	87.39
		173	5865	17.30	17.50	
		177	5885	17.20	17.50	
	802.11ax-HE40 MCS0	167	5835	16.10	16.50	87.18
		175	5875	16.10	16.50	
	802.11ax-HE80 MCS0	171	5855	15.10	15.50	88.72

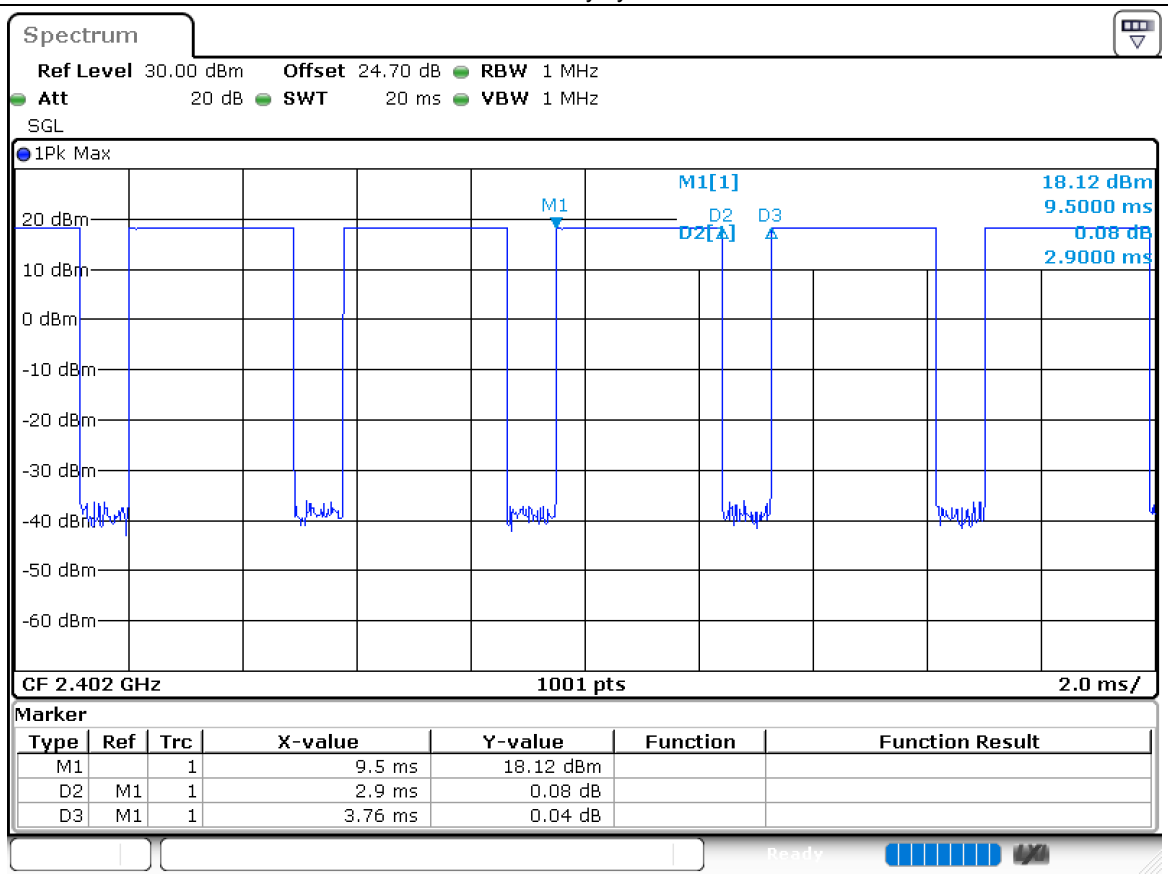
<2.4GHz Bluetooth>

Bluetooth	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	BR / EDR 1Mbps	0	2402	19.10	20.00	77.13
		39	2441	19.71	20.00	
		78	2480	19.83	20.00	
	BR / EDR 2Mbps	0	2402	16.88	17.00	77.13
		39	2441	16.91	17.00	
		78	2480	16.97	17.00	
	BR / EDR 3Mbps	0	2402	16.84	17.00	77.13
		39	2441	16.89	17.00	
		78	2480	16.93	17.00	
	LE 1Mbps	0	2402	18.60	20.00	60.00
		19	2440	18.90	20.00	
		39	2480	19.10	20.00	
	LE 2Mbps	0	2402	19.00	20.00	57.02
		19	2440	18.60	20.00	
		39	2480	19.40	20.00	
	BLE GFSK 1Mbps	2	2404	18.40	20.00	15.97
		38	2440	18.20	20.00	
		76	2478	18.70	20.00	
	BLE GFSK 2Mbps	2	2404	18.50	20.00	11.11
		38	2440	18.30	20.00	
		76	2478	18.80	20.00	
	BLE ASK 1Mbps	2	2404	19.15	20.00	15.83
		38	2440	18.97	20.00	
		76	2478	19.46	20.00	

General Note:

1. For 2.4GHz Bluetooth SAR testing was selected BR/EDR 1Mbps due to its highest average power and duty cycle is 77.13% considered in SAR testing, and the duty cycle would be scaled to theoretical 83.3% in reported SAR calculation.

BT Duty cycle



12. 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
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.

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/B17/B26/B71 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
7. LTE band 2/4/5/17 SAR test was covered by Band 25/66/26/12; according to TCB workshop, SAR test for overlapping LTE bands can be reduced if
   a. The maximum output power, including tolerance, for the smaller band is ≤ the larger band to qualify for the SAR test exclusion.
   b. The channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band.

WLAN Note:

1. Per KDB 248227 D01v02r02, for 2.4GHz 802.11g/n SAR testing is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.
2. Per KDB 248227 D01v02r02, WLAN5.2GHz SAR testing is not required when the WLAN5.3GHz band highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for WLAN5.2GHz band.
3. When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is ≤ 0.8 W/kg or all required test position are tested.
4. For all positions / configurations, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions / configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.
5. During SAR testing the WLAN transmission was verified using a spectrum analyzer.

12.1 Next to mouth SAR

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Strap	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_Ant 0	RMC 12.2Kbps	Front	10mm	Strap 1	9538	1907.6	23.23	24.00	1.194	0.08	0.060	0.072
01	WCDMA II_Ant 0	RMC 12.2Kbps	Front	10mm	Strap 2	9538	1907.6	23.23	24.00	1.194	-0.17	0.100	0.119
	WCDMA II_Ant 0	RMC 12.2Kbps	Front	10mm	Strap 3	9538	1907.6	23.23	24.00	1.194	0.01	0.071	0.085
	WCDMA IV_Ant 0	RMC 12.2Kbps	Front	10mm	Strap 1	1413	1732.6	23.57	24.00	1.104	0.08	0.096	0.106
02	WCDMA IV_Ant 0	RMC 12.2Kbps	Front	10mm	Strap 2	1413	1732.6	23.57	24.00	1.104	-0.03	0.147	0.162
	WCDMA IV_Ant 0	RMC 12.2Kbps	Front	10mm	Strap 3	1413	1732.6	23.57	24.00	1.104	0.01	0.088	0.097
03	WCDMA V_Ant 1	RMC 12.2Kbps	Front	10mm	Strap 1	4182	836.4	23.79	24.00	1.050	0	< 0.001	< 0.001
	WCDMA V_Ant 1	RMC 12.2Kbps	Front	10mm	Strap 2	4182	836.4	23.79	24.00	1.050	0	< 0.001	< 0.001
	WCDMA V_Ant 1	RMC 12.2Kbps	Front	10mm	Strap 3	4182	836.4	23.79	24.00	1.050	0	< 0.001	< 0.001

<LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Strap	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)
04	LTE Band 7_Ant 0	20M	QPSK	1	0	Front	10mm	Strap 1	21100	2535	22.87	23.50	1.156	0.08	0.240	0.277
	LTE Band 7_Ant 0	20M	QPSK	1	0	Front	10mm	Strap 1	20850	2510	22.79	23.50	1.178	0.08	0.227	0.267
	LTE Band 7_Ant 0	20M	QPSK	1	0	Front	10mm	Strap 1	21350	2560	22.66	23.50	1.213	0.01	0.227	0.275
	LTE Band 7_Ant 0	20M	QPSK	50	24	Front	10mm	Strap 1	21100	2535	22.12	22.50	1.091	0.03	0.194	0.212
	LTE Band 7_Ant 0	20M	QPSK	1	0	Front	10mm	Strap 2	21100	2535	22.87	23.50	1.156	-0.08	0.141	0.163
	LTE Band 7_Ant 0	20M	QPSK	1	0	Front	10mm	Strap 2	20850	2510	22.79	23.50	1.178	-0.08	0.134	0.158
	LTE Band 7_Ant 0	20M	QPSK	1	0	Front	10mm	Strap 2	21350	2560	22.66	23.50	1.213	0.1	0.135	0.164
	LTE Band 7_Ant 0	20M	QPSK	50	24	Front	10mm	Strap 2	21100	2535	22.12	22.50	1.091	-0.18	0.114	0.124
	LTE Band 7_Ant 0	20M	QPSK	1	0	Front	10mm	Strap 3	21100	2535	22.87	23.50	1.156	0.1	0.157	0.182
	LTE Band 7_Ant 0	20M	QPSK	1	0	Front	10mm	Strap 3	20850	2510	22.79	23.50	1.178	0.12	0.149	0.175
	LTE Band 7_Ant 0	20M	QPSK	1	0	Front	10mm	Strap 3	21350	2560	22.66	23.50	1.213	0.08	0.147	0.178
	LTE Band 7_Ant 0	20M	QPSK	50	24	Front	10mm	Strap 3	21100	2535	22.12	22.50	1.091	-0.17	0.140	0.153
	LTE Band 7_Ant 0	20M	QPSK	1	0	Front	10mm	Strap 4	21100	2535	22.87	23.50	1.156	-0.03	0.176	0.203
	LTE Band 7_Ant 0	20M	QPSK	1	0	Front	10mm	Strap 5	21100	2535	22.87	23.50	1.156	0.14	0.168	0.194
	LTE Band 7_Ant 0	20M	QPSK	1	0	Front	10mm	Strap 6	21100	2535	22.87	23.50	1.156	0.11	0.134	0.155
	LTE Band 7_Ant 0	20M	QPSK	1	0	Front	10mm	Strap 7	21100	2535	22.87	23.50	1.156	-0.05	0.161	0.186
	LTE Band 7_Ant 0	20M	QPSK	1	0	Front	10mm	Strap 8	21100	2535	22.87	23.50	1.156	0.18	0.163	0.188
05	LTE Band 12_Ant 1	10M	QPSK	1	0	Front	10mm	Strap 1	23095	707.5	23.33	24.00	1.167	0	< 0.001	< 0.001
	LTE Band 12_Ant 1	10M	QPSK	25	0	Front	10mm	Strap 1	23095	707.5	22.09	23.00	1.233	0	< 0.001	< 0.001
	LTE Band 12_Ant 1	10M	QPSK	1	0	Front	10mm	Strap 2	23095	707.5	23.33	24.00	1.167	0	< 0.001	< 0.001
	LTE Band 12_Ant 1	10M	QPSK	25	0	Front	10mm	Strap 2	23095	707.5	22.09	23.00	1.233	0	< 0.001	< 0.001
	LTE Band 12_Ant 1	10M	QPSK	1	0	Front	10mm	Strap 3	23095	707.5	23.33	24.00	1.167	0	< 0.001	< 0.001
	LTE Band 12_Ant 1	10M	QPSK	25	0	Front	10mm	Strap 3	23095	707.5	22.09	23.00	1.233	0	< 0.001	< 0.001
06	LTE Band 13_Ant 1	10M	QPSK	1	0	Front	10mm	Strap 1	23230	782	23.18	24.00	1.208	0	< 0.001	< 0.001
	LTE Band 13_Ant 1	10M	QPSK	25	12	Front	10mm	Strap 1	23230	782	22.23	23.00	1.194	0	< 0.001	< 0.001
	LTE Band 13_Ant 1	10M	QPSK	1	0	Front	10mm	Strap 2	23230	782	23.18	24.00	1.208	0	< 0.001	< 0.001
	LTE Band 13_Ant 1	10M	QPSK	25	12	Front	10mm	Strap 2	23230	782	22.23	23.00	1.194	0	< 0.001	< 0.001
	LTE Band 13_Ant 1	10M	QPSK	1	0	Front	10mm	Strap 3	23230	782	23.18	24.00	1.208	0	< 0.001	< 0.001
	LTE Band 13_Ant 1	10M	QPSK	25	12	Front	10mm	Strap 3	23230	782	22.23	23.00	1.194	0	< 0.001	< 0.001
	LTE Band 25_Ant 0	20M	QPSK	1	0	Front	10mm	Strap 1	26340	1880	22.95	24.00	1.274	-0.17	0.096	0.122
	LTE Band 25_Ant 0	20M	QPSK	50	24	Front	10mm	Strap 1	26340	1880	22.00	23.00	1.259	0.17	0.078	0.098
07	LTE Band 25_Ant 0	20M	QPSK	1	0	Front	10mm	Strap 2	26340	1880	22.95	24.00	1.274	-0.07	0.112	0.143
	LTE Band 25_Ant 0	20M	QPSK	50	24	Front	10mm	Strap 2	26340	1880	22.00	23.00	1.259	-0.05	0.091	0.115
	LTE Band 25_Ant 0	20M	QPSK	1	0	Front	10mm	Strap 3	26340	1880	22.95	24.00	1.274	0.01	0.053	0.067
	LTE Band 25_Ant 0	20M	QPSK	50	24	Front	10mm	Strap 3	26340	1880	22.00	23.00	1.259	0.1	0.043	0.054
08	LTE Band 26_Ant 1	15M	QPSK	1	0	Front	10mm	Strap 1	26865	831.5	22.71	24.00	1.346	0	< 0.001	< 0.001
	LTE Band 26_Ant 1	15M	QPSK	36	0	Front	10mm	Strap 1	26865	831.5	21.68	23.00	1.355	0	< 0.001	< 0.001
	LTE Band 26_Ant 1	15M	QPSK	1	0	Front	10mm	Strap 2	26865	831.5	22.71	24.00	1.346	0	< 0.001	< 0.001
	LTE Band 26_Ant 1	15M	QPSK	36	0	Front	10mm	Strap 2	26865	831.5	21.68	23.00	1.355	0	< 0.001	< 0.001
	LTE Band 26_Ant 1	15M	QPSK	1	0	Front	10mm	Strap 3	26865	831.5	22.71	24.00	1.346	0	< 0.001	< 0.001
	LTE Band 26_Ant 1	15M	QPSK	36	0	Front	10mm	Strap 3	26865	831.5	21.68	23.00	1.355	0	< 0.001	< 0.001
	LTE Band 66_Ant 0	20M	QPSK	1	0	Front	10mm	Strap 1	132322	1745	23.43	24.00	1.140	0.1	0.106	0.121
	LTE Band 66_Ant 0	20M	QPSK	50	24	Front	10mm	Strap 1	132322	1745	22.47	23.00	1.130	0.12	0.088	0.099
09	LTE Band 66_Ant 0	20M	QPSK	1	0	Front	10mm	Strap 2	132322	1745	23.43	24.00	1.140	-0.07	0.134	0.153
	LTE Band 66_Ant 0	20M	QPSK	50	24	Front	10mm	Strap 2	132322	1745	22.47	23.00	1.130	0.08	0.111	0.125
	LTE Band 66_Ant 0	20M	QPSK	1	0	Front	10mm	Strap 3	132322	1745	23.43	24.00	1.140	-0.17	0.063	0.072
	LTE Band 66_Ant 0	20M	QPSK	1	0	Front	10mm	Strap 3	132322	1745	23.43	24.00	1.140	-0.03	0.059	0.067
10	LTE Band 71_Ant 1	20M	QPSK	1	49	Front	10mm	Strap 1	133322	683	22.68	24.00	1.355	0	< 0.001	< 0.001
	LTE Band 71_Ant 1	20M	QPSK	50	24	Front	10mm	Strap 1	133322	683	21.78	23.00	1.324	0	< 0.001	< 0.001
	LTE Band 71_Ant 1	20M	QPSK	1	49	Front	10mm	Strap 2	133322	683	22.68	24.00	1.355	0	< 0.001	< 0.001
	LTE Band 71_Ant 1	20M	QPSK	50	24	Front	10mm	Strap 2	133322	683	21.78	23.00	1.324	0	< 0.001	< 0.001
	LTE Band 71_Ant 1	20M	QPSK	1	49	Front	10mm	Strap 3	133322	683	22.68	24.00	1.355	0	< 0.001	< 0.001
	LTE Band 71_Ant 1	20M	QPSK	50	24	Front	10mm	Strap 3	133322	683	21.78	23.00	1.324	0	< 0.001	< 0.001

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Strap	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	Strap 1	11	2462	18.40	18.50	1.023	98.63	1.014	0.08	0.063	0.065
	WLAN2.4GHz	802.11b 1Mbps	Front	10mm	Strap 2	11	2462	18.40	18.50	1.023	98.63	1.014	0.01	0.043	0.045
11	WLAN2.4GHz	802.11b 1Mbps	Front	10mm	Strap 3	11	2462	18.40	18.50	1.023	98.63	1.014	0.16	0.074	0.077
	WLAN5GHz	802.11a 6Mbps	Front	10mm	Strap 1	64	5320	17.40	17.50	1.023	90.51	1.105	0.17	0.056	0.063
	WLAN5GHz	802.11a 6Mbps	Front	10mm	Strap 2	64	5320	17.40	17.50	1.023	90.51	1.105	-0.05	0.050	0.057
12	WLAN5GHz	802.11a 6Mbps	Front	10mm	Strap 3	64	5320	17.40	17.50	1.023	90.51	1.105	0.08	0.057	0.064
	WLAN5GHz	802.11a 6Mbps	Front	10mm	Strap 1	100	5500	17.40	17.50	1.023	90.51	1.105	0.01	0.108	0.122
	WLAN5GHz	802.11a 6Mbps	Front	10mm	Strap 2	100	5500	17.40	17.50	1.023	90.51	1.105	0.1	0.098	0.111
13	WLAN5GHz	802.11a 6Mbps	Front	10mm	Strap 3	100	5500	17.40	17.50	1.023	90.51	1.105	0.16	0.133	0.150
	WLAN5GHz	802.11a 6Mbps	Front	10mm	Strap 1	165	5825	17.40	17.50	1.023	90.51	1.105	-0.17	0.118	0.133
	WLAN5GHz	802.11a 6Mbps	Front	10mm	Strap 2	165	5825	17.40	17.50	1.023	90.51	1.105	0.04	0.119	0.135
14	WLAN5GHz	802.11a 6Mbps	Front	10mm	Strap 3	165	5825	17.40	17.50	1.023	90.51	1.105	-0.13	0.142	0.161
	WLAN5GHz	802.11a 6Mbps	Front	10mm	Strap 1	173	5865	17.40	17.50	1.023	90.51	1.105	-0.01	0.119	0.135
	WLAN5GHz	802.11a 6Mbps	Front	10mm	Strap 1	169	5845	17.30	17.50	1.047	90.51	1.105	0.08	0.109	0.126
	WLAN5GHz	802.11a 6Mbps	Front	10mm	Strap 1	177	5885	17.30	17.50	1.047	90.51	1.105	0.01	0.107	0.124
	WLAN5GHz	802.11a 6Mbps	Front	10mm	Strap 2	173	5865	17.40	17.50	1.023	90.51	1.105	-0.08	0.134	0.152
	WLAN5GHz	802.11a 6Mbps	Front	10mm	Strap 2	169	5845	17.30	17.50	1.047	90.51	1.105	0.03	0.127	0.147
	WLAN5GHz	802.11a 6Mbps	Front	10mm	Strap 2	177	5885	17.30	17.50	1.047	90.51	1.105	-0.08	0.124	0.143
15	WLAN5GHz	802.11a 6Mbps	Front	10mm	Strap 3	173	5865	17.40	17.50	1.023	90.51	1.105	-0.08	0.174	0.197
	WLAN5GHz	802.11a 6Mbps	Front	10mm	Strap 3	169	5845	17.30	17.50	1.047	90.51	1.105	-0.08	0.164	0.190
	WLAN5GHz	802.11a 6Mbps	Front	10mm	Strap 3	177	5885	17.30	17.50	1.047	90.51	1.105	0.1	0.161	0.186
	WLAN5GHz	802.11a 6Mbps	Front	10mm	Strap 4	173	5865	17.40	17.50	1.023	90.51	1.105	-0.18	0.099	0.112
	WLAN5GHz	802.11a 6Mbps	Front	10mm	Strap 5	173	5865	17.40	17.50	1.023	90.51	1.105	0.1	0.095	0.107
	WLAN5GHz	802.11a 6Mbps	Front	10mm	Strap 6	173	5865	17.40	17.50	1.023	90.51	1.105	0.12	0.097	0.110
	WLAN5GHz	802.11a 6Mbps	Front	10mm	Strap 7	173	5865	17.40	17.50	1.023	90.51	1.105	0.08	0.092	0.104
	WLAN5GHz	802.11a 6Mbps	Front	10mm	Strap 8	173	5865	17.40	17.50	1.023	90.51	1.105	-0.17	0.097	0.110

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Strap	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)
	Bluetooth	1Mbps	Front	10mm	Strap 1	78	2480	19.83	20.00	1.039	77.13	1.080	0.06	0.048	0.054
	Bluetooth	1Mbps	Front	10mm	Strap 2	78	2480	19.83	20.00	1.039	77.13	1.080	-0.09	0.050	0.056
16	Bluetooth	1Mbps	Front	10mm	Strap 3	78	2480	19.83	20.00	1.039	77.13	1.080	0.1	0.051	0.057

12.2 Extremity SAR

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Strap	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	WCDMA II_Ant 0	RMC 12.2Kbps	Back	0mm	Strap 1	9538	1907.6	23.23	24.00	1.194	0.1	0.038	0.045
17	WCDMA II_Ant 0	RMC 12.2Kbps	Back	0mm	Strap 2	9538	1907.6	23.23	24.00	1.194	-0.05	0.069	0.082
	WCDMA II_Ant 0	RMC 12.2Kbps	Back	0mm	Strap 3	9538	1907.6	23.23	24.00	1.194	0.12	0.067	0.080
	WCDMA IV_Ant 0	RMC 12.2Kbps	Back	0mm	Strap 1	1413	1732.6	23.57	24.00	1.104	0.08	0.079	0.087
18	WCDMA IV_Ant 0	RMC 12.2Kbps	Back	0mm	Strap 2	1413	1732.6	23.57	24.00	1.104	0.13	0.164	0.181
	WCDMA IV_Ant 0	RMC 12.2Kbps	Back	0mm	Strap 3	1413	1732.6	23.57	24.00	1.104	0.01	0.144	0.159
19	WCDMA V_Ant 1	RMC 12.2Kbps	Back	0mm	Strap 1	4182	836.4	23.79	24.00	1.050	0.05	0.320	0.336
	WCDMA V_Ant 1	RMC 12.2Kbps	Back	0mm	Strap 2	4182	836.4	23.79	24.00	1.050	-0.05	0.225	0.236
	WCDMA V_Ant 1	RMC 12.2Kbps	Back	0mm	Strap 3	4182	836.4	23.79	24.00	1.050	0.18	0.109	0.114

<LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Strap	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	LTE Band 7_Ant 0	20M	QPSK	1	0	Back	0mm	Strap 1	21100	2535	22.87	23.50	1.156	0.1	0.119	0.138
	LTE Band 7_Ant 0	20M	QPSK	50	24	Back	0mm	Strap 1	21100	2535	22.12	22.50	1.091	0.12	0.104	0.114
	LTE Band 7_Ant 0	20M	QPSK	1	0	Back	0mm	Strap 2	21100	2535	22.87	23.50	1.156	0.08	0.112	0.129
	LTE Band 7_Ant 0	20M	QPSK	50	24	Back	0mm	Strap 2	21100	2535	22.12	22.50	1.091	-0.17	0.074	0.081
20	LTE Band 7_Ant 0	20M	QPSK	1	0	Back	0mm	Strap 3	21100	2535	22.87	23.50	1.156	0.19	0.212	0.245
	LTE Band 7_Ant 0	20M	QPSK	50	24	Back	0mm	Strap 3	21100	2535	22.12	22.50	1.091	-0.03	0.172	0.188
21	LTE Band 12_Ant 1	10M	QPSK	1	0	Back	0mm	Strap 1	23095	707.5	23.33	24.00	1.167	0.14	0.365	0.426
	LTE Band 12_Ant 1	10M	QPSK	25	0	Back	0mm	Strap 1	23095	707.5	22.09	23.00	1.233	-0.17	0.335	0.413
	LTE Band 12_Ant 1	10M	QPSK	1	0	Back	0mm	Strap 2	23095	707.5	23.33	24.00	1.167	0.17	0.289	0.337
	LTE Band 12_Ant 1	10M	QPSK	25	0	Back	0mm	Strap 2	23095	707.5	22.09	23.00	1.233	-0.05	0.234	0.289
	LTE Band 12_Ant 1	10M	QPSK	1	0	Back	0mm	Strap 3	23095	707.5	23.33	24.00	1.167	0.01	0.092	0.107
	LTE Band 12_Ant 1	10M	QPSK	25	0	Back	0mm	Strap 3	23095	707.5	22.09	23.00	1.233	0.1	0.069	0.085
22	LTE Band 13_Ant 1	10M	QPSK	1	0	Back	0mm	Strap 1	23230	782	23.18	24.00	1.208	0.16	0.377	0.455
	LTE Band 13_Ant 1	10M	QPSK	25	12	Back	0mm	Strap 1	23230	782	22.23	23.00	1.194	0.06	0.324	0.387
	LTE Band 13_Ant 1	10M	QPSK	1	0	Back	0mm	Strap 2	23230	782	23.18	24.00	1.208	-0.09	0.245	0.296
	LTE Band 13_Ant 1	10M	QPSK	25	12	Back	0mm	Strap 2	23230	782	22.23	23.00	1.194	-0.08	0.197	0.235
	LTE Band 13_Ant 1	10M	QPSK	1	0	Back	0mm	Strap 3	23230	782	23.18	24.00	1.208	0.13	0.096	0.116
	LTE Band 13_Ant 1	10M	QPSK	25	12	Back	0mm	Strap 3	23230	782	22.23	23.00	1.194	0.12	0.074	0.088
	LTE Band 25_Ant 0	20M	QPSK	1	0	Back	0mm	Strap 1	26340	1880	22.95	24.00	1.274	0.18	0.064	0.082
	LTE Band 25_Ant 0	20M	QPSK	50	24	Back	0mm	Strap 1	26340	1880	22.00	23.00	1.259	-0.1	0.054	0.068
	LTE Band 25_Ant 0	20M	QPSK	1	0	Back	0mm	Strap 2	26340	1880	22.95	24.00	1.274	0.01	0.058	0.074
	LTE Band 25_Ant 0	20M	QPSK	50	24	Back	0mm	Strap 2	26340	1880	22.00	23.00	1.259	-0.15	0.047	0.059
23	LTE Band 25_Ant 0	20M	QPSK	1	0	Back	0mm	Strap 3	26340	1880	22.95	24.00	1.274	-0.1	0.103	0.131
	LTE Band 25_Ant 0	20M	QPSK	50	24	Back	0mm	Strap 3	26340	1880	22.00	23.00	1.259	0.19	0.056	0.070
24	LTE Band 26_Ant 1	15M	QPSK	1	0	Back	0mm	Strap 1	26865	831.5	22.71	24.00	1.346	-0.04	0.356	0.479
	LTE Band 26_Ant 1	15M	QPSK	1	0	Back	0mm	Strap 1	26765	821.5	22.70	24.00	1.349	0.05	0.334	0.451
	LTE Band 26_Ant 1	15M	QPSK	1	0	Back	0mm	Strap 1	26965	841.5	22.65	24.00	1.365	-0.11	0.327	0.446
	LTE Band 26_Ant 1	15M	QPSK	36	0	Back	0mm	Strap 1	26865	831.5	21.68	23.00	1.355	0.11	0.210	0.285
	LTE Band 26_Ant 1	15M	QPSK	1	0	Back	0mm	Strap 2	26865	831.5	22.71	24.00	1.346	-0.08	0.285	0.384
	LTE Band 26_Ant 1	15M	QPSK	36	0	Back	0mm	Strap 2	26865	831.5	21.68	23.00	1.355	-0.17	0.168	0.228
	LTE Band 26_Ant 1	15M	QPSK	1	0	Back	0mm	Strap 3	26865	831.5	22.71	24.00	1.346	-0.08	0.251	0.338
	LTE Band 26_Ant 1	15M	QPSK	36	0	Back	0mm	Strap 3	26865	831.5	21.68	23.00	1.355	-0.04	0.141	0.191
	LTE Band 26_Ant 1	15M	QPSK	1	0	Back	0mm	Strap 4	26865	831.5	22.71	24.00	1.346	0.01	0.241	0.324
	LTE Band 26_Ant 1	15M	QPSK	1	0	Back	0mm	Strap 5	26865	831.5	22.71	24.00	1.346	-0.18	0.234	0.315
	LTE Band 26_Ant 1	15M	QPSK	1	0	Back	0mm	Strap 6	26865	831.5	22.71	24.00	1.346	0.1	0.224	0.301

	LTE Band 26_Ant 1	15M	QPSK	1	0	Back	0mm	Strap 7	26865	831.5	22.71	24.00	1.346	0.12	0.230	0.310
	LTE Band 26_Ant 1	15M	QPSK	1	0	Back	0mm	Strap 8	26865	831.5	22.71	24.00	1.346	0.08	0.217	0.292
	LTE Band 66_Ant 0	20M	QPSK	1	0	Back	0mm	Strap 1	132322	1745	23.43	24.00	1.140	-0.13	0.043	0.049
	LTE Band 66_Ant 0	20M	QPSK	50	24	Back	0mm	Strap 1	132322	1745	22.47	23.00	1.130	-0.13	0.014	0.016
25	LTE Band 66_Ant 0	20M	QPSK	1	0	Back	0mm	Strap 2	132322	1745	23.43	24.00	1.140	-0.13	0.105	0.120
	LTE Band 66_Ant 0	20M	QPSK	50	24	Back	0mm	Strap 2	132322	1745	22.47	23.00	1.130	0.06	0.039	0.044
	LTE Band 66_Ant 0	20M	QPSK	1	0	Back	0mm	Strap 3	132322	1745	23.43	24.00	1.140	-0.03	0.074	0.084
	LTE Band 66_Ant 0	20M	QPSK	50	24	Back	0mm	Strap 3	132322	1745	22.47	23.00	1.130	-0.03	0.027	0.031
26	LTE Band 71_Ant 1	20M	QPSK	1	49	Back	0mm	Strap 1	133322	683	22.68	24.00	1.355	0.17	0.589	0.798
	LTE Band 71_Ant 1	20M	QPSK	50	24	Back	0mm	Strap 1	133322	683	21.78	23.00	1.324	0.08	0.555	0.735
	LTE Band 71_Ant 1	20M	QPSK	1	49	Back	0mm	Strap 2	133322	683	22.68	24.00	1.355	0.01	0.450	0.610
	LTE Band 71_Ant 1	20M	QPSK	50	24	Back	0mm	Strap 2	133322	683	21.78	23.00	1.324	0.03	0.439	0.581
	LTE Band 71_Ant 1	20M	QPSK	1	49	Back	0mm	Strap 3	133322	683	22.68	24.00	1.355	-0.08	0.203	0.275
	LTE Band 71_Ant 1	20M	QPSK	50	24	Back	0mm	Strap 3	133322	683	21.78	23.00	1.324	-0.08	0.191	0.253

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Strap	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)
	WLAN2.4GHz	802.11b 1Mbps	Back	0mm	Strap 1	11	2462	18.40	18.50	1.023	98.63	1.014	0.08	0.065	0.067
	WLAN2.4GHz	802.11b 1Mbps	Back	0mm	Strap 1	1	2412	18.20	18.50	1.072	98.63	1.014	0.01	0.044	0.048
	WLAN2.4GHz	802.11b 1Mbps	Back	0mm	Strap 1	6	2437	18.30	18.50	1.047	98.63	1.014	0.03	0.051	0.054
	WLAN2.4GHz	802.11b 1Mbps	Back	0mm	Strap 2	11	2462	18.40	18.50	1.023	98.63	1.014	0.1	0.054	0.056
	WLAN2.4GHz	802.11b 1Mbps	Back	0mm	Strap 2	1	2412	18.20	18.50	1.072	98.63	1.014	-0.18	0.047	0.051
	WLAN2.4GHz	802.11b 1Mbps	Back	0mm	Strap 2	6	2437	18.30	18.50	1.047	98.63	1.014	0.1	0.046	0.049
	WLAN2.4GHz	802.11b 1Mbps	Back	0mm	Strap 3	11	2462	18.40	18.50	1.023	98.63	1.014	-0.17	0.069	0.072
	WLAN2.4GHz	802.11b 1Mbps	Back	0mm	Strap 3	1	2412	18.20	18.50	1.072	98.63	1.014	-0.03	0.071	0.077
27	WLAN2.4GHz	802.11b 1Mbps	Back	0mm	Strap 3	6	2437	18.30	18.50	1.047	98.63	1.014	0.01	0.078	0.083
	WLAN2.4GHz	802.11b 1Mbps	Back	0mm	Strap 4	6	2437	18.30	18.50	1.047	98.63	1.014	-0.05	0.057	0.061
	WLAN2.4GHz	802.11b 1Mbps	Back	0mm	Strap 5	6	2437	18.30	18.50	1.047	98.63	1.014	0.18	0.063	0.067
	WLAN2.4GHz	802.11b 1Mbps	Back	0mm	Strap 6	6	2437	18.30	18.50	1.047	98.63	1.014	0.14	0.077	0.082
	WLAN2.4GHz	802.11b 1Mbps	Back	0mm	Strap 7	6	2437	18.30	18.50	1.047	98.63	1.014	-0.17	0.068	0.072
	WLAN2.4GHz	802.11b 1Mbps	Back	0mm	Strap 8	6	2437	18.30	18.50	1.047	98.63	1.014	0.17	0.061	0.065
	WLAN5GHz	802.11a 6Mbps	Back	0mm	Strap 1	64	5320	17.40	17.50	1.023	90.51	1.105	0	0.001	0.001
	WLAN5GHz	802.11a 6Mbps	Back	0mm	Strap 2	64	5320	17.40	17.50	1.023	90.51	1.105	-0.17	0.003	0.003
28	WLAN5GHz	802.11a 6Mbps	Back	0mm	Strap 3	64	5320	17.40	17.50	1.023	90.51	1.105	-0.06	0.004	0.005
	WLAN5GHz	802.11a 6Mbps	Back	0mm	Strap 1	100	5500	17.40	17.50	1.023	90.51	1.105	0.04	0.004	0.005
	WLAN5GHz	802.11a 6Mbps	Back	0mm	Strap 2	100	5500	17.40	17.50	1.023	90.51	1.105	-0.01	0.005	0.006
29	WLAN5GHz	802.11a 6Mbps	Back	0mm	Strap 3	100	5500	17.40	17.50	1.023	90.51	1.105	0.03	0.007	0.008
	WLAN5GHz	802.11a 6Mbps	Back	0mm	Strap 1	165	5825	17.40	17.50	1.023	90.51	1.105	-0.08	0.011	0.012
	WLAN5GHz	802.11a 6Mbps	Back	0mm	Strap 2	165	5825	17.40	17.50	1.023	90.51	1.105	0.05	0.011	0.012
30	WLAN5GHz	802.11a 6Mbps	Back	0mm	Strap 3	165	5825	17.40	17.50	1.023	90.51	1.105	0.05	0.015	0.017
	WLAN5GHz	802.11a 6Mbps	Back	0mm	Strap 1	173	5865	17.40	17.50	1.023	90.51	1.105	0.08	0.011	0.012
	WLAN5GHz	802.11a 6Mbps	Back	0mm	Strap 2	173	5865	17.40	17.50	1.023	90.51	1.105	0.01	0.009	0.010
31	WLAN5GHz	802.11a 6Mbps	Back	0mm	Strap 3	173	5865	17.40	17.50	1.023	90.51	1.105	-0.05	0.019	0.021

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Strap	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)
	Bluetooth	1Mbps	Back	0mm	Strap 1	78	2480	19.83	20.00	1.039	77.13	1.080	0.06	0.035	0.039
	Bluetooth	1Mbps	Back	0mm	Strap 2	78	2480	19.83	20.00	1.039	77.13	1.080	-0.09	0.030	0.034
32	Bluetooth	1Mbps	Back	0mm	Strap 3	78	2480	19.83	20.00	1.039	77.13	1.080	-0.09	0.049	0.055

13. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Next to mouth	Extremity
1.	WWAN + WLAN2.4GHz	Yes	Yes
2.	WWAN + WLAN5GHz + Bluetooth	Yes	Yes

General Note:

1. WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.
2. The worst case WLAN reported SAR for each configuration was used for SAR summation. Therefore, the following summations represent the absolute worst cases for simultaneous transmission with WLAN.
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.

13.1 Next to mouth Exposure Conditions

WWAN Band	Exposure Position	1	2	3	4	1+2 Summed 1g SAR (W/kg)	1+3+4 Summed 1g SAR (W/kg)
		WWAN	WLAN2.4GHz	WLAN5GHz	Bluetooth		
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)		
WCDMA II	Front	0.119	0.077	0.197	0.057	**0.196**	**0.373**
WCDMA IV	Front	0.162	0.077	0.197	0.057	**0.239**	**0.416**
WCDMA V	Front	0.001	0.077	0.197	0.057	**0.078**	**0.255**
LTE Band 7	Front	0.277	0.077	0.197	0.057	**0.354**	**0.531**
LTE Band 12	Front	0.001	0.077	0.197	0.057	**0.078**	**0.255**
LTE Band 13	Front	0.001	0.077	0.197	0.057	**0.078**	**0.255**
LTE Band 25	Front	0.143	0.077	0.197	0.057	**0.220**	**0.397**
LTE Band 26	Front	0.001	0.077	0.197	0.057	**0.078**	**0.255**
LTE Band 66	Front	0.153	0.077	0.197	0.057	**0.230**	**0.407**
LTE Band 71	Front	0.001	0.077	0.197	0.057	**0.078**	**0.255**

13.2 Extremity Exposure Conditions

WWAN Band	Exposure Position	1	2	3	4	1+2 Summed 10g SAR (W/kg)	1+3+4 Summed 10g SAR (W/kg)
		WWAN	WLAN2.4GHz	WLAN5GHz	Bluetooth		
		10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)		
WCDMA II	Back	0.082	0.083	0.021	0.055	**0.165**	**0.158**
WCDMA IV	Back	0.181	0.083	0.021	0.055	**0.264**	**0.257**
WCDMA V	Back	0.336	0.083	0.021	0.055	**0.419**	**0.412**
LTE Band 7	Back	0.245	0.083	0.021	0.055	**0.328**	**0.321**
LTE Band 12	Back	0.426	0.083	0.021	0.055	**0.509**	**0.502**
LTE Band 13	Back	0.455	0.083	0.021	0.055	**0.538**	**0.531**
LTE Band 25	Back	0.131	0.083	0.021	0.055	**0.214**	**0.207**
LTE Band 26	Back	0.479	0.083	0.021	0.055	**0.562**	**0.555**
LTE Band 66	Back	0.120	0.083	0.021	0.055	**0.203**	**0.196**
LTE Band 71	Back	0.798	0.083	0.021	0.055	**0.881**	**0.874**

Test Engineer： Harry Hsu and Andy Chiang

14. 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.

15. 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 941225 D01 v03r01, “3G SAR MEAUREMENT PROCEDURES”, Oct 2015

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

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

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