FCC SAR TEST REPORT

FCC ID	:	**B32T650P**
Equipment	:	**Point of Sales Terminal**
Brand Name	:	**Verifone**
Model Name	:	**T650p**
Applicant	:	**Verifone, Inc. 1400 West Stanford Ranch Road, Suite 200, Rocklin CA 95765 USA**
Manufacturer	:	**Verifone, Inc. 1400 West Stanford Ranch Road, Suite 200, Rocklin CA 95765 USA**
Standard	:	**FCC 47 CFR Part 2 (2.1093)**

The product was received on Sep. 04, 2020 and testing was started from Sep. 26, 2020 and completed on Oct. 06, 2020. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample provide by manufacturer and the test data has been evaluated in accordance with the test procedures given in 47 CFR Part 2.1093 and FCC KDB and has been pass the FCC requirement.

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

Approved by: Cona Huang / Deputy Manager

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History of this test report

Report No.	Version	Description	Issued Date
FA052211-07	01	Initial issue of report	Oct. 19, 2020

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Verifone, Inc., Point of Sales Terminal, T650p**, are as follows.

Equipment Class	Frequency Band	Highest SAR Summary	
		Limbs (Separation 10mm) 10g SAR (W/kg)	Highest Simultaneous Transmission 10g SAR (W/kg)
Licensed	GSM850	1.11	1.31
	GSM1900	0.73	
	WCDMA II	1.03	
	WCDMA IV	1.05	
	WCDMA V	0.62	
	LTE Band 4	1.00	
	LTE Band 7	1.20	
	LTE Band 12	0.23	
	LTE Band 13	0.41	
	LTE Band 2 / 25	1.27	
	LTE Band 5 / 26	0.51	
DTS	2.4GHz WLAN	0.18	
NII	5GHz WLAN	0.70	
DSS	Bluetooth	0.04	1.31
Date of Testing:		2020/9/26 ~ 2020/10/6	

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190) and the FCC designation No. TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC test. This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (4.0 W/kg) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013 and FCC KDB publications.

Reviewed by: Jason Wang
Report Producer: Daisy Peng

2. Guidance Applied

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

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 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	Point of Sales Terminal
Brand Name	Verifone
Model Name	T650p
FCC ID	B32T650P
IMEI Code	SIM 1: 869091031626368 SIM 2: 869091031626376
Wireless Technology and Frequency Range	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz 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 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz WLAN 2.4GHz Band: 2400 MHz ~ 2483.5 MHz WLAN 5.2GHz Band: 5150 MHz ~ 5250 MHz WLAN 5.3GHz Band: 5250 MHz ~ 5350 MHz WLAN 5.6GHz Band: 5470 MHz ~ 5725 MHz WLAN 5.8GHz Band: 5725 MHz ~ 5825 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz CTLS : 13.56 MHz
Mode	GSM/GPRS/EGPRS RMC/AMR 12.2Kbps HSDPA HSUPA DC-HSDPA LTE: QPSK, 16QAM WLAN: 802.11a/b/g/n HT20/HT40 Bluetooth BR/EDR/LE CTLS:ASK
GSM / (E)GPRS Transfer mode	Class B – EUT cannot support Packet Switched and Circuit Switched Network simultaneously but can automatically switch between Packet and Circuit Switched Network.
EUT Stage	Production Unit
Remark: 1. The device is designed for ordering and electronic payment, intended for use in hand; therefore, extremity SAR is necessary to show compliance. 2. The WWAN / WLAN and Bluetooth will not transmit simultaneous at the same time for this device.	

3.2 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05	
FCC ID	B32T650P
Equipment Name	Point of Sales Terminal
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 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz
Channel Bandwidth	LTE Band 02:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 04:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 05:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 07: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 12:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 13: 5MHz, 10MHz LTE Band 25:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 26:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz
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 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

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:

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

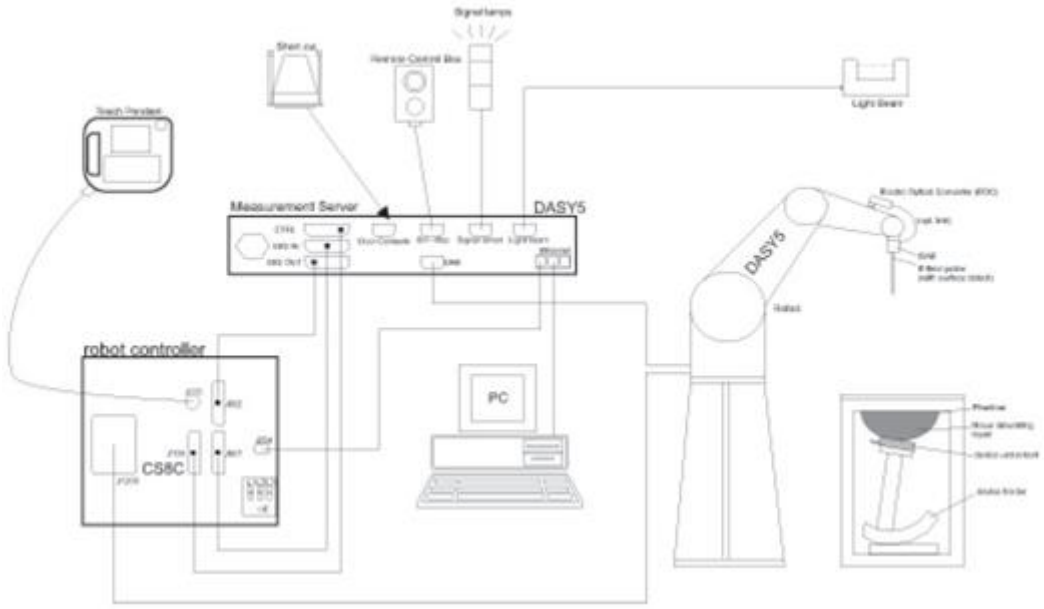
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

6. System Description and Setup

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



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

6.1 Test Site Location

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

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

6.2 E-Field Probe

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

<ES3DV3 Probe>

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

<EX3DV4 Probe>

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

6.3 Data Acquisition Electronics (DAE)

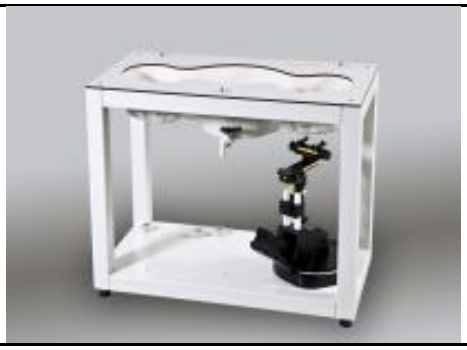
The data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an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

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

Fig 5.1 Photo of DAE

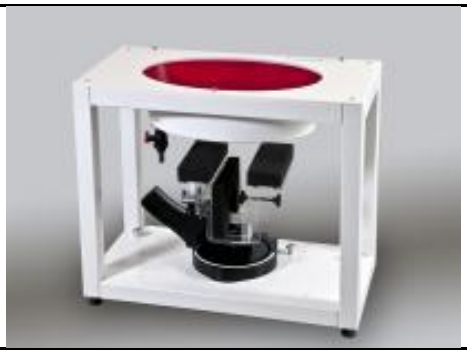
6.4 Phantom

<SAM Twin Phantom>

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

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

<ELI Phantom>

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

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

6.5 Device Holder

<Mounting Device for Hand-Held Transmitter>

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

Mounting Device for Hand-Held Transmitters

Mounting Device Adaptor for Wide-Phones

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

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

Mounting Device for Laptops

7. Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

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

<SAR measurement>

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

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

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

7.1 Spatial Peak SAR Evaluation

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

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

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

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

7.2 Power Reference Measurement

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

7.3 Area Scan

The area scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum found in the scanned area, within a range of the global maximum. The range (in dB0 is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan), if only one zoom scan follows the area scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of zoom scans has to be increased accordingly.

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

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

7.4 Zoom Scan

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

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

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ 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	1107	Mar. 08, 2019	Mar. 06, 2021
SPEAG	835MHz System Validation Kit	D835V2	4d167	Nov. 25, 2019	Nov. 24, 2020
SPEAG	1750MHz System Validation Kit(2)	D1750V2	1112	Mar. 07, 2019	Mar. 05, 2021
SPEAG	1900MHz System Validation Kit(2)	D1900V2	5d185	Mar. 07, 2019	Mar. 05, 2021
SPEAG	2450MHz System Validation Kit	D2450V2	929	Nov. 21, 2019	Nov. 20, 2020
SPEAG	2600MHz System Validation Kit(2)	D2600V2	1078	Mar. 06, 2019	Mar. 04, 2021
SPEAG	5GHz System Validation Kit(2)	D5GHzV2	1006	Sep. 27, 2018	Sep. 24, 2021
SPEAG	Data Acquisition Electronics	DAE4	376	Dec. 06, 2019	Dec. 05, 2020
SPEAG	Data Acquisition Electronics	DAE4	699	Feb. 26, 2020	Feb. 25, 2021
SPEAG	Dosimetric E-Field Probe	ES3DV3	3169	May. 27, 2020	May. 26, 2021
SPEAG	Dosimetric E-Field Probe	EX3DV4	3642	Apr. 29, 2020	Apr. 28, 2021
RCPTWN	Thermometer	HTC-1	TM685-1	Nov. 12, 2019	Nov. 11, 2020
RCPTWN	Thermometer	HTC-1	TM560-2	Nov. 12, 2019	Nov. 11, 2020
Anritsu	Radio Communication Analyzer	MT8821C	6201341950	Oct. 31, 2019	Oct. 30, 2020
Agilent	Wireless Communication Test Set	E5515C	MY50266977	May. 24, 2020	May. 23, 2021
R&S	BT Base Station	CBT	100815	Feb. 15, 2020	Feb. 14, 2021
SPEAG	Device Holder	N/A	N/A	N/A	N/A
Anritsu	Signal Generator	MG3710A	6201502524	Nov. 20, 2019	Nov. 19, 2020
Keysight	ENA Network Analyzer	E5071C	MY46101588	Jun. 10, 2020	Jun. 09, 2021
SPEAG	Dielectric Probe Kit	DAK-3.5	1146	Jul. 22, 2020	Jul. 21, 2021
LINE SEIKI	Digital Thermometer	DTM3000-spezial	2942	Nov. 18, 2019	Nov. 17, 2020
Anritsu	Power Meter	ML2495A	1419002	Aug. 19, 2020	Aug. 18, 2021
Anritsu	Power Sensor	MA2411B	1911176	Aug. 18, 2020	Aug. 17, 2021
Anritsu	Power Meter	ML2495A	1218006	Oct. 14, 2019	Oct. 13, 2020
Anritsu	Power Sensor	MA2411B	1207363	Oct. 14, 2019	Oct. 13, 2020
Anritsu	Spectrum Analyzer	MS2830A	6201396378	Jun. 30, 2020	Jun. 29, 2021
Anritsu	Spectrum Analyzer	N9010A	MY53470118	Mar. 12, 2020	Mar. 11, 2021
Mini-Circuits	Power Amplifier	ZVE-8G+	6418	Oct. 16, 2019	Oct. 15, 2020
Mini-Circuits	Power Amplifier	ZHL-42W+	321501827	Aug. 06, 2020	Aug. 05, 2021
ATM	Dual Directional Coupler	C122H-10	P610410z-02	Note 1	
Woken	Attenuator 1	WK0602-XX	N/A	Note 1	
PE	Attenuator 2	PE7005-10	N/A	Note 1	
PE	Attenuator 3	PE7005- 3	N/A	Note 1	

General Note:

1. Prior to system verification and validation, the path loss from the signal generator to the system check source and the power meter, which includes the amplifier, cable, attenuator and directional coupler, was measured by the network analyzer. The reading of the power meter was offset by the path loss difference between the path to the power meter and the path to the system check source to monitor the actual power level fed to the system check source.
2. The dipole calibration interval can be extended to 3 years with justification according to KDB 865664 D01. The dipoles are also not physically damaged, or repaired during the interval. The justification data in appendix C can be found which the return loss is < -20dB, within 20% of prior calibration, the impedance is within 5 ohm of prior calibration for each dipole.

9. System Verification

9.1 Tissue Simulating Liquids

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

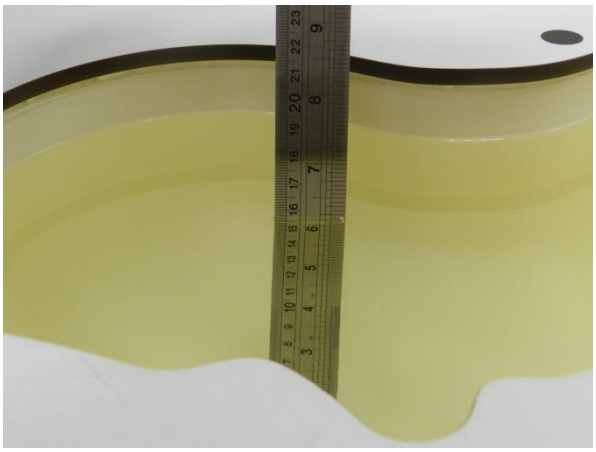


Fig 10.1Photo of Liquid Height for Head SAR

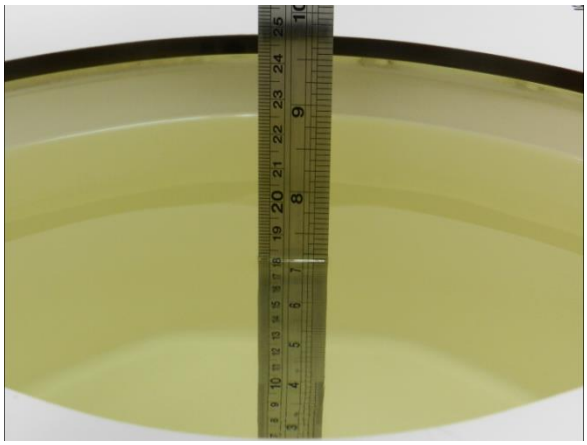


Fig 10.2 Photo of Liquid Height for Body SAR

9.2 Tissue Verification

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

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (εr)
750	41.1	57.0	0.2	1.4	0.2	0	0.89	41.9
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
900	40.3	57.9	0.2	1.4	0.2	0	0.97	41.5
1800, 1900, 2000	55.2	0	0	0.3	0	44.5	1.40	40.0
2450	55.0	0	0	0	0	45.0	1.80	39.2
2600	54.8	0	0	0.1	0	45.1	1.96	39.0

Simulating Liquid for 5GHz, Manufactured by SPEAG

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

<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
750	22.7	0.912	41.659	0.89	41.90	2.47	-0.58	±5	2020/9/26
835	22.7	0.879	40.831	0.90	41.50	-2.33	-1.61	±5	2020/9/26
1750	22.2	1.378	39.662	1.37	40.10	0.58	-1.09	±5	2020/9/27
1900	22.2	1.393	38.170	1.40	40.00	-0.50	-4.58	±5	2020/9/27
1900	22.2	1.420	39.234	1.40	40.00	1.43	-1.92	±5	2020/10/6
2450	22.8	1.854	39.118	1.80	39.20	3.00	-0.21	±5	2020/9/28
2450	22.1	1.821	39.826	1.80	39.20	1.17	1.60	±5	2020/9/30
2600	22.2	2.032	38.066	1.96	39.00	3.67	-2.39	±5	2020/9/27
5250	22.8	4.648	37.128	5.07	35.50	-8.32	4.59	±5	2020/9/28
5600	22.8	5.023	36.593	5.07	35.50	-0.93	3.08	±5	2020/9/28
5750	22.8	5.169	36.417	0.94	56.70	449.89	-35.77	±5	2020/9/28

9.3 System Performance Check Results

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

Date	Frequency (MHz)	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 10g SAR (W/kg)	Targeted 10g SAR (W/kg)	Normalized 10g SAR (W/kg)	Deviation (%)
2020/9/26	750	250	D750V3-1107	ES3DV3 - SN3169	DAE4 Sn699	1.31	5.61	5.24	-6.60
2020/9/26	835	250	D835V2-4d167	ES3DV3 - SN3169	DAE4 Sn699	1.44	6.21	5.76	-7.25
2020/9/27	1750	250	D1750V2-1112	ES3DV3 - SN3169	DAE4 Sn699	4.67	19.40	18.68	-3.71
2020/9/27	1900	250	D1900V2-5d185	ES3DV3 - SN3169	DAE4 Sn699	5.15	20.50	20.6	0.49
2020/10/6	1900	250	D1900V2-5d185	ES3DV3 - SN3169	DAE4 Sn699	5.10	20.50	20.4	-0.49
2020/9/28	2450	250	D2450V2-929	ES3DV3 - SN3169	DAE4 Sn699	6.34	24.70	25.36	2.67
2020/9/30	2450	250	D2450V2-929	ES3DV3 - SN3169	DAE4 Sn699	6.23	24.70	24.92	0.89
2020/9/27	2600	250	D2600V2-1078	ES3DV3 - SN3169	DAE4 Sn699	6.75	25.50	27	5.88
2020/9/28	5250	100	D5GHzV2-1006-5250	EX3DV4 - SN3642	DAE4 Sn376	2.38	23.20	23.8	2.59
2020/9/28	5600	100	D5GHzV2-1006-5600	EX3DV4 - SN3642	DAE4 Sn376	2.47	23.80	24.7	3.78
2020/9/28	5750	100	D5GHzV2-1006-5750	EX3DV4 - SN3642	DAE4 Sn376	2.36	22.90	23.6	3.06

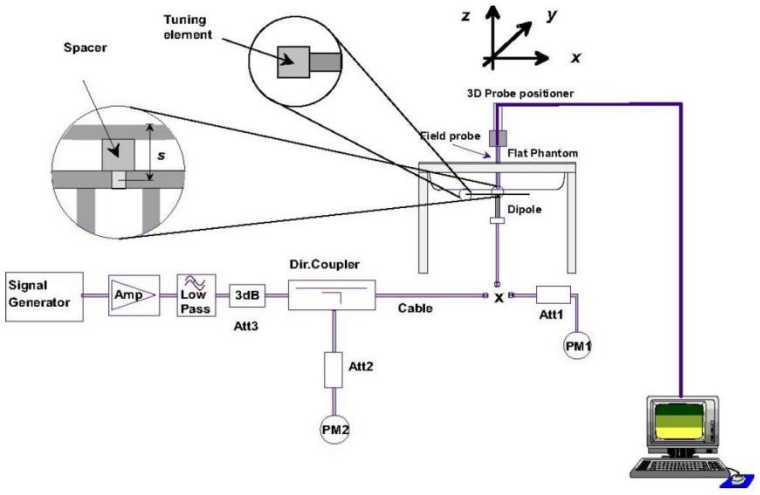


Fig 8.3.1 System Performance Check Setup

Fig 8.3.2 Setup Photo

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

<GSM Conducted Power>

General Note:

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

GSM850	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
TX Channel	128	189	251		128	189	251	
Frequency (MHz)	824.2	836.4	848.8		824.2	836.4	848.8	
GSM 1 Tx slot	32.91	32.89	32.86	33.00	23.91	23.89	23.86	24.00
GPRS 1 Tx slot	32.65	32.70	32.63	33.00	23.65	23.70	23.63	24.00
GPRS 2 Tx slots	31.95	31.90	31.90	32.00	25.95	25.90	25.90	26.00
GPRS 3 Tx slots	29.72	29.70	29.68	30.00	25.46	25.44	25.42	25.74
GPRS 4 Tx slots	28.50	28.47	28.45	28.50	25.50	25.47	25.45	25.50
EDGE 1 Tx slot	27.00	26.88	26.81	27.00	18.00	17.88	17.81	18.00
EDGE 2 Tx slots	26.40	26.25	26.20	26.50	20.40	20.25	20.20	20.50
EDGE 3 Tx slots	24.50	24.36	24.30	24.50	20.24	20.10	20.04	20.24
EDGE 4 Tx slots	23.34	23.09	23.09	23.50	20.34	20.09	20.09	20.50

GSM1900	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
TX Channel	512	661	810		512	661	810	
Frequency (MHz)	1850.2	1880	1909.8		1850.2	1880	1909.8	
GSM 1 Tx slot	29.06	28.98	28.71	30.50	20.06	19.98	19.71	21.50
GPRS 1 Tx slot	28.95	28.97	28.95	30.50	19.95	19.97	19.95	21.50
GPRS 2 Tx slots	28.57	28.61	28.53	29.00	22.57	22.61	22.53	23.00
GPRS 3 Tx slots	26.43	26.51	26.41	27.00	22.17	22.25	22.15	22.74
GPRS 4 Tx slots	25.30	25.20	25.24	26.00	22.30	22.20	22.24	23.00
EDGE 1 Tx slot	25.25	25.26	25.24	26.00	16.25	16.26	16.24	17.00
EDGE 2 Tx slots	24.24	24.31	24.25	25.00	18.24	18.31	18.25	19.00
EDGE 3 Tx slots	22.71	22.77	22.69	23.50	18.45	18.51	18.43	19.24
EDGE 4 Tx slots	21.53	21.58	21.55	22.00	18.53	18.58	18.55	19.00

<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.		

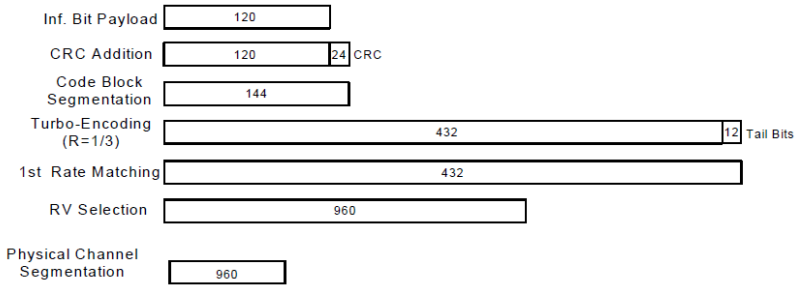


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

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.

Band		WCDMA II			Tune-up Limit (dBm)	WCDMA IV			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)
TX Channel		9262	9400	9538		1312	1413	1513		4132	4182	4233	
Rx Channel		9662	9800	9938		1537	1638	1738		4357	4407	4458	
Frequency (MHz)		1852.4	1880	1907.6		1712.4	1732.6	1752.6		826.4	836.4	846.6	
3GPP Rel 99	AMR 12.2Kbps	23.29	23.30	23.33	24.00	23.00	23.38	23.35	24.00	23.70	23.64	23.65	24.00
3GPP Rel 99	RMC 12.2Kbps	23.31	23.36	23.37	24.00	23.09	23.43	23.38	24.00	23.74	23.65	23.69	24.00
3GPP Rel 6	HSDPA Subtest-1	23.05	23.09	23.18	24.00	22.91	23.08	23.06	24.00	23.40	23.43	23.36	24.00
3GPP Rel 6	HSDPA Subtest-2	23.05	23.11	23.07	24.00	22.88	23.08	23.03	24.00	23.45	23.34	23.34	24.00
3GPP Rel 6	HSDPA Subtest-3	22.58	22.62	22.67	23.50	22.44	22.65	22.58	23.50	23.02	22.90	22.93	23.50
3GPP Rel 6	HSDPA Subtest-4	22.69	22.72	22.73	23.50	22.47	22.67	22.62	23.50	22.98	22.95	22.94	23.50
3GPP Rel 8	DC-HSDPA Subtest-1	23.05	23.14	23.20	24.00	22.86	23.13	22.99	24.00	23.34	23.53	23.39	24.00
3GPP Rel 8	DC-HSDPA Subtest-2	22.99	23.11	23.12	24.00	22.85	23.13	23.13	24.00	23.52	23.42	23.36	24.00
3GPP Rel 8	DC-HSDPA Subtest-3	22.50	22.62	22.74	23.50	22.38	22.73	22.62	23.50	22.93	22.98	22.98	23.50
3GPP Rel 8	DC-HSDPA Subtest-4	22.77	22.72	22.83	23.50	22.41	22.68	22.64	23.50	22.92	23.00	22.85	23.50
3GPP Rel 6	HSUPA Subtest-1	22.90	22.60	22.46	24.00	22.71	22.32	23.08	24.00	23.27	23.10	22.74	24.00
3GPP Rel 6	HSUPA Subtest-2	21.53	21.90	22.00	22.00	21.88	21.99	21.55	22.00	22.00	21.75	21.87	22.00
3GPP Rel 6	HSUPA Subtest-3	22.11	22.12	22.14	23.00	21.94	21.90	21.99	23.00	21.89	22.17	22.21	23.00
3GPP Rel 6	HSUPA Subtest-4	21.15	21.91	21.85	22.00	21.67	21.74	21.89	22.00	21.99	22.00	21.92	22.00
3GPP Rel 6	HSUPA Subtest-5	23.14	23.19	23.24	24.00	22.93	23.10	23.04	24.00	23.24	23.37	23.31	24.00

<LTE Conducted Power>

General Note:

1. Anritsu MT8820C base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.
2. Per KDB 941225 D05v02r05, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.
3. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
6. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
7. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
8. For LTE B4/B5/B12/B26 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
9. LTE band 2/5 SAR test was covered by Band 25/26; 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>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				18700	18900	19100		
Frequency (MHz)				1860	1880	1900		
20	QPSK	1	0	23.43	23.93	23.42	24	0
20	QPSK	1	49	23.55	23.28	23.42		
20	QPSK	1	99	23.53	23.50	23.29		
20	QPSK	50	0	22.49	22.54	22.53	23	1
20	QPSK	50	24	22.52	22.38	22.53		
20	QPSK	50	50	22.53	22.45	22.43		
20	QPSK	100	0	22.51	22.42	22.53		
20	16QAM	1	0	22.29	22.45	22.43	23	1
20	16QAM	1	49	22.48	22.16	22.42		
20	16QAM	1	99	22.49	22.46	22.51		
20	16QAM	50	0	21.47	21.42	21.59	22	2
20	16QAM	50	24	21.44	21.32	21.45		
20	16QAM	50	50	21.54	21.33	21.40		
20	16QAM	100	0	21.60	21.30	21.48		
Channel				18675	18900	19125	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	23.33	23.62	23.41	24	0
15	QPSK	1	37	23.50	23.20	23.36		
15	QPSK	1	74	23.50	23.42	23.26		
15	QPSK	36	0	22.39	22.47	22.47	23	1
15	QPSK	36	20	22.47	22.32	22.45		
15	QPSK	36	39	22.50	22.43	22.39		
15	QPSK	75	0	22.49	22.41	22.47		
15	16QAM	1	0	22.26	22.91	22.86	23	1
15	16QAM	1	37	22.39	22.16	22.81		
15	16QAM	1	74	22.53	22.91	22.61		
15	16QAM	36	0	21.37	21.42	21.58	22	2
15	16QAM	36	20	21.35	21.25	21.39		
15	16QAM	36	39	21.48	21.29	21.34		
15	16QAM	75	0	21.50	21.20	21.41		
Channel				18650	18900	19150	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	23.31	23.56	23.40	24	0
10	QPSK	1	25	23.46	23.19	23.27		
10	QPSK	1	49	23.44	23.34	23.24		
10	QPSK	25	0	22.36	22.43	22.46	23	1
10	QPSK	25	12	22.46	22.27	22.45		
10	QPSK	25	25	22.50	22.40	22.29		
10	QPSK	50	0	22.44	22.39	22.41		
10	16QAM	1	0	22.26	22.86	22.83	23	1
10	16QAM	1	25	22.30	22.07	22.80		
10	16QAM	1	49	22.51	22.82	22.51		
10	16QAM	25	0	21.28	21.37	21.55	22	2
10	16QAM	25	12	21.27	21.17	21.39		
10	16QAM	25	25	21.41	21.26	21.29		
10	16QAM	50	0	21.42	21.20	21.31		
Channel				18625	18900	19175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	23.27	23.51	23.29	24	0
5	QPSK	1	12	23.39	23.09	23.27		
5	QPSK	1	24	23.36	23.36	23.13		

5	QPSK	12	0	22.32	22.28	22.37	23	1
5	QPSK	12	7	22.27	22.20	22.40		
5	QPSK	12	13	22.42	22.23	22.33		
5	QPSK	25	0	22.34	22.28	22.44		
5	16QAM	1	0	22.12	22.77	22.74	23	1
5	16QAM	1	12	22.26	22.07	22.74		
5	16QAM	1	24	22.42	22.81	22.49		
5	16QAM	12	0	21.37	21.33	21.51	22	2
5	16QAM	12	7	21.23	21.18	21.28		
5	16QAM	12	13	21.40	21.18	21.15		
5	16QAM	25	0	21.39	21.05	21.36		
Channel				18615	18900	19185	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	23.30	23.53	23.23	24	0
3	QPSK	1	8	23.35	23.05	23.16		
3	QPSK	1	14	23.30	23.33	23.13		
3	QPSK	8	0	22.24	22.29	22.29	23	1
3	QPSK	8	4	22.30	22.21	22.32		
3	QPSK	8	7	22.38	22.22	22.27		
3	QPSK	15	0	22.29	22.28	22.34		
3	16QAM	1	0	22.11	22.69	22.78	23	1
3	16QAM	1	8	22.26	22.03	22.61		
3	16QAM	1	14	22.44	22.70	22.46		
3	16QAM	8	0	21.34	21.20	21.44	22	2
3	16QAM	8	4	21.19	21.19	21.23		
3	16QAM	8	7	21.36	21.18	21.16		
3	16QAM	15	0	21.30	20.98	21.29		
Channel				18607	18900	19193	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3		
1.4	QPSK	1	0	23.25	23.52	23.21	24	0
1.4	QPSK	1	3	23.24	23.03	23.13		
1.4	QPSK	1	5	23.40	23.29	23.10		
1.4	QPSK	3	0	22.13	22.13	22.30		
1.4	QPSK	3	1	22.18	22.10	22.25		
1.4	QPSK	3	3	22.29	22.13	22.23		
1.4	QPSK	6	0	22.28	22.27	22.35	23	1
1.4	16QAM	1	0	22.07	22.60	22.76	23	1
1.4	16QAM	1	3	22.07	22.01	22.56		
1.4	16QAM	1	5	22.39	22.73	22.40		
1.4	16QAM	3	0	21.21	21.22	21.36		
1.4	16QAM	3	1	21.19	21.20	21.17		
1.4	16QAM	3	3	21.30	21.09	21.11		
1.4	16QAM	6	0	21.27	21.02	21.24	22	2

<LTE Band 4>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20050	20175	20300		
Frequency (MHz)				1720	1732.5	1745		
20	QPSK	1	0	23.42	23.56	23.42	24	0
20	QPSK	1	49	23.42	23.51	23.27		
20	QPSK	1	99	23.29	23.36	23.05		
20	QPSK	50	0	22.53	22.57	22.46	23	1
20	QPSK	50	24	22.53	22.25	22.26		
20	QPSK	50	50	22.43	22.36	22.11		
20	QPSK	100	0	22.53	22.31	22.22		
20	16QAM	1	0	22.38	22.32	22.42	23	1
20	16QAM	1	49	22.45	22.53	22.56		
20	16QAM	1	99	22.51	22.35	22.17		
20	16QAM	50	0	21.59	21.37	21.39	22	2
20	16QAM	50	24	21.45	21.26	21.33		
20	16QAM	50	50	21.40	21.36	21.14		
20	16QAM	100	0	21.48	21.25	21.28		
Channel				20025	20175	20325	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1732.5	1747.5		
15	QPSK	1	0	23.40	23.53	23.37	24	0
15	QPSK	1	37	23.51	23.50	23.19		
15	QPSK	1	74	23.23	23.27	23.03		
15	QPSK	36	0	22.56	22.34	22.53	23	1
15	QPSK	36	20	22.48	22.23	22.29		
15	QPSK	36	39	22.38	22.40	22.01		
15	QPSK	75	0	22.52	22.33	22.16		
15	16QAM	1	0	22.94	22.22	22.97	23	1
15	16QAM	1	37	22.74	22.63	22.59		
15	16QAM	1	74	22.62	22.28	22.25		
15	16QAM	36	0	21.57	21.42	21.42	22	2
15	16QAM	36	20	21.40	21.26	21.35		
15	16QAM	36	39	21.30	21.29	21.10		
15	16QAM	75	0	21.43	21.26	21.29		
Channel				20000	20175	20350	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1732.5	1750		
10	QPSK	1	0	23.38	23.47	23.43	24	0
10	QPSK	1	25	23.32	23.40	23.30		
10	QPSK	1	49	23.28	23.24	23.03		
10	QPSK	25	0	22.51	22.41	22.33	23	1
10	QPSK	25	12	22.43	22.23	22.24		
10	QPSK	25	25	22.40	22.35	22.12		
10	QPSK	50	0	22.57	22.29	22.22		
10	16QAM	1	0	22.98	22.34	22.98	23	1
10	16QAM	1	25	22.79	22.63	22.62		
10	16QAM	1	49	22.77	22.31	22.17		
10	16QAM	25	0	21.64	21.21	21.29	22	2
10	16QAM	25	12	21.26	21.16	21.32		
10	16QAM	25	25	21.44	21.23	21.03		
10	16QAM	50	0	21.49	21.32	21.25		
Channel				19975	20175	20375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1732.5	1752.5		
5	QPSK	1	0	23.35	23.39	23.42	24	0
5	QPSK	1	12	23.23	23.34	23.29		
5	QPSK	1	24	23.24	23.23	22.96		

5	QPSK	12	0	22.48	22.38	22.31	23	1
5	QPSK	12	7	22.34	22.20	22.18		
5	QPSK	12	13	22.32	22.27	22.07		
5	QPSK	25	0	22.47	22.23	22.18		
5	16QAM	1	0	22.96	22.33	22.96	23	1
5	16QAM	1	12	22.75	22.58	22.62		
5	16QAM	1	24	22.68	22.26	22.12		
5	16QAM	12	0	21.58	21.16	21.24	22	2
5	16QAM	12	7	21.21	21.14	21.24		
5	16QAM	12	13	21.43	21.14	20.93		
5	16QAM	25	0	21.47	21.25	21.21		
Channel				19965	20175	20385	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1732.5	1753.5		
3	QPSK	1	0	23.25	23.37	23.35	24	0
3	QPSK	1	8	23.21	23.24	23.21		
3	QPSK	1	14	23.16	23.14	22.92		
3	QPSK	8	0	22.42	22.28	22.31	23	1
3	QPSK	8	4	22.25	22.20	22.16		
3	QPSK	8	7	22.26	22.27	21.97		
3	QPSK	15	0	22.38	22.18	22.16		
3	16QAM	1	0	22.95	22.27	22.92	23	1
3	16QAM	1	8	22.67	22.52	22.60		
3	16QAM	1	14	22.61	22.25	22.10		
3	16QAM	8	0	21.54	21.11	21.24	22	2
3	16QAM	8	4	21.15	21.07	21.18		
3	16QAM	8	7	21.40	21.06	20.93		
3	16QAM	15	0	21.45	21.19	21.19		
Channel				19957	20175	20393	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1732.5	1754.3		
1.4	QPSK	1	0	23.35	23.47	23.41	24	0
1.4	QPSK	1	3	23.25	23.31	23.25		
1.4	QPSK	1	5	23.20	23.21	22.97		
1.4	QPSK	3	0	22.43	22.32	22.27		
1.4	QPSK	3	1	22.35	22.22	22.18		
1.4	QPSK	3	3	22.36	22.28	22.02		
1.4	QPSK	6	0	22.52	22.20	22.22	23	1
1.4	16QAM	1	0	22.95	22.32	22.90	23	1
1.4	16QAM	1	3	22.69	22.54	22.56		
1.4	16QAM	1	5	22.77	22.26	22.15		
1.4	16QAM	3	0	21.64	21.20	21.21		
1.4	16QAM	3	1	21.18	21.12	21.26		
1.4	16QAM	3	3	21.34	21.15	21.23		
1.4	16QAM	6	0	21.45	21.28	21.25	22	2

<LTE Band 5>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20450	20525	20600		
Frequency (MHz)				829	836.5	844		
10	QPSK	1	0	23.78	23.86	23.77	24	0
10	QPSK	1	25	23.66	23.67	23.60		
10	QPSK	1	49	23.60	23.47	23.58		
10	QPSK	25	0	22.79	22.96	22.82	23	1
10	QPSK	25	12	22.74	22.72	22.73		
10	QPSK	25	25	22.67	22.63	22.67		
10	QPSK	50	0	22.74	22.86	22.88		
10	16QAM	1	0	22.95	22.78	22.94	23	1
10	16QAM	1	25	22.88	22.89	22.77		
10	16QAM	1	49	22.78	22.62	22.67		
10	16QAM	25	0	21.91	21.81	21.78	22	2
10	16QAM	25	12	21.96	21.91	21.59		
10	16QAM	25	25	21.74	21.78	21.65		
10	16QAM	50	0	21.69	21.83	21.89		
Channel				20425	20525	20625	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				826.5	836.5	846.5		
5	QPSK	1	0	23.73	22.83	23.68	24	0
5	QPSK	1	12	23.60	23.59	23.55		
5	QPSK	1	24	23.52	23.42	23.52		
5	QPSK	12	0	22.73	22.91	22.75	23	1
5	QPSK	12	7	22.71	22.65	22.69		
5	QPSK	12	13	22.66	22.59	22.57		
5	QPSK	25	0	22.70	22.85	22.79		
5	16QAM	1	0	22.94	22.77	22.87	23	1
5	16QAM	1	12	22.91	22.91	22.74		
5	16QAM	1	24	22.70	22.56	22.58		
5	16QAM	12	0	21.87	21.72	21.78	22	2
5	16QAM	12	7	21.94	21.89	21.54		
5	16QAM	12	13	21.70	21.70	21.59		
5	16QAM	25	0	21.62	21.81	21.82		
Channel				20415	20525	20635	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				825.5	836.5	847.5		
3	QPSK	1	0	23.72	23.77	23.70	24	0
3	QPSK	1	8	23.62	23.58	23.54		
3	QPSK	1	14	23.54	23.43	23.53		
3	QPSK	8	0	22.74	22.90	22.80	23	1
3	QPSK	8	4	22.72	22.71	22.65		
3	QPSK	8	7	22.58	22.57	22.65		
3	QPSK	15	0	22.74	22.77	22.80		
3	16QAM	1	0	22.89	22.72	22.85	23	1
3	16QAM	1	8	22.94	22.88	22.68		
3	16QAM	1	14	22.78	22.52	22.58		
3	16QAM	8	0	21.86	21.79	21.75	22	2
3	16QAM	8	4	21.95	21.87	21.58		
3	16QAM	8	7	21.73	21.75	21.65		
3	16QAM	15	0	21.61	21.76	21.80		
Channel				20407	20525	20643	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				824.7	836.5	848.3		
1.4	QPSK	1	0	23.68	23.82	23.67	24	0
1.4	QPSK	1	3	23.57	23.59	23.51		
1.4	QPSK	1	5	23.50	23.40	23.51		

1.4	QPSK	3	0	22.77	22.88	22.75		
1.4	QPSK	3	1	22.74	22.69	22.63		
1.4	QPSK	3	3	22.58	22.59	22.63		
1.4	QPSK	6	0	22.73	22.86	22.85	23	1
1.4	16QAM	1	0	22.89	22.78	22.87		
1.4	16QAM	1	3	22.94	22.93	22.70		
1.4	16QAM	1	5	22.75	22.60	22.61	23	1
1.4	16QAM	3	0	21.89	21.76	21.74		
1.4	16QAM	3	1	21.89	21.84	21.55		
1.4	16QAM	3	3	21.70	21.68	21.56		
1.4	16QAM	6	0	21.67	21.76	21.89	22	2

<LTE Band 7>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20850	21100	21350		
Frequency (MHz)				2510	2535	2560		
20	QPSK	1	0	23.39	23.50	23.39	24.5	0
20	QPSK	1	49	23.22	23.18	23.32		
20	QPSK	1	99	23.24	23.35	23.34		
20	QPSK	50	0	22.33	22.45	22.42	23.5	1
20	QPSK	50	24	22.30	22.14	22.33		
20	QPSK	50	50	22.17	22.18	22.26		
20	QPSK	100	0	22.21	22.22	22.33		
20	16QAM	1	0	22.42	22.43	22.39	23.5	1
20	16QAM	1	49	22.37	21.86	22.12		
20	16QAM	1	99	22.44	22.34	22.09		
20	16QAM	50	0	21.22	21.26	21.43	22.5	2
20	16QAM	50	24	21.22	21.02	21.31		
20	16QAM	50	50	21.11	21.17	21.25		
20	16QAM	100	0	21.18	21.11	21.42		
Channel				20825	21100	21375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	23.37	23.48	23.29	24.5	0
15	QPSK	1	37	23.16	23.08	23.25		
15	QPSK	1	74	23.14	23.29	23.30		
15	QPSK	36	0	22.29	22.29	22.38	23.5	1
15	QPSK	36	20	22.29	22.10	22.33		
15	QPSK	36	39	22.12	22.16	22.26		
15	QPSK	75	0	22.21	22.18	22.27		
15	16QAM	1	0	22.46	22.40	22.35	23.5	1
15	16QAM	1	37	22.27	21.83	22.04		
15	16QAM	1	74	22.43	22.24	22.09		
15	16QAM	36	0	21.18	21.25	21.41	22.5	2
15	16QAM	36	20	21.20	20.95	21.30		
15	16QAM	36	39	21.10	21.14	21.16		
15	16QAM	75	0	21.16	21.10	21.32		
Channel				20800	21100	21400	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	23.29	23.43	23.39	24.5	0
10	QPSK	1	25	23.15	23.09	23.28		
10	QPSK	1	49	23.24	23.26	23.27		
10	QPSK	25	0	22.27	22.24	22.36	23.5	1
10	QPSK	25	12	22.24	22.14	22.31		
10	QPSK	25	25	22.10	22.18	22.16		
10	QPSK	50	0	22.14	22.18	22.23		
10	16QAM	1	0	22.50	22.41	22.33	23.5	1
10	16QAM	1	25	22.33	21.82	22.07		
10	16QAM	1	49	22.44	22.25	22.05		
10	16QAM	25	0	21.21	21.16	21.40	22.5	2
10	16QAM	25	12	21.13	21.02	21.21		
10	16QAM	25	25	21.11	21.11	21.21		
10	16QAM	50	0	21.12	21.04	21.41		
Channel				20775	21100	21425	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	23.29	23.43	23.39	24.5	0
5	QPSK	1	12	23.35	23.49	23.34		
5	QPSK	1	24	23.20	23.16	23.30		

5	QPSK	12	0	23.21	23.30	23.25	23.5	1
5	QPSK	12	7	22.32	22.31	22.40		
5	QPSK	12	13	22.23	22.10	22.24		
5	QPSK	25	0	22.11	22.09	22.21		
5	16QAM	1	0	22.11	22.16	22.29	23.5	1
5	16QAM	1	12	22.41	22.44	22.33		
5	16QAM	1	24	22.27	21.85	22.10		
5	16QAM	12	0	22.42	22.32	22.03	22.5	2
5	16QAM	12	7	21.19	21.24	21.41		
5	16QAM	12	13	21.16	20.94	21.24		
5	16QAM	25	0	21.02	21.13	21.19		

<LTE Band 12>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				23060	23095	23130		
Frequency (MHz)				704	707.5	711		
10	QPSK	1	0	23.75	23.98	23.76	24	0
10	QPSK	1	25	23.96	23.88	23.77		
10	QPSK	1	49	23.62	23.62	23.61		
10	QPSK	25	0	22.86	22.97	22.96	23	1
10	QPSK	25	12	22.87	22.82	22.82		
10	QPSK	25	25	22.86	22.69	22.87		
10	QPSK	50	0	22.93	22.79	22.94		
10	16QAM	1	0	22.89	22.93	22.94	23	1
10	16QAM	1	25	22.91	22.92	22.95		
10	16QAM	1	49	22.74	22.88	22.89		
10	16QAM	25	0	21.88	21.76	21.92	22	2
10	16QAM	25	12	21.79	21.97	21.76		
10	16QAM	25	25	21.94	21.87	21.81		
10	16QAM	50	0	21.82	21.88	21.85		
Channel				23035	23095	23155	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				701.5	707.5	713.5		
5	QPSK	1	0	23.74	23.51	23.74	24	0
5	QPSK	1	12	23.88	23.88	23.75		
5	QPSK	1	24	23.52	23.55	23.57		
5	QPSK	12	0	22.78	22.86	22.86	23	1
5	QPSK	12	7	22.87	22.77	22.73		
5	QPSK	12	13	22.85	22.66	22.86		
5	QPSK	25	0	22.88	22.72	22.91		
5	16QAM	1	0	23.00	22.91	22.91	23	1
5	16QAM	1	12	22.98	22.91	22.90		
5	16QAM	1	24	22.73	22.78	22.84		
5	16QAM	12	0	21.79	21.68	21.91	22	2
5	16QAM	12	7	21.79	21.95	21.69		
5	16QAM	12	13	21.85	21.86	21.71		
5	16QAM	25	0	21.82	21.85	21.85		
Channel				23025	23095	23165	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				700.5	707.5	714.5		
3	QPSK	1	0	23.69	23.55	23.68	24	0
3	QPSK	1	8	23.89	23.84	23.76		
3	QPSK	1	14	23.59	23.55	23.56		
3	QPSK	8	0	22.84	22.82	22.94	23	1
3	QPSK	8	4	22.86	22.73	22.75		
3	QPSK	8	7	22.81	22.64	22.84		
3	QPSK	15	0	22.89	22.75	22.86		
3	16QAM	1	0	22.99	22.92	22.92	23	1
3	16QAM	1	8	22.93	22.92	22.94		
3	16QAM	1	14	22.70	22.86	22.83		
3	16QAM	8	0	21.83	21.76	21.90	22	2
3	16QAM	8	4	21.72	21.87	21.73		
3	16QAM	8	7	21.92	21.86	21.79		
3	16QAM	15	0	21.81	21.88	21.76		
Channel				23017	23095	23173	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				699.7	707.5	715.3		
1.4	QPSK	1	0	23.60	23.54	23.66	24	0
1.4	QPSK	1	3	23.76	23.73	23.66		
1.4	QPSK	1	5	23.53	23.51	23.51		

1.4	QPSK	3	0	22.77	22.72	22.88		
1.4	QPSK	3	1	22.79	22.64	22.71		
1.4	QPSK	3	3	22.74	22.59	22.80		
1.4	QPSK	6	0	22.83	22.73	22.86	23	1
1.4	16QAM	1	0	22.90	22.84	22.84		
1.4	16QAM	1	3	22.93	22.91	22.91		
1.4	16QAM	1	5	22.61	22.85	22.78	23	1
1.4	16QAM	3	0	21.79	21.74	21.81		
1.4	16QAM	3	1	21.62	21.78	21.69		
1.4	16QAM	3	3	21.83	21.78	21.70		
1.4	16QAM	6	0	21.75	21.81	21.73	22	2

<LTE Band 13>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel					23230			
Frequency (MHz)					782			
10	QPSK	1	0		23.76		24	0
10	QPSK	1	25		23.64			
10	QPSK	1	49		23.69			
10	QPSK	25	0		22.74		23	1
10	QPSK	25	12		22.67			
10	QPSK	25	25		22.57			
10	QPSK	50	0		22.72			
10	16QAM	1	0		22.56		23	1
10	16QAM	1	25		22.62			
10	16QAM	1	49		22.50			
10	16QAM	25	0		21.90		22	2
10	16QAM	25	12		21.63			
10	16QAM	25	25		21.49			
10	16QAM	50	0		21.61			
Channel				23205	23230	23255	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				779.5	782	784.5		
5	QPSK	1	0	23.04	23.45	23.25	24	0
5	QPSK	1	12	23.43	23.54	23.55		
5	QPSK	1	24	23.53	23.68	23.60		
5	QPSK	12	0	22.42	22.67	22.76	23	1
5	QPSK	12	7	22.35	22.64	22.45		
5	QPSK	12	13	22.14	22.54	22.46		
5	QPSK	25	0	22.43	22.65	22.67		
5	16QAM	1	0	22.23	22.46	22.35	23	1
5	16QAM	1	12	22.67	22.54	22.45		
5	16QAM	1	24	22.49	22.50	22.19		
5	16QAM	12	0	21.75	21.83	21.32	22	2
5	16QAM	12	7	21.53	21.58	21.44		
5	16QAM	12	13	21.42	21.47	21.39		
5	16QAM	25	0	21.69	21.58	21.50		

<LTE Band 25>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				26140	26340	26590		
Frequency (MHz)				1860	1880	1905		
20	QPSK	1	0	23.34	23.68	23.27	24	0
20	QPSK	1	49	23.66	23.46	23.29		
20	QPSK	1	99	23.16	23.21	23.28		
20	QPSK	50	0	22.33	22.59	22.26	23	1
20	QPSK	50	24	22.30	22.18	22.16		
20	QPSK	50	50	22.22	22.18	22.11		
20	QPSK	100	0	22.28	22.27	22.14		
20	16QAM	1	0	22.39	22.41	22.07	23	1
20	16QAM	1	49	22.12	22.52	22.01		
20	16QAM	1	99	22.05	22.21	22.14		
20	16QAM	50	0	21.38	21.30	21.13	22	2
20	16QAM	50	24	21.36	21.15	21.00		
20	16QAM	50	50	21.32	21.17	21.15		
20	16QAM	100	0	21.19	21.23	21.08		
Channel				26115	26340	26615	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1907.5		
15	QPSK	1	0	23.26	23.46	23.20	24	0
15	QPSK	1	37	23.56	23.41	23.20		
15	QPSK	1	74	23.14	23.19	23.28		
15	QPSK	36	0	22.28	22.26	22.24	23	1
15	QPSK	36	20	22.24	22.15	22.09		
15	QPSK	36	39	22.16	22.08	22.10		
15	QPSK	75	0	22.25	22.18	22.09		
15	16QAM	1	0	22.36	22.64	21.98	23	1
15	16QAM	1	37	22.06	22.51	21.97		
15	16QAM	1	74	21.96	22.18	22.07		
15	16QAM	36	0	21.31	21.29	21.08	22	2
15	16QAM	36	20	21.29	21.05	20.90		
15	16QAM	36	39	21.28	21.09	21.12		
15	16QAM	75	0	21.10	21.21	21.04		
Channel				26090	26340	26640	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1910		
10	QPSK	1	0	23.32	23.37	23.25	24	0
10	QPSK	1	25	23.58	23.42	23.29		
10	QPSK	1	49	23.11	23.16	23.23		
10	QPSK	25	0	22.30	22.21	22.22	23	1
10	QPSK	25	12	22.29	22.14	22.08		
10	QPSK	25	25	22.17	22.16	22.11		
10	QPSK	50	0	22.24	22.25	22.09		
10	16QAM	1	0	22.30	22.68	22.04	23	1
10	16QAM	1	25	22.09	22.47	21.95		
10	16QAM	1	49	22.00	22.11	22.07		
10	16QAM	25	0	21.28	21.25	21.13	22	2
10	16QAM	25	12	21.29	21.11	20.99		
10	16QAM	25	25	21.27	21.09	21.15		
10	16QAM	50	0	21.15	21.23	21.03		
Channel				26065	26340	26665	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1912.5		
5	QPSK	1	0	23.23	23.35	23.19	24	0
5	QPSK	1	12	23.52	23.32	23.22		
5	QPSK	1	24	23.04	23.15	23.16		

5	QPSK	12	0	22.27	22.15	22.15	23	1
5	QPSK	12	7	22.20	22.14	21.99		
5	QPSK	12	13	22.14	22.10	22.03		
5	QPSK	25	0	22.22	22.15	22.04		
5	16QAM	1	0	22.24	22.64	22.02	23	1
5	16QAM	1	12	22.02	22.45	21.94		
5	16QAM	1	24	21.90	22.09	21.98		
5	16QAM	12	0	21.23	21.20	21.09	22	2
5	16QAM	12	7	21.25	21.05	20.98		
5	16QAM	12	13	21.22	20.99	21.10		
5	16QAM	25	0	21.11	21.14	20.96		
Channel				26055	26340	26675	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1913.5		
3	QPSK	1	0	23.17	23.32	23.19	24	0
3	QPSK	1	8	23.47	23.32	23.15		
3	QPSK	1	14	23.03	23.12	23.16		
3	QPSK	8	0	22.18	22.11	22.05	23	1
3	QPSK	8	4	22.10	22.10	21.96		
3	QPSK	8	7	22.14	22.05	21.96		
3	QPSK	15	0	22.20	22.10	22.00		
3	16QAM	1	0	22.20	22.59	21.94	23	1
3	16QAM	1	8	21.97	22.45	21.93		
3	16QAM	1	14	21.80	22.06	21.93		
3	16QAM	8	0	21.19	21.17	21.07	22	2
3	16QAM	8	4	21.18	21.03	20.91		
3	16QAM	8	7	21.12	20.91	21.00		
3	16QAM	15	0	21.06	21.05	20.92		
Channel				26047	26340	26683	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1914.3		
1.4	QPSK	1	0	23.23	23.34	23.22	24	0
1.4	QPSK	1	3	23.54	23.37	23.26		
1.4	QPSK	1	5	23.07	23.14	23.21		
1.4	QPSK	3	0	22.23	22.16	22.20		
1.4	QPSK	3	1	22.27	22.10	22.04		
1.4	QPSK	3	3	22.07	22.12	22.05		
1.4	QPSK	6	0	22.20	22.16	22.09	23	1
1.4	16QAM	1	0	22.29	22.66	22.03	23	1
1.4	16QAM	1	3	22.09	22.38	21.94		
1.4	16QAM	1	5	21.99	22.01	21.98		
1.4	16QAM	3	0	21.27	21.24	21.11		
1.4	16QAM	3	1	21.26	21.01	21.06		
1.4	16QAM	3	3	21.18	21.01	21.12		
1.4	16QAM	6	0	21.12	21.16	21.01	22	2

<LTE Band 26>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				26765	26865	26965		
Frequency (MHz)				821.5	831.5	841.5		
15	QPSK	1	0	23.70	23.75	23.63	24	0
15	QPSK	1	37	23.44	23.53	23.42		
15	QPSK	1	74	23.45	23.51	23.36		
15	QPSK	36	0	22.73	22.91	22.75	23	1
15	QPSK	36	20	22.49	22.56	22.53		
15	QPSK	36	39	22.50	22.56	22.55		
15	QPSK	75	0	22.54	22.63	22.63		
15	16QAM	1	0	22.87	22.85	22.86	23	1
15	16QAM	1	37	22.21	22.74	22.25		
15	16QAM	1	74	22.47	22.79	22.17		
15	16QAM	36	0	21.73	21.66	21.60	22	2
15	16QAM	36	20	21.41	21.50	21.51		
15	16QAM	36	39	21.45	21.56	21.48		
15	16QAM	75	0	21.60	21.59	21.62		
Channel				26740	26865	26990	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				819	831.5	844		
10	QPSK	1	0	23.70	23.63	23.69	24	0
10	QPSK	1	25	23.37	23.47	23.38		
10	QPSK	1	49	23.39	23.44	23.30		
10	QPSK	25	0	22.73	22.59	22.69	23	1
10	QPSK	25	12	22.46	22.56	22.44		
10	QPSK	25	25	22.41	22.54	22.48		
10	QPSK	50	0	22.53	22.59	22.61		
10	16QAM	1	0	22.81	22.90	22.92	23	1
10	16QAM	1	25	22.17	22.64	22.15		
10	16QAM	1	49	22.42	22.72	22.16		
10	16QAM	25	0	21.68	21.63	21.50	22	2
10	16QAM	25	12	21.32	21.47	21.43		
10	16QAM	25	25	21.44	21.55	21.46		
10	16QAM	50	0	21.58	21.56	21.60		
Channel				26715	26865	27015	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				816.5	831.5	846.5		
5	QPSK	1	0	23.61	23.55	23.71	24	0
5	QPSK	1	12	23.42	23.44	23.34		
5	QPSK	1	24	23.37	23.46	23.34		
5	QPSK	12	0	22.66	22.61	22.70	23	1
5	QPSK	12	7	22.48	22.50	22.47		
5	QPSK	12	13	22.43	22.52	22.51		
5	QPSK	25	0	22.54	22.61	22.60		
5	16QAM	1	0	22.81	22.85	22.83	23	1
5	16QAM	1	12	22.18	22.67	22.15		
5	16QAM	1	24	22.44	22.75	22.09		
5	16QAM	12	0	21.72	21.62	21.52	22	2
5	16QAM	12	7	21.33	21.47	21.48		
5	16QAM	12	13	21.42	21.50	21.46		
5	16QAM	25	0	21.53	21.49	21.58		
Channel				26705	26865	27025	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				815.5	831.5	847.5		
3	QPSK	1	0	23.64	23.62	23.74	24	0
3	QPSK	1	8	23.39	23.45	23.41		
3	QPSK	1	14	23.42	23.45	23.34		

3	QPSK	8	0	22.70	22.54	22.69	23	1
3	QPSK	8	4	22.40	22.49	22.52		
3	QPSK	8	7	22.40	22.49	22.50		
3	QPSK	15	0	22.46	22.60	22.60		
3	16QAM	1	0	22.80	22.89	22.84	23	1
3	16QAM	1	8	22.17	22.71	22.18		
3	16QAM	1	14	22.41	22.78	22.17		
3	16QAM	8	0	21.70	21.65	21.60	22	2
3	16QAM	8	4	21.36	21.40	21.47		
3	16QAM	8	7	21.38	21.50	21.44		
3	16QAM	15	0	21.53	21.58	21.56		
Channel				26697	26865	27033	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				814.7	831.5	848.3		
1.4	QPSK	1	0	23.69	23.61	23.73	24	0
1.4	QPSK	1	3	23.38	23.50	23.42		
1.4	QPSK	1	5	23.39	23.43	23.28		
1.4	QPSK	3	0	22.67	22.54	22.69		
1.4	QPSK	3	1	22.49	22.51	22.53		
1.4	QPSK	3	3	22.43	22.53	22.51		
1.4	QPSK	6	0	22.50	22.60	22.57	23	1
1.4	16QAM	1	0	22.79	22.83	22.84	23	1
1.4	16QAM	1	3	22.12	22.68	22.22		
1.4	16QAM	1	5	22.40	22.71	22.11		
1.4	16QAM	3	0	21.67	21.61	21.50		
1.4	16QAM	3	1	21.31	21.45	21.48		
1.4	16QAM	3	3	21.40	21.50	21.46		
1.4	16QAM	6	0	21.56	21.53	21.60	22	2

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

General Note:

1. 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.
2. 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).
3. 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.
4. DSSS and OFDM configurations are considered separately according to the required SAR procedures. SAR is measured in the initial test position using the 802.11 transmission mode configuration required by the DSSS procedure or initial test configuration and subsequent test configuration(s) according to the OFDM procedures.18 The initial test position procedure is described in the following:
   a. When the reported SAR of the initial test position is ≤ 0.4 W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and 802.11 transmission mode combinations within the frequency band or aggregated band.
   b. When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is ≤ 0.8 W/kg or all required test position are tested.
   c. For all positions/configurations, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

<2.4GHz WLAN >

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	17.40	18.00	97.05
		6	2437	17.40	18.00	
		11	2462	17.40	18.00	
	802.11g 6Mbps	1	2412	16.30	17.00	86.98
		6	2437	16.30	17.00	
		11	2462	16.30	17.00	
	802.11n-HT20 MCS0	1	2412	14.20	15.00	86.49
		6	2437	14.20	15.00	
		11	2462	14.20	15.00	

<5GHz WLAN >

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11a 6Mbps	36	5180	14.00	15.00	86.67
		40	5200	14.30	15.00	
		44	5220	14.30	15.00	
		48	5240	14.30	15.00	
	802.11n-HT20 MCS0	36	5180	14.30	14.50	86.53
		40	5200	14.30	14.50	
		44	5220	14.20	14.50	
		48	5240	14.20	14.50	
	802.11n-HT40 MCS0	38	5190	9.80	10.00	87.90
		46	5230	14.20	14.50	

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN	802.11a 6Mbps	52	5260	14.30	15.00	86.67
		56	5280	14.30	15.00	
		60	5300	14.30	15.00	
		64	5320	13.00	15.00	
	802.11n-HT20 MCS0	52	5260	14.20	14.50	86.53
		56	5280	14.20	14.50	
		60	5300	14.20	14.50	
		64	5320	12.80	13.00	
	802.11n-HT40 MCS0	54	5270	14.10	14.50	87.90
		62	5310	8.10	9.00	

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN	802.11a 6Mbps	100	5500	13.10	15.00	86.67
		116	5580	14.40	15.00	
		124	5620	14.40	15.00	
		132	5660	14.40	15.00	
		144	5720	14.40	15.00	
	802.11n-HT20 MCS0	100	5500	12.80	13.00	86.53
		116	5580	14.30	14.50	
		124	5620	14.30	14.50	
		132	5660	14.30	14.50	
		144	5720	14.20	14.50	
	802.11n-HT40 MCS0	102	5510	9.00	10.00	87.90
		110	5550	14.30	14.50	
		126	5630	14.30	14.50	
		134	5670	12.00	13.00	
		142	5710	14.30	14.50	

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN	802.11a 6Mbps	149	5745	14.40	15.00	86.67
		157	5785	14.30	15.00	
		165	5825	14.40	15.00	
	802.11n-HT20 MCS0	149	5745	14.20	14.50	86.53
		157	5785	14.10	14.50	
		165	5825	14.10	14.50	
	802.11n-HT40 MCS0	151	5755	14.20	14.50	87.90
		159	5795	14.20	14.50	

<2.4GHz Bluetooth>

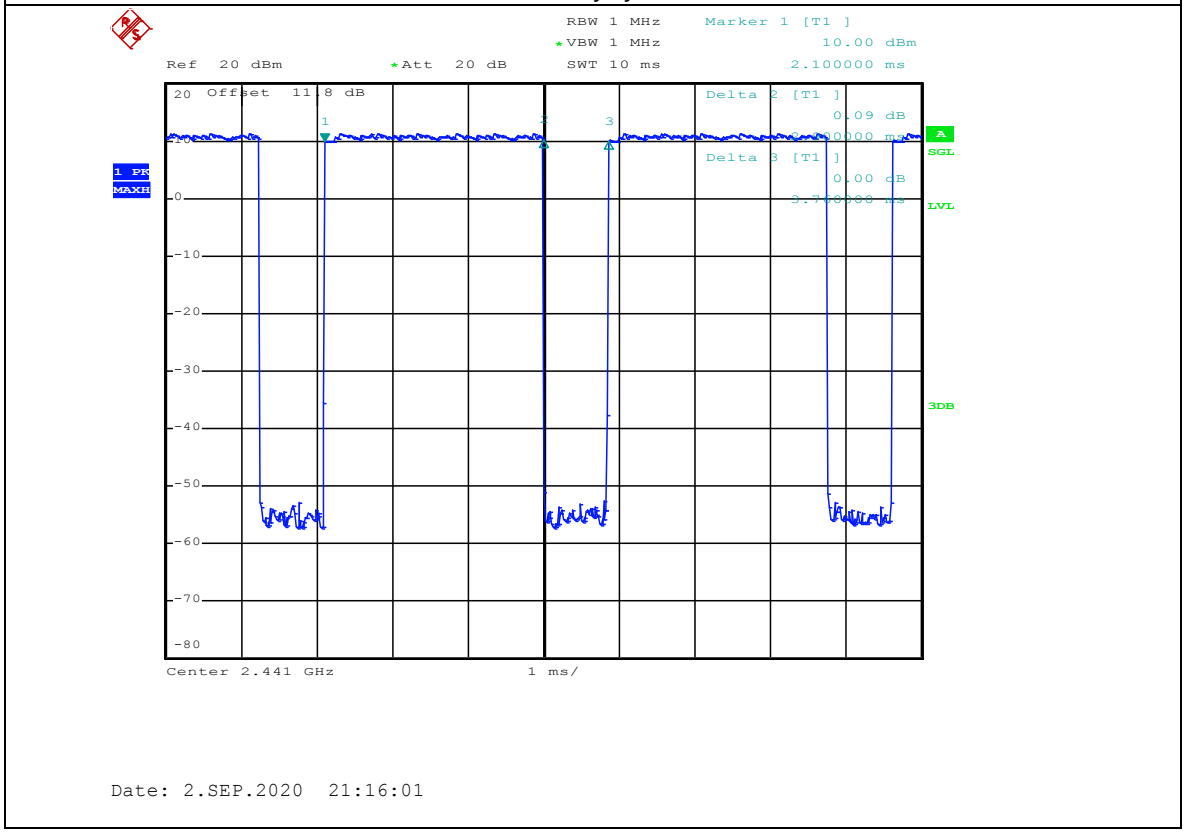
Mode	Channel	Frequency (MHz)	Average power (dBm)		
			1Mbps	2Mbps	3Mbps
BR / EDR	CH 00	2402	6.76	4.48	4.55
	CH 39	2441	6.83	4.71	4.69
	CH 78	2480	5.83	3.61	3.68
Tune-up Limit			7.00	5.00	5.00

Mode	Channel	Frequency (MHz)	Average power (dBm)
			GFSK
LE	CH 00	2402	1.80
	CH 19	2440	1.90
	CH 39	2480	1.30
Tune-up Limit			2.00

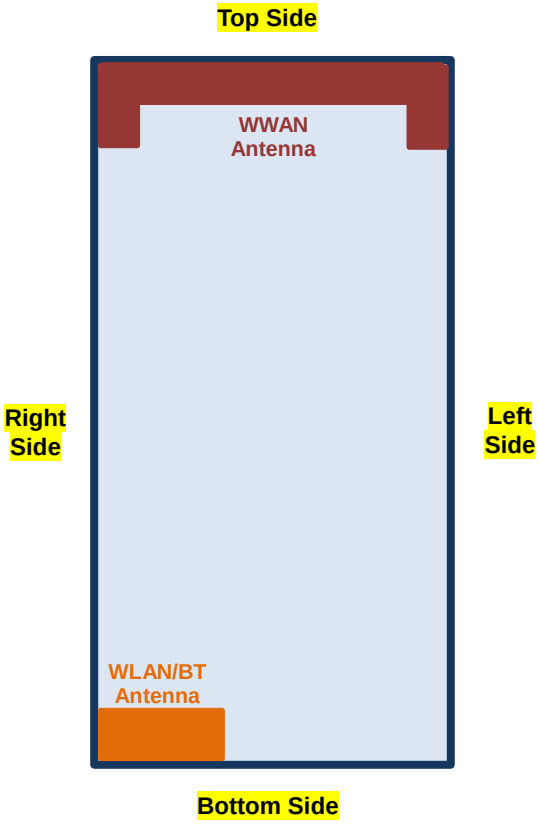
General Note:

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

BT Duty cycle



12. Antenna Location



Back View

13. 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.

GSM Note:

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

UMTS Note:

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

LTE Note:

1. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
2. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
3. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
4. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
5. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
6. For LTE B4/B5/B12/B26 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
7. LTE band 2/5 SAR test was covered by Band 25/26; according to TCB workshop, SAR test for overlapping LTE bands can be reduced if
   a. The maximum output power, including tolerance, for the smaller band is ≤ the larger band to qualify for the SAR test exclusion.
   b. The channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band.

WLAN Note:

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

13.1 Limbs SAR

<GSM SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	GSM850	GPRS (2 Tx slots)	Front	0mm	128	824.2	31.95	32.00	1.012	0.02	0.370	0.374
	GSM850	GPRS (2 Tx slots)	Back	0mm	128	824.2	31.95	32.00	1.012	0.14	0.339	0.343
	GSM850	GPRS (2 Tx slots)	Left Side	0mm	128	824.2	31.95	32.00	1.012	-0.05	0.458	0.463
	GSM850	GPRS (2 Tx slots)	Right Side	0mm	128	824.2	31.95	32.00	1.012	-0.03	0.669	0.677
	GSM850	GPRS (2 Tx slots)	Right Side	0mm	189	836.4	31.90	32.00	1.023	-0.14	1.075	1.100
01	GSM850	GPRS (2 Tx slots)	Right Side	0mm	251	848.8	31.90	32.00	1.023	-0.1	1.080	1.105
	GSM850	GPRS (2 Tx slots)	Top Side	0mm	128	824.2	31.95	32.00	1.012	0.06	0.233	0.236
	GSM1900	GPRS (4 Tx slots)	Front	0mm	512	1850.2	25.30	26.00	1.175	0.02	0.087	0.102
	GSM1900	GPRS (4 Tx slots)	Back	0mm	512	1850.2	25.30	26.00	1.175	-0.01	0.231	0.271
	GSM1900	GPRS (4 Tx slots)	Left Side	0mm	512	1850.2	25.30	26.00	1.175	0.08	0.446	0.524
02	GSM1900	GPRS (4 Tx slots)	Right Side	0mm	512	1850.2	25.30	26.00	1.175	-0.03	0.624	0.733
	GSM1900	GPRS (4 Tx slots)	Right Side	0mm	661	1880	25.20	26.00	1.202	-0.07	0.554	0.666
	GSM1900	GPRS (4 Tx slots)	Right Side	0mm	810	1909.8	25.24	26.00	1.191	-0.05	0.575	0.685
	GSM1900	GPRS (4 Tx slots)	Top Side	0mm	512	1850.2	25.30	26.00	1.175	0.06	0.322	0.378

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	WCDMA II	RMC 12.2Kbps	Front	0mm	9538	1907.6	23.37	24.00	1.156	0.01	0.157	0.182
	WCDMA II	RMC 12.2Kbps	Back	0mm	9538	1907.6	23.37	24.00	1.156	0.05	0.304	0.351
	WCDMA II	RMC 12.2Kbps	Left Side	0mm	9538	1907.6	23.37	24.00	1.156	-0.06	0.470	0.543
	WCDMA II	RMC 12.2Kbps	Right Side	0mm	9538	1907.6	23.37	24.00	1.156	0.08	0.781	0.903
03	WCDMA II	RMC 12.2Kbps	Right Side	0mm	9262	1852.4	23.31	24.00	1.172	0.05	0.877	1.028
	WCDMA II	RMC 12.2Kbps	Right Side	0mm	9400	1880	23.36	24.00	1.159	-0.1	0.786	0.911
	WCDMA II	RMC 12.2Kbps	Top Side	0mm	9538	1907.6	23.37	24.00	1.156	0.06	0.436	0.504
	WCDMA IV	RMC 12.2Kbps	Front	0mm	1413	1732.6	23.43	24.00	1.140	0.14	0.255	0.291
	WCDMA IV	RMC 12.2Kbps	Back	0mm	1413	1732.6	23.43	24.00	1.140	-0.17	0.312	0.356
	WCDMA IV	RMC 12.2Kbps	Left Side	0mm	1413	1732.6	23.43	24.00	1.140	0.04	0.403	0.460
04	WCDMA IV	RMC 12.2Kbps	Right Side	0mm	1413	1732.6	23.43	24.00	1.140	0.03	0.921	1.050
	WCDMA IV	RMC 12.2Kbps	Right Side	0mm	1312	1712.4	23.09	24.00	1.233	-0.08	0.850	1.048
	WCDMA IV	RMC 12.2Kbps	Right Side	0mm	1513	1752.6	23.38	24.00	1.153	-0.15	0.872	1.006
	WCDMA IV	RMC 12.2Kbps	Top Side	0mm	1413	1732.6	23.43	24.00	1.140	-0.02	0.678	0.773
	WCDMA V	RMC 12.2Kbps	Front	0mm	4132	826.4	23.74	24.00	1.062	-0.05	0.246	0.261
	WCDMA V	RMC 12.2Kbps	Back	0mm	4132	826.4	23.74	24.00	1.062	0.16	0.203	0.216
	WCDMA V	RMC 12.2Kbps	Left Side	0mm	4132	826.4	23.74	24.00	1.062	-0.04	0.276	0.293
	WCDMA V	RMC 12.2Kbps	Right Side	0mm	4132	826.4	23.74	24.00	1.062	0.14	0.527	0.560
	WCDMA V	RMC 12.2Kbps	Right Side	0mm	4182	836.4	23.65	24.00	1.084	0.13	0.563	0.610
05	WCDMA V	RMC 12.2Kbps	Right Side	0mm	4233	846.6	23.69	24.00	1.074	-0.15	0.574	0.616
	WCDMA V	RMC 12.2Kbps	Top Side	0mm	4132	826.4	23.74	24.00	1.062	0.06	0.188	0.200

<LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	LTE Band 4	20M	QPSK	1	0	Front	0mm	20175	1732.5	23.56	24.00	1.107	0.02	0.259	0.287
	LTE Band 4	20M	QPSK	50	0	Front	0mm	20175	1732.5	22.57	23.00	1.104	-0.11	0.195	0.215
	LTE Band 4	20M	QPSK	1	0	Back	0mm	20175	1732.5	23.56	24.00	1.107	-0.16	0.303	0.335
	LTE Band 4	20M	QPSK	50	0	Back	0mm	20175	1732.5	22.57	23.00	1.104	0.02	0.235	0.259
	LTE Band 4	20M	QPSK	1	0	Left Side	0mm	20175	1732.5	23.56	24.00	1.107	-0.17	0.382	0.423
	LTE Band 4	20M	QPSK	50	0	Left Side	0mm	20175	1732.5	22.57	23.00	1.104	0.07	0.295	0.326
06	LTE Band 4	20M	QPSK	1	0	Right Side	0mm	20175	1732.5	23.56	24.00	1.107	-0.1	0.899	0.995
	LTE Band 4	20M	QPSK	50	0	Right Side	0mm	20175	1732.5	22.57	23.00	1.104	-0.05	0.681	0.752
	LTE Band 4	20M	QPSK	1	0	Top Side	0mm	20175	1732.5	23.56	24.00	1.107	-0.12	0.686	0.759
	LTE Band 4	20M	QPSK	50	0	Top Side	0mm	20175	1732.5	22.57	23.00	1.104	0.01	0.512	0.565
	LTE Band 7	20M	QPSK	1	0	Front	0mm	21100	2535	23.50	24.50	1.259	0.04	0.292	0.367
	LTE Band 7	20M	QPSK	50	0	Front	0mm	21100	2535	22.45	23.50	1.274	0.19	0.209	0.266
	LTE Band 7	20M	QPSK	1	0	Back	0mm	21100	2535	23.50	24.50	1.259	-0.15	0.168	0.211
	LTE Band 7	20M	QPSK	50	0	Back	0mm	21100	2535	22.45	23.50	1.274	0.01	0.131	0.166
	LTE Band 7	20M	QPSK	1	0	Left Side	0mm	21100	2535	23.50	24.50	1.259	-0.03	0.287	0.361
	LTE Band 7	20M	QPSK	50	0	Left Side	0mm	21100	2535	22.45	23.50	1.274	-0.14	0.266	0.339
07	LTE Band 7	20M	QPSK	1	0	Right Side	0mm	21100	2535	23.50	24.50	1.259	-0.05	0.956	1.204
	LTE Band 7	20M	QPSK	1	0	Right Side	0mm	20850	2510	23.39	24.50	1.291	0.17	0.893	1.153
	LTE Band 7	20M	QPSK	1	0	Right Side	0mm	21350	2560	23.39	24.50	1.291	-0.03	0.926	1.195
	LTE Band 7	20M	QPSK	50	0	Right Side	0mm	21100	2535	22.45	23.50	1.274	0.11	0.929	1.183
	LTE Band 7	20M	QPSK	1	0	Top Side	0mm	21100	2535	23.50	24.50	1.259	0.08	0.221	0.278
	LTE Band 7	20M	QPSK	50	0	Top Side	0mm	21100	2535	22.45	23.50	1.274	-0.09	0.208	0.265
	LTE Band 12	10M	QPSK	1	0	Front	0mm	23095	707.5	23.98	24.00	1.005	-0.02	0.187	0.188
	LTE Band 12	10M	QPSK	25	0	Front	0mm	23095	707.5	22.97	23.00	1.007	0.04	0.155	0.156
	LTE Band 12	10M	QPSK	1	0	Back	0mm	23095	707.5	23.98	24.00	1.005	0.07	0.214	0.215
	LTE Band 12	10M	QPSK	25	0	Back	0mm	23095	707.5	22.97	23.00	1.007	-0.13	0.182	0.183
	LTE Band 12	10M	QPSK	1	0	Left Side	0mm	23095	707.5	23.98	24.00	1.005	0.18	0.182	0.183
	LTE Band 12	10M	QPSK	25	0	Left Side	0mm	23095	707.5	22.97	23.00	1.007	0.07	0.139	0.140
	LTE Band 12	10M	QPSK	1	0	Right Side	0mm	23095	707.5	23.98	24.00	1.005	0.17	0.192	0.193
	LTE Band 12	10M	QPSK	25	0	Right Side	0mm	23095	707.5	22.97	23.00	1.007	0.04	0.166	0.167
08	LTE Band 12	10M	QPSK	1	0	Top Side	0mm	23095	707.5	23.98	24.00	1.005	-0.03	0.227	0.228
	LTE Band 12	10M	QPSK	25	0	Top Side	0mm	23095	707.5	22.97	23.00	1.007	0.16	0.188	0.190
	LTE Band 13	10M	QPSK	1	0	Front	0mm	23230	782	23.76	24.00	1.057	-0.13	0.178	0.188
	LTE Band 13	10M	QPSK	25	0	Front	0mm	23230	782	22.74	23.00	1.062	-0.05	0.153	0.163
	LTE Band 13	10M	QPSK	1	0	Back	0mm	23230	782	23.76	24.00	1.057	0.08	0.325	0.343
	LTE Band 13	10M	QPSK	25	0	Back	0mm	23230	782	22.74	23.00	1.062	0.15	0.240	0.254
	LTE Band 13	10M	QPSK	1	0	Left Side	0mm	23230	782	23.76	24.00	1.057	0.04	0.154	0.163
	LTE Band 13	10M	QPSK	25	0	Left Side	0mm	23230	782	22.74	23.00	1.062	-0.12	0.121	0.128
	LTE Band 13	10M	QPSK	1	0	Right Side	0mm	23230	782	23.76	24.00	1.057	-0.09	0.257	0.272
	LTE Band 13	10M	QPSK	25	0	Right Side	0mm	23230	782	22.74	23.00	1.062	0.01	0.198	0.210
09	LTE Band 13	10M	QPSK	1	0	Top Side	0mm	23230	782	23.76	24.00	1.057	-0.04	0.392	0.414
	LTE Band 13	10M	QPSK	25	0	Top Side	0mm	23230	782	22.74	23.00	1.062	0.07	0.307	0.326

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	LTE Band 25	20M	QPSK	1	0	Front	0mm	26340	1880	23.68	24.00	1.076	-0.17	0.152	0.164
	LTE Band 25	20M	QPSK	50	0	Front	0mm	26340	1880	22.59	23.00	1.099	0.05	0.125	0.137
	LTE Band 25	20M	QPSK	1	0	Back	0mm	26340	1880	23.68	24.00	1.076	-0.08	0.383	0.412
	LTE Band 25	20M	QPSK	50	0	Back	0mm	26340	1880	22.59	23.00	1.099	-0.13	0.323	0.355
	LTE Band 25	20M	QPSK	1	0	Left Side	0mm	26340	1880	23.68	24.00	1.076	-0.18	0.604	0.650
	LTE Band 25	20M	QPSK	50	0	Left Side	0mm	26340	1880	22.59	23.00	1.099	0.19	0.487	0.535
	LTE Band 25	20M	QPSK	1	0	Right Side	0mm	26340	1880	23.68	24.00	1.076	-0.08	0.985	1.060
10	LTE Band 25	20M	QPSK	1	0	Right Side	0mm	26140	1860	23.34	24.00	1.164	-0.04	1.090	1.269
	LTE Band 25	20M	QPSK	1	0	Right Side	0mm	26590	1905	23.27	24.00	1.183	-0.06	0.978	1.157
	LTE Band 25	20M	QPSK	50	0	Right Side	0mm	26340	1880	22.59	23.00	1.099	0.13	0.787	0.865
	LTE Band 25	20M	QPSK	1	0	Top Side	0mm	26340	1880	23.68	24.00	1.076	0.14	0.625	0.673
	LTE Band 25	20M	QPSK	50	0	Top Side	0mm	26340	1880	22.59	23.00	1.099	-0.08	0.506	0.556
	LTE Band 26	15M	QPSK	1	0	Front	0mm	26865	831.5	23.75	24.00	1.059	-0.04	0.229	0.243
	LTE Band 26	15M	QPSK	36	0	Front	0mm	26865	831.5	22.91	23.00	1.021	0.01	0.173	0.177
	LTE Band 26	15M	QPSK	1	0	Back	0mm	26865	831.5	23.75	24.00	1.059	0.08	0.186	0.197
	LTE Band 26	15M	QPSK	36	0	Back	0mm	26865	831.5	22.91	23.00	1.021	-0.19	0.144	0.147
	LTE Band 26	15M	QPSK	1	0	Left Side	0mm	26865	831.5	23.75	24.00	1.059	-0.06	0.249	0.264
	LTE Band 26	15M	QPSK	36	0	Left Side	0mm	26865	831.5	22.91	23.00	1.021	-0.05	0.188	0.192
11	LTE Band 26	15M	QPSK	1	0	Right Side	0mm	26865	831.5	23.75	24.00	1.059	-0.11	0.478	0.506
	LTE Band 26	15M	QPSK	36	0	Right Side	0mm	26865	831.5	22.91	23.00	1.021	0.17	0.381	0.389
	LTE Band 26	15M	QPSK	1	0	Top Side	0mm	26865	831.5	23.75	24.00	1.059	-0.13	0.173	0.183
	LTE Band 26	15M	QPSK	36	0	Top Side	0mm	26865	831.5	22.91	23.00	1.021	-0.08	0.125	0.127

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	WLAN2.4GHz	802.11b 1Mbps	Front	0mm	6	2437	17.40	18.00	1.148	97.05	1.030	0.01	0.023	0.027
	WLAN2.4GHz	802.11b 1Mbps	Back	0mm	6	2437	17.40	18.00	1.148	97.05	1.030	-0.06	0.115	0.136
12	WLAN2.4GHz	802.11b 1Mbps	Right Side	0mm	6	2437	17.40	18.00	1.148	97.05	1.030	-0.06	0.149	0.176
	WLAN2.4GHz	802.11b 1Mbps	Right Side	0mm	1	2412	17.40	18.00	1.148	97.05	1.030	-0.06	0.147	0.174
	WLAN2.4GHz	802.11b 1Mbps	Right Side	0mm	11	2462	17.40	18.00	1.148	97.05	1.030	0.01	0.134	0.158
	WLAN2.4GHz	802.11b 1Mbps	Bottom Side	0mm	6	2437	17.40	18.00	1.148	97.05	1.030	0	0.143	0.169
	WLAN5GHz	802.11a 6Mbps	Front	0mm	60	5300	14.30	15.00	1.175	86.67	1.154	0.1	0.018	0.024
13	WLAN5GHz	802.11a 6Mbps	Back	0mm	60	5300	14.30	15.00	1.175	86.67	1.154	-0.05	0.417	0.565
	WLAN5GHz	802.11a 6Mbps	Back	0mm	52	5260	14.30	15.00	1.175	86.67	1.154	-0.02	0.403	0.546
	WLAN5GHz	802.11a 6Mbps	Back	0mm	56	5280	14.30	15.00	1.175	86.67	1.154	0.06	0.400	0.542
	WLAN5GHz	802.11a 6Mbps	Back	0mm	64	5320	13.00	15.00	1.585	86.67	1.154	-0.14	0.218	0.399
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	60	5300	14.30	15.00	1.175	86.67	1.154	0.08	0.196	0.266
	WLAN5GHz	802.11a 6Mbps	Bottom Side	0mm	60	5300	14.30	15.00	1.175	86.67	1.154	0.12	0.104	0.141
	WLAN5GHz	802.11a 6Mbps	Front	0mm	116	5580	14.40	15.00	1.148	86.67	1.154	0.06	0.024	0.032
	WLAN5GHz	802.11a 6Mbps	Back	0mm	116	5580	14.40	15.00	1.148	86.67	1.154	0.01	0.425	0.563
	WLAN5GHz	802.11a 6Mbps	Back	0mm	100	5500	13.10	15.00	1.549	86.67	1.154	0.09	0.226	0.404
	WLAN5GHz	802.11a 6Mbps	Back	0mm	124	5620	14.40	15.00	1.148	86.67	1.154	-0.05	0.490	0.649
	WLAN5GHz	802.11a 6Mbps	Back	0mm	132	5660	14.40	15.00	1.148	86.67	1.154	0.06	0.504	0.668
14	WLAN5GHz	802.11a 6Mbps	Back	0mm	144	5720	14.40	15.00	1.148	86.67	1.154	-0.01	0.530	0.702
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	116	5580	14.40	15.00	1.148	86.67	1.154	0.13	0.226	0.299
	WLAN5GHz	802.11a 6Mbps	Bottom Side	0mm	116	5580	14.40	15.00	1.148	86.67	1.154	-0.08	0.140	0.185
	WLAN5GHz	802.11a 6Mbps	Front	0mm	149	5745	14.40	15.00	1.148	86.67	1.154	-0.02	0.016	0.021
15	WLAN5GHz	802.11a 6Mbps	Back	0mm	149	5745	14.40	15.00	1.148	86.67	1.154	-0.1	0.442	0.586
	WLAN5GHz	802.11a 6Mbps	Back	0mm	157	5785	14.30	15.00	1.175	86.67	1.154	-0.04	0.349	0.473
	WLAN5GHz	802.11a 6Mbps	Back	0mm	165	5825	14.40	15.00	1.148	86.67	1.154	0.03	0.293	0.388
	WLAN5GHz	802.11a 6Mbps	Right Side	0mm	149	5745	14.40	15.00	1.148	86.67	1.154	0.18	0.151	0.200
	WLAN5GHz	802.11a 6Mbps	Bottom Side	0mm	149	5745	14.40	15.00	1.148	86.67	1.154	-0.15	0.196	0.260

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	Bluetooth	1Mbps	Front	0mm	39	2441	6.83	7.00	1.040	77.13	1.080	0.01	0.001	0.001
	Bluetooth	1Mbps	Back	0mm	39	2441	6.83	7.00	1.040	77.13	1.080	-0.16	0.001	0.001
	Bluetooth	1Mbps	Right Side	0mm	39	2441	6.83	7.00	1.040	77.13	1.080	0.19	0.032	0.036
	Bluetooth	1Mbps	Right Side	0mm	0	2402	6.76	7.00	1.057	77.13	1.080	0.08	0.034	0.039
16	Bluetooth	1Mbps	Right Side	0mm	78	2480	5.83	7.00	1.309	77.13	1.080	-0.15	0.030	0.042
	Bluetooth	1Mbps	Bottom Side	0mm	39	2441	6.83	7.00	1.040	77.13	1.080	0.09	0.026	0.029

14. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Limbs
1.	WWAN + Bluetooth	Yes

General Note:

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

14.1 Limbs Exposure Conditions

WWAN Band	Exposure Position	1	4	1+4
		WWAN	Bluetooth	Summed
		10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)
GSM850	Front	0.374	0.001	**0.375**
	Back	0.343	0.001	**0.344**
	Left side	0.463		**0.463**
	Right side	1.105	0.042	**1.147**
	Top side	0.236		**0.236**
	Bottom side		0.029	**0.029**
GSM1900	Front	0.102	0.001	**0.103**
	Back	0.271	0.001	**0.272**
	Left side	0.524		**0.524**
	Right side	0.733	0.042	**0.775**
	Top side	0.378		**0.378**
	Bottom side		0.029	**0.029**
WCDMA II	Front	0.182	0.001	**0.183**
	Back	0.351	0.001	**0.352**
	Left side	0.543		**0.543**
	Right side	1.028	0.042	**1.070**
	Top side	0.504		**0.504**
	Bottom side		0.029	**0.029**
WCDMA IV	Front	0.291	0.001	**0.292**
	Back	0.356	0.001	**0.357**
	Left side	0.460		**0.460**
	Right side	1.050	0.042	**1.092**
	Top side	0.773		**0.773**
	Bottom side		0.029	**0.029**
WCDMA V	Front	0.261	0.001	**0.262**
	Back	0.216	0.001	**0.217**
	Left side	0.293		**0.293**
	Right side	0.616	0.042	**0.658**
	Top side	0.200		**0.200**
	Bottom side		0.029	**0.029**
LTE Band 4	Front	0.287	0.001	**0.288**
	Back	0.335	0.001	**0.336**
	Left side	0.423		**0.423**
	Right side	0.995	0.042	**1.037**
	Top side	0.759		**0.759**
	Bottom side		0.029	**0.029**
LTE Band 7	Front	0.367	0.001	**0.368**
	Back	0.211	0.001	**0.212**
	Left side	0.361		**0.361**
	Right side	1.204	0.042	**1.246**
	Top side	0.278		**0.278**
	Bottom side		0.029	**0.029**
LTE Band 12	Front	0.188	0.001	**0.189**
	Back	0.215	0.001	**0.216**
	Left side	0.183		**0.183**
	Right side	0.193	0.042	**0.235**
	Top side	0.228		**0.228**
	Bottom side		0.029	**0.029**

WWAN Band	Exposure Position	1 WWAN 10g SAR (W/kg)	4 Bluetooth 10g SAR (W/kg)	1+4 Summed 10g SAR (W/kg)
LTE Band 13	Front	0.188	0.001	**0.189**
	Back	0.343	0.001	**0.344**
	Left side	0.163		**0.163**
	Right side	0.272	0.042	**0.314**
	Top side	0.414		**0.414**
	Bottom side		0.029	**0.029**
LTE Band 25	Front	0.164	0.001	**0.165**
	Back	0.412	0.001	**0.413**
	Left side	0.650		**0.650**
	Right side	1.269	0.042	**1.311**
	Top side	0.673		**0.673**
	Bottom side		0.029	**0.029**
LTE Band 26	Front	0.243	0.001	**0.244**
	Back	0.197	0.001	**0.198**
	Left side	0.264		**0.264**
	Right side	0.506	0.042	**0.548**
	Top side	0.183		**0.183**
	Bottom side		0.029	**0.029**

Test Engineer： York Lu and Jeff Tsao

15. 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 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.

16. 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.