TEST REPORT

APPLICANT	:	mMax Communications, Inc.
PRODUCT NAME	:	Fresno
MODEL NAME	:	HPP-M14
BRAND NAME	:	Hot Pepper
FCC ID	:	2AWVS-M14
STANDARD(S)	:	47CFR 2.1093,KDB's
RECEIPT DATE	:	2020-07-15
TEST DATE	:	2020-07-15 to 2020-08-06
ISSUE DATE	:	2020-08-19

Edited by : Stefan Sun(Test engineer)

Review by: Peng fuwei(Auditor)

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DIRECTORY

Change history			
Version	**Date**	**Reason for change**	**Test engineer**
1.0	2020-08-19	Original	Stefan Sun

1. SAR Results Summary

The maximum results of Specific Absorption Rate (SAR) found during test as bellows:

Frequency Band		Highest SAR Summary (1-g SAR,W/kg)	
		Body-worn (Separation 10mm)	Hotspot (Separation 10mm)
WCDMA	WCDMA Band II	0.740	0.740
	WCDMA Band IV	0.750	0.750
	WCDMA Band V	0.489	0.489
LTE	LTE Band 2	0.649	0.701
	LTE Band 4	0.902	0.902
	LTE Band 5	0.864	0.864
	LTE Band 12	0.784	0.784
	LTE Band 13	0.682	0.682
	LTE Band 25	0.777	0.777
	LTE Band 26	0.978	0.978
	LTE Band 41	1.101	1.101
	LTE Band 66	0.914	0.914
	LTE Band 71	0.309	0.309
WLAN	2.4GHz WLAN	0.289	0.289
	5GHz WLAN	0.379	0.464
Highest Simultaneous Transmission		Body-worn	Hotspot
WWAN + 2.4GHz WLAN		1.390	1.390
WWAN + 5GHz WLAN		1.480	1.565
Max Scaled SAR_{1g} (W/Kg) Limit(W/kg): 1.6 W/kg		Body-worn	1.101
		Hotspot	1.101

2. Technical Information

Note: Provide by applicant.

2.1. Applicant and Manufacturer Information

Applicant:	mMax Communications, Inc.
Applicant Address:	5151 California Ave., Suite 100, Irvine 92617, USA
Manufacturer:	mMax Communications, Inc.
Manufacturer Address:	5151 California Ave., Suite 100, Irvine 92617, USA

2.2. Equipment Under Test (EUT) Description

Product name:	Fresno
Hardware Version:	SD305T_V1.0
Software Version:	Fresno_V1.0.2_RLK
Frequency Bands:	WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz WCDMA Band IV: 1710 MHz ~ 1755 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz FDD-LTE Band 2: 1850 MHz ~ 1910 MHz FDD-LTE Band 4: 1710 MHz ~ 1755 MHz FDD-LTE Band 5: 824 MHz ~ 849 MHz FDD-LTE Band 12: 699 MHz ~ 716 MHz FDD-LTE Band 13: 779.5 MHz ~ 784.5 MHz FDD-LTE Band 25: 1850 MHz ~ 1915 MHz FDD-LTE Band 26: 824 MHz ~ 849 MHz TDD-LTE Band 41: 2498 MHz ~ 2688 MHz FDD-LTE Band 66: 1710 MHz ~ 1780 MHz FDD-LTE Band 71: 665 MHz ~ 696 MHz WLAN 2.4GHz: 2412 MHz ~ 2472 MHz WLAN 5.2GHz: 5180 MHz ~ 5240 MHz WLAN 5.8GHz: 5745 MHz ~ 5825 MHz
Modulation Mode:	WCDMA: QPSK/16QAM LTE: QPSK/16QAM/64QAM 802.11b: DSSS 802.11 g/n-HT20/HT40/ac-VHT40/VHT80: OFDM
Hotspot Mode:	Support
Antenna Type:	PIFI
Battery:	3000mAh 3.8V

Note: For a more detailed description, please refer to specification or user's manual supplied by the applicant and/or manufacturer.

2.3. Photographs of the EUT

Normal Temperature (NT):	20 ... 25 °C
Relative Humidity:	30 ... 75 %
Air Pressure:	980 ... 1020 hPa

Test frequency:	WCDMA Band II/IV/V; FDD-LTE Band 2/4/5/12/13/25/26/66/71; TDD-LTE Band 41; WLAN 2.4GHz; WLAN 5GHz;
Operation mode:	Establish connection
Power Level:	WCDMA Band II/IV/V (All Up Bits) FDD-LTE Band 2/4/5/12/13/25/26/66/71 (Maximum output power) TDD-LTE Band 41 (Maximum output power) WLAN 2.4GHz (Maximum output power) WLAN 5GHz (Maximum output power)

During SAR test, EUT is in Traffic Mode (Channel Allocated) at Normal Voltage Condition. A communication link is set up with a System Simulator (SS) by air link, and a call is established.

The EUT shall use its internal transmitter. The antenna(s), battery and accessories shall be those specified by the Factory. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output. If a wireless link is used, the antenna connected to the output of the base station simulator shall be placed at least 50 cm away from the handset.
The signal transmitted by the simulator to the antenna feeding point shall be lower than the output power level of the handset by at least 35 dB.

For SAR testing, EUT is in GPRS mode. In GPRS link mode, its crest factor is 2, because EUT is set in GPRS multi-slot class 12 with 4 uplink slots. In WCDMA and WI-FI mode, its crest factor is 1.

3. Specific Absorption Rate (SAR)

3.1. Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radiofield. The SAR distribution in a biological body is complicated and is usually carried out byexperimental techniques or numerical modeling. The standard recommends limits for two tiers ofgroups, occupational/controlled and general population/uncontrolled, based on a person's awarenessand ability to exercise control over his or her exposure.
Ingeneral,occupational/controlled exposurelimits are Middle than the limits for general population/uncontrolled.

3.2. 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)
SAR measurement can be either related to the temperature elevation in tissue by,

$$\mathbf{SAR} = \mathbf{C}\left(\frac{\boldsymbol{\delta}\mathbf{T}}{\boldsymbol{\delta}\mathbf{t}}\right)$$

Where C is the specific head capacity, δT is the temperature rise and δt the exposure duration, or related to the electrical field in the tissue by

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

Where σ is the conductivity of the tissue, ρ is the mass density of the tissue and $|E|$ is the rmselectrical field strength.

However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

4. RF Exposure Limits

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

Type Exposure	Uncontrolled Environment Limit
Spatial Peak SAR (1g cube tissue for head and trunk)	1.60W/kg
Spatial Peak SAR (10g cube tissue for limbs)	4.00W/kg
Spatial Peak SAR (1g cube tissue for whole body)	0.08W/kg

Note:

1. This limit is according to recommendation1999/519/EC, Annex II (Basic Restrictions)
2. Occupational/Uncontrolled Environments are defined as locations where there is exposure that may be incurred by people who are aware of the potential for exposure,(i.e. as a result of employment or occupation)

5. Applied Reference Documents

Leading reference documents for testing:

No.	Identity	Document Title
1	47 CFR§2.1093	Radio Frequency Radiation Exposure Evaluation: Portable Devices
2	KDB 447498 D01v06	General RF Exposure Guidance
3	KDB 248227 D01v02r02	SAR Measurement Procedures for 802.11 Transmitters
4	KDB 865664 D01v01r04	SAR Measurement 100 MHz to 6 GHz
5	KDB 865664 D02v01r02	RF Exposure Reporting
6	KDB 648474 D04v01r03	Handset SAR
7	KDB 941225 D01v03r01	3G SAR MEAUREMENT PROCEDURES
8	KDB 941225 D05v02r05	SAR Evaluation Consideration for LTE Devices
9	KDB 941225 D06v02r01	SAR Evaluation Procedures For Portable Devices With Wireless Router Capabilities

6. SAR Measurement System

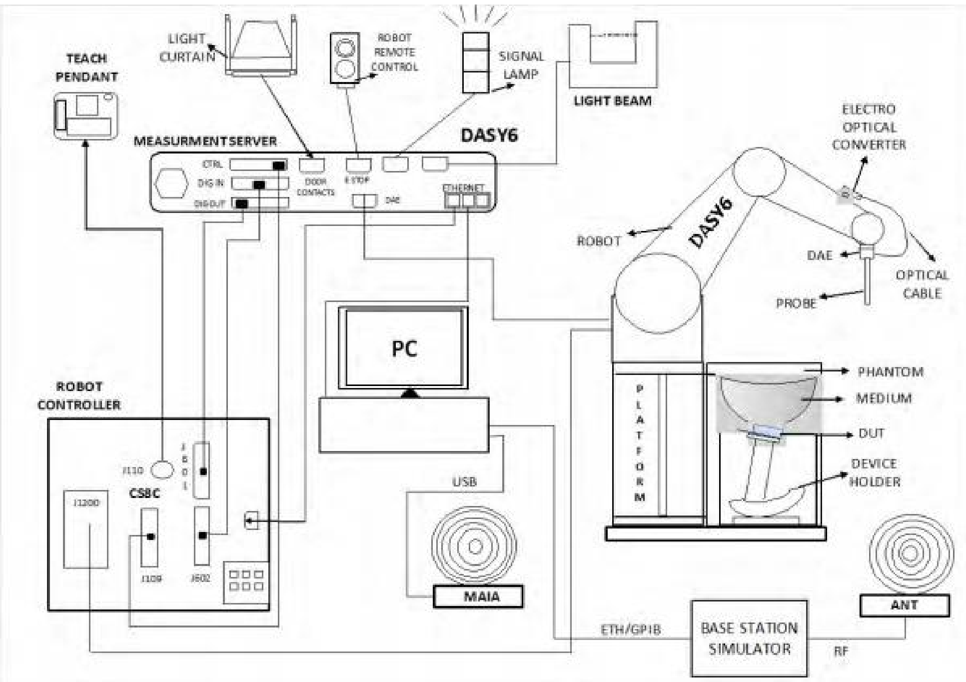

Fig 6.1 SPEAG DASY System Configurations

The DASY system for performance compliance tests is illustrated above graphically. This system consists of the following items:

- A standard high precision 6-axis robot (Staubli TX/RX family, with its software especially configured for SPEAG) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- A platform on which robot arm is mounted and phantom shells to be inserted in dedicated slots.
- 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 Win8.1/Win10 professional operating system and the cDASY6 V6.4 and

DASY5 V5.2 software. Please see 1.6 DASY6 Software Installation for detailed computer requirements.

- 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. 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.

E-Field Probe Specification

Model	Ex3DV4	 Fig 6.2 Photo of EX3DV4
Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	10 MHz to 6 GHz; Linearity: ± 0.2 dB	
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotationnormal to probe axis)	
Dynamic Range	10 μW/g to 100 mW/g; Linearity: ± 0.2 dB	
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipolecenters: 1 mm	
Application	High precision dosimetric measurements in any exposure scenario(e.g.,very strong gradient fields).Only probe which enables compliance testing forfrequencies up to 6 GHz with precision of better 30%	

E-Field Probe Calibration

Each probe needs to be calibrated according to a dosimetric assessment procedure with accuracy better than ± 10%. The spherical isotropy shall be evaluated and within ± 0.25 dB. The sensitivity parameters (Norm X, Norm Y, and Norm Z), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested. The calibration data can be referred to appendix C of this report.

6.2. Data Acquisition Electronics (DAE)

The data acquisition electronics (DAE4 or DAE3) consist 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 with a 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 mechanical probe mounting device includes two different sensor systems for frontal and sideways probe contacts used for mechanical surface detection and probe collision detection. The input impedance of both the DAE4 as well as of the DAE3 box is 200 MOhm; the inputs are symmetric and floating. Common mode rejection is above 80 dB.	 **Fig 6.3 Photo of DAE**

6.3. Robot

The DASY6 system uses the high-precision industrial robots TX60LfromSt¨aubliSA (France). The TX robot family – the successor of the well-known RX robot family – continues to offer the features important for DASY6 applications:

• High precision (repeatability 0.02 mm)

• High reliability (industrial design)

• Low maintenance costs (virtually maintenance-free as all gears are direct drive, no belt drives)

• Jerk-free straight movements (brushless synchron motors, no stepper motors)

• Low extremely low frequency (ELF) interference (motor control fields are shielded by the closed metallic construction)

The robots are controlled by the St¨aubli CS8c robot controllers. All information regarding the use andmaintenance of the robot arm and the robot controller is provided on CDs delivered with the robot.Paper manuals are available directly from St¨aubli upon request

Fig 6.4Robot

6.4. Measurement Server

The DASY6 measurement server is based on a PC/104 CPU board with a 400 MHz intel ULVCeleron, 128 MB chip-disk and 128 MB RAM. The necessary circuits for communication with the DAE4(or DAE3) electronics box, as well as the 16-bit AD converter system for optical detection and digital I/O interface are contained on the DASY6 I/O board, which is directly connected to the PC/104 bus of the CPU board.

The measurement server performs all real-time data evaluations of field measurements and surface detection, controls robot movements, and handles safety operations.

Fig 6.5Measurement Server

6.5. Phantom

The SAM-Twin phantom (shown in frontof DASY6) is a fiberglass shell phantom with shell thickness 2 mm, except in the ear region where the thickness is increased to 6 mm. The phantom has three measurement areas:

1) Left Head
2) Right Head
3) Flat Section

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 Reference points on the phantoms (P1, P2, P3) are used to teach the absolute phantom position relative to the robot.

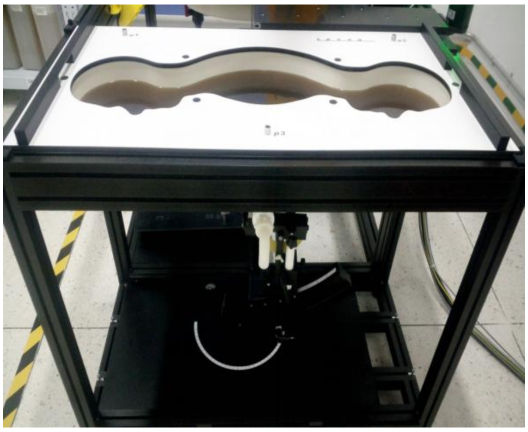

Fig 6.6Photo of SAM Phantom

7. Device Holder

The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5 mm distance, a positioning uncertainty of ±0.5 mm would produce uncertainty in the SAR of ±20%. Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions at which the devices must be measured are defined by the standards.

The DASY device holder is designed to cope with the different positions described in the standard. It has two scales for device rotation (with respect to the body axis) and device inclination (with respect to the line between the ear reference points). The rotation centers for both scales is the ear reference point (ERP). Thus, the device needs no repositioning when the angles are changed. The DASY device holder is constructed of low-loss polyoxymethylene (POM) material, which has the following dielectric parameters: relative permittivity ε =3 and loss tangent δ =0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered

Fig 7.1 Device Holder

7.1. Data Storage and Evaluation

Data Storage

The DASY software stores the assessed data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all the necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files. The post-processing software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of erroneous parameter settings. For example, if a measurement has been performed with an incorrect crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be reevaluated.

The measured data can be visualized or exported in different units or formats, depending on the selected probe type (e.g., [V/m], [A/m], [mW/g]). Some of these units are not available in certain situations or give meaningless results, e.g., a SAR-output in a non-lose media, will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

Data Evaluation

The DASY post-processing software (SEMCAD) automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software.

Probe parameters:	- Sensitivity	$Norm_i$, a_{i0}, a_{i1}, a_{i2}
	- Conversion factor	$ConvF_i$
	- Diode compression point	dcpi
Device parameters:	- Frequency	f
	- Crest factor	cf
Media parameters:	- Conductivity	σ
	- Density	ρ

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY components. In the direct measuring mode of the multi-meter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics. If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power.

The formula for each channel can be given as:

$$V_i = U_i + U_i^2 \times \frac{cf}{dcp_i}$$

With Vi = compensated signal of channel i, (i = x, y, z)
Ui = input signal of channel i, (i = x, y, z)
cf = crest factor of exciting field (DASY parameter)
dcpi = diode compression point (DASY parameter)

From the compensated input signals, the primary field data for each channel can be evaluated:

$$\text{E-field Probes:} E_i = \sqrt{\frac{V_i}{Norm_i \times ConvF}}$$

$$\text{H-field Probes:} H_i = \sqrt{V_i} \times \frac{a_{i0} + a_{i1} + a_{i2} f^2}{f}$$

With V_i = compensated signal of channel i, (i = x, y, z)

$Norm_i$ = sensor sensitivity of channel i, (i = x, y, z), μV/(V/m)^2 forE-field

Probes ConvF = sensitivity enhancement in solution

a_{ij} = sensor sensitivity factors for H-field probes

f = carrier frequency [GHz]

E_i = electric field strength of channel i in V/m

H_i = magnetic field strength of channel i in A/m

The RSS value of the field components gives the total field strength (Hermitian magnitude):

$$E_{tot} = \sqrt{E_x^2 + E_y^2 + E_z^2}$$

The primary field data are used to calculate the derived field units.

$$SAR = E_{tot}^2 \times \frac{\sigma}{\rho \times 1000}$$

with SAR = local specific absorption rate in mW/g

E_{tot} = total field strength in V/m

σ = conductivity in [mho/m] or [Siemens/m]

ρ = equivalent tissue density in g/cm^3

Note that the density is set to 1, to account for actual head tissue density rather than the density of the tissue simulating liquid.

7.2. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	750MHz System Validation Kit	D750V3	1173	2018.06.21	2021.06.20
SPEAG	835MHz System Validation Kit	D835V2	4d227	2018.06.22	2021.06.21
SPEAG	1750MHz System Validation Kit	D1750V2	1160	2018.06.25	2021.06.24
SPEAG	1900MHz System Validation Kit	D1900V2	5d221	2018.06.22	2021.06.21
SPEAG	2450MHz System Validation Kit	D2450V2	997	2018.06.26	2021.06.25
SPEAG	2600MHz System Validation Kit	D2600V2	1139	2018.06.25	2021.06.24
SPEAG	5GHz System Validation Kit	D5GHzV2	1176	2018.11.06	2021.11.05

SPEAG	Dosimetric E-Field Probe	EX3DV4	7445	2019.11.06	2020.11.05
SPEAG	Dosimetric E-Field Probe	EX3DV4	3823	2020.01.03	2021.01.02
SPEAG	Dosimetric E-Field Probe	EX3DV4	3975	2020.05.20	2021.05.19
SPEAG	Data Acquisition Electronics	DAE4	1516	2019.11.11	2020.11.10
SPEAG	Dielectric Assessment KIT	DAK-3.5	1279	2019.11.03	2020.11.02
SPEAG	SAM Twin Phantom	QD 000 P41 AA	1922	NCR	NCR
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
R&S	Network Emulator	CMW500	124534	2020.03.11	2021.03.10
Agilent	Network Analyzer	E5071B	MY42404762	2020.03.12	2021.03.11
mini-circuits	Amplifier	ZHL-42W+	608501717	NCR	NCR
mini-circuits	Amplifier	ZVE-8G+	754401735	NCR	NCR
Agilent	Signal Generator	E4438C	MY47272140	2020.03.09	2021.03.08
Agilent	Power Senor	N8482A	MY41090849	2019.11.23	2020.11.22
Agilent	Power Meter	E4416A	MY45102093	2019.11.23	2020.11.22
Anritsu	Power Sensor	MA2411B	N/A	2019.11.23	2020.11.22
Anritsu	Power Meter	NRVD	101066	2019.11.23	2020.11.22
Agilent	Dual Directional Coupler	778D	50422	NA	NA
MCL	Attenuation1	351-218-010	N/A	NA	NA
THERMOMETER	Thermo meter	NT-312	N/A	2020.03.09	2021.03.08
N/A	Tissue Simulating Liquids	700-6000MHz	N/A	24H	

Note:

1. The calibration certificate of DASY can be referred to appendix E of this report.
2. The Insertion Loss calibration of Dual Directional Coupler and Attenuator were characterized via the network analyzer and compensated during system check.
3. The dielectric probe kit was calibrated via the network analyzer, with the specified procedure (calibrated in pure water) and calibration kit (standard) short circuit, before the dielectric measurement. The specific procedure and calibration kit are provided by Speag.
4. In system check we need to monitor the level on the power meter, and adjust the power amplifier level to have precise power level to the dipole; the measured SAR will be normalized to 1W input power according to the ratio of1W to the input power to the dipole. For system check, the calibration of the power amplifier is deemed not critically required for correct measurement; the power meter is critical and we do have calibration for it
5. Attenuator insertion loss is calibrated by the network Analyzer, which the calibration is valid, before system check.
6. N.C.R means No Calibration Requirement.

8. Tissue Simulating Liquids

For SAR measurement of the field distribution inside the phantom, the phantom must be filled with homogeneous tissue simulating liquid to a depth of at least 15cm. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than15cm.For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than15cm, which is shown in Fig. 5.1. 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. 5.2.Thenominaldielectricvaluesofthe tissue simulating liquids in the phantom and the tolerance of 5%are listed in below table.

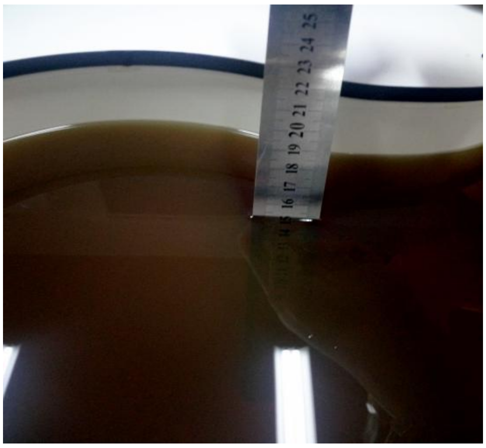

Fig 8.1 Photo of Liquid Height for Head SAR

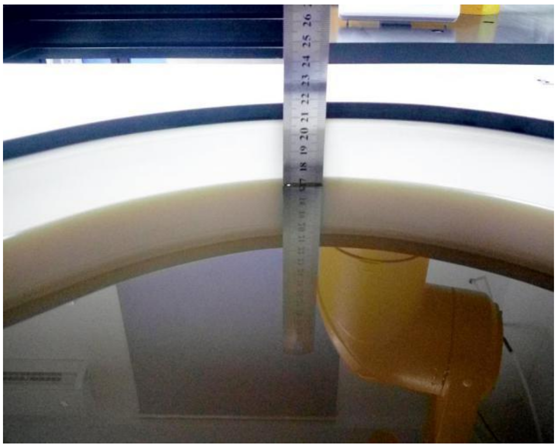

Fig 8.2 Photo of Liquid Height for Body SAR

The following table gives the recipes for tissue simulating liquids

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (εr)
Head								
750	41.1	57.0	0.2	1.4	0.2	0	0.89	41.9
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
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
Body								
750	51.7	47.2	0	0.9	0.1	0	0.96	55.5
835	50.8	48.2	0	0.9	0.1	0	0.97	55.2
1800, 1900, 2000	70.2	0	0	0.4	0	29.4	1.52	53.3
2450	68.6	0	0	0	0	31.4	1.95	52.7
2600	68.1	0	0	0.1	0	31.8	2.16	52.5

Simulating Liquid for 5GHz, Manufactured by SPEAG

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

Note: Please refer to the validation results for dielectric parameters of each frequency band.

The dielectric properties of the tissue simulating liquids were verified prior to the SAR evaluation using an Agilent 85033E Dielectric Probe Kit and an Agilent Network Analyzer.

Table 1: Dielectric Performance of Tissue Simulating Liquid

Date	Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Conductivity (σ)	Conductivity Target (σ)	Delta (σ) (%)	Limit (%)
2020.08.06	750	HSL	22.40	0.93	0.89	4.38	±5
2020.07.31	835	HSL	22.30	0.92	0.9	2.01	±5
2020.07.28	1750	HSL	22.10	1.34	1.4	-4.64	±5
2020.07.29	1750	HSL	22.00	1.37	1.4	-1.86	±5
2020.07.30	1900	HSL	21.80	1.35	1.4	-3.71	±5
2020.08.03	2450	HSL	22.20	1.81	1.8	0.44	±5
2020.08.04	2600	HSL	22.60	1.94	1.96	-1.02	±5
2020.08.05	5250	HSL	21.70	4.71	4.71	0.00	±5
2020.08.07	5750	HSL	21.80	5.25	5.22	0.54	±5

Date	Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Permittivity (ε_r)	Permittivity Target (ε_r)	Delta (ε_r) (%)	Limit (%)
2020.08.06	750	HSL	22.40	42.14	41.9	0.57	±5
2020.07.31	835	HSL	22.30	40.10	41.5	-3.38	±5
2020.07.28	1750	HSL	22.10	38.84	40	-2.89	±5
2020.07.29	1750	HSL	22.00	38.86	40	-2.85	±5
2020.07.30	1900	HSL	21.80	38.38	40	-4.05	±5
2020.08.03	2450	HSL	22.20	38.84	39.2	-0.93	±5
2020.08.04	2600	HSL	22.60	38.99	39	-0.04	±5
2020.08.05	5250	HSL	21.70	34.60	35.95	-3.75	±5
2020.08.07	5750	HSL	21.70	35.64	35.35	0.82	±5

9. SAR System Verification

Each DASY system is equipped with one or more system validation kits. These units, together with the predefined measurement procedures within the DASY software, enable the user to conduct the system performance check and system validation. System validation kit includes a dipole, tripod holder to fix it underneath the flat phantom and a corresponding distance holder.

9.1. Purpose of System Performance check

The system performance check verifies that the system operates within its specifications. System and operator errors can be detected and corrected. It is recommended that the system performance check be performed prior to any usage of the system in order to guarantee reproducible results. The system performance check uses normal SAR measurements in a simplified setup with a well characterized source. This setup was selected to give a high sensitivity to all parameters that might fail or vary over time. The system check does not intend to replace the calibration of the components, but indicates situations where the system uncertainty is exceeded due to drift or failure.

9.2. System Setup

The output power on dipole port must be calibrated to 24 dBm (250 mW) before dipole is connected.
In the simplified setup for system evaluation, the DUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave which comes from a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The system check verifies that the system operates within its specifications. It is performed daily or before every SAR measurement. The system check uses normal SAR measurements in the flat section of the phantom with a matched dipole at a specified distance. The system verification setup is shown as below.

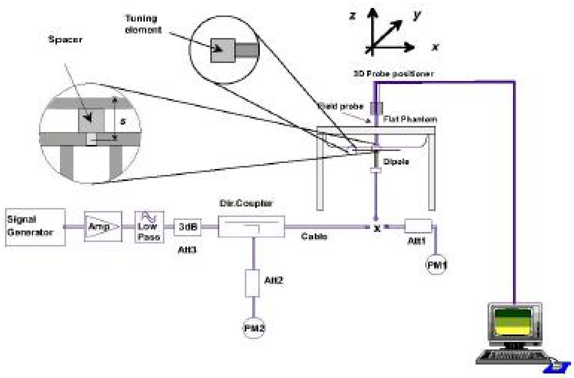

Fig 9.1 Photo of Dipole Setup Fig **9.2 System Setup for System Evaluation**

9.3. Validation Results

After system check testing, the SAR result will be normalized to 1W forward input power and compared with the reference SAR value derived from validation dipole certificate report. The deviation of system check should be within 10 %.

<Validation Setup>

Frequency (MHz)2	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N
750	HSL	250	D750V3-	3975	1516
835	HSL	250	D835V2-	7445	1516
1750	HSL	250	D1750V2	7445	1516
1900	HSL	250	D1900V2	7445	1516
2450	HSL	250	D2450V2	7445	1516
2600	HSL	250	D2600V2-	7445	1516
5250	HSL	100	D5GHzV2-1176	3823	1516
5750	HSL	100	D5GHzV2-1176	3823	1516

<1g SAR>

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2020.08.06	750	HSL	250	2.07	8.26	8.28	0.24
2020.07.31	835	HSL	250	2.37	9.34	9.48	1.50
2020.07.28	1750	HSL	250	9.62	37.10	38.48	3.72
2020.07.29	1750	HSL	250	9.73	37.10	38.92	4.91
2020.07.30	1900	HSL	250	9.75	39.50	39	-1.27
2020.08.03	2450	HSL	250	13.2	52.90	52.8	-0.19
2020.08.04	2600	HSL	250	13.5	54.00	54	0.00
2020.08.05	5250	HSL	100	8.18	78.90	81.8	3.68
2020.08.07	5750	HSL	100	7.96	80.00	79.6	-0.50

<10g SAR>

Date	Frequency (MHz)2	Tissue Type	Input Power (mW)	Measured 10g SAR (W/kg)	Targeted 10g SAR (W/kg)3	Normalized 10g SAR (W/kg)	Deviation (%)
2020.08.06	750	HSL	250	1.37	5.45	5.48	0.55
2020.07.31	835	HSL	250	1.52	6.07	6.08	0.16
2020.07.28	1750	HSL	250	5.12	20.00	20.48	2.40
2020.07.29	1750	HSL	250	5.22	20.00	20.88	4.40
2020.07.30	1900	HSL	250	5.08	20.60	20.32	-1.36
2020.08.03	2450	HSL	250	6.15	24.90	24.6	-1.20
2020.08.04	2600	HSL	250	6.12	24.50	24.48	-0.08
2020.08.05	5250	HSL	100	2.36	22.50	23.6	4.89
2020.08.07	5750	HSL	100	2.25	22.60	22.5	-0.44

Note: System checks the specific test data please see Annex C

10. EUT Testing Position

This EUT was tested in six different positions. They are right cheek/right tilted/left cheek/left tilted for head, Front/Back of the EUT with phantom 10 mm gap, as illustrated below, please refer to Appendix B for the test setup photos. SAR Evaluations near the Mouth/Jaw Regions of the SAM Phantom

Antennas located near the bottom of a phone may require SAR measurements around the mouth and jaw regions of the SAM head phantom. This typically applies to clam-shell style phones that are generally longer in the unfolded normal use positions or to certain older style long rectangular phones.

Under these circumstances, the following procedures apply, adopted from the FCC guidance on SAR handsets document FCC KDB Publication 648474 D04v01r03. The SAR required in these regions of SAM should be measured using a flat phantom. The phone should be positioned with a separation distance of 4 mm between the ear reference point (ERP) and the outer surface of the flat phantom shell. While maintaining this distance at the ERP location, the low (bottom) edge of the phone should be lowered from the phantom to establish the same separation distance between the peak SAR locations identified by the truncated partial SAR distribution measured with the SAM phantom. The distance from the peak SAR location to the phone is determined by the straight line passing perpendicularly through the phantom surface. When it is not feasible to maintain 4 mm separation at the ERP while also establishing the required separation at the peak SAR location, the top edge of the phone will be allowed to touch the phantom with a separation < 4 mm at the ERP. The phone should not be tilted to the left or right while placed in this inclined position to the flat phantom.

10.1. Body-worn Configurations

The body-worn configurations shall be tested with the supplied accessories (belt-clips, holsters, etc.) attached to the device in normal use configuration.

For body-worn and other configurations a flat phantom shall be used which is comprised of material with electrical properties similar to the corresponding tissues.

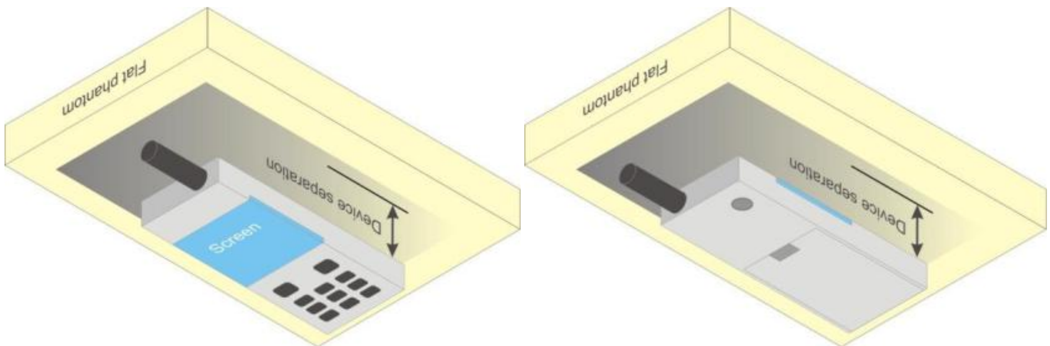

Fig 10.5 Illustration for Body-Worn Position

10.2. Hotspot Mode Exposure Position Conditions

For handsets that support hotspot mode operations, with wireless router capabilities and various web browsing functions, the relevant hand and body exposure conditions are tested according to the hotspot SAR procedures in KDB 941225. A test separation distance of 10 mm is required between the phantom and all surfaces and edges with a transmitting antenna located within 25 mm from that surface or edge. When the form factor of a handset is smaller than 9 cm x 5 cm, a test separation distance of 5 mm (instead of 10 mm) is required for testing hotspot mode. When the separation distance required for body-worn accessory testing is larger than or equal to that tested for hotspot mode, in the same wireless mode and for the same surface of the phone, the hotspot mode SAR data may be used to support body-worn accessory SAR compliance for that particular configuration (surface).

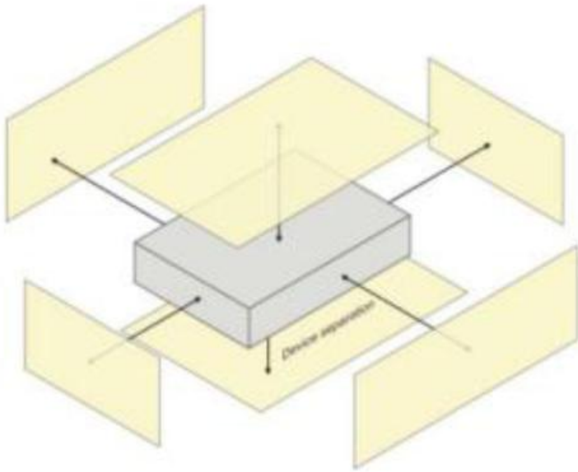

Fig 10.6 Illustrationfor Hotspot Position

11. 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

11.1. 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 scAnt.

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

11.2. 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.

11.3. Area Scan Procedures

Area scans are defined prior to the measurement process being executed with a user defined variable spacing between each measurement point (integral) allowing low uncertainty measurements to be conducted. Scans defined for FCC applications utilize a10mm² step integral, with 1mm interpolation used to locate the peak SAR area used for zoom scan assessments.

When an Area Scan has measured all reachable points, it computes the field maxima founding the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE1528-2003, EN 50361 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan).

11.4. Zoom Scan Procedures

Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. A density of 1000 kg/m³ is used to represent the head and body tissue density and not the phantom liquid density, in order to be consistent with the definition of the liquid dielectric properties, i.e. the side length of the 1g cube is 10mm, with the side length of the 10 g cube 21,5mm.The zoom scan integer steps can be user defined so as to reduce uncertainty, but normal practice for typical test applications utilize a physical step of 5x5x7 (8mmx8mmx5mm) providing a volume of 32mm in the X & Y axis, and 30mm in the Z axis.

11.5. SAR Averaged Methods

In DASY, the interpolation and extrapolation are both based on the modified Quadratic Sheppard's method. The interpolation scheme combines a least-square fitted function method and a weighted average method which are the two basic types of computational interpolation and approximation.

Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1 g and 10 g cubes, the extrapolation distance should not be larger than 5 mm.

11.6. Power Drift Monitoring

All SAR testing is under the DUT 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 DUT 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 drift more than 5%, the SAR will be retested.

12. SAR Test Procedure

12.1. General scan Requirements

Probe boundary effect error compensation is required for measurements with the probe tip closer than half a probe tip diameter to the phantom surface. Both the probe tip diameter and sensor offset distance must satisfy measurement protocols; to ensure probe boundary effect errors are minimized and the higher fields closest to the phantom surface can be correctly measured and extrapolated to the phantom surface for computing 1-g SAR. Tolerances of the post-processing algorithms must be verified by the test laboratory for the scan resolutions used in the SAR measurements, according to the reference distribution functions specified in IEEE Std 1528-2013.

<table>
<tr><td colspan="3"></td><td>≤ 3 GHz</td><td>> 3 GHz</td></tr>
<tr><td colspan="3">Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 mm ± 1 mm</td><td>$\frac{1}{2} \cdot \delta \cdot \ln(2)$ mm ± 0.5 mm</td></tr>
<tr><td colspan="3">Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30° ± 1°</td><td>20° ± 1°</td></tr>
<tr><td colspan="3" rowspan="2">Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}</td><td>≤ 2 GHz: ≤ 15 mm
2 – 3 GHz: ≤ 12 mm</td><td>3 – 4 GHz: ≤ 12 mm
4 – 6 GHz: ≤ 10 mm</td></tr>
<tr><td colspan="2">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.</td></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>≤ 2 GHz: ≤ 8 mm
2 – 3 GHz: ≤ 5 mm*</td><td>3 – 4 GHz: ≤ 5 mm*
4 – 6 GHz: ≤ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{Zoom}(n)$</td><td>≤ 5 mm</td><td>3 – 4 GHz: ≤ 4 mm
4 – 5 GHz: ≤ 3 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface</td><td>≤ 4 mm</td><td>3 – 4 GHz: ≤ 3 mm
4 – 5 GHz: ≤ 2.5 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">≤ $1.5 \cdot \Delta z_{Zoom}(n-1)$ mm</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>≥ 30 mm</td><td>3 – 4 GHz: ≥ 28 mm
4 – 5 GHz: ≥ 25 mm
5 – 6 GHz: ≥ 22 mm</td></tr>
<tr><td colspan="5">Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see IEEE Std 1528-2013 for details.
* When zoom scan is required and the <u>reported</u> SAR from the area scan based 1-g SAR estimation procedures of KDB Publication 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.</td></tr>
</table>

12.2. Test procedure

The Following steps are used for each test position

1. Establish a call with the maximum output power with a base station simulator. The connection between the mobile and the base station simulator is established via air interface.
2. Measurement of the local E-field value at a fixed location. This value serves as a reference value for calculating a possible power drift.
3. Measurement of the SAR distribution with a grid of 8 to 16mm * 8 to16 mm and a constant distance to the inner surface of the phantom. Since the sensors cannot directly measure at the inner phantom surface, the values between the sensors and the inner phantom surface are extrapolated. With these values the area of the maximum SAR is calculated by an interpolation scheme.
4. Around this point, a cube of 30 * 30 * 30 mm or 32 * 32 * 32 mm is assessed by measuring 5 or 8 * 5 or 8*4 or 5 mm. With these data, the peak spatial-average SAR value can be calculated.

12.3. Description of interpolation/extrapolation scheme

The local SAR inside the phantom is measured using small dipole sensing elements inside a probe body. The probe tip must not be in contact with the phantom surface in order to minimize measurements errors, but the highest local SAR will occur at the surface of the phantom.

An extrapolation is using to determinate this highest local SAR values. The extrapolation is based on a fourth-order least-square polynomial fit of measured data. The local SAR value is then extrapolated from the liquid surface with a 1mm step.

The measurements have to be performed over a limited time (due to the duration of the battery) so the step of measurement is high. It could vary between 5 and 8 mm. To obtain an accurate assessment of the maximum SAR averaged over 10 grams and 1 gram requires a very fine resolution in the three dimensional scanned data array.

12.4. Wireless Router

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

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

13. SAR Test Configuration

<GSM Mode>

A summary of these settings are illustrated below:
For GSM850frequency band, the power control is set to 5 for GSM/GPRS mode (GSMK-CS1) and set to 8 for EDGE mode (MCS5); For GSM1900frequency band, the power control is set to 0 for GSM/GPRS mode (GSMK-CS1) and set to 2 for EDGE mode (MCS5)

1. Per KDB 447498 D01v06, the maximum output power channel is used for SAR testing and for further SAR test reduction.
2. Per KDB 941225 D01v03r01, 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 (4Tx slots) for GSM850/GSM1900 is considered as the primary mode.
3. Other configurations of GSM / GPRS / EDGE are considered as secondary modes.

Timeslot consignations:

Remark:

1. The frame-averaged power is linearly reported the maximum burst averaged power over 8 time slots. The calculated method are shown as below:
   The duty cycle "x" of different time slots as below:
   1 TX slot is 1/8, 2 TX slots is 2/8, 3 TX slots is 3/8 and 4 TX slots is 4/8
   Based on the calculation formula:
   Frame-averaged power = Burst averaged power + 10 1og (x)
   So,
   Frame-averaged power (1 TX slot) = Burst averaged power (1 TX slot)– 9.03
   Frame-averaged power (2 TX slots) = Burst averaged power (2 TX slots)– 6.02
   Frame-averaged power (3 TX slots) = Burst averaged power (3 TX slots)– 4.26
   Frame-averaged power (4 TX slots) = Burst averaged power (4 TX slots) – 3.01
2. CS1 coding scheme was used in GPRS conducted power measurements and SAR testing, MCS5 coding scheme was used in EGPRS conducted power measurements and SAR testing (if necessary).

No. of Slots:	Slot 1	Slot 2	Slot 3	Slot 4
Slot Consignation:	1Up4Down	2Up3Down	3Up2Down	4Up1Down
Duty Cycle:	1:8.3	1:4.15	1:2.77	1:2.08
Correct Factor:	-9.03dB	-6.02dB	-4.26dB	-3.01dB

<WCDMA Mode>

Summary of UMTS conducted power measurement:

1. 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.
2. The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification.
3. 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.
4. For HSPA+ devices supporting 16 QAM in the uplink, power measurements procedure is according to the configurations in Table C.11.1.4 of 3GPP TS 34.121-1.
5. 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 / HSPA+ 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 / HSPA+ to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA / HSPA+, and according to the following RF output power, the output power results of the secondary modes (HSDPA / HSUPA / DC-HSDPA / HSPA+) are less than ¼ dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA / HSPA+.
6. A fixed level power reduction is applied for WCDMA Band II when handset open Hotspot mode, the power reduction triggered.

HSDPA Setup Configuration:

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (1)	CM (dB) (2)
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15 (3)	15/15 (3)	64	12/15 (3)	24/15	1.0
3	15/15	8/15	64	15/8	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5

Note 1: Δ_{ACK}, Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$

Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$.

Note 3: 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 signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$.

HSUPA Setup Configuration:

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (1)	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM(2) (dB)	MPR (dB)	AG(4) Index	E-TFCI
1	11/15(3)	15/15(3)	64	11/15(3)	22/15	209/225	1039/225	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	β_{ed1}: 47/15 β_{ed2}: 47/15	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(4)	15/15(4)	64	15/15(4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 8 ⇔ $A_{hs} = \beta_{hs}/\beta_c = 30/15$ ⇔ $\beta_{hs} = 30/15 * \beta_c$.
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 signaled gain factors for the reference TFC (TF1, TF1) to β_c = 10/15 and β_d = 15/15.
Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 14/15 and β_d = 15/15.
Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g.
Note 6: β_{ed} cannot be set directly; it is set by Absolute Grant Value.

HSPA+ 3GPP release 7 (uplink category 7) 16QAM, Setup Configuration:

Table C.11.1.4: β values for transmitter characteristics tests with HS-DPCCH and E-DCH with 16QAM

Sub-test	β_c (Note3)	β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (2xSF2) (Note 4)	β_{ed} (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCI (Note 5)	E-TFCI (boost)
1	1	0	30/15	30/15	β_{ed}1: 30/15 β_{ed}2: 30/15	β_{ed}3: 24/15 β_{ed}4: 24/15	3.5	2.5	14	105	105

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with $\beta_{hs} = 30/15 * \beta_c$.
Note 2: CM = 3.5 and the MPR is based on the relative CM difference, MPR = MAX(CM-1,0).
Note 3: DPDCH is not configured, therefore the β_c is set to 1 and β_d = 0 by default.
Note 4: β_{ed} can not be set directly; it is set by Absolute Grant Value.
Note 5: All the sub-tests require the UE to transmit 2SF2+2SF4 16QAM EDCH and they apply for UE using E-DPDCH category 7. E-DCH TTI is set to 2ms TTI and E-DCH table index = 2. To support these E-DCH configurations DPDCH is not allocated. The UE is signaled to use the extrapolation algorithm.

<LTE Mode>

LTE Target MPR level

The device implements maximum power reduction per 3GPP 36.101 requirements where the MPR target is as below table. The MPR settings are implemented configured into firmware and cannot be disabled by the end user or LTE carrier network.

Modulation	Channel bandwidth / Transmission bandwidth configuration [RB]						MPR Target (dB)	3GPP MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz		
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	1	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	1	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	2	≤ 2

Note: The measurement result showed some difference from the target MPR level, due to expected 0.5dBmeasurement tolerance

LTE Bands

LTE Bands	Channel bandwidth / Transmission bandwidth configuration [RB]					
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz
2	v	v	v	v	v	v
4	v	v	v	v	v	v
5	v	v	v	v	N/A	N/A
13	v	v	v	v	N/A	N/A

Note:

1. 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.
2. 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.
3. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
4. 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.
5. Per KDB 941225 D05v02r05, 16QAM/64QAM 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 KDB941225 D05v02r05, 16QAM/64QAM SAR testing is not required.
6. 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.
7. For LTE B4 / B5 / B7 / B17 the maximum bandwidth does not support three non-overlapping channels, per KDB941225 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.
8. LTE band 2 / 12 SAR test was covered by Band 25 / 17; 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.

9. According to 2017 TCB workshop, for 64 QAM and 16 QAM should be verified by checking the signal constellation with a call box to avoid incorrect maximum power levels due to MPR and other requirements associated with signal modulation, and the following figure is taken from the "Fundamental Measurement >> Modulation Analysis >>constellation" mode of the device connect to the CMW500 base station, therefore, the device 64QAM and 16QAMsignal modulation are correct. Identify if Maximum Power Reduction (MPR) is optional or mandatory, i.e. built-in by design: only mandatory MPR may be considered during SAR testing, when the maximum output power is permanently limited by the MPR implemented within the UE; and only for the applicable RB (resource block) configurations specified in LTE standards: b) A-MPR (additional MPR) must be disabled.
10. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.

    a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.

    b. For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"

    c. For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor

    d. For WLAN/Bluetooth: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor

    e. For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix 63.3%/62.9% = 1.006 is applied to scale-up the measured SAR result. The Reported TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.
11. 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
12. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.
13. Per KDB 648474 D04v01r03, when the reported SAR for a body-worn accessory measured without a headset connected to the handset is ≤ 1.2 W/kg, SAR testing with a headset connected to the handset is not required.

<WLAN 2.4GHz>

1. SAR is measured for 2.4 GHz 802.11b DSSS using either the fixed test position or, when applicable, the initial test position procedure. SAR test reduction is determined according to the following:
   1) When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.
   2) When the reported SAR is > 0.8 W/kg, SAR is required for that position using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.
2. 2.4 GHz 802.11 g/n OFDM are additionally evaluated for SAR if the highest reported SAR for 802.11b, adjusted by the ratio of the OFDM to DSSS specified maximum output power, is > 1.2 W/kg. When SAR is required for OFDM modes in 2.4 GHz band, the Initial Test Configuration Procedures should be followed.
3. For held-to-ear and hotspot operations, the initial test position procedures were applied. The test position with the highest extrapolated peak SAR will be used as the initial test position. When reported SAR for the initial test position is ≤ 0.4 W/kg, no additional testing for the remaining test positions was required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured.
4. Justification for test configurations for WLAN per KDB Publication 248227 D02DR02-41929 for 2.4 GHz WI-FI single transmission chain operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4 GHz802.11g/n) was not required due to the maximum allowed powers and the highest reported DSSSSAR.
5. Per KDB 248227 D01v02r02, In the 2.4 GHz band, separate SAR procedures are applied to DSSS and OFDM configurations to simplify DSSS test requirements. SAR is not required for the following 2.4 GHz OFDM conditions:
   1) When KDB Publication 447498 SAR test exclusion applies to the OFDM configuration.
   2) 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.

<WLAN 5GHz>

A)U-NII-1 and U-NII-2A Bands

For devices that operate in only one of the U-NII-1 and U-NII-2A bands, the normally required SAR procedures for OFDM configurations are applied. For devices that operate in both U-NII bands using the same transmitter and antenna(s), SAR test reduction is determined according to the following：

1) When the same maximum output power is specified for both bands, begin SAR measurement in U- NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test

configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, both bands are tested independently for SAR.

2) When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration; otherwise, both bands are tested independently for SAR.

3)The two U-NII bands may be aggregated to support a 160 MHz channel on channel number 50. Without additional testing, the maximum output power for this is limited to the lower of the maximum output power certified for the two bands. When SAR measurement is required for at least one of the bands and the highest reported SAR adjusted by the ratio of specified maximum output power of aggregated to standalone band is > 1.2 W/kg, SAR is required for the 160 MHz channel. This procedure does not apply to an aggregated band with maximum output higher than the standalone band(s); the aggregated band must be tested independently for SAR. SAR is not required when the 160 MHz channel is operating at a reduced maximum power and also qualifies for SAR test exclusion.

B)U-NII-2C and U-NII-3 Bands

The frequency range covered by these bands is 380 MHz (5.47 – 5.85 GHz), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements. when Terminal Doppler Weather Radar (TDWR) restriction applies, all channels that operate at 5.60 – 5.65 GHz must be included to apply the SAR test reduction and measurement procedures. When the same transmitter and antenna(s) are used for U-NII-2C band and U-NII-3 band or 5.8 GHz band of §15.247, the bands may be aggregated to enable additional channels with 20, 40 or 80 MHz bandwidth to span across the band gap, as illustrated in Appendix B. The maximum output power for the additional band gap channels is limited to the lower of those certified for the bands. Unless band gap channels are permanently disabled, they must be considered for SAR testing. The frequency range covered by these bands is 380 MHz (5.47 – 5.85 GHz), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements. To maintain SAR measurement accuracy and to facilitate test reduction, the channels in U-NII-2C band above 5.65 GHz may be grouped with the 5.8 GHz channels in U-NII-3 or §15.247 band to enable two SAR probe calibration frequency points to cover the bands, including the band gap channels. When band gap channels are supported and the bands are not aggregated for SAR testing, band gap channels must be considered independently in each band according to the normally required OFDM SAR measurement and probe calibration frequency points requirements.

C)OFDM Transmission Mode SAR Test Configuration and Channel Selection Requirements

The initial test configuration for 5 GHz OFDM transmission modes is determined by the 802.11 configuration with the highest maximum output power specified for production units, including tune-up tolerance, in each standalone and aggregated frequency band. SAR for the initial test configuration is measured using the highest maximum output power channel determined by the default power measurement procedures. When multiple configurations in a frequency band have the same specified maximum output power, the initial test configuration is determined according to the following steps applied sequentially.

1)The largest channel bandwidth configuration is selected among the multiple configurations with thesame specified maximum output power.

2)If multiple configurations have the same specified maximum output power and largest channelbandwidth, the lowest order modulation among the largest channel bandwidth configurations is selected.

3)If multiple configurations have the same specified maximum output power, largest channel bandwidthand lowest order modulation, the lowest data rate configuration among these configurations is selected.

4)When multiple transmission modes (802.11a/g/n/ac) have the same specified maximum output power,largest channel bandwidth, lowest order modulation and lowest data rate, the lowest order 802.11 mode is selected; i.e., 802.11a is chosen over 802.11n then 802.11ac or 802.11g is chosen over 802.11n. After an initial test configuration is determined, if multiple test channels have the same measured maximum output power, the channel chosen for SAR measurement is determined according to the following. These channel selection procedures apply to both the initial test configuration and subsequent test configuration(s), with respect to the default power measurement procedures or additional power measurements required for further SAR test reduction. The same procedures also apply to subsequent highest output power channel(s) selection.

1)The channel closest to mid-band frequency is selected for SAR measurement.

2)For channels with equal separation from mid-band frequency; for example, high and low channels ortwo mid-band channels, the higher frequency (number) channel is selected for SAR measurement.

D)SAR Test Requirements for OFDM configurations

When SAR measurement is required for 802.11 a/n/ac OFDM configurations, each standalone and frequency aggregated band is considered separately for SAR test reduction. When the sametransmitter and antenna(s) are used for U-NII-1 and U-NII-2A bands, additional SAR test reduction Vapplies. When band gap channels between U-NII-2C band and 5.8 GHz U-NII-3 or §15.247 bandare supported, the highest maximum output power transmission mode configuration and maximumoutput power channel across the bands must be used to determine SAR test reduction, accordingto the initial test configuration and subsequent test configuration requirements. In applying theinitial test configuration and subsequent test configuration procedures, the 802.11 transmissionconfiguration with the highest specified maximum output power and the channel within a testconfiguration with the highest measured maximum output power should be clearly distinguished toapply the procedures.

14. Conducted RF Output Power

WCDMA Conducted Power：

Band	WCDMA II			Tune-up Limit (dBm)	WCDMA IV			Tune-up Limit (dBm)
TX Channel	9262	9400	9538		1312	1413	1513	
Rx Channel	9662	9800	9938		1537	1638	1738	
Frequency (MHz)	1852.4	1880	1907.6		1712.4	1732.6	1752.6	
AMR 12.2Kbps	21.40	21.36	21.75	22.00	21.33	21.26	21.54	22.00
RMC 12.2Kbps	21.62	21.76	21.90	22.00	21.51	21.38	21.68	22.00
HSDPA Subtest-1	20.66	20.80	20.83	21.00	20.46	20.40	20.58	21.00
HSDPA Subtest-2	20.59	20.50	20.67	21.00	20.34	20.18	20.43	20.50
HSDPA Subtest-3	19.50	19.42	19.69	20.00	19.22	19.14	19.41	19.50
HSDPA Subtest-4	19.52	19.52	19.53	20.00	18.91	18.90	19.08	19.50
HSUPA Subtest-1	20.05	19.99	20.14	20.50	19.59	19.62	19.85	20.00
HSUPA Subtest-2	20.64	20.77	20.84	21.00	20.48	20.38	20.60	21.00
HSUPA Subtest-3	19.87	20.18	20.18	20.50	19.74	19.92	19.92	20.00
HSUPA Subtest-4	20.70	20.85	20.86	21.00	20.51	20.41	20.60	21.00
HSUPA Subtest-5	19.80	20.02	20.19	20.50	19.73	19.44	19.79	20.00
HSPA+ (16QAM) Subtest-1	19.83	19.92	19.90	20.00	19.96	19.86	19.88	20.00

Band	WCDMA V			Tune-up Limit (dBm)
TX Channel	4132	4182	4233	
Rx Channel	4357	4407	4458	
Frequency (MHz)	826.4	836.4	846.6	
AMR 12.2Kbps	22.17	22.28	22.37	22.50
RMC 12.2Kbps	22.48	22.49	22.44	22.50
HSDPA Subtest-1	21.49	21.52	21.49	22.00
HSDPA Subtest-2	21.11	21.15	21.09	21.50
HSDPA Subtest-3	19.82	20.32	20.07	20.50
HSDPA Subtest-4	20.15	20.20	19.86	20.50
HSUPA Subtest-1	20.54	20.82	20.67	21.00
HSUPA Subtest-2	21.45	21.40	21.27	21.50
HSUPA Subtest-3	20.90	20.91	20.70	21.00
HSUPA Subtest-4	21.45	21.52	21.49	22.00
HSUPA Subtest-5	20.65	20.72	20.65	21.00
HSPA+ (16QAM) Subtest-1	19.50	19.64	19.49	20.00

LTE Conducted Power:

<FDD 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)
Channel				18700	18900	19100	
Frequency (MHz)				1860	1880	1900	
20	QPSK	1	0	21.51	21.90	21.79	22.5
20	QPSK	1	49	21.75	**22.08**	21.86	
20	QPSK	1	99	21.46	21.66	21.43	
20	QPSK	50	0	20.61	20.84	**20.91**	21.00
20	QPSK	50	24	20.91	20.68	20.71	
20	QPSK	50	50	20.73	20.79	20.73	
20	QPSK	100	0	20.57	20.81	20.84	
20	16QAM	1	0	20.65	20.26	20.62	21.5
20	16QAM	1	49	21.04	20.40	21.24	
20	16QAM	1	99	20.77	20.22	20.48	
20	16QAM	50	0	19.63	19.81	19.73	20.00
20	16QAM	50	24	19.70	19.76	19.66	
20	16QAM	50	50	19.74	19.86	19.57	
20	16QAM	100	0	19.65	19.83	19.83	
20	64QAM	1	0	19.86	21.12	21.20	21.5
20	64QAM	1	49	20.59	21.47	21.46	
20	64QAM	1	99	20.29	21.15	21.09	
20	64QAM	50	0	19.93	20.13	20.27	20.50
20	64QAM	50	24	20.23	20.17	20.11	
20	64QAM	50	50	20.11	20.22	20.36	
20	64QAM	100	0	20.02	20.19	20.32	
Channel				18675	18900	19125	Tune-up limit (dBm)
Frequency (MHz)				1857.5	1880	1902.5	
15	QPSK	1	0	21.57	21.68	21.58	22.0
15	QPSK	1	37	21.43	21.75	21.56	
15	QPSK	1	74	21.44	21.51	21.47	
15	QPSK	36	0	20.55	20.90	20.92	21.00
15	QPSK	36	20	20.91	20.70	20.66	
15	QPSK	36	39	20.65	20.88	20.76	
15	QPSK	75	0	20.49	20.79	20.80	

15	16QAM	1	0	20.79	21.52	20.65	22.0
15	16QAM	1	37	20.64	21.70	20.36	
15	16QAM	1	74	20.44	21.17	20.06	
15	16QAM	36	0	19.48	19.67	19.94	20.00
15	16QAM	36	20	19.95	19.67	19.51	
15	16QAM	36	39	19.67	19.99	19.66	
15	16QAM	75	0	19.53	19.67	19.79	
15	64QAM	1	0	19.66	21.20	21.12	21.5
15	64QAM	1	37	20.17	21.28	21.30	
15	64QAM	1	74	19.96	21.12	21.13	
15	64QAM	36	0	19.81	20.20	20.33	20.50
15	64QAM	36	20	20.14	20.07	19.89	
15	64QAM	36	39	20.04	20.39	20.28	
15	64QAM	75	0	19.94	20.23	20.28	
Channel				18650	18900	19150	Tune-up limit (dBm)
Frequency (MHz)				1855	1880	1905	
10	QPSK	1	0	21.58	21.84	21.77	22.0
10	QPSK	1	25	21.56	21.96	21.72	
10	QPSK	1	49	21.57	21.57	21.71	
10	QPSK	25	0	20.64	20.77	20.83	21.00
10	QPSK	25	12	20.80	20.70	20.80	
10	QPSK	25	25	20.68	20.80	20.73	
10	QPSK	50	0	20.60	20.78	20.83	
10	16QAM	1	0	20.62	21.36	20.84	22.0
10	16QAM	1	25	21.17	21.86	20.62	
10	16QAM	1	49	20.55	21.52	20.23	
10	16QAM	25	0	19.80	19.89	19.97	20.50
10	16QAM	25	12	19.87	19.86	20.04	
10	16QAM	25	25	19.76	20.04	19.92	
10	16QAM	50	0	19.55	19.70	19.78	
10	64QAM	1	0	19.83	21.25	21.65	22.0
10	64QAM	1	25	20.36	21.61	21.62	
10	64QAM	1	49	20.01	21.29	21.17	
10	64QAM	25	0	20.13	20.17	20.38	20.50
10	64QAM	25	12	20.15	20.23	20.28	
10	64QAM	25	25	20.14	20.38	20.23	
10	64QAM	50	0	20.12	20.28	20.35	
Channel				18625	18900	19175	Tune-up limit

Frequency (MHz)				1852.5	1880	1907.5	(dBm)
5	QPSK	1	0	21.56	21.82	21.77	22.0
5	QPSK	1	12	21.53	21.76	21.75	
5	QPSK	1	24	21.46	21.55	21.68	
5	QPSK	12	0	20.72	20.91	20.85	21.00
5	QPSK	12	7	20.75	20.90	20.89	
5	QPSK	12	13	20.69	20.92	20.75	
5	QPSK	25	0	20.77	20.89	20.88	
5	16QAM	1	0	20.62	21.06	20.61	21.5
5	16QAM	1	12	20.42	21.03	20.85	
5	16QAM	1	24	20.27	21.25	20.61	
5	16QAM	12	0	19.73	19.67	19.81	20.00
5	16QAM	12	7	19.73	19.77	19.60	
5	16QAM	12	13	19.71	19.69	19.59	
5	16QAM	25	0	19.86	19.75	19.69	
5	64QAM	1	0	21.08	21.09	21.40	21.5
5	64QAM	1	12	21.10	21.12	21.30	
5	64QAM	1	24	20.97	21.18	21.25	
5	64QAM	12	0	20.05	20.27	20.44	20.50
5	64QAM	12	7	20.18	20.27	20.25	
5	64QAM	12	13	20.09	20.37	20.14	
5	64QAM	25	0	20.07	20.32	20.38	
Channel				18615	18900	19185	Tune-up limit
Frequency (MHz)				1851.5	1880	1908.5	(dBm)
3	QPSK	1	0	21.54	21.83	22.00	22.5
3	QPSK	1	8	21.58	21.84	21.73	
3	QPSK	1	14	21.61	21.64	21.78	
3	QPSK	8	0	20.75	20.94	20.92	21.00
3	QPSK	8	4	20.84	20.85	20.82	
3	QPSK	8	7	20.81	20.84	20.83	
3	QPSK	15	0	20.69	20.82	20.94	
3	16QAM	1	0	20.71	21.32	20.45	22.0
3	16QAM	1	8	20.63	21.48	20.26	
3	16QAM	1	14	20.52	21.54	20.34	
3	16QAM	8	0	19.84	20.00	19.93	20.50
3	16QAM	8	4	19.83	19.96	19.81	
3	16QAM	8	7	19.84	19.85	19.72	
3	16QAM	15	0	19.67	19.73	19.78	

3	64QAM	1	0	20.94	21.47	21.68	22.0
3	64QAM	1	8	20.98	21.43	21.16	
3	64QAM	1	14	20.98	21.53	21.29	
3	64QAM	8	0	20.95	21.13	21.58	22.00
3	64QAM	8	4	21.57	21.21	21.15	
3	64QAM	8	7	21.05	21.44	21.26	
3	64QAM	15	0	20.07	20.24	20.38	
Channel				18607	18900	19193	Tune-up limit (dBm)
Frequency (MHz)				1850.7	1880	1909.3	
1.4	QPSK	1	0	21.56	21.79	21.84	22.5
1.4	QPSK	1	3	21.69	21.73	22.15	
1.4	QPSK	1	5	21.59	21.62	21.93	
1.4	QPSK	3	0	21.62	21.73	21.67	22.00
1.4	QPSK	3	1	21.72	21.72	21.72	
1.4	QPSK	3	3	21.72	21.68	21.70	
1.4	QPSK	6	0	20.61	20.76	20.86	
1.4	16QAM	1	0	21.02	20.84	20.99	21.5
1.4	16QAM	1	3	21.16	20.69	21.22	
1.4	16QAM	1	5	21.09	20.42	21.11	
1.4	16QAM	3	0	20.52	20.80	20.69	21.00
1.4	16QAM	3	1	20.68	20.61	20.62	
1.4	16QAM	3	3	20.77	20.69	20.65	
1.4	16QAM	6	0	19.67	19.75	19.99	
1.4	64QAM	1	0	21.36	21.07	21.77	22.0
1.4	64QAM	1	3	21.29	21.14	21.64	
1.4	64QAM	1	5	21.22	21.16	21.39	
1.4	64QAM	3	0	20.97	21.41	21.52	22.00
1.4	64QAM	3	1	21.20	21.26	21.21	
1.4	64QAM	3	3	21.03	21.36	21.30	
1.4	64QAM	6	0	19.99	20.29	20.31	

<FDD 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)
Channel				20050	20175	20300	
Frequency (MHz)				1720	1732.5	1745	
20	QPSK	1	0	21.07	21.54	**21.56**	22.0
20	QPSK	1	49	21.39	21.50	21.30	

20	QPSK	1	99	21.19	21.20	21.48	
20	QPSK	50	0	20.30	20.40	**20.44**	20.50
20	QPSK	50	24	20.40	20.16	20.14	
20	QPSK	50	50	20.41	20.33	20.08	
20	QPSK	100	0	20.47	20.35	20.28	
20	16QAM	1	0	20.68	20.03	20.40	21.0
20	16QAM	1	49	20.82	20.06	20.71	
20	16QAM	1	99	19.99	19.65	20.19	
20	16QAM	50	0	19.31	19.29	19.28	19.50
20	16QAM	50	24	19.30	19.25	19.20	
20	16QAM	50	50	19.32	19.32	19.13	
20	16QAM	100	0	19.36	19.39	19.20	
20	64QAM	1	0	20.46	21.00	20.81	21.5
20	64QAM	1	49	20.96	21.19	20.91	
20	64QAM	1	99	20.71	20.94	20.46	
20	64QAM	50	0	19.73	19.87	19.78	20.00
20	64QAM	50	24	19.71	19.74	19.77	
20	64QAM	50	50	19.85	19.95	19.70	
20	64QAM	100	0	19.82	19.95	19.76	
Channel				20025	20175	20325	Tune-up limit (dBm)
Frequency (MHz)				1717.5	1732.5	1747.5	
15	QPSK	1	0	21.22	21.50	21.29	22.0
15	QPSK	1	37	21.38	21.46	21.27	
15	QPSK	1	74	21.30	21.19	21.02	
15	QPSK	36	0	20.20	20.52	20.27	21.00
15	QPSK	36	20	20.50	20.35	20.45	
15	QPSK	36	39	20.32	20.37	20.29	
15	QPSK	75	0	20.27	20.50	20.13	
15	16QAM	1	0	20.33	21.06	20.17	22.0
15	16QAM	1	37	20.33	21.61	19.86	
15	16QAM	1	74	20.38	20.72	18.91	
15	16QAM	36	0	19.22	19.39	19.16	20.00
15	16QAM	36	20	19.46	19.42	19.27	
15	16QAM	36	39	19.22	19.51	19.13	
15	16QAM	75	0	19.38	19.47	19.16	
15	64QAM	1	0	20.75	20.86	20.74	21.0
15	64QAM	1	37	20.76	20.97	20.59	
15	64QAM	1	74	20.91	20.74	20.50	

15	64QAM	36	0	19.75	19.88	19.67	20.00
15	64QAM	36	20	19.66	19.65	19.75	
15	64QAM	36	39	19.79	19.93	19.59	
15	64QAM	75	0	19.74	19.91	19.68	
Channel				20000	20175	20350	Tune-up limit (dBm)
Frequency (MHz)				1715	1732.5	1750	
10	QPSK	1	0	21.11	21.58	21.19	22.0
10	QPSK	1	25	21.34	21.74	21.65	
10	QPSK	1	49	21.22	21.35	21.14	
10	QPSK	25	0	20.36	20.49	20.28	21.00
10	QPSK	25	12	20.45	20.39	20.42	
10	QPSK	25	25	20.37	20.41	20.20	
10	QPSK	50	0	20.31	20.51	20.13	
10	16QAM	1	0	20.37	21.16	19.87	22.0
10	16QAM	1	25	21.04	21.56	19.99	
10	16QAM	1	49	20.19	20.82	19.67	
10	16QAM	25	0	19.53	19.53	19.29	20.00
10	16QAM	25	12	19.40	19.43	19.32	
10	16QAM	25	25	19.35	19.51	19.23	
10	16QAM	50	0	19.31	19.38	19.06	
10	64QAM	1	0	20.64	20.92	20.65	21.5
10	64QAM	1	25	20.91	21.00	21.04	
10	64QAM	1	49	20.62	20.70	20.60	
10	64QAM	25	0	19.68	19.95	19.64	20.00
10	64QAM	25	12	19.80	19.60	19.85	
10	64QAM	25	25	19.74	19.96	19.56	
10	64QAM	50	0	19.64	19.91	19.63	
Channel				19975	20175	20375	Tune-up limit (dBm)
Frequency (MHz)				1712.5	1732.5	1752.5	
5	QPSK	1	0	21.07	21.48	21.11	21.5
5	QPSK	1	12	21.06	21.17	21.16	
5	QPSK	1	24	21.16	21.06	21.04	
5	QPSK	12	0	20.14	20.56	20.18	21.00
5	QPSK	12	7	20.28	20.55	20.52	
5	QPSK	12	13	20.25	20.45	20.19	
5	QPSK	25	0	20.28	20.49	20.14	
5	16QAM	1	0	19.89	20.68	19.99	21.0
5	16QAM	1	12	19.89	20.79	19.90	

5	16QAM	1	24	19.81	20.81	20.15	
5	16QAM	12	0	19.14	19.23	19.03	20.00
5	16QAM	12	7	19.32	19.22	19.31	
5	16QAM	12	13	19.15	19.34	19.04	
5	16QAM	25	0	19.21	19.59	19.09	
5	64QAM	1	0	20.52	20.85	20.85	21.0
5	64QAM	1	12	20.50	20.77	20.80	
5	64QAM	1	24	20.61	20.71	20.71	
5	64QAM	12	0	19.76	19.85	19.73	20.50
5	64QAM	12	7	19.89	19.76	19.63	
5	64QAM	12	13	19.61	19.90	19.59	
5	64QAM	25	0	19.61	20.06	19.70	
Channel				19965	20175	20385	Tune-up limit (dBm)
Frequency (MHz)				1711.5	1732.5	1753.5	
3	QPSK	1	0	21.14	21.76	21.21	22.0
3	QPSK	1	8	21.06	21.35	21.35	
3	QPSK	1	14	21.21	21.31	21.44	
3	QPSK	8	0	20.21	20.54	20.14	21.00
3	QPSK	8	4	20.33	20.22	20.23	
3	QPSK	8	7	20.19	20.48	20.16	
3	QPSK	15	0	20.16	20.49	20.19	
3	16QAM	1	0	20.54	20.62	19.62	21.0
3	16QAM	1	8	20.55	20.74	19.66	
3	16QAM	1	14	20.63	20.59	19.62	
3	16QAM	8	0	19.24	19.35	19.06	19.50
3	16QAM	8	4	18.96	19.02	19.00	
3	16QAM	8	7	19.30	19.30	18.95	
3	16QAM	15	0	19.12	19.30	18.99	
3	64QAM	1	0	20.73	20.97	20.54	21.0
3	64QAM	1	8	20.65	20.90	19.61	
3	64QAM	1	14	20.61	20.79	20.54	
3	64QAM	8	0	20.69	20.94	19.61	21.50
3	64QAM	8	4	20.80	20.54	20.12	
3	64QAM	8	7	20.59	21.11	20.54	
3	64QAM	15	0	19.57	20.01	19.61	
Channel				19957	20175	20393	Tune-up limit (dBm)
Frequency (MHz)				1710.7	1732.5	1754.3	
1.4	QPSK	1	0	21.43	21.54	21.22	22.0

1.4	QPSK	1	3	21.50	21.59	21.19	
1.4	QPSK	1	5	21.41	21.48	21.15	
1.4	QPSK	3	0	21.22	21.41	21.19	21.50
1.4	QPSK	3	1	21.28	21.24	21.39	
1.4	QPSK	3	3	21.22	21.37	21.19	
1.4	QPSK	6	0	20.22	20.39	20.12	
1.4	16QAM	1	0	20.35	20.91	19.92	21.5
1.4	16QAM	1	3	20.56	20.87	20.02	
1.4	16QAM	1	5	20.27	21.04	19.95	
1.4	16QAM	3	0	20.37	20.55	20.17	21.00
1.4	16QAM	3	1	20.29	20.50	20.26	
1.4	16QAM	3	3	20.40	20.64	20.11	
1.4	16QAM	6	0	19.06	19.57	18.99	
1.4	64QAM	1	0	20.87	20.98	20.71	21.5
1.4	64QAM	1	3	20.86	21.04	20.74	
1.4	64QAM	1	5	20.87	20.74	20.53	
1.4	64QAM	3	0	20.73	20.86	20.59	21.00
1.4	64QAM	3	1	20.73	20.80	20.81	
1.4	64QAM	3	3	20.75	20.83	20.60	
1.4	64QAM	6	0	19.73	20.08	19.61	

<FDD 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)
Channel				20450	20525	20600	
Frequency (MHz)				829	836.5	844	
10	QPSK	1	0	22.20	22.31	22.02	22.5
10	QPSK	1	25	22.20	22.40	**22.49**	
10	QPSK	1	49	22.02	21.94	22.12	
10	QPSK	25	0	21.27	21.23	**21.33**	21.50
10	QPSK	25	12	21.32	21.14	21.25	
10	QPSK	25	25	21.18	21.16	21.11	
10	QPSK	50	0	21.26	21.24	21.14	
10	16QAM	1	0	21.21	21.87	20.81	22.5
10	16QAM	1	25	21.80	22.27	20.80	
10	16QAM	1	49	21.00	21.60	20.53	
10	16QAM	25	0	20.36	20.37	20.22	20.50
10	16QAM	25	12	20.32	20.21	20.30	

10	16QAM	25	25	20.28	20.20	20.15	
10	16QAM	50	0	20.21	20.07	20.12	
10	64QAM	1	0	21.66	21.79	21.75	22.5
10	64QAM	1	25	22.05	21.99	22.12	
10	64QAM	1	49	21.64	21.68	21.59	
10	64QAM	25	0	20.87	20.84	20.84	21.00
10	64QAM	25	12	20.78	20.66	20.78	
10	64QAM	25	25	20.88	20.82	20.59	
10	64QAM	50	0	20.88	20.79	20.76	
Channel				20425	20525	20625	Tune-up limit (dBm)
Frequency (MHz)				826.5	836.5	846.5	
5	QPSK	1	0	22.01	22.12	21.90	22.5
5	QPSK	1	12	21.93	22.13	21.97	
5	QPSK	1	24	21.96	21.92	22.02	
5	QPSK	12	0	21.23	21.15	21.10	21.50
5	QPSK	12	7	21.14	21.17	21.09	
5	QPSK	12	13	21.09	21.16	21.24	
5	QPSK	25	0	21.15	21.08	21.12	
5	16QAM	1	0	21.22	21.30	20.99	21.5
5	16QAM	1	12	20.97	21.22	21.02	
5	16QAM	1	24	20.72	21.15	21.12	
5	16QAM	12	0	20.07	19.95	20.01	20.50
5	16QAM	12	7	19.98	20.11	19.95	
5	16QAM	12	13	20.00	19.86	20.15	
5	16QAM	25	0	20.02	19.90	20.00	
5	64QAM	1	0	21.60	21.55	21.75	22.0
5	64QAM	1	12	21.72	21.62	21.79	
5	64QAM	1	24	21.69	21.50	21.78	
5	64QAM	12	0	20.87	20.80	20.58	21.00
5	64QAM	12	7	20.60	20.61	20.82	
5	64QAM	12	13	20.89	20.74	20.78	
5	64QAM	25	0	20.87	20.78	20.62	
Channel				20415	20525	20635	Tune-up limit (dBm)
Frequency (MHz)				825.5	836.5	847.5	
3	QPSK	1	0	22.14	22.00	21.75	22.5
3	QPSK	1	8	22.03	22.06	22.00	
3	QPSK	1	14	21.93	21.91	21.99	
3	QPSK	8	0	21.24	21.20	21.02	21.50

3	QPSK	8	4	21.05	21.19	21.06	
3	QPSK	8	7	21.18	21.25	21.10	
3	QPSK	15	0	21.16	21.16	21.11	
3	16QAM	1	0	21.28	21.65	20.85	22.0
3	16QAM	1	8	21.07	21.70	20.98	
3	16QAM	1	14	20.98	21.43	20.73	
3	16QAM	8	0	20.02	19.94	20.16	20.50
3	16QAM	8	4	19.99	20.08	20.01	
3	16QAM	8	7	20.15	20.09	20.25	
3	16QAM	15	0	20.01	19.92	20.16	
3	64QAM	1	0	21.73	21.74	21.54	22.0
3	64QAM	1	8	21.74	21.81	21.85	
3	64QAM	1	14	21.67	21.67	21.85	
3	64QAM	8	0	21.78	21.72	21.73	22.00
3	64QAM	8	4	21.84	21.67	21.74	
3	64QAM	8	7	21.77	21.67	21.91	
3	64QAM	15	0	20.90	20.76	20.72	
Channel				20407	20525	20643	Tune-up limit (dBm)
Frequency (MHz)				824.7	836.5	848.3	
1.4	QPSK	1	0	22.14	22.17	22.37	23.0
1.4	QPSK	1	3	22.27	22.19	22.55	
1.4	QPSK	1	5	22.00	22.07	22.49	
1.4	QPSK	3	0	22.18	22.11	22.09	22.50
1.4	QPSK	3	1	22.09	22.06	22.14	
1.4	QPSK	3	3	22.11	22.05	22.05	
1.4	QPSK	6	0	21.26	21.18	21.15	
1.4	16QAM	1	0	21.64	20.99	21.26	22.0
1.4	16QAM	1	3	21.77	20.86	21.39	
1.4	16QAM	1	5	21.63	20.71	21.30	
1.4	16QAM	3	0	21.34	21.12	21.28	21.50
1.4	16QAM	3	1	21.19	21.26	21.35	
1.4	16QAM	3	3	21.38	21.08	21.28	
1.4	16QAM	6	0	20.26	20.25	20.05	
1.4	64QAM	1	0	22.01	21.76	21.70	22.5
1.4	64QAM	1	3	22.14	21.83	21.83	
1.4	64QAM	1	5	22.05	21.62	21.75	
1.4	64QAM	3	0	21.88	21.84	21.64	22.00
1.4	64QAM	3	1	21.74	21.73	21.81	

1.4	64QAM	3	3	21.78	21.73	21.73	
1.4	64QAM	6	0	20.80	20.79	20.81	

<FDD 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)
Channel				23060	23095	23130	
Frequency (MHz)				704	707.5	711	
10	QPSK	1	0	21.98	22.20	22.03	23.0
10	QPSK	1	25	22.32	22.57	**22.75**	
10	QPSK	1	49	21.98	22.04	21.94	
10	QPSK	25	0	21.24	21.29	**21.43**	21.50
10	QPSK	25	12	21.31	21.42	21.28	
10	QPSK	25	25	21.21	21.32	21.26	
10	QPSK	50	0	21.31	21.31	21.31	
10	16QAM	1	0	21.31	21.85	20.77	22.5
10	16QAM	1	25	21.99	22.34	21.05	
10	16QAM	1	49	21.27	21.88	20.52	
10	16QAM	25	0	20.43	20.42	20.43	20.50
10	16QAM	25	12	20.39	20.31	20.37	
10	16QAM	25	25	20.39	20.34	20.29	
10	16QAM	50	0	20.31	20.27	20.32	
10	64QAM	1	0	21.17	21.35	21.51	22.0
10	64QAM	1	25	21.53	21.85	21.87	
10	64QAM	1	49	21.39	21.32	21.26	
10	64QAM	25	0	20.50	20.65	20.70	21.00
10	64QAM	25	12	20.57	20.64	20.59	
10	64QAM	25	25	20.59	20.58	20.58	
10	64QAM	50	0	20.48	20.57	20.66	
Channel				23035	23095	23155	Tune-up limit (dBm)
Frequency (MHz)				701.5	707.5	713.5	
5	QPSK	1	0	21.86	22.21	22.13	22.5
5	QPSK	1	12	21.95	21.99	22.33	
5	QPSK	1	24	22.00	21.86	21.96	
5	QPSK	12	0	21.37	21.26	21.16	21.50
5	QPSK	12	7	21.24	21.28	21.30	
5	QPSK	12	13	21.23	21.33	21.17	
5	QPSK	25	0	21.30	21.27	21.20	

5	16QAM	1	0	21.13	21.38	21.29	22.0
5	16QAM	1	12	21.07	21.50	21.25	
5	16QAM	1	24	20.91	21.27	21.12	
5	16QAM	12	0	20.27	20.12	20.21	20.50
5	16QAM	12	7	20.05	20.05	20.18	
5	16QAM	12	13	20.23	20.03	20.31	
5	16QAM	25	0	20.32	20.27	20.34	
5	64QAM	1	0	21.30	21.49	21.53	22.0
5	64QAM	1	12	21.44	21.59	21.54	
5	64QAM	1	24	21.37	21.33	21.12	
5	64QAM	12	0	20.55	20.64	20.45	21.00
5	64QAM	12	7	20.63	20.49	20.53	
5	64QAM	12	13	20.51	20.62	20.51	
5	64QAM	25	0	20.50	20.58	20.53	
Channel				23025	23095	23165	Tune-up limit (dBm)
Frequency (MHz)				700.5	707.5	714.5	
3	QPSK	1	0	21.87	22.29	22.17	22.5
3	QPSK	1	8	22.13	22.17	21.99	
3	QPSK	1	14	21.88	22.05	22.05	
3	QPSK	8	0	21.22	21.25	21.29	21.50
3	QPSK	8	4	21.32	21.30	21.23	
3	QPSK	8	7	21.23	21.32	21.23	
3	QPSK	15	0	21.18	21.27	21.29	
3	16QAM	1	0	21.22	21.93	20.84	22.0
3	16QAM	1	8	21.20	21.90	20.94	
3	16QAM	1	14	20.90	21.92	20.87	
3	16QAM	8	0	20.13	20.44	20.30	20.50
3	16QAM	8	4	20.36	20.30	20.16	
3	16QAM	8	7	20.42	20.31	20.34	
3	16QAM	15	0	20.15	20.16	20.32	
3	64QAM	1	0	21.42	21.62	21.39	22.0
3	64QAM	1	8	21.49	21.59	21.43	
3	64QAM	1	14	21.37	21.41	21.33	
3	64QAM	8	0	21.40	21.39	21.38	22.00
3	64QAM	8	4	21.46	21.45	21.46	
3	64QAM	8	7	21.36	21.51	21.43	
3	64QAM	15	0	20.52	20.74	20.55	
Channel				23017	23095	23173	Tune-up limit

Frequency (MHz)				699.7	707.5	715.3	(dBm)
1.4	QPSK	1	0	21.92	22.29	22.32	23.0
1.4	QPSK	1	3	22.01	22.55	22.44	
1.4	QPSK	1	5	21.96	22.46	22.23	
1.4	QPSK	3	0	22.14	22.21	22.03	22.50
1.4	QPSK	3	1	22.01	22.05	22.15	
1.4	QPSK	3	3	22.10	22.18	22.01	
1.4	QPSK	6	0	21.29	21.19	21.17	
1.4	16QAM	1	0	21.56	20.91	21.27	22.0
1.4	16QAM	1	3	21.74	21.09	21.52	
1.4	16QAM	1	5	21.62	20.85	21.32	
1.4	16QAM	3	0	21.44	21.26	21.29	22.00
1.4	16QAM	3	1	21.35	21.38	21.46	
1.4	16QAM	3	3	21.54	21.39	21.31	
1.4	16QAM	6	0	20.50	20.48	20.33	
1.4	64QAM	1	0	21.64	21.59	21.55	22.0
1.4	64QAM	1	3	21.68	21.53	21.67	
1.4	64QAM	1	5	21.61	21.45	21.51	
1.4	64QAM	3	0	21.56	21.69	21.54	22.00
1.4	64QAM	3	1	21.47	21.56	21.55	
1.4	64QAM	3	3	21.46	21.63	21.40	
1.4	64QAM	6	0	20.35	20.62	20.52	

<FDD 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)
Channel					23230		
Frequency (MHz)					782		
10	QPSK	1	0		22.37		23.0
10	QPSK	1	25		**22.55**		
10	QPSK	1	49		22.09		
10	QPSK	25	0		**21.47**		21.50
10	QPSK	25	12		21.41		
10	QPSK	25	25		21.38		
10	QPSK	50	0		21.42		
10	16QAM	1	0		21.40		22.0
10	16QAM	1	25		21.83		
10	16QAM	1	49		21.20		

10	16QAM	25	0	20.57			21.00
10	16QAM	25	12	20.57			
10	16QAM	25	25	20.57			
10	16QAM	50	0	20.44			
10	64QAM	1	0	21.39			22.0
10	64QAM	1	25	21.91			
10	64QAM	1	49	21.65			
10	64QAM	25	0	20.73			21.00
10	64QAM	25	12	20.76			
10	64QAM	25	25	20.78			
10	64QAM	50	0	20.80			
Channel				23205	23230	23255	Tune-up limit (dBm)
Frequency (MHz)				779.5	782	784.5	
5	QPSK	1	0	22.43	22.05	22.11	22.5
5	QPSK	1	12	22.15	22.15	22.12	
5	QPSK	1	24	22.22	21.95	22.11	
5	QPSK	12	0	21.46	21.30	21.42	21.50
5	QPSK	12	7	21.43	21.36	21.43	
5	QPSK	12	13	21.41	21.42	21.29	
5	QPSK	25	0	21.46	21.35	21.43	
5	16QAM	1	0	21.50	21.19	21.25	22.0
5	16QAM	1	12	21.62	21.24	21.25	
5	16QAM	1	24	21.54	21.15	20.99	
5	16QAM	12	0	20.30	20.36	20.32	20.50
5	16QAM	12	7	20.29	20.24	20.27	
5	16QAM	12	13	20.30	20.37	20.19	
5	16QAM	25	0	20.34	20.27	20.49	
5	64QAM	1	0	21.41	21.66	21.62	22.0
5	64QAM	1	12	21.57	21.79	21.61	
5	64QAM	1	24	21.51	21.48	21.64	
5	64QAM	12	0	20.72	20.74	20.92	21.00
5	64QAM	12	7	20.83	20.89	20.84	
5	64QAM	12	13	20.76	20.80	20.81	
5	64QAM	25	0	20.70	20.72	20.87	

<FDD 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)
Channel				26140	26340	26590	
Frequency (MHz)				1860	1880	1905	
20	QPSK	1	0	21.56	21.68	21.98	
20	QPSK	1	49	21.77	**22.28**	21.44	22.5
20	QPSK	1	99	21.23	21.96	21.29	
20	QPSK	50	0	20.42	20.62	20.56	
20	QPSK	50	24	20.64	20.46	20.47	21.00
20	QPSK	50	50	20.66	**20.66**	20.34	
20	QPSK	100	0	20.50	20.46	20.60	
20	16QAM	1	0	20.56	20.46	20.73	
20	16QAM	1	49	21.25	20.52	20.42	21.5
20	16QAM	1	99	20.14	19.63	19.92	
20	16QAM	50	0	19.55	19.69	19.72	
20	16QAM	50	24	19.59	19.48	19.67	20.00
20	16QAM	50	50	19.73	19.66	19.31	
20	16QAM	100	0	19.41	19.58	19.62	
20	64QAM	1	0	20.14	20.56	21.00	
20	64QAM	1	49	20.68	21.08	20.38	21.5
20	64QAM	1	99	20.18	20.72	20.90	
20	64QAM	50	0	19.35	19.56	19.75	
20	64QAM	50	24	19.46	19.37	19.74	20.00
20	64QAM	50	50	19.36	19.73	19.58	
20	64QAM	100	0	19.33	19.72	19.60	
Channel				26115	26340	26615	Tune-up limit (dBm)
Frequency (MHz)				1857.5	1880	1907.5	
15	QPSK	1	0	21.55	21.54	21.62	
15	QPSK	1	37	21.47	21.97	21.65	22.0
15	QPSK	1	74	21.41	21.39	21.33	
15	QPSK	36	0	20.43	20.70	20.75	
15	QPSK	36	20	20.59	20.53	20.63	21.00
15	QPSK	36	39	20.41	20.54	20.46	
15	QPSK	75	0	20.36	20.58	20.60	
15	16QAM	1	0	20.66	21.10	20.39	22.0

15	16QAM	1	37	21.23	21.93	20.29	
15	16QAM	1	74	20.44	21.01	19.46	
15	16QAM	36	0	19.39	19.62	19.50	20.00
15	16QAM	36	20	19.43	19.52	19.44	
15	16QAM	36	39	19.46	19.58	19.41	
15	16QAM	75	0	19.42	19.61	19.62	
15	64QAM	1	0	20.26	20.31	20.75	21.0
15	64QAM	1	37	20.37	20.78	20.65	
15	64QAM	1	74	20.31	20.44	20.75	
15	64QAM	36	0	19.24	19.67	19.79	20.00
15	64QAM	36	20	19.38	19.58	19.27	
15	64QAM	36	39	19.22	19.74	19.62	
15	64QAM	75	0	19.24	19.68	19.81	
Channel				26090	26340	26640	Tune-up limit (dBm)
Frequency (MHz)				1855	1880	1910	
10	QPSK	1	0	21.77	21.67	21.81	22.5
10	QPSK	1	25	21.54	22.12	21.76	
10	QPSK	1	49	21.39	21.48	21.82	
10	QPSK	25	0	20.57	20.65	20.60	21.00
10	QPSK	25	12	20.80	20.62	20.64	
10	QPSK	25	25	20.54	20.82	20.44	
10	QPSK	50	0	20.41	20.78	20.56	
10	16QAM	1	0	20.65	20.75	20.63	22.0
10	16QAM	1	25	21.01	21.88	20.29	
10	16QAM	1	49	20.53	20.97	19.84	
10	16QAM	25	0	19.47	19.70	19.65	20.00
10	16QAM	25	12	19.59	19.78	19.57	
10	16QAM	25	25	19.61	19.87	19.47	
10	16QAM	50	0	19.34	19.62	19.68	
10	64QAM	1	0	20.32	20.34	20.79	21.5
10	64QAM	1	25	20.59	20.86	20.74	
10	64QAM	1	49	20.18	20.63	21.22	
10	64QAM	25	0	19.23	19.60	19.59	20.00
10	64QAM	25	12	19.29	19.47	19.26	
10	64QAM	25	25	19.33	19.78	19.64	
10	64QAM	50	0	19.15	19.71	19.78	
Channel				26065	26340	26665	Tune-up limit (dBm)
Frequency (MHz)				1852.5	1880	1912.5	

5	QPSK	1	0	21.42	21.97	21.38	22.0
5	QPSK	1	12	21.55	21.67	21.52	
5	QPSK	1	24	21.39	21.48	21.58	
5	QPSK	12	0	20.46	20.77	20.53	21.00
5	QPSK	12	7	20.42	20.49	20.70	
5	QPSK	12	13	20.59	20.90	20.36	
5	QPSK	25	0	20.39	20.81	20.53	
5	16QAM	1	0	20.43	21.05	20.39	21.5
5	16QAM	1	12	20.41	20.89	20.41	
5	16QAM	1	24	20.24	21.10	20.22	
5	16QAM	12	0	19.30	19.47	19.59	20.00
5	16QAM	12	7	19.31	19.24	19.24	
5	16QAM	12	13	19.45	19.62	19.22	
5	16QAM	25	0	19.45	19.61	19.45	
5	64QAM	1	0	20.16	20.49	20.62	21.0
5	64QAM	1	12	20.26	20.74	20.57	
5	64QAM	1	24	20.51	20.44	20.59	
5	64QAM	12	0	19.18	19.62	19.74	20.00
5	64QAM	12	7	19.39	19.20	19.23	
5	64QAM	12	13	19.41	19.67	19.84	
5	64QAM	25	0	19.22	19.69	19.69	
Channel				26055	26340	26675	Tune-up limit (dBm)
Frequency (MHz)				1851.5	1880	1913.5	
3	QPSK	1	0	21.56	21.86	21.56	22.0
3	QPSK	1	8	21.53	21.63	21.50	
3	QPSK	1	14	21.62	21.52	21.52	
3	QPSK	8	0	20.46	20.77	20.65	21.00
3	QPSK	8	4	20.47	20.80	20.41	
3	QPSK	8	7	20.58	20.83	20.37	
3	QPSK	15	0	20.49	20.83	20.49	
3	16QAM	1	0	20.48	21.49	20.59	22.0
3	16QAM	1	8	20.40	21.72	20.08	
3	16QAM	1	14	20.29	21.60	19.92	
3	16QAM	8	0	19.32	19.98	19.48	20.50
3	16QAM	8	4	19.77	19.53	19.70	
3	16QAM	8	7	19.54	20.06	19.30	
3	16QAM	15	0	19.41	19.96	19.42	
3	64QAM	1	0	20.48	20.58	21.08	21.5

3	64QAM	1	8	20.35	20.82	20.88	
3	64QAM	1	14	20.27	20.56	20.65	
3	64QAM	8	0	20.37	20.58	20.92	21.00
3	64QAM	8	4	20.30	20.62	20.56	
3	64QAM	8	7	20.18	20.65	20.73	
3	64QAM	15	0	19.37	19.70	19.91	
Channel				26047	26340	26683	Tune-up limit (dBm)
Frequency (MHz)				1850.7	1880	1914.3	
1.4	QPSK	1	0	21.83	22.00	21.54	22.5
1.4	QPSK	1	3	21.91	22.05	21.43	
1.4	QPSK	1	5	21.80	21.95	21.32	
1.4	QPSK	3	0	21.57	21.83	21.47	22.00
1.4	QPSK	3	1	21.29	21.34	21.88	
1.4	QPSK	3	3	21.67	21.94	21.28	
1.4	QPSK	6	0	20.51	20.72	20.21	
1.4	16QAM	1	0	20.66	21.19	20.36	21.5
1.4	16QAM	1	3	20.80	21.37	20.06	
1.4	16QAM	1	5	20.69	21.29	19.93	
1.4	16QAM	3	0	20.55	21.04	20.26	21.50
1.4	16QAM	3	1	20.92	20.58	20.49	
1.4	16QAM	3	3	20.69	21.02	20.11	
1.4	16QAM	6	0	19.46	19.71	19.20	
1.4	64QAM	1	0	20.73	20.46	21.03	21.5
1.4	64QAM	1	3	20.78	20.75	21.05	
1.4	64QAM	1	5	20.73	20.62	21.03	
1.4	64QAM	3	0	20.22	20.63	20.60	21.00
1.4	64QAM	3	1	20.24	20.60	20.32	
1.4	64QAM	3	3	20.28	20.64	20.53	
1.4	64QAM	6	0	19.34	19.70	19.56	

<FDD 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)
Channel				26765	26865	26965	
Frequency (MHz)				821.5	831.5	841.5	
15	QPSK	1	0	22.28	22.25	22.19	22.5
15	QPSK	1	37	22.28	22.32	**22.35**	
15	QPSK	1	74	22.12	22.04	22.09	

15	QPSK	36	0	**21.49**	21.37	21.41	21.50
15	QPSK	36	20	21.37	21.33	21.12	
15	QPSK	36	39	21.37	21.46	21.11	
15	QPSK	75	0	21.28	21.40	21.26	
15	16QAM	1	0	21.55	21.72	21.09	22.5
15	16QAM	1	37	22.15	22.38	20.87	
15	16QAM	1	74	21.25	21.76	20.26	
15	16QAM	36	0	20.46	20.32	20.30	20.50
15	16QAM	36	20	20.20	20.41	20.17	
15	16QAM	36	39	20.35	20.30	20.08	
15	16QAM	75	0	20.34	20.37	20.22	
15	64QAM	1	0	21.56	21.35	21.40	22.0
15	64QAM	1	37	21.79	21.84	21.64	
15	64QAM	1	74	21.47	21.44	21.45	
15	64QAM	36	0	20.67	20.76	20.78	21.00
15	64QAM	36	20	20.72	20.70	20.74	
15	64QAM	36	39	20.74	20.84	20.71	
15	64QAM	75	0	20.66	20.81	20.73	
Channel				26740	26865	26990	Tune-up limit (dBm)
Frequency (MHz)				819	831.5	844	
10	QPSK	1	0	22.28	22.33	22.10	22.5
10	QPSK	1	25	22.49	22.38	22.39	
10	QPSK	1	49	22.17	22.22	22.28	
10	QPSK	25	0	21.46	21.38	21.50	22.00
10	QPSK	25	12	21.29	21.38	21.32	
10	QPSK	25	25	21.41	21.40	21.27	
10	QPSK	50	0	21.52	21.29	21.41	
10	16QAM	1	0	21.46	21.92	21.18	22.5
10	16QAM	1	25	22.09	22.36	21.83	
10	16QAM	1	49	21.28	21.88	20.89	
10	16QAM	25	0	20.54	20.43	20.43	21.00
10	16QAM	25	12	20.20	20.54	20.17	
10	16QAM	25	25	20.51	20.45	20.16	
10	16QAM	50	0	20.34	20.31	20.37	
10	64QAM	1	0	21.55	21.54	21.48	22.0
10	64QAM	1	25	21.83	21.91	21.90	
10	64QAM	1	49	21.56	21.56	21.60	
10	64QAM	25	0	20.81	20.73	20.86	21.00

10	64QAM	25	12	20.89	20.84	20.75	
10	64QAM	25	25	20.89	20.73	20.67	
10	64QAM	50	0	20.83	20.74	20.77	
Channel				26715	26865	27015	Tune-up limit (dBm)
Frequency (MHz)				816.5	831.5	846.5	
5	QPSK	1	0	22.24	22.07	22.18	22.5
5	QPSK	1	12	22.39	22.25	22.13	
5	QPSK	1	24	22.36	22.05	21.99	
5	QPSK	12	0	21.48	21.27	21.40	21.50
5	QPSK	12	7	21.48	21.45	21.40	
5	QPSK	12	13	21.43	21.35	21.19	
5	QPSK	25	0	21.44	21.24	21.36	
5	16QAM	1	0	21.27	21.36	21.10	21.5
5	16QAM	1	12	21.32	21.46	21.09	
5	16QAM	1	24	20.99	21.39	21.06	
5	16QAM	12	0	20.39	20.08	20.40	21.00
5	16QAM	12	7	20.10	20.29	20.29	
5	16QAM	12	13	20.24	20.17	20.06	
5	16QAM	25	0	20.50	20.17	20.33	
5	64QAM	1	0	21.49	21.51	21.56	22.0
5	64QAM	1	12	21.59	21.53	21.48	
5	64QAM	1	24	21.57	21.39	21.41	
5	64QAM	12	0	20.78	20.75	20.79	21.00
5	64QAM	12	7	20.76	20.81	20.74	
5	64QAM	12	13	20.84	20.78	20.64	
5	64QAM	25	0	20.85	20.80	20.74	
Channel				26705	26865	27025	Tune-up limit (dBm)
Frequency (MHz)				815.5	831.5	847.5	
3	QPSK	1	0	22.17	22.13	22.10	22.5
3	QPSK	1	8	22.34	22.23	22.02	
3	QPSK	1	14	22.25	22.15	22.13	
3	QPSK	8	0	21.44	21.39	21.39	21.50
3	QPSK	8	4	21.37	21.34	21.31	
3	QPSK	8	7	21.40	21.36	21.26	
3	QPSK	15	0	21.41	21.32	21.35	
3	16QAM	1	0	21.45	21.72	21.10	22.0
3	16QAM	1	8	21.35	21.83	20.77	
3	16QAM	1	14	21.29	21.93	20.75	

3	16QAM	8	0	20.50	20.50	20.23	21.00
3	16QAM	8	4	20.39	20.28	20.33	
3	16QAM	8	7	20.46	20.48	20.21	
3	16QAM	15	0	20.35	20.27	20.34	
3	64QAM	1	0	21.59	21.73	21.69	22.0
3	64QAM	1	8	21.70	21.83	21.54	
3	64QAM	1	14	21.52	21.78	21.52	
3	64QAM	8	0	21.58	21.71	21.80	22.00
3	64QAM	8	4	21.80	21.52	21.55	
3	64QAM	8	7	21.76	21.64	21.47	
3	64QAM	15	0	20.83	20.76	20.73	
Channel				26697	26865	27033	Tune-up limit (dBm)
Frequency (MHz)				814.7	831.5	848.3	
1.4	QPSK	1	0	22.42	22.27	21.99	22.5
1.4	QPSK	1	3	22.48	22.38	22.11	
1.4	QPSK	1	5	22.37	22.34	22.02	
1.4	QPSK	3	0	22.46	22.18	22.12	22.50
1.4	QPSK	3	1	22.35	22.25	22.30	
1.4	QPSK	3	3	22.33	22.20	22.19	
1.4	QPSK	6	0	21.38	21.15	21.30	
1.4	16QAM	1	0	21.50	21.44	21.77	22.5
1.4	16QAM	1	3	21.16	21.68	22.00	
1.4	16QAM	1	5	21.01	21.55	21.94	
1.4	16QAM	3	0	21.40	21.37	21.27	21.50
1.4	16QAM	3	1	21.37	21.33	21.30	
1.4	16QAM	3	3	21.38	21.42	21.27	
1.4	16QAM	6	0	20.23	20.04	20.41	
1.4	64QAM	1	0	21.89	21.59	21.73	22.0
1.4	64QAM	1	3	21.98	21.62	21.84	
1.4	64QAM	1	5	21.87	21.48	21.76	
1.4	64QAM	3	0	21.70	21.57	21.64	22.00
1.4	64QAM	3	1	21.66	21.58	21.59	
1.4	64QAM	3	3	21.70	21.59	21.61	
1.4	64QAM	6	0	20.80	20.80	20.71	

<FDD LTE Band 41>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power Low Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				39750	40185	40620	41055	41490	
Frequency (MHz)				2506	2549.5	2593	2636.5	2680	
20	QPSK	1	0	21.26	21.60	21.89	21.55	21.49	22.00
20	QPSK	1	49	21.64	21.88	**21.90**	21.83	21.84	
20	QPSK	1	99	21.42	21.59	21.89	21.74	21.68	
20	QPSK	50	0	20.68	20.68	20.95	20.97	**20.98**	21.00
20	QPSK	50	24	20.63	20.66	20.74	20.78	20.88	
20	QPSK	50	50	20.78	20.81	20.84	20.70	20.53	
20	QPSK	100	0	20.61	20.67	20.89	20.66	20.50	
20	16QAM	1	0	20.95	20.92	20.64	20.51	20.47	21.50
20	16QAM	1	49	21.18	21.04	20.65	20.62	20.62	
20	16QAM	1	99	20.71	20.66	20.57	20.50	20.32	
20	16QAM	50	0	19.96	19.94	19.93	19.62	19.56	20.00
20	16QAM	50	24	19.87	19.85	19.74	19.77	19.84	
20	16QAM	50	50	19.82	19.74	19.73	19.60	19.50	
20	16QAM	100	0	19.82	19.82	19.82	19.71	19.56	
20	64QAM	1	0	20.33	20.99	21.32	21.62	21.83	22.00
20	64QAM	1	49	20.99	21.62	21.76	21.73	21.65	
20	64QAM	1	99	20.47	20.63	21.11	21.14	21.56	
20	64QAM	50	0	19.63	19.97	20.41	20.43	20.43	20.50
20	64QAM	50	24	19.54	20.17	20.31	20.38	20.40	
20	64QAM	50	50	19.82	19.96	20.33	20.48	20.49	
20	64QAM	100	0	19.67	19.91	20.35	20.41	20.46	
Channel				39725	40173	40620	41068	41515	Tune-up limit (dBm)
Frequency (MHz)				2503.5	2548.3	2593	2637.8	2682.5	
15	QPSK	1	0	21.56	21.75	21.57	21.97	21.66	22.00
15	QPSK	1	37	21.78	21.78	21.86	21.85	21.71	
15	QPSK	1	74	21.63	21.64	21.72	21.67	21.34	
15	QPSK	36	0	20.69	20.70	20.92	20.88	20.65	21.00
15	QPSK	36	20	20.56	20.64	20.87	20.68	20.55	
15	QPSK	36	39	20.77	20.73	20.73	20.69	20.59	
15	QPSK	75	0	20.61	20.76	20.83	20.69	20.54	
15	16QAM	1	0	20.66	20.99	21.08	20.64	20.55	22.00

15	16QAM	1	37	20.62	20.67	20.93	20.52	20.34	
15	16QAM	1	74	20.61	21.43	21.50	21.16	20.34	
15	16QAM	36	0	19.61	19.75	19.93	19.72	19.48	20.00
15	16QAM	36	20	19.54	19.79	19.90	19.54	19.32	
15	16QAM	36	39	19.71	19.72	19.86	19.84	19.62	
15	16QAM	75	0	19.65	19.67	19.85	19.73	19.67	
15	64QAM	1	0	20.46	21.39	21.40	21.41	21.41	22.00
15	64QAM	1	37	20.79	21.32	21.39	21.34	21.30	
15	64QAM	1	74	20.73	20.90	21.02	21.50	21.52	
15	64QAM	36	0	19.58	20.25	20.45	20.43	20.39	20.50
15	64QAM	36	20	19.47	20.12	20.34	20.37	20.39	
15	64QAM	36	39	19.74	20.11	20.32	20.39	20.43	
15	64QAM	75	0	19.70	20.17	20.39	20.39	20.40	
Channel				39700	40160	40620	41080	41540	Tune-up limit (dBm)
Frequency (MHz)				2501	2547	2593	2639	2685	
10	QPSK	1	0	21.74	21.77	21.95	21.94	21.65	22.00
10	QPSK	1	25	21.86	21.88	21.90	21.94	21.51	
10	QPSK	1	49	21.68	21.78	21.79	21.42	21.41	
10	QPSK	25	0	20.88	20.96	20.97	20.60	20.60	21.00
10	QPSK	25	12	20.77	20.83	20.90	20.83	20.50	
10	QPSK	25	25	20.83	20.83	20.83	20.75	20.70	
10	QPSK	50	0	20.96	20.92	20.85	20.77	20.57	
10	16QAM	1	0	20.63	20.67	21.38	21.05	20.78	22.00
10	16QAM	1	25	21.15	21.47	21.69	21.68	21.03	
10	16QAM	1	49	20.90	20.95	21.35	21.23	20.75	
10	16QAM	25	0	19.69	19.92	20.00	19.88	19.82	20.50
10	16QAM	25	12	19.54	19.56	19.97	19.83	19.76	
10	16QAM	25	25	19.79	19.83	19.86	19.80	19.73	
10	16QAM	50	0	19.72	19.74	19.74	19.69	19.59	
10	64QAM	1	0	20.68	21.29	21.35	21.55	21.57	22.00
10	64QAM	1	25	20.86	21.45	21.52	21.51	21.47	
10	64QAM	1	49	20.93	21.10	21.19	21.24	21.49	
10	64QAM	25	0	19.75	19.77	20.38	20.39	20.44	21.00
10	64QAM	25	12	19.64	19.75	20.28	20.32	20.37	
10	64QAM	25	25	19.93	20.15	20.33	20.61	20.69	
10	64QAM	50	0	19.82	19.98	20.43	20.50	20.50	
Channel				39675	40148	40620	41093	41565	Tune-up limit (dBm)
Frequency (MHz)				2498.5	2545.8	2593	2640.30	2687.5	

5	QPSK	1	0	21.50	21.69	21.78	21.65	21.49	22.00
5	QPSK	1	12	21.68	21.69	21.78	21.53	21.52	
5	QPSK	1	24	21.68	21.61	21.53	21.51	21.49	
5	QPSK	12	0	20.72	20.76	20.91	20.93	20.94	21.00
5	QPSK	12	7	20.71	20.81	20.83	20.84	20.87	
5	QPSK	12	13	20.88	20.86	20.70	20.75	20.79	
5	QPSK	25	0	20.80	20.81	20.85	20.84	20.56	
5	16QAM	1	0	20.97	20.98	21.12	21.02	20.53	21.50
5	16QAM	1	12	21.07	21.12	21.16	20.51	20.48	
5	16QAM	1	24	21.08	20.87	20.79	20.66	20.30	
5	16QAM	12	0	19.57	19.60	19.67	19.70	19.79	20.00
5	16QAM	12	7	19.46	19.52	19.57	19.57	19.64	
5	16QAM	12	13	19.65	19.62	19.56	19.50	19.35	
5	16QAM	25	0	19.63	19.67	19.81	19.69	19.52	
5	64QAM	1	0	20.67	20.79	21.16	21.20	21.35	21.50
5	64QAM	1	12	20.62	20.78	21.17	21.34	21.46	
5	64QAM	1	24	20.52	20.67	20.99	21.28	21.38	
5	64QAM	12	0	20.49	20.65	21.16	21.22	21.23	22.00
5	64QAM	12	7	20.39	20.92	21.07	21.13	21.19	
5	64QAM	12	13	20.55	20.87	21.05	21.52	21.54	
5	64QAM	25	0	19.75	20.19	20.36	20.36	20.37	

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BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				132072	132322	132572	
Frequency (MHz)				1720	1745	1770	
20	QPSK	1	0	20.90	21.49	21.31	22.0
20	QPSK	1	49	21.57	**21.57**	21.48	
20	QPSK	1	99	20.95	21.42	20.90	
20	QPSK	50	0	20.23	20.33	20.21	20.50
20	QPSK	50	24	20.13	20.33	20.32	
20	QPSK	50	50	**20.40**	20.23	20.12	
20	QPSK	100	0	20.27	20.39	20.09	
20	16QAM	1	0	20.49	20.06	20.12	21.0
20	16QAM	1	49	20.92	19.89	20.67	
20	16QAM	1	99	20.46	19.69	19.86	

20	16QAM	50	0	19.34	19.48	19.20	19.50
20	16QAM	50	24	19.41	19.40	19.35	
20	16QAM	50	50	19.45	19.21	19.14	
20	16QAM	100	0	19.27	19.42	19.10	
20	64QAM	1	0	20.44	20.29	20.28	21.0
20	64QAM	1	49	20.74	20.58	20.46	
20	64QAM	1	99	20.29	20.23	20.21	
20	64QAM	50	0	19.49	19.57	19.68	20.00
20	64QAM	50	24	19.63	19.53	19.58	
20	64QAM	50	50	19.56	19.63	19.52	
20	64QAM	100	0	19.48	19.62	19.55	
Channel				132047	132322	132597	Tune-up limit (dBm)
Frequency (MHz)				1717.5	1745	1772.5	
15	QPSK	1	0	21.20	21.41	21.07	21.5
15	QPSK	1	37	21.26	21.38	21.04	
15	QPSK	1	74	21.27	21.14	20.89	
15	QPSK	36	0	20.23	20.36	20.13	20.50
15	QPSK	36	20	20.40	20.29	20.16	
15	QPSK	36	39	20.42	20.21	20.15	
15	QPSK	75	0	20.20	20.37	20.08	
15	16QAM	1	0	20.48	20.96	20.01	21.5
15	16QAM	1	37	21.15	20.76	19.90	
15	16QAM	1	74	20.46	20.77	19.34	
15	16QAM	36	0	19.22	19.42	19.11	19.50
15	16QAM	36	20	19.39	19.26	19.32	
15	16QAM	36	39	19.33	19.01	19.13	
15	16QAM	75	0	19.18	19.29	19.18	
15	64QAM	1	0	20.34	20.19	20.18	21.0
15	64QAM	1	37	20.64	20.48	20.36	
15	64QAM	1	74	20.19	20.13	20.11	
15	64QAM	36	0	19.39	19.47	19.58	20.00
15	64QAM	36	20	19.56	19.56	19.44	
15	64QAM	36	39	19.46	19.53	19.42	
15	64QAM	75	0	19.38	19.52	19.45	
Channel				132022	132322	132622	Tune-up limit (dBm)
Frequency (MHz)				1715	1745	1775	
10	QPSK	1	0	21.20	21.43	21.15	22.0
10	QPSK	1	25	21.34	21.44	21.51	

10	QPSK	1	49	21.20	21.20	21.08	
10	QPSK	25	0	20.18	20.39	20.10	20.50
10	QPSK	25	12	20.31	20.12	20.23	
10	QPSK	25	25	20.33	20.18	20.11	
10	QPSK	50	0	20.24	20.34	20.05	
10	16QAM	1	0	20.35	20.91	19.73	21.5
10	16QAM	1	25	20.93	21.45	20.34	
10	16QAM	1	49	20.40	20.92	19.90	
10	16QAM	25	0	19.24	19.53	19.17	20.00
10	16QAM	25	12	19.24	19.22	19.34	
10	16QAM	25	25	19.50	19.22	19.30	
10	16QAM	50	0	19.33	19.33	19.13	
10	64QAM	1	0	20.29	20.36	20.21	21.0
10	64QAM	1	25	20.53	20.74	20.69	
10	64QAM	1	49	20.27	20.24	20.38	
10	64QAM	25	0	19.50	19.47	19.50	20.00
10	64QAM	25	12	19.59	19.57	19.44	
10	64QAM	25	25	19.61	19.45	19.35	
10	64QAM	50	0	19.55	19.56	19.47	
Channel				131997	132322	132647	Tune-up limit (dBm)
Frequency (MHz)				1712.5	1745	1777.5	
5	QPSK	1	0	21.11	21.33	20.99	21.5
5	QPSK	1	12	21.07	21.27	21.12	
5	QPSK	1	24	21.08	21.09	21.12	
5	QPSK	12	0	20.20	20.36	19.95	20.50
5	QPSK	12	7	19.97	20.33	20.21	
5	QPSK	12	13	20.31	20.21	20.05	
5	QPSK	25	0	20.24	20.27	20.04	
5	16QAM	1	0	19.77	20.39	19.99	20.5
5	16QAM	1	12	19.83	20.40	19.95	
5	16QAM	1	24	19.83	20.32	20.00	
5	16QAM	12	0	19.21	19.17	19.09	19.50
5	16QAM	12	7	19.20	19.23	19.10	
5	16QAM	12	13	19.31	19.01	19.20	
5	16QAM	25	0	19.15	19.21	19.04	
5	64QAM	1	0	20.28	20.16	20.29	20.5
5	64QAM	1	12	20.33	20.34	20.20	
5	64QAM	1	24	20.32	20.18	20.15	

5	64QAM	12	0	19.46	19.49	19.51	20.00
5	64QAM	12	7	19.52	19.51	19.35	
5	64QAM	12	13	19.53	19.47	19.34	
5	64QAM	25	0	19.53	19.49	19.43	
Channel				131987	132322	132657	Tune-up limit (dBm)
Frequency (MHz)				1711.5	1745	1778.5	
3	QPSK	1	0	21.07	21.30	20.89	21.5
3	QPSK	1	8	21.17	21.25	21.15	
3	QPSK	1	14	21.12	21.19	20.98	
3	QPSK	8	0	20.19	20.36	20.00	20.50
3	QPSK	8	4	20.19	20.24	20.15	
3	QPSK	8	7	20.24	20.27	20.15	
3	QPSK	15	0	20.21	20.29	20.06	
3	16QAM	1	0	20.33	20.68	19.86	21.0
3	16QAM	1	8	20.14	20.65	19.87	
3	16QAM	1	14	20.11	20.66	19.94	
3	16QAM	8	0	19.01	19.58	19.12	20.00
3	16QAM	8	4	19.12	19.46	19.29	
3	16QAM	8	7	19.32	19.42	19.15	
3	16QAM	15	0	19.18	19.11	19.06	
3	64QAM	1	0	20.34	20.41	20.49	20.5
3	64QAM	1	8	20.36	20.42	20.21	
3	64QAM	1	14	20.26	20.36	20.31	
3	64QAM	8	0	20.33	20.31	20.50	21.00
3	64QAM	8	4	20.34	20.43	20.24	
3	64QAM	8	7	20.28	20.23	20.23	
3	64QAM	15	0	19.50	19.43	19.50	
Channel				131979	132322	132665	Tune-up limit (dBm)
Frequency (MHz)				1710.7	1745	1779.3	
1.4	QPSK	1	0	21.52	21.13	21.02	22.0
1.4	QPSK	1	3	21.59	21.10	21.00	
1.4	QPSK	1	5	21.48	21.06	20.96	
1.4	QPSK	3	0	21.20	21.12	21.04	21.50
1.4	QPSK	3	1	21.06	21.15	21.18	
1.4	QPSK	3	3	21.20	21.26	21.06	
1.4	QPSK	6	0	20.26	20.27	20.05	
1.4	16QAM	1	0	20.12	20.90	19.94	21.0
1.4	16QAM	1	3	20.34	20.95	19.93	

1.4	16QAM	1	5	20.26	20.83	19.64	
1.4	16QAM	3	0	20.36	20.54	20.22	21.00
1.4	16QAM	3	1	20.04	20.46	20.35	
1.4	16QAM	3	3	20.39	20.51	19.96	
1.4	16QAM	6	0	19.11	19.43	18.80	
1.4	64QAM	1	0	20.59	20.32	20.46	21.0
1.4	64QAM	1	3	20.68	20.44	20.55	
1.4	64QAM	1	5	20.67	20.31	20.51	
1.4	64QAM	3	0	20.44	20.42	20.48	20.50
1.4	64QAM	3	1	20.47	20.46	20.43	
1.4	64QAM	3	3	20.42	20.42	20.38	
1.4	64QAM	6	0	19.51	19.54	19.45	

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BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				133222	133322	133372	
Frequency (MHz)				673	683	688	
20	QPSK	1	0	21.54	21.65	21.58	22.5
20	QPSK	1	49	21.93	**22.01**	21.83	
20	QPSK	1	99	21.35	21.46	21.62	
20	QPSK	50	0	20.74	20.81	20.74	21.00
20	QPSK	50	24	20.79	20.65	20.67	
20	QPSK	50	50	20.79	**20.84**	20.52	
20	QPSK	100	0	20.76	20.85	20.88	
20	16QAM	1	0	21.44	21.50	21.46	22.0
20	16QAM	1	49	21.15	21.05	20.93	
20	16QAM	1	99	20.86	20.65	20.54	
20	16QAM	50	0	19.84	19.92	19.93	20.00
20	16QAM	50	24	19.82	19.83	19.87	
20	16QAM	50	50	19.73	19.88	19.76	
20	16QAM	100	0	19.82	19.85	19.80	
20	64QAM	1	0	21.11	21.24	20.80	21.5
20	64QAM	1	49	21.29	20.25	20.76	
20	64QAM	1	99	20.90	20.43	20.51	
20	64QAM	50	0	19.77	19.91	19.92	20.00
20	64QAM	50	24	19.76	19.76	19.75	

20	64QAM	50	50	19.80	19.80	19.91	
20	64QAM	100	0	19.81	19.88	19.91	
Channel				133197	133297	133397	Tune-up limit (dBm)
Frequency (MHz)				670.5	680.5	690.5	
15	QPSK	1	0	21.53	21.65	21.06	22.0
15	QPSK	1	37	21.48	21.79	21.18	
15	QPSK	1	74	21.61	21.57	21.09	
15	QPSK	36	0	20.85	20.96	20.85	21.00
15	QPSK	36	20	20.80	20.90	20.96	
15	QPSK	36	39	20.72	20.77	20.74	
15	QPSK	75	0	20.77	20.86	20.93	
15	16QAM	1	0	20.96	21.50	20.91	22.0
15	16QAM	1	37	20.83	21.54	20.95	
15	16QAM	1	74	20.85	21.73	20.97	
15	16QAM	36	0	20.44	21.03	20.52	21.50
15	16QAM	36	20	20.78	20.57	20.86	
15	16QAM	36	39	20.39	20.62	20.54	
15	16QAM	75	0	20.69	20.74	20.22	
15	64QAM	1	0	21.40	21.54	21.24	22.0
15	64QAM	1	37	21.10	21.09	21.67	
15	64QAM	1	74	21.04	20.91	21.10	
15	64QAM	36	0	20.82	20.97	20.34	21.50
15	64QAM	36	20	20.93	20.26	20.26	
15	64QAM	36	39	20.62	20.97	20.53	
15	64QAM	75	0	20.38	21.01	20.51	
Channel				133172	133297	133422	Tune-up limit (dBm)
Frequency (MHz)				668	680.5	693	
10	QPSK	1	0	22.01	22.03	21.94	22.5
10	QPSK	1	25	21.94	21.95	21.88	
10	QPSK	1	49	21.53	21.66	21.85	
10	QPSK	25	0	20.83	20.92	20.96	21.50
10	QPSK	25	12	20.98	20.96	21.01	
10	QPSK	25	25	20.84	20.75	21.04	
10	QPSK	50	0	20.43	20.92	20.91	
10	16QAM	1	0	21.54	21.92	21.83	22.0
10	16QAM	1	25	21.63	21.86	21.80	
10	16QAM	1	49	20.92	21.72	21.76	
10	16QAM	25	0	20.30	20.89	20.85	21.00

10	16QAM	25	12	20.64	20.49	20.60	
10	16QAM	25	25	20.46	20.86	20.88	
10	16QAM	50	0	20.72	20.93	20.96	
10	64QAM	1	0	20.94	21.12	20.85	22.0
10	64QAM	1	25	21.29	21.67	21.32	
10	64QAM	1	49	21.42	21.61	21.28	
10	64QAM	25	0	20.32	20.88	20.66	21.00
10	64QAM	25	12	20.27	20.33	20.24	
10	64QAM	25	25	20.29	20.39	20.94	
10	64QAM	50	0	20.64	20.61	20.72	
Channel				133147	133297	133447	Tune-up limit (dBm)
Frequency (MHz)				665.5	680.5	695.5	
5	QPSK	1	0	21.75	21.82	21.69	22.0
5	QPSK	1	12	21.79	21.80	21.77	
5	QPSK	1	24	21.53	21.59	21.67	
5	QPSK	12	0	20.64	20.75	20.71	21.00
5	QPSK	12	7	20.76	20.70	20.69	
5	QPSK	12	13	20.68	20.80	20.72	
5	QPSK	25	0	20.52	20.76	20.70	
5	16QAM	1	0	21.62	21.73	21.60	22.0
5	16QAM	1	12	21.59	21.64	21.54	
5	16QAM	1	24	21.40	21.43	21.48	
5	16QAM	12	0	20.60	20.72	20.63	21.00
5	16QAM	12	7	20.66	20.65	20.67	
5	16QAM	12	13	20.68	20.70	20.62	
5	16QAM	25	0	20.53	20.62	20.41	
5	64QAM	1	0	21.22	21.45	21.49	21.5
5	64QAM	1	12	21.13	21.37	21.48	
5	64QAM	1	24	20.98	21.39	21.48	
5	64QAM	12	0	20.25	20.81	20.61	21.00
5	64QAM	12	7	20.45	20.26	20.76	
5	64QAM	12	13	20.62	20.64	20.57	
5	64QAM	25	0	20.48	20.36	20.96	

WLAN Conducted Power:

2.4GHz WLAN:

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Power Setting	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	CH 1	2412	15.90	17.00	15	100.00
		CH 6	2437	15.45	17.00	15	
		CH 11	2462	16.56	17.00	15	
	802.11g 6Mbps	CH 1	2412	17.97	19.50	15	100.00
		CH 6	2437	18.18	19.50	15	
		CH 11	2462	**19.23**	19.50	15	
	802.11n-HT20 MCS0	CH 1	2412	17.75	19.00	15	100.00
		CH 6	2437	17.40	19.00	15	
		CH 11	2462	18.63	19.00	15	
	802.11n-HT40 MCS0	CH 3	2422	17.81	18.50	15	100.00
		CH 6	2437	17.88	18.50	15	
		CH 9	2452	18.05	18.50	15	

5GHz WLAN:

<5.2GHz WLAN>

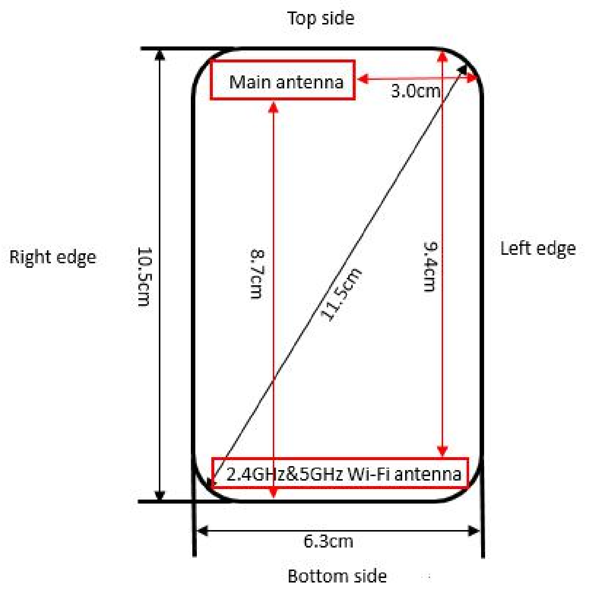
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Power Setting	Duty Cycle %
5.2GHz WLAN	802.11n-HT20 MCS0	CH 36	5180	17.88	18.50	15	100.00
		CH 40	5200	18.00	18.50	15	
		CH 48	5240	18.10	18.50	15	
	802.11n-HT40 MCS0	CH 38	5190	17.65	18.50	15	100.00
		CH 46	5230	**18.41**	18.50	15	
	802.11ac-VHT20 MCS0	CH 36	5180	17.78	18.50	15	100.00
		CH 40	5200	18.08	18.50	15	
		CH 48	5240	18.09	18.50	15	
	802.11ac-VHT40 MCS0	CH 38	5190	17.62	18.50	15	100.00
		CH 46	5230	18.35	18.50	15	
	802.11ac-VHT80 MCS0	CH 42	5210	17.56	18.50	15	100.00

<5.8GHz WLAN>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Power Setting	Duty Cycle %
5.8GHz WLAN ANT 1	802.11n-HT20 MCS0	CH 149	5745	17.71	19.00	15	100.00
		CH 157	5785	18.65	19.00	15	
		CH 165	5825	18.64	19.00	15	
	802.11n-HT40 MCS0	CH 151	5755	17.89	19.00	15	100.00
		CH 159	5795	18.24	19.00	15	
	802.11ac-VHT20 MCS0	CH 149	5745	17.63	19.00	15	100.00
		CH 157	5785	18.65	19.00	15	
		CH 165	5825	**18.67**	19.00	15	
	802.11ac-VHT40 MCS0	CH 151	5755	17.76	19.00	15	100.00
		CH 159	5795	18.16	19.00	15	
	802.11ac-VHT80 MCS0	CH 155	5775	17.68	19.00	15	100.00

15. Hot-Spot Mode Evaluation Procedure

15.1. EUT Antenna Location



Back side view

Main antenna supported TX bands :
UMTS Band II/IV/V
FDD LTE Band 2/4/5/12/13/25/26/41/66/71
WLAN antenna supported bands : 2.4GHz/5GHz

Hotspot Evaluation:

Assessment	Hotspot side for SARTest distance: 10mm					
Antennas	Back	Front	Top	Bottom	Left edge	Right edge
WWAN Main Antenna	Yes	Yes	Yes	No	No	Yes
WLAN/BT Main Antenna	Yes	Yes	No	Yes	Yes	Yes

Note :

1. The SAR evaluation procedures for Portable Devices with Wireless Router function is according to KDB 941225 D06 Hotspot SAR v02r01.
2. Head/Body-worn/Hotspot mode SAR assessments are required.
3. Referring to KDB 941225 D06, when the overall device length and width are ≥ 9cm*5cm, the test distance is 10 mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge.
4. For Main antenna, SAR measurements at Top side are not required since the distance between DUT and flat phantom > 25mm.
5. For WLAN&BT antenna, SAR measurements Bottom side and Left side are not required since the distance between DUT and flat phantom > 25mm.
6. For the Diversity antenna, it supports RX only, SAR is not required.

16. Block diagram of the tests to be performed

16.1. Body

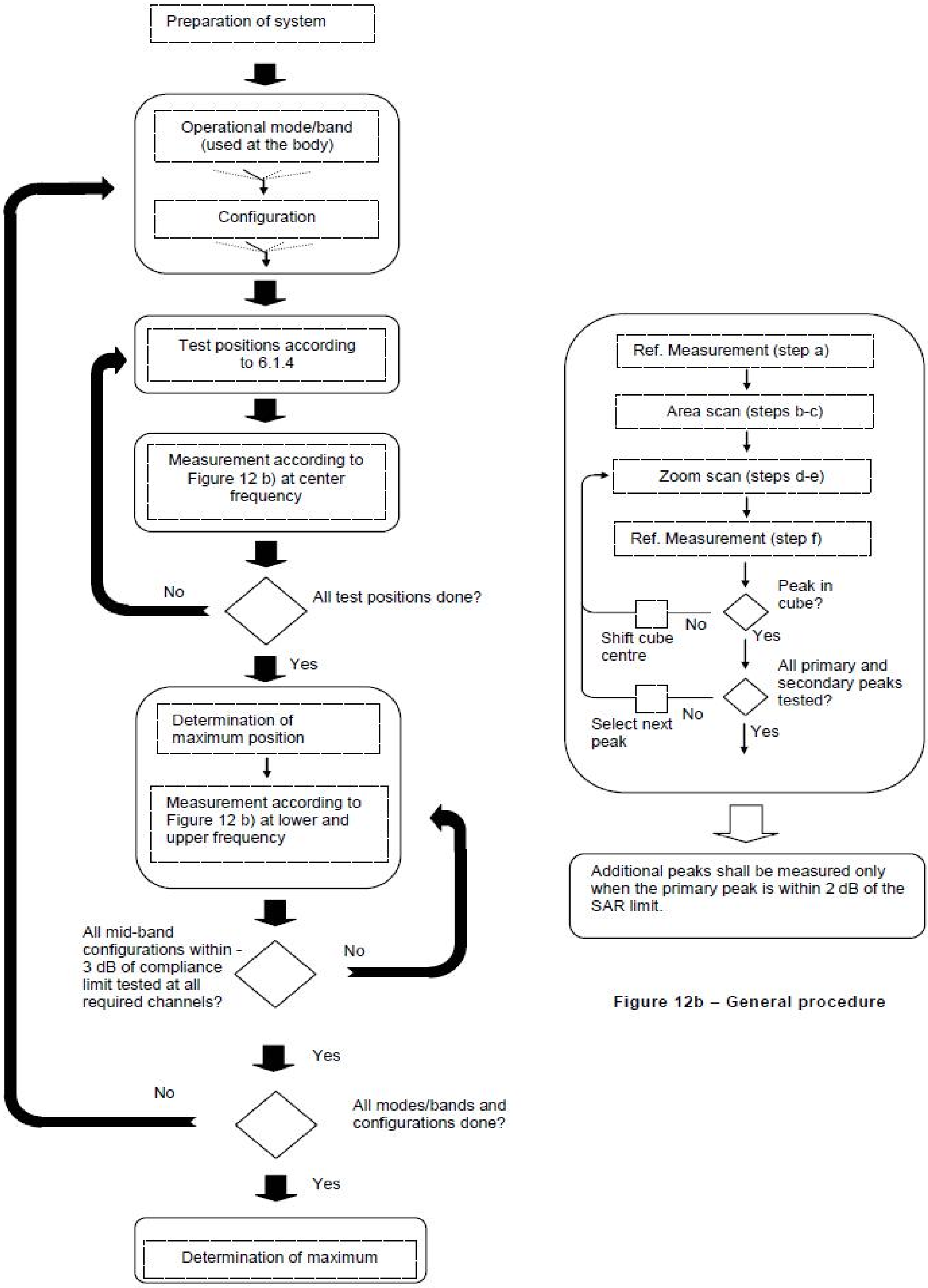


Figure 12b – General procedure

17. Test Results List

17.1. Test Guidance

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.
4. Per KDB 648474 D04v01r03, when the reported SAR for a body-worn accessory measured without a headset connected to the handset is ≤ 1.2 W/kg, SAR testing with a headset connected to the handset is not required.
5. Per KDB648474 D04v01r03, for smart phones with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm, when hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg, however, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for tablet modes to compare with the 1.2 W/kg SAR test reduction threshold.
6. Per KDB248227 D01v02r02,a Wi-Fi device must be configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools for SAR measurement. The test frequencies

established using test mode must correspond to the actual channel frequencies required for operations in the U.S. When 802.11 frame gaps are accounted for in the transmission, a maximum transmission duty factor of 92 - 96% is typically achievable in most test mode configurations. A minimum transmission duty factor of 85% is required to avoid certain hardware and device implementation issues related to wide range SAR scaling. In addition, a periodic transmission duty factor is required for current generation SAR systems to measure SAR correctly. Unless it is permitted by specific KDB procedures or continuous transmission is specifically restricted by the device, the reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit. When a device is not capable of sustaining continuous transmission or the output can become nonlinear, and it is limited by hardware design and unable to transmit at higher than 85% duty factor, a periodic duty factor within 15% of the maximum duty factor the device is capable of transmitting should be used. The reported SAR must be scaled to the maximum transmission duty factor to determine compliance. Descriptions of the procedures applied to establish the specific duty factor used for SAR testing are required in SAR reports to support the test results.

17.2. Standalone Hotspot SAR Data

<WCDMA>

Plot No.	Band	Mode	Test Position	Ch.	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WCDMA Band II	RMC 12.2Kbps	Front Side	9538	21.9	22	1.023	0.337	0.345
1#	WCDMA Band II	RMC 12.2Kbps	Back Side	9538	21.9	22	1.023	0.723	**0.740**
	WCDMA Band II	RMC 12.2Kbps	Right Side	9538	21.9	22	1.023	0.325	0.333
	WCDMA Band II	RMC 12.2Kbps	Top side	9538	21.9	22	1.023	0.687	0.703
	WCDMA Band IV	RMC 12.2Kbps	Front Side	1513	21.68	22	1.076	0.378	0.407
2#	WCDMA Band IV	RMC 12.2Kbps	Back Side	1513	21.68	22	1.076	0.697	**0.750**
	WCDMA Band IV	RMC 12.2Kbps	Right Side	1513	21.68	22	1.076	0.501	0.539
	WCDMA Band IV	RMC 12.2Kbps	Top side	1513	21.68	22	1.076	0.510	0.549
	WCDMA Band V	RMC 12.2Kbps	Front Side	4182	22.49	22.5	1.002	0.144	0.144
3#	WCDMA Band V	RMC 12.2Kbps	Back Side	4182	22.49	22.5	1.002	0.488	**0.489**
	WCDMA Band V	RMC 12.2Kbps	Right Side	4182	22.49	22.5	1.002	0.483	0.484
	WCDMA Band V	RMC 12.2Kbps	Top side	4182	22.49	22.5	1.002	0.229	0.230

<FDD-LTE >

Plot No.	Band	BW (MHz)	Modulation RB/offset	Test Position	Ch.	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 2	20MHz	QPSK1RB#49	Front Side	18900	22.08	22.5	1.102	0.318	0.350
	LTE Band 2	20MHz	QPSK1RB#49	Back Side	18900	22.08	22.5	1.102	0.589	0.649
	LTE Band 2	20MHz	QPSK1RB#49	Right Side	18900	22.08	22.5	1.102	0.233	0.257
4#	LTE Band 2	20MHz	QPSK1RB#49	Top side	18900	22.08	22.5	1.102	0.636	**0.701**
	LTE Band 2	20MHz	QPSK50RB#0	Front Side	19100	20.91	21	1.021	0.253	0.258
	LTE Band 2	20MHz	QPSK50RB#0	Back Side	19100	20.91	21	1.021	0.453	0.462
	LTE Band 2	20MHz	QPSK50RB#0	Right Side	19100	20.91	21	1.021	0.168	0.172
5#	LTE Band 2	20MHz	QPSK50RB#0	Top side	19100	20.91	21	1.021	0.493	**0.503**

	LTE Band 4	20MHz	QPSK1RB#49	Front Side	20300	21.56	22	1.107	0.504	0.558
6#	LTE Band 4	20MHz	QPSK1RB#49	Back Side	20300	21.56	22	1.107	0.815	0.902
	LTE Band 4	20MHz	QPSK1RB#49	Back Side	20050	21.5	22	1.122	0.799	0.896
	LTE Band 4	20MHz	QPSK1RB#49	Back Side	20175	21.54	22	1.112	0.805	0.895
	LTE Band 4	20MHz	QPSK1RB#49	Right Side	20300	21.56	22	1.107	0.232	0.257
	LTE Band 4	20MHz	QPSK1RB#49	Top side	20300	21.56	22	1.107	0.623	0.689
	LTE Band 4	20MHz	QPSK50RB#0	Front Side	20300	20.44	20.50	1.014	0.399	0.405
7#	LTE Band 4	20MHz	QPSK50RB#0	Back Side	20300	20.44	20.50	1.014	0.684	0.694
	LTE Band 4	20MHz	QPSK50RB#0	Right Side	20300	20.44	20.50	1.014	0.136	0.138
	LTE Band 4	20MHz	QPSK50RB#0	Top side	20300	20.44	20.50	1.014	0.476	0.483
	LTE Band 5	10MHz	QPSK1RB#25	Front Side	20600	22.49	22.5	1.002	0.503	0.504
	LTE Band 5	10MHz	QPSK1RB#25	Back Side	20600	22.49	22.5	1.002	0.812	0.814
	LTE Band 5	10MHz	QPSK1RB#25	Back Side	20450	22.4	22.5	1.023	0.802	0.821
8#	LTE Band 5	10MHz	QPSK1RB#25	Back Side	20525	22.2	22.5	1.072	0.806	**0.864**
	LTE Band 5	10MHz	QPSK1RB#25	Right Side	20600	22.49	22.5	1.002	0.465	0.466
	LTE Band 5	10MHz	QPSK1RB#25	Top side	20600	22.49	22.5	1.002	0.116	0.116
	LTE Band 5	10MHz	QPSK25RB#0	Front Side	20600	21.33	21.5	1.040	0.397	0.413
9#	LTE Band 5	10MHz	QPSK25RB#0	Back Side	20600	21.33	21.5	1.040	0.803	**0.835**
	LTE Band 5	10MHz	QPSK25RB#0	Back Side	20450	21.27	21.5	1.054	0.787	0.830
	LTE Band 5	10MHz	QPSK25RB#0	Back Side	20525	21.23	21.5	1.064	0.765	0.814
	LTE Band 5	10MHz	QPSK25RB#0	Right Side	20600	21.33	21.5	1.040	0.473	0.492
	LTE Band 5	10MHz	QPSK25RB#0	Top side	20600	21.33	21.5	1.040	0.094	0.097
	LTE Band 12	10MHz	QPSK1RB#25	Front Side	23130	22.75	23.00	1.059	0.469	0.497
10#	LTE Band 12	10MHz	QPSK1RB#25	Back Side	23130	22.75	23.00	1.059	0.740	**0.784**
	LTE Band 12	10MHz	QPSK1RB#25	Right Side	23130	22.75	23.00	1.059	0.412	0.436
	LTE Band 12	10MHz	QPSK1RB#25	Top side	23130	22.75	23.00	1.059	0.104	0.110
	LTE Band 12	10MHz	QPSK25RB#0	Front Side	23130	21.43	21.50	1.016	0.391	0.397
11#	LTE Band 12	10MHz	QPSK25RB#0	Back Side	23130	21.43	21.50	1.016	0.560	**0.569**
	LTE Band 12	10MHz	QPSK25RB#0	Right Side	23130	21.43	21.50	1.016	0.310	0.315
	LTE Band 12	10MHz	QPSK25RB#0	Top side	23130	21.43	21.50	1.016	0.080	0.081

	LTE Band 13	10MHz	QPSK1RB#25	Front Side	23230	22.55	23.00	1.109	0.524	0.581
12#	LTE Band 13	10MHz	QPSK1RB#25	Back Side	23230	22.55	23.00	1.109	0.615	**0.682**
	LTE Band 13	10MHz	QPSK1RB#25	Right Side	23230	22.55	23.00	1.109	0.380	0.421
	LTE Band 13	10MHz	QPSK1RB#25	Top side	23230	22.55	23.00	1.109	0.128	0.142
	LTE Band 13	10MHz	QPSK25RB#0	Front Side	23230	21.47	21.50	1.007	0.408	0.411
13#	LTE Band 13	10MHz	QPSK25RB#0	Back Side	23230	21.47	21.50	1.007	0.487	**0.490**
	LTE Band 13	10MHz	QPSK25RB#0	Right Side	23230	21.47	21.50	1.007	0.294	0.296
	LTE Band 13	10MHz	QPSK25RB#0	Top side	23230	21.47	21.50	1.007	0.086	0.086
	LTE Band 25	20MHz	QPSK1RB#49	Front Side	26365	22.28	22.50	1.052	0.345	0.363
14#	LTE Band 25	20MHz	QPSK1RB#49	Back Side	26365	22.28	22.50	1.052	0.739	**0.777**
	LTE Band 25	20MHz	QPSK1RB#49	Right Side	26365	22.28	22.50	1.052	0.282	0.297
	LTE Band 25	20MHz	QPSK1RB#49	Top side	26365	22.28	22.50	1.052	0.670	0.705
	LTE Band 25	20MHz	QPSK50RB#50	Front Side	26365	20.66	21.00	1.081	0.258	0.279
	LTE Band 25	20MHz	QPSK50RB#50	Back Side	26365	20.66	21.00	1.081	0.469	0.507
	LTE Band 25	20MHz	QPSK50RB#50	Right Side	26365	20.66	21.00	1.081	0.202	0.218
15#	LTE Band 25	20MHz	QPSK50RB#50	Top side	26365	20.66	21.00	1.081	0.500	**0.541**
	LTE Band 26	15MHz	QPSK1RB#37	Front Side	26965	22.35	22.50	1.035	0.779	0.806
	LTE Band 26	15MHz	QPSK1RB#37	Back Side	26965	22.35	22.50	1.035	0.944	0.977
16#	LTE Band 26	15MHz	QPSK1RB#37	Back Side	26765	22.28	22.50	1.052	0.930	**0.978**
	LTE Band 26	15MHz	QPSK1RB#37	Back Side	26865	22.32	22.50	1.042	0.924	0.963
	LTE Band 26	15MHz	QPSK1RB#37	Right Side	26965	22.35	22.50	1.035	0.552	0.571
	LTE Band 26	15MHz	QPSK1RB#37	Top side	26965	22.35	22.50	1.035	0.110	0.114
	LTE Band 26	15MHz	QPSK36RB#0	Front Side	26765	21.49	21.50	1.002	0.718	0.720
	LTE Band 26	15MHz	QPSK36RB#0	Back Side	26765	21.49	21.50	1.002	0.824	0.826
17#	LTE Band 26	15MHz	QPSK36RB#0	Back Side	26865	21.37	21.50	1.030	0.806	**0.830**
	LTE Band 26	15MHz	QPSK36RB#0	Back Side	26965	21.41	21.50	1.021	0.768	0.784
	LTE Band 26	15MHz	QPSK36RB#0	Right Side	26765	21.49	21.50	1.002	0.534	0.535
	LTE Band 26	15MHz	QPSK36RB#0	Top side	26765	21.49	21.50	1.002	0.104	0.104

	LTE Band 66	20MHz	QPSK1RB#49	Front Side	132322	21.57	22	1.104	0.533	0.588
18#	LTE Band 66	20MHz	QPSK1RB#49	Back Side	132322	21.57	22	1.104	0.828	**0.914**
	LTE Band 66	20MHz	QPSK1RB#49	Back Side	132072	21.57	22	1.104	0.812	0.897
	LTE Band 66	20MHz	QPSK1RB#49	Back Side	132572	21.48	22	1.127	0.802	0.904
	LTE Band 66	20MHz	QPSK1RB#49	Right Side	132322	21.57	22	1.104	0.242	0.267
	LTE Band 66	20MHz	QPSK1RB#49	Top side	132322	21.57	22	1.104	0.602	0.665
	LTE Band 66	20MHz	QPSK50RB#50	Front Side	132072	20.4	20.5	1.023	0.451	0.462
19#	LTE Band 66	20MHz	QPSK50RB#50	Back Side	132072	20.4	20.5	1.023	0.581	**0.595**
	LTE Band 66	20MHz	QPSK50RB#50	Right Side	132072	20.4	20.5	1.023	0.209	0.214
	LTE Band 66	20MHz	QPSK50RB#50	Top side	132072	20.4	20.5	1.023	0.505	0.517
	LTE Band 71	20MHz	QPSK1RB#49	Front Side	133322	22.01	22.5	1.119	0.190	0.213
20#	LTE Band 71	20MHz	QPSK1RB#49	Back Side	133322	22.01	22.5	1.119	0.276	**0.309**
	LTE Band 71	20MHz	QPSK1RB#49	Right Side	133322	22.01	22.5	1.119	0.177	0.198
	LTE Band 71	20MHz	QPSK1RB#49	Top side	133322	22.01	22.5	1.119	0.061	0.068
	LTE Band 71	20MHz	QPSK50RB#50	Front Side	133322	20.84	21	1.038	0.166	0.172
21#	LTE Band 71	20MHz	QPSK50RB#50	Back Side	133322	20.84	21	1.038	0.247	**0.256**
	LTE Band 71	20MHz	QPSK50RB#50	Right Side	133322	20.84	21	1.038	0.179	0.186
	LTE Band 71	20MHz	QPSK50RB#50	Top side	133322	20.84	21	1.038	0.058	0.060

<TDD-LTE>

Plot No.	Band	BW (MHz)	Modulation RB/offset	Test Position	Ch.	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 41	20MHz	QPSK1RB#49	Front Side	40620	21.9	22	1.023	62.89	1.006	0.232	0.239
22#	LTE Band 41	20MHz	QPSK1RB#49	Back Side	40620	21.9	22	1.023	62.89	1.006	1.070	**1.101**
	LTE Band 41	20MHz	QPSK1RB#49	Back Side	39750	21.64	22	1.086	62.89	1.006	0.977	1.068
	LTE Band 41	20MHz	QPSK1RB#49	Back Side	41490	21.84	22	1.038	62.89	1.006	1.020	1.065
	LTE Band 41	20MHz	QPSK1RB#49	Right Side	40620	21.9	22	1.023	62.89	1.006	0.208	0.214
	LTE Band 41	20MHz	QPSK1RB#49	Top side	40620	21.9	22	1.023	62.89	1.006	0.958	0.986
	LTE Band 41	20MHz	QPSK50RB#0	Front Side	41490	20.98	21	1.005	62.89	1.006	0.160	0.162
23#	LTE Band 41	20MHz	QPSK50RB#0	Back Side	41490	20.98	21	1.005	62.89	1.006	0.891	0.900

	LTE Band 41	20MHz	QPSK50RB#0	Back Side	40620	20.95	21	1.012	62.89	1.006	0.839	0.854
	LTE Band 41	20MHz	QPSK50RB#0	Back Side	39750	20.68	21	1.076	62.89	1.006	0.644	0.697
	LTE Band 41	20MHz	QPSK50RB#0	Right Side	41490	20.98	21	1.005	62.89	1.006	0.161	0.163
	LTE Band 41	20MHz	QPSK50RB#0	Top side	41490	20.98	21	1.005	62.89	1.006	0.755	0.763

<2.4G WLAN >

Plot No.	Band	Mode	Test Position	Ch.	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
24#	WLAN2.4GHz	802.11g	Front Side	11	19.23	19.5	1.064	0.272	**0.289**
	WLAN2.4GHz	802.11g	Back Side	11	19.23	19.5	1.064	0.217	0.231
	WLAN2.4GHz	802.11g	Left Side	11	19.23	19.5	1.064	0.100	0.106
	WLAN2.4GHz	802.11g	Right Side	11	19.23	19.5	1.064	0.056	0.060
	WLAN2.4GHz	802.11g	Bottom side	11	19.23	19.5	1.064	0.191	0.203

<5G WLAN >

Plot No.	Band	Mode	Test Position	Ch.	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
Band 1									
	WLAN5GHz	802.11n40	Front Side	46	18.41	18.5	1.021	0.371	0.379
	WLAN5GHz	802.11n40	Back Side	46	18.41	18.5	1.021	0.318	0.325
25#	WLAN5GHz	802.11n40	Left Side	46	18.41	18.5	1.021	0.450	0.459
	WLAN5GHz	802.11n40	Right Side	46	18.41	18.5	1.021	0.005	0.005
	WLAN5GHz	802.11n40	Bottom Side	46	18.41	18.5	1.021	0.017	0.017
Band 4									
	WLAN5GHz	802.11n40	Front Side	165	18.67	19	1.079	0.237	0.256
	WLAN5GHz	802.11n40	Back Side	165	18.67	19	1.079	0.258	0.278
26#	WLAN5GHz	802.11n40	Left Side	165	18.67	19	1.079	0.430	**0.464**
	WLAN5GHz	802.11n40	Right Side	165	18.67	19	1.079	0.004	0.004
	WLAN5GHz	802.11n40	Bottom side	165	18.67	19	1.079	0.113	0.122

Note: The WLAN Reported 1g SAR (W/kg) has been calculated together with the duty cycle scaling factor.

17.3. Body-worn SAR Data

<WCDMA>

Band	Mode	Test Position	Ch.	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
WCDMA Band II	RMC 12.2Kbps	Front Side	9538	21.9	22	1.023	0.337	0.345
WCDMA Band II	RMC 12.2Kbps	Back Side	9538	21.9	22	1.023	0.723	0.740
WCDMA Band IV	RMC 12.2Kbps	Front Side	1513	21.68	22	1.076	0.378	0.407
WCDMA Band IV	RMC 12.2Kbps	Back Side	1513	21.68	22	1.076	0.697	0.750
WCDMA Band V	RMC 12.2Kbps	Front Side	4182	22.49	22.5	1.002	0.144	0.144
WCDMA Band V	RMC 12.2Kbps	Back Side	4182	22.49	22.5	1.002	0.488	**0.489**

<FDD-LTE >

Band	BW (MHz)	Modulation RB/offset	Test Position	Ch.	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
LTE Band 2	20MHz	QPSK1RB#49	Front Side	18900	22.08	22.5	1.102	0.318	0.350
LTE Band 2	20MHz	QPSK1RB#49	Back Side	18900	22.08	22.5	1.102	0.589	0.649
LTE Band 2	20MHz	QPSK50RB#0	Front Side	19100	20.91	21	1.021	0.253	0.258
LTE Band 2	20MHz	QPSK50RB#0	Back Side	19100	20.91	21	1.021	0.453	0.462
LTE Band 4	20MHz	QPSK1RB#49	Front Side	20300	21.56	22	1.107	0.504	0.558
LTE Band 4	20MHz	QPSK1RB#49	Back Side	20300	21.56	22	1.107	0.815	0.902
LTE Band 4	20MHz	QPSK1RB#49	Back Side	20050	21.5	22	1.122	0.799	0.896
LTE Band 4	20MHz	QPSK1RB#49	Back Side	20175	21.54	22	1.112	0.805	0.895
LTE Band 4	20MHz	QPSK50RB#0	Front Side	20300	20.44	20.50	1.014	0.399	0.405
LTE Band 4	20MHz	QPSK50RB#0	Back Side	20300	20.44	20.50	1.014	0.684	0.694
LTE Band 5	10MHz	QPSK1RB#25	Front Side	20600	22.49	22.5	1.002	0.503	0.504
LTE Band 5	10MHz	QPSK1RB#25	Back Side	20600	22.49	22.5	1.002	0.812	0.814
LTE Band 5	10MHz	QPSK1RB#25	Back Side	20450	22.4	22.5	1.023	0.802	0.821
LTE Band 5	10MHz	QPSK1RB#25	Back Side	20525	22.2	22.5	1.072	0.806	**0.864**

LTE Band 5	10MHz	QPSK25RB#0	Front Side	20600	21.33	21.5	1.040	0.397	0.413
LTE Band 5	10MHz	QPSK25RB#0	Back Side	20600	21.33	21.5	1.040	0.803	**0.835**
LTE Band 5	10MHz	QPSK25RB#0	Back Side	20450	21.27	21.5	1.054	0.787	0.830
LTE Band 5	10MHz	QPSK25RB#0	Back Side	20525	21.23	21.5	1.064	0.765	0.814
LTE Band 12	10MHz	QPSK1RB#25	Front Side	23130	22.75	23.00	1.059	0.469	0.497
LTE Band 12	10MHz	QPSK1RB#25	Back Side	23130	22.75	23.00	1.059	0.740	0.784
LTE Band 12	10MHz	QPSK25RB#0	Front Side	23130	21.43	21.50	1.016	0.391	0.397
LTE Band 12	10MHz	QPSK25RB#0	Back Side	23130	21.43	21.50	1.016	0.560	0.569
LTE Band 13	10MHz	QPSK1RB#25	Front Side	23230	22.55	23.00	1.109	0.524	0.581
LTE Band 13	10MHz	QPSK1RB#25	Back Side	23230	22.55	23.00	1.109	0.615	0.682
LTE Band 13	10MHz	QPSK25RB#0	Front Side	23230	21.47	21.50	1.007	0.408	0.411
LTE Band 13	10MHz	QPSK25RB#0	Back Side	23230	21.47	21.50	1.007	0.487	0.490
LTE Band 25	20MHz	QPSK1RB#49	Front Side	26365	22.28	22.50	1.052	0.345	0.363
LTE Band 25	20MHz	QPSK1RB#49	Back Side	26365	22.28	22.50	1.052	0.739	0.777
LTE Band 25	20MHz	QPSK50RB#50	Front Side	26365	20.66	21.00	1.081	0.258	0.279
LTE Band 25	20MHz	QPSK50RB#50	Back Side	26365	20.66	21.00	1.081	0.469	0.507
LTE Band 26	15MHz	QPSK1RB#37	Front Side	26965	22.35	22.50	1.035	0.779	0.806
LTE Band 26	15MHz	QPSK1RB#37	Back Side	26965	22.35	22.50	1.035	0.944	0.977
LTE Band 26	15MHz	QPSK1RB#37	Back Side	26765	22.28	22.50	1.052	0.930	0.978
LTE Band 26	15MHz	QPSK1RB#37	Back Side	26865	22.32	22.50	1.042	0.924	0.963
LTE Band 26	15MHz	QPSK36RB#0	Front Side	26765	21.49	21.50	1.002	0.718	0.720
LTE Band 26	15MHz	QPSK36RB#0	Back Side	26765	21.49	21.50	1.002	0.824	0.826
LTE Band 26	15MHz	QPSK36RB#0	Back Side	26865	21.37	21.50	1.030	0.806	0.830
LTE Band 26	15MHz	QPSK36RB#0	Back Side	26965	21.41	21.50	1.021	0.768	0.784
LTE Band 66	20MHz	QPSK1RB#49	Front Side	132322	21.57	22	1.104	0.533	0.588
LTE Band 66	20MHz	QPSK1RB#49	Back Side	132322	21.57	22	1.104	0.828	0.914
LTE Band 66	20MHz	QPSK1RB#49	Back Side	132072	21.57	22	1.104	0.812	0.897
LTE Band 66	20MHz	QPSK1RB#49	Back Side	132572	21.38	22	1.153	0.841	0.970
LTE Band 66	20MHz	QPSK50RB#50	Front Side	132072	20.4	20.5	1.023	0.451	0.462
LTE Band 66	20MHz	QPSK50RB#50	Back Side	132072	20.4	20.5	1.023	0.581	0.595

LTE Band 71	20MHz	QPSK1RB#49	Front Side	133322	22.01	22.5	1.119	0.190	0.213
LTE Band 71	20MHz	QPSK1RB#49	Back Side	133322	22.01	22.5	1.119	0.276	0.309
LTE Band 71	20MHz	QPSK50RB#50	Front Side	133322	20.84	21	1.038	0.166	0.172
LTE Band 71	20MHz	QPSK50RB#50	Back Side	133322	20.84	21	1.038	0.247	0.256

<TDD-LTE>

Band	BW (MHz)	Modulation RB/offset	Test Position	Ch.	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
LTE Band 41	20MHz	QPSK1RB#49	Front Side	40620	21.9	22	1.023	62.89	1.006	0.232	0.239
LTE Band 41	20MHz	QPSK1RB#49	Back Side	40620	21.9	22	1.023	62.89	1.006	1.070	1.101
LTE Band 41	20MHz	QPSK1RB#49	Back Side	39750	21.64	22	1.086	62.89	1.006	0.977	1.068
LTE Band 41	20MHz	QPSK1RB#49	Back Side	41490	21.84	22	1.038	62.89	1.006	1.020	1.065
LTE Band 41	20MHz	QPSK1RB#49	Back Side	40185	21.88	22	1.028	62.89	1.006	1.060	1.096
LTE Band 41	20MHz	QPSK1RB#49	Back Side	41055	21.83	22	1.040	62.89	1.006	0.991	1.037
LTE Band 41	20MHz	QPSK50RB#0	Front Side	41490	20.98	21	1.005	62.89	1.006	0.160	0.162
LTE Band 41	20MHz	QPSK50RB#0	Back Side	41490	20.98	21	1.005	62.89	1.006	0.891	0.900
LTE Band 41	20MHz	QPSK50RB#0	Back Side	40620	20.95	21	1.012	62.89	1.006	0.839	0.854
LTE Band 41	20MHz	QPSK50RB#0	Back Side	39750	20.68	21	1.076	62.89	1.006	0.644	0.697
LTE Band 41	20MHz	QPSK50RB#0	Back Side	40185	20.68	21	1.076	62.89	1.006	0.827	0.896
LTE Band 41	20MHz	QPSK50RB#0	Back Side	41055	20.97	21	1.007	62.89	1.006	0.855	0.866

<2.4G WLAN >

Band	Mode	Test Position	Ch.	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
WLAN2.4GHz	802.11n20	Front Side	11	19.23	19.5	1.064	0.272	0.289
WLAN2.4GHz	802.11n20	Back Side	11	19.23	19.5	1.064	0.217	0.231

<5G WLAN >

Band	Mode	Test Position	Ch.	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
Band 1								
WLAN5GHz	802.11n40	Front Side	46	18.41	18.5	1.021	0.371	0.379
WLAN5GHz	802.11n40	Back Side	46	18.41	18.5	1.021	0.318	0.325
Band 4								
WLAN5GHz	802.11n40	Front Side	165	18.67	19	1.079	0.237	0.256
WLAN5GHz	802.11n40	Back Side	165	18.67	19	1.079	0.258	0.278

Note: The WLAN Reported 1g SAR (W/kg) has been calculated together with the duty cycle scaling factor.

17.4. Repeated SAR Measurement

In accordance with published RF Exposure KDB procedure 865664 D01 SAR measurement 100 MHz to 6 GHz. These additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

<FDD-LTE >

Band	BW (MHz)	Modulation RB/offset	Test Position	Ch.	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
LTE Band 4	20MHz	QPSK1RB#49	Back Side	20300	21.56	22	1.107	0.812	0.899
LTE Band 5	10Mhz	QPSK1RB#25	Back Side	20600	22.49	22.5	1.002	0.800	0.802
LTE Band 5	10Mhz	QPSK25RB#0	Back Side	20600	21.33	21.5	1.040	0.792	0.824
LTE Band 26	15Mhz	QPSK1RB#37	Back Side	26965	22.35	22.50	1.035	0.937	0.970
LTE Band 26	15Mhz	QPSK36RB#0	Back Side	26765	21.49	21.50	1.002	0.823	0.825
LTE Band 66	20Mhz	QPSK1RB#49	Back Side	132322	21.57	22	1.104	0.805	0.889

<TDD-LTE>

Band	BW (MHz)	Modulation RB/offset	Test Position	Ch.	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
LTE Band 41	20MHz	QPSK1RB#49	Back Side	40620	21.9	22	1.023	62.89	1.006	1.040	1.071
LTE Band 41	20MHz	QPSK1RB#49	Top side	40620	21.9	22	1.023	62.89	1.006	0.939	0.961
LTE Band 41	20MHz	QPSK50RB#50	Back Side	41490	20.98	21	1.005	62.89	1.006	0.881	0.890

18. Simultaneous Transmission Evaluation

Simultaneous Evaluation:

No.	Simultaneous transmission Condition	Body-worn	Hotspot
1	WWAN + WLAN 2.4GHz	Yes	Yes
2	WWAN + WLAN 5GHz	Yes	Yes

Note:

1. When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the Wi-Fi transmitter and another WWAN transmitter. Both transmitter often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions. The "Portable Hotspot" feature on the handset was NOT activated, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal.
2. The hotspot SAR result may overlap with the body-worn accessory SAR requirements, per KDB 941225 D06, the more conservative configurations can be considered, thus excluding some unnecessary body-worn accessory SAR tests.
3. GSM supports voice and data transmission, though not simultaneously. WCDMA supports voice and data transmission simultaneously.
4. Simultaneous Transmission SAR evaluation is not required for BT and Wi-Fi , because the software mechanism have been incorporated to guarantee that the WLAN and Bluetooth transmitters would not simultaneously operate.
5. Per KDB 447498D01v06, Simultaneous Transmission SAR Evaluation procedures is as followed:

   Step 1: If sum of 1 g SAR < 1.6 W/kg, Simultaneous SAR measurement is not required.

   Step 2: If sum of 1 g SAR > 1.6 W/kg, ratio of SAR to peak separation distance for pair of transmitters calculated.

   Step 3: If the ratio of SAR to peak separation distance is ≤ 0.04, Simultaneous SAR measurement is not required.

   Step 4: If the ratio of SAR to peak separation distance is > 0.04, Simultaneous SAR measurement is required and simultaneous transmission SAR value is calculated.

   (The ratio is determined by: (SAR1 + SAR2) ^ 1.5/Ri ≤ 0.04,

Ri is the separation distance between the peak SAR locations for the antenna pair in mm.

<Hotspot Simultaneous Transmission>

WWAN Band		Exposure Position	1 WWAN 1g SAR (W/kg)	2 2.4GHz WLAN 1g SAR (W/kg)	3 5GHz WLAN 1g SAR (W/kg)	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)
WCDMA	WCDMA Band II	Front Side	0.345	0.289	0.379	0.634	0.724
		Back Side	0.740	0.231	0.325	0.971	1.065
		Right Side	0.333	0.106	0.459	0.439	0.792
		Left Side	0.000	0.060	0.005	0.060	0.005
		Bottom Side	0.000	0.203	0.017	0.203	0.017
		Top Side	0.703	0.000	0.000	0.703	0.703
	WCDMA Band IV	Front Side	0.407	0.289	0.379	0.696	0.786
		Back Side	0.750	0.231	0.325	0.981	1.075
		Right Side	0.539	0.106	0.459	0.645	0.998
		Left Side	0.000	0.060	0.005	0.060	0.005
		Bottom Side	0.000	0.203	0.017	0.203	0.017
		Top Side	0.549	0.000	0.000	0.549	0.549
	WCDMA Band V	Front Side	0.144	0.289	0.379	0.433	0.523
		Back Side	0.489	0.231	0.325	0.720	0.814
		Right Side	0.484	0.106	0.459	0.590	0.943
		Left Side	0.000	0.060	0.005	0.060	0.005
		Bottom Side	0.000	0.203	0.017	0.203	0.017
		Top Side	0.230	0.000	0.000	0.230	0.230
LTE	LTE Band 2	Front Side	0.350	0.289	0.379	0.639	0.729
		Back Side	0.649	0.231	0.325	0.880	0.974
		Right Side	0.257	0.106	0.459	0.363	0.716
		Left Side	0.000	0.060	0.005	0.060	0.005
		Bottom Side	0.000	0.203	0.017	0.203	0.017
		Top Side	0.701	0.000	0.000	0.701	0.701
	LTE Band 4	Front Side	0.558	0.289	0.379	0.847	0.937
		Back Side	0.902	0.231	0.325	1.133	1.227
		Right Side	0.257	0.106	0.459	0.363	0.716
		Left Side	0.000	0.060	0.005	0.060	0.005
		Bottom Side	0.000	0.203	0.017	0.203	0.017
		Top Side	0.689	0.000	0.000	0.689	0.689
	LTE Band	Front Side	0.504	0.289	0.379	0.793	0.883

	5	Back Side	0.864	0.231	0.325	1.095	1.189
		Right Side	0.466	0.106	0.459	0.572	0.925
		Left Side	0.000	0.060	0.005	0.060	0.005
		Bottom Side	0.000	0.203	0.017	0.203	0.017
		Top Side	0.116	0.000	0.000	0.116	0.116
	LTE Band 12	Front Side	0.497	0.289	0.379	0.786	0.876
		Back Side	0.784	0.231	0.325	1.015	1.109
		Right Side	0.436	0.106	0.459	0.542	0.895
		Left Side	0.000	0.060	0.005	0.060	0.005
		Bottom Side	0.000	0.203	0.017	0.203	0.017
		Top Side	0.110	0.000	0.000	0.110	0.110
	LTE Band 13	Front Side	0.581	0.289	0.379	0.870	0.960
		Back Side	0.682	0.231	0.325	0.913	1.007
		Right Side	0.421	0.106	0.459	0.527	0.880
		Left Side	0.000	0.060	0.005	0.060	0.005
		Bottom Side	0.000	0.203	0.017	0.203	0.017
		Top Side	0.142	0.000	0.000	0.142	0.142
	LTE Band 25	Front Side	0.363	0.289	0.379	0.652	0.742
		Back Side	0.777	0.231	0.325	1.008	1.102
		Right Side	0.297	0.106	0.459	0.403	0.756
		Left Side	0.000	0.060	0.005	0.060	0.005
		Bottom Side	0.000	0.203	0.017	0.203	0.017
		Top Side	0.705	0.000	0.000	0.705	0.705
	LTE Band 26	Front Side	0.806	0.289	0.379	1.095	1.185
		Back Side	0.978	0.231	0.325	1.209	1.303
		Right Side	0.571	0.106	0.459	0.677	1.030
		Left Side	0.000	0.060	0.005	0.060	0.005
		Bottom Side	0.000	0.203	0.017	0.203	0.017
		Top Side	0.114	0.000	0.000	0.114	0.114
	LTE Band 41	Front Side	0.239	0.289	0.379	0.528	0.618
		Back Side	1.101	0.231	0.325	1.332	1.426
		Right Side	0.214	0.106	0.459	0.320	0.673
		Left Side	0.000	0.060	0.005	0.060	0.005
		Bottom Side	0.000	0.203	0.017	0.203	0.017
		Top Side	0.986	0.000	0.000	0.986	0.986
	LTE Band 66	Front Side	0.588	0.289	0.379	0.877	0.967
		Back Side	0.970	0.231	0.325	1.201	1.295
		Right Side	0.267	0.106	0.459	0.373	0.726

		Left Side	0.000	0.060	0.005	0.060	0.005
		Bottom Side	0.000	0.203	0.017	0.203	0.017
		Top Side	0.665	0.000	0.000	0.665	0.665
	LTE Band 71	Front Side	0.213	0.289	0.379	0.502	0.592
		Back Side	0.309	0.231	0.325	0.540	0.634
		Right Side	0.198	0.106	0.459	0.304	0.657
		Left Side	0.000	0.060	0.005	0.060	0.005
		Bottom Side	0.000	0.203	0.017	0.203	0.017
		Top Side	0.068	0.000	0.000	0.068	0.068

<Body-worn Simultaneous Transmission>

WWAN Band	Exposure Position	1	2	3	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)
		WWAN	2.4GHz WLAN	5GHz WLAN		
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)		
WCDMA II	Front Side	0.345	0.289	0.379	0.634	0.724
	Back Side	0.740	0.231	0.325	0.971	1.065
WCDMA IV	Front Side	0.407	0.289	0.379	0.696	0.786
	Back Side	0.750	0.231	0.325	0.981	1.075
WCDMA V	Front Side	0.144	0.289	0.379	0.433	0.523
	Back Side	0.489	0.231	0.325	0.720	0.814
LTE Band 2	Front Side	0.350	0.289	0.379	0.639	0.729
	Back Side	0.649	0.231	0.325	0.880	0.974
LTE Band 4	Front Side	0.558	0.289	0.379	0.847	0.937
	Back Side	0.902	0.231	0.325	1.133	1.227
LTE Band 5	Front Side	0.504	0.289	0.379	0.793	0.883
	Back Side	0.864	0.231	0.325	1.095	1.189
LTE Band 12	Front Side	0.497	0.289	0.379	0.786	0.876
	Back Side	0.784	0.231	0.325	1.015	1.109
LTE Band 13	Front Side	0.581	0.289	0.379	0.870	0.960
	Back Side	0.682	0.231	0.325	0.913	1.007
LTE Band 25	Front Side	0.363	0.289	0.379	0.652	0.742
	Back Side	0.777	0.231	0.325	1.008	1.102

LTE Band 26	Front Side	0.806	0.289	0.379	1.095	1.185
	Back Side	0.978	0.231	0.325	1.209	1.303
LTE Band 41	Front Side	0.239	0.289	0.379	0.528	0.618
	Back Side	1.101	0.231	0.325	1.332	1.426
LTE Band 66	Front Side	0.588	0.289	0.379	0.877	0.967
	Back Side	0.970	0.231	0.325	1.201	1.295
LTE Band 71	Front Side	0.213	0.289	0.379	0.502	0.592
	Back Side	0.309	0.231	0.325	0.540	0.634

19. Uncertainty Assessment

The component of uncertainly may generally be categorized according to the methods used to evaluate them. The evaluation of uncertainly by the statistical analysis of a series of observations is termed a Type An evaluation of uncertainty. The evaluation of uncertainty by means other than the statistical analysis of a series of observation is termed a Type B evaluation of uncertainty. Each component of uncertainty, however evaluated, is represented by an estimated standard deviation, termed standard uncertainty, which is determined by the positive square root of the estimated variance.

A Type A evaluation of standard uncertainty may be based on any valid statistical method for treating data. This includes calculating the standard deviation of the mean of a series of independent observations; using the method of least squares to fit a curve to the data in order to estimate the parameter of the curve and their standard deviations; or carrying out an analysis of variance in order to identify and quantify random effects in certain kinds of measurement.

A type B evaluation of standard uncertainty is typically based on scientific judgment using all of the relevant information available. These may include previous measurement data, experience, and knowledge of the behavior and properties of relevant materials and instruments, manufacture's specification, data provided in calibration reports and uncertainties assigned to reference data taken from handbooks. Broadly speaking, the uncertainty is either obtained from an outdoor source or obtained from an assumed distribution, such as the normal distribution, rectangular or triangular distributions indicated in table below.

Uncertainty	Normal	Rectangular	Triangular	U-Shape
Multi-plying Factor[a]	1/k[b]	$1/\sqrt{3}$	$1/\sqrt{6}$	$1/\sqrt{2}$

Table 8.1. Standard Uncertainty for Assumed Distribution

(a) standard uncertainty is determined as the product of the multiplying factor and the estimated range of variations in the measured quantity

(b) κ is the coverage factor

The combined standard uncertainty of the measurement result represents the estimated standard deviation of the result. It is obtained by combining the individual standard uncertainties of both Type A and Type B evaluation using the usual "root-sum-squares" (RSS) methods of combining standard deviations by taking the positive square root of the estimated variances.

Expanded uncertainty is a measure of uncertainty that defines an interval about the measurement result within which the measured value is confidently believed to lie. It is obtained by multiplying the combined standard uncertainty by a coverage factor. Typically, the coverage factor ranges from 2 to 3. Using a coverage factor allows the true value of a measured quantity to be specified with a defined probability within the specified uncertainty range. For purpose of this document, a coverage factor two is used, which corresponds to confidence interval of about 95 %. The DASY uncertainty Budget is shown in the following tables.

Error Description	Uncertainty Value (±%)	Probability	Divisor	(Ci) 1g	(Ci) 10g	Standard Uncertainty (1g) (±%)	Standard Uncertainty (10g) (±%)
Measurement System							
Probe Calibration	6.0	N	1	1	1	6.0	6.0
Axial Isotropy	4.7	R	1.732	0.7	0.7	1.9	1.9
Hemispherical Isotropy	9.6	R	1.732	0.7	0.7	3.9	3.9
Boundary Effects	1.0	R	1.732	1	1	0.6	0.6
Linearity	4.7	R	1.732	1	1	2.7	2.7
System Detection Limits	1.0	R	1.732	1	1	0.6	0.6
Modulation Response	3.2	R	1.732	1	1	1.8	1.8
Readout Electronics	0.3	N	1	1	1	0.3	0.3
Response Time	0.0	R	1.732	1	1	0.0	0.0
Integration Time	2.6	R	1.732	1	1	1.5	1.5
RF Ambient Noise	3.0	R	1.732	1	1	1.7	1.7
RF Ambient Reflections	3.0	R	1.732	1	1	1.7	1.7
Probe Positioner	0.4	R	1.732	1	1	0.2	0.2
Probe Positioning	2.9	R	1.732	1	1	1.7	1.7
Max. SAR Eval.	2.0	R	1.732	1	1	1.2	1.2
Test Sample Related							
Device Positioning	3.0	N	1	1	1	3.0	3.0
Device Holder	3.6	N	1	1	1	0.089	0.089
Power Drift	5.0	R	1.732	1	1	2.9	2.9
Power Scaling	0.0	R	1.732	1	1	0.0	0.0
Phantom and Setup							
Phantom Uncertainty	6.1	R	1.732	1	1	3.5	3.5
SAR correction	0.0	R	1.732	1	0.84	0.0	0.0
Liquid Conductivity Repeatability	0.2	N	1	0.78	0.71	0.1	0.1
Liquid Conductivity (target)	5.0	R	1.732	0.78	0.71	2.3	2.0
Liquid Conductivity (mea.)	2.5	R	1.732	0.78	0.71	1.1	1.0
Temp. unc. - Conductivity	3.4	R	1.732	0.78	0.71	1.5	1.4
Liquid Permittivity Repeatability	0.15	N	1	0.23	0.26	0.0	0.0
Liquid Permittivity (target)	5.0	R	1.732	0.23	0.26	0.7	0.8
Liquid Permittivity (mea.)	2.5	R	1.732	0.23	0.26	0.3	0.4
Temp. unc. - Permittivity	0.83	R	1.732	0.23	0.26	0.1	0.1
Combined Std. Uncertainty						11.4%	11.4%
Coverage Factor for 95 %						K=2	K=2
Expanded STD Uncertainty						22.9%	22.7%

Error Description	Uncertainty Value (±%)	Probability	Divisor	(Ci) 1g	(Ci) 10g	Standard Uncertainty (1g) (±%)	Standard Uncertainty (10g) (±%)
Measurement System							
Probe Calibration	6.55	N	1	1	1	6.0	6.0
Axial Isotropy	4.7	R	1.732	0.7	0.7	1.9	1.9
Hemispherical Isotropy	9.6	R	1.732	0.7	0.7	3.9	3.9
Boundary Effects	2.0	R	1.732	1	1	1.2	1.2
Linearity	4.7	R	1.732	1	1	2.7	2.7
System Detection Limits	1.0	R	1.732	1	1	0.6	0.6
Modulation Response	3.2	R	1.732	1	1	1.8	1.8
Readout Electronics	0.3	N	1	1	1	0.3	0.3
Response Time	0.0	R	1.732	1	1	0.0	0.0
Integration Time	2.6	R	1.732	1	1	1.5	1.5
RF Ambient Noise	3.0	R	1.732	1	1	1.7	1.7
RF Ambient Reflections	3.0	R	1.732	1	1	1.7	1.7
Probe Positioner	0.4	R	1.732	1	1	0.2	0.2
Probe Positioning	6.7	R	1.732	1	1	3.9	3.9
Max. SAR Eval.	4.0	R	1.732	1	1	2.3	2.3
Test Sample Related							
Device Positioning	3.0	N	1	1	1	3.0	3.0
Device Holder	3.6	N	1	1	1	0.089	0.089
Power Drift	5.0	R	1.732	1	1	2.9	2.9
Power Scaling	0.0	R	1.732	1	1	0.0	0.0
Phantom and Setup							
Phantom Uncertainty	6.1	R	1.732	1	1	3.8	3.8
SAR correction	0.0	R	1.732	1	0.84	0.0	0.0
Liquid Conductivity Repeatability	0.2	N	1	0.78	0.71	0.1	0.1
Liquid Conductivity (target)	5.0	R	1.732	0.78	0.71	2.3	2.0
Liquid Conductivity (mea.)	2.5	R	1.732	0.78	0.71	1.1	1.0
Temp. unc. - Conductivity	3.4	R	1.732	0.78	0.71	1.5	1.4
Liquid Permittivity Repeatability	0.15	N	1	0.23	0.26	0.0	0.0
Liquid Permittivity (target)	5.0	R	1.732	0.23	0.26	0.7	0.8
Liquid Permittivity (mea.)	2.5	R	1.732	0.23	0.26	0.3	0.4
Temp. unc. - Permittivity	0.83	R	1.732	0.23	0.26	0.1	0.1
Combined Std. Uncertainty						12.5%	12.5%
Coverage Factor for 95 %						K=2	K=2
Expanded STD Uncertainty						25.1 %	25.1%

Annex A General Information

1. Identification of the Responsible Testing Laboratory

Company Name:	Kehu-Morlab Test Laboratory
Department:	Morlab Laboratory
Address:	Unit 101, No.1732 Gangzhong Road, Xiamen Area, Pilot Free Trade Zone (Fujian) China
Responsible Test Lab Manager:	Di Dehai
Telephone:	+86-592-5612050
Facsimile:	+86-592-5612095

2. Identification of the Responsible Testing Location

Name:	Kehu-Morlab Test Laboratory
Address:	Unit 101, No.1732 Gangzhong Road, Xiamen Area, Pilot Free Trade Zone (Fujian) China

****** END OF MAIN REPORT ******