TEST REPORT

APPLICANT	:	Reliance Communications LLC
PRODUCT NAME	:	Orbic Speed X
MODEL NAME	:	RC400LX
BRAND NAME	:	Orbic, Kajeet
FCC ID	:	2ABGH-RC400LX
STANDARD(S)	:	FCC 47CFR Part 2(2.1093)
RECEIPT DATE	:	2020-04-16
TEST DATE	:	2020-04-22 to 2020-07-14
ISSUE DATE	:	2020-07-14

Edited by : _Liang Yumei_

Liang Yumei (Rapporteur)

Approved by: _Peng Huarui_

Peng Huarui (Supervisor)

DIRECTORY

MORLAB

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 2 of 97

MORLAB
SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 3 of 97

Annex C Plots of System Performance Check
Annex D Plots of Maximum SAR Test Results
Annex E DASY Calibration Certificate

Changed History		
Version	**Date**	**Reason for Change**
1.0	2020-07-14	First edition

MORLAB

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 4 of 97

1. SAR Results Summary

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

<Highest Reported standalone SAR Summary>

Frequency Band		Highest SAR Summary
		Body (Gap 10mm)
		1g SAR (W/kg)
WCDMA	WCDMA Band II	1.142
	WCDMA Band IV	1.004
	WCDMA Band V	1.040
LTE	LTE Band 2	0.962
	LTE Band 4	0.885
	LTE Band 5	1.081
	LTE Band 7	0.667
	LTE Band 12	0.398
	LTE Band 14	1.008
	LTE Band 25	0.824
	LTE Band 26	0.479
	LTE Band 30	1.181
	LTE Band 41	0.248
	LTE Band 66	1.187
	LTE Band 71	0.647
WLAN	2.4GHz WLAN	0.170
	5GHz WLAN	0.884

Max Scaled SAR$_{1g}$ (W/Kg):	Body:	1.187 W/kg	Limit(W/kg): 1.6 W/kg

Highest Simultaneous Transmission SAR$_{1g}$ (W/Kg):	1.503 W/kg	Limit(W/kg): 1.6 W/kg

Note:

This device is in compliance with Specific Absorption Rate (SAR) for general population/ uncontrolled exposure limits (1.6W/kg as averaged over any 1 gram of tissue; specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and FCC KDB publications.

MORLAB

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 5 of 97

2. Technical Information

Note: Provide by applicant.

2.1. Applicant and Manufacturer Information

Applicant:	Reliance Communications LLC
Applicant Address:	91 Colin Drive, Unit 1, HOLBROOK, New York 11741, United States
Manufacturer:	Unimaxcomm
Manufacturer Address:	Room 602, Floor 6th, Building B, Software Park T3,Hi-Tech Park South, Nanshan District, Shenzhen, P.R. China

2.2. Equipment Under Test (EUT) Description

EUT Name:	Orbic Speed X
Hardware Version:	V1.1
Software Version:	ORB400LX_V1.0.2_BVZNAKJ
Frequency Bands:	WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band IV: 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 14: 788 MHz ~ 798 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 30: 2305 MHz ~ 2315 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 66: 1710 MHz ~ 1780 MHz LTE Band 71: 663 MHz ~ 698 MHz WLAN 2.4GHz: 2412 MHz ~ 2462 MHz WLAN 5.2GHz: 5180 MHz ~ 5240 MHz WLAN 5.8GHz: 5745 MHz ~ 5825 MHz
Modulation Mode:	WCDMA: QPSK/16QAM LTE: QPSK/16QAM 802.11b: DSSS

MORLAB
SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525
Http://www.morlab.cn   E-mail: service@morlab.cn

Page 6 of 97

	802.11g/n-HT20/HT40/ac-VHT20/ac-VHT40/ac-VHT80: OFDM
Hotspot Mode:	WWAN, 2.4GHz WLAN, 5GHz WLAN
Antenna Type:	WWAN: Fixed Internal WLAN: PIFA Antenna
SIM Cards Description:	Only supports single SIM card

Note:

1. This report was updated from the original report (report NO. SZ20040157, model name RC400L, FCC ID: 2ABGH-RC400L). According to the declaration that both of them are different from following:
   a. Modifying the product name, model, software and hardware version.
   b. Adding brand.
   c. Adding 3G/4G RF front end components (Added UMTS Band 4 and LTE Band 7/12/14/17/25/26/30/41/71).
   d. Disabling LTE Band 13 (Removed LTE Band 13 components).
   e. Disabling WiFi MIMO function and change to SISO (Removed one WiFi connector and related components), the WiFi chip and circuit are the same as the original EUT.
2. The worst case of WLAN was tested for the verified results are consistent with the original report, and others would be rested.
3. For a more detailed description, please refer to specification or user manual supplied by the applicant and/or manufacturer.

MORLAB
SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 7 of 97

2.3. Environment of Test Site/Conditions

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 2/4/5/7/12/14/25/26/30/66/71 TDD-LTE Band 41 WLAN 2.4GHz WLAN 5GHz
Operation mode:	Call established
Power Level:	WCDMA Band II/IV/V (All Up Bits) FDD-LTE Band 2/4/5/7/12/14/25/26/30/66/71 (Maximum output power) TDD-LTE Band 41 (Maximum output power) WLAN 2.4GHz (Power setting=14) WLAN 5GHz (Power setting=14)

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.

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 8 of 97

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 radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/ controlled exposure limits are 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:

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

SAR is expressed in units of Watts per kilogram (W/kg)
SAR measurement can be either related to the temperature elevation in tissue by,

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

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

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

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.

MORLAB
SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 9 of 97

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 ANSI/IEEE C95.1-1992, 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)

MORLAB

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 10 of 97

5. Applied Reference Documents

Leading reference documents for testing:

No.	Identity	Document Title	Method determination /Remark
1	FCC 47CFR Part2(2.1093)	Radio Frequency Radiation Exposure Evaluation: Portable Devices	No deviation
2	KDB 447498 D01v06	General RF Exposure Guidance	No deviation
3	KDB 248227 D01v02r02	SAR Measurement Procedures for 802.11 Transmitters	No deviation
4	KDB 865664 D01v01r04	SAR Measurement 100 MHz to 6 GHz	No deviation
5	KDB 865664 D02v01r02	RF Exposure Reporting	No deviation
6	KDB 941225 D01v03r01	3G SAR MEAUREMENT PROCEDURES	No deviation
7	KDB 941225 D05v02r05	SAR Evaluation Consideration for LTE Devices	No deviation
8	KDB 941225 D06v02r01	SAR Evaluation Procedures For Portable Devices With Wireless Router Capabilities	No deviation

MORLAB

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 11 of 97

6. SAR Measurement System
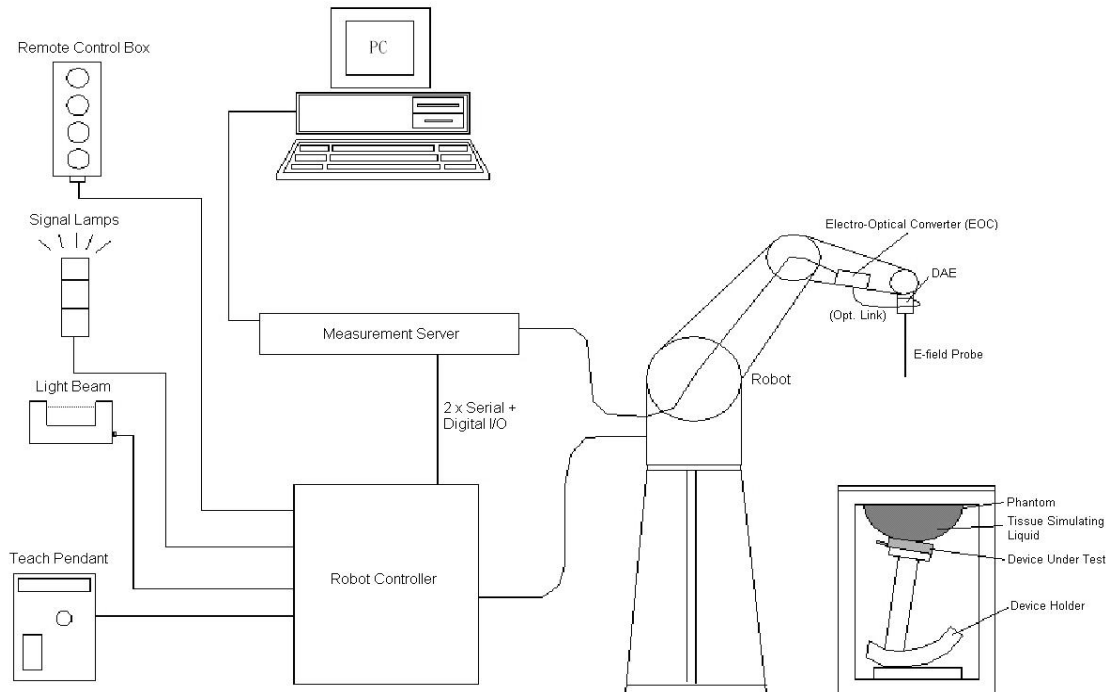
Fig 6.1 SPEAG DASY System Configurations

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 with controller, a teach pendant and software.

➢ A data acquisition electronic (DAE) attached to the robot arm extension.

➢ A dosimetric probe equipped with an optical surface detector system.

➢ The electro-optical converter (ECO) performs the conversion between optical and electrical signals.

➢ A measurement server performs the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.

➢ A probe alignment unit which improves the accuracy of the probe positioning.

➢ A computer operating Windows XP.

➢ DASY software.

➢ Remove control with teach pendant and additional circuitry for robot safety such as warming lamps, etc.

➢ The SAM twin phantom.

➢ A device holder.

➢ Tissue simulating liquid.

➢ Dipole for evaluating the proper functioning of the system.

➢ Some of the components are described in details in the following sub-sections.

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**
<ES3DV3 Probe>
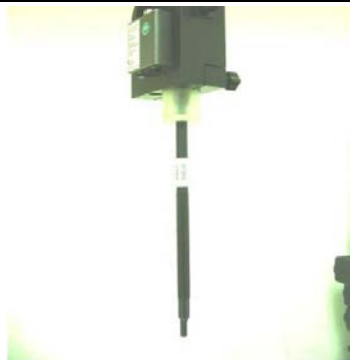
Construction	Symmetrical design with triangular core Built-in optical fiber for surface detection system. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	10 MHz to 3 GHz; Linearity: ± 0.2 dB	
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.4 dB in HSL (rotation normal to probe axis)	
Dynamic Range	5 µW/g to 100 mW/g; Linearity: ± 0.2 dB	
Dimensions	Overall length: 330 mm (Tip: 16 mm) Tip diameter: 6.8 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.7 mm	**Fig 6.2 Photo of ES3DV3**

<EX3DV4 Probe>

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 (rotation normal 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 dipole centers: 1 mm	**Fig 6.3 Photo of EX3DV4**

➢ **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 (NormX, NormY, and NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested. The calibration data can be referred to Annex C of this report.

MORLAB SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd. FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road, Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 13 of 97

6.2. Data Acquisition Electronics (DAE)

The data acquisition electronics(DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast16 bit AD-converter and a command decoder and control logic unit. AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an optical reduced link for data and status information as well as an optical uplink for commands and the clock. The input impedance of the DAE is 200MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

Fig 6.4 Photo of DAE

6.3. Robot

The SPEAG DASY system uses the high precision robots (DASY4: RX90BL; DASY5: TX90XL) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version (DASY4: CS7MB; DASY5: CS8c) from Stäubli is used. The Stäubli robot series have many features that are important for our application:

High precision (repeatability ±0.035 mm)

High reliability (industrial design)

Jerk-free straight movements

Low ELF interference (the closed metallic construction shields against motor control fields)

Fig 6.5 Photo of DASY5

6.4. Measurement Server

The measurement server is based on a PC/104 CPU board with CPU (DASY4: 166 MHz, Intel Pentium; DASY5: 400 MHz, Intel Celeron), chip disk (DASY4: 32 MB; DASY5: 128 MB), RAM (DASY4: 64 MB, DASY5: 128 MB). The necessary circuits for communication with the DAE electronic box, as well as the 16 bit AD converter system for optical detection and digital I/O

MORLAB

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 14 of 97

interface are contained on the DASY I/O board, which is directly connected to the PC/104 bus of the CPU board.

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

Fig 6.6 Photo of Server for DASY5

6.5. Light Beam Unit

The light beam switch allows automatic "tooling" of the probe. During the process, the actual position of the probe tip with respect to the robot arm is measured, as well as the probe length and the horizontal probe offset. The software then corrects all movements, such that the robot coordinates are valid for the probe tip.

The repeatability of this process is better than0.1 mm. If a position has been taught with an aligned probe, the same position will be reached with another aligned probe within 0.1 mm, even if the other probe has different dimensions. During probe rotations, the probe tip will keep its actual position.

Fig. 6.7 Photo of Light Beam

6.6. Phantom

<SAM Twin Phantom>

Shell Thickness	2 ± 0.2 mm (sagging: <1%) Center ear point: 6 ± 0.2 mm	
Filling Volume	Approx. 25 liters	
Dimensions	Length: 1000 mm; Width: 500 mm; Height: adjustable feet	
Measurement Areas	Left Hand, Right Hand, Flat Phantom	**Fig 6.8 Photo of SAM Phantom**

The bottom plate contains three pair of bolts for locking the device holder. The device holder

MORLAB

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 15 of 97

positions are adjusted to the standard measurement positions in the three sections. A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

6.7. Device Holder

<Device Holder for SAM Twin Phantom>

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 a SAR uncertainty of ± 20 %. Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards.

The DASY device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation center for both scales is the ear reference point (EPR). Thus the device needs no repositioning when changing the angles.

The DASY device holder is constructed of low-loss POM material having 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 6.9 Device Holder

MORLAB

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 16 of 97

<Laptop Extension Kit>

The extension is lightweight and made of POM, acrylic glass and foam. It fits easily on the upper part of the mounting device in place of the phone positioned. The extension is fully compatible with the SAM Twin and ELI phantoms.
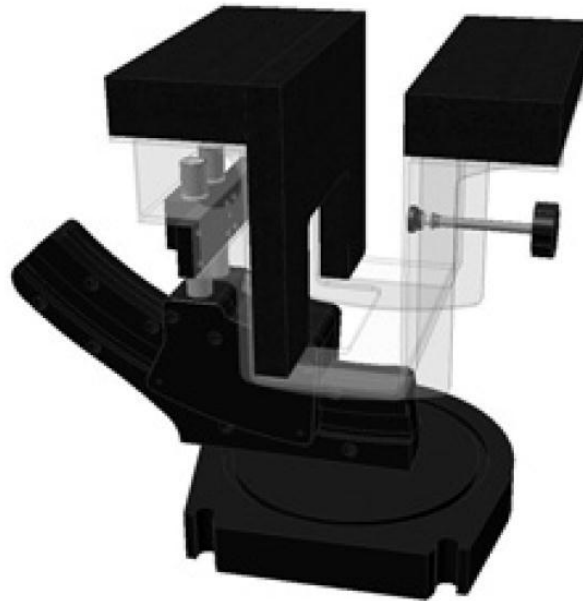
Fig 6.10 Laptop Extension Kit

6.8. 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.

MORLAB
SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 17 of 97

> **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	dcp_i
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
$\quad$ Vi = compensated signal of channel i, (i = x, y, z)
$\quad$ Ui = input signal of channel i, (i = x, y, z)
$\quad$ cf = crest factor of exciting field (DASY parameter)
$\quad$ dcpi = diode compression point (DASY parameter)

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

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

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

MORLAB SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555 $\quad$ Fax: 86-755-36698525

Http://www.morlab.cn $\quad$ E-mail: service@morlab.cn

Page 18 of 97

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

　　　　　　　　$Norm_i$ = sensor sensitivity of channel i, (i = x, y, z), $\mu V/(V/m)^2$ 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.

6.9. 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	2300MHz System Validation Kit	D2300V2	1107	2020.06.03	2023.06.02
SPEAG	2450MHz System Validation Kit	D2450V2	805	2018.10.26	2021.10.25
SPEAG	5000MHz System Validation Kit	D5GHzV2	1176	2018.11.06	2021.11.05
SPEAG	Dosimetric E-Field Probe	ES3DV3	3154	2019.07.16	2020.07.15
SPEAG	Dosimetric E-Field Probe	EX3DV4	3823	2020.01.03	2021.01.02
SPEAG	Data Acquisition Electronics	DAE4	871	2019.06.27	2020.06.26
SPEAG	Data Acquisition Electronics	DAE4	480	2020.06.02	2021.06.01
SPEAG	Dielectric Assessment KIT	DAK-3.5	1279	2019.11.03	2020.11.02
SPEAG	SAM Twin Phantom 1	QD 000 P40 CB	TP-1471	NCR	NCR
SPEAG	SAM Twin Phantom 2	QD 000 P40 CB	TP-1464	NCR	NCR
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
R&S	Network Emulator	CMW500	124534	2020.04.01	2021.03.31
Agilent	Network Analyzer	E5071B	MY42404762	2020.04.01	2021.03.31
mini-circuits	Amplifier	ZHL-42W+	608501717	NCR	NCR
mini-circuits	Amplifier	ZVE-8G+	754401735	NCR	NCR
Agilent	Signal Generator	N5182B	MY53050509	2020.04.01	2021.03.31
Agilent	Power Senor	N8482A	MY41090849	2019.10.28	2020.10.27
Agilent	Power Meter	E4416A	MY45102093	2019.10.28	2020.10.27
Anritsu	Power Sensor	MA2411B	N/A	2019.10.28	2020.10.27
Anritsu	Power Meter	NRVD	101066	2019.10.28	2020.10.27
Agilent	Dual Directional Coupler	778D	50422	NA	NA
MCL	Attenuation1	351-218-010	N/A	NA	NA
THERMOMETER	Thermo meter	DC-803	N/A	2019.11.22	2020.11.21
N/A	Tissue Simulating Liquids	700-6000MHz	N/A	24H	

Note:

1. The calibration certificate of DASY can be referred to Annex 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.

MORLAB

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 21 of 97

7. 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 than 15cm. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15cm, which is shown in Fig. 7.2. The nominal dielectric values of the tissue simulating liquids in the phantom and the tolerance of 5% are listed in below table.
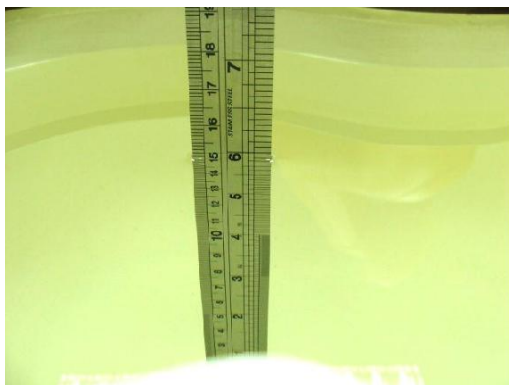
Fig 7.1 Photo of Liquid Height for Head SAR   **Fig 7.2 Photo of Liquid Height for Body SAR**

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.

MORLAB SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 22 of 97

Table 1: Dielectric Performance of Tissue Simulating Liquid

Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Conductivity (σ)	Conductivity Target (σ)	Delta (σ) (%)	Limit (%)	Date
750	HSL	22.2	0.931	0.89	4.58	±5	2020.06.24
835	HSL	22.1	0.942	0.90	4.67	±5	2020.07.01
1750	HSL	22.5	1.448	1.37	4.17	±5	2020.07.09
1900	HSL	22.3	1.389	1.40	-0.79	±5	2020.07.08
2300	HSL	22.6	1.640	1.67	-1.80	±5	2020.07.12
2450	HSL	22.1	1.870	1.80	3.89	±5	2020.04.22
2450	HSL	22.3	1.817	1.80	0.94	±5	2020.07.11
2600	HSL	22.5	1.987	1.96	1.38	±5	2020.07.14
5250	HSL	22.4	4.532	4.71	-3.78	±5	2020.04.23
5250	HSL	22.1	4.533	4.71	-3.76	±5	2020.07.09
5750	HSL	22.4	5.030	5.22	-3.64	±5	2020.04.23
5750	HSL	22.4	5.105	5.22	-3.68	±5	2020.07.10

Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Permittivity (ε_r)	Permittivity Target (ε_r)	Delta (ε_r) (%)	Limit (%)	Date
750	HSL	22.2	42.140	41.90	0.57	±5	2020.06.24
835	HSL	22.1	42.881	41.50	3.33	±5	2020.07.01
1750	HSL	22.5	39.531	40.10	-1.27	±5	2020.07.09
1900	HSL	22.3	39.745	40.00	-0.64	±5	2020.07.08
2300	HSL	22.6	39.251	39.50	-0.63	±5	2020.07.12
2450	HSL	22.1	38.061	39.20	-2.91	±5	2020.04.22
2450	HSL	22.3	38.801	39.20	-1.02	±5	2020.07.11
2600	HSL	22.5	38.294	39.00	-1.81	±5	2020.07.14
5250	HSL	22.4	34.968	35.95	-2.73	±5	2020.04.23
5250	HSL	22.1	34.970	35.95	-2.73	±5	2020.07.09
5750	HSL	22.4	34.288	35.35	-3.00	±5	2020.04.23
5750	HSL	22.4	34.176	35.35	-3.13	±5	2020.07.10

Note：

According to the TCB Workshop in April 2019, FCC permitted the use of single head-tissue simulating liquid specified in IEC 62209-1 for all SAR tests

MORLAB SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 23 of 97

8. 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.

8.1. 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.

8.2. 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 8.1 Photo of Dipole Setup
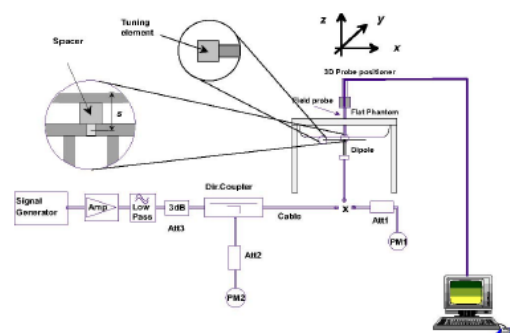
Fig 8.2 System Setup for System Evaluation

8.3. 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>

Dipole S/N	Probe S/N	DAE S/N
D2450V2-805	3823	871
D5GHzV2-1176-5250	3823	871
D5GHzV2-1176-5750	3823	871

Dipole S/N	Probe S/N	DAE S/N
D750V3-1173	3154	480
D835V2-4d227	3823	480
D1750V2-1160	3823	480
D1900V2_5d221	3823	480
D2300V2_1107	3823	480
D2450V2-805	3823	480
D5GHzV2-1176-5250	3823	480
D5GHzV2-1176-5750	3823	480

<Validation Results>

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2020.06.24	750	HSL	250	2.12	8.26	8.48	2.66
2020.07.01	835	HSL	250	2.42	9.34	9.68	3.64
2020.07.09	1750	HSL	250	9.56	37.10	38.24	3.07
2020.07.08	1900	HSL	250	9.97	39.50	39.88	0.96
2020.07.12	2300	HSL	250	11.94	48.40	47.76	-1.32
2020.04.22	2450	HSL	250	6.15	24.10	24.6	2.07
2020.07.11	2450	HSL	250	13.60	52.00	54.4	4.62
2020.07.14	2600	HSL	250	13.9	54.00	55.6	2.96
2020.04.23	5250	HSL	100	8.08	78.90	80.8	2.41
2020.07.09	5250	HSL	100	7.92	78.90	79.2	0.38
2020.04.23	5750	HSL	100	7.90	80.00	79	-1.25

| 2020.07.10 | 5750 | HSL | 100 | 7.79 | 80.00 | 77.9 | -2.62 |

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Measured 10g SAR (W/kg)	Targeted 10g SAR (W/kg)	Normalized 10g SAR (W/kg)	Deviation (%)
2020.06.24	750	HSL	250	1.40	5.45	5.6	2.75
2020.07.01	835	HSL	250	1.56	6.07	6.24	2.80
2020.07.09	1750	HSL	250	5.03	20.00	20.12	0.60
2020.07.08	1900	HSL	250	5.18	20.60	20.72	0.58
2020.07.12	2300	HSL	250	5.73	23.00	22.92	-0.35
2020.04.22	2450	HSL	250	6.15	24.10	24.6	2.07
2020.07.11	2450	HSL	250	6.18	24.10	24.72	2.57
2020.07.14	2600	HSL	250	6.24	24.50	24.96	1.88
2020.04.23	5250	HSL	100	2.19	22.50	21.9	-2.67
2020.07.09	5250	HSL	100	2.20	22.50	22	-2.22
2020.04.23	5750	HSL	100	2.24	22.60	22.4	-0.88
2020.07.10	5750	HSL	100	2.23	22.60	22.3	-1.33

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

MORLAB

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 26 of 97

9. 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 Annex B for the test setup photos.

9.1. 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).
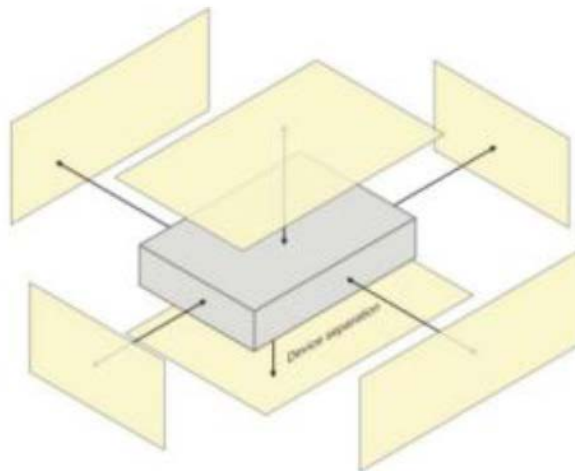
Fig 9.1 Illustration for Hotspot Position

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 27 of 97

10. 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 Annex 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.

10.1. 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

MORLAB SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525
Http://www.morlab.cn   E-mail: service@morlab.cn

Page 28 of 97

scan.

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

a. Extraction of the measured data (grid and values) from the Zoom Scan

b. Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)

c. Generation of a high-resolution mesh within the measured volume

d. Interpolation of all measured values form the measurement grid to the high-resolution grid

e. Extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface

f. Calculation of the averaged SAR within masses of 1g and 10g

10.2. 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.

10.3. 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.

MORLAB

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 29 of 97

10.4. 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.

10.5. 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.

10.6. 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 is greater than 5%, the SAR will be retested.

MORLAB
SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 30 of 97

11. SAR Test Procedure

11.1. 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.

			$\leq$ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5 mm $\pm$ 1 mm	$\frac{1}{4} \cdot \delta \cdot \ln(2)$ mm $\pm$ 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location			30° $\pm$ 1°	20° $\pm$ 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}			$\leq$ 2 GHz: $\leq$ 15 mm 2 – 3 GHz: $\leq$ 12 mm	3 – 4 GHz: $\leq$ 12 mm 4 – 6 GHz: $\leq$ 10 mm
				When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\leq$ the corresponding x or y dimension of the test device with at least one measurement point on the test device.
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			$\leq$ 2 GHz: $\leq$ 8 mm 2 – 3 GHz: $\leq$ 5 mm*	3 – 4 GHz: $\leq$ 5 mm* 4 – 6 GHz: $\leq$ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		$\leq$ 5 mm	3 – 4 GHz: $\leq$ 4 mm 4 – 5 GHz: $\leq$ 3 mm 5 – 6 GHz: $\leq$ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	$\leq$ 4 mm	3 – 4 GHz: $\leq$ 3 mm 4 – 5 GHz: $\leq$ 2.5 mm 5 – 6 GHz: $\leq$ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	$\leq$ 1.5·$\Delta z_{Zoom}(n-1)$ mm	
Minimum zoom scan volume	x, y, z		$\geq$ 30 mm	3 – 4 GHz: $\geq$ 28 mm 4 – 5 GHz: $\geq$ 25 mm 5 – 6 GHz: $\geq$ 22 mm

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 *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB Publication 447498 is $\leq$ 1.4 W/kg, $\leq$ 8 mm, $\leq$ 7 mm and $\leq$ 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.

MORLAB
SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525
Http://www.morlab.cn   E-mail: service@morlab.cn

Page 31 of 97

11.2. 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.

11.3. 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.

MORLAB

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 32 of 97

11.4. 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.

MORLAB

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 33 of 97

12. SAR Test Configuration

<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 $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 \ast \beta_c$
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 $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$.

Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. 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 $\beta_c = 10/15$ and $\beta_d = 15/15$.

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 $\beta_c = 14/15$ and $\beta_d = 15/15$.

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 (Note 3)	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 $\Delta_{CQI} = 30/15$ 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 $\beta_d = 0$ 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.

DC-HSDPA Setup Configuration:

The following tests were completed according to procedures in section 7.3.13 of 3GPP TS34.108 v9.5.0. A summary of these settings are illustrated below:

Reduced link Physical Channels are set as per 3GPP TS34.121-1 v9.0.0 E.5.

Table E.5.0: Levels for HSDPA connection setup

Parameter During Connection setup	Unit	Value
P-CPICH_Ec/Ior	dB	-10
P-CCPCH and SCH_Ec/Ior	dB	-12
PICH _Ec/Ior	dB	-15
HS-PDSCH	dB	off
HS-SCCH_1	dB	off
DPCH_Ec/Ior	dB	-5
OCNS_Ec/Ior	dB	-3.1

Call is set up as per 3GPP TS34.108 v9.5.0 sub clause 7.3.13

The configurations of the fixed reference channels for HSDPA RF tests are described in 3GPP TS 34.121, Annex C for FDD and 3GPP TS 34.122.

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

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

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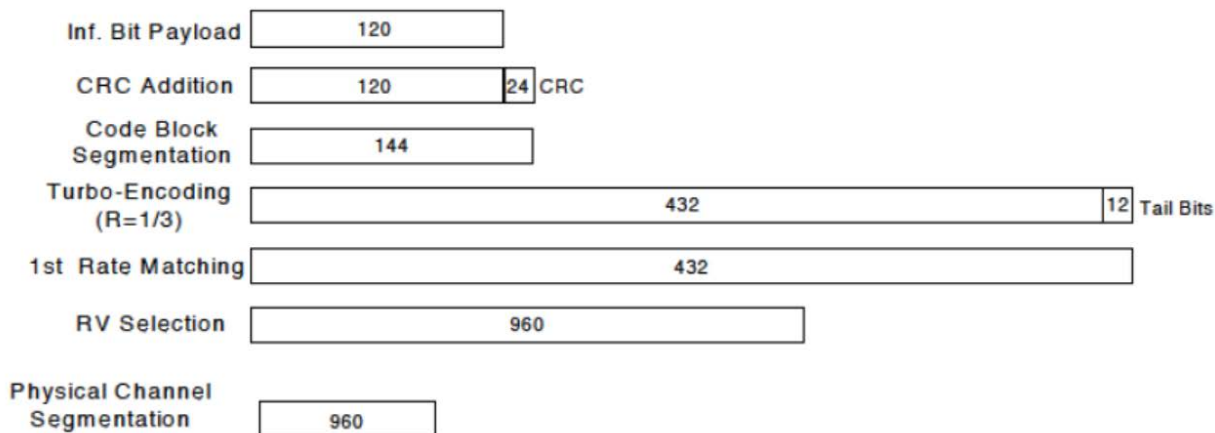
Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

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	3GPP
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Target (dB)	MPR (dB)
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	1	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	1	≤ 1
64 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
7	N/A	N/A	v	v	v	v
12	v	v	v	v	N/A	N/A
14	N/A	N/A	v	v	N/A	N/A
17	v	v	v	v	N/A	N/A
25	v	v	v	v	v	v

MORLAB

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 37 of 97

26	v	v	v	v	v	N/A
30	N/A	N/A	v	v	N/A	N/A
41	N/A	N/A	v	v	v	v
66	v	v	v	v	v	v
71	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 band width is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.

7. For LTE B4/B5/B7/17 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.

MORLAB SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 38 of 97

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

MORLAB
SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 39 of 97

following:

1) When the reported SAR of the highest measured maximum output power channel for the exposure configuration is $\leqslant$ 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 $\leqslant$ 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 $\leqslant$ 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. A fixed level power reduction is applied for WiFi when handset operates "held to the body" condition or "held to the ear" condition, the power reduction triggered by audio receiver detection and call establish status.

6. 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:

   a. When KDB Publication 447498 SAR test exclusion applies to the OFDM configuration.

   b. 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 $\leqslant$ 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

MORLAB SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525
Http://www.morlab.cn   E-mail: service@morlab.cn

Page 40 of 97

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.

4. 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.
   a. The channel closest to mid-band frequency is selected for SAR measurement.
   b. 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

MORLAB

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 42 of 97

a testconfiguration with the highest measured maximum output power should be clearly distinguished toapply the procedures.

13. Conducted RF Output Power

➢ **WCDMA Conducted Power**

Band		WCDMA Band II			Tune-up Limit (dBm)
TX Channel		9262	9400	9538	
Rx Channel		9662	9800	9938	
Frequency (MHz)		1852.4	1880	1907.6	
3GPP Rel 99	RMC 12.2Kbps	21.62	21.64	21.52	22.50
3GPP Rel 5	HSDPA Subtest-1	20.27	20.09	20.21	21.00
3GPP Rel 5	HSDPA Subtest-2	20.26	20.07	20.20	21.00
3GPP Rel 5	HSDPA Subtest-3	20.23	20.05	20.19	20.50
3GPP Rel 5	HSDPA Subtest-4	20.19	20.01	20.15	20.50
3GPP Rel 6	HSUPA Subtest-1	20.32	20.12	20.33	21.00
3GPP Rel 6	HSUPA Subtest-2	20.30	20.09	20.28	21.00
3GPP Rel 6	HSUPA Subtest-3	20.28	20.07	20.26	21.00
3GPP Rel 6	HSUPA Subtest-4	20.27	20.06	20.23	21.00
3GPP Rel 6	HSUPA Subtest-5	20.23	20.03	20.20	21.00
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	20.24	20.05	20.23	21.00
3GPP Rel 8	DC-HSDPA Subtest-1	21.67	21.77	21.74	22.00
3GPP Rel 8	DC-HSDPA Subtest-2	21.68	21.74	21.78	22.00
3GPP Rel 8	DC-HSDPA Subtest-3	21.2	21.26	21.22	21.50
3GPP Rel 8	DC-HSDPA Subtest-4	21.12	21.3	21.23	21.50

Band		WCDMA Band IV			Tune-up Limit (dBm)
TX Channel		1312	1413	1513	
Rx Channel		1537	1638	1738	
Frequency (MHz)		1712.4	1732.6	1752.6	
3GPP Rel 99	RMC 12.2Kbps	21.71	21.90	21.87	22.50
3GPP Rel 5	HSDPA Subtest-1	21.66	21.69	21.63	22.00
3GPP Rel 5	HSDPA Subtest-2	21.39	21.41	21.40	22.00
3GPP Rel 5	HSDPA Subtest-3	21.27	21.25	21.31	21.50
3GPP Rel 5	HSDPA Subtest-4	21.09	21.10	21.11	21.50
3GPP Rel 6	HSUPA Subtest-1	21.15	21.13	21.18	21.50
3GPP Rel 6	HSUPA Subtest-2	20.93	20.94	20.95	21.50
3GPP Rel 6	HSUPA Subtest-3	20.75	20.76	20.87	21.50

MORLAB SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China
Tel: 86-755-36698555   Fax: 86-755-36698525
Http://www.morlab.cn   E-mail: service@morlab.cn

Page 43 of 97

3GPP Rel 6	HSUPA Subtest-4	20.67	20.66	20.73	21.50
3GPP Rel 6	HSUPA Subtest-5	20.63	20.59	20.65	21.50
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	20.39	20.35	20.38	21.00
3GPP Rel 8	DC-HSDPA Subtest-1	19.77	19.79	19.77	20.00
3GPP Rel 8	DC-HSDPA Subtest-2	19.74	19.81	19.78	20.00
3GPP Rel 8	DC-HSDPA Subtest-3	19.34	19.33	19.36	19.50
3GPP Rel 8	DC-HSDPA Subtest-4	19.29	19.31	19.37	19.50

Band		WCDMA Band V			Tune-up Limit (dBm)
TX Channel		4132	4183	4233	
Rx Channel		4357	4408	4458	
Frequency (MHz)		826.4	836.6	846.6	
3GPP Rel 99	RMC 12.2Kbps	21.69	21.78	21.73	22.50
3GPP Rel 5	HSDPA Subtest-1	20.45	20.54	20.41	21.00
3GPP Rel 5	HSDPA Subtest-2	20.43	20.51	20.40	21.00
3GPP Rel 5	HSDPA Subtest-3	20.42	20.50	20.37	20.50
3GPP Rel 5	HSDPA Subtest-4	20.40	20.48	20.35	20.50
3GPP Rel 6	HSUPA Subtest-1	20.50	20.60	20.51	21.00
3GPP Rel 6	HSUPA Subtest-2	20.48	20.57	20.49	21.00
3GPP Rel 6	HSUPA Subtest-3	20.47	20.55	20.44	21.00
3GPP Rel 6	HSUPA Subtest-4	20.44	20.52	20.41	21.00
3GPP Rel 6	HSUPA Subtest-5	20.40	20.49	20.37	21.00
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	20.41	20.50	20.41	21.00
3GPP Rel 8	DC-HSDPA Subtest-1	21.53	21.52	21.37	22.00
3GPP Rel 8	DC-HSDPA Subtest-2	21.46	21.53	21.46	22.00
3GPP Rel 8	DC-HSDPA Subtest-3	20.95	21.02	20.93	21.50
3GPP Rel 8	DC-HSDPA Subtest-4	20.9	20.98	20.92	21.50

➢ **LTE Conducted Power**

<LTE Band 2>

BW [MHz]	Modulation	RB Size	RB Offset	Low Channel	Middle Channel	High Channel	Tune-up limit (dBm)
Channel				18700	18900	19100	
Frequency (MHz)				1860	1880	1900	
20	QPSK	1	0	23.32	23.33	23.27	23.50
20	QPSK	1	49	23.22	23.14	23.18	
20	QPSK	1	99	22.91	23.24	23.06	
20	QPSK	50	0	22.35	22.37	22.19	22.50
20	QPSK	50	24	22.32	22.24	22.32	
20	QPSK	50	50	22.31	22.29	22.28	
20	QPSK	100	0	22.41	22.26	22.27	
20	16QAM	1	0	22.11	22.37	22.18	22.50
20	16QAM	1	49	22.17	22.05	22.06	
20	16QAM	1	99	22.09	22.07	22.06	
20	16QAM	50	0	21.33	21.16	21.28	22.00
20	16QAM	50	24	21.29	21.22	21.31	
20	16QAM	50	50	21.37	21.24	21.21	
20	16QAM	100	0	21.28	21.22	21.31	
Channel				18675	18900	19125	Tune-up limit (dBm)
Frequency (MHz)				1857.5	1880	1902.5	
15	QPSK	1	0	23.05	22.89	23.06	23.50
15	QPSK	1	37	23.26	23.26	23.03	
15	QPSK	1	74	23.14	23.16	23.17	
15	QPSK	36	0	22.45	22.24	22.31	22.50
15	QPSK	36	20	22.24	22.22	22.32	
15	QPSK	36	39	22.17	22.29	22.32	
15	QPSK	75	0	22.29	22.27	22.35	
15	16QAM	1	0	22.32	22.25	22.11	22.50
15	16QAM	1	37	22.12	22.17	22.15	
15	16QAM	1	74	22.22	22.32	22.02	
15	16QAM	36	0	21.23	21.17	21.24	22.00
15	16QAM	36	20	21.34	21.18	21.24	
15	16QAM	36	39	21.21	21.23	21.27	
15	16QAM	75	0	21.28	21.31	21.38	
Channel				18650	18900	19150	Tune-up

Frequency (MHz)				1855	1880	1905	limit (dBm)
10	QPSK	1	0	23.15	23.09	23.11	23.50
10	QPSK	1	25	23.16	23.11	23.27	
10	QPSK	1	49	23.02	23.04	23.09	
10	QPSK	25	0	22.12	22.09	22.16	22.50
10	QPSK	25	12	22.23	22.12	22.14	
10	QPSK	25	25	22.06	22.14	22.16	
10	QPSK	50	0	22.05	22.02	22.13	
10	16QAM	1	0	22.07	22.12	22.09	22.50
10	16QAM	1	25	22.09	22.17	22.14	
10	16QAM	1	49	22.18	22.22	22.03	
10	16QAM	25	0	21.16	21.17	21.19	22.00
10	16QAM	25	12	21.26	21.11	21.13	
10	16QAM	25	25	21.19	21.36	21.21	
10	16QAM	50	0	21.14	21.26	21.29	
Channel				18625	18900	19175	Tune-up limit (dBm)
Frequency (MHz)				1852.5	1880	1907.5	
5	QPSK	1	0	23.04	23.06	23.09	23.50
5	QPSK	1	12	23.08	23.04	23.11	
5	QPSK	1	24	23.14	22.96	23.03	
5	QPSK	12	0	22.22	22.05	22.31	22.50
5	QPSK	12	7	22.19	22.11	22.13	
5	QPSK	12	13	22.13	22.11	22.08	
5	QPSK	25	0	22.21	22.18	22.11	
5	16QAM	1	0	22.17	22.27	22.13	22.50
5	16QAM	1	12	22.25	22.13	22.18	
5	16QAM	1	24	22.36	22.14	22.15	
5	16QAM	12	0	21.22	21.12	21.03	22.00
5	16QAM	12	7	21.25	21.19	21.31	
5	16QAM	12	13	21.26	21.26	21.18	
5	16QAM	25	0	21.22	21.18	21.36	
Channel				18615	18900	19185	Tune-up limit (dBm)
Frequency (MHz)				1851.5	1880	1908.5	
3	QPSK	1	0	23.03	23	22.98	23.50
3	QPSK	1	8	23.07	22.99	22.88	

3	QPSK	1	14	23.02	22.92	22.59	
3	QPSK	8	0	22.19	22.17	22.02	
3	QPSK	8	4	22.01	22.13	22.03	22.50
3	QPSK	8	7	22.05	22.16	22.01	
3	QPSK	15	0	22.05	22.17	22.13	
3	16QAM	1	0	22.15	22.18	22.16	
3	16QAM	1	8	22.16	22.18	22.19	22.50
3	16QAM	1	14	22.13	22.01	22.04	
3	16QAM	8	0	21.12	21.16	21.18	
3	16QAM	8	4	21.11	21.26	21.16	22.00
3	16QAM	8	7	21.06	21.11	21.18	
3	16QAM	15	0	21.02	21.18	21.28	
Channel				18607	18900	19193	Tune-up limit (dBm)
Frequency (MHz)				1850.7	1880	1909.3	
1.4	QPSK	1	0	23.05	23.04	23.02	
1.4	QPSK	1	3	23.14	23.01	23.04	
1.4	QPSK	1	5	23.14	23.12	23.01	
1.4	QPSK	3	0	23.15	23.14	23.09	23.50
1.4	QPSK	3	1	23.14	23.15	23.15	
1.4	QPSK	3	3	23.09	23.16	23.12	
1.4	QPSK	6	0	22.16	22.16	22.19	22.50
1.4	16QAM	1	0	22.16	22.16	22.19	
1.4	16QAM	1	3	22.18	22.02	22.16	
1.4	16QAM	1	5	22.15	22.08	22.09	22.50
1.4	16QAM	3	0	22.07	22.04	22.11	
1.4	16QAM	3	1	22.02	22.06	22.12	
1.4	16QAM	3	3	22.22	22.26	22.15	
1.4	16QAM	6	0	21.22	21.17	21.19	22.00

<LTE Band 4>

BW [MHz]	Modulation	RB Size	RB Offset	Low Channel	Middle Channel	High Channel	Tune-up limit (dBm)
Channel				20050	20175	20300	
Frequency (MHz)				1720	1732.5	1745	
20	QPSK	1	0	22.09	22.38	22.35	23.00
20	QPSK	1	49	21.89	21.94	21.89	
20	QPSK	1	99	21.94	21.91	21.92	
20	QPSK	50	0	20.96	21.17	21.07	22.00
20	QPSK	50	24	20.94	21.01	21.04	
20	QPSK	50	50	20.93	20.92	20.83	
20	QPSK	100	0	21.00	21.01	21.05	
20	16QAM	1	0	20.83	21.02	21.00	22.00
20	16QAM	1	49	20.77	20.93	20.79	
20	16QAM	1	99	20.71	20.86	20.62	
20	16QAM	50	0	20.10	20.18	20.28	21.00
20	16QAM	50	24	19.99	20.13	20.08	
20	16QAM	50	50	19.81	19.98	19.89	
20	16QAM	100	0	19.89	20.06	20.02	
Channel				20025	20175	20325	Tune-up limit (dBm)
Frequency (MHz)				1717.5	1732.5	1747.5	
15	QPSK	1	0	22.14	22.23	22.24	23.00
15	QPSK	1	37	21.81	21.91	21.79	
15	QPSK	1	74	21.82	21.94	22.16	
15	QPSK	36	0	20.97	21.06	21.05	22.00
15	QPSK	36	20	20.98	21.07	21.01	
15	QPSK	36	39	20.99	21.10	20.95	
15	QPSK	75	0	21.00	21.04	21.06	
15	16QAM	1	0	20.74	20.68	21.14	22.00
15	16QAM	1	37	21.11	21.02	20.85	
15	16QAM	1	74	20.98	20.78	20.96	
15	16QAM	36	0	19.94	20.06	20.04	21.00
15	16QAM	36	20	19.92	20.04	20.01	
15	16QAM	36	39	19.94	20.08	19.92	
15	16QAM	75	0	20.04	20.12	20.16	
Channel				20000	20175	20350	Tune-up limit
Frequency (MHz)				1715	1732.5	1750	

							(dBm)
10	QPSK	1	0	21.97	22.23	22.26	
10	QPSK	1	25	21.77	21.82	21.77	23.00
10	QPSK	1	49	21.82	21.79	21.80	
10	QPSK	25	0	20.84	20.95	21.05	
10	QPSK	25	12	20.82	20.89	20.92	22.00
10	QPSK	25	25	20.81	20.80	20.71	
10	QPSK	50	0	20.88	20.89	20.93	
10	16QAM	1	0	20.71	20.90	20.88	
10	16QAM	1	25	20.65	20.81	20.67	22.00
10	16QAM	1	49	20.59	20.74	20.50	
10	16QAM	25	0	19.98	20.06	20.16	
10	16QAM	25	12	19.87	20.01	19.96	21.00
10	16QAM	25	25	19.69	19.86	19.77	
10	16QAM	50	0	19.77	19.94	19.90	
Channel				19975	20175	20375	Tune-up limit (dBm)
Frequency (MHz)				1712.5	1732.5	1752.5	
5	QPSK	1	0	22.02	22.11	22.12	
5	QPSK	1	12	21.69	21.79	21.67	23.00
5	QPSK	1	24	21.70	21.82	22.04	
5	QPSK	12	0	20.85	20.94	20.93	
5	QPSK	12	7	20.86	20.95	20.89	22.00
5	QPSK	12	13	20.87	20.98	20.83	
5	QPSK	25	0	20.88	20.92	20.94	
5	16QAM	1	0	20.62	20.56	21.02	
5	16QAM	1	12	20.99	20.90	20.73	22.00
5	16QAM	1	24	20.86	20.66	20.84	
5	16QAM	12	0	19.82	19.94	19.92	
5	16QAM	12	7	19.80	19.92	19.89	21.00
5	16QAM	12	13	19.82	19.96	19.80	
5	16QAM	25	0	19.92	20.00	20.04	
Channel				19965	20175	20385	Tune-up limit (dBm)
Frequency (MHz)				1711.5	1732.5	1753.5	
3	QPSK	1	0	21.91	22.06	21.69	
3	QPSK	1	8	21.87	21.89	21.86	23.00
3	QPSK	1	14	21.81	21.74	21.73	

3	QPSK	8	0	20.99	20.99	20.90	
3	QPSK	8	4	20.84	20.97	20.99	22.00
3	QPSK	8	7	20.97	20.99	20.94	
3	QPSK	15	0	20.90	21.04	20.95	
3	16QAM	1	0	20.62	20.66	20.98	
3	16QAM	1	8	20.87	20.80	20.79	22.00
3	16QAM	1	14	20.86	21.00	21.08	
3	16QAM	8	0	20.01	19.76	19.72	
3	16QAM	8	4	20.17	19.84	19.78	21.00
3	16QAM	8	7	19.84	19.72	19.72	
3	16QAM	15	0	19.87	19.88	19.83	
Channel				19957	20175	20393	22.03
Frequency (MHz)				1710.7	1732.5	1754.3	22.05
1.4	QPSK	1	0	22.03	22.13	22.03	
1.4	QPSK	1	3	22.05	22.12	22.12	23.00
1.4	QPSK	1	5	22.02	22.03	21.87	
1.4	QPSK	3	0	21.99	22.01	21.73	
1.4	QPSK	3	1	22.02	22.00	21.94	22.00
1.4	QPSK	3	3	21.98	22.02	22.02	
1.4	QPSK	6	0	20.96	21.00	21.05	
1.4	16QAM	1	0	20.54	20.51	20.58	
1.4	16QAM	1	3	20.81	20.75	20.68	22.00
1.4	16QAM	1	5	20.66	20.97	20.88	
1.4	16QAM	3	0	20.98	21.07	20.96	
1.4	16QAM	3	1	20.98	21.10	21.36	21.00
1.4	16QAM	3	3	20.98	21.06	21.23	
1.4	16QAM	6	0	20.08	19.92	19.99	

\<LTE Band 5\>

BW [MHz]	Modulation	RB Size	RB Offset	Low Channel	Middle Channel	High Channel	Tune-up limit (dBm)
Channel				20450	20525	20600	
Frequency (MHz)				829	836.5	844	
10	QPSK	1	0	21.36	21.50	21.43	22.50
10	QPSK	1	25	21.11	21.45	21.38	22.50
10	QPSK	1	49	21.28	21.18	21.00	
10	QPSK	25	0	20.10	20.44	20.25	21.50
10	QPSK	25	12	20.34	20.40	20.40	
10	QPSK	25	25	20.23	20.33	20.32	
10	QPSK	50	0	20.21	20.21	20.36	
10	16QAM	1	0	19.75	20.19	20.10	21.50
10	16QAM	1	25	19.92	19.98	20.01	
10	16QAM	1	49	19.96	19.91	20.18	
10	16QAM	25	0	19.35	19.02	19.33	20.50
10	16QAM	25	12	19.33	19.30	19.48	
10	16QAM	25	25	19.45	19.21	19.30	
10	16QAM	50	0	19.19	19.55	19.38	
Channel				20425	20525	20625	Tune-up limit (dBm)
Frequency (MHz)				826.5	836.5	846.5	
5	QPSK	1	0	21.18	21.38	21.18	22.50
5	QPSK	1	12	21.09	21.42	21.45	
5	QPSK	1	24	21.28	21.09	21.05	
5	QPSK	12	0	20.10	20.16	20.31	21.50
5	QPSK	12	7	20.10	20.31	20.26	
5	QPSK	12	13	20.23	20.36	20.35	
5	QPSK	25	0	20.25	20.25	20.41	
5	16QAM	1	0	20.23	20.24	20.25	21.50
5	16QAM	1	12	19.94	20.01	20.10	
5	16QAM	1	24	20.03	20.41	20.21	
5	16QAM	12	0	19.12	19.16	19.20	20.50
5	16QAM	12	7	19.45	19.23	19.33	
5	16QAM	12	13	19.22	19.19	19.21	
5	16QAM	25	0	19.24	19.54	19.42	
Channel				20415	20525	20635	Tune-up limit
Frequency (MHz)				825.5	836.5	847.5	

							(dBm)
3	QPSK	1	0	21.10	21.16	21.18	
3	QPSK	1	8	21.09	21.41	21.41	22.50
3	QPSK	1	14	20.93	21.23	21.11	
3	QPSK	8	0	20.28	20.18	20.30	
3	QPSK	8	4	20.22	20.44	20.28	
3	QPSK	8	7	20.18	20.30	20.39	21.50
3	QPSK	15	0	20.10	20.25	20.28	
3	16QAM	1	0	20.09	20.29	20.06	
3	16QAM	1	8	20.30	20.23	20.21	21.50
3	16QAM	1	14	20.35	20.23	20.06	
3	16QAM	8	0	19.13	19.10	19.23	
3	16QAM	8	4	19.21	19.30	19.22	
3	16QAM	8	7	19.32	19.24	19.38	20.50
3	16QAM	15	0	19.14	19.38	19.08	
Channel				20407	20525	20643	Tune-up limit (dBm)
Frequency (MHz)				824.7	836.5	848.3	
1.4	QPSK	1	0	21.31	21.20	21.19	
1.4	QPSK	1	3	21.15	21.43	21.25	
1.4	QPSK	1	5	21.22	21.30	21.12	22.50
1.4	QPSK	3	0	21.21	21.24	21.19	
1.4	QPSK	3	1	21.18	21.28	21.28	
1.4	QPSK	3	3	21.29	21.19	21.22	
1.4	QPSK	6	0	20.29	20.30	20.19	21.50
1.4	16QAM	1	0	20.21	19.90	20.16	
1.4	16QAM	1	3	20.29	20.01	20.38	
1.4	16QAM	1	5	20.23	19.94	20.23	21.50
1.4	16QAM	3	0	20.23	20.24	20.31	
1.4	16QAM	3	1	20.29	20.28	20.21	
1.4	16QAM	3	3	20.24	20.29	20.22	
1.4	16QAM	6	0	19.34	19.31	19.48	20.50

<LTE Band 7>

BW [MHz]	Modulation	RB Size	RB Offset	Low Channel	Middle Channel	High Channel	Tune-up limit (dBm)
Channel				20850	21100	21350	
Frequency (MHz)				2510	2535	2560	
20	QPSK	1	0	23.30	23.23	23.43	24.00
20	QPSK	1	49	23.30	23.49	23.20	
20	QPSK	1	99	23.11	23.23	23.09	
20	QPSK	50	0	22.38	22.38	22.32	23.00
20	QPSK	50	24	22.32	22.31	22.32	
20	QPSK	50	50	22.18	22.33	22.30	
20	QPSK	100	0	22.37	22.32	22.29	
20	16QAM	1	0	22.60	22.14	22.43	23.00
20	16QAM	1	49	22.16	22.16	22.50	
20	16QAM	1	99	22.13	22.30	22.14	
20	16QAM	50	0	21.34	21.41	21.36	22.00
20	16QAM	50	24	21.35	21.47	21.32	
20	16QAM	50	50	21.20	21.34	21.36	
20	16QAM	100	0	21.33	21.39	21.29	
Channel				20825	21100	21375	Tune-up limit (dBm)
Frequency (MHz)				2507.5	2535	2562.5	
15	QPSK	1	0	23.39	23.28	23.19	24.00
15	QPSK	1	37	23.34	23.43	23.20	
15	QPSK	1	74	23.20	23.41	23.21	
15	QPSK	36	0	22.38	22.33	22.25	23.00
15	QPSK	36	20	22.30	22.39	22.26	
15	QPSK	36	39	22.29	22.28	22.30	
15	QPSK	75	0	22.49	22.37	22.25	
15	16QAM	1	0	22.60	22.15	22.26	23.00
15	16QAM	1	37	22.51	22.27	22.64	
15	16QAM	1	74	22.28	22.45	22.28	
15	16QAM	36	0	21.44	21.35	21.35	22.00
15	16QAM	36	20	21.43	21.52	21.30	
15	16QAM	36	39	21.24	21.28	21.23	
15	16QAM	75	0	21.46	21.40	21.27	
Channel				20800	21100	21400	Tune-up limit
Frequency (MHz)				2505	2535	2565	

							(dBm)
10	QPSK	1	0	23.32	23.21	23.12	
10	QPSK	1	25	23.27	23.36	23.13	24.00
10	QPSK	1	49	23.13	23.34	23.14	
10	QPSK	25	0	22.31	22.26	22.18	
10	QPSK	25	12	22.23	22.32	22.19	23.00
10	QPSK	25	25	22.22	22.21	22.23	
10	QPSK	50	0	22.42	22.30	22.18	
10	16QAM	1	0	22.53	22.08	22.19	
10	16QAM	1	25	22.44	22.20	22.57	23.00
10	16QAM	1	49	22.21	22.38	22.21	
10	16QAM	25	0	21.37	21.28	21.28	
10	16QAM	25	12	21.36	21.45	21.23	22.00
10	16QAM	25	25	21.17	21.21	21.16	
10	16QAM	50	0	21.39	21.33	21.20	
Channel				20775	21100	21425	Tune-up limit (dBm)
Frequency (MHz)				2502.5	2535	2567.5	
5	QPSK	1	0	23.23	23.16	23.36	
5	QPSK	1	12	23.23	23.42	23.23	24.00
5	QPSK	1	24	23.14	23.16	23.02	
5	QPSK	12	0	22.31	22.18	22.31	
5	QPSK	12	7	22.25	22.24	22.25	23.00
5	QPSK	12	13	22.11	22.26	22.23	
5	QPSK	25	0	22.30	22.25	22.22	
5	16QAM	1	0	22.43	22.07	22.46	
5	16QAM	1	12	21.99	22.09	22.43	23.00
5	16QAM	1	24	21.96	22.23	22.17	
5	16QAM	12	0	21.27	21.34	21.29	
5	16QAM	12	7	21.28	21.40	21.25	22.00
5	16QAM	12	13	21.13	21.27	21.29	
5	16QAM	25	0	21.26	21.32	21.22	

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 54 of 97

\<LTE Band 12\>

BW [MHz]	Modulation	RB Size	RB Offset	Low Channel	Middle Channel	High Channel	Tune-up limit (dBm)
Channel				23060	23095	23130	
Frequency (MHz)				704	707.5	711	
10	QPSK	1	0	22.64	22.65	22.79	23.50
10	QPSK	1	25	23.12	22.98	23.03	
10	QPSK	1	49	22.62	22.66	22.63	
10	QPSK	25	0	22.00	22.10	22.06	22.50
10	QPSK	25	12	22.11	22.03	22.04	
10	QPSK	25	25	22.14	22.02	22.01	
10	QPSK	50	0	22.05	22.05	22.09	
10	16QAM	1	0	21.64	21.56	21.54	22.50
10	16QAM	1	25	21.93	21.91	21.82	
10	16QAM	1	49	21.96	21.55	21.56	
10	16QAM	25	0	21.02	21.10	21.12	21.50
10	16QAM	25	12	21.10	21.18	20.98	
10	16QAM	25	25	20.99	21.03	21.05	
10	16QAM	50	0	21.05	21.05	20.95	
Channel				23035	23095	23155	Tune-up limit (dBm)
Frequency (MHz)				701.5	707.5	713.5	
5	QPSK	1	0	22.77	22.80	22.75	23.50
5	QPSK	1	12	22.66	23.04	22.97	
5	QPSK	1	24	22.68	22.56	22.65	
5	QPSK	12	0	21.98	22.03	21.97	22.50
5	QPSK	12	7	21.98	22.11	22.03	
5	QPSK	12	13	21.84	21.99	21.96	
5	QPSK	25	0	21.86	21.98	21.95	
5	16QAM	1	0	21.63	21.82	21.86	22.50
5	16QAM	1	12	21.51	21.62	21.48	
5	16QAM	1	24	21.71	21.53	21.51	
5	16QAM	12	0	20.83	21.06	21.09	21.50
5	16QAM	12	7	20.80	20.95	21.12	
5	16QAM	12	13	21.06	20.84	21.08	
5	16QAM	25	0	21.13	20.93	21.10	
Channel				23025	23095	23165	Tune-up limit
Frequency (MHz)				700.5	707.5	714.5	

							(dBm)
3	QPSK	1	0	22.77	22.72	22.74	
3	QPSK	1	8	22.80	22.75	22.75	23.50
3	QPSK	1	14	22.50	22.80	22.78	
3	QPSK	8	0	21.98	21.89	21.95	
3	QPSK	8	4	22.08	22.02	22.09	22.50
3	QPSK	8	7	21.92	22.06	22.03	
3	QPSK	15	0	21.98	21.95	22.01	
3	16QAM	1	0	21.75	21.74	21.80	
3	16QAM	1	8	21.76	21.61	22.02	22.50
3	16QAM	1	14	21.78	21.83	21.81	
3	16QAM	8	0	20.76	21.07	20.80	
3	16QAM	8	4	20.96	21.05	21.13	21.50
3	16QAM	8	7	21.01	21.19	21.25	
3	16QAM	15	0	20.92	20.96	21.16	
Channel				23017	23095	23173	Tune-up limit (dBm)
Frequency (MHz)				699.7	707.5	715.3	
1.4	QPSK	1	0	22.63	22.92	22.86	
1.4	QPSK	1	3	22.66	22.95	22.93	
1.4	QPSK	1	5	22.51	22.95	22.91	23.50
1.4	QPSK	3	0	22.90	23.03	22.84	
1.4	QPSK	3	1	23.06	23.07	22.94	
1.4	QPSK	3	3	23.01	22.98	22.88	
1.4	QPSK	6	0	21.92	22.07	21.93	22.50
1.4	16QAM	1	0	21.96	21.65	21.73	
1.4	16QAM	1	3	22.10	21.66	21.79	
1.4	16QAM	1	5	21.97	21.90	21.88	22.50
1.4	16QAM	3	0	21.78	21.97	21.97	
1.4	16QAM	3	1	21.95	22.12	22.04	
1.4	16QAM	3	3	21.92	22.15	21.89	
1.4	16QAM	6	0	21.04	21.04	21.05	21.50

<LTE Band 14>

BW [MHz]	Modulation	RB Size	RB Offset	Low Channel	Middle Channel	High Channel	Tune-up limit (dBm)
Channel					23330		
Frequency (MHz)					793		
10	QPSK	1	0		23.82		
10	QPSK	1	25		24.03		24.50
10	QPSK	1	49		23.57		
10	QPSK	25	0		22.98		
10	QPSK	25	12		22.96		
10	QPSK	25	25		22.82		23.50
10	QPSK	50	0		23.07		
10	16QAM	1	0		22.95		
10	16QAM	1	25		23.03		23.50
10	16QAM	1	49		23.09		
10	16QAM	25	0		22.04		
10	16QAM	25	12		22.07		
10	16QAM	25	25		21.90		22.50
10	16QAM	50	0		22.01		
Channel				23305	23330	23355	Tune-up limit (dBm)
Frequency (MHz)				790.5	793	795.5	
5	QPSK	1	0	23.79	23.74	23.77	
5	QPSK	1	12	24.02	23.95	23.89	24.50
5	QPSK	1	24	23.84	23.71	23.83	
5	QPSK	12	0	23.04	22.92	22.74	
5	QPSK	12	7	22.63	22.93	22.67	23.50
5	QPSK	12	13	23.12	23.03	22.65	
5	QPSK	25	0	23.12	23.28	22.95	
5	16QAM	1	0	22.89	22.84	22.88	
5	16QAM	1	12	22.88	22.90	22.81	23.50
5	16QAM	1	24	22.80	22.68	22.74	
5	16QAM	12	0	22.07	21.76	21.89	
5	16QAM	12	7	21.79	21.74	21.83	22.50
5	16QAM	12	13	21.71	21.85	21.81	
5	16QAM	25	0	22.09	22.16	22.10	

<LTE Band 17>

BW [MHz]	Modulation	RB Size	RB Offset	Low Channel	Middle Channel	High Channel	Tune-up limit (dBm)
Channel				23780	23790	23800	
Frequency (MHz)				709	710	711	
10	QPSK	1	0	22.89	22.78	22.64	23.50
10	QPSK	1	25	22.93	22.83	22.73	
10	QPSK	1	49	22.75	22.52	22.45	
10	QPSK	25	0	22.03	21.87	21.86	22.50
10	QPSK	25	12	22.07	21.79	21.80	
10	QPSK	25	25	21.97	21.81	21.69	
10	QPSK	50	0	22.03	21.77	21.78	
10	16QAM	1	0	21.61	21.58	21.54	22.50
10	16QAM	1	25	21.83	21.52	21.88	
10	16QAM	1	49	21.90	21.49	21.50	
10	16QAM	25	0	20.96	20.68	20.77	21.50
10	16QAM	25	12	20.91	20.49	20.59	
10	16QAM	25	25	20.92	20.66	20.58	
10	16QAM	50	0	20.94	20.67	20.51	
Channel				23755	23790	23825	Tune-up limit (dBm)
Frequency (MHz)				706.5	710	713.5	
5	QPSK	1	0	22.91	22.67	22.77	23.50
5	QPSK	1	12	22.77	22.79	22.78	
5	QPSK	1	24	22.71	22.69	22.54	
5	QPSK	12	0	21.92	21.83	21.72	22.50
5	QPSK	12	7	21.90	21.61	21.65	
5	QPSK	12	13	21.89	21.71	21.63	
5	QPSK	25	0	21.99	21.63	21.62	
5	16QAM	1	0	21.53	21.50	21.53	22.50
5	16QAM	1	12	21.40	21.20	21.66	
5	16QAM	1	24	21.66	21.23	21.57	
5	16QAM	12	0	20.75	20.45	20.68	21.50
5	16QAM	12	7	20.63	20.49	20.54	
5	16QAM	12	13	20.61	20.50	20.45	
5	16QAM	25	0	20.56	20.51	20.50	

<LTE Band 25>

BW [MHz]	Modulation	RB Size	RB Offset	Low Channel	Middle Channel	High Channel	Tune-up limit (dBm)
Channel				26140	26365	26590	
Frequency (MHz)				1860	1882.5	1905	
20	QPSK	1	0	23.64	23.66	23.65	24.50
20	QPSK	1	49	23.93	24.10	23.95	
20	QPSK	1	99	23.70	23.93	23.62	
20	QPSK	50	0	23.01	23.18	23.16	23.50
20	QPSK	50	24	22.89	23.06	23.17	
20	QPSK	50	50	22.81	23.12	22.92	
20	QPSK	100	0	22.97	23.09	23.08	
20	16QAM	1	0	22.95	22.51	22.93	23.50
20	16QAM	1	49	22.85	22.87	22.87	
20	16QAM	1	99	22.81	22.76	22.49	
20	16QAM	50	0	22.13	21.93	22.15	23.00
20	16QAM	50	24	22.03	22.22	22.16	
20	16QAM	50	50	21.96	22.26	22.27	
20	16QAM	100	0	21.94	22.08	22.36	
Channel				26115	26365	26615	Tune-up limit (dBm)
Frequency (MHz)				1857.5	1882.5	1907.5	
15	QPSK	1	0	23.92	23.73	23.78	24.50
15	QPSK	1	37	23.85	23.80	24.05	
15	QPSK	1	74	23.90	23.91	23.80	
15	QPSK	36	0	23.02	23.03	23.26	23.50
15	QPSK	36	20	23.05	23.13	23.11	
15	QPSK	36	39	23.00	23.25	23.02	
15	QPSK	75	0	22.99	23.16	23.09	
15	16QAM	1	0	22.88	23.03	23.10	23.50
15	16QAM	1	37	23.10	23.19	22.76	
15	16QAM	1	74	22.74	22.78	22.75	
15	16QAM	36	0	22.14	22.04	22.16	23.00
15	16QAM	36	20	22.21	22.11	22.15	
15	16QAM	36	39	22.06	22.27	22.05	
15	16QAM	75	0	21.99	22.26	22.15	
Channel				26090	26365	26640	Tune-up limit
Frequency (MHz)				1855	1882.5	1910	

							(dBm)
10	QPSK	1	0	23.95	23.70	24.10	
10	QPSK	1	25	24.05	24.09	23.87	24.50
10	QPSK	1	49	24.10	24.08	23.84	
10	QPSK	25	0	23.08	23.11	23.08	
10	QPSK	25	12	23.13	23.10	23.55	23.50
10	QPSK	25	25	23.11	23.07	23.10	
10	QPSK	50	0	22.99	22.97	23.25	
10	16QAM	1	0	22.83	23.01	22.92	
10	16QAM	1	25	23.03	23.13	22.95	23.50
10	16QAM	1	49	23.14	22.69	22.89	
10	16QAM	25	0	22.15	22.04	22.05	
10	16QAM	25	12	22.03	22.16	22.14	23.00
10	16QAM	25	25	22.13	22.29	22.18	
10	16QAM	50	0	22.22	22.27	22.26	
Channel				26065	26365	26665	Tune-up limit (dBm)
Frequency (MHz)				1852.5	1882.5	1912.5	
5	QPSK	1	0	23.74	23.58	23.92	
5	QPSK	1	12	24.05	24.06	24.01	24.50
5	QPSK	1	24	23.80	24.05	24.04	
5	QPSK	12	0	22.82	22.98	23.10	
5	QPSK	12	7	22.96	23.10	22.98	23.50
5	QPSK	12	13	22.90	23.08	22.98	
5	QPSK	25	0	22.84	23.10	23.05	
5	16QAM	1	0	22.97	22.65	22.79	
5	16QAM	1	12	22.94	22.97	22.49	23.50
5	16QAM	1	24	22.70	22.85	22.68	
5	16QAM	12	0	22.15	22.05	22.12	
5	16QAM	12	7	22.33	22.30	21.89	23.00
5	16QAM	12	13	21.88	22.17	22.03	
5	16QAM	25	0	22.17	22.34	22.19	
Channel				26055	26365	26675	Tune-up limit (dBm)
Frequency (MHz)				1851.5	1882.5	1913.5	
3	QPSK	1	0	23.71	23.80	24.09	
3	QPSK	1	8	23.78	23.98	24.05	24.50
3	QPSK	1	14	23.79	23.97	24.09	

3	QPSK	8	0	23.00	23.00	23.04	23.50
3	QPSK	8	4	23.14	23.07	22.95	
3	QPSK	8	7	22.84	23.15	23.32	
3	QPSK	15	0	23.05	23.11	22.95	
3	16QAM	1	0	22.64	22.70	22.45	23.50
3	16QAM	1	8	22.52	22.61	22.49	
3	16QAM	1	14	22.59	22.62	22.93	
3	16QAM	8	0	22.10	22.27	22.13	23.00
3	16QAM	8	4	22.30	22.13	22.54	
3	16QAM	8	7	22.27	22.40	22.35	
3	16QAM	15	0	22.09	22.24	21.96	
Channel				26047	26365	26683	Tune-up limit (dBm)
Frequency (MHz)				1850.7	1882.5	1914.3	
1.4	QPSK	1	0	23.73	23.87	24.04	24.50
1.4	QPSK	1	3	23.84	24.01	24.09	
1.4	QPSK	1	5	23.75	23.98	24.05	
1.4	QPSK	3	0	23.65	23.59	23.54	
1.4	QPSK	3	1	23.54	23.57	23.44	
1.4	QPSK	3	3	23.52	23.51	23.40	
1.4	QPSK	6	0	22.99	23.09	22.87	23.50
1.4	16QAM	1	0	22.80	22.83	22.85	23.50
1.4	16QAM	1	3	22.58	22.87	22.90	
1.4	16QAM	1	5	22.93	22.86	22.53	
1.4	16QAM	3	0	22.85	22.99	22.96	
1.4	16QAM	3	1	22.99	22.95	22.86	
1.4	16QAM	3	3	22.91	22.97	22.93	
1.4	16QAM	6	0	22.05	22.12	21.87	23.00

<LTE Band 26>

BW [MHz]	Modulation	RB Size	RB Offset	Low Channel	Middle Channel	High Channel	Tune-up limit (dBm)
Channel				26765	26865	26965	
Frequency (MHz)				821.5	831.5	841.5	
15	QPSK	1	0	23.98	24.08	24.24	25.00
15	QPSK	1	37	24.26	24.10	24.37	
15	QPSK	1	74	24.10	24.21	24.44	
15	QPSK	36	0	23.23	23.31	23.41	24.00
15	QPSK	36	20	23.30	23.23	23.38	
15	QPSK	36	39	23.20	23.35	23.32	
15	QPSK	75	0	23.30	23.28	23.33	
15	16QAM	1	0	23.07	23.04	23.03	24.00
15	16QAM	1	37	22.71	22.84	23.16	
15	16QAM	1	74	22.75	22.83	23.14	
15	16QAM	36	0	22.29	22.32	22.55	23.00
15	16QAM	36	20	22.33	22.25	22.50	
15	16QAM	36	39	22.29	22.35	22.30	
15	16QAM	75	0	22.33	22.34	22.31	
Channel				26740	26865	26990	Tune-up limit (dBm)
Frequency (MHz)				819	831.5	844	
10	QPSK	1	0	23.97	24.07	24.23	25.00
10	QPSK	1	25	24.25	24.09	24.36	
10	QPSK	1	49	24.09	24.20	24.43	
10	QPSK	25	0	23.22	23.30	23.40	24.00
10	QPSK	25	12	23.29	23.22	23.37	
10	QPSK	25	25	23.19	23.34	23.31	
10	QPSK	50	0	23.29	23.27	23.32	
10	16QAM	1	0	23.06	23.03	23.02	24.00
10	16QAM	1	25	22.70	22.83	23.15	
10	16QAM	1	49	22.74	22.82	23.13	
10	16QAM	25	0	22.28	22.31	22.54	23.00
10	16QAM	25	12	22.32	22.24	22.49	
10	16QAM	25	25	22.28	22.34	22.29	
10	16QAM	50	0	22.32	22.33	22.30	
Channel				26715	26865	27015	Tune-up limit
Frequency (MHz)				816.5	831.5	846.5	

							(dBm)
5	QPSK	1	0	23.95	24.05	24.21	
5	QPSK	1	12	24.23	24.07	24.34	25.00
5	QPSK	1	24	24.07	24.18	24.41	
5	QPSK	12	0	23.20	23.28	23.38	
5	QPSK	12	7	23.27	23.20	23.35	
5	QPSK	12	13	23.17	23.32	23.29	24.00
5	QPSK	25	0	23.27	23.25	23.30	
5	16QAM	1	0	23.04	23.01	23.00	
5	16QAM	1	12	22.68	22.81	23.13	24.00
5	16QAM	1	24	22.72	22.80	23.11	
5	16QAM	12	0	22.26	22.29	22.52	
5	16QAM	12	7	22.30	22.22	22.47	
5	16QAM	12	13	22.26	22.32	22.27	23.00
5	16QAM	25	0	22.30	22.31	22.28	
Channel				26705	26865	27025	Tune-up limit (dBm)
Frequency (MHz)				815.5	831.5	847.5	
3	QPSK	1	0	23.96	24.06	24.22	
3	QPSK	1	8	24.24	24.08	24.35	25.00
3	QPSK	1	14	24.08	24.19	24.42	
3	QPSK	8	0	23.21	23.29	23.39	
3	QPSK	8	4	23.28	23.21	23.36	
3	QPSK	8	7	23.18	23.33	23.30	24.00
3	QPSK	15	0	23.28	23.26	23.31	
3	16QAM	1	0	23.05	23.02	23.01	
3	16QAM	1	8	22.69	22.82	23.14	24.00
3	16QAM	1	14	22.73	22.81	23.12	
3	16QAM	8	0	22.27	22.30	22.53	
3	16QAM	8	4	22.31	22.23	22.48	
3	16QAM	8	7	22.27	22.33	22.28	23.00
3	16QAM	15	0	22.31	22.32	22.29	
Channel				26697	26865	27033	Tune-up limit (dBm)
Frequency (MHz)				814.7	831.5	848.3	
1.4	QPSK	1	0	23.83	23.93	24.09	
1.4	QPSK	1	3	24.11	23.95	24.22	25.00
1.4	QPSK	1	5	23.95	24.06	24.29	

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 63 of 97

1.4	QPSK	3	0	23.08	23.16	23.26	
1.4	QPSK	3	1	23.15	23.08	23.23	
1.4	QPSK	3	3	23.05	23.20	23.17	
1.4	QPSK	6	0	23.15	23.13	23.18	24.00
1.4	16QAM	1	0	22.92	22.89	22.88	
1.4	16QAM	1	3	22.56	22.69	23.01	
1.4	16QAM	1	5	22.60	22.68	22.99	
1.4	16QAM	3	0	22.14	22.17	22.40	24.00
1.4	16QAM	3	1	22.18	22.10	22.35	
1.4	16QAM	3	3	22.14	22.20	22.15	
1.4	16QAM	6	0	22.18	22.19	22.16	23.00

<LTE Band 30>

BW [MHz]	Modulation	RB Size	RB Offset	Low Channel	Middle Channel	High Channel	Tune-up limit (dBm)
Channel					27710		
Frequency (MHz)					2310		
10	QPSK	1	0		18.94		
10	QPSK	1	25		19.19		19.50
10	QPSK	1	49		18.81		
10	QPSK	25	0		18.01		
10	QPSK	25	12		18.06		18.50
10	QPSK	25	25		18.04		
10	QPSK	50	0		17.96		
10	16QAM	1	0		17.79		
10	16QAM	1	25		17.96		18.50
10	16QAM	1	49		18.00		
10	16QAM	25	0		17.14		
10	16QAM	25	12		17.01		17.50
10	16QAM	25	25		16.98		
10	16QAM	50	0		16.85		
Channel				27685	27710	27735	Tune-up limit (dBm)
Frequency (MHz)				2307.5	2310	2312.5	
5	QPSK	1	0	18.80	18.91	18.87	
5	QPSK	1	12	18.69	18.94	18.98	19.50
5	QPSK	1	24	18.64	18.77	18.83	
5	QPSK	12	0	17.81	17.95	17.91	18.50

5	QPSK	12	7	17.95	18.04	18.01	
5	QPSK	12	13	17.81	18.06	17.91	
5	QPSK	25	0	17.78	17.89	17.96	
5	16QAM	1	0	17.88	17.89	17.59	
5	16QAM	1	12	17.42	17.90	17.56	18.50
5	16QAM	1	24	17.61	17.67	17.48	
5	16QAM	12	0	16.65	16.82	16.83	
5	16QAM	12	7	16.82	17.01	16.98	
5	16QAM	12	13	16.70	16.85	16.86	17.50
5	16QAM	25	0	16.88	16.97	17.10	

<LTE Band 66>

BW [MHz]	Modulation	RB Size	RB Offset	Low Channel	Middle Channel	High Channel	Tune-up limit (dBm)
Channel				132072	132322	132572	
Frequency (MHz)				1720	1745	1770	
20	QPSK	1	0	21.45	21.50	21.44	
20	QPSK	1	49	21.39	21.34	21.39	22.50
20	QPSK	1	99	21.23	21.23	21.42	
20	QPSK	50	0	20.47	20.71	20.47	
20	QPSK	50	24	20.49	20.50	20.57	
20	QPSK	50	50	20.60	20.50	20.64	21.50
20	QPSK	100	0	20.52	20.45	20.42	
20	16QAM	1	0	20.40	20.52	20.50	
20	16QAM	1	49	20.53	20.41	20.52	21.50
20	16QAM	1	99	20.33	20.45	20.69	
20	16QAM	50	0	19.43	19.65	19.50	
20	16QAM	50	24	19.44	19.50	19.43	
20	16QAM	50	50	19.50	19.42	19.50	20.50
20	16QAM	100	0	19.54	19.44	19.42	
Channel				132047	132322	132597	Tune-up limit (dBm)
Frequency (MHz)				1717.5	1745	1772.5	
15	QPSK	1	0	21.23	21.39	21.43	
15	QPSK	1	37	21.33	21.34	21.33	22.50
15	QPSK	1	74	21.39	21.32	21.25	
15	QPSK	36	0	20.64	20.61	20.56	
15	QPSK	36	20	20.50	20.50	20.50	21.50

15	QPSK	36	39	20.49	20.42	20.56	
15	QPSK	75	0	20.62	20.62	20.69	
15	16QAM	1	0	20.46	20.41	20.50	
15	16QAM	1	37	20.51	20.50	20.42	21.50
15	16QAM	1	74	20.17	20.44	20.41	
15	16QAM	36	0	19.44	19.53	19.62	
15	16QAM	36	20	19.65	19.50	19.50	20.50
15	16QAM	36	39	19.54	19.47	19.65	
15	16QAM	75	0	19.62	19.46	19.50	
Channel				132022	132322	132622	Tune-up limit (dBm)
Frequency (MHz)				1715	1745	1775	
10	QPSK	1	0	21.43	21.32	21.20	
10	QPSK	1	25	21.49	21.22	21.17	22.50
10	QPSK	1	49	21.40	21.20	21.32	
10	QPSK	25	0	20.61	20.47	20.63	
10	QPSK	25	12	20.60	20.46	20.59	21.50
10	QPSK	25	25	20.54	20.49	20.66	
10	QPSK	50	0	20.57	20.50	20.62	
10	16QAM	1	0	20.43	20.41	20.42	
10	16QAM	1	25	20.45	20.41	20.50	21.50
10	16QAM	1	49	20.43	20.60	20.65	
10	16QAM	25	0	19.60	19.49	19.60	
10	16QAM	25	12	19.50	19.42	19.60	20.50
10	16QAM	25	25	19.45	19.54	19.46	
10	16QAM	50	0	19.53	19.50	19.76	
Channel				131997	132322	132647	Tune-up limit (dBm)
Frequency (MHz)				1712.5	1745	1777.5	
5	QPSK	1	0	21.23	21.41	21.22	
5	QPSK	1	12	21.32	21.39	21.17	22.50
5	QPSK	1	24	21.14	21.32	21.22	
5	QPSK	12	0	20.47	20.59	20.62	
5	QPSK	12	7	20.50	20.63	20.50	21.50
5	QPSK	12	13	20.55	20.56	20.60	
5	QPSK	25	0	20.72	20.46	20.46	
5	16QAM	1	0	20.47	20.55	20.41	21.50
5	16QAM	1	12	20.50	20.44	20.50	

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525
Http://www.morlab.cn   E-mail: service@morlab.cn

Page 66 of 97

5	16QAM	1	24	20.43	20.50	20.42	
5	16QAM	12	0	19.63	19.60	19.62	
5	16QAM	12	7	19.69	19.46	19.44	20.50
5	16QAM	12	13	19.46	19.50	19.41	
5	16QAM	25	0	19.50	19.50	19.39	
Channel				131987	132322	132657	Tune-up limit (dBm)
Frequency (MHz)				1711.5	1745	1778.5	
3	QPSK	1	0	21.21	21.10	21.13	
3	QPSK	1	8	21.00	21.22	21.22	22.50
3	QPSK	1	14	21.02	21.23	21.20	
3	QPSK	8	0	20.47	20.63	20.44	
3	QPSK	8	4	20.57	20.53	20.51	21.50
3	QPSK	8	7	20.45	20.57	20.42	
3	QPSK	15	0	20.50	20.69	20.50	
3	16QAM	1	0	20.45	20.42	20.51	
3	16QAM	1	8	20.50	20.50	20.49	21.50
3	16QAM	1	14	20.46	20.44	20.42	
3	16QAM	8	0	19.63	19.54	19.46	
3	16QAM	8	4	19.50	19.65	19.50	20.50
3	16QAM	8	7	19.42	19.50	19.43	
3	16QAM	15	0	19.50	19.44	19.41	
Channel				131979	132322	132665	Tune-up limit (dBm)
Frequency (MHz)				1710.7	1745	1779.3	
1.4	QPSK	1	0	21.14	21.32	21.22	
1.4	QPSK	1	3	21.00	21.17	21.00	
1.4	QPSK	1	5	21.11	21.32	21.10	
1.4	QPSK	3	0	20.89	20.99	21.03	22.50
1.4	QPSK	3	1	21.19	21.12	20.97	
1.4	QPSK	3	3	21.11	21.06	21.11	
1.4	QPSK	6	0	20.53	20.67	20.53	21.50
1.4	16QAM	1	0	20.60	20.50	20.42	
1.4	16QAM	1	3	20.42	20.50	20.49	
1.4	16QAM	1	5	20.63	20.36	20.53	21.50
1.4	16QAM	3	0	20.50	20.50	20.49	
1.4	16QAM	3	1	20.49	20.44	20.39	
1.4	16QAM	3	3	20.70	20.42	20.52	

1.4	16QAM	6	0	19.44	19.53	19.50	20.50

<LTE Band 71>

BW [MHz]	Modulation	RB Size	RB Offset	Low Channel	Middle Channel	High Channel	Tune-up limit (dBm)
Channel				133222	133322	133372	
Frequency (MHz)				673	680.5	688	
20	QPSK	1	0	22.77	22.63	22.56	23.50
20	QPSK	1	49	22.63	22.59	22.57	
20	QPSK	1	99	22.33	22.50	22.32	
20	QPSK	50	0	22.10	21.96	21.89	22.50
20	QPSK	50	24	21.96	21.92	21.90	
20	QPSK	50	50	21.66	21.83	21.65	
20	QPSK	100	0	21.43	21.29	21.22	
20	16QAM	1	0	21.70	21.71	21.63	22.50
20	16QAM	1	49	21.49	21.66	21.48	
20	16QAM	1	99	21.42	21.28	21.41	
20	16QAM	50	0	21.20	21.21	21.13	21.50
20	16QAM	50	24	20.99	21.16	20.98	
20	16QAM	50	50	20.92	20.78	20.91	
20	16QAM	100	0	20.92	20.69	20.65	
Channel				133197	133297	133397	Tune-up limit (dBm)
Frequency (MHz)				670.5	680.5	690.5	
15	QPSK	1	0	22.73	22.60	22.62	23.50
15	QPSK	1	37	22.67	22.58	22.61	
15	QPSK	1	74	22.72	22.60	22.75	
15	QPSK	36	0	22.06	21.93	21.95	22.50
15	QPSK	36	20	22.00	21.91	21.94	
15	QPSK	36	39	22.05	21.93	22.08	
15	QPSK	75	0	22.00	21.97	22.01	
15	16QAM	1	0	21.39	21.26	21.28	22.50
15	16QAM	1	37	21.33	21.24	21.27	
15	16QAM	1	74	21.38	21.26	21.41	
15	16QAM	36	0	20.48	20.35	20.37	21.50
15	16QAM	36	20	20.42	20.33	20.36	
15	16QAM	36	39	20.47	20.35	20.50	
15	16QAM	75	0	20.34	20.36	20.45	

Channel				133172	133297	133422	Tune-up limit (dBm)
Frequency (MHz)				668	680.5	693	
10	QPSK	1	0	22.53	22.57	22.60	23.50
10	QPSK	1	25	22.56	22.55	22.61	
10	QPSK	1	49	22.32	22.26	22.55	
10	QPSK	25	0	21.86	21.90	21.93	22.50
10	QPSK	25	12	21.89	21.88	21.94	
10	QPSK	25	25	21.65	21.59	21.88	
10	QPSK	50	0	21.55	21.54	21.60	
10	16QAM	1	0	21.69	21.73	21.76	22.50
10	16QAM	1	25	21.72	21.71	21.77	
10	16QAM	1	49	21.48	21.42	21.71	
10	16QAM	25	0	21.19	21.23	21.26	21.50
10	16QAM	25	12	21.22	21.21	21.27	
10	16QAM	25	25	20.98	20.92	21.21	
10	16QAM	50	0	20.81	20.82	20.71	
Channel				133147	133297	133447	Tune-up limit (dBm)
Frequency (MHz)				665.5	680.5	695.5	
5	QPSK	1	0	22.37	22.60	22.27	23.50
5	QPSK	1	12	22.53	22.56	22.49	
5	QPSK	1	24	22.38	22.72	22.39	
5	QPSK	12	0	21.70	21.93	21.60	22.50
5	QPSK	12	7	21.86	21.89	21.82	
5	QPSK	12	13	21.71	22.05	21.72	
5	QPSK	25	0	21.67	21.69	21.59	
5	16QAM	1	0	21.53	21.76	21.43	22.50
5	16QAM	1	12	21.69	21.72	21.65	
5	16QAM	1	24	21.54	21.88	21.55	
5	16QAM	12	0	21.03	21.26	20.93	21.50
5	16QAM	12	7	21.19	21.22	21.15	
5	16QAM	12	13	21.04	21.38	21.05	
5	16QAM	25	0	21.16	21.30	21.15	

➢ TDD-LTE Conducted Power

TDD LTE configuration setup for SAR measurement

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

a) 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations

b) "special subframe S" contains both uplink and downlink transmissions, it has been taken into consideration to determine the transmission duty factor according to the worst case uplink and downlink cyclic prefix requirements for UpPTS

One radio frame, $T_f = 307200 T_s = 10$ ms

One half-frame, $153600 T_s = 5$ ms

One slot, $T_{slot} = 15360 T_s$ $30720 T_s$

Subframe #0 | Subframe #2 | Subframe #3 | Subframe #4 | Subframe #5 | Subframe #7 | Subframe #8 | Subframe #9

One subframe, $30720 T_s$

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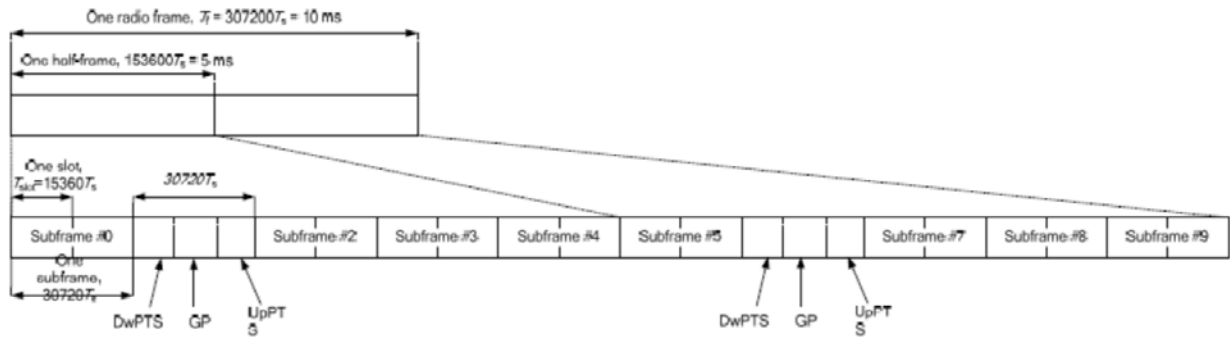
Uplink-downlink configuration	Downlink-to-Uplink Switch-point periodicity	Subframe number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U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

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

<LTE Band 41>

BW [MHz]	Modulation	RB Size	RB Offset	Low Channel	Low Middle Channel	Middle Channel	High Middle Channel	High Channel	Tune-up limit (dBm)
Channel				39750	40185	40620	41055	41490	
Frequency (MHz)				2506	2549.5	2593	2636.5	2680	
20	QPSK	1	0	23.23	23.25	23.49	23.41	23.57	
20	QPSK	1	49	23.49	23.53	23.50	23.45	23.72	24.50
20	QPSK	1	99	23.41	23.37	23.45	23.40	23.68	
20	QPSK	50	0	22.61	22.57	22.42	22.38	22.74	
20	QPSK	50	24	22.63	22.52	22.47	22.29	22.38	
20	QPSK	50	50	22.35	22.35	22.44	22.51	22.43	23.50
20	QPSK	100	0	22.09	21.72	22.14	22.05	22.18	
20	16QAM	1	0	22.05	22.15	21.94	21.88	22.33	
20	16QAM	1	49	22.11	21.93	22.03	21.87	22.29	23.50
20	16QAM	1	99	21.89	21.83	21.98	21.86	22.28	
20	16QAM	50	0	21.67	21.63	21.42	21.55	21.45	
20	16QAM	50	24	21.69	21.45	21.47	21.56	21.49	
20	16QAM	50	50	21.41	21.77	21.45	21.79	21.52	22.50
20	16QAM	100	0	21.48	21.58	21.51	21.15	21.31	
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	23.10	23.12	23.36	23.28	23.44	
15	QPSK	1	37	23.36	23.40	23.17	23.32	23.59	24.50
15	QPSK	1	74	23.11	23.24	23.22	23.27	23.55	
15	QPSK	36	0	22.48	22.44	22.39	22.05	22.51	
15	QPSK	36	20	22.25	22.43	22.44	22.16	22.25	
15	QPSK	36	39	22.22	22.22	22.51	22.48	22.30	23.50
15	QPSK	75	0	22.06	21.79	22.07	21.92	22.05	
15	16QAM	1	0	22.02	21.82	21.91	21.85	22.20	
15	16QAM	1	37	22.08	21.85	22.20	21.94	22.26	23.50
15	16QAM	1	74	22.06	21.90	21.85	21.93	22.15	
15	16QAM	36	0	21.34	21.45	21.49	21.12	21.22	
15	16QAM	36	20	21.26	21.22	21.44	21.23	21.36	
15	16QAM	36	39	21.28	21.43	21.52	21.56	21.39	22.50
15	16QAM	75	0	21.35	21.55	21.58	21.22	21.18	
Channel				39700	40160	40620	41080	41540	Tune-up

Frequency (MHz)				2501	2547	2593	2639	2685	limit (dBm)
10	QPSK	1	0	23.14	23.16	23.40	23.32	23.48	24.50
10	QPSK	1	25	23.40	23.44	23.21	23.36	23.63	
10	QPSK	1	49	23.22	23.28	23.16	23.31	23.59	
10	QPSK	25	0	22.52	22.48	22.33	22.29	22.55	23.50
10	QPSK	25	12	22.54	22.57	22.38	22.20	22.29	
10	QPSK	25	25	22.26	22.36	22.35	22.52	22.34	
10	QPSK	50	0	22.30	21.93	22.31	21.96	22.09	
10	16QAM	1	0	22.06	21.86	21.85	21.89	22.14	23.50
10	16QAM	1	25	22.02	21.84	21.94	21.98	22.06	
10	16QAM	1	49	22.10	21.94	21.79	21.97	22.19	
10	16QAM	25	0	21.38	21.54	21.33	21.16	21.26	22.50
10	16QAM	25	12	21.46	21.26	21.38	21.27	21.40	
10	16QAM	25	25	21.32	21.37	21.36	21.49	21.43	
10	16QAM	50	0	21.39	21.49	21.42	21.06	21.22	
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	23.12	23.14	23.38	23.30	23.46	24.50
5	QPSK	1	12	23.38	23.42	23.19	23.34	23.61	
5	QPSK	1	24	23.16	23.26	23.14	23.29	23.57	
5	QPSK	12	0	22.50	22.46	22.31	22.07	22.43	23.50
5	QPSK	12	7	22.52	22.46	22.36	22.18	22.27	
5	QPSK	12	13	22.26	22.04	22.33	22.50	22.32	
5	QPSK	25	0	21.77	21.61	22.09	21.94	22.07	
5	16QAM	1	0	21.83	21.74	21.63	21.77	22.02	23.50
5	16QAM	1	12	21.86	21.82	21.92	21.76	22.08	
5	16QAM	1	24	21.66	21.92	21.87	21.95	22.07	
5	16QAM	12	0	21.05	21.42	21.31	21.14	20.94	22.50
5	16QAM	12	7	21.07	20.94	21.36	21.25	21.38	
5	16QAM	12	13	21.36	21.36	21.34	21.28	21.41	
5	16QAM	25	0	21.29	21.47	21.40	21.04	21.20	

➢ **WLAN Conducted Power**

<2.4GHz WLAN>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	CH 1	2412	13.68	14.00	100.00
		CH 6	2437	13.85	14.00	
		CH 11	2462	13.86	14.00	
	802.11g 6Mbps	CH 1	2412	13.15	13.50	95.37
		CH 6	2437	13.33	13.50	
		CH 11	2462	13.26	13.50	
	802.11n-HT20 MCS0	CH 1	2412	13.02	13.50	94.58
		CH 6	2437	13.19	13.50	
		CH 11	2462	13.14	13.50	
	802.11n-HT40 MCS0	CH 3	2422	13.25	13.50	90.91
		CH 6	2437	13.34	13.50	
		CH 9	2452	13.05	13.50	

Note:

1. Per KDB 447498 D01v06, the 1-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:

    [(*max. power of channel, including tune-up tolerance, mW*) / (*min. test separation distance, mm*)] · [√f(GHz)] ≤ 3.0 for 1-g SAR, where
    - f(GHz) is the RF channel transmit frequency in GHz
    - Power and distance are rounded to the nearest mW and mm before calculation
    - The result is rounded to one decimal place for comparison

Frequency (GHz)	Max. Tune-up Power (dBm)	Max. Power (mW)	Test distance (mm)	Result	exclusion thresholds for 1-g SAR
2.462	14.00	25.12	5	7.88	3.0

2. Base on the result of note1, RF exposure evaluation of 802.11 b and g mode is required.

3. Per KDB 248227 D01v02r02, choose the highest output power channel to test SAR and determine further SAR exclusion.

4. 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.

MORLAB
SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 73 of 97

5. The output power of all data rate were pre-scan, just the worst case (the lowest data rate) of all mode were shown in report.

<5.2GHz WLAN>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11n-HT20 MCS0	CH 36	5180	12.63	13.00	95.05
		CH 40	5200	12.54	13.00	
		CH 48	5240	12.71	13.00	
	802.11n-HT40 MCS0	CH 38	5190	12.26	12.50	90.91
		CH 46	5230	12.31	12.50	
	802.11ac-VHT20 MCS0	CH 36	5180	12.55	13.00	95.07
		CH 40	5200	12.47	13.00	
		CH 48	5240	12.36	12.50	
	802.11ac-VHT40 MCS0	CH 38	5190	12.25	12.50	91.35
		CH 46	5230	12.31	12.50	
	802.11ac-VHT80 MCS0	CH 42	5210	12.13	12.50	84.06

Note:

1. Per KDB 447498 D01v06, the 1-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤50 mm are determined by:

   [(*max. power of channel, including tune-up tolerance, mW*)/ (*min. test separation distance, mm*)] · [$\sqrt{f(GHz)}$] ≤ 3.0 for1-g SAR, where

   · f(GHz) is the RF channel transmit frequency in GHz
   · Power and distance are rounded to the nearest mW and mm before calculation
   · The result is rounded to one decimal place for comparison

Frequency (GHz)	Max. Tune-up Power (dBm)	Max. Power (mW)	Test distance (mm)	Result	exclusion thresholds for 1-g SAR
5.240	13.00	19.95	5	9.13	3.0

2. Per KDB 248227 D01v02r02, choose the highest output power channel to test SAR and determine further SAR exclusion.

3. The output power of all data rate were pre-scan, just the worst case (the lowest data rate) of all mode were shown in report.

MORLAB SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 74 of 97

<5.8GHz WLAN>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN	802.11n-HT20 MCS0	CH 149	5745	12.58	13.00	95.05
		CH 157	5785	12.45	12.50	
		CH 165	5825	12.33	12.50	
	802.11n-HT40 MCS0	CH 151	5755	12.30	12.50	90.91
		CH 159	5795	12.24	12.50	
	802.11ac-VHT20 MCS0	CH 149	5745	12.56	13.00	95.07
		CH 157	5785	12.54	13.00	
		CH 165	5825	12.63	13.00	
	802.11ac-VHT40 MCS0	CH 151	5755	12.22	12.50	91.35
		CH 159	5795	12.19	12.50	
	802.11ac-VHT80 MCS0	CH 155	5775	11.89	12.00	84.06

Note:

4. Per KDB 447498 D01v06, the 1-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤50 mm are determined by:

   [(*max. power of channel, including tune-up tolerance, mW*)/ (*min. test separation distance, mm*)] · [√f(GHz)] ≤ 3.0 for 1-g SAR, where

   · f(GHz) is the RF channel transmit frequency in GHz
   · Power and distance are rounded to the nearest mW and mm before calculation
   · The result is rounded to one decimal place for comparison

Frequency (GHz)	Max. Tune-up Power (dBm)	Max. Power (mW)	Test distance (mm)	Result	exclusion thresholds for 1-g SAR
5.745	13.00	19.95	5	9.56	3.0

5. Per KDB 248227 D01v02r02, choose the highest output power channel to test SAR and determine further SAR exclusion.

6. The output power of all data rate were pre-scan, just the worst case (the lowest data rate) of all mode were shown in report.

14. EUT Antenna Location

Main Antenna supported TX bands:

UMTS Band II/IV/V

FDD LTE Bands:

2/4/5/7/12//14/17/25/26/30/41/66/71

WLAN antenna supported bands :

2.4GHz/5GHz
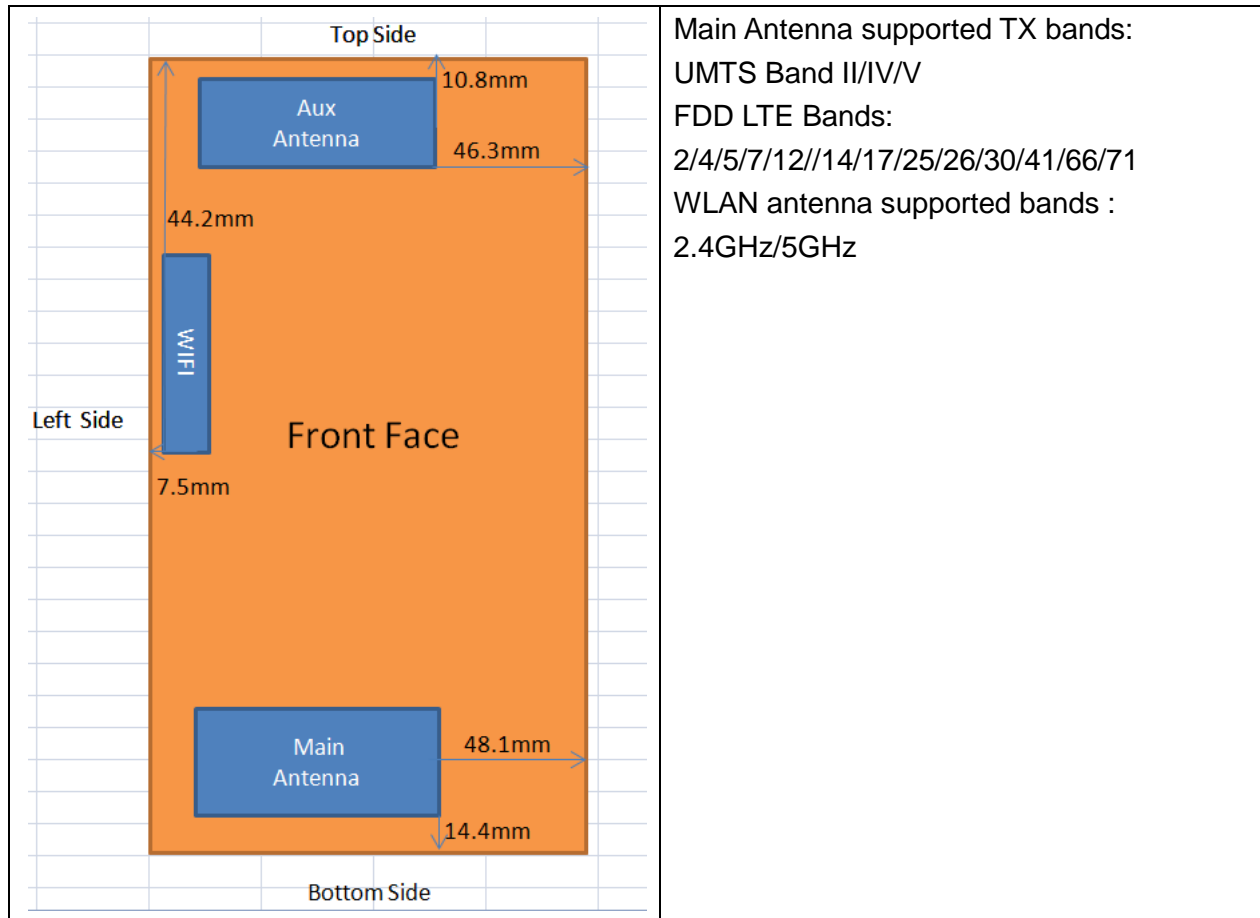
EUT Antenna Distance:

Antenna Location	Support Function	Top Side(mm)	Bottom Side(mm)	Left Side(mm)	Right Side(mm)
Main Antenna	TX/RX	97.5	14.4	17.6	48.1
Aux Antenna	DRX	10.8	101.8	18.9	46.3
WLAN Antenna	TX/RX	44.2	65.6	7.5	58.1

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 76 of 97

15. Block diagram of the tests to be performed

15.1. Body

Preparation of system

Operational mode/band (used at the body)

Configuration

Test positions according to 6.1.4

Measurement according to Figure 12 b) at center frequency

All test positions done?

No

Yes

Determination of maximum position

Measurement according to Figure 12 b) at lower and upper frequency

All mid-band configurations within - 3 dB of compliance limit tested at all required channels?

No

Yes

All modes/bands and configurations done?

No

Yes

Determination of maximum

Ref. Measurement (step a)

Area scan (steps b-c)

Zoom scan (steps d-e)

Ref. Measurement (step f)

Peak in cube?

No

Shift cube centre

Yes

All primary and secondary peaks tested?

No

Select next peak

Yes

Additional peaks shall be measured only when the primary peak is within 2 dB of the SAR limit.
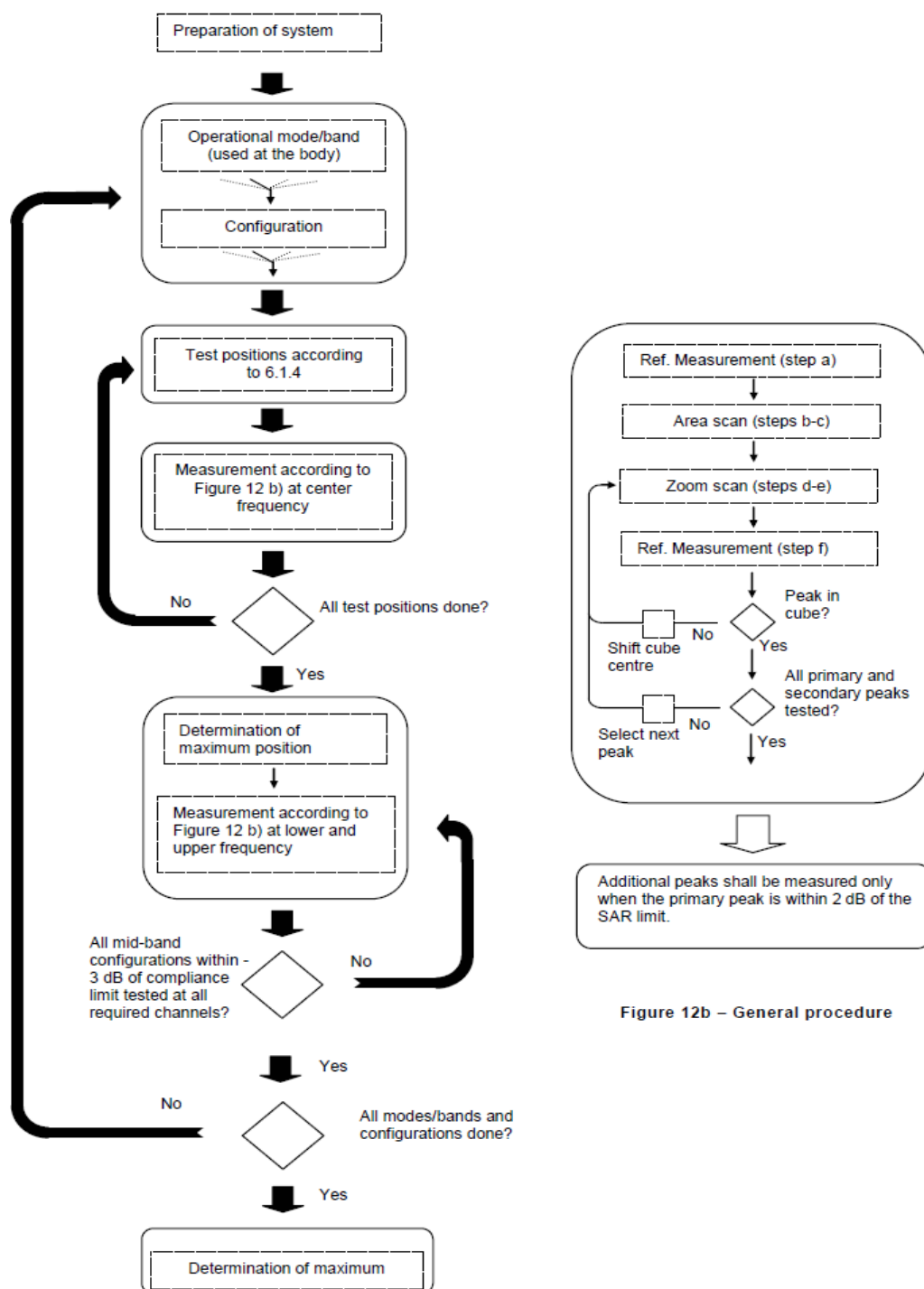
Figure 12b – General procedure

16. Test Results List

16.1. 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 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.

5. 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

MORLAB SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 78 of 97

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.

6. Per KDB648474 D04v01r03, when the aggregate SAR from multiple antennas at any location in the combined SAR distribution is either ≤ 1.2 W/kg where at least 90% of the SAR is attributed to a single SAR distribution or ≤ 0.4 W/kg where no more than one SAR distribution is contributing > 0.1 W/kg, the antennas may be considered spatially separated. In this report, the MIMO mode SAR is not required for the SAR of the WLAN antennas on the top side and bottom side are less than 1.2 W/kg on 1-g.

MORLAB
SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 79 of 97

16.2. Body SAR Data

➢ **WCDMA Body SAR**

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR1g (W/kg)	Reported SAR1g (W/kg)
	Band II/RMC	Front Side	9400	21.64	22.50	1.219	0.893	1.089
	Band II/RMC	Back Side	9400	21.64	22.50	1.219	0.747	0.911
	Band II/RMC	Left Side	9400	21.64	22.50	1.219	0.350	0.427
	Band II/RMC	Right Side	9400	21.64	22.50	1.219	0.276	0.336
	Band II/RMC	Top Side	9400	21.64	22.50	1.219	0.112	0.137
	Band II/RMC	Bottom Side	9400	21.64	22.50	1.219	0.377	0.460
	Band II/RMC	Front Side	9262	21.62	22.50	1.225	0.737	0.903
1#	Band II/RMC	Front Side	9538	21.52	22.50	1.253	0.911	**1.142**
	Band II/RMC	Back Side	9262	21.62	22.50	1.225	0.727	0.890
	Band II/RMC	Back Side	9538	21.52	22.50	1.253	0.815	1.021
	Band IV/RMC	Front Side	1413	21.90	22.50	1.148	0.704	0.808
	Band IV/RMC	Back Side	1413	21.90	22.50	1.148	0.824	0.946
	Band IV/RMC	Left Side	1413	21.90	22.50	1.148	0.227	0.261
	Band IV/RMC	Right Side	1413	21.90	22.50	1.148	0.116	0.133
	Band IV/RMC	Top Side	1413	21.90	22.50	1.148	0.500	0.574
	Band IV/RMC	Bottom Side	1413	21.90	22.50	1.148	0.346	0.397
	Band IV/RMC	Front Side	1312	21.71	22.50	1.199	0.711	0.853
	Band IV/RMC	Front Side	1513	21.87	22.50	1.156	0.802	0.927
	Band IV/RMC	Back Side	1312	21.71	22.50	1.199	0.738	0.885
2#	Band IV/RMC	Back Side	1513	21.87	22.50	1.156	0.868	**1.004**
	Band V/RMC	Front Side	4183	21.78	22.50	1.180	0.827	0.976
	Band V/RMC	Back Side	4183	21.78	22.50	1.180	0.801	0.945
	Band V/RMC	Left Side	4183	21.78	22.50	1.180	0.284	0.335
	Band V/RMC	Right Side	4183	21.78	22.50	1.180	0.122	0.144
	Band V/RMC	Top Side	4183	21.78	22.50	1.180	0.046	0.054
	Band V/RMC	Bottom Side	4183	21.78	22.50	1.180	0.075	0.088
	Band V/RMC	Front Side	4132	21.69	22.50	1.205	0.765	0.922
	Band V/RMC	Front Side	4233	21.73	22.50	1.194	0.816	0.974
3#	Band V/RMC	Back Side	4132	21.69	22.50	1.205	0.863	**1.040**
	Band V/RMC	Back Side	4233	21.73	22.50	1.194	0.784	0.936

MORLAB

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 80 of 97

➤ **LTE QPSK Body SAR**

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR1g (W/kg)	Reported SAR1g (W/kg)
	LTE Band 2/1RB#0 20M	Front Side	18900	23.33	23.50	1.040	0.877	0.912
4#	LTE Band 2/1RB#0 20M	Back Side	18900	23.33	23.50	1.040	0.925	**0.962**
	LTE Band 2/1RB#0 20M	Left Side	18900	23.33	23.50	1.040	0.254	0.264
	LTE Band 2/1RB#0 20M	Right Side	18900	23.33	23.50	1.040	0.185	0.192
	LTE Band 2/1RB#0 20M	Top Side	18900	23.33	23.50	1.040	0.110	0.114
	LTE Band 2/1RB#0 20M	Bottom Side	18900	23.33	23.50	1.040	0.265	0.276
	LTE Band 2/1RB#0 20M	Front Side	18700	23.32	23.50	1.042	0.769	0.802
	LTE Band 2/1RB#0 20M	Front Side	19100	23.27	23.50	1.054	0.715	0.754
	LTE Band 2/1RB#0 20M	Back Side	18700	23.32	23.50	1.042	0.844	0.880
	LTE Band 2/1RB#0 20M	Back Side	19100	23.27	23.50	1.054	0.784	0.827
	LTE Band 2/**100RB**#0 20M	Back Side	18700	22.26	22.50	1.057	0.670	0.708
	LTE Band 2/50RB#0 20M	Front Side	18900	22.37	22.50	1.030	0.570	0.587
	LTE Band 2/50RB#0 20M	Back Side	18900	22.37	22.50	1.030	0.616	0.635
	LTE Band 2/50RB#0 20M	Left Side	18900	22.37	22.50	1.030	0.206	0.212
	LTE Band 2/50RB#0 20M	Right Side	18900	22.37	22.50	1.030	0.149	0.154
	LTE Band 2/50RB#0 20M	Top Side	18900	22.37	22.50	1.030	0.097	0.100
	LTE Band 2/50RB#0 20M	Bottom Side	18900	22.37	22.50	1.030	0.209	0.215

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR1g (W/kg)	Reported SAR1g (W/kg)
	LTE Band 4/1RB#0 20M	Front Side	20175	22.38	23.00	1.161	0.585	0.675
	LTE Band 4/1RB#0 20M	Back Side	20175	22.38	23.00	1.161	0.727	0.839
	LTE Band 4/1RB#0 20M	Left Side	20175	22.38	23.00	1.161	0.233	0.269
	LTE Band 4/1RB#0 20M	Right Side	20175	22.38	23.00	1.161	0.122	0.141
	LTE Band 4/1RB#0 20M	Top Side	20175	22.38	23.00	1.161	0.091	0.105
	LTE Band 4/1RB#0 20M	Bottom Side	20175	22.38	23.00	1.161	0.200	0.231
	LTE Band 4/1RB#0 20M	Back Side	20050	22.09	23.00	1.233	0.623	0.768
5#	LTE Band 4/1RB#0 20M	Back Side	20300	22.35	23.00	1.153	0.762	**0.885**
	LTE Band 4/**100RB**#0 20M	Back Sid	20175	21.01	22.00	1.256	0.549	0.690
	LTE Band 4/50RB#0 20M	Front Side	20175	21.17	22.00	1.211	0.467	0.565
	LTE Band 4/50RB#0 20M	Back Side	20175	21.17	22.00	1.211	0.588	0.712

MORLAB
SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 81 of 97

	LTE Band 4/50RB#0 20M	Left Side	20175	21.17	22.00	1.211	0.187	0.226
	LTE Band 4/50RB#0 20M	Right Side	20175	21.17	22.00	1.211	0.092	0.111
	LTE Band 4/50RB#0 20M	Top Side	20175	21.17	22.00	1.211	0.051	0.062
	LTE Band 4/50RB#0 20M	Bottom Side	20175	21.17	22.00	1.211	0.164	0.199
	LTE Band 4/50RB#0 20M	Back Side	20050	20.96	22.00	1.271	0.512	0.651
	LTE Band 4/50RB#0 20M	Back Side	20300	21.07	22.00	1.239	0.561	0.695
	LTE Band 5/1RB#0 10M	Front Side	20525	21.50	22.50	1.259	0.593	0.747
6#	LTE Band 5/1RB#0 10M	Back Side	20525	21.50	22.50	1.259	0.859	**1.081**
	LTE Band 5/1RB#0 10M	Left Side	20525	21.50	22.50	1.259	0.190	0.239
	LTE Band 5/1RB#0 10M	Right Side	20525	21.50	22.50	1.259	0.312	0.393
	LTE Band 5/1RB#0 10M	Top Side	20525	21.50	22.50	1.259	0.043	0.054
	LTE Band 5/1RB#0 10M	Bottom Side	20525	21.50	22.50	1.259	0.057	0.072
	LTE Band 5/1RB#0 10M	Back Side	20450	21.36	22.50	1.300	0.818	1.064
	LTE Band 5/1RB#0 10M	Back Side	20600	21.43	22.50	1.279	0.826	1.057
	LTE Band 5/**50RB**#0 10M	Back Side	20525	20.21	21.50	1.346	0.621	0.836
	LTE Band 5/25RB#0 10M	Front Side	20525	20.44	21.50	1.276	0.486	0.620
	LTE Band 5/25RB#0 10M	Back Side	20525	20.44	21.50	1.276	0.584	0.745
	LTE Band 5/25RB#0 10M	Left Side	20525	20.44	21.50	1.276	0.117	0.149
	LTE Band 5/25RB#0 10M	Right Side	20525	20.44	21.50	1.276	0.251	0.320
	LTE Band 5/25RB#0 10M	Top Side	20525	20.44	21.50	1.276	0.031	0.040
	LTE Band 5/25RB#0 10M	Bottom Side	20525	20.44	21.50	1.276	0.047	0.060
	LTE Band 5/25RB#0 10M	Back Side	20450	20.10	21.50	1.380	0.532	0.734
	LTE Band 5/25RB#0 10M	Back Side	20600	20.25	21.50	1.334	0.498	0.664
	LTE Band 7/1RB#49 20M	Front Side	21100	23.49	24.00	1.125	0.277	0.312
	LTE Band 7/1RB#49 20M	Back Side	21100	23.49	24.00	1.125	0.198	0.223
	LTE Band 7/1RB#49 20M	Left Side	21100	23.49	24.00	1.125	0.434	0.488
	LTE Band 7/1RB#49 20M	Right Side	21100	23.49	24.00	1.125	0.037	0.042
	LTE Band 7/1RB#49 20M	Top Side	21100	23.49	24.00	1.125	0.049	0.055
	LTE Band 7/1RB#49 20M	Bottom Side	21100	23.49	24.00	1.125	0.505	0.568
7#	LTE Band 7/1RB#49 20M	Bottom Side	20850	23.30	24.00	1.175	0.568	**0.667**
	LTE Band 7/1RB#49 20M	Bottom Side	21350	23.20	24.00	1.202	0.520	0.625

MORLAB

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 82 of 97

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR1g (W/kg)	Reported SAR1g (W/kg)
	LTE Band 7/50RB#0 10M	Front Side	21100	22.38	23.00	1.153	0.222	0.256
	LTE Band 7/50RB#0 10M	Back Side	21100	22.38	23.00	1.153	0.165	0.190
	LTE Band 7/50RB#0 10M	Left Side	21100	22.38	23.00	1.153	0.339	0.391
	LTE Band 7/50RB#0 10M	Right Side	21100	22.38	23.00	1.153	0.022	0.025
	LTE Band 7/50RB#0 10M	Top Side	21100	22.38	23.00	1.153	0.021	0.024
	LTE Band 7/50RB#0 10M	Bottom Side	21100	22.38	23.00	1.153	0.392	0.452
	LTE Band 7/50RB#0 10M	Bottom Side	20850	22.38	23.00	1.153	0.377	0.435
	LTE Band 7/50RB#0 10M	Bottom Side	21350	22.32	23.00	1.169	0.437	0.511
	LTE Band 12/1RB#25 10M	Front Side	23060	23.12	23.50	1.091	0.321	0.350
8#	LTE Band 12/1RB#25 10M	Back Side	23060	23.12	23.50	1.091	0.365	**0.398**
	LTE Band 12/1RB#25 10M	Left Side	23060	23.12	23.50	1.091	0.213	0.232
	LTE Band 12/1RB#25 10M	Right Side	23060	23.12	23.50	1.091	0.069	0.075
	LTE Band 12/1RB#25 10M	Top Side	23060	23.12	23.50	1.091	0.046	0.050
	LTE Band 12/1RB#25 10M	Bottom Side	23060	23.12	23.50	1.091	0.039	0.042
	LTE Band 12/1RB#25 10M	Back Side	23095	22.98	23.50	1.127	0.324	0.365
	LTE Band 12/1RB#25 10M	Back Side	23130	23.03	23.50	1.114	0.310	0.345
	LTE Band 12/25RB#25 10M	Front Side	23060	22.14	22.50	1.086	0.240	0.261
	LTE Band 12/25RB#25 10M	Back Side	23060	22.14	22.50	1.086	0.250	0.272
	LTE Band 12/25RB#25 10M	Left Side	23060	22.14	22.50	1.086	0.155	0.168
	LTE Band 12/25RB#25 10M	Right Side	23060	22.14	22.50	1.086	0.068	0.074
	LTE Band 12/25RB#25 10M	Top Side	23060	22.14	22.50	1.086	0.043	0.047
	LTE Band 12/25RB#25 10M	Bottom Side	23060	22.14	22.50	1.086	0.040	0.043
	LTE Band 12/25RB#25 10M	Back Side	23095	22.02	22.50	1.117	0.266	0.297
	LTE Band 12/25RB#25 10M	Back Side	23130	22.01	22.50	1.119	0.336	0.376
	LTE Band 14/1RB#25 10M	Front Side	23330	24.03	24.50	1.114	0.875	0.975
9#	LTE Band 14/1RB#25 10M	Back Side	23330	24.03	24.50	1.114	0.905	**1.008**
	LTE Band 14/1RB#25 10M	Left Side	23330	24.03	24.50	1.114	0.426	0.475
	LTE Band 14/1RB#25 10M	Right Side	23330	24.03	24.50	1.114	0.541	0.603
	LTE Band 14/1RB#25 10M	Top Side	23330	24.03	24.50	1.114	0.042	0.046
	LTE Band 14/1RB#25 10M	Bottom Side	23330	24.03	24.50	1.114	0.092	0.102
	LTE Band 14/**50RB**#0 10M	Back Side	23330	23.07	23.5	1.104	0.712	0.786

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR1g (W/kg)	Reported SAR1g (W/kg)
	LTE Band 14/25RB#0 10M	Front Side	23330	22.98	23.50	1.127	0.744	0.839
	LTE Band 14/25RB#0 10M	Back Side	23330	22.98	23.50	1.127	0.737	0.831
	LTE Band 14/25RB#0 10M	Left Side	23330	22.98	23.50	1.127	0.397	0.447
	LTE Band 14/25RB#0 10M	Right Side	23330	22.98	23.50	1.127	0.443	0.499
	LTE Band 14/25RB#0 10M	Top Side	23330	22.98	23.50	1.127	0.035	0.040
	LTE Band 14/25RB#0 10M	Bottom Side	23330	22.98	23.50	1.127	0.074	0.083
	LTE Band 25/1RB#49 20M	Front Side	26365	24.10	24.50	1.096	0.651	0.714
	LTE Band 25/1RB#49 20M	Back Side	26365	24.10	24.50	1.096	0.556	0.610
	LTE Band 25/1RB#49 20M	Left Side	26365	24.10	24.50	1.096	0.297	0.326
	LTE Band 25/1RB#49 20M	Right Side	26365	24.10	24.50	1.096	0.302	0.331
	LTE Band 25/1RB#49 20M	Top Side	26365	24.10	24.50	1.096	0.598	0.656
	LTE Band 25/1RB#49 20M	Bottom Side	26365	24.10	24.50	1.096	0.374	0.410
10#	LTE Band 25/1RB#49 20M	Front Side	26140	23.93	24.50	1.140	0.723	**0.824**
	LTE Band 25/1RB#49 20M	Front Side	26590	23.95	24.50	1.135	0.574	0.651
	LTE Band 25/50RB#0 20M	Front Side	26365	23.18	23.50	1.076	0.521	0.561
	LTE Band 25/50RB#0 20M	Back Side	26365	23.18	23.50	1.076	0.466	0.502
	LTE Band 25/50RB#0 20M	Left Side	26365	23.18	23.50	1.076	0.257	0.277
	LTE Band 25/50RB#0 20M	Right Side	26365	23.18	23.50	1.076	0.275	0.296
	LTE Band 25/50RB#0 20M	Top Side	26365	23.18	23.50	1.076	0.501	0.539
	LTE Band 25/50RB#0 20M	Bottom Side	26365	23.18	23.50	1.076	0.291	0.313
	LTE Band 25/50RB#0 20M	Front Side	26140	23.01	23.50	1.119	0.702	0.786
	LTE Band 25/50RB#0 20M	Front Side	26590	23.16	23.50	1.081	0.549	0.594
	LTE Band 26/1RB#74 15M	Front Side	26965	24.44	25.00	1.138	0.284	0.323
	LTE Band 26/1RB#74 15M	Back Side	26965	24.44	25.00	1.138	0.407	0.463
	LTE Band 26/1RB#74 15M	Left Side	26965	24.44	25.00	1.138	0.072	0.082
	LTE Band 26/1RB#74 15M	Right Side	26965	24.44	25.00	1.138	0.142	0.162
	LTE Band 26/1RB#74 15M	Top Side	26965	24.44	25.00	1.138	0.065	0.074
	LTE Band 26/1RB#74 15M	Bottom Side	26965	24.44	25.00	1.138	0.193	0.220
11#	LTE Band 26/1RB#74 15M	Back Side	26765	24.10	25.00	1.230	0.389	**0.479**
	LTE Band 26/1RB#74 15M	Back Side	26865	24.21	25.00	1.199	0.382	0.458

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR1g (W/kg)	Reported SAR1g (W/kg)
	LTE Band 26/36RB#0 15M	Front Side	26965	23.41	24.00	1.146	0.351	0.402
	LTE Band 26/36RB#0 15M	Back Side	26965	23.41	24.00	1.146	0.359	0.411
	LTE Band 26/36RB#0 15M	Left Side	26965	23.41	24.00	1.146	0.050	0.058
	LTE Band 26/36RB#0 15M	Right Side	26965	23.41	24.00	1.146	0.097	0.111
	LTE Band 26/36RB#0 15M	Top Side	26965	23.41	24.00	1.146	0.065	0.074
	LTE Band 26/36RB#0 15M	Bottom Side	26965	23.41	24.00	1.146	0.196	0.225
	LTE Band 26/36RB#0 15M	Back Side	26765	23.23	24.00	1.194	0.394	0.470
	LTE Band 26/36RB#0 15M	Back Side	26865	23.31	24.00	1.172	0.382	0.448
	LTE Band 30/1RB#25 10M	Front Side	27710	19.19	19.50	1.074	0.549	0.590
	LTE Band 30/1RB#25 10M	Back Side	27710	19.19	19.50	1.074	0.271	0.291
	LTE Band 30/1RB#25 10M	Left Side	27710	19.19	19.50	1.074	0.193	0.207
	LTE Band 30/1RB#25 10M	Right Side	27710	19.19	19.50	1.074	0.047	0.050
	LTE Band 30/1RB#25 10M	Top Side	27710	19.19	19.50	1.074	0.030	0.033
12#	LTE Band 30/1RB#25 10M	Bottom Side	27710	19.19	19.50	1.074	1.100	**1.181**
	LTE Band 30/**50RB**#25 10M	Bottom Side	27710	17.96	18.50	1.132	0.820	0.929
	LTE Band 30/25RB#12 10M	Front Side	27710	18.06	18.50	1.107	0.407	0.450
	LTE Band 30/25RB#12 10M	Back Side	27710	18.06	18.50	1.107	0.220	0.243
	LTE Band 30/25RB#12 10M	Left Side	27710	18.06	18.50	1.107	0.159	0.176
	LTE Band 30/25RB#12 10M	Right Side	27710	18.06	18.50	1.107	0.038	0.042
	LTE Band 30/25RB#12 10M	Top Side	27710	18.06	18.50	1.107	0.026	0.029
	LTE Band 30/25RB#12 10M	Bottom Side	27710	18.06	18.50	1.107	0.557	0.616
	LTE Band 41/1RB#49 20M	Front Side	41490	23.72	24.50	1.197	0.158	0.189
	LTE Band 41/1RB#49 20M	Back Side	41490	23.72	24.50	1.197	0.123	0.147
	LTE Band 41/1RB#49 20M	Left Side	41490	23.72	24.50	1.197	0.128	0.153
	LTE Band 41/1RB#49 20M	Right Side	41490	23.72	24.50	1.197	0.040	0.048
	LTE Band 41/1RB#49 20M	Top Side	41490	23.72	24.50	1.197	0.016	0.019
	LTE Band 41/1RB#49 20M	Bottom Side	41490	23.72	24.50	1.197	0.190	0.227
13#	LTE Band 41/1RB#49 20M	Bottom Side	39750	23.34	24.50	1.306	0.190	**0.248**
	LTE Band 41/1RB#49 20M	Bottom Side	40185	23.53	24.50	1.250	0.196	0.245
	LTE Band 41/1RB#49 20M	Bottom Side	40620	23.50	24.50	1.259	0.196	0.247
	LTE Band 41/1RB#49 20M	Bottom Side	41055	23.45	24.50	1.274	0.188	0.239

MORLAB
SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525
Http://www.morlab.cn   E-mail: service@morlab.cn

Page 85 of 97

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR1g (W/kg)	Reported SAR1g (W/kg)
	LTE Band 41/50RB#0 20M	Front Side	41490	22.74	23.50	1.191	0.129	0.154
	LTE Band 41/50RB#0 20M	Back Side	41490	22.74	23.50	1.191	0.101	0.120
	LTE Band 41/50RB#0 20M	Left Side	41490	22.74	23.50	1.191	0.100	0.119
	LTE Band 41/50RB#0 20M	Right Side	41490	22.74	23.50	1.191	0.022	0.026
	LTE Band 41/50RB#0 20M	Top Side	41490	22.74	23.50	1.191	0.010	0.012
	LTE Band 41/50RB#0 20M	Bottom Side	41490	22.74	23.50	1.191	0.139	0.166
	LTE Band 41/50RB#0 20M	Bottom Side	39750	22.40	23.50	1.288	0.153	0.197
	LTE Band 41/50RB#0 20M	Bottom Side	40185	22.57	23.50	1.239	0.155	0.192
	LTE Band 41/50RB#0 20M	Bottom Side	40620	22.42	23.50	1.282	0.154	0.197
	LTE Band 41/50RB#0 20M	Bottom Side	41055	22.38	23.50	1.294	0.143	0.185
	LTE Band 66/1RB#0 20M	Front Side	132322	21.50	22.50	1.259	0.679	0.855
	LTE Band 66/1RB#0 20M	Back Side	132322	21.50	22.50	1.259	0.942	1.186
	LTE Band 66/1RB#0 20M	Left Side	132322	21.50	22.50	1.259	0.271	0.341
	LTE Band 66/1RB#0 20M	Right Side	132322	21.50	22.50	1.259	0.139	0.175
	LTE Band 66/1RB#0 20M	Top Side	132322	21.50	22.50	1.259	0.355	0.447
	LTE Band 66/1RB#0 20M	Bottom Side	132322	21.50	22.50	1.259	0.397	0.500
	LTE Band 66/1RB#0 20M	Front Side	132072	21.45	22.50	1.274	0.446	0.568
	LTE Band 66/1RB#0 20M	Front Side	132572	21.44	22.50	1.276	0.609	0.777
14#	LTE Band 66/1RB#0 20M	Back Side	132072	21.45	22.50	1.274	0.932	**1.187**
	LTE Band 66/1RB#0 20M	Back Side	132572	21.44	22.50	1.276	0.786	1.003
	LTE Band 66/**100RB**#0 20M	Back Side	132322	20.45	21.50	1.274	0.503	0.641
	LTE Band 66/50RB#0 20M	Front Side	132322	20.71	21.50	1.199	0.497	0.596
	LTE Band 66/50RB#0 20M	Back Side	132322	20.71	21.50	1.199	0.640	0.768
	LTE Band 66/50RB#0 20M	Left Side	132322	20.71	21.50	1.199	0.212	0.254
	LTE Band 66/50RB#0 20M	Right Side	132322	20.71	21.50	1.199	0.107	0.128
	LTE Band 66/50RB#0 20M	Top Side	132322	20.71	21.50	1.199	0.266	0.319
	LTE Band 66/50RB#0 20M	Bottom Side	132322	20.71	21.50	1.199	0.314	0.377
	LTE Band 66/50RB#0 20M	Back Side	132072	20.47	21.50	1.268	0.589	0.747
	LTE Band 66/50RB#0 20M	Back Side	132572	20.47	21.50	1.268	0.611	0.775

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR1g (W/kg)	Reported SAR1g (W/kg)
	LTE Band 71/1RB#0 20M	Front Side	133222	22.77	23.50	1.183	0.403	0.477
	LTE Band 71/1RB#0 20M	Back Side	133222	22.77	23.50	1.183	0.423	0.500
	LTE Band 71/1RB#0 20M	Left Side	133222	22.77	23.50	1.183	0.201	0.238
	LTE Band 71/1RB#0 20M	Right Side	133222	22.77	23.50	1.183	0.192	0.227
	LTE Band 71/1RB#0 20M	Top Side	133222	22.77	23.50	1.183	0.020	0.023
	LTE Band 71/1RB#0 20M	Bottom Side	133222	22.77	23.50	1.183	0.029	0.035
	LTE Band 71/1RB#0 20M	Back Side	133322	22.63	23.50	1.222	0.436	0.533
15#	LTE Band 71/1RB#0 20M	Back Side	133372	22.56	23.50	1.242	0.521	**0.647**
	LTE Band 71/50RB#0 20M	Front Side	133222	22.10	22.50	1.096	0.381	0.418
	LTE Band 71/50RB#0 20M	Back Side	133222	22.10	22.50	1.096	0.386	0.423
	LTE Band 71/50RB#0 20M	Left Side	133222	22.10	22.50	1.096	0.170	0.186
	LTE Band 71/50RB#0 20M	Right Side	133222	22.10	22.50	1.096	0.158	0.173
	LTE Band 71/50RB#0 20M	Top Side	133222	22.10	22.50	1.096	0.017	0.019
	LTE Band 71/50RB#0 20M	Bottom Side	133222	22.10	22.50	1.096	0.025	0.028
	LTE Band 71/50RB#0 20M	Back Side	133322	21.96	22.50	1.132	0.422	0.478
	LTE Band 71/50RB#0 20M	Back Side	133372	21.89	22.50	1.151	0.424	0.488

➤ **WLAN Body SAR**

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR1g (W/kg)	Reported SAR1g (W/kg)
	WLAN2.4GHz/802.11b	Front Side	11	13.86	14.00	1.033	0.108	0.112
	WLAN2.4GHz/802.11b	Back Side	11	13.86	14.00	1.033	0.156	0.161
	WLAN2.4GHz/802.11b	Left Side	11	13.86	14.00	1.033	0.025	0.026
	WLAN2.4GHz/802.11b	Right Side	11	13.86	14.00	1.033	0.071	0.073
	WLAN2.4GHz/802.11b	Top Side	11	13.86	14.00	1.033	0.031	0.032
	WLAN2.4GHz/802.11b	Bottom Side	11	13.86	14.00	1.033	0.018	0.019
16#	WLAN2.4GHz/802.11b	Back Side	1	13.68	14.00	1.076	0.158	**0.170**
	WLAN2.4GHz/802.11b	Back Side	6	13.85	14.00	1.035	0.135	0.140

MORLAB

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 87 of 97

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR1g (W/kg)	Reported SAR1g (W/kg)
	WLAN5.2GHz/802.11n-20	Front Side	48	12.71	13.00	1.069	0.194	0.218
	WLAN5.2GHz/802.11n-20	Back Side	48	12.71	13.00	1.069	0.207	0.233
	WLAN5.2GHz/802.11n-20	Left Side	48	12.71	13.00	1.069	0.100	0.112
	WLAN5.2GHz/802.11n-20	Right Side	48	12.71	13.00	1.069	0.625	0.703
	WLAN5.2GHz/802.11n-20	Top Side	48	12.71	13.00	1.069	0.095	0.107
	WLAN5.2GHz/802.11n-20	Bottom Side	48	12.71	13.00	1.069	0.049	0.055
	WLAN5.2GHz/802.11n-20	Right Side	36	12.63	13.00	1.089	0.763	0.874
17#	WLAN5.2GHz/802.11n-20	Right Side	40	12.54	13.00	1.112	0.756	**0.884**
	WLAN5.8GHz/802.11n-20	Front Side	149	12.58	13.00	1.102	0.250	0.290
	WLAN5.8GHz/802.11n-20	Back Side	149	12.58	13.00	1.102	0.267	0.309
	WLAN5.8GHz/802.11n-20	Left Side	149	12.58	13.00	1.102	0.136	0.158
	WLAN5.8GHz/802.11n-20	Right Side	149	12.58	13.00	1.102	0.662	0.767
	WLAN5.8GHz/802.11n-20	Top Side	149	12.58	13.00	1.102	0.149	0.173
	WLAN5.8GHz/802.11n-20	Bottom Side	149	12.58	13.00	1.102	0.103	0.119
	WLAN5.8GHz/802.11n-20	Back Side	157	12.45	12.50	1.012	0.252	0.268
18#	WLAN5.8GHz/802.11n-20	Back Side	165	12.33	12.50	1.040	0.289	**0.316**

Note:

The WLAN Reported 1g SAR (W/kg) has been calculated together with the duty cycle scaling factor 1.006.

16.3. 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.

➢ **Repeated SAR**

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR$_{1g}$ (W/kg)	Rep. SAR$_{1g}$ (W/kg)
OR	WCDMA IV/RMC	Back Side	1513	21.87	22.50	1.156	0.868	1.004
	WCDMA IV/RMC	Back Side	1513	21.87	22.50	1.156	0.855	0.988
OR	WCDMA V/RMC	Back Side	4132	21.69	22.50	1.205	0.863	1.040
	WCDMA V/RMC	Back Side	4132	21.69	22.50	1.205	0.847	1.021
OR	LTE Band 2/1RB#0 20M	Back Side	18900	23.33	23.50	1.040	0.925	0.962
	LTE Band 2/1RB#0 20M	Back Side	18900	23.33	23.50	1.040	0.918	0.955
OR	LTE Band 14/1RB#25 10M	Back Side	23330	24.03	24.50	1.114	0.905	1.008
	LTE Band 14/1RB#25 10M	Back Side	23330	24.03	24.50	1.114	0.888	0.989
OR	LTE Band 30/1RB#25 10M	Bottom Side	27710	19.19	19.50	1.074	1.100	1.181
	LTE Band 30/1RB#25 10M	Bottom Side	27710	19.19	19.50	1.074	1.02	1.095
OR	LTE Band 66/1RB#0 20M	Back Side	132072	21.45	22.50	1.274	0.932	1.187
	LTE Band 66/1RB#0 20M	Back Side	132072	21.45	22.50	1.274	0.913	1.163

MORLAB

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 89 of 97

17. Simultaneous Transmission Evaluation

➢ **Simultaneous Evaluation:**

No.	Simultaneous Transmission Consideration	Body
1	WCDMA/LTE + WLAN 2.4GHz	Yes
2	WCDMA/LTE + WLAN 5GHz	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.

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: $(SAR1 + SAR2) \wedge 1.5/Ri ≤ 0.04$,

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

MORLAB SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 90 of 97

> **Body Simultaneous Transmission for WWAN+2.4GHz/5GHzWLAN**

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	1.142	0.112	0.290	1.254	1.432
		Back Side	1.021	0.170	0.316	1.191	1.337
		Left side	0.427	0.026	0.158	0.453	0.585
		Right side	0.336	0.073	0.884	0.409	1.220
		Top side	0.137	0.032	0.173	0.169	0.310
		Bottom side	0.460	0.019	0.119	0.479	0.579
	WCDMA Band IV	Front Side	0.808	0.112	0.290	0.920	1.098
		Back Side	1.004	0.170	0.316	1.174	1.320
		Left side	0.261	0.026	0.158	0.287	0.419
		Right side	0.133	0.073	0.884	0.206	1.017
		Top side	0.574	0.032	0.173	0.606	0.747
		Bottom side	0.397	0.019	0.119	0.416	0.516
	WCDMA Band V	Front Side	0.976	0.112	0.290	1.088	1.266
		Back Side	1.040	0.170	0.316	1.210	1.356
		Left side	0.335	0.026	0.158	0.361	0.493
		Right side	0.144	0.073	0.884	0.217	1.028
		Top side	0.054	0.032	0.173	0.086	0.227
		Bottom side	0.088	0.019	0.119	0.107	0.207
LTE	LTE Band 2	Front Side	0.912	0.112	0.290	1.024	1.202
		Back Side	0.962	0.170	0.316	1.132	1.278
		Left side	0.264	0.026	0.158	0.290	0.422
		Right side	0.192	0.073	0.884	0.265	1.076
		Top side	0.114	0.032	0.173	0.146	0.287
		Bottom side	0.276	0.019	0.119	0.295	0.395
	LTE Band 4	Front Side	0.675	0.112	0.290	0.787	0.965
		Back Side	0.885	0.170	0.316	1.055	1.201
		Left side	0.269	0.026	0.158	0.295	0.427
		Right side	0.141	0.073	0.884	0.214	1.025
		Top side	0.105	0.032	0.173	0.137	0.278
		Bottom side	0.231	0.019	0.119	0.250	0.350

MORLAB

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 91 of 97

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)
LTE	LTE Band 5	Front Side	0.747	0.112	0.290	0.859	1.037
		Back Side	1.081	0.170	0.316	1.251	1.397
		Left side	0.239	0.026	0.158	0.265	0.397
		Right side	0.393	0.073	0.884	0.466	1.277
		Top side	0.054	0.032	0.173	0.086	0.227
		Bottom side	0.072	0.019	0.119	0.091	0.191
	LTE Band 7	Front Side	0.312	0.112	0.290	0.424	0.602
		Back Side	0.223	0.170	0.316	0.393	0.539
		Left side	0.488	0.026	0.158	0.514	0.646
		Right side	0.042	0.073	0.884	0.115	0.926
		Top side	0.055	0.032	0.173	0.087	0.228
		Bottom side	0.667	0.019	0.119	0.686	0.786
	LTE Band 12	Front Side	0.350	0.112	0.290	0.462	0.640
		Back Side	0.398	0.170	0.316	0.568	0.714
		Left side	0.232	0.026	0.158	0.258	0.390
		Right side	0.075	0.073	0.884	0.148	0.959
		Top side	0.050	0.032	0.173	0.082	0.223
		Bottom side	0.043	0.019	0.119	0.062	0.162
	LTE Band 14	Front Side	0.975	0.112	0.290	1.087	1.265
		Back Side	1.008	0.170	0.316	1.178	1.324
		Left side	0.475	0.026	0.158	0.501	0.633
		Right side	0.603	0.073	0.884	0.676	1.487
		Top side	0.046	0.032	0.173	0.078	0.219
		Bottom side	0.102	0.019	0.119	0.121	0.221
	LTE Band 25	Front Side	0.824	0.112	0.290	0.936	1.114
		Back Side	0.610	0.170	0.316	0.780	0.926
		Left side	0.326	0.026	0.158	0.352	0.484
		Right side	0.331	0.073	0.884	0.404	1.215
		Top side	0.656	0.032	0.173	0.688	0.829
		Bottom side	0.410	0.019	0.119	0.429	0.529

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)
LTE	LTE Band 26	Front Side	0.402	0.112	0.290	0.514	0.692
		Back Side	0.479	0.170	0.316	0.649	0.795
		Left side	0.082	0.026	0.158	0.108	0.240
		Right side	0.162	0.073	0.884	0.235	1.046
		Top side	0.074	0.032	0.173	0.106	0.247
		Bottom side	0.225	0.019	0.119	0.244	0.344
	LTE Band 30	Front Side	0.590	0.112	0.290	0.702	0.880
		Back Side	0.291	0.170	0.316	0.461	0.607
		Left side	0.207	0.026	0.158	0.233	0.365
		Right side	0.050	0.073	0.884	0.123	0.934
		Top side	0.033	0.032	0.173	0.065	0.206
		Bottom side	1.181	0.019	0.119	1.200	1.300
	LTE Band 41	Front Side	0.189	0.112	0.290	0.301	0.479
		Back Side	0.147	0.170	0.316	0.317	0.463
		Left side	0.153	0.026	0.158	0.179	0.311
		Right side	0.048	0.073	0.884	0.121	0.932
		Top side	0.019	0.032	0.173	0.051	0.192
		Bottom side	0.248	0.019	0.119	0.267	0.367
	LTE Band 66	Front Side	0.855	0.112	0.290	0.967	1.145
		Back Side	1.187	0.170	0.316	1.357	1.503
		Left side	0.341	0.026	0.158	0.367	0.499
		Right side	0.175	0.073	0.884	0.248	1.059
		Top side	0.447	0.032	0.173	0.479	0.620
		Bottom side	0.500	0.019	0.119	0.519	0.619
	LTE Band 71	Front Side	0.477	0.112	0.290	0.589	0.767
		Back Side	0.647	0.170	0.316	0.817	0.963
		Left side	0.238	0.026	0.158	0.264	0.396
		Right side	0.227	0.073	0.884	0.300	1.111
		Top side	0.023	0.032	0.173	0.055	0.196
		Bottom side	0.035	0.019	0.119	0.054	0.154

18. 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

MORLAB
SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 94 of 97

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%

MORLAB

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

Http://www.morlab.cn   E-mail: service@morlab.cn

Page 95 of 97

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

Laboratory Name:	Shenzhen Morlab Communications Technology Co., Ltd.Morlab Laboratory
Laboratory Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
Telephone:	+86 755 36698555
Facsimile:	+86 755 36698525

2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

3. Facilities and Accreditations

All measurement facilities used to collect the measurement data are located at FL.3, Building A, FeiYang Science Park, Block 67, BaoAn District, Shenzhen, 518101 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.10-2013 and CISPR Publication 22; the FCC designation number is CN1192, the test firm registration number is 226174.

Note：

The main report is end here and the other Annex (B,C,D,E) will be submitted separately.

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

MORLAB SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555 Fax: 86-755-36698525

Http://www.morlab.cn E-mail: service@morlab.cn

Page 97 of 97