SAR TEST REPORT

Reference No.	:	WTS20S04023741W003
FCC ID	:	2AWB8JADEUD100
Applicant	:	Jade Wireless, Inc.
Address	:	1752 Aspen Village Way, West Covina CA91791, USA
Manufacturer	:	Jade Wireless, Inc.
Address	:	1752 Aspen Village Way, West Covina CA91791, USA
Product	:	JADESTICK
Model(s).....	:	UD-100
Brand Name	:	JADEStcik
Standards	:	FCC 47 CFR Part2(2.1093) ANSI/IEEE C95.1-2006 IEEE 1528-2013 & Published RF Exposure KDB Procedures
Date of Receipt sample	:	2020-04-30
Date of Test	:	2020-05-01 to 2020-05-29
Date of Issue	:	2020-06-26
Test Result	:	Pass

Remarks:
The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

Prepared By:
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Approved by:

Phil Zhong / Manager

2 Contents

3 Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTS20S04023741W003	2020-04-30	2020-05-01 to 2020-05-29	2020-06-26	original	-	Valid

4 General Information

4.1 General Description of E.U.T.

Product:	JADESTICK
Model(s):	UD-100
Model Description:	N/A
WCDMA Band(s):	FDD Band II/IV/V
LTE Band(s):	FDD Band 2/4/5/12/13/14/66/71
Hardware Version:	1.3.0
Software Version:	1.7.2

4.2 Details of E.U.T.

Operation Frequency:	WCDMA Band II: 1850~1910MHz WCDMA Band V: 824~849MHz WCDMA Band IV:1710~1755MHz LTE Band 2: 1850~1910MHz LTE Band 4: 1710~1755MHz LTE Band 5: 824~849MHz LTE Band 12: 699~716MHz LTE Band 13: 777~787MHz LTE Band 14: 788~798MHz LTE Band 66: 1710~1780MHz LTE Band 71: 663~698MHz
Max. RF output power:	WCDMA Band II: 23.19dBm WCDMA Band V: 23.21dBm WCDMA Band IV: 23.46dBm LTE Band 2: 23.85dBm LTE Band 4: 23.72dBm LTE Band 5: 24.05dBm LTE Band 12: 23.74dBm LTE Band 13: 23.85dBm LTE Band 14: 23.88dBm LTE Band 66: 23.82dBm LTE Band 71: 23.47dBm
Max.SAR:	1.49 W/Kg 1g Hotspot
Type of Modulation:	WCDMA: BPSK LTE: QPSK, 16QAM
Antenna installation	WCDMA/LTE: Dipole
Antenna Gain:	WCDMA Band II: 4.85dBi WCDMA Band V: 4.05dBi WCDMA Band IV: 4.48dBi

	LTE Band 2: 4.85dBi LTE Band 4: 4.48dBi LTE Band 5: 4.05dBi LTE Band 12: 4.08dBi LTE Band 13: 3.15dBi LTE Band 14: 3.15dBi LTE Band 66: 4.48dBi LTE Band 71: 4.08dBi
Ratings:	DC 5V by USB port

4.3 Test Facility

The test facility has a test site registered with the following organizations:

ISED CAB identifier: CN0013. Test Firm Registration No.: 7760A.

Waltek Services(Shenzhen) Co., Ltd. Has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration number 7760A, October 15, 2016.

FCC Designation No.: CN1201. Test Firm Registration No.: 523476.

Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory `has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration number 523476, September 10, 2019.

5 Equipment Used during Test

5.1 Equipment List

Name of Equipment	Manufacturer	Type/Model	Serial Number	Calibration Date	Calibration Due
6 AXIS ROBOT	KUKA	KR6 R900 SIXX	502635	N/A	N/A
SATIMO Test Software	MVG	OPENSAR	OPENSAR V_4_02_27	N/A	N/A
PHANTOM TABLE	MVG	N/A	SAR_1215_01	N/A	N/A
SAM PHANTOM	MVG	SAM118	SN 11/15 SAM118	N/A	N/A
MultiMeter	Keithley	MiltiMeter 2000	4073942	2020-02-27	2021-02-26
Data Acquisition Electronics	MVG	DAE4	915	2020-02-27	2021-02-26
S-Parameter Network Analyzer	Agilent	8753E	JP38160684	2019-09-17	2020-09-16
Universal Radio Communication Tester	ROHDE&SCHWARZ	CMU200	114798	2019-09-17	2020-09-16
Wideband Radio Communication Tester	ROHDE&SCHWARZ	CMW500	/	2019-09-17	2020-09-16
E-Field Probe	MVG	SSE5	SN 07/15 EP247	2019-08-20	2020-08-19
DIPOLE 750	MVG	SID750	SN 09/15 DIP 0G750-357	2018-02-28	2021-02-27
DIPOLE 835	MVG	SID835	SN 09/15 DIP 0G835-358	2018-02-28	2021-02-27
DIPOLE 1800	MVG	SID1800	SN 09/15 DIP 1G800-360	2018-02-28	2021-02-27
DIPOLE 1900	MVG	SID1900	SN 09/15 DIP 1G900-361	2018-02-28	2021-02-27
Limesar Dielectric Probe	MVG	SCLMP	SN 11/15 OCPG 69	2020-02-28	2021-02-27
Power Amplifier	BONN	BLWA 0830 -160/100/40D	128740	2019-09-17	2020-09-16
Signal Generator	R&S	SMB100A	105942	2019-09-17	2020-09-16
Power Meter	R&S	NRP2	102031	2019-09-17	2020-09-16
Power Meter	R&S	NRVD	102284	2019-09-17	2020-09-16
USB Wideband Power Sensor	Malaysia Keysight	U2021XA	MY54340009	2020-04-19	2021-04-18
USB Wideband Power Sensor	Malaysia Keysight	U2021XA	MY54340010	2020-04-19	2021-04-18

5.2 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

6 SAR Introduction

6.1 Introduction

This measurement report shows compliance of the EUT with ANSI/IEEE C95.1-2006 and FCC 47 CFR Part2 (2.1093).The test procedures, as described in IEEE 1528-2013 Standard for IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques(300MHz~6GHz) and Published RF Exposure KDB Procedures

6.2 SAR Definition

- SAR : Specific Absorption Rate
- The SAR characterize the absorption of energy by a quantity of tissue
- This is related to a increase of the temperature of these tissues during a time period.

$$DAS = \frac{d}{dt}\left(\frac{dW}{dm}\right) = \frac{d}{dt}\left(\frac{dW}{\rho dV}\right)$$

$$DAS = \frac{\sigma E^2}{\rho}$$

$$DAS = c_h \left.\frac{dT}{dt}\right|_{t=0}$$

SAR definition

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

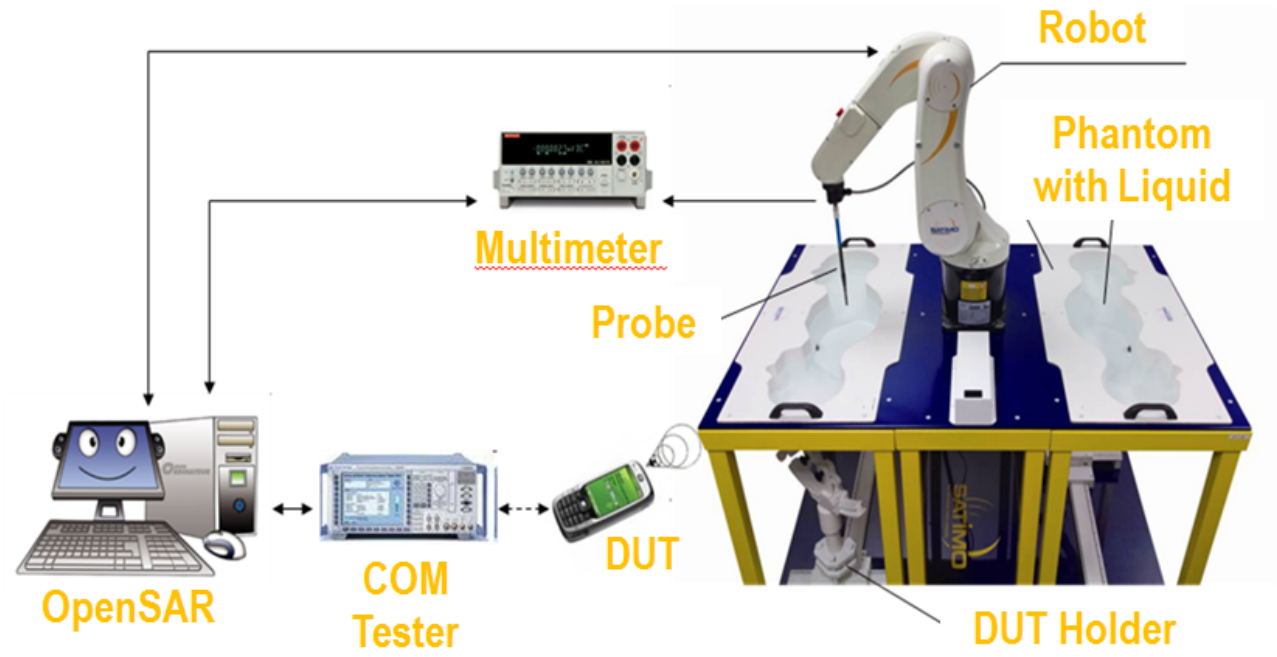
- SAR : Specific Absorption Rate
  - σ : Liquid conductivity
    - $\varepsilon_r = \varepsilon' - j\varepsilon''$ (complex permittivity of liquid)
    - $\sigma = \frac{\varepsilon'' \omega}{\varepsilon_0}$
  - ρ: Liquid density
    - ρ = 1000 g/L = 1000Kg/m³

where:

σ = conductivity of the tissue (S/m)
ρ = mass density of the tissue (kg/m3)
E = rms electric field strength (V/m)

7 SAR Measurement Setup

SAR bench sub-systems



Scanning System (robot)

- It must be able to scan all the volume of the phantom to evaluate the tridimensional distribution of SAR.
- Must be able to set the probe orthogonal of the surface of the phantom (±30°).
- Detects stresses on the probe and stop itself if necessary to keep the integrity of the probe.

SAM Phantom (Specific Anthropomorphic Mannequin)

- The probe scanning of the E-Field is done in the 2 half of the normalized head.
- The normalized shape of the phantom corresponds to the dimensions of 90% of an adult head size.
- The materials for the phantom should not affect the radiation of the device under test (DUT)
  - Permittivity < 5
- The head is filled with tissue simulating liquid.
- The hand holding the DUT does not have to be modeled.

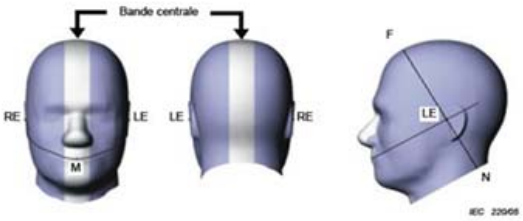
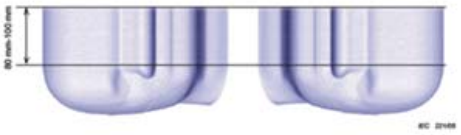
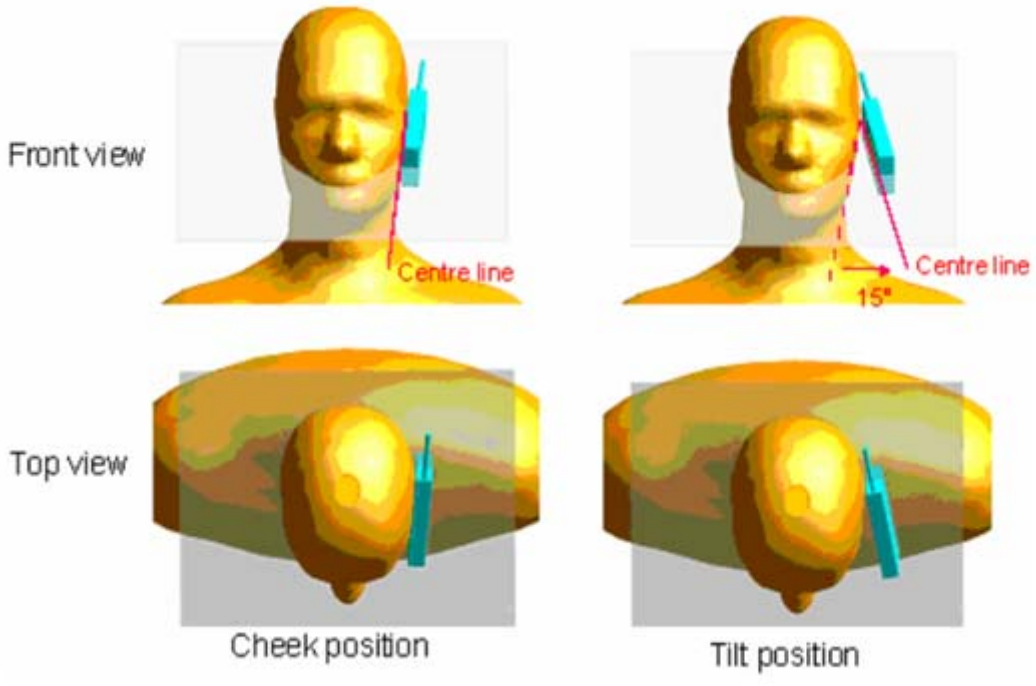


Illustration du fantôme donnant les points de référence des oreilles, RE et LE, le point de référence de la bouche, M, la ligne de référence N-F et la bande centrale



Bi-section sagittale du fantôme avec périmètre étendu (montrée sur le côté comme lors des essais de DAS de l'appareil)



The OPENSAR system for performing compliance tests consist of the following items:

1. A standard high precision 6-axis robot (KUKA) with controller and software.
2. KUKA Control Panel (KCP).
3. A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
4. The functions of the PC plug-in card are to perform the time critical task such as signal filtering, surveillance of the robot operation fast movement interrupts.
5. A computer operating Windows 7.
6. OPENSAR software.
7. Remote control with teaches pendant and additional circuitry for robot safety such as warning lamps, etc.
8. The SAM phantom enabling testing left-hand right-hand and body usage.
9. The Position device for handheld EUT.
10. Tissue simulating liquid mixed according to the given recipes (see Application Note).
11. System validation dipoles to validate the proper functioning of the system.

Data Evaluation

The OPENSAR software automatically executes the following procedure to calculate the field units from the microvolt readings at the probe connector. The parameters used in the valuation are stored in the configuration modules of the software:

Probe Parameters	· Sensitivity	$Norm_i$
	· Conversion factor	ConvFi
	· Diode compression point Dcpi	
Device Parameter	· Frequency	f
	· Crest factor	cf
Media Parametrs	· Conductivity	σ
	· Density	ρ

These parameters must be set correctly in the software. They can either be found in the component documents or be imported into the software from the configuration files issued for the OPENSAR components.

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

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

Where V_i = *Compensated signal of channel i (i = x, y, z)*
U_i = *Input signal of channel i (i = x, y, z)*
cf = *Crest factor of exciting field (DASY parameter)*
dcp_i = *Diode compression point (DASY parameter)*

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

E-field probes: $$E_i = \sqrt{\frac{V_i}{Norm_i \cdot ConvF}}$$

H-field probes: $$H_i = \sqrt{Vi} \cdot \frac{a_{i10} + a_{i11} f + a_{i12} f^2}{f}$$

Where V_i = *Compensated signal of channel i (i = x, y, z)*
$Norm_i$ = *Sensor sensitivity of channel i (i = x, y, z)*
μV/(V/m)2 for E0field 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.

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

where 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/cm3

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid.

The power flow density is calculated assuming the excitation field as a free space field.

$$P_{pwe} = \frac{E_{tot}^2}{3770} \quad or \quad P_{pwe} = H_{tot}^2 \cdot 37.7$$

where P_{pwe} = Equivalent power density of a plane wave in mW/cm2
E_{tot} = total electric field strength in V/m
H_{tot} = total magnetic field strength in A/m

SAR Evaluation – Peak Spatial - Average

The procedure for assessing the peak spatial-average SAR value consists of the following steps

- **Power Reference Measurement**

  The reference and drift jobs are useful jobs for monitoring the power drift of the device under test in the batch process. Both jobs measure the field at a specified reference position, at a selectable distance from the phantom surface. The reference position can be either the selected section's grid reference point or a user point in this section. The reference job projects the selected point onto the phantom surface, orients the probe perpendicularly to the surface, and approaches the surface
  using the selected detection method.

- **Area Scan**

  The area scan is used as a fast scan in two dimensions to find the area of high field values, before doing a finer measurement around the hot spot. The sophisticated interpolation routines implemented in OPENSAR software can find the maximum locations even in relatively coarse grids. The scan area is defined by an editable grid. This grid is anchored at the grid reference point of the selected section in the phantom.

When the area scan's property sheet is brought-up, grid was at to 15 mm by 15 mm and can be edited by a user.

- **Zoom Scan**

  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. The default zoom scan measures 5 x 5 x 7 points within a cube whose base faces are centered around the maximum found in a preceding area scan job within the same procedure. If the preceding Area Scan job indicates more then one maximum, the number of Zoom Scans has to be enlarged accordingly (The default number inserted is 1).

- **Power Drift measurement**

  The drift job measures the field at the same location as the most recent reference job within the same procedure, and with the same settings. The drift measurement gives the field difference in dB from the reading conducted within the last reference measurement. Several drift measurements are possible for one reference measurement. This allows a user to monitor the power drift of the device under test within a batch process. In the properties of the Drift job, the user can specify a limit for the drift and have OPENSAR software stop the measurements if this limit is exceeded.

SAR Evaluation – Peak SAR

The procedure for spatial peak SAR evaluation has been implemented according to the IEEE1528 standard. It can be conducted for 1 g and 10 g. The OPENSAR system allows evaluations that combine measured data and robot positions, such
as:

- maximum search
- extrapolation
- boundary correction
- peak search for averaged SAR

During a maximum search, global and local maximum searches are automatically performed in 2-D after each Area Scan measurement with at least 6 measurement points. It is based on the evaluation of the local SAR gradient calculated by the Quadratic Shepard's method. The algorithm will find the global maximum and all local maxima within -2 dB of the global maxima for all SAR distributions.

Extrapolation

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. Several measurements at different distances are necessary for the extrapolation.
They are used in the Cube Scan to obtain SAR values between the lowest measurement points and the inner phantom surface. The routine uses the fourth order least square polynomial method for extrapolation. For a grid using 5x5x7 measurement points with 5mm resolution amounting to 343 measurement points, the uncertainty of the extrapolation routines is less than 1% for 1 g and 10 g cubes.

Definition of Reference Points

Ear Reference Point

Figure 6.2 shows the front, back and side views of the SAM Phantom. The point "M" is the reference point for the center of the mouth, "LE" is the left ear reference point (ERP), and "RE" is the right ERP. The ERPs are 15mm posterior to the entrance to the ear canal (EEC) along the B-M line (Back-Mouth), as shown in Figure 6.1. The plane passing through the two ear canals and M is defined as the Reference Plane. The line N-F (Neck-Front) is perpendicular to the reference plane and passing through the RE (or LE) is called the Reference Pivoting Line (see Figure 6.1). Line B-M is perpendicular to the N-F line. Both N-F and B-M lines are marked on the external phantom shell to facilitate handset positioning [5].

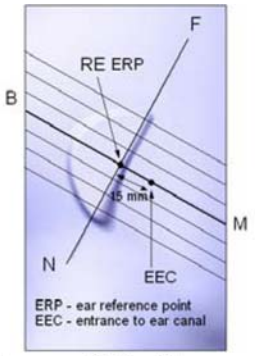


Figure 6.1 Close-up side view of ERP's

Figure 6.2 Front, back and side view of SAM

Device Reference Points

Two imaginary lines on the device need to be established: the vertical centerline and the horizontal line. The test device is placed in a normal operating position with the "test device reference point" located along the "vertical centerline" on the front of the device aligned to the "ear reference point" (See Fig. 6.3). The "test device reference point" is than located at the same level as the center of the ear reference point. The test device is positioned so that the "vertical centerline" is bisecting the front surface of the device at it's top and bottom edges, positioning the "ear reference point" on the outer surface of both the left and right head phantoms on the ear reference point [5].

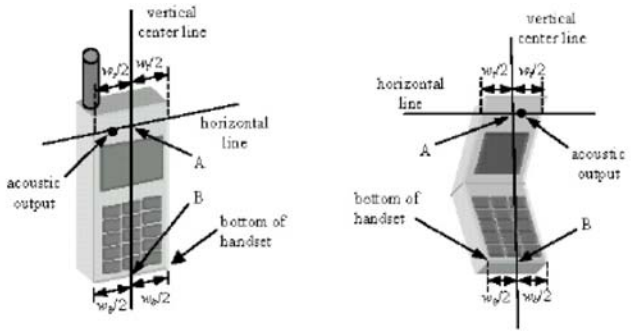


Figure 6.3 Handset Vertical Center & Horizontal Line Reference Points

Test Configuration – Positioning for Cheek / Touch

1. Position the device close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure below), such that the plane defined by the vertical center line and the horizontal line of the device is approximately parallel to the sagittal plane of the phantom

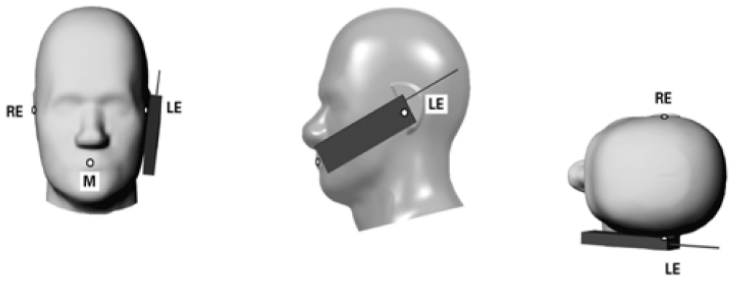


Figure 7.1 Front, Side and Top View of Cheek/Touch Position

2. Translate the device towards the phantom along the line passing through RE and LE until the device touches the ear.

3. While maintaining the device in this plane, rotate it around the LE-RE line until the vertical centerline is in the plane normal to MB-NF including the line MB (called the reference plane).
4. Rotate the device around the vertical centerline until the device (horizontal line) is symmetrical with respect to the line NF.

5. While maintaining the vertical centerline in the reference plane, keeping point A on the line passing through RE and LE and maintaining the device contact with the ear, rotate the device about the line NF until any point on the device is in contact with a phantom point below the ear (cheek). See Figure below.

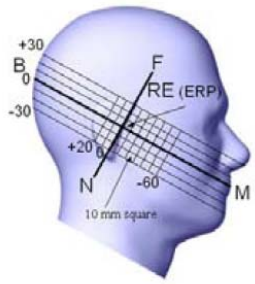


Figure 7.2 Side view w/ relevant markings

Test Configuration – Positioning for Ear / 15° Tilt

With the test device aligned in the Cheek/Touch Position":

1. While maintaining the orientation of the device, retracted the device parallel to the reference plane far enough to enable a rotation of the device by 15 degrees.

2. Rotate the device around the horizontal line by 15 degrees.

3. While maintaining the orientation of the device, move the device parallel to the reference plane until any part of the device touches the head. (In this position, point A is located on the line RE-LE). The tilted position is obtained when the contact is on the pinna. If the contact is at any location other than the pinna, the angle of the device shall be reduced. The tilted position is obtained when any part of the device is in contact with the ear as well as a second part of the device is in contact with the head (see Figure below).

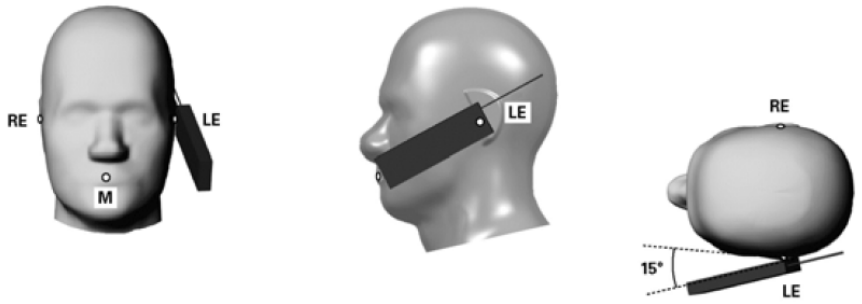
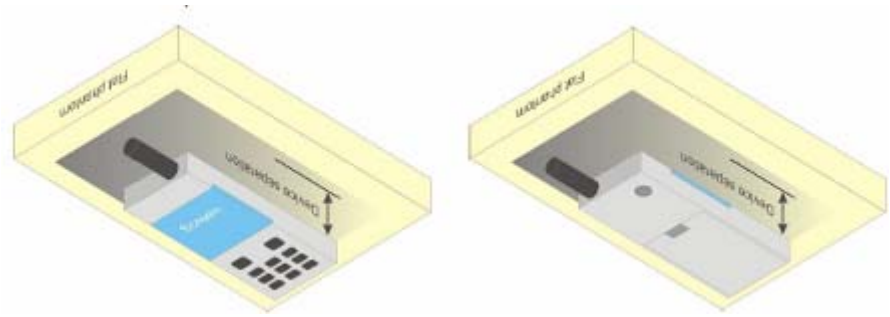


Figure 7.3 Front, Side and Top View of Ear/15˚ Tilt Position

Test Position – Body Configurations

Body Worn Position
(a) To position the device parallel to the phantom surface with either keypad up or down.
(b) To adjust the device parallel to the flat phantom.
(c) To adjust the distance between the device surface and the flat phantom to 1.0 cm or holster surface and the flat phantom to 0 cm.



8 Exposure limit

In order for users to be aware of the body-worn operating requirements for meeting RF exposure compliance, operating instructions and cautions statements are included in the user's manual.

Uncontrolled Environment

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

Controlled Environment

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

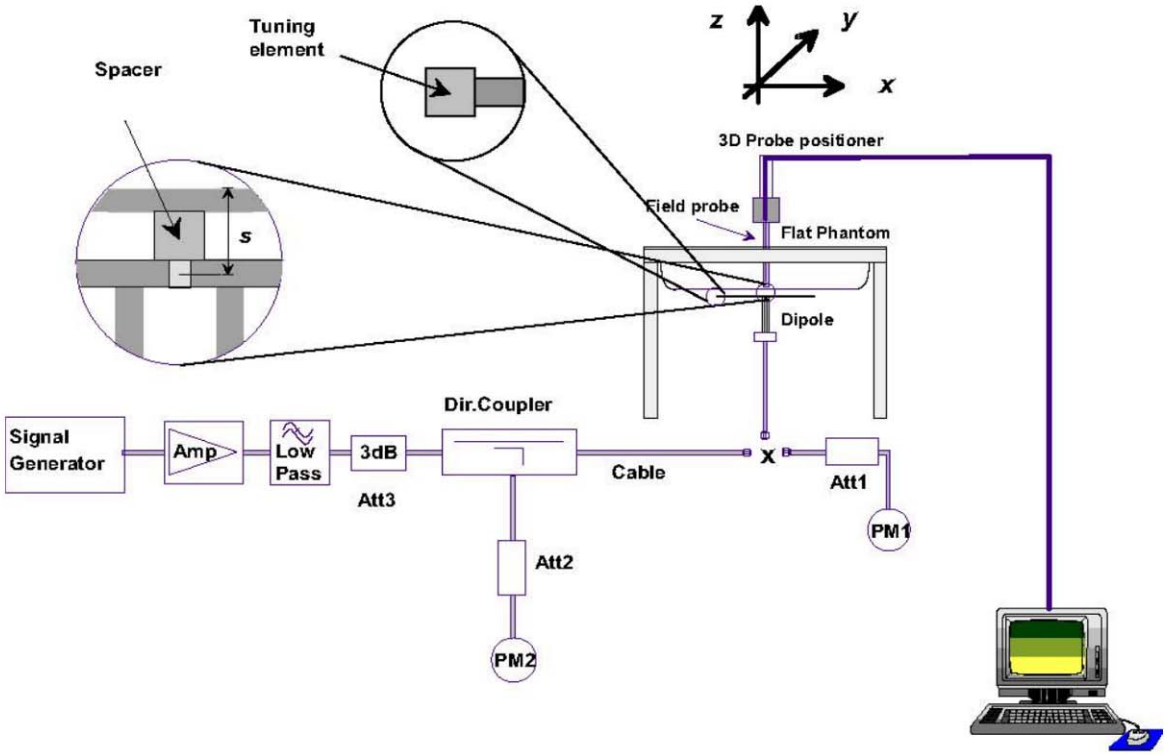
Table 8.1 Human Exposure Limits

	UNCONTROLLED ENVIRONMENT General Population (W/kg) or (mW/g)	CONTROLLED ENVIROMENT Professional Population (W/kg) or (mW/g)
SPATIAL PEAK SAR[1] Brain	1.60	8.00
SPATIAL AVERAGE SAR[2] Whole Body	0.08	0.40
SPATIAL PEAK SAR[3] Hands, Feet, Ankles, Wrists	4.00	20.00

[1] The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.
[2] The Spatial Average value of the SAR averaged over the whole body.
[3] The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

9 System and liquid validation

9.1 System validation



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.

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 that 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 equipment setup is shown below:

1. Signal Generator
2. Amplifier
3. Directional Coupler
4. Power Meter
5. Calibrated Dipole

The output power on dipole port must be calibrated to 30 dBm (1000 mW) before dipole is connected.

Numerical reference SAR values (W/kg) for reference dipole and flat phantom

Frequency (MHz)	1g SAR	10g SAR	Local SAR at surface(above feed-point)	Local SAR at surface(y = 2 cm offset from feedpoint)
300	3.02	2.04	4.40	2.10
450	4.92	3.28	7.20	3.20
750	8.49	5.55	12.6	4.59
835	9.56	6.22	14.1	4.90
900	10.9	6.99	16.4	5.40
1450	29.0	16.0	50.2	6.50
1800	38.4	20.1	69.5	6.80
1900	39.7	20.5	72.1	6.60
2000	41.1	21.1	74.6	6.50
2450	52.4	24.0	104	7.70
2600	55.3	24.6	113	8.29
3000	63.8	25.7	140	9.50

Table 1: system validation (1g)

Measurement Date	Frequency (MHz)	Liquid Type (head/body)	1W Target SAR1g (W/kg)	Measured SAR1g (W/kg)	1W Normalized SAR1g (W/kg)	Desired Tolerance (%)	Actual Tolerance (%)
2020-05-15	750	body	8.59	0.910	9.10	±10	5.9
2020-05-01	835	body	9.78	1.029	10.29	±10	5.2
2020-05-08	1800	body	38.90	3.711	37.11	±10	-4.6
2020-05-29	1900	body	40.01	3.896	38.96	±10	-2.6

Note: system check input power: 100mW.

9.2 liquid validation

The dielectric parameters were checked prior to assessment using the HP85070C dielectric probe kit. The dielectric parameters measured are reported in each correspondent section.

KDB 865664 recommended Tissue Dielectric Parameters

The head and body tissue parameters given in this below table should be used to measure the SAR of transmitters operating in 100 MHz to 6 GHz frequency range. The tissue dielectric parameters of the tissue medium at the test frequency should be within the tolerance required in this document. The dielectric parameters should be linearly interpolated between the closest pair of target frequencies to determine the applicable dielectric parameters corresponding to the device test frequency.

The head tissue dielectric parameters recommended by IEEE Std 1528-2013 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. Other head and body tissue parameters that have not been specified in 1528 are derived from tissue dielectric parameters computed from the 4-Cole-Cole equations described above and extrapolated according to the head parameters specified in 1528.

Target Frequency	Head Tissue		Body Tissue	
MHz	εr	σ (S/m)	εr	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800-2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
2600	39.0	1.96	52.5	2.16
3000	38.5	2.40	52.0	2.73
5800	35.3	5.27	48.2	6.00

Tissue Dielectric Parameters for Head and Body Phantoms

The head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 in P1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness Power drifts in a human head. Other head and body tissue parameters that have not been specified in P1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equations described in Reference [12] and extrapolated according to the head parameters specified in P1528.

Table 2: Recommended Dielectric Performance of Tissue

Recommended Dielectric Performance of Tissue												
Ingredients (% by weight)	**Frequency (MHz)**											
	750		**835**		**1800**		**1900**		**2450**		**2600**	
Tissue	**Head**	**Body**	**Head**	**Body**	**Head**	**Body**	**Head**	**Body**	**Head**	**Body**	**Head**	**Body**
Water	40.52	51.83	41.45	52.4	55.2	70.2	54.9	40.4	62.7	73.2	54.8	68.1
Salt (Nacl)	1.61	1.52	1.45	1.4	0.3	0.4	0.18	0.5	0.5	0.04	0.1	0.01
Sugar	57.67	46.45	56.0	45.0	0.0	0.0	0.0	58.0	0.0	0.0	0.0	0.0
HEC	0.1	0.1	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
Bactericide	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Triton x-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.8	0.0	0.0	0.0
DGBE	0.0	0.0	0.0	0.0	44.5	29.4	44.92	0.0	0.0	26.7	45.1	31.8
Dielectric	40.93	54.32	42.54	56.1	40.0	53.3	39.9	54.0	39.8	52.5	39.0	52.5
Conductivity	0.87	0.95	0.91	0.95	1.40	1.52	1.42	1.45	1.88	1.78	1.96	2.15

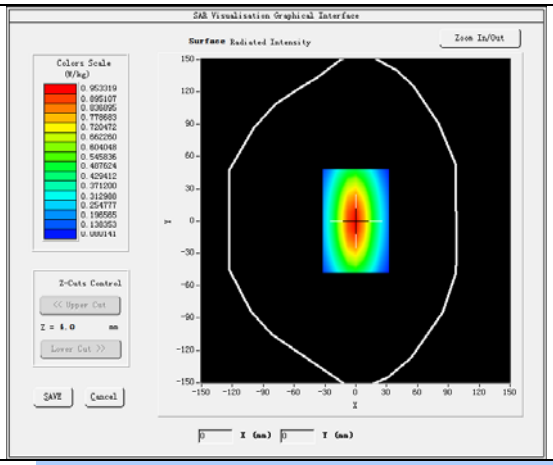
Table 3: Dielectric Performance of Body Tissue Simulating Liquid

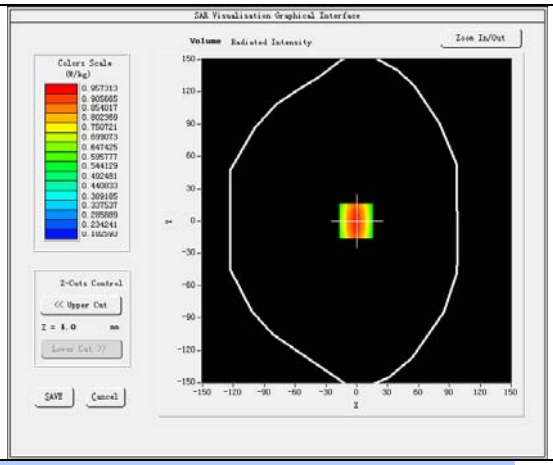
Temperature: 21°C , Relative humidity: 57% , Measured Date: 2020-05-01				
Frequency(MHz)	Measured Date	Description	Dielectric Parameters	
			εr	σ(s/m)
700	2020-05-15	Target Value ±5% window	55.2 52.63 — 57.75	0.97 0.922 — 1.018
		Measurement Value	53.77	0.97
750	2020-05-15	Target Value ±5% window	55.2 52.63 — 57.75	0.97 0.922 — 1.018
		Measurement Value	53.63	0.98
835	2020-05-01	Target Value ±5% window	55.2 52.63 — 57.75	0.97 0.922 — 1.018
		Measurement Value	55.16	0.92
1700	2020-05-08	Target Value ±5% window	53.30 50.64 — 55.97	1.52 1.44 — 1.60
		Measurement Value	53.63	1.51
1800	2020-05-08	Target Value ±5% window	53.30 50.64 — 55.97	1.52 1.44 — 1.60
		Measurement Value	53.60	1.57
1900	2020-05-29	Target Value ±5% window	53.30 50.64 — 55.97	1.52 1.44 — 1.60
		Measurement Value	53.59	1.55

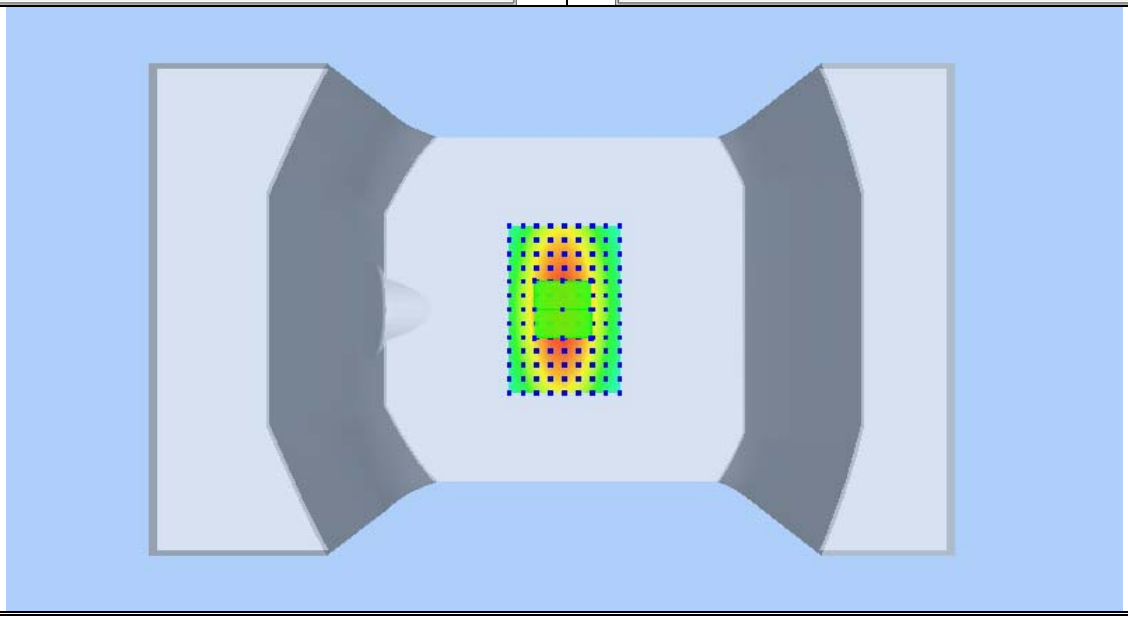
System Verification Plots

Product Description: Dipole
Model: SID750
Test Date: 2020-05-15

Medium(liquid type)	MSL_750
Frequency (MHz)	750.000000
Relative permittivity (real part)	53.63
Conductivity (S/m)	0.98
Input power	100mW
E-Field Probe	SN 07/15 EP247
Duty cycle	1:1
Conversion Factor	4.94
Sensor-surface	4mm
Area Scan	dx=8mm dy=8mm
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm
Variation (%)	-0.36
SAR 10g (W/Kg)	0.607685
SAR 1g (W/Kg)	0.910163
SURFACE SAR	**VOLUME SAR**

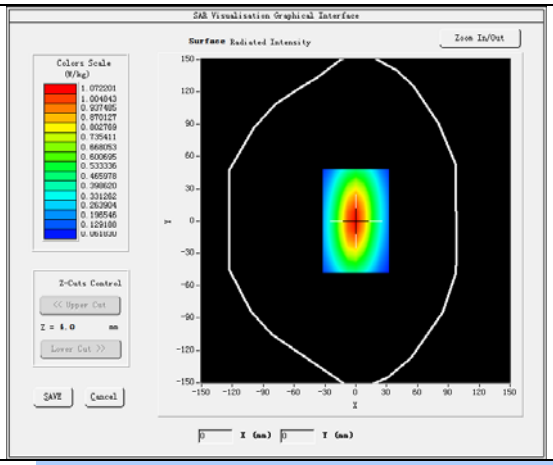


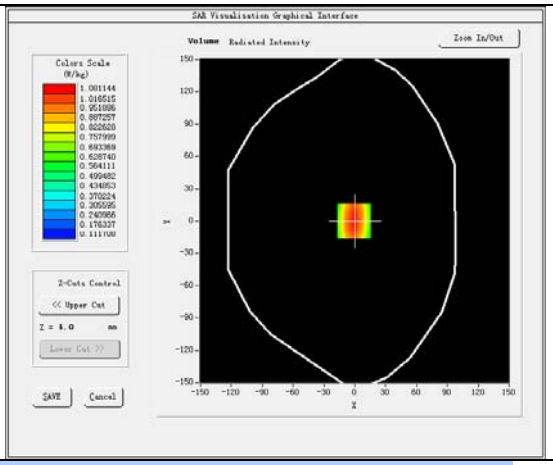


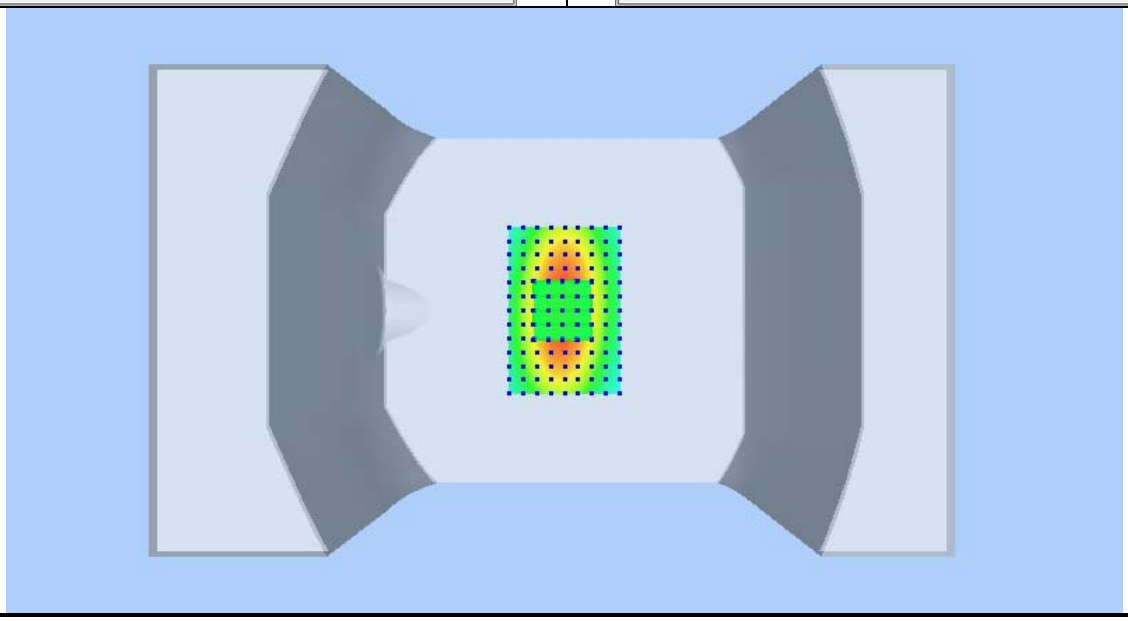


Product Description: Dipole
Model: SID835
Test Date: 2020-05-01

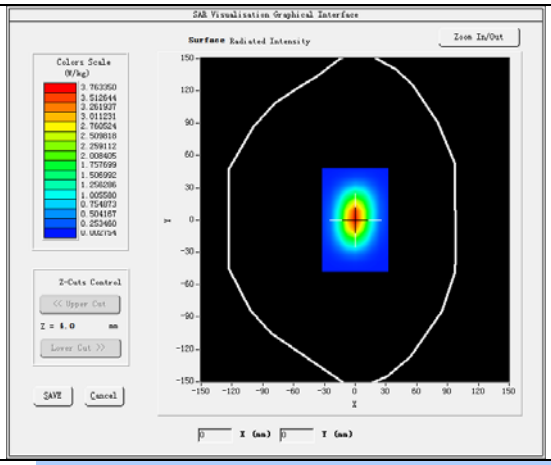
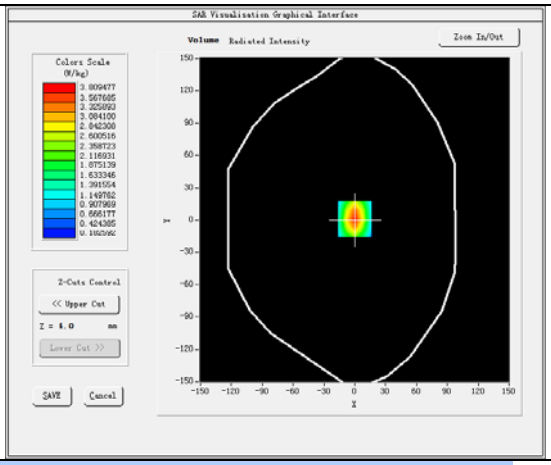
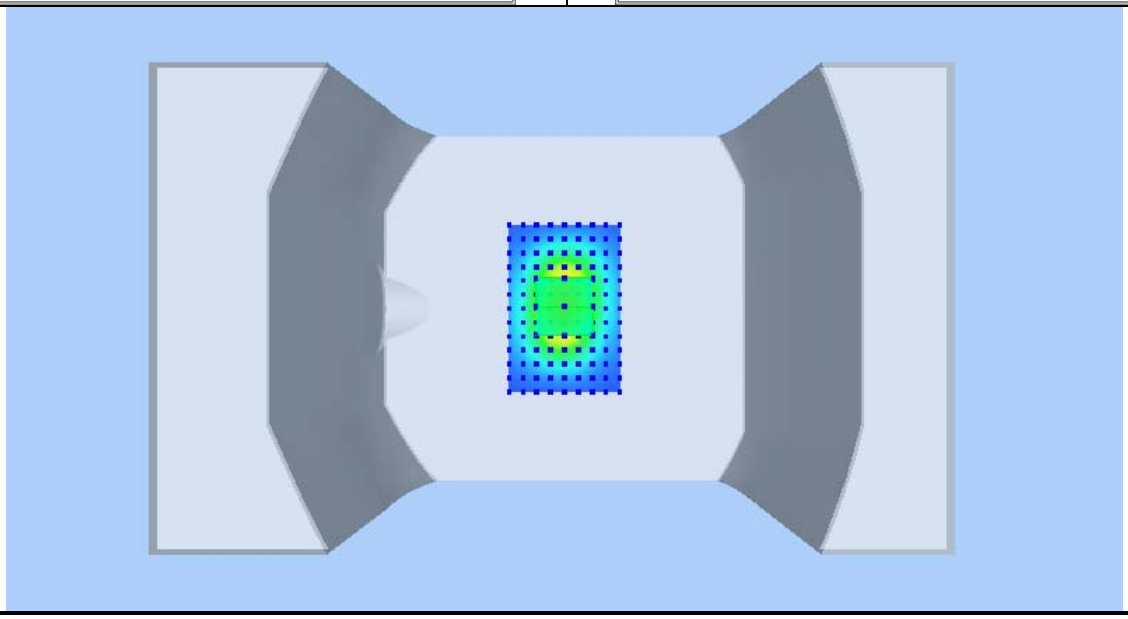
Medium(liquid type)	MSL_835
Frequency (MHz)	835.000000
Relative permittivity (real part)	55.16
Conductivity (S/m)	0.92
Input power	100mW
E-Field Probe	SN 07/15 EP247
Duty cycle	1:1
Conversion Factor	5.18
Sensor-surface	4mm
Area Scan	dx=8mm dy=8mm
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm
Variation (%)	-0.26
SAR 10g (W/Kg)	0.683987
SAR 1g (W/Kg)	1.029015
SURFACE SAR	**VOLUME SAR**



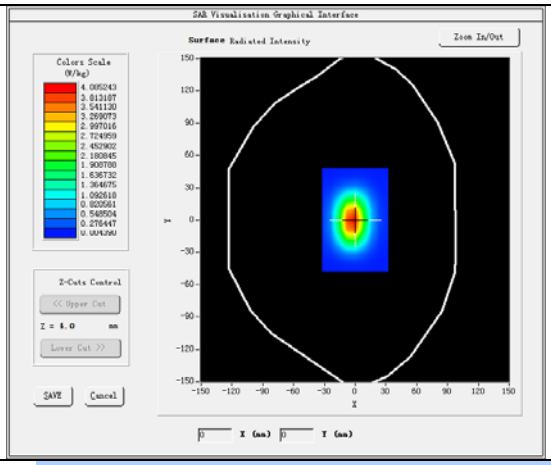
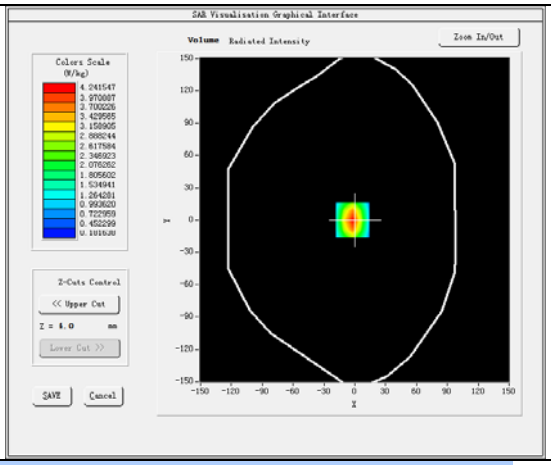
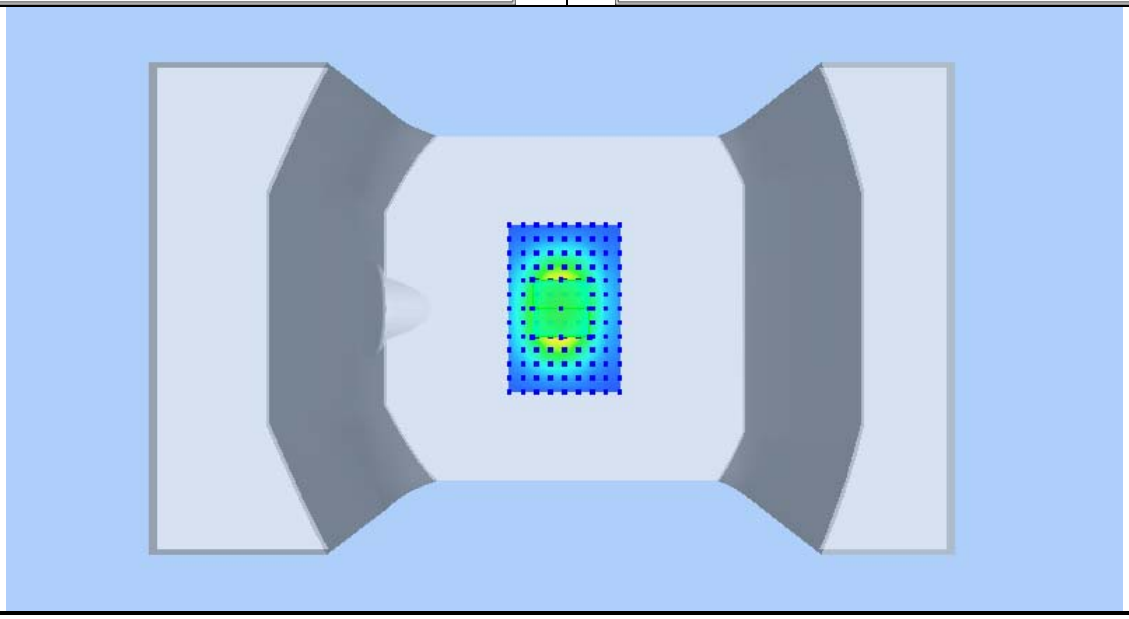




Product Description: Dipole
Model: SID1800
Test Date: 2020-05-08

Medium(liquid type)	MSL_1800
Frequency (MHz)	1800.000
Relative permittivity (real part)	53.60
Conductivity (S/m)	1.57
Input power	100mW
E-Field Probe	SN 07/15 EP247
Duty cycle	1:1
Conversion Factor	4.43
Sensor-Surface	4mm
Area Scan	dx=8mm dy=8mm
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm
Variation (%)	0.25
SAR 10g (W/Kg)	1.881560
SAR 1g (W/Kg)	3.711258
SURFACE SAR	**VOLUME SAR**
	
	

Product Description: Dipole
Model: SID1900
Test Date: 2020-05-29

Medium(liquid type)	MSL_1900
Frequency (MHz)	1900.000
Relative permittivity (real part)	53.59
Conductivity (S/m)	1.55
Input power	100mW
E-Field Probe	SN 07/15 EP247
Duty cycle	1:1
Conversion Factor	4.83
Sensor-Surface	4mm
Area Scan	dx=8mm dy=8mm
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm
Variation (%)	0.25
SAR 10g (W/Kg)	2.036845
SAR 1g (W/Kg)	3.896025
SURFACE SAR	**VOLUME SAR**
	
	

10 Type a Measurement Uncertainty

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 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 Distribution	Normal	Rectangle	Triangular	U Shape
Multi-plying Factor(a)	1/k(b)	1 / √3	1 / √6	1 / √2

(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

Standard Uncertainty for Assumed Distribution

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 -sum- 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 COMOSAR Uncertainty Budget is show in below table:

UNCERTAINTY FOR SYSTEM PERFORMANCE CHECK								
a	c	d	e= f(d,k)	f	g	h= c*f/e	i= c*g/e	k
Uncertainty Component	Tol (+- %)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	Vi
Measurement System								
Probe calibration	5.8	N	1	1	1	5.80	5.80	∞
Axial Isotropy	3.5	R	√3	(1_Cp)^1/2	(1_Cp)^1/2	1.43	1.43	∞
Hemispherical Isotropy	5.9	R	√3	(Cp)^1/2	(Cp)^1/2	2.41	2.41	∞
Boundary effect	1.0	R	√3	1	1	0.58	0.58	∞
Linearity	4.7	R	√ 3	1	1	2.71	2.71	∞
System detection limits	1.0	R	√3	1	1	0.58	0.58	∞
Modulation response	0.00	N	1	1	1	0.00	0.00	∞
Readout Electronics	0.50	N	1	1	1	0.50	0.50	∞
Reponse Time	0.0	R	√3	1	1	0.00	0.00	∞
Integration Time	1.4	R	√3	1	1	0.81	0.81	∞
RF ambient Conditions - Noise	3.0	R	√3	1	1	1.73	1.73	∞
RF ambient Conditions - Reflections	3.0	R	√3	1	1	1.73	1.73	∞
Probe positioner Mechanical Tolerance	1.4	R	√3	1	1	0.81	0.81	∞
Probe positioning with respect to Phantom Shell	1.40	R	√3	1	1	0.81	0.81	∞
Extrapolation, interpolation and integration Algoritms for Max. SAR Evaluation	2.3	R	√3	1	1	1.33	1.33	∞
Dipole								
Deviation of experimental source from numerical source	4.00	N	1	1	1	4.00	4.00	∞
Input power and SAR drift measurement	5.00	R	√3	1	1	2.89	2.89	∞
Dipole axis to liquid Distance	2.00	R	√3	1	1	1.15	1.15	∞
Phantom and Tissue Parameters								
Phantom Uncertainty (Shape and thickness tolerances)	4.00	R	√3	1	1	2.31	2.31	∞
Uncertainty in SAR correction for deviation (in permittivity and conductivity)	2.00	N	1	1	1	2.00	1.68	∞
Liquid conductivity (temperature uncertainty)	2.50	N	1	0.78	0.71	1.95	1.77	∞
Liquid conductivity - measurement uncertainty	4.00	N	1	0.23	0.26	0.92	1.04	M
Liquid permittivity (temperature uncertainty)	2.50	N	1	0.78	0.71	1.95	1.77	∞
Liquid permittivity - measurement uncertainty	5.00	N	1	0.23	0.26	1.15	1.30	M
Combined Standard Uncertainty		RSS				10.21	10.12	
Expanded Uncertainty (95% Confidence interval)		k				19.91	19.73	

UNCERTAINTY EVALUATION FOR HANDSET SAR TEST								
a	c	d	e= f(d,k)	f	g	h= c*f/e	i= c*g/e	k
Uncertainty Component	Tol (+- %)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	Vi
Measurement System								
Probe calibration	5.8	N	1	1	1	5.80	5.80	∞
Axial Isotropy	3.5	R	√3	(1_Cp)^ 1/2	(1_Cp)^ 1/2	1.43	1.43	∞
Hemispherical Isotropy	5.9	R	√3	(Cp)^ 1/2	(Cp)^ 1/2	2.41	2.41	∞
Boundary effect	1.0	R	√3	1	1	0.58	0.58	∞
Linearity	4.7	R	√3	1	1	2.71	2.71	∞
System detection limits	1.0	R	√3	1	1	0.58	0.58	∞
Modulation response	3.00	N	1	1	1	3.00	3.00	∞
Readout Electronics	0.50	N	1	1	1	0.50	0.50	∞
Reponse Time	0.0	R	√3	1	1	0.00	0.00	∞
Integration Time	1.4	R	√3	1	1	0.81	0.81	∞
RF ambient Conditions - Noise	3.0	R	√3	1	1	1.73	1.73	∞
RF ambient Conditions - Reflections	3.0	R	√3	1	1	1.73	1.73	∞
Probe positioner Mechanical Tolerance	1.4	R	√3	1	1	0.81	0.81	∞
Probe positioning with respect to Phantom Shell	1.40	R	√3	1	1	0.81	0.81	∞
Extrapolation, interpolation and integration Algoritms for Max. SAR Evaluation	2.3	R	√3	1	1	1.33	1.33	∞
Test sample Related								
Test sample positioning	2.60	N	1	1	1	2.60	2.60	N-1
Device Holder Uncertainty	3.00	N	1	1	1	3.00	3.00	N-1
Output power Variation - SAR drift measurement	5.00	R	√3	1	1	2.89	2.89	∞
SAR scaling	2.00	R	√3	1	1	1.15	1.15	∞
Phantom and Tissue Parameters								
Phantom Uncertainty (Shape and thickness tolerances)	4.00	R	√3	1	1	2.31	2.31	∞
Uncertainty in SAR correction for deviation (in permittivity and conductivity)	2.00	N	1	1	1	2.00	1.68	∞
Liquid conductivity (temperature uncertainty)	2.50	N	1	0.78	0.71	1.95	1.77	∞
Liquid conductivity - measurement uncertainty	4.00	N	1	0.23	0.26	0.92	1.04	M
Liquid permittivity (temperature uncertainty)	2.50	N	1	0.78	0.71	1.95	1.77	∞
Liquid permittivity - measurement uncertainty	5.00	N	1	0.23	0.26	1.15	1.30	M
Combined Standard Uncertainty		RSS				10.63	10.54	
Expanded Uncertainty (95% Confidence interval)		k				20.73	20.56	

11 Output Power Verification

Test Condition:

1. Conducted Measurement
   EUT was set for low, mid, high channel with modulated mode and highest RF output power.
   The base station simulator was connected to the antenna terminal.
2. Conducted Emissions Measurement Uncertainty
   All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz – 40GHz is ±1.5dB.
3. Environmental Conditions

Temperature	23°C
Relative Humidity	53%
Atmospheric Pressure	1019mbar

4. Test Date : 2020-01-18
   Tested By : Andy Feng

Test Procedures:

JADESTICK radio output power measurement

1. The transmitter output port was connected to base station emulator.
2. Establish communication link between emulator and EUT and set EUT to operate at maximum output power all the time.
3. Select lowest, middle, and highest channels for each band and different possible test mode.
4. Measure the conducted peak burst power and conducted average burst power from EUT antenna port.

Other radio output power measurement:

The output power was measured using power meter at low, mid, and hi channels.

Source-based Time Averaged Burst Power Calculation:

For TDMA, the following duty cycle factor was used to calculate the source-based time average power

Number of Time slot	1	2	3	4
Duty Cycle	1:8	1:4	1:2.66	1:2
Duty cycle factor	-9.03 dB	-6.02 dB	-4.26 dB	-3.01 dB
Crest Factor	8	4	2.66	2

Remark: *Time slot duty cycle factor = 10 * log (Time Slot Duty Cycle)*
Source based time averaged power = Maximum burst averaged power (1 Uplink) – 9.03 dB
Source based time averaged power = Maximum burst averaged power (2 Uplink) – 6.02 dB
Source based time averaged power = Maximum burst averaged power (3 Uplink) – 4.26 dB
Source based time averaged power = Maximum burst averaged power (4 Uplink) – 3.01 dB

Test Result:

WCDMA Band V		Conducted Power(dBm)		
		Channel 4132	Channel 4183	Channel 4233
		826.4(MHz)	836.6(MHz)	846.6(MHz)
RMC		23.21	23.19	23.19
HSDPA	Sub - Test 1	22.16	22.22	22.27
	Sub - Test 2	22.24	22.23	22.22
	Sub - Test 3	21.70	21.62	21.76
	Sub - Test 4	21.67	21.68	21.75
HSUPA	Sub - Test 1	22.15	22.24	22.23
	Sub - Test 2	21.72	21.70	21.76
	Sub - Test 3	22.20	22.20	22.19
	Sub - Test 4	22.22	22.28	22.26
	Sub - Test 5	22.17	22.24	22.23
DC-HSDPA	Sub - Test 1	23.08	23.06	23.06
	Sub - Test 2	23.17	23.04	23.05
	Sub - Test 3	22.66	22.53	22.54
	Sub - Test 4	22.65	22.52	22.53

WCDMA Band II		Conducted Power(dBm)		
		Channel 9262	Channel 9400	Channel 9538
		1852.4(MHz)	1880(MHz)	1907.6(MHz)
RMC		23.19	23.05	23.04
HSDPA	Sub - Test 1	22.26	22.11	22.00
	Sub - Test 2	22.20	22.07	22.00
	Sub - Test 3	21.71	21.59	21.53
	Sub - Test 4	21.72	21.60	21.54
HSUPA	Sub - Test 1	22.26	22.15	22.05
	Sub - Test 2	21.67	21.62	21.61
	Sub - Test 3	22.21	22.08	22.02
	Sub - Test 4	22.31	22.18	22.13
	Sub - Test 5	22.20	22.07	22.02
DC-HSDPA	Sub - Test 1	23.12	22.94	22.93
	Sub - Test 2	23.11	22.93	22.92
	Sub - Test 3	22.60	22.42	22.41
	Sub - Test 4	22.59	22.51	22.39

WCDMA Band IV		AV Conducted Power(dBm)		
		Channel 1312	Channel 1413	Channel 1513
		1712.4 (MHz)	1732.6 (MHz)	1752.6(MHz)
RMC		23.46	23.35	23.37
HSDPA	Sub - Test 1	22.46	22.31	22.30
	Sub - Test 2	22.50	22.31	22.38
	Sub - Test 3	21.92	21.83	21.91
	Sub - Test 4	21.91	21.81	21.90
HSUPA	Sub - Test 1	22.22	22.27	22.21
	Sub - Test 2	21.95	21.81	21.91
	Sub - Test 3	22.51	22.40	22.37
	Sub - Test 4	22.53	22.38	22.37
	Sub - Test 5	22.50	22.31	22.39
DC-HSDPA	Sub - Test 1	23.33	23.22	23.24
	Sub - Test 2	23.31	23.21	23.23
	Sub - Test 3	22.80	22.70	22.72
	Sub - Test 4	22.79	22.69	22.71

LTE Power Reduction

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

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

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signalling Value of “NS_01”.

Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
NS_03	6.6.2.2.1	2, 4,10, 23, 25, 35, 36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2	41	5	>6	≤ 1
			10, 15, 20	See Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10,15,20	≥ 50	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS_07	6.6.2.2.3 6.6.3.3.2	13	10	Table 6.2.4-2	Table 6.2.4-2
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23[1]	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5
..					
NS_32	-	-	-	-	-
Note 1: Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region.					

LTE Band 2：

LTE Band 2				Conducted Power(dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18607/1850.7	18900/1880	19193/1909.3
1.4MHz	QPSK	1	0	23.37	23.41	22.99
		1	2	23.41	23.79	22.99
		1	5	23.33	23.26	22.91
		3	0	23.35	23.29	23.12
		3	2	23.18	23.09	23.21
		3	3	23.37	23.26	22.90
		6	0	22.23	22.49	22.07
	16QAM	1	0	22.36	22.91	22.68
		1	2	22.41	22.94	23.00
		1	5	22.20	22.95	23.02
		3	0	22.33	22.19	22.16
		3	2	22.42	22.16	22.07
		3	3	22.31	22.29	22.06
		6	0	21.36	21.29	21.30
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18615/1851.5	18900/1880	19185/1908.5
3MHz	QPSK	1	0	23.39	23.45	23.02
		1	7	23.44	23.84	23.03
		1	14	23.36	23.31	22.95
		8	0	22.45	22.41	22.25
		8	4	22.30	22.19	22.33
		8	7	22.47	22.37	22.00
		15	0	22.26	22.53	22.10
	16QAM	1	0	22.39	22.93	22.71
		1	7	22.44	22.99	23.04
		1	14	22.22	22.99	23.05
		8	0	21.44	21.32	21.28
		8	4	21.53	21.29	21.19
		8	7	21.41	21.41	21.19
		15	0	21.39	21.33	21.33
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18625/1852.5	18900/1880	19175/1907.5
5MHz	QPSK	1	0	23.36	23.43	22.98
		1	13	23.42	23.80	23.00
		1	24	23.33	23.26	22.91
		12	0	22.42	22.36	22.21

		12	6	22.28	22.15	22.28
		12	13	22.45	22.35	21.96
		25	0	22.24	22.52	22.08
	16QAM	1	0	22.36	22.89	22.68
		1	13	22.41	22.97	23.01
		1	24	22.19	22.97	23.01
		12	0	21.42	21.28	21.25
		12	6	21.50	21.24	21.15
		12	13	21.38	21.36	21.15
		25	0	21.37	21.29	21.28
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18650/1855	18900/1880	19150/1905
10MHz	QPSK	1	0	23.38	23.44	23.01
		1	25	23.45	23.85	23.04
		1	49	23.35	23.30	22.94
		25	0	22.45	22.41	22.25
		25	13	22.31	22.20	22.32
		25	25	22.47	22.39	22.01
		50	0	22.32	22.54	22.12
	16QAM	1	0	22.38	22.92	22.70
		1	25	22.44	23.01	23.04
		1	49	22.22	22.99	23.04
		25	0	21.45	21.33	21.29
		25	13	21.52	21.28	21.18
		25	25	21.41	21.41	21.19
		50	0	21.40	21.34	21.32
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18675/1857.5	18900/1880	19125/1902.5
15MHz	QPSK	1	0	23.37	23.40	22.99
		1	38	23.43	23.84	23.01
		1	74	23.32	23.25	22.90
		36	0	22.43	22.37	22.22
		36	18	22.28	22.15	22.28
		36	39	22.44	22.36	21.97
		75	0	22.30	22.50	22.07
	16QAM	1	0	22.33	22.90	22.68
		1	38	22.42	22.98	23.02
		1	74	22.19	22.95	23.01
		36	0	21.42	21.31	21.26
		36	18	21.49	21.23	21.14

		36	39	21.39	21.37	21.16
		75	0	21.37	21.29	21.28
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18700/1860	18900/1880	19100/1900
20MHz	QPSK	1	0	23.34	23.36	22.96
		1	50	23.42	23.80	22.99
		1	99	23.30	23.24	22.87
		50	0	22.40	22.32	22.18
		50	25	22.26	22.11	22.25
		50	50	22.41	22.31	21.93
		100	0	22.27	22.45	22.03
	16QAM	1	0	22.31	22.86	22.63
		1	50	22.38	22.96	22.98
		1	99	22.17	22.92	22.99
		50	0	21.39	21.27	21.23
		50	25	21.46	21.21	21.11
		50	50	21.36	21.32	21.12
		100	0	21.35	21.25	21.25

LTE Band 4：

LTE Band 4				AV Conducted Power(dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				19957/1710.7	20175/1732.5	20393/1754.3
1.4MHz	QPSK	1	0	23.55	23.20	23.42
		1	2	23.44	23.53	23.46
		1	5	23.20	23.54	23.68
		3	0	23.32	23.22	23.55
		3	2	23.28	23.33	23.40
		3	3	23.31	23.42	23.39
		6	0	22.30	22.40	22.64
	16QAM	1	0	22.45	22.25	23.27
		1	2	22.52	22.79	23.15
		1	5	22.38	22.98	23.37
		3	0	22.23	22.32	22.43
		3	2	22.32	22.39	22.26
		3	3	22.39	22.47	22.47
		6	0	21.34	21.48	21.68
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				19965/1711.5	20175/1732.5	20385/1753.5
3MHz	QPSK	1	0	23.57	23.24	23.45
		1	7	23.47	23.58	23.50
		1	14	23.23	23.59	23.72
		8	0	22.42	22.34	22.68
		8	4	22.40	22.43	22.52
		8	7	22.41	22.53	22.49
		15	0	22.33	22.44	22.67
	16QAM	1	0	22.48	22.27	23.30
		1	7	22.55	22.84	23.19
		1	14	22.40	23.02	23.40
		8	0	21.34	21.45	21.55
		8	4	21.43	21.52	21.38
		8	7	21.49	21.59	21.60
		15	0	21.37	21.52	21.71
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				19975/1712.5	20175/1732.5	20375/1752.5
5MHz	QPSK	1	0	23.54	23.22	23.41
		1	13	23.45	23.54	23.47
		1	24	23.20	23.54	23.68
		12	0	22.39	22.29	22.64
		12	6	22.38	22.39	22.47
		12	13	22.39	22.51	22.45
		25	0	22.31	22.43	22.65

	16QAM	1	0	22.45	22.23	23.27
		1	13	22.52	22.82	23.16
		1	24	22.37	23.00	23.36
		12	0	21.32	21.41	21.52
		12	6	21.40	21.47	21.34
		12	13	21.46	21.54	21.56
		25	0	21.35	21.48	21.66
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20000/1715	20175/1732.5	20350/1750
10MHz	QPSK	1	0	23.56	23.23	23.44
		1	25	23.48	23.59	23.51
		1	49	23.22	23.58	23.71
		25	0	22.42	22.34	22.68
		25	13	22.41	22.44	22.51
		25	25	22.41	22.55	22.50
		50	0	22.39	22.45	22.69
	16QAM	1	0	22.47	22.26	23.29
		1	25	22.55	22.86	23.19
		1	49	22.40	23.02	23.39
		25	0	21.35	21.46	21.56
		25	13	21.42	21.51	21.37
		25	25	21.49	21.59	21.60
		50	0	21.38	21.53	21.70
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20025/1717.5	20175/1732.5	20325/1747.5
15MHz	QPSK	1	0	23.55	23.19	23.42
		1	38	23.46	23.58	23.48
		1	74	23.19	23.53	23.67
		36	0	22.40	22.30	22.65
		36	18	22.38	22.39	22.47
		36	39	22.38	22.52	22.46
		75	0	22.37	22.41	22.64
	16QAM	1	0	22.42	22.24	23.27
		1	38	22.53	22.83	23.17
		1	74	22.37	22.98	23.36
		36	0	21.32	21.44	21.53
		36	18	21.39	21.46	21.33
		36	39	21.47	21.55	21.57
		75	0	21.35	21.48	21.66
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20050/1720	20175/1732.5	20300/1745
20MHz	QPSK	1	0	23.52	23.15	23.39
		1	50	23.45	23.54	23.46

		1	99	23.17	23.52	23.64
		50	0	22.37	22.25	22.61
		50	25	22.36	22.35	22.44
		50	50	22.35	22.47	22.42
		100	0	22.34	22.36	22.60
	16QAM	1	0	22.40	22.20	23.22
		1	50	22.49	22.81	23.13
		1	99	22.35	22.95	23.34
		50	0	21.29	21.40	21.50
		50	25	21.36	21.44	21.30
		50	50	21.44	21.50	21.53
		100	0	21.33	21.44	21.63

LTE Band 5：

LTE Band 5				Conducted Power(dBm)		
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)		
				20407/824.7	20525/836.5	20643/848.3
1.4MHz	QPSK	1	0	23.81	23.90	23.80
		1	2	23.88	23.90	24.01
		1	5	23.97	23.90	23.77
		3	0	23.67	23.70	23.75
		3	2	23.67	23.74	23.78
		3	3	23.82	23.78	23.77
		6	0	22.80	22.89	22.87
	16QAM	1	0	23.44	23.11	22.82
		1	2	23.14	23.38	22.67
		1	5	23.25	23.04	22.66
		3	0	22.60	22.69	22.77
		3	2	22.78	22.63	22.60
		3	3	22.80	22.66	22.55
		6	0	21.68	21.75	21.71
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)		
				20415/825.5	20525/836.5	20635/847.5
3MHz	QPSK	1	0	23.83	23.94	23.83
		1	7	23.91	23.95	24.05
		1	14	24.00	23.95	23.81
		8	0	22.77	22.82	22.88
		8	4	22.79	22.84	22.90
		8	7	22.92	22.89	22.87
		15	0	22.83	22.93	22.90
	16QAM	1	0	23.47	23.13	22.85
		1	7	23.17	23.43	22.71
		1	14	23.27	23.08	22.69
		8	0	21.71	21.82	21.89
		8	4	21.89	21.76	21.72
		8	7	21.90	21.78	21.68
		15	0	21.71	21.79	21.74
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)		
				20425/826.5	20525/836.5	20625/846.5
5MHz	QPSK	1	0	23.81	23.89	23.80

		1	13	23.90	23.95	24.03
		1	24	23.96	23.89	23.76
		12	0	22.75	22.78	22.85
		12	6	22.77	22.80	22.85
		12	13	22.89	22.88	22.84
		25	0	22.87	22.90	22.87
	16QAM	1	0	23.41	23.10	22.82
		1	13	23.15	23.42	22.69
		1	24	23.24	23.04	22.65
		12	0	21.69	21.81	21.87
		12	6	21.85	21.70	21.67
		12	13	21.88	21.74	21.65
		25	0	21.69	21.75	21.69
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)		
				20450/829	20525/836.5	20600/844
10MHz	QPSK	1	0	23.78	23.85	23.77
		1	25	23.89	23.91	24.01
		1	49	23.94	23.88	23.73
		25	0	22.72	22.73	22.81
		25	13	22.75	22.76	22.82
		25	25	22.86	22.83	22.80
		50	0	22.84	22.85	22.83
	16QAM	1	0	23.39	23.06	22.77
		1	25	23.11	23.40	22.65
		1	49	23.22	23.01	22.63
		25	0	21.66	21.77	21.84
		25	13	21.82	21.68	21.64
		25	25	21.85	21.69	21.61
		50	0	21.67	21.71	21.66

LTE Band 12：

LTE Band 12				AV Conducted Power(dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23017/699.7	23095/707.5	23173/715.3
1.4MHz	QPSK	1	0	23.63	23.64	23.61
		1	2	23.67	23.57	23.69
		1	5	23.61	23.50	23.70
		3	0	23.50	23.54	23.63
		3	2	23.45	23.50	23.54
		3	3	23.66	23.62	23.63
		6	0	22.61	22.57	22.65
	16QAM	1	0	22.95	22.18	22.96
		1	2	22.94	22.55	23.20
		1	5	22.76	22.36	22.86
		3	0	22.58	22.60	22.74
		3	2	22.52	22.50	22.51
		3	3	22.52	22.58	22.46
		6	0	21.71	21.63	21.84
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23025/700.5	23095/707.5	23165/714.5
3MHz	QPSK	1	0	23.65	23.68	23.64
		1	7	23.70	23.62	23.73
		1	14	23.64	23.55	23.74
		8	0	22.60	22.66	22.76
		8	4	22.57	22.60	22.66
		8	7	22.76	22.73	22.73
		15	0	22.64	22.61	22.68
	16QAM	1	0	22.98	22.20	22.99
		1	7	22.97	22.60	23.24

		1	14	22.78	22.40	22.89
		8	0	21.69	21.73	21.86
		8	4	21.63	21.63	21.63
		8	7	21.62	21.70	21.59
		15	0	21.74	21.67	21.87
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23035/701.5	23095/707.5	23155/713.5
5MHz	QPSK	1	0	23.63	23.63	23.61
		1	13	23.69	23.62	23.71
		1	24	23.60	23.49	23.69
		12	0	22.58	22.62	22.73
		12	6	22.55	22.56	22.61
		12	13	22.73	22.72	22.70
		25	0	22.68	22.58	22.65
	16QAM	1	0	22.92	22.17	22.96
		1	13	22.95	22.59	23.22
		1	24	22.75	22.36	22.85
		12	0	21.67	21.72	21.84
		12	6	21.59	21.57	21.58
		12	13	21.60	21.66	21.56
		25	0	21.72	21.63	21.82
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23060/704	23095/707.5	23130/711
10MHz	QPSK	1	0	23.60	23.59	23.58
		1	25	23.68	23.58	23.69
		1	49	23.58	23.48	23.66
		25	0	22.55	22.57	22.69
		25	13	22.53	22.52	22.58
		25	25	22.70	22.67	22.66
		50	0	22.65	22.53	22.61
	16QAM	1	0	22.90	22.13	22.91
		1	25	22.91	22.57	23.18
		1	49	22.73	22.33	22.83
		25	0	21.64	21.68	21.81
		25	13	21.56	21.55	21.55
		25	25	21.57	21.61	21.52
		50	0	21.70	21.59	21.79

LTE Band 13：

LTE Band 13				Conducted Power(dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23205/779.5	23230/782	23255/784.5
5MHz	QPSK	1	0	23.72	23.63	23.78
		1	13	23.79	23.68	23.77
		1	24	23.58	23.69	23.65
		12	0	22.87	22.77	22.82
		12	6	22.85	22.80	22.86
		12	13	22.75	22.82	22.83
		25	0	22.81	22.74	22.80
	16QAM	1	0	23.06	22.41	22.60
		1	13	23.14	22.45	22.35
		1	24	23.03	22.16	22.43
		12	0	21.50	21.52	21.68
		12	6	21.63	21.75	21.65
		12	13	21.76	21.60	21.57
		25	0	21.74	21.96	21.62
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				/	23230/782	/
10MHz	QPSK	1	0	/	23.76	/
		1	25	/	23.85	/
		1	49	/	23.71	/
		25	0	/	22.87	/
		25	13	/	22.79	/
		25	25	/	22.88	/
		50	0	/	22.74	/
	16QAM	1	0	/	23.11	/
		1	25	/	23.41	/
		1	49	/	22.94	/
		25	0	/	21.78	/
		25	13	/	21.83	/
		25	25	/	21.88	/
		50	0	/	21.82	/

LTE Band 14：

LTE Band 14				Conducted Power(dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23305/790.5	23330/793	23355/795.5
5MHz	QPSK	1	0	23.81	23.59	23.59
		1	13	23.64	23.84	23.75
		1	24	23.68	23.88	23.90
		12	0	22.83	22.83	22.75
		12	6	22.77	22.80	22.71
		12	13	22.82	22.85	22.77
		25	0	22.89	22.76	22.73
	16QAM	1	0	22.50	22.47	22.42
		1	13	22.38	22.61	22.54
		1	24	22.21	22.57	22.22
		12	0	21.65	21.68	21.74
		12	6	21.84	21.59	21.85
		12	13	21.67	21.50	21.65
		25	0	21.77	21.73	21.69
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				/	23330/793	/
10MHz	QPSK	1	0	/	23.73	/
		1	25	/	23.85	/
		1	49	/	23.53	/
		25	0	/	22.84	/
		25	13	/	22.78	/
		25	25	/	22.82	/
		50	0	/	22.83	/
	16QAM	1	0	/	22.70	/
		1	25	/	23.38	/
		1	49	/	22.85	/
		25	0	/	21.64	/
		25	13	/	21.80	/
		25	25	/	21.76	/
		50	0	/	21.77	/

LTE Band 66：

LTE Band 66				Conducted Power(dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				131979/1710.7	132322/1745	132665/1779.3
1.4MHz	QPSK	1	0	23.42	23.57	23.56
		1	2	23.30	23.76	23.57
		1	5	23.37	23.64	23.45
		3	0	23.47	23.58	23.26
		3	2	23.35	23.75	23.33
		3	3	23.59	23.55	23.36
		6	0	22.51	22.73	22.34
	16QAM	1	0	22.84	22.38	22.20
		1	2	22.43	22.76	22.57
		1	5	22.57	22.42	22.22
		3	0	22.53	22.57	22.27
		3	2	22.32	22.76	22.43
		3	3	22.69	22.62	22.45
		6	0	21.65	21.84	21.45
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				131987/1711.5	132322/1745	132657/1778.5
3MHz	QPSK	1	0	23.44	23.61	23.59
		1	7	23.33	23.81	23.61
		1	14	23.40	23.69	23.49
		8	0	22.57	22.70	22.39
		8	4	22.47	22.85	22.45
		8	7	22.69	22.66	22.46
		15	0	22.54	22.77	22.37
	16QAM	1	0	22.87	22.40	22.23
		1	7	22.46	22.81	22.61
		1	14	22.59	22.46	22.25
		8	0	21.64	21.70	21.39
		8	4	21.43	21.89	21.55
		8	7	21.79	21.74	21.58
		15	0	21.68	21.88	21.48

Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				131997/1712.5	132322/1745	132647/1777.5
5MHz	QPSK	1	0	23.41	23.59	23.55
		1	13	23.31	23.77	23.58
		1	24	23.37	23.64	23.45
		12	0	22.54	22.65	22.35
		12	6	22.45	22.81	22.40
		12	13	22.67	22.64	22.42
		25	0	22.52	22.76	22.35
	16QAM	1	0	22.84	22.36	22.20
		1	13	22.43	22.79	22.58
		1	24	22.56	22.44	22.21
		12	0	21.62	21.66	21.36
		12	6	21.40	21.84	21.51
		12	13	21.76	21.69	21.54
		25	0	21.66	21.84	21.43

Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				132022/1715	132322/1745	132622/1775
10MHz	QPSK	1	0	23.43	23.60	23.58
		1	25	23.34	23.82	23.62
		1	49	23.39	23.68	23.48
		25	0	22.57	22.70	22.39
		25	13	22.48	22.86	22.44
		25	25	22.69	22.68	22.47
		50	0	22.60	22.78	22.39
	16QAM	1	0	22.86	22.39	22.22
		1	25	22.46	22.83	22.61
		1	49	22.59	22.46	22.24
		25	0	21.65	21.71	21.40
		25	13	21.42	21.88	21.54
		25	25	21.79	21.74	21.58
		50	0	21.69	21.89	21.47

Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				132047/1717.5	132322/1745	132597/1772.5
15MHz	QPSK	1	0	23.42	23.56	23.56
		1	38	23.32	23.81	23.59
		1	74	23.36	23.63	23.44
		36	0	22.55	22.66	22.36
		36	18	22.45	22.81	22.40
		36	39	22.66	22.65	22.43
		75	0	22.58	22.74	22.34
	16QAM	1	0	22.81	22.37	22.20
		1	38	22.44	22.80	22.59
		1	74	22.56	22.42	22.21
		36	0	21.62	21.69	21.37
		36	18	21.39	21.83	21.50
		36	39	21.77	21.70	21.55
		75	0	21.66	21.84	21.43
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				132072/1720	132322/1745	132572/1770
20MHz	QPSK	1	0	23.39	23.52	23.53
		1	50	23.31	23.77	23.57
		1	99	23.34	23.62	23.41
		50	0	22.52	22.61	22.32
		50	25	22.43	22.77	22.37
		50	50	22.63	22.60	22.39
		100	0	22.55	22.69	22.30
	16QAM	1	0	22.79	22.33	22.15
		1	50	22.40	22.78	22.55
		1	99	22.54	22.39	22.19
		50	0	21.59	21.65	21.34
		50	25	21.36	21.81	21.47
		50	50	21.74	21.65	21.51
		100	0	21.64	21.80	21.40

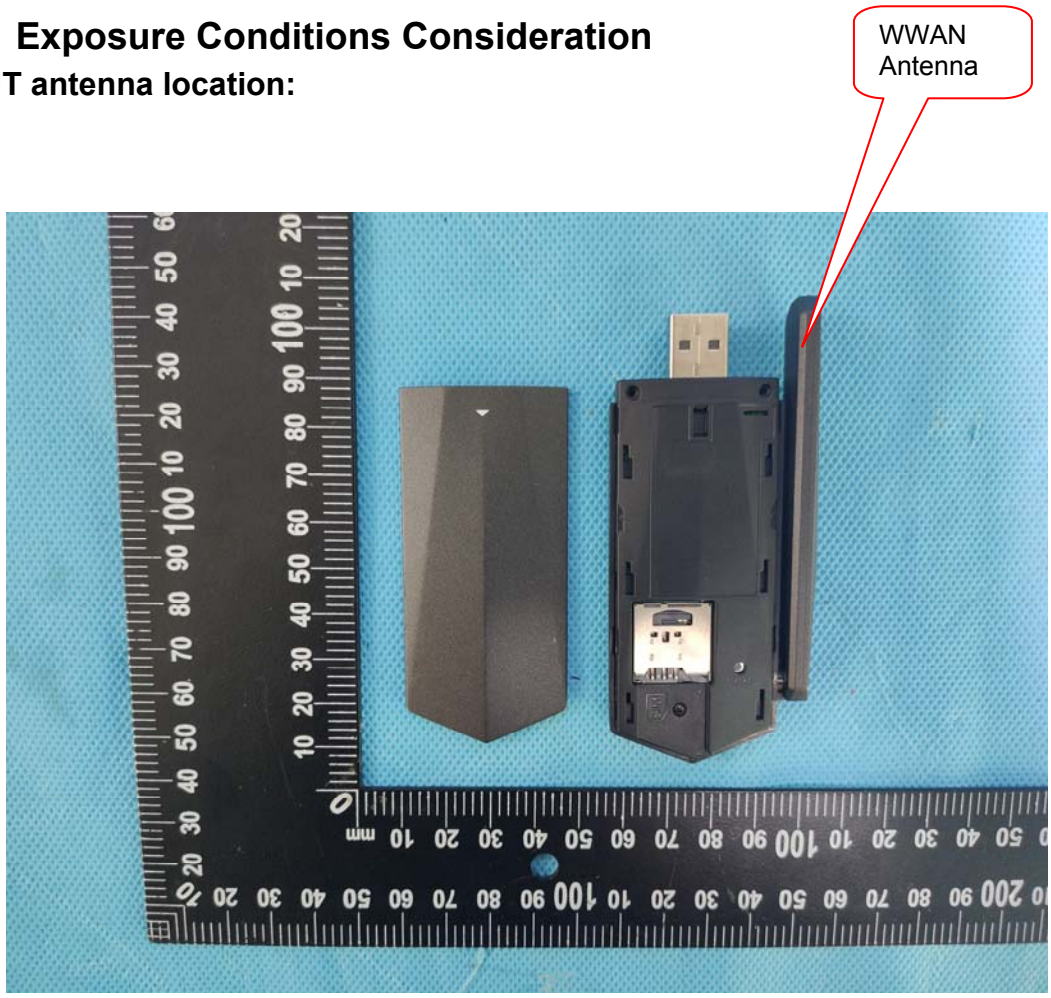
LTE Band 71：

LTE Band 71				Conducted Power(dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				133147/665.5	133297/680.5	133447/695.5
5MHz	QPSK	1	0	23.15	23.23	22.96
		1	13	23.44	23.23	23.08
		1	24	23.25	23.06	23.07
		12	0	22.15	22.33	22.29
		12	6	22.20	22.19	22.21
		12	13	22.38	22.36	22.33
		25	0	22.17	22.40	22.20
	16QAM	1	0	22.08	22.64	22.90
		1	13	22.20	22.85	22.91
		1	24	22.22	22.43	22.78
		12	0	21.29	21.23	21.07
		12	6	21.25	21.28	21.26
		12	13	21.38	21.23	21.13
		25	0	21.32	21.50	21.31
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				133172/668	133297/680.5	133422/693
10MHz	QPSK	1	0	23.17	23.24	22.99
		1	25	23.47	23.28	23.12
		1	49	23.27	23.10	23.10
		25	0	22.18	22.38	22.33
		25	13	22.23	22.24	22.25
		25	25	22.40	22.40	22.38
		50	0	22.25	22.42	22.24
	16QAM	1	0	22.10	22.67	22.92
		1	25	22.23	22.89	22.94
		1	49	22.25	22.45	22.81
		25	0	21.32	21.28	21.11
		25	13	21.27	21.32	21.29
		25	25	21.41	21.28	21.17
		50	0	21.35	21.55	21.35
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				133197/670.5	133297/680.5	133397/690.5
15MHz	QPSK	1	0	23.16	23.01	22.97

		1	38	23.45	23.11	23.09
		1	74	23.24	23.09	23.06
		36	0	22.16	22.25	22.30
		36	18	22.20	22.21	22.21
		36	39	22.37	22.13	22.34
		75	0	22.23	22.11	22.19
	16QAM	1	0	22.05	22.07	22.90
		1	38	22.21	22.09	22.92
		1	74	22.22	22.22	22.78
		36	0	21.29	21.25	21.08
		36	18	21.24	21.20	21.25
		36	39	21.39	21.12	21.14
		75	0	21.32	21.11	21.31
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				133222/673	133322/683	133372/688
20MHz	QPSK	1	0	23.13	23.16	22.94
		1	50	23.44	23.23	23.07
		1	99	23.22	23.04	23.03
		50	0	22.13	22.29	22.26
		50	25	22.18	22.15	22.18
		50	50	22.34	22.32	22.30
		100	0	22.20	22.33	22.15
	16QAM	1	0	22.03	22.61	22.85
		1	50	22.17	22.84	22.88
		1	99	22.20	22.38	22.76
		50	0	21.26	21.22	21.05
		50	25	21.21	21.25	21.22
		50	50	21.36	21.19	21.10
		100	0	21.30	21.46	21.28

12 Exposure Conditions Consideration

EUT antenna location:



Note:
1. When the antenna on stowed position, it can not insert to the computer. So we can consider it no transmitting on this position. The antenna of this dongle can be rotated from 0 to 120 degree, and 0 to -120 degree.
2. According KDB 447498 D02v02r1, we test the body SAR on 10 positions with 5mm distance to phantom.
(1). front side face to phantom (the antenna degree with 45°\90°\120°);
(2). rear side face to phantom (the antenna degree with 90°)
(3). top side face to phantom with antenna 45°\90°\120° position;
(4). bottom side face to phantom side with antenna 45°\90°\120° position;

13 SAR Test Results

Test Condition:

1. SAR Measurement
   The distance between the EUT and the antenna of the emulator is more than 50 cm and the output power radiated from the emulator antenna is at least 30 dB less than the output power of EUT.

2	Environmental Conditions	Temperature	23°C
		Relative Humidity	57%
		Atmospheric Pressure	1019mbar

3 Test Date : 2020-05-01~2020-05-29
Tested By : Andy Feng

Generally Test Procedures:

1. Establish communication link between EUT and base station emulation by air link.
2. Place the EUT in the selected test position. (Cheek, tilt or flat)
3. Perform SAR testing at middle or highest output power channel under the selected test mode. If the measured 1-g SAR is ≤ 0.8 W/kg, then testing for the other channel will not be performed.
4. When SAR is<0.8W/kg, no repeated SAR measurement is required

For WCDMA test:

1. KDB941225 D01-Body SAR is not required for HSDPA when the average output of each RF channel with HSDPA active is less than 0.25dB higher than measured without HSDPA using 12.2kbps RMC or the maximum SAR for 12.2kbps RMC<75% of the SAR limit.
2. KDB941225 D01-Body SAR is not required for handset with HSPA capabilities when the maximum average output of each RF channel with HSUPA/HSDPA active is less than 0.25dB higher than that measure without HSUPA/HSDPA using 12.2kbps RMC AND THE maximum SAR for 12.2kbps RMC is<75% of the SAR limit

For LTE test:

1. According to FCC KDB 941225 D05v02r05:
   a. Per Section 5.2.1, SAR is required for QPSK 1 RB Allocation for the largest bandwidth
      i. The required channel and offset combination with the highest maximum output power is required for SAR.
      ii. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required. Otherwise, SAR is required for the remaining required test channels using the RB offset configuration with highest output power for that channel.
      iii. When the reported SAR for a required test channel is > 1.45 W/kg, SAR is required for all RB offset configurations for that channel.
   b. Per Section 5.2.2, SAR is required for 50% RB allocation using the largest bandwidth following the same procedures outlined in Section 5.2.1.
   c. Per Section 5.2.3, QPSK SAR is not required for the 100% allocation when the highest maximum output power for the 100% allocation is less than the highest maximum output power of the 1 RB and 50% RB allocations and the reported SAR for the 1 RB and 50% RB allocations is < 0.8 W/kg.
   d. Per Section 5.2.4 and 5.3, SAR tests for higher order modulations and lower bandwidths configurations are not required when the conducted power of the required test configurations determined by Sections 5.2.1 through 5.2.3 is less than or equal to ½ dB higher than the equivalent configuration using QPSK modulation and when the QPSK SAR for those configurations is <1.45 W/kg.
   e. A-MPR was disabled for all SAR tests by setting NS=01 on the base station simulator. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).

SAR Summary Test Result:

Table 4: SAR Values of WCDMA BAND V

Test Positions		Channel		Test Mode	Power(dBm)		SAR 1g(W/Kg), Limit(1.6W/kg)		Plot No.
		CH.	MHz		Maximum Turn-up Power(dBm)	Measured output power(dBm)	Measured SAR 1g(W/kg)	Scaled SAR 1g(W/kg)	
Hotspot (5mm Separation)	Front Side 45°	4132	826.4	RMC 12.2kbps	24	23.21	0.833	**1.00**	**1**
	Front Side 45°	4132	826.4	RMC 12.2kbps	24	23.21	0.829	0.99	--
	Front Side 45°	4183	836.6	RMC 12.2kbps	24	23.19	0.774	0.93	--
	Front Side 45°	4233	846.6	RMC 12.2kbps	24	23.19	0.687	0.83	--
	Front Side 90°	4132	826.4	RMC 12.2kbps	24	23.21	0.546	0.65	--
	Front Side 120°	4132	826.4	RMC 12.2kbps	24	23.21	0.412	0.49	--
	Back Side 90°	4132	826.4	RMC 12.2kbps	24	23.21	0.230	0.28	--
	Top Side 45°	4132	826.4	RMC 12.2kbps	24	23.21	0.157	0.19	--
	Top Side 90°	4132	826.4	RMC 12.2kbps	24	23.21	0.145	0.17	--
	Top Side 120°	4132	826.4	RMC 12.2kbps	24	23.21	0.130	0.16	--
	Bottom Side 45°	4132	826.4	RMC 12.2kbps	24	23.21	0.220	0.26	--
	Bottom Side 90°	4132	826.4	RMC 12.2kbps	24	23.21	0.211	0.25	--
	Bottom Side 120°	4132	826.4	RMC 12.2kbps	24	23.21	0.214	0.26	--

Table 5: SAR Values of WCDMA BAND Ⅱ

Test Positions		Channel		Test Mode	Power(dBm)		SAR 1g(W/Kg), Limit(1.6W/kg)		Plot No.
		CH.	MHz		Maximum Turn-up Power(dBm)	Measured output power(dBm)	Measured SAR 1g(W/kg)	Scaled SAR 1g(W/kg)	
Hotspot (5mm Separation)	Front Side 45°	9262	1852.4	RMC 12.2kbps	24	23.19	1.233	**1.49**	**2**
	Front Side 45°	9262	1852.4	RMC 12.2kbps	24	23.19	1.211	1.46	--
	Front Side 45°	9400	1880	RMC 12.2kbps	24	23.05	1.110	1.38	--
	Front Side 45°	9538	1907.6	RMC 12.2kbps	24	23.04	1.124	1.40	--
	Front Side 90°	9262	1852.4	RMC 12.2kbps	24	23.19	1.102	1.33	--
	Front Side 90°	9262	1852.4	RMC 12.2kbps	24	23.19	1.100	1.33	--
	Front Side 90°	9400	1880	RMC 12.2kbps	24	23.05	0.909	1.13	--
	Front Side 90°	9538	1907.6	RMC 12.2kbps	24	23.04	0.918	1.15	--
	Front Side 120°	9262	1852.4	RMC 12.2kbps	24	23.19	0.888	1.07	--
	Front Side 120°	9262	1852.4	RMC 12.2kbps	24	23.19	0.876	1.06	--
	Front Side 120°	9400	1880	RMC 12.2kbps	24	23.05	0.765	0.95	--
	Front Side 120°	9538	1907.6	RMC 12.2kbps	24	23.04	0.789	0.98	--
	Back Side 90°	9262	1852.4	RMC 12.2kbps	24	23.19	0.412	0.50	--
	Top Side 45°	9262	1852.4	RMC 12.2kbps	24	23.19	0.135	0.16	--
	Top Side 90°	9262	1852.4	RMC 12.2kbps	24	23.19	0.125	0.15	--
	Top Side 120°	9262	1852.4	RMC 12.2kbps	24	23.19	0.120	0.14	--
	Bottom Side 45°	9262	1852.4	RMC 12.2kbps	24	23.19	0.178	0.21	--

	Bottom Side 90°	9262	1852.4	RMC 12.2kbps	24	23.19	0.166	0.20	--
	Bottom Side 120°	9262	1852.4	RMC 12.2kbps	24	23.19	0.164	0.20	--

Table 6: SAR Values of WCDMA BAND IV

Test Positions		Channel		Test Mode	Power(dBm)		SAR 1g(W/Kg), Limit(1.6W/kg)		Plot No.
		CH.	MHz		Maximum Turn-up Power(dBm)	Measured output power(dBm)	Measured SAR 1g(W/kg)	Scaled SAR 1g(W/kg)	
Hotspot (5mm Separation)	Front Side 45°	1312	1712.4	RMC 12.2kbps	24	23.46	1.306	**1.48**	**3**
	Front Side 45°	1312	1712.4	RMC 12.2kbps	24	23.46	1.299	1.47	--
	Front Side 45°	1413	1732.6	RMC 12.2kbps	24	23.35	1.202	1.40	--
	Front Side 45°	1513	1752.6	RMC 12.2kbps	24	23.37	1.211	1.40	--
	Front Side 90°	1312	1712.4	RMC 12.2kbps	24	23.46	1.202	1.36	--
	Front Side 90°	1312	1712.4	RMC 12.2kbps	24	23.46	1.189	1.35	--
	Front Side 90°	1413	1732.6	RMC 12.2kbps	24	23.35	1.102	1.28	--
	Front Side 90°	1513	1752.6	RMC 12.2kbps	24	23.37	1.112	1.29	--
	Front Side 120°	1312	1712.4	RMC 12.2kbps	24	23.46	1.114	1.26	--
	Front Side 120°	1312	1712.4	RMC 12.2kbps	24	23.46	1.110	1.26	--
	Front Side 120°	1413	1732.6	RMC 12.2kbps	24	23.35	1.009	1.17	--
	Front Side 120°	1513	1752.6	RMC 12.2kbps	24	23.37	1.001	1.16	--
	Back Side 90°	1312	1712.4	RMC 12.2kbps	24	23.46	0.478	0.54	--
	Top Side 45°	1312	1712.4	RMC 12.2kbps	24	23.46	0.041	0.05	--
	Top Side 90°	1312	1712.4	RMC 12.2kbps	24	23.46	0.055	0.06	--
	Top Side 120°	1312	1712.4	RMC 12.2kbps	24	23.46	0.059	0.07	--
	Bottom Side 45°	1312	1712.4	RMC 12.2kbps	24	23.46	0.074	0.08	--

	Bottom Side 90°	1312	1712.4	RMC 12.2kbps	24	23.46	0.071	0.08	--
	Bottom Side 120°	1312	1712.4	RMC 12.2kbps	24	23.46	0.065	0.07	--

Table 7: SAR Values of LTE BAND 2 , 20MHz ,QPSK

Test Mode	Test Positions		Channel		Power(dBm)		MPR (dB)	SAR 1g(W/Kg), Limit(1.6W/kg)		Plot No.
			CH.	MHz	Maximum Turn-up Power(dBm)	Measured output power(dBm)		Measured SAR 1g(W/kg)	Scaled SAR 1g(W/kg)	
1RB #50	Hotspot (5mm Separation)	Front Side 45°	18700	1860	24	23.42	0	0.908	**1.04**	**4**
		Front Side 45°	18900	1880	24	23.80	0	0.972	1.02	--
		Front Side 45°	18900	1880	24	23.80	0	0.970	1.02	--
		Front Side 45°	19100	1900	24	22.99	0	0.702	0.89	--
		Front Side 90°	18700	1860	24	23.42	0	0.767	0.88	--
		Front Side 90°	18900	1880	24	23.80	0	0.887	0.93	--
		Front Side 90°	18900	1880	24	23.80	0	0.880	0.92	--
		Front Side 90°	19100	1900	24	22.99	0	0.634	0.80	--
		Front Side 120°	18900	1880	24	23.80	0	0.747	0.78	--
		Back Side 90°	18900	1880	24	23.80	0	0.230	0.24	--
		Top Side 45°	18900	1880	24	23.80	0	0.110	0.12	--
		Top Side 90°	18900	1880	24	23.80	0	0.121	0.13	--
		Top Side 120°	18900	1880	24	23.80	0	0.133	0.14	--
		Bottom Side 45°	18900	1880	24	23.80	0	0.121	0.13	--
		Bottom Side 90°	18900	1880	24	23.80	0	0.120	0.13	--
		Bottom Side 120°	18900	1880	24	23.80	0	0.134	0.14	--
50%RB #25	Hotspot (5mm Separation)	Front Side 45°	18700	1860	23	22.41	1	0.748	0.86	--

		Front Side 90°	18700	1860	23	22.41	1	0.720	0.82	--
		Front Side 120°	18700	1860	23	22.41	1	0.701	0.80	--
		Back Side 90°	18700	1860	23	22.41	1	0.089	0.10	--
		Top Side 45°	18700	1860	23	22.41	1	0.099	0.11	--
		Top Side 90°	18700	1860	23	22.41	1	0.092	0.11	--
		Top Side 120°	18700	1860	23	22.41	1	0.087	0.10	--
		Bottom Side 45°	18700	1860	23	22.41	1	0.084	0.10	--
		Bottom Side 90°	18700	1860	23	22.41	1	0.091	0.10	--
		Bottom Side 120°	18700	1860	23	22.41	1	0.093	0.11	--

Table 8: SAR Values of LTE BAND 4, 20MHz ,QPSK

Test Mode	Test Positions		Channel		Power(dBm)		MPR (dB)	SAR 1g(W/Kg), Limit(1.6W/kg)		Plot No.
			CH.	MHz	Maximum Turn-up Power(dBm)	Measured output power(dBm)		Measured SAR 1g(W/kg)	Scaled SAR 1g(W/kg)	
1RB #99	Hotspot (5mm Separation)	Front Side 45°	20050	1720	24	23.17	0	0.903	1.09	--
		Front Side 45°	20175	1732.5	24	23.52	0	0.919	1.03	--
		Front Side 45°	20300	1745	24	23.64	0	1.086	**1.18**	**5**
		Front Side 45°	20300	1745	24	23.64	0	1.079	1.17	--
		Front Side 90°	20050	1720	24	23.17	0	0.890	1.08	--
		Front Side 90°	20175	1732.5	24	23.52	0	0.921	1.03	--
		Front Side 90°	20300	1745	24	23.64	0	1.001	1.09	--
		Front Side 90°	20300	1745	24	23.64	0	1.000	1.09	--

		Front Side 120°	20050	1720	24	23.17	0	0.876	1.06	--
		Front Side 120°	20175	1732.5	24	23.52	0	0.808	0.90	--
		Front Side 120°	20300	1745	24	23.64	0	0.956	1.04	--
		Front Side 120°	20300	1745	24	23.64	0	0.952	1.03	--
		Back Side 90°	20300	1745	24	23.64	0	0.087	0.09	--
		Top Side 45°	20300	1745	24	23.64	0	0.117	0.13	--
		Top Side 90°	20300	1745	24	23.64	0	0.119	0.13	--
		Top Side 120°	20300	1745	24	23.64	0	0.102	0.11	--
		Bottom Side 45°	20300	1745	24	23.64	0	0.066	0.07	--
		Bottom Side 90°	20300	1745	24	23.64	0	0.065	0.07	--
		Bottom Side 120°	20300	1745	24	23.64	0	0.064	0.07	--
50%RB #0	Hotspot (5mm Separation)	Front Side 45°	20050	1720	23	22.37	1	0.902	1.04	--
		Front Side 45°	20175	1732.5	23	22.25	1	0.891	1.06	--
		Front Side 45°	20300	1745	23	22.61	1	0.947	1.04	--
		Front Side 45°	20300	1745	23	22.61	1	0.942	1.03	--
		Front Side 90°	20050	1720	23	22.37	1	0.812	0.94	--
		Front Side 90°	20175	1732.5	23	22.25	1	0.823	0.98	--
		Front Side 90°	20300	1745	23	22.61	1	0.902	0.99	--
		Front Side 90°	20300	1745	23	22.61	1	0.900	0.98	--

		Front Side 120°	20050	1720	23	22.37	1	0.718	0.83	--
		Front Side 120°	20175	1732.5	23	22.25	1	0.759	0.90	--
		Front Side 120°	20300	1745	23	22.61	1	0.900	0.98	--
		Front Side 120°	20300	1745	23	22.61	1	0.892	0.98	--
		Back Side 90°	20300	1745	23	22.61	1	0.055	0.06	--
		Top Side 45°	20300	1745	23	22.61	1	0.067	0.07	--
		Top Side 90°	20300	1745	23	22.61	1	0.062	0.07	--
		Top Side 120°	20300	1745	23	22.61	1	0.060	0.07	--
		Bottom Side 45°	20300	1745	23	22.61	1	0.055	0.06	--
		Bottom Side 90°	20300	1745	23	22.61	1	0.047	0.05	--
		Bottom Side 120°	20300	1745	23	22.61	1	0.057	0.06	--

Table 9: SAR Values of LTE BAND 5 , 10MHz ,QPSK

Test Mode	Test Positions		Channel		Power(dBm)		MPR (dB)	SAR 1g(W/Kg), Limit(1.6W/kg)		Plot No.
			CH.	MHz	Maximum Turn-up Power(dBm)	Measured output power(dBm)		Measured SAR 1g(W/kg)	Scaled SAR 1g(W/kg)	
1RB #49	Hotspot (5mm Separation)	Front Side 45°	20450	829	24.50	24.01	0	0.777	0.87	--
		Front Side 45°	20525	836.5	24.50	23.89	0	0.812	0.93	--
		Front Side 45°	20600	844	24.50	24.01	0	0.911	1.02	--
		Front Side 45°	20600	844	24.50	24.01	0	0.914	**1.02**	**6**
		Front Side 90°	20450	829	24.50	24.01	0	0.801	0.90	--
		Front Side 90°	20525	836.5	24.50	23.89	0	0.753	0.87	--
		Front Side 90°	20600	844	24.50	24.01	0	0.868	0.97	--
		Front Side 90°	20600	844	24.50	24.01	0	0.877	0.98	--
		Front Side 120°	20600	844	24.50	24.01	0	0.745	0.83	--
		Back Side 90°	20600	844	24.50	24.01	0	0.056	0.06	--
		Top Side 45°	20600	844	24.50	24.01	0	0.191	0.21	--
		Top Side 90°	20600	844	24.50	24.01	0	0.188	0.21	--
		Top Side 120°	20600	844	24.50	24.01	0	0.182	0.20	--
		Bottom Side 45°	20600	844	24.50	24.01	0	0.146	0.16	--
		Bottom Side 90°	20600	844	24.50	24.01	0	0.140	0.16	--
		Bottom Side 120°	20600	844	24.50	24.01	0	0.143	0.16	--
50%RB #25	Hotspot (5mm Separation)	Front Side 45°	20450	829	23	22.86	1.5	0.801	0.83	--

		Front Side 45°	20450	829	23	22.86	1.5	0.798	0.82	--
		Front Side 45°	20525	836.5	23	22.83	1.5	0.712	0.74	--
		Front Side 45°	20600	844	23	22.80	1.5	0.709	0.74	--
		Front Side 90°	20450	829	23	22.86	1.5	0.784	0.81	--
		Front Side 120°	20450	829	23	22.86	1.5	0.777	0.80	--
		Back Side 90°	20450	829	23	22.86	1.5	0.047	0.05	--
		Top Side 45°	20450	829	23	22.86	1.5	0.123	0.13	--
		Top Side 90°	20450	829	23	22.86	1.5	0.114	0.12	--
		Top Side 120°	20450	829	23	22.86	1.5	0.115	0.12	--
		Bottom Side 45°	20450	829	23	22.86	1.5	0.112	0.12	--
		Bottom Side 90°	20450	829	23	22.86	1.5	0.108	0.11	--
		Bottom Side 120°	20450	829	23	22.86	1.5	0.110	0.11	--

Table 10: SAR Values of LTE BAND 12 , 10MHz ,QPSK

Test Mode	Test Positions		Channel		Power(dBm)		MPR (dB)	SAR 1g(W/Kg), Limit(1.6W/kg)		Plot No.
			CH.	MHz	Maximum Turn-up Power(dBm)	Measured output power(dBm)		Measured SAR 1g(W/kg)	Scaled SAR 1g(W/kg)	
1RB #25	Hotspot (5mm Separation)	Front Side 45°	23060	704	24	23.68	0	1.102	1.19	--
		Front Side 45°	23095	707.5	24	23.58	0	1.113	1.23	--
		Front Side 45°	23130	711	24	23.69	0	1.287	**1.38**	**7**
		Front Side 45°	23130	711	24	23.69	0	1.280	1.37	--
		Front Side 90°	23060	704	24	23.68	0	1.112	1.20	--

		Front Side 90°	23095	707.5	24	23.58	0	1.100	1.21	--
		Front Side 90°	23130	711	24	23.69	0	1.202	1.29	--
		Front Side 90°	23130	711	24	23.69	0	1.200	1.29	--
		Front Side 120°	23060	704	24	23.68	0	0.919	0.99	--
		Front Side 120°	23095	707.5	24	23.58	0	0.908	1.00	--
		Front Side 120°	23130	711	24	23.69	0	1.139	1.22	--
		Front Side 120°	23130	711	24	23.69	0	1.145	1.23	--
		Back Side 90°	23130	711	24	23.69	0	0.223	0.24	--
		Top Side 45°	23130	711	24	23.69	0	0.271	0.29	--
		Top Side 90°	23130	711	24	23.69	0	0.269	0.29	--
		Top Side 120°	23130	711	24	23.69	0	0.264	0.28	--
		Bottom Side 45°	23130	711	24	23.69	0	0.285	0.31	--
		Bottom Side 90°	23130	711	24	23.69	0	0.274	0.29	--
		Bottom Side 120°	23130	711	24	23.69	0	0.283	0.30	--
50%RB #25	Hotspot (5mm Separation)	Front Side 45°	23060	704	23.0	22.70	1	1.012	1.08	--
		Front Side 45°	23060	704	23.0	22.70	1	1.008	1.08	--
		Front Side 45°	23095	707.5	23.0	22.67	1	0.901	0.97	--
		Front Side 45°	23130	711	23.0	22.66	1	0.890	0.96	--
		Front Side 90°	23060	704	23.0	22.70	1	1.011	1.08	--

		Front Side 90°	23060	704	23.0	22.70	1	1.010	1.08	--
		Front Side 90°	23095	707.5	23.0	22.67	1	0.887	0.96	--
		Front Side 90°	23130	711	23.0	22.66	1	0.865	0.94	--
		Front Side 120°	23060	704	23.0	22.70	1	1.002	1.07	--
		Front Side 120°	23060	704	23.0	22.70	1	0.998	1.07	--
		Front Side 120°	23095	707.5	23.0	22.67	1	0.812	0.88	--
		Front Side 120°	23130	711	23.0	22.66	1	0.813	0.88	--
		Back Side 90°	23130	711	23.0	22.70	1	0.102	0.11	--
		Top Side 45°	23130	711	23.0	22.70	1	0.180	0.19	--
		Top Side 90°	23130	711	23.0	22.70	1	0.171	0.18	--
		Top Side 120°	23130	711	23.0	22.70	1	0.172	0.18	--
		Bottom Side 45°	23130	711	23.0	22.70	1	0.202	0.22	--
		Bottom Side 90°	23130	711	23.0	22.70	1	0.201	0.22	--
		Bottom Side 120°	23130	711	23.0	22.70	1	0.198	0.21	--

Table 11: SAR Values of LTE BAND 13 , 10MHz ,QPSK

Test Mode	Test Positions		Channel		Power(dBm)		MPR (dB)	SAR 1g(W/Kg), Limit(1.6W/kg)		Plot No.
			CH.	MHz	Maximum Turn-up Power(dBm)	Measured output power(dBm)		Measured SAR 1g(W/kg)	Scaled SAR 1g(W/kg)	
1RB #25	Hotspot (5mm Separation)	Front Side 45°	23230	782	24	23.85	0	1.322	**1.37**	**8**
		Front Side 45°	23230	782	24	23.85	0	1.320	1.37	--
		Front Side 90°	23230	782	24	23.85	0	1.286	1.33	--

		Front Side 90°	23230	782	24	23.85	0	1.282	1.33	--
		Front Side 120°	23230	782	24	23.85	0	1.279	1.32	--
		Front Side 120°	23230	782	24	23.85	0	1.277	1.32	--
		Back Side 90°	23230	782	24	23.85	0	0.110	0.11	--
		Top Side 45°	23230	782	24	23.85	0	0.190	0.20	--
		Top Side 90°	23230	782	24	23.85	0	0.188	0.19	--
		Top Side 120°	23230	782	24	23.85	0	0.185	0.19	--
		Bottom Side 45°	23230	782	24	23.85	0	0.271	0.28	--
		Bottom Side 90°	23230	782	24	23.85	0	0.269	0.28	--
		Bottom Side 120°	23230	782	24	23.85	0	0.264	0.27	--
50%RB #25	Hotspot (5mm Separation)	Front Side 45°	23230	782	23	22.88	1	1.205	1.24	--
		Front Side 45°	23230	782	23	22.88	1	1.200	1.24	--
		Front Side 90°	23230	782	23	22.88	1	1.198	1.23	--
		Front Side 90°	23230	782	23	22.88	1	1.195	1.23	--
		Front Side 120°	23230	782	23	22.88	1	1.180	1.21	--
		Front Side 120°	23230	782	23	22.88	1	1.177	1.21	--
		Back Side 90°	23230	782	23	22.88	1	0.102	0.10	--
		Top Side 45°	23230	782	23	22.88	1	0.145	0.15	--
		Top Side 90°	23230	782	23	22.88	1	0.133	0.14	--

		Top Side 120°	23230	782	23	22.88	1	0.140	0.14	--
		Bottom Side 45°	23230	782	23	22.88	1	0.202	0.21	--
		Bottom Side 90°	23230	782	23	22.88	1	0.194	0.20	--
		Bottom Side 120°	23230	782	23	22.88	1	0.183	0.19	--

Table 12: SAR Values of LTE BAND 14 , 10MHz ,QPSK

Test Mode	Test Positions		Channel		Power(dBm)		MPR (dB)	SAR 1g(W/Kg), Limit(1.6W/kg)		Plot No.
			CH.	MHz	Maximum Turn-up Power(dBm)	Measured output power(dBm)		Measured SAR 1g(W/kg)	Scaled SAR 1g(W/kg)	
1RB #25	Hotspot (5mm Separation)	Front Side 45°	23330	793	24	23.85	0	1.054	**1.09**	**9**
		Front Side 45°	23330	793	24	23.85	0	1.049	1.09	--
		Front Side 90°	23330	793	24	23.85	0	0.952	0.99	--
		Front Side 90°	23330	793	24	23.85	0	0.948	0.99	--
		Front Side 120°	23330	793	24	23.85	0	0.945	0.98	--
		Front Side 120°	23330	793	24	23.85	0	0.940	0.98	--
		Back Side 90°	23330	793	24	23.85	0	0.085	0.09	--
		Top Side 45°	23330	793	24	23.85	0	0.167	0.17	--
		Top Side 90°	23330	793	24	23.85	0	0.162	0.17	--
		Top Side 120°	23330	793	24	23.85	0	0.158	0.16	--
		Bottom Side 45°	23330	793	24	23.85	0	0.206	0.21	--
		Bottom Side 90°	23330	793	24	23.85	0	0.199	0.21	--
		Bottom Side 120°	23330	793	24	23.85	0	0.197	0.20	--
50%RB #25	Hotspot (5mm Separation)	Front Side 45°	23330	793	23	22.84	1	0.901	0.93	--
		Front Side 45°	23330	793	23	22.84	1	0.898	0.93	--
		Front Side 90°	23330	793	23	22.84	1	0.855	0.89	--
		Front Side 90°	23330	793	23	22.84	1	0.854	0.89	--

		Front Side 120°	23330	793	23	22.84	1	0.812	0.84	--
		Front Side 120°	23330	793	23	22.84	1	0.808	0.84	--
		Back Side 90°	23330	793	23	22.84	1	0.071	0.07	--
		Top Side 45°	23330	793	23	22.84	1	0.131	0.14	--
		Top Side 90°	23330	793	23	22.84	1	0.125	0.13	--
		Top Side 120°	23330	793	23	22.84	1	0.120	0.12	--
		Bottom Side 45°	23330	793	23	22.84	1	0.188	0.20	--
		Bottom Side 90°	23330	793	23	22.84	1	0.175	0.18	--
		Bottom Side 120°	23330	793	23	22.84	1	0.161	0.17	--

Table 13: SAR Values of LTE BAND 66 , 20MHz ,QPSK

Test Mode	Test Positions		Channel		Power(dBm)		MPR (dB)	SAR 1g(W/Kg), Limit(1.6W/kg)		Plot No.
			CH.	MHz	Maximum Turn-up Power(dBm)	Measured output power(dBm)		Measured SAR 1g(W/kg)	Scaled SAR 1g(W/kg)	
1RB #50	Hotspot (5mm Separation)	Front Side 45°	132072	1720	24	23.31	0	1.112	1.30	--
		Front Side 45°	132322	1745	24	23.77	0	1.284	**1.35**	**10**
		Front Side 45°	132322	1745	24	23.77	0	1.282	1.35	--
		Front Side 45°	132572	1770	24	23.57	0	1.102	1.22	--
		Front Side 90°	132072	1720	24	23.31	0	1.089	1.28	--
		Front Side 90°	132322	1745	24	23.77	0	1.202	1.27	--
		Front Side 90°	132322	1745	24	23.77	0	1.199	1.26	--
		Front Side 90°	132572	1770	24	23.57	0	1.091	1.20	--
		Front Side 120°	132072	1720	24	23.31	0	1.011	1.19	--
		Front Side 120°	132322	1745	24	23.77	0	1.183	1.25	--
		Front Side 120°	132322	1745	24	23.77	0	1.185	1.25	--
		Front Side 120°	132572	1770	24	23.57	0	1.039	1.15	--
		Back Side 90°	132322	1745	24	23.77	0	0.041	0.04	--
		Top Side 45°	132322	1745	24	23.77	0	0.102	0.11	--
		Top Side 90°	132322	1745	24	23.77	0	0.097	0.10	--
		Top Side 120°	132322	1745	24	23.77	0	0.089	0.09	--
		Bottom Side 45°	132322	1745	24	23.77	0	0.065	0.07	--

		Bottom Side 90°	132322	1745	24	23.77	0	0.061	0.06	--
		Bottom Side 120°	132322	1745	24	23.77	0	0.062	0.07	--
50%RB #25	Hotspot (5mm Separation)	Front Side 45°	132072	1720	23	22.43	1	1.077	1.23	--
		Front Side 45°	132322	1745	23	22.77	1	1.102	1.16	--
		Front Side 45°	132322	1745	23	22.77	1	1.100	1.16	--
		Front Side 45°	132572	1745	23	22.37	1	1.000	1.16	--
		Front Side 90°	132072	1720	23	22.43	1	0.919	1.05	--
		Front Side 90°	132322	1745	23	22.77	1	1.089	1.15	--
		Front Side 90°	132322	1745	23	22.77	1	1.085	1.14	--
		Front Side 90°	132572	1745	23	22.37	1	0.912	1.05	--
		Front Side 120°	132072	1720	23	22.43	1	0.901	1.03	--
		Front Side 120°	132322	1745	23	22.77	1	1.084	1.14	--
		Front Side 120°	132322	1745	23	22.77	1	1.082	1.14	--
		Front Side 120°	132572	1745	23	22.37	1	0.919	1.06	--
		Back Side 90°	132322	1745	23	22.77	1	0.036	0.04	--
		Top Side 45°	132322	1745	23	22.77	1	0.089	0.09	--
		Top Side 90°	132322	1745	23	22.77	1	0.080	0.08	--
		Top Side 120°	132322	1745	23	22.77	1	0.081	0.09	--
		Bottom Side 45°	132322	1745	23	22.77	1	0.050	0.05	--

		Bottom Side 90°	132322	1745	23	22.77	1	0.049	0.05	--
		Bottom Side 120°	132322	1745	23	22.77	1	0.044	0.05	--

Table 14: SAR Values of LTE BAND 71 , 20MHz ,QPSK

Test Mode	Test Positions		Channel		Power(dBm)		MPR (dB)	SAR 1g(W/Kg), Limit(1.6W/kg)		Plot No.
			CH.	MHz	Maximum Turn-up Power(dBm)	Measured output power(dBm)		Measured SAR 1g(W/kg)	Scaled SAR 1g(W/kg)	
1RB #25	Hotspot (5mm Separation)	Front Side 45°	133222	673	24	23.44	0	1.230	1.40	--
		Front Side 45°	133222	673	24	23.44	0	1.237	**1.41**	**11**
		Front Side 45°	133322	683	24	23.23	0	1.101	1.31	--
		Front Side 45°	133372	688	24	23.07	0	1.115	1.38	--
		Front Side 90°	133222	673	24	23.44	0	1.202	1.37	--
		Front Side 90°	133222	673	24	23.44	0	1.198	1.36	--
		Front Side 90°	133322	683	24	23.23	0	1.010	1.21	--
		Front Side 90°	133372	688	24	23.07	0	1.112	1.38	--
		Front Side 120°	133222	673	24	23.44	0	1.115	1.27	--
		Front Side 120°	133222	673	24	23.44	0	1.111	1.26	--
		Front Side 120°	133322	683	24	23.23	0	1.028	1.23	--
		Front Side 120°	133372	688	24	23.07	0	1.007	1.25	--
		Back Side 90°	133222	673	24	23.44	0	0.250	0.28	--
		Top Side 45°	133222	673	24	23.44	0	0.345	0.39	--
		Top Side 90°	133222	673	24	23.44	0	0.330	0.38	--

		Top Side 120°	133222	673	24	23.44	0	0.337	0.38	--
		Bottom Side 45°	133222	673	24	23.44	0	0.340	0.39	--
		Bottom Side 90°	133222	673	24	23.44	0	0.336	0.38	--
		Bottom Side 120°	133222	673	24	23.44	0	0.331	0.38	--
50%RB #25	Hotspot (5mm Separation)	Front Side 45°	133222	673	23	22.34	1	1.145	1.33	--
		Front Side 45°	133222	673	23	22.34	1	1.142	1.33	--
		Front Side 45°	133322	683	23	22.32	1	1.023	1.20	--
		Front Side 45°	133372	688	23	22.30	1	0.919	1.08	--
		Front Side 90°	133222	673	23	22.34	1	1.110	1.29	--
		Front Side 90°	133222	673	23	22.34	1	1.108	1.29	--
		Front Side 90°	133322	683	23	22.32	1	1.021	1.19	--
		Front Side 90°	133372	688	23	22.30	1	1.028	1.21	--
		Front Side 120°	133222	673	23	22.34	1	1.045	1.22	--
		Front Side 120°	133222	673	23	22.34	1	1.041	1.21	--
		Front Side 120°	133322	683	23	22.32	1	0.929	1.09	--
		Front Side 120°	133372	688	23	22.30	1	0.953	1.12	--
		Back Side 90°	133372	688	23	22.34	1	0.202	0.24	--
		Top Side 45°	133372	688	23	22.34	1	0.289	0.34	--
		Top Side 90°	133372	688	23	22.34	1	0.274	0.32	--

		Top Side 120°	133372	688	23	22.34	1	0.270	0.31	--
		Bottom Side 45°	133372	688	23	22.34	1	0.250	0.29	--
		Bottom Side 90°	133372	688	23	22.34	1	0.241	0.28	--
		Bottom Side 120°	133372	688	23	22.34	1	0.230	0.27	--

Measurement variability consideration

According to KDB 865664 D01v01r04 section 2.8.1, repeated measurements are required following the procedures as below:

Repeated measurement is not required when the original highest measured SAR is < 0.80W/kg; steps 2) through 4) do not apply.

When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.

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).

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:

Band	Position	Channel	Mode	measured SAR(W/kg)				
				Original	1st Repeated		2nd Repeated	
					Value	Ratio	Value	Ratio
WCDMA Band V	Front Side 45°	4132	RMC	0.833	0.829	1.005	NA	NA
WCDMA Band II	Front Side 45°	9262	RMC	1.233	1.211	1.018	NA	NA
	Front Side 90°	9262	RMC	1.102	1.100	1.002	NA	NA
	Front Side 120°	9262	RMC	0.888	0.876	1.014	NA	NA
WCDMA Band IV	Front Side 45°	1312	RMC	1.306	1.299	1.005	NA	NA
	Front Side 90°	1312	RMC	1.202	1.189	1.010	NA	NA
	Front Side 120°	1312	RMC	1.114	1.110	1.004	NA	NA
LTE Band 2	Front Side 45°	18700	1RB	0.972	0.970	1.002	NA	NA
	Front Side 90°	18700	1RB	0.887	0.880	1.008	NA	NA
LTE Band 4	Front Side 45°	20300	1RB	1.086	1.079	1.006	NA	NA
	Front Side 90°	20300	1RB	1.001	1.000	1.001	NA	NA
	Front Side 120°	20300	1RB	0.956	0.952	1.004	NA	NA
	Front Side 45°	20300	50%RB	0.947	0.942	1.005	NA	NA
	Front Side 90°	20300	50%RB	0.902	0.900	1.002	NA	NA
	Front Side 120°	20300	50%RB	0.900	0.892	1.009	NA	NA
LTE Band 5	Front Side 45°	20600	1RB	0.914	0.911	1.003	NA	NA

	Front Side 90°	20600	1RB	0.877	0.868	1.010	NA	NA
	Front Side 45°	20450	50%RB	0.801	0.798	1.004	NA	NA
LTE Band 12	Front Side 45°	23130	1RB	1.287	1.280	1.005	NA	NA
	Front Side 90°	23130	1RB	1.202	1.200	1.002	NA	NA
	Front Side 120°	23130	1RB	1.145	1.139	1.005	NA	NA
	Front Side 45°	23060	50%RB	1.012	1.008	1.004	NA	NA
	Front Side 90°	23060	50%RB	1.011	1.010	1.001	NA	NA
	Front Side 120°	23060	50%RB	1.002	0.998	1.004	NA	NA
LTE Band 13	Front Side 45°	23230	1RB	1.322	1.320	1.002	NA	NA
	Front Side 90°	23230	1RB	1.286	1.282	1.003	NA	NA
	Front Side 120°	23230	1RB	1.279	1.277	1.002	NA	NA
	Front Side 45°	23230	50%RB	1.205	1.200	1.004	NA	NA
	Front Side 90°	23230	50%RB	1.198	1.195	1.003	NA	NA
	Front Side 120°	23230	50%RB	1.180	1.177	1.003	NA	NA
LTE Band 14	Front Side 45°	23330	1RB	1.054	1.049	1.005	NA	NA
	Front Side 90°	23330	1RB	0.952	0.948	1.004	NA	NA
	Front Side 120°	23330	1RB	0.945	0.940	1.005	NA	NA
	Front Side 45°	23330	50%RB	0.901	0.898	1.003	NA	NA
	Front Side 90°	23330	50%RB	0.855	0.854	1.001	NA	NA
	Front Side 120°	23330	50%RB	0.812	0.808	1.005	NA	NA
LTE Band 66	Front Side 45°	132322	1RB	1.284	1.282	1.002	NA	NA
	Front Side 90°	132322	1RB	1.202	1.199	1.003	NA	NA
	Front Side 120°	132322	1RB	1.185	1.183	1.002	NA	NA
	Front Side 45°	132322	50%RB	1.102	1.100	1.002	NA	NA
	Front Side 90°	132322	50%RB	1.089	1.085	1.004	NA	NA
	Front Side 120°	132322	50%RB	1.084	1.082	1.002	NA	NA
	Front Side 45°	133222	1RB	1.237	1.230	1.006	NA	NA
	Front Side 90°	133222	1RB	1.202	1.198	1.003	NA	NA

LTE Band 71	Front Side 120°	133222	1RB	1.115	1.111	1.004	NA	NA
	Front Side 45°	133222	50%RB	1.145	1.142	1.003	NA	NA
	Front Side 90°	133222	50%RB	1.110	1.108	1.002	NA	NA
	Front Side 120°	133222	50%RB	1.045	1.041	1.004	NA	NA

Simultaneous Transmission SAR Analysis.

No simultaneous transmission SAR

14 SAR Measurement Reference

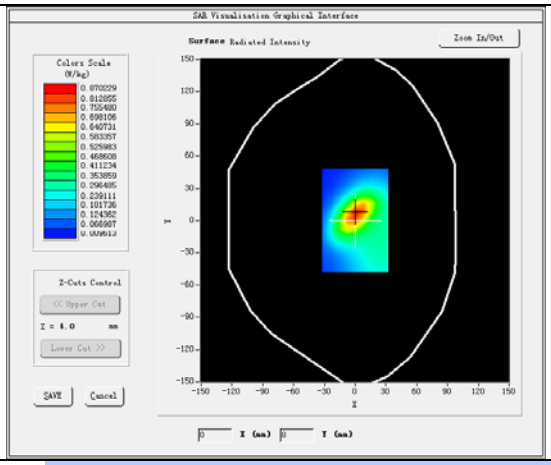
References

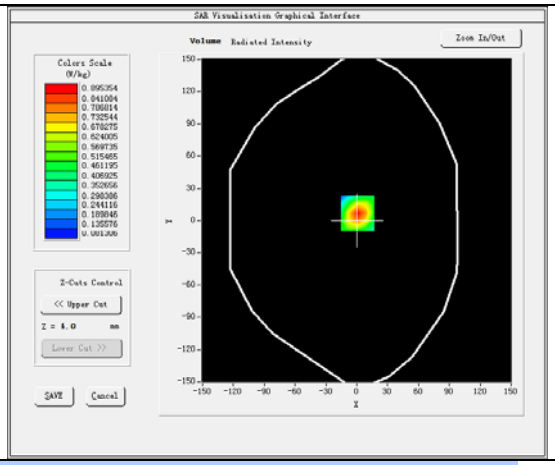
1. **FCC 47 CFR Part 2 "Frequency Allocations and Radio Treaty Matters; General Rules and Regulations"**
2. **IEEE Std. C95.1-2005, "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3kHz to 300GHz", 2005**
3. **IEEE Std. 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices:Measurement Techniques", June 2013**
4. **IEC 62209-2, "Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices—Human models, instrumentation, and procedures – Part 2: Procedure to determine the specific absorption rate(SAR) for wireless communication devices used in close proximity to the human body(frequency range of 30MHz to 6GHz)", April 2010**
5. **FCC KDB 447498 D01 v02, "Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies", Oct 23th, 2015**
6. **FCC KDB 447498 D02 v06, "SAR Measurement Procedures for USB Dongle Transmitters", Nov 13th, 2009**
7. **FCC KDB 941225 D01 v03r01, "3G SAR Measurement Procedures", Oct 23th, 2015**
8. **FCC KDB 941225 D05 v02r05, "SAR Evaluation Considerations for LTE Devices", Dec 16th, 2015**
9. **FCC KDB 941225 D06 v02r01, "SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities", Oct 23th, 2015**
10. **FCC KDB865664 D01 v01r04, "SAR Measurement Requirements 100MHz to 6GHz", Aug 7th, 2015**
11. **FCC KDB865664 D02 v01r02, "RF Exposure Compliance Reporting and Documentation Considerations ", Oct 23th", 2015**
12. **FCC KDB648474 D04 v01r03, "SAR Evaluation Considerations for Wireless Handsets", Oct 23th", 2015**

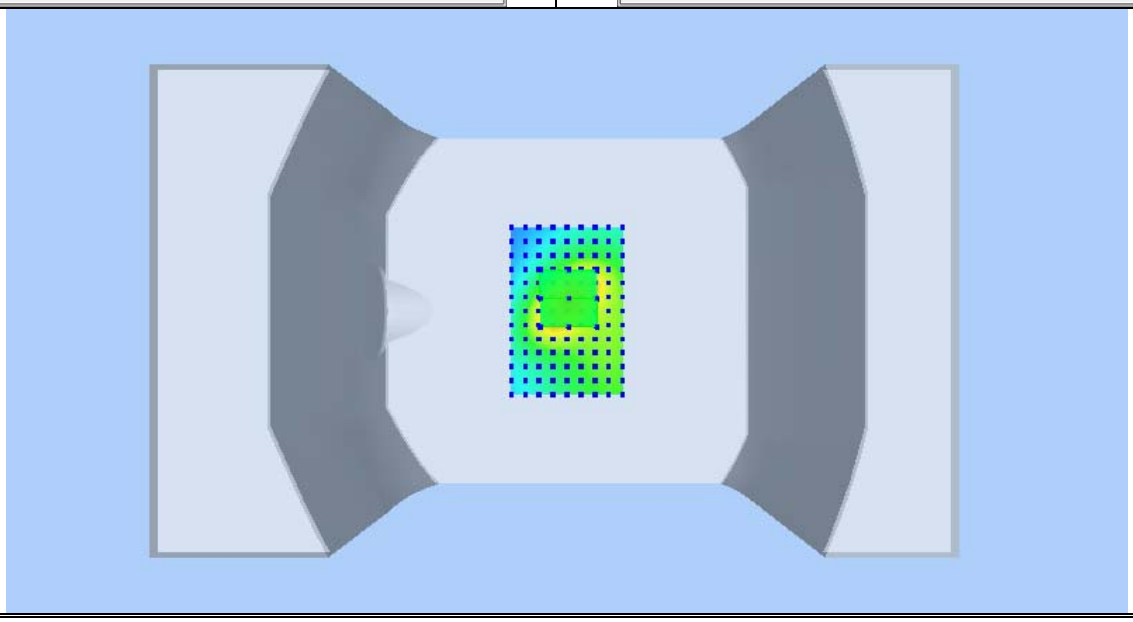
Maximum SAR measurement Plots

Plot 1: WCDMA BAND V, Low channel (Hotspot, Front Side 45°)
Product Description: JADESTICK
Test Date: 2020-05-01

Medium(liquid type)	MSL_850
Frequency (MHz)	826.4000
Relative permittivity (real part)	55.16
Conductivity (S/m)	0.98
Signal	WCDMA (Duty cycle: 1:1)
E-Field Probe	SN 07/15 EP247
Conversion Factor	5.18
Sensor-Surface	4mm
Area Scan	dx=8mm dy=8mm
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm
Variation (%)	-0.50
SAR 10g (W/Kg)	0.481095
SAR 1g (W/Kg)	0.832773
SURFACE SAR	**VOLUME SAR**

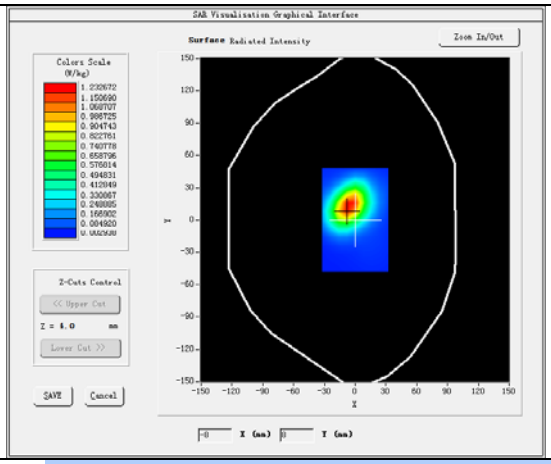


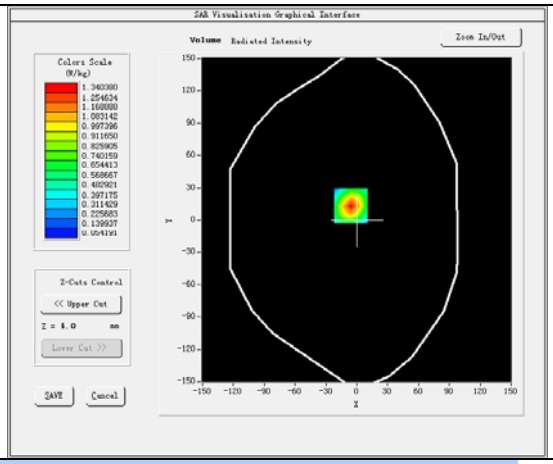


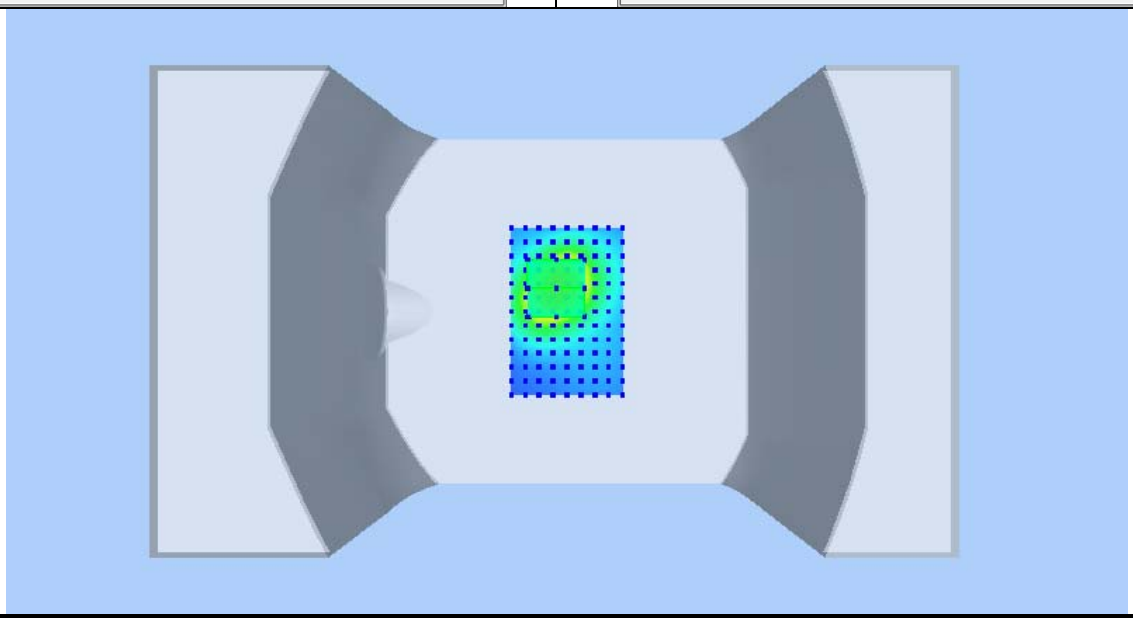


Plot 2: WCDMA BAND Ⅱ, Low channel (Hotspot, Front Side 45°)
Product Description: JADESTICK
Test Date: 2020-05-29

Medium(liquid type)	MSL_1900
Frequency (MHz)	1852.4000
Relative permittivity (real part)	53.59
Conductivity (S/m)	1.55
Signal	WCDMA(Duty cycle: 1:1)
E-Field Probe	SN 07/15 EP247
Conversion Factor	4.83
Sensor-Surface	4mm
Area Scan	dx=8mm dy=8mm
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm
Variation (%)	2.08
SAR 10g (W/Kg)	0.644709
SAR 1g (W/Kg)	1.232820
SURFACE SAR	**VOLUME SAR**

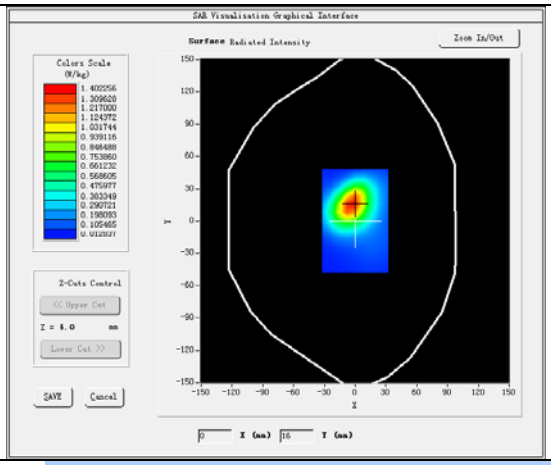


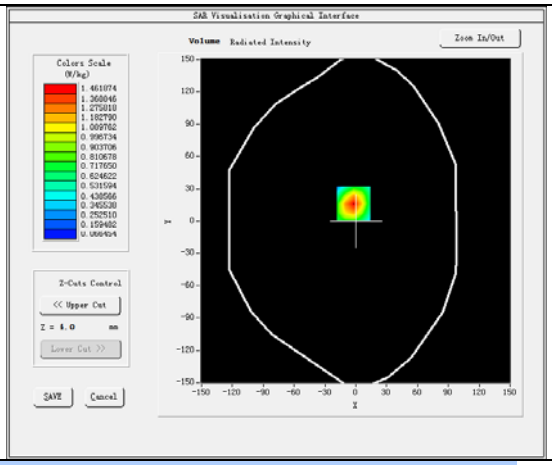


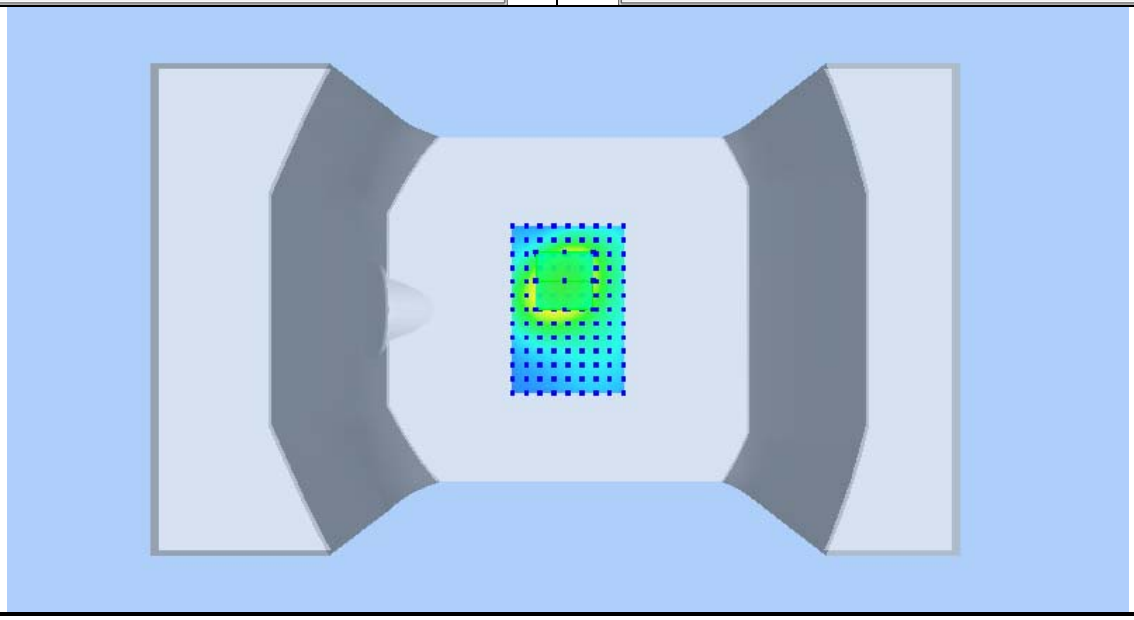


Plot 3: WCDMA BAND IV, Low channel (Hotspot, Front Side 45°)
Product Description: JADESTICK
Test Date: 2020-05-08

Medium(liquid type)	HSL_1700
Frequency (MHz)	1712.4000
Relative permittivity (real part)	53.63
Conductivity (S/m)	1.57
Signal	WCDMA(Duty cycle: 1:1)
E-Field Probe	SN 07/15 EP247
Conversion Factor	4.43
Sensor-Surface	4mm
Area Scan	dx=8mm dy=8mm
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm
Variation (%)	-0.40
SAR 10g (W/Kg)	0.738889
SAR 1g (W/Kg)	1.306244
SURFACE SAR	**VOLUME SAR**

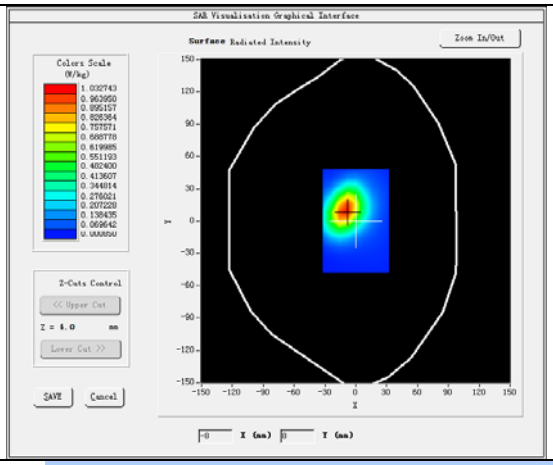


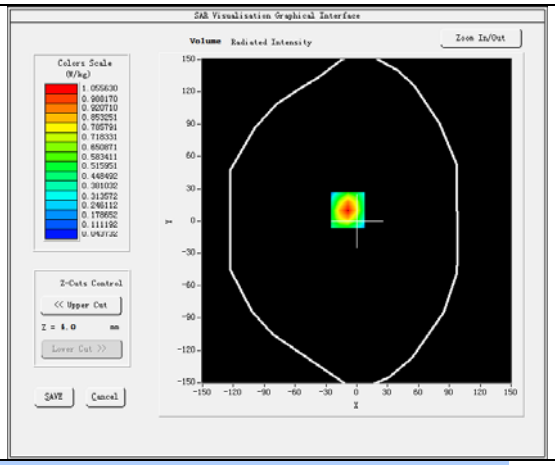


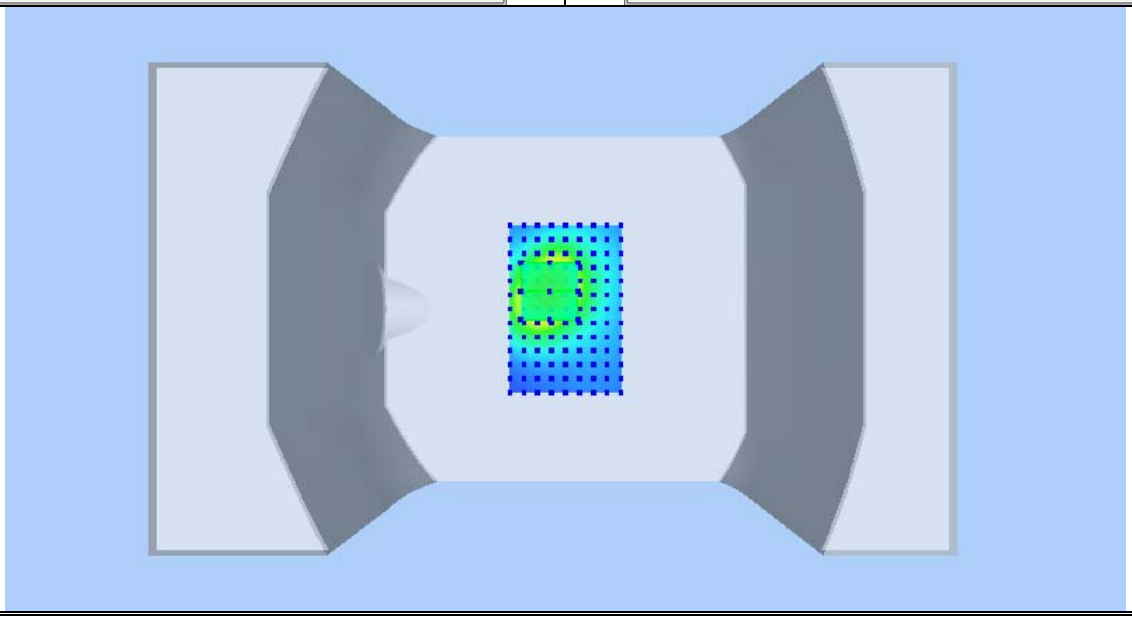


Plot 4:LTE BAND 2, Low channel (Hotspot, Front Side 45°)
Product Description:JADESTICK
Test Date: 2020-05-29

Medium(liquid type)	MSL_1900
Frequency (MHz)	1860.0000
Relative permittivity (real part)	53.59
Conductivity (S/m)	1.55
Signal	Duty cycle: 1:1
E-Field Probe	SN 07/15 EP247
Conversion Factor	4.83
Bandwidth(MHz)	20
RB Allocation	1
RB Offset	49
Area Scan	dx=8mm dy=8mm
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm
Variation (%)	-0.33
SAR 10g (W/Kg)	0.520083
SAR 1g (W/Kg)	0.908481
SURFACE SAR	**VOLUME SAR**

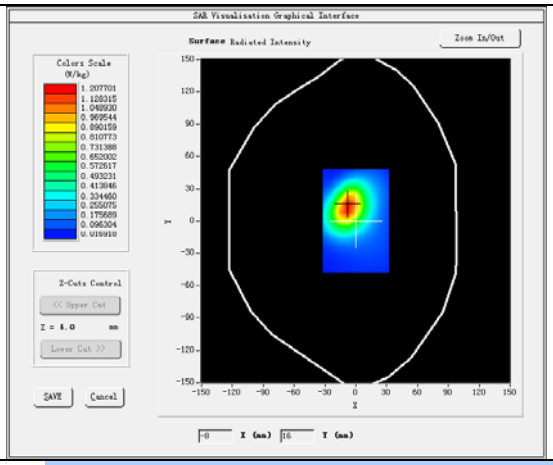


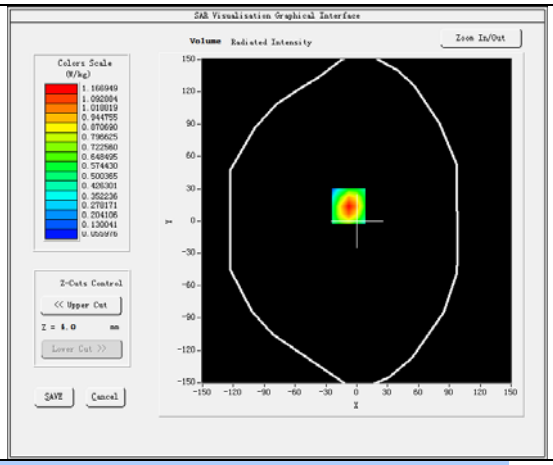


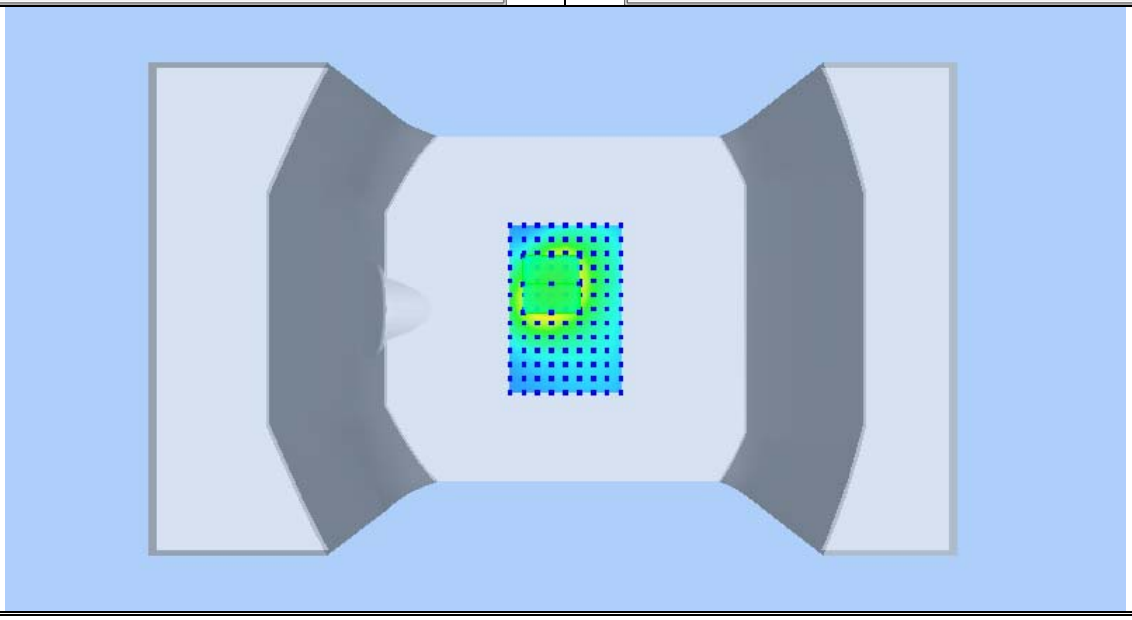


Plot 5:LTE BAND 4, High channel (Hotspot, Front Side 45°)
Product Description:JADESTICK
Test Date: 2020-05-08

Medium(liquid type)	MSL_1800
Frequency (MHz)	1745.0000
Relative permittivity (real part)	53.63
Conductivity (S/m)	1.57
Signal	Duty cycle: 1:1
E-Field Probe	SN 07/15 EP247
Conversion Factor	4.43
Bandwidth(MHz)	20
RB Allocation	1
RB Offset	49
Area Scan	dx=8mm dy=8mm
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm
Variation (%)	-2.31
SAR 10g (W/Kg)	0.601131
SAR 1g (W/Kg)	1.086208
SURFACE SAR	**VOLUME SAR**

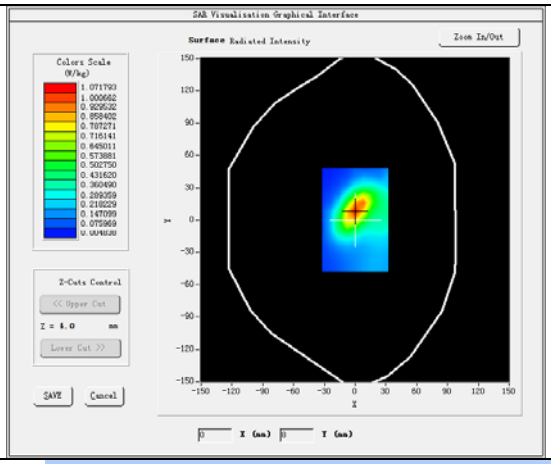


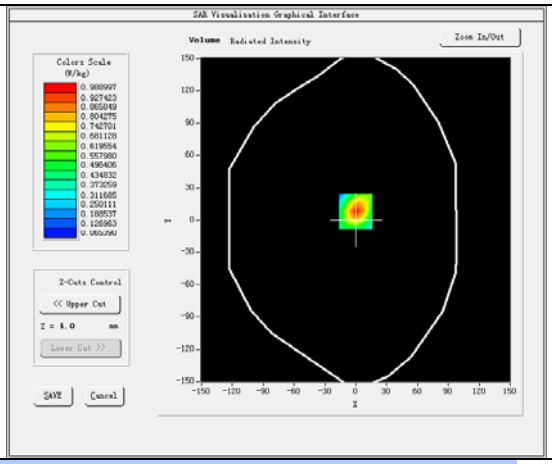


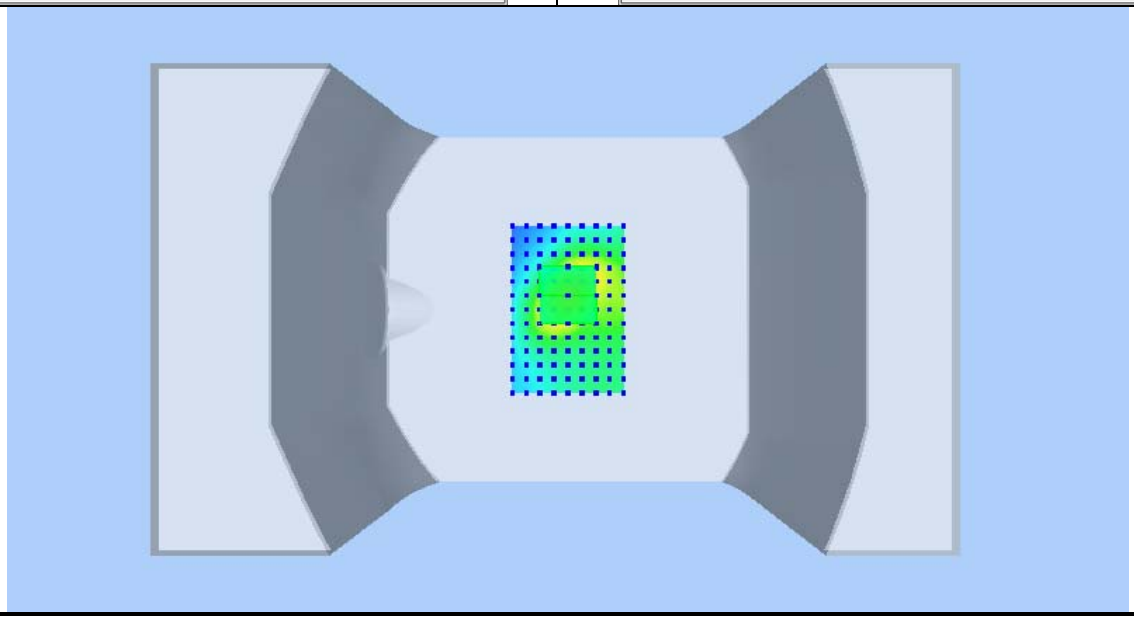


Plot 6: LTE BAND 5, High channel (Hotspot, Front Side 45°)
Product Description: JADESTICK
Test Date: 2020-05-01

Medium(liquid type)	MSL_850
Frequency (MHz)	844.00000
Relative permittivity (real part)	55.16
Conductivity (S/m)	0.92
Signal	Duty cycle: 1:1
E-Field Probe	SN 07/15 EP247
Conversion Factor	5.18
Bandwidth(MHz)	10
RB Allocation	1
RB Offset	49
Sensor-Surface	4mm
Area Scan	dx=8mm dy=8mm
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm
Variation (%)	-2.08
SAR 10g (W/Kg)	0.517678
SAR 1g (W/Kg)	0.913780
SURFACE SAR	**VOLUME SAR**

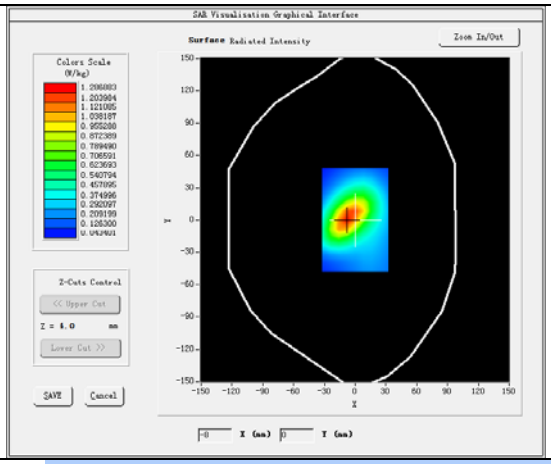


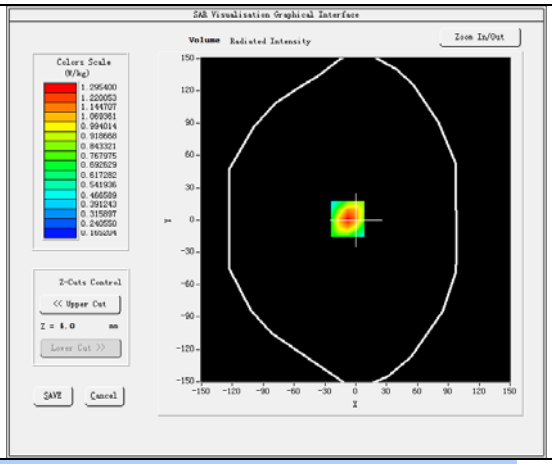


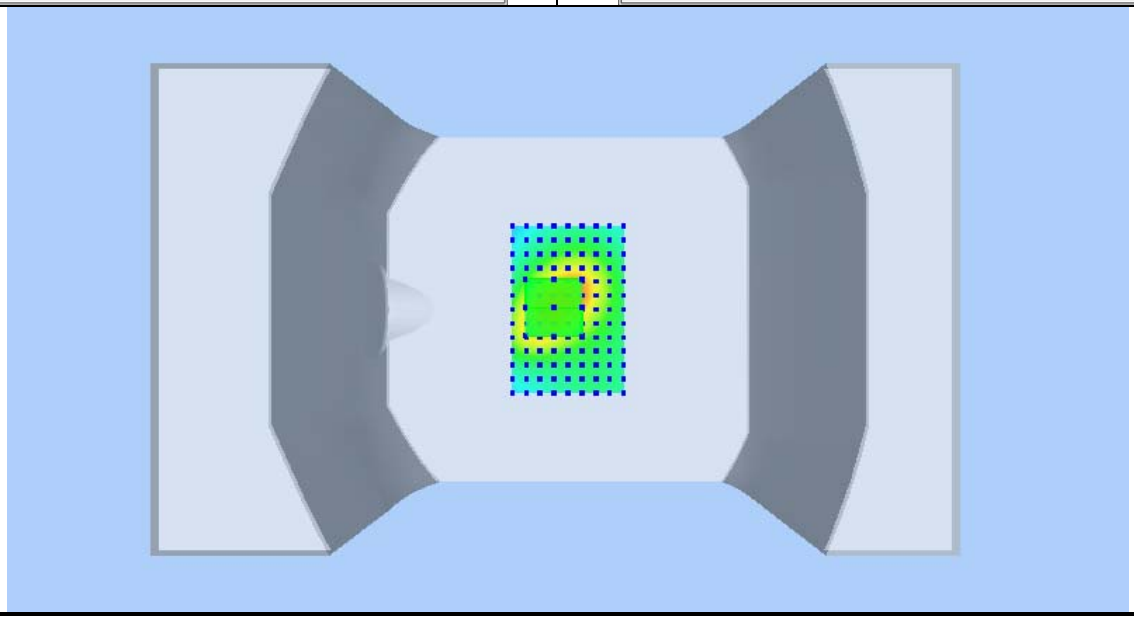


Plot 7: LTE BAND 12, High channel (Hotspot, Front Side 45°)
Product Description: JADESTICK
Test Date: 2020-05-15

Medium(liquid type)	MSL_750
Frequency (MHz)	711.00000
Relative permittivity (real part)	53.61
Conductivity (S/m)	0.98
Signal	Duty cycle: 1:1
E-Field Probe	SN 07/15 EP247
Conversion Factor	4.94
Bandwidth(MHz)	10
RB Allocation	1
RB Offset	49
Sensor-Surface	4mm
Area Scan	dx=8mm dy=8mm
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm
Variation (%)	-1.75
SAR 10g (W/Kg)	0.788351
SAR 1g (W/Kg)	1.286682
SURFACE SAR	**VOLUME SAR**

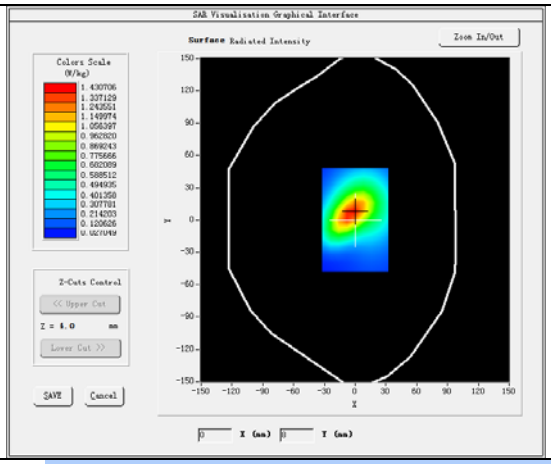


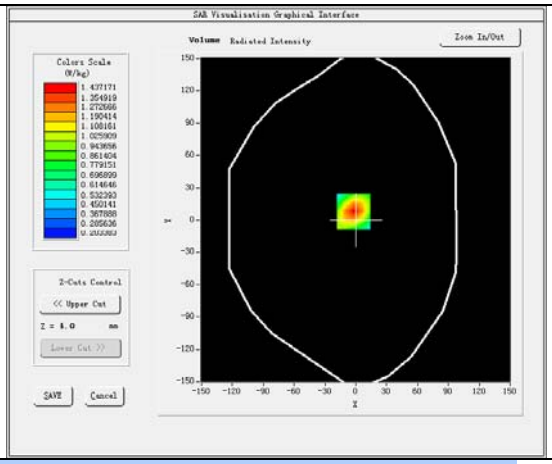


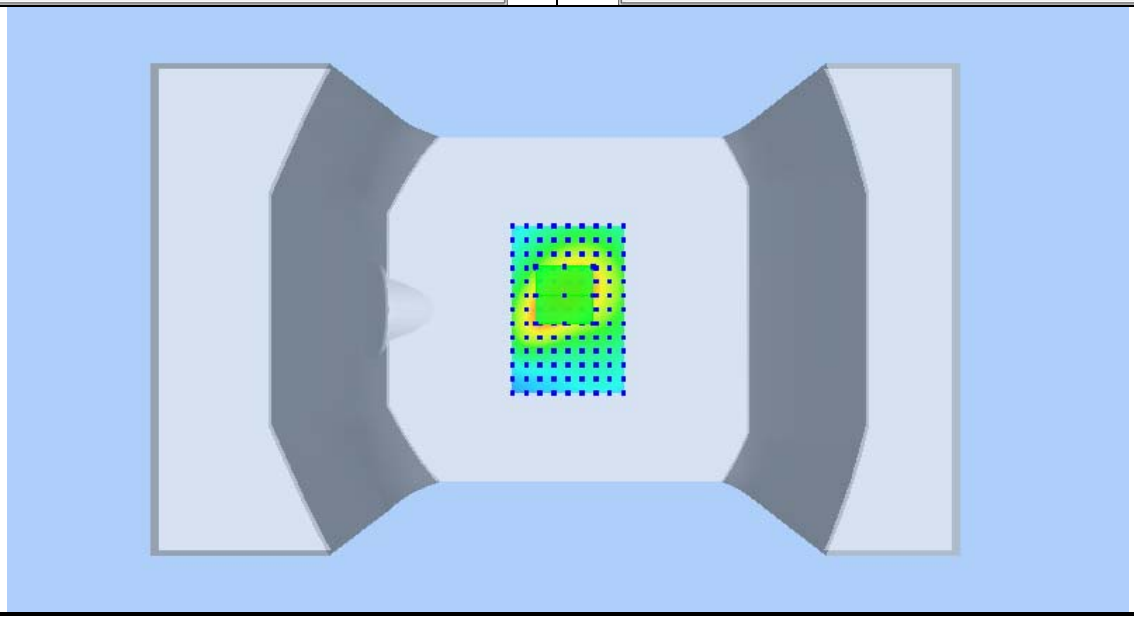


Plot 8: LTE BAND 13, Mid channel (Hotspot, Front Side 45°)
Product Description: JADESTICK
Test Date: 2020-05-15

Medium(liquid type)	MSL_750
Frequency (MHz)	782.00000
Relative permittivity (real part)	53.63
Conductivity (S/m)	0.98
Signal	Duty cycle: 1:1
E-Field Probe	SN 07/15 EP247
Conversion Factor	4.94
Bandwidth(MHz)	10
RB Allocation	1
RB Offset	49
Sensor-Surface	4mm
Area Scan	dx=8mm dy=8mm
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm
Variation (%)	1.22
SAR 10g (W/Kg)	0.850692
SAR 1g (W/Kg)	1.322332
SURFACE SAR	**VOLUME SAR**

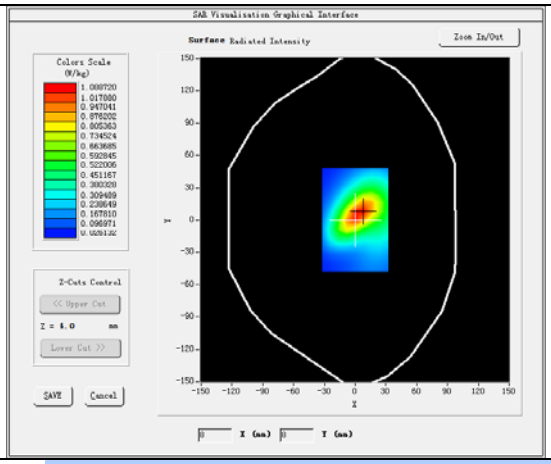


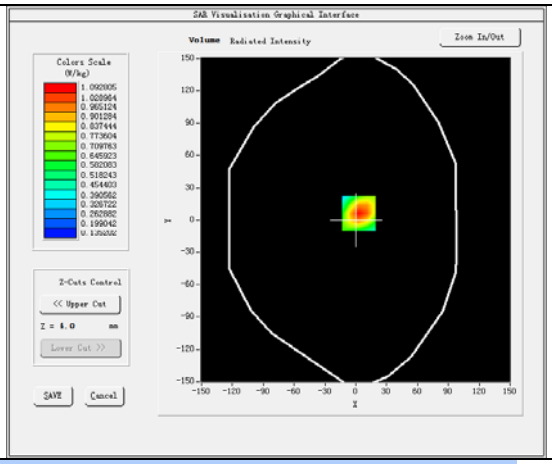


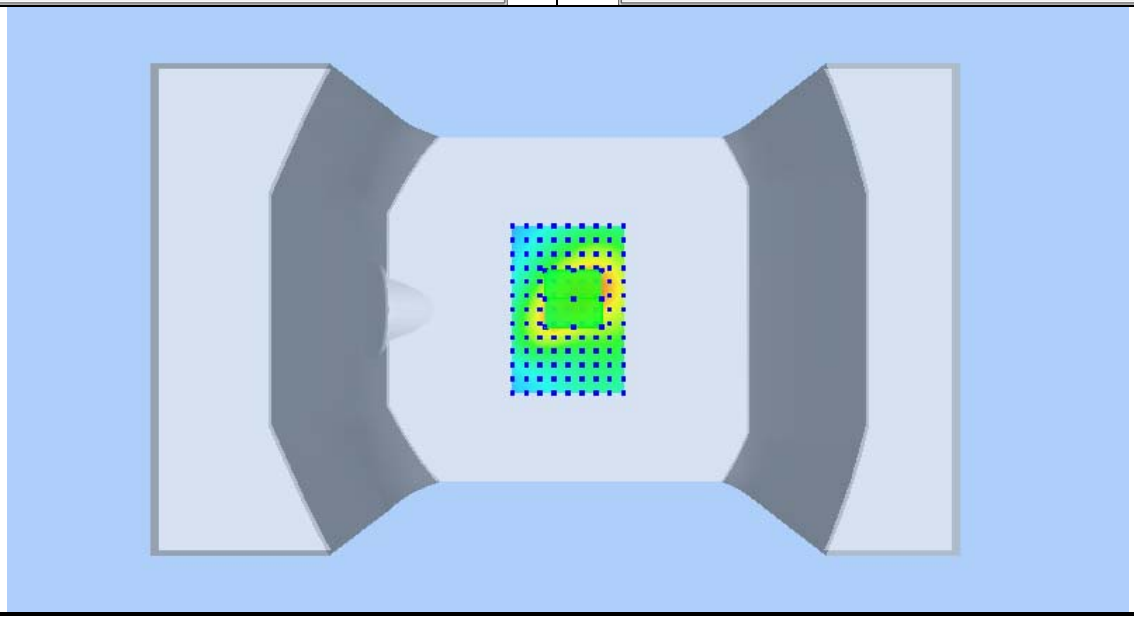


Plot 9: LTE BAND 14, Mid channel (Hotspot, Front Side 45°)
Product Description: JADESTICK
Test Date: 2020-05-15

Medium(liquid type)	MSL_750
Frequency (MHz)	793.00000
Relative permittivity (real part)	53.60
Conductivity (S/m)	1.57
Signal	Duty cycle: 1:1
E-Field Probe	SN 07/15 EP247
Conversion Factor	4.94
Bandwidth(MHz)	10
RB Allocation	1
RB Offset	49
Sensor-Surface	4mm
Area Scan	dx=8mm dy=8mm
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm
Variation (%)	1.06
SAR 10g (W/Kg)	0.639110
SAR 1g (W/Kg)	1.054423
SURFACE SAR	**VOLUME SAR**

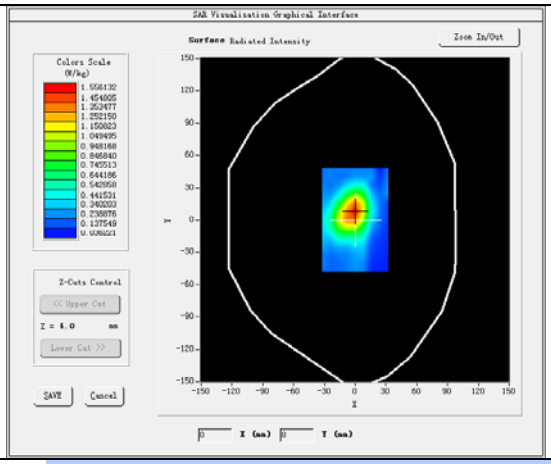


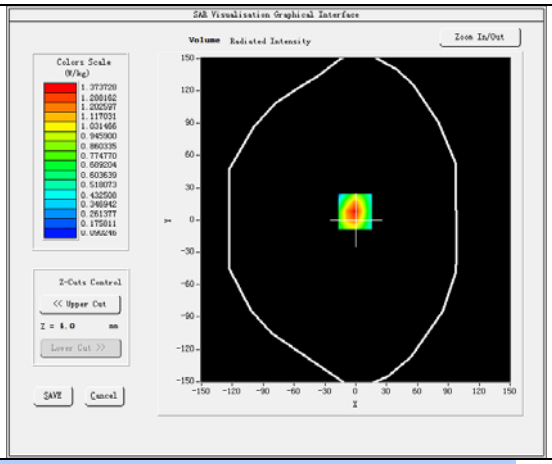


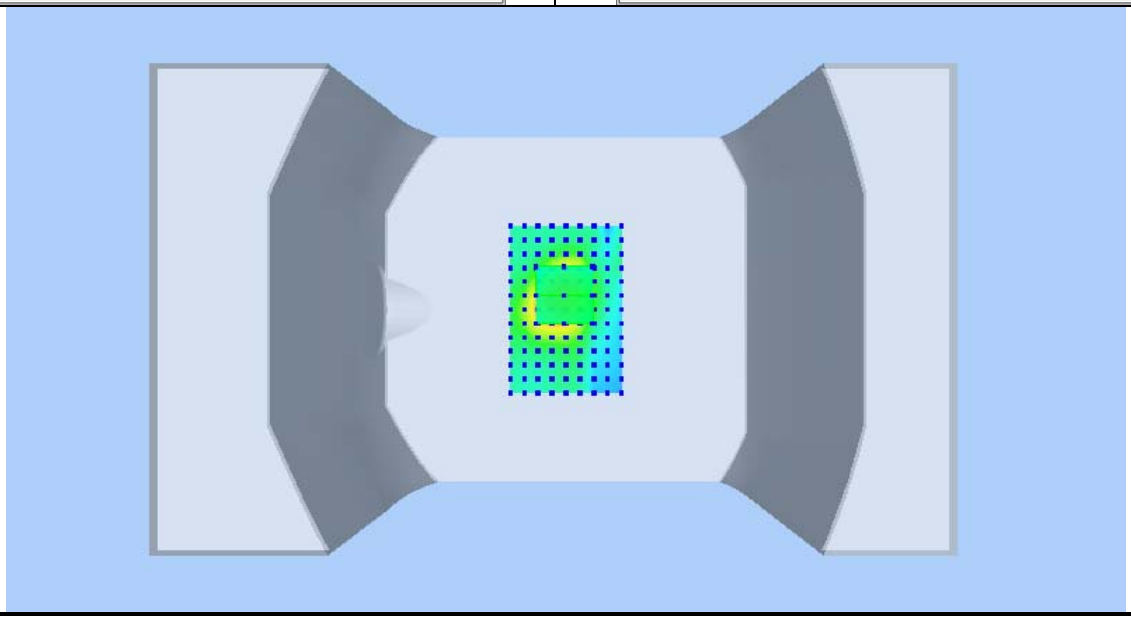


Plot 10: LTE BAND 66, Mid channel (Hotspot, Front Side 45°)
Product Description: JADESTICK
Test Date: 2020-05-08

Medium(liquid type)	MSL_1800
Frequency (MHz)	1720.00000
Relative permittivity (real part)	53.60
Conductivity (S/m)	1.57
Signal	Duty cycle: 1:1
E-Field Probe	SN 07/15 EP247
Conversion Factor	4.43
Bandwidth(MHz)	20
RB Allocation	1
RB Offset	49
Sensor-Surface	4mm
Area Scan	dx=8mm dy=8mm
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm
Variation (%)	-2.87
SAR 10g (W/Kg)	0.712182
SAR 1g (W/Kg)	1.283901
SURFACE SAR	**VOLUME SAR**

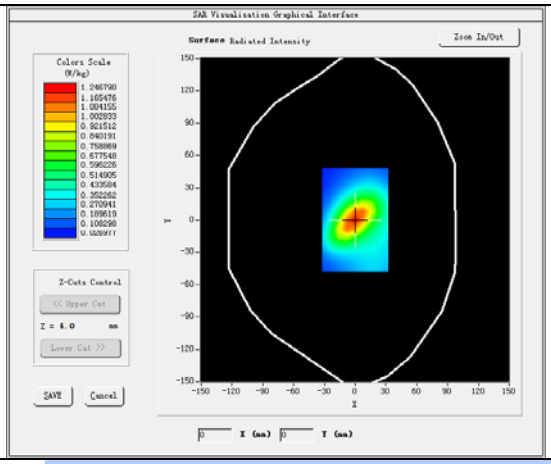


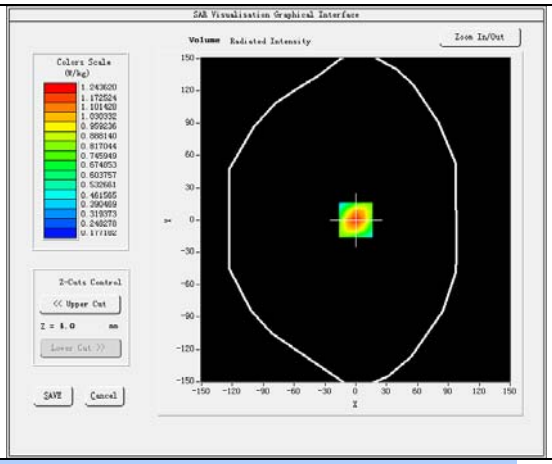


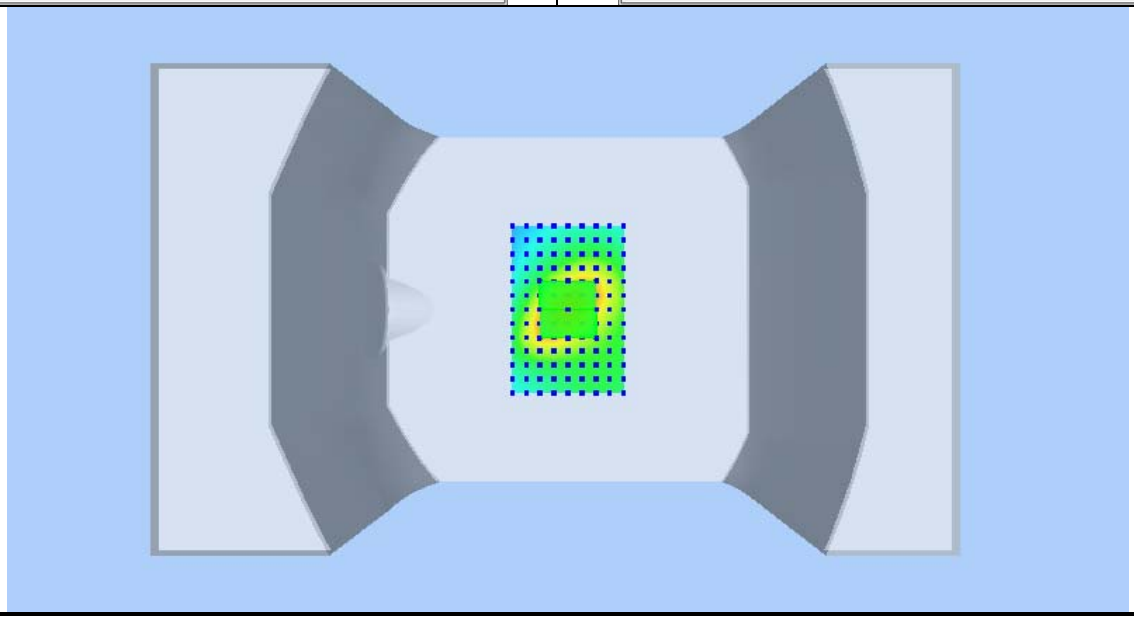


Plot 11: LTE BAND 71, Low channel (Hotspot, Front Side 45°)
Product Description: JADESTICK
Test Date: 2020-05-15

Medium(liquid type)	MSL_750
Frequency (MHz)	673.00000
Relative permittivity (real part)	53.77
Conductivity (S/m)	0.97
Signal	Duty cycle: 1:1
E-Field Probe	SN 07/15 EP247
Conversion Factor	4.94
Bandwidth(MHz)	20
RB Allocation	1
RB Offset	49
Sensor-Surface	4mm
Area Scan	dx=8mm dy=8mm
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm
Variation (%)	1.14
SAR 10g (W/Kg)	0.755588
SAR 1g (W/Kg)	1.236898
SURFACE SAR	**VOLUME SAR**







15 Calibration Reports-Probe and Dipole

COMOSAR E-Field Probe Calibration Report

Ref : ACR.318.1.19.SATU.A

WALTEK SERVICES (SHENZHEN) CO., LTD

1/F, FUKANGTAI BUILDING, WEST BAIMA ROAD,SONGGANG STREET, BAOAN DISTRICT

SHENZHEN (518105), CHINA

MVG COMOSAR DOSIMETRIC E-FIELD PROBE

SERIAL NO.: SN 07/15 EP247

Calibrated at MVG US

2105 Barrett Park Dr. - Kennesaw, GA 30144

ACCREDITED Calibration CERT #2246-02

Calibration Date: 8/20/19

Summary:

This document presents the method and results from an accredited COMOSAR Dosimetric E-Field Probe calibration performed in MVG USA using the CALISAR / CALIBAIR test bench, for use with a COMOSAR system only. All calibration results are traceable to national metrology institutions.

	Name	*Function*	*Date*	*Signature*
Prepared by :	Jérôme LUC	Product Manager	8/21/2019	
Checked by :	Jérôme LUC	Product Manager	8/21/2019	
Approved by :	Kim RUTKOWSKI	Quality Manager	8/21/2019	

	Customer Name
Distribution :	Waltek Services (Shenzhen)Co.,Ltd

Issue	*Date*	*Modifications*
A	8/21/2019	Initial release

TABLE OF CONTENTS

1 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR DOSIMETRIC E FIELD PROBE
Manufacturer	MVG
Model	SSE5
Serial Number	SN 7/15 EP247
Product Condition (new / used)	Used
Frequency Range of Probe	0.7 GHz-3GHz
Resistance of Three Dipoles at Connector	Dipole 1: R1=0.213 MΩ Dipole 2: R2=0.208 MΩ Dipole 3: R3=0.213 MΩ

A yearly calibration interval is recommended.

2 PRODUCT DESCRIPTION

2.1 GENERAL INFORMATION

MVG's COMOSAR E field Probes are built in accordance to the IEEE 1528, OET 65 Bulletin C and CEI/IEC 62209 standards.

Figure 1 – *MVG COMOSAR Dosimetric E field Dipole*

Probe Length	330 mm
Length of Individual Dipoles	4.5 mm
Maximum external diameter	8 mm
Probe Tip External Diameter	5 mm
Distance between dipoles / probe extremity	2.7 mm

3 MEASUREMENT METHOD

The IEEE 1528, OET 65 Bulletin C, CENELEC EN50361 and CEI/IEC 62209 standards provide recommended practices for the probe calibrations, including the performance characteristics of interest and methods by which to assess their affect. All calibrations / measurements performed meet the fore mentioned standards.

3.1 LINEARITY

The evaluation of the linearity was done in free space using the waveguide, performing a power sweep to cover the SAR range 0.01W/kg to 100W/kg.

3.2 SENSITIVITY

The sensitivity factors of the three dipoles were determined using a two step calibration method (air and tissue simulating liquid) using waveguides as outlined in the standards.

3.3 LOWER DETECTION LIMIT

The lower detection limit was assessed using the same measurement set up as used for the linearity measurement. The required lower detection limit is 10 mW/kg.

3.4 ISOTROPY

The axial isotropy was evaluated by exposing the probe to a reference wave from a standard dipole with the dipole mounted under the flat phantom in the test configuration suggested for system validations and checks. The probe was rotated along its main axis from 0 - 360 degrees in 15 degree steps. The hemispherical isotropy is determined by inserting the probe in a thin plastic box filled with tissue-equivalent liquid, with the plastic box illuminated with the fields from a half wave dipole. The dipole is rotated about its axis (0°–180°) in 15° increments. At each step the probe is rotated about its axis (0°–360°).

3.5 BOUNDARY EFFECT

The boundary effect is defined as the deviation between the SAR measured data and the expected exponential decay in the liquid when the probe is oriented normal to the interface. To evaluate this effect, the liquid filled flat phantom is exposed to fields from either a reference dipole or waveguide. With the probe normal to the phantom surface, the peak spatial average SAR is measured and compared to the analytical value at the surface.

4 MEASUREMENT UNCERTAINTY

The guidelines outlined in the IEEE 1528, OET 65 Bulletin C, CENELEC EN50361 and CEI/IEC 62209 standards were followed to generate the measurement uncertainty associated with an E-field probe calibration using the waveguide technique. All uncertainties listed below represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2, traceable to the Internationally Accepted Guides to Measurement Uncertainty.

Uncertainty analysis of the probe calibration in waveguide					
ERROR SOURCES	**Uncertainty value (%)**	**Probability Distribution**	**Divisor**	**ci**	**Standard Uncertainty (%)**
Incident or forward power	3.00%	Rectangular	$\sqrt{3}$	1	1.732%
Reflected power	3.00%	Rectangular	$\sqrt{3}$	1	1.732%
Liquid conductivity	5.00%	Rectangular	$\sqrt{3}$	1	2.887%
Liquid permittivity	4.00%	Rectangular	$\sqrt{3}$	1	2.309%
Field homogeneity	3.00%	Rectangular	$\sqrt{3}$	1	1.732%
Field probe positioning	5.00%	Rectangular	$\sqrt{3}$	1	2.887%

Field probe linearity	3.00%	Rectangular	$\sqrt{3}$	1	1.732%
Combined standard uncertainty					5.831%
Expanded uncertainty 95 % confidence level k = 2					12.0%

5 CALIBRATION MEASUREMENT RESULTS

Calibration Parameters	
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

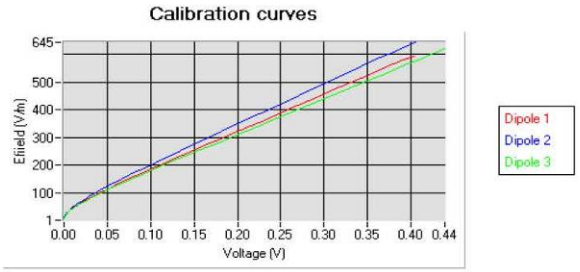
5.1 SENSITIVITY IN AIR

Normx dipole 1 (μV/(V/m)^2)	Normy dipole 2 (μV/(V/m)^2)	Normz dipole 3 (μV/(V/m)^2)
5.51	5.53	6.41

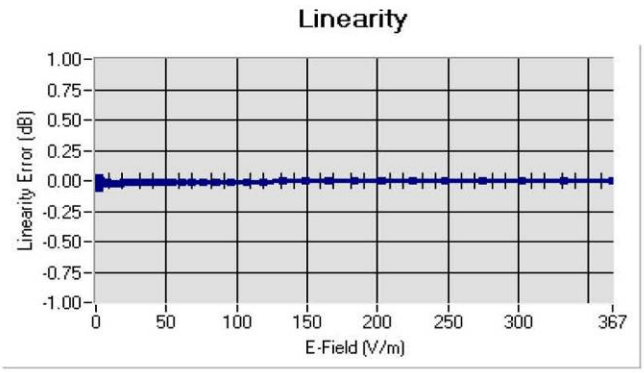
DCP dipole 1 (mV)	DCP dipole 2 (mV)	DCP dipole 3 (mV)
95	95	95

Calibration curves ei=f(V) (i=1,2,3) allow to obtain H-field value using the formula:

$$E = \sqrt{E_1^{\,2} + E_2^{\,2} + E_3^{\,2}}$$



5.2 LINEARITY



Linearity:±1.50% (+/-0.07dB)

5.3 SENSITIVITY IN LIQUID

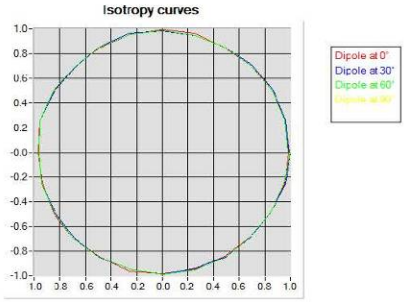
Liquid	Frequency (MHz +/- 100MHz)	Permittivity	Epsilon (S/m)	ConvF
HL750	750	42.09	0.91	4.80
BL750	750	55.69	0.95	4.94
HL850	835	42.71	0.89	4.99
BL850	835	57.52	1.03	5.18
HL900	900	41.94	0.93	4.95
BL900	900	52.87	1.09	5.14
HL1800	1800	40.62	1.39	4.29
BL1800	1800	53.22	1.47	4.43
HL1900	1900	41.22	1.37	4.73
BL1900	1900	50.99	1.52	4.83
HL2000	2000	40.39	1.36	4.56
BL2000	2000	54.39	1.54	4.69
HL2300	2300	38.10	1.74	4.59
BL2300	2300	53.33	1.86	4.77
HL2450	2450	40.46	1.87	4.46
BL2450	2450	54.62	1.95	4.61
HL2600	2600	38.46	2.01	4.16
BL2600	2600	51.98	2.16	4.28

LOWER DETECTION LIMIT: 7mW/kg

5.4 ISOTROPY

HL900 MHz

- Axial isotropy: 0.04 dB
- Hemispherical isotropy: 0.07 dB



HL1800 MHz

- Axial isotropy: 0.04 dB
- Hemispherical isotropy: 0.08 dB