FCC SAR REPORT

Applicant:	Sun Cupid Technology (HK) Ltd.
Address of Applicant:	16/F, CEO Tower, 77 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong.
Equipment Under Test (EUT)	
Product Name:	LTE mobile phone
Model No.:	N5704L, G1, P1, G1+
Trade mark	NUU
FCC ID:	2ADINN5704L
Applicable standards:	FCC 47 CFR Part 2.1093
Date of Test:	24 Apr., 2018 ~ 30 Apr., 2018
Test Result:	Maximum Reported 1-g SAR (W/kg) Head: 0.307 Body: 0.254 Hotspot: 0.469

Authorized Signature:

Bruce Zhang
Laboratory Manager

2 Version

Version No.	Date	Description
00	*09 May., 2018*	*Original*
01	*21 May., 2018*	*1. Updated Band information on page 34.*
02	*23 May., 2018*	*1. Updated model No. on page 1/6.*

Prepared by:	Jacky Su ***Report Clerk***	***Date:***	*23 May., 2018*
Reviewed by:	Janet Wei ***Project Engineer***	***Date:***	*23 May., 2018*

3 Contents

4 SAR Results Summary

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

<Highest Reported standalone SAR Summary>

Exposure Position	Frequency Band	Reported 1-g SAR (W/kg)	Equipment Class	Highest Reported 1-g SAR (W/kg)
Head	GSM 850	0.042	PCE	0.307
	GSM 1900	0.011		
	WCDMA Band V	0.060		
	WCDMA Band IV	0.025		
	WCDMA Band II	0.037		
	LTE Band 2	0.039		
	LTE Band 4	0.091		
	LTE Band 5	0.060		
	LTE Band 7	0.009		
	LTE Band 12	0.079		
	WLAN 2.4 GHz	0.307	DTS	
Body (10 mm Gap)	GSM 850	0.064	PCE	0.254
	GSM 1900	0.116		
	WCDMA Band V	0.105		
	WCDMA Band IV	0.169		
	WCDMA Band II	0.224		
	LTE Band 2	0.254		
	LTE Band 4	0.169		
	LTE Band 5	0.077		
	LTE Band 7	0.248		
	LTE Band 12	0.124		
	WLAN 2.4GHz	0.061	DTS	
Hotspot (10 mm Gap)	GSM 850	0.159	PCE	0.469
	GSM 1900	0.466		
	WCDMA Band V	0.105		
	WCDMA Band IV	0.346		
	WCDMA Band II	0.446		
	LTE Band 2	0.469		
	LTE Band 4	0.232		
	LTE Band 5	0.077		
	LTE Band 7	0.248		
	LTE Band 12	0.124		
	WLAN 2.4 GHz	0.072	DTS	

<Highest Reported simultaneous SAR Summary>

Exposure Position	Frequency Band	Reported 1-g SAR (W/kg)	Equipment Class	Highest Reported Simultaneous Transmission 1-g SAR (W/kg)
Bottom	LTE Band 2	0.469	PCE	0.469
	WLAN 2.4 GHz	/	DTS	

Note:

1. The highest simultaneous transmission is scalar summation of Reported standalone SAR per FCC KDB 690783 D01 v01r03, and scalar SAR summation of all possible simultaneous transmission scenarios are < 1.6W/kg.
2. This device is compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-2005, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013.

5 General Information

5.1 Client Information

Applicant:	Sun Cupid Technology (HK) Ltd.
Address of Applicant:	16/F, CEO Tower, 77 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong.
Manufacturer:	Sun Cupid Technology (HK) Ltd.
Address of Manufacturer:	16/F, CEO Tower, 77 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong.
Factory:	SUNCUPID (ShenZhen) Electronic Ltd
Address of Factory:	Baolong Industrial City, Longgang District, Shenzhen Hi-Tech Road, Building 1, A 7, China.

5.2 General Description of EUT

Product Name:	LTE mobile phone
Model No.:	N5704L, G1, P1, G1+
Category of device	Portable device
Operation Frequency:	GSM850: 824.2 ~ 848.8 MHz PCS 1900: 1850.2 ~ 1909.8 MHz WCDMA Band V: 826.4 ~ 846.6 MHz WCDMA Band IV: 1712.4 ~ 1752.6 MHz WCDMA Band II: 1852.4 ~ 1907.6 MHz FDD LTE Band 2 :1850MHz~1910MHz FDD LTE Band 4 :1710MHz~1755MHz FDD LTE Band 5 :824MHz~849MHz FDD LTE Band 7: 2500MHz~2570MHz FDD LTE Band 12: 698MHz~716MHz FDD LTE Band 17: 704MHz~716MHz Bluetooth: 2402 MHz ~ 2480 MHz Wi-Fi: 802.11b/g/n-HT20: 2412MHz ~ 2462 MHz 802.11n-HT40 :2422MHz~2452MHz
Modulation technology:	GSM/GPRS:GMSK, EGPRS: 8PSK WCDMA/HSDPA/HSUPA: QPSK, LTE:QPSK/16QAM Bluetooth: GFSK/π/4DQPSK/8DPSK Wi-Fi: 802.11b: DSSS, 802.11g/n: OFDM
Antenna Type:	Internal Antenna
Antenna Gain:	GSM 850: -1.46 dBi, PCS 1900: 2.48 dBi WCDMA Band V: -1.47 dBi, WCDMA Band II: 2.48 dBi WCDMA Band IV: 1.37 dBi, LTE Band 2: 2.59dBi LTE Band 4: 1.37dBi, LTE Band 5: -1.47dBi LTE Band 7: 2.35dBi, LTE Band 12: -1.69dBi LTE Band 17: -1.69dBi, WIFI/BT: 1.72dBi
Release Version:	R99 for GSM, R6 for WCDMA, R8 for LTE
(E)GPRS Class:	(E)GPRS Class: 12
Dimensions (L*W*H):	152 mm (L)× 72 mm (W)×11 mm (H)

<table>
<tr><td rowspan="2">Accessories information:</td><td rowspan="2">Adapter:
Model: HJ-0502000N2-US
Input: AC100-240V, 50/60Hz, 0.3A
Output: DC 5.0V, 2000mA</td><td>Battery:
Rechargeable Li-ion Battery 3.8V/5200mAh</td></tr>
<tr><td>Headset:
Support headset</td></tr>
</table>

5.3 Maximum RF Output Power

Mode	Average Power (dBm)	
	GSM 850	GSM 1900
GSM (Voice)	32.67	29.94
GPRS (1 TX Slot)	32.65	29.93
GPRS (2 TX Slots)	31.86	29.23
GPRS (3 TX Slots)	30.11	27.47
GPRS (4 TX Slots)	29.03	26.40
EGPRS (1 TX Slot)	26.75	26.64
EGPRS (2 TX Slots)	25.40	25.60
EGPRS (3 TX Slots)	22.96	23.41
EGPRS (4 TX Slots)	21.63	22.42

Mode	Average Power (dBm)		
	WCDMA Band V	WCDMA Band IV	WCDMA Band II
AMR 12.2 kbps	22.79	23.20	23.08
RMC 12.2 kbps	22.80	23.22	23.10
HSDPA Sub-test 1	21.81	22.25	22.17
HSDPA Sub-test 2	21.41	22.03	21.72
HSDPA Sub-test 3	19.90	20.37	20.22
HSDPA Sub-test 4	19.87	20.58	20.23
HSUPA Sub-test 1	21.37	21.93	21.66
HSUPA Sub-test 2	21.79	22.35	22.16
HSUPA Sub-test 3	19.45	20.04	19.68
HSUPA Sub-test 4	21.84	22.39	22.17
HSUPA Sub-test 5	20.38	20.84	20.69

Mode	Average Power (dBm)					
	LTE Band 2	LTE Band 4	LTE Band 5	LTE Band 7	LTE Band 12	LTE Band 17
BW/1.4 MHz	22.48	22.45	22.84	/	22.67	/
BW/3.0 MHz	22.56	22.47	22.89	/	22.59	/
BW/5.0 MHz	22.53	22.45	22.76	21.96	22.63	22.76
BW/10 MHz	22.59	22.45	22.95	21.78	22.85	22.39
BW/15 MHz	22.59	22.35	/	21.90	/	/
BW/20 MHz	22.62	22.44	/	21.78	/	/

WLAN 2.4 GHz Band Average Power (dBm)				
Mode/Band	b	g	n (HT-20)	n (HT-40)
WLAN 2.4GHz	17.71	15.74	15.74	13.90

Bluetooth Average Power (dBm)				
Mode/Band	1 Mbps(GFSK)	2 Mbps(π/4DQPSK)	3 Mbps (8DPSK)	LE (BT 4.0)
Bluetooth 2.4 GHz	3.65	2.58	2.64	2.88

5.4 Environment of Test Site

Temperature:	18°C ~25 °C
Humidity:	35%~75% RH
Atmospheric Pressure:	1010 mbar

5.5 Test Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd.
Address: No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,
Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755-23118282, Fax: +86-755-23116366
E-mail: info@ccis-cb.com

6 Introduction

6.1 Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person’s awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

6.2 SAR Definition

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (ρ). The equation description is as below:

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

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

SAR measurement can be either related to the temperature elevation in tissue by

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

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

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

Where: σ is the conductivity of the tissue, ρ is the mass density of the tissue and E is the RMS electrical field strength. However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

7 RF Exposure Limits

7.1 Uncontrolled Environment

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

7.2 Controlled Environment

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. 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.

7.3 RF Exposure Limits

SAR Human Exposure Specified in ANSI/IEEE C95.1-1992 and Health Canada Safety Code 6

HUMAN EXPOSURE LIMITS		
	UNCONTROLLED ENVIRONMENT *General Population* (W/kg) or (mW/g)	CONTROLLED ENVIRONMENT *Occupational* (W/kg) or (mW/g)
SPATIAL PEAK SAR Brain	1.6	8.0
SPATIAL AVERAGE SAR Whole Body	0.08	0.4
SPATIAL PEAK SAR Hands, Feet, Ankles, Wrists	4.0	20

Note:

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.

8 SAR Measurement System

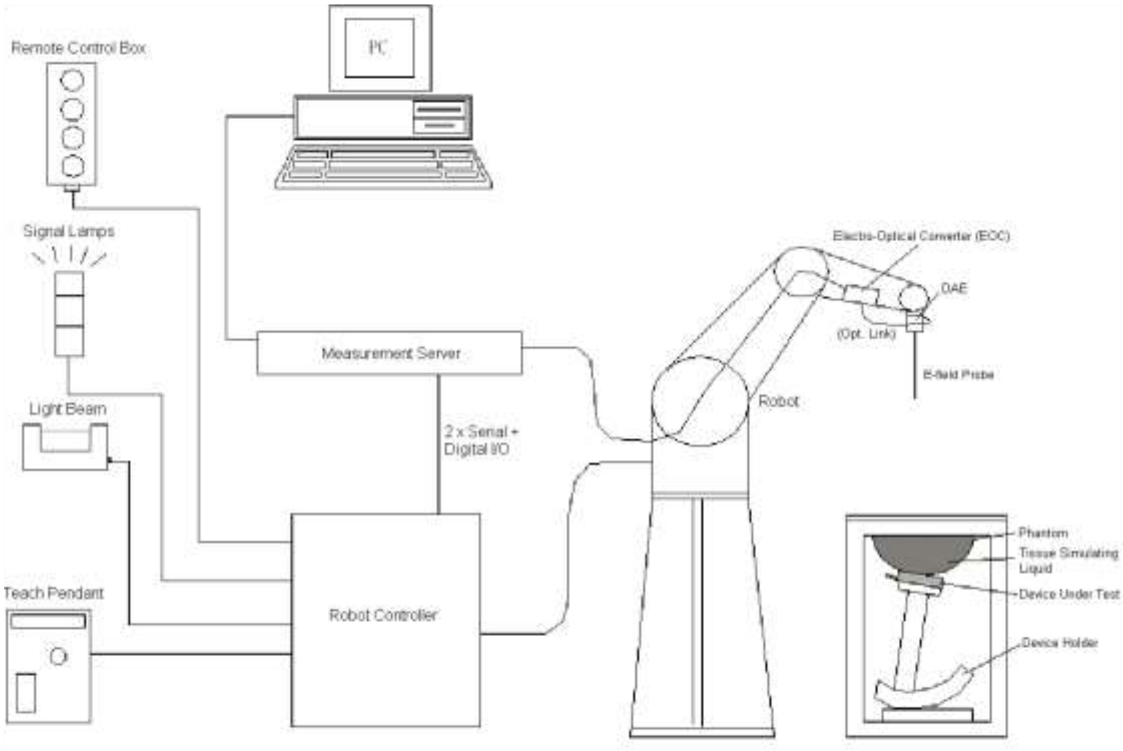


Fig. 8.1 SPEAG DASY System Configurations

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

- A standard high precision 6-axis robot with controller, a teach pendant and software
- A data acquisition electronic (DAE) attached to the robot arm extension
- A dosimetric probe equipped with an optical surface detector system
- The electro-optical converter (EOC) performs the conversion between optical and electrical signals
- A measurement server performs the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the accuracy of the probe positioning
- A computer operating Windows XP
- DASY software
- Remove control with teach pendant and additional circuitry for robot safety such as warming lamps, etc.
- The SAM twin phantom
- A device holder
- Tissue simulating liquid
- Dipole for evaluating the proper functioning of the system

Component details are described in the following sub-sections.

8.1 E-Field Probe

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

- **E-Field Probe Specification**
  <EX3DV4 Probe>

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	 **Fig. 8.2 Photo of E-Field Probe**
Frequency Directivity	10 MHz to 6 GHz; Linearity: ± 0.2 dB ± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)	
Dynamic Range	10 µW/g to 100 mW/g; Linearity: ± 0.2 dB (noise: typically < 1 µW/g)	
Dimensions	Overall length: 330 mm (Tip: 20mm) Tip diameter: 2.5 mm (Body: 12mm) Typical distance from probe tip to dipole centers: 1 mm	

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

8.2 Data Acquisition Electronics (DAE)

The Data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock. The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

Fig. 8.3 Photo of DAE

8.3 Robot

The SPEAG DASY system uses the high precision robots (DASY5: TX60XL) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version (DASY5: CS8c) from Stäubli is used. The Stäubli robot series have many features that are important for our application:

- High precision (repeatability 0.02 mm)
- High reliability (industrial design)
- Low maintenance costs (virtually maintenance free due to direct drive gears; no belt drives)
- Jerk-free straight movements
- Low ELF interference (motor control fields shielded via the closed metallic construction shields)

Fig. 8.4 Photo of Robot

8.4 Measurement Server

The measurement server is based on a PC/104 CPU board with CPU (DASY 5: 400MHz, Intel Celeron), chip-disk (DASY5: 128 MB), RAM (DASY5: 128 MB). The necessary circuits for communication with the DAE electronic box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY I/O board, which is directly connected to the PC/104 bus of the CPU board.
The measurement server performs all the real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operations.

Fig. 8.5 Photo of Server for DASY5

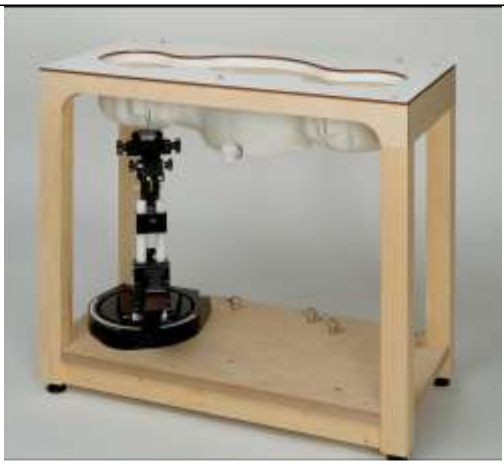
8.5 Light Beam Unit

The light beam switch allows automatic "tooling" of the probe. During the process, the actual position of the probe tip with respect to the robot arm is measured, as well as the probe length and the horizontal probe offset. The software then corrects all movements, such that the robot coordinates are valid for the probe tip.
The repeatability of this process is better than 0.1 mm. If a position has been taught with an aligned probe, the same position will be reached with another aligned probe within 0.1 mm, even if the other probe has different dimensions. During probe rotations, the probe tip will keep its actual position.

Fig. 8.6 Photo of Light Beam

8.6 Phantom

<SAM Twin Phantom>

Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm	 **Fig. 8.7 Photo of SAM Twin Phantom**
Filling Volume Dimensions	Approx. 25 liters Length: 1000mm; Width: 500mm; Height: adjustable feet	
Measurement Areas	Left Head, Right Head, Flat phantom	

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

<ELI4 Phantom >

The ELI4 phantom is intended for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30MHz to 6 GHz. ELI4 is fully compatible with the latest draft of the standard IEC 62209-2 and all known tissue simulating liquids.

ELI4 has been optimized regarding its performance and can be integrated into a SPEAG standard phantom table. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points The phantom can be used with the following tissue simulating liquids:

- Water-sugar based liquids can be left permanently in the phantom. Always cover the liquid if the system is not in use; otherwise the parameters will change due to water evaporation.
- DGBE based liquids should be used with care. As DGBE is a softener for most plastics, the liquid should be taken out of the phantom and the phantom should be dried when the system is not in use (desirable at least once a week).
- Do not use other organic solvents without previously testing the phantom resistiveness.

Fig.8.8 Photo of ELI4 Phantom

8.7 Device Holder

<Device Holder for SAM Twin Phantom>

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

The DASY device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation center for both scales is the ear reference point (ERP).

Thus the device needs no repositioning when changing the angles.

The DASY device holder is constructed of low-low POM material having the following dielectric parameters: relative permittivity $\varepsilon = 3$ and loss tangent $\delta = 0.02$. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

Fig. 8.9 Photo of Device Holder

8.8 Data storage and Evaluation

- **Data Storage**

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

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

- **Data Evaluation**

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

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

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

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

The formula for each channel can be given as:

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

With 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: $H_i = \sqrt{V_i} \cdot \frac{a_{i0} + a_{i1} f + a_{i2} f^2}{f}$

With V_i = compensated signal of channel i, (i = x, y, z)
$Norm_i$ = senor sensitivity of channel i, (i = x, y, z), µV/ (V/m)^2
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
Hi = 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.

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

With SAR = local specific absorption rate in mW/g
E_{tot} = total field strength in V/m
σ = conductivity in (mho/m) or (Siemens/m)
ρ = equipment tissue density in g/cm^3

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

8.9 Test Equipment List

Manufacturer	Equipment Description	Model	S/N	Cal. Information	
				Last Cal.	Due Date
SPEAG	750MHz System Validation Kit	D750V3	1118	06.08.2017	06.07.2020
SPEAG	835MHz System Validation Kit	D835V2	4d154	06.16.2016	06.15.2019
MVG	COMOSAR 1800 MHz REFERENCE DIPOLE	SID1800	SN 09/15 DIP 1G800-360	02.28.2018	02.27.2021
SPEAG	1900MHz System Validation Kit	D1900V2	5d175	06.15.2016	06.14.2019
SPEAG	2450MHz System Validation Kit	D2450V2	910	06.15.2016	06.14.2019
SPEAG	2600MHz System Validation Kit	D2600V2	1114	09.21.2015	09.20.2018
SPEAG	Data Acquisition Electronics	DAE4	1373	03.22.2018	03.21.2019
SPEAG	Dosimetric E-Field Probe	EX3DV4	3924	06.27.2017	06.26.2018
SPEAG	Phantom	Twin Phantom	1765	N.C.R	N.C.R
SPEAG	Phantom	ELI V5.0	1208	N.C.R	N.C.R
SPEAG	Phone Positioner	N/A	N/A	N.C.R	N.C.R
Stäubli	Robot	TX60L	F13/5P6VB1/A/01	N.C.R	N.C.R
Anritsu	Universal Radio Communication Analyzer	MT8820C	6201060814	03.07.2018	03.06.2019
R&S	Universal Radio Communication Tester	CMU200	113097	03.07.2018	03.06.2019
HP	Network Analyzer	8753D	3410A06291	03.19.2018	03.18.2019
Agilent	EPM Series Power Meter	E4418B	GB39512692	03.07.2018	03.06.2019
Agilent	MAX Signal Analyzer	N9020A	MY50510123	11.10.2017	11.09.2018
Agilent	Power Sensor	8481A	MY41090341	03.07.2018	03.06.2019
R&S	Power Sensor	URV5-Z2	SEL0071	03.07.2018	03.06.2019
R&S	Signal Generator	SMX	835457/016	03.07.2018	03.06.2019
R&S	Signal Generator	SMR20	10080050	03.07.2018	03.06.2019
Huber Suhner	RF Cable	SUCOFLEX	12341	See Note 3	
Huber Suhner	RF Cable	SUCOFLEX	17268	See Note 3	
Huber Suhner	RF Cable	SUCOFLEX	2080	See Note 3	
Weinschel	Attenuator	23-3-34	BL5513	See Note 3	
Anritsu	Directional Coupler	MP654A	100217491	See Note 3	
SPEAG	Dielectric Assessment Kit	3.5 Probe	1119	See Note 4	
Mini-circuits	Power amplifier	ZHL-42W	SC609401309	See Note 5	

Note:

1. The calibration certificate of DASY can be referred to appendix C of this report.
2. Referring to KDB 865664 D01v01r04, the dipole calibration interval can be extended to 3 years with justification. The dipoles are also not physically damaged, or repaired during the interval.
3. The Insertion Loss calibration of Dual Directional Coupler and Attenuator were characterized via the network analyzer and compensated during system check.
4. The dielectric probe kit was calibrated via the network analyzer, with the specified procedure (calibrated in pure water) and calibration kit (standard) short circuit, before the dielectric measurement. The specific procedure and calibration kit are provided by Speag.
5. In system check we need to monitor the level on the power meter, and adjust the power amplifier level to have precise power level to the dipole; the measured SAR will be normalized to 1 W input power according to the ratio of 1 W to the input power to the dipole. For system check, the calibration of the power amplifier is deemed not critically required for correct measurement; the power meter is critical and we do have calibration for it
6. Attenuator insertion loss is calibrated by the network Analyzer, which the calibration is valid, before system check.
7. N.C.R means No Calibration Requirement.

9 Tissue Simulating Liquids

For the measurement of the field distribution inside the SAM phantom with DASY, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 9.1, for body SAR testing, the liquid height from the center of the flat phantom to liquid top surface is larger than 15 cm, which is shown in Fig. 9.2.

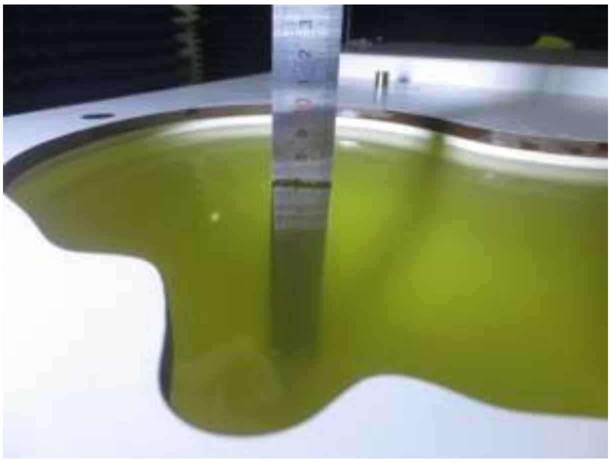


Fig. 9.1 Photo of Liquid Height for Head SAR (700MHz~1000MHz) (depth>15cm)

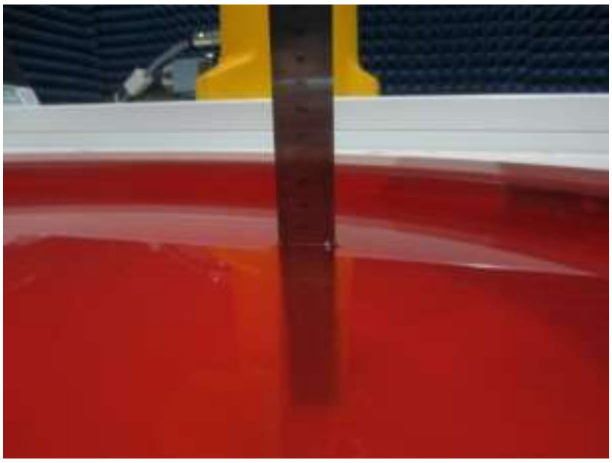


Fig. 9.2 Photo of Liquid Height for Body SAR of (700MHz~1000MHz) (depth>15cm)

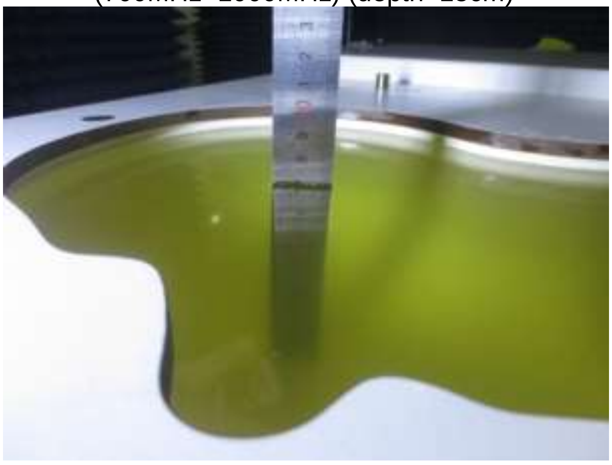


Fig. 9.3 Photo of Liquid Height for Head SAR (1710MHz~1910MHz) (depth>15cm)

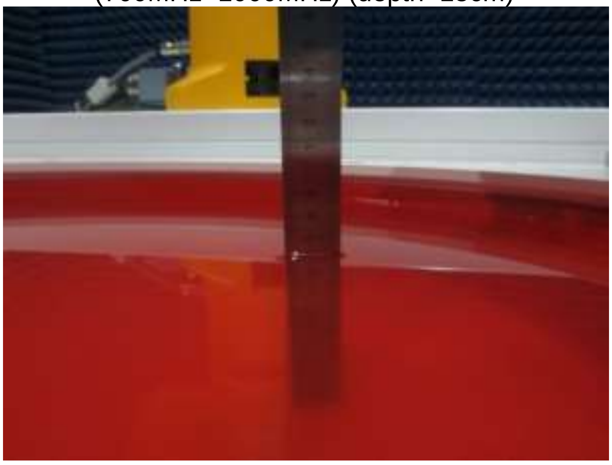


Fig. 9.4 Photo of Liquid Height for Body SAR of ELI V5.0 (1710MHz~1910MHz) (depth>15cm)

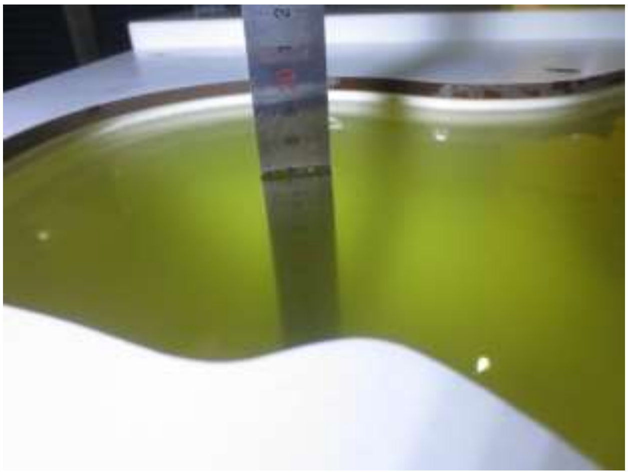


Fig. 9.5 Photo of Liquid Height for Head SAR (2000MHz~2600MHz) (depth>15cm)

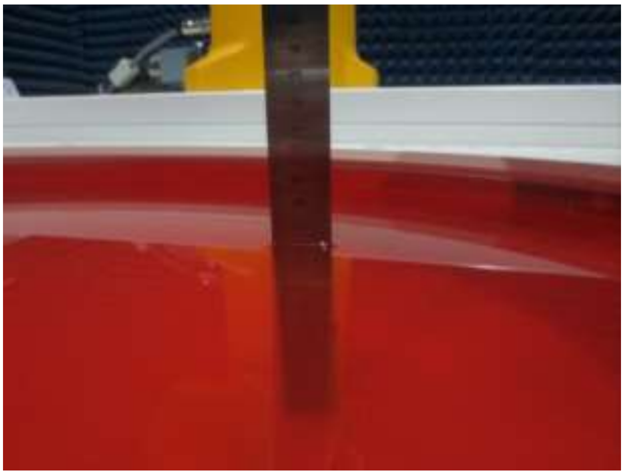


Fig. 9.6 Photo of Liquid Height for Body SAR of Twin Phantom (2000MHz~2600MHz) (depth>15cm)

The relative permittivity and conductivity of the tissue material should be within ±5% of the values given in the table below recommended by the FCC OET 65 supplement C and RSS 102 Issue 5.

Target Frequency	Head		Body	
(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
3000	38.5	2.40	52.0	2.73
5800	35.3	5.27	48.2	6.00

(εr = relative permittivity, σ = conductivity and ρ = 1000 kg/m^3)

The dielectric parameters of liquids were verified prior to the SAR evaluation using a Speag Dielectric Probe Kit and an Agilent Network Analyzer.
The following table shows the measuring results for simulating liquid.

Frequency (MHz)	Liquid Type	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (εr)	Conductivity Target(σ)	Permittivity Target(εr)	Delta (σ)%	Delta (εr)%	Limit (%)	Date (mm/dd/yy)
750	Head	22.5	0.87	41.78	0.89	41.9	-2.25	-0.29	±5	04.24.2018
835	Head	22.5	0.91	41.51	0.9	41.5	1.11	0.02	±5	04.24.2018
1800	Head	22.3	1.40	40.17	1.4	40.0	0.00	0.43	±5	04.25.2018
1900	Head	22.3	1.42	39.47	1.4	40.0	1.43	-1.33	±5	04.25.2018
2450	Head	22.0	1.81	39.89	1.8	39.2	0.56	1.76	±5	04.29.2018
2600	Head	22.0	1.99	38.60	1.96	39.0	1.53	-1.03	±5	04.29.2018
750	Body	22.5	0.95	55.26	0.96	55.5	-1.04	-0.43	±5	04.26.2018
835	Body	22.5	0.98	54.82	0.97	55.2	1.03	-0.69	±5	04.26.2018
1800	Body	22.7	1.50	52.82	1.52	53.3	-1.32	-0.90	±5	04.27.2018
1900	Body	22.7	1.54	52.20	1.52	53.3	1.32	-2.06	±5	04.27.2018
2450	Body	21.9	1.96	52.30	1.95	52.7	0.51	-0.76	±5	04.30.2018
2600	Body	21.9	2.18	51.62	2.16	52.5	0.93	-1.68	±5	04.30.2018

10 SAR System Verification

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

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

- **System Setup**
  In the simplified setup for system evaluation, the EUT 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:

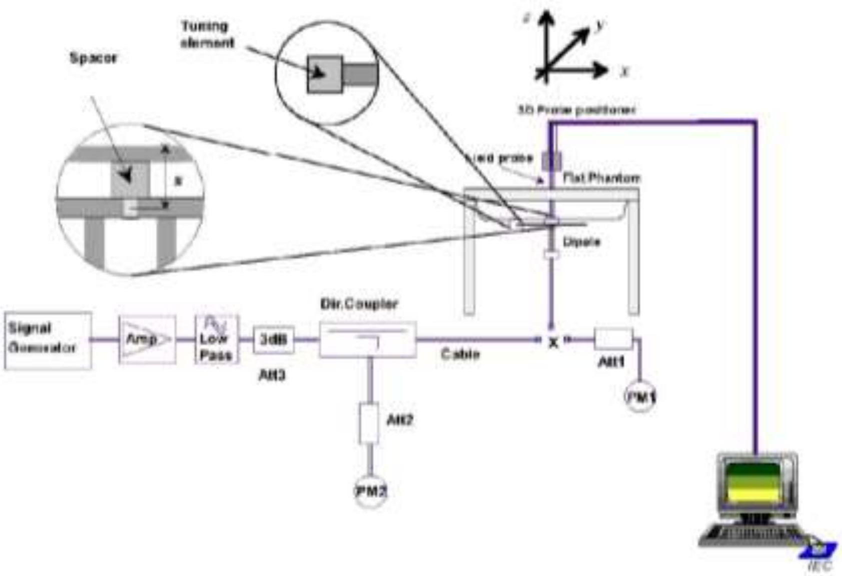


Fig.10.1 System Verification Setup Diagram

Fig.10.2 Photo of Dipole setup

- **System Verification Results**

  Comparing to the original SAR value provided by SPEAG, the verification data should be within its specification of 10%. The table as below indicates the system performance check can meet the variation criterion and the plots can be referred to Appendix C of this report.

Date (mm/dd/yy)	Frequency (MHz)	Liquid Type	Power fed onto dipole (mW)	Measured 1g SAR (W/kg)	Normalized to 1W 1g SAR (W/kg)	1W Target 1g SAR (W/kg)	Deviation (%)
04.24.2018	750	Head	80	0.697	8.71	8.31	4.81
04.24.2018	835	Head	80	0.785	9.81	9.24	6.17
04.25.2018	1800	Head	40	1.56	39.0	38.76	3.83
04.25.2018	1900	Head	40	1.65	41.25	40.4	2.10
04.29.2018	2450	Head	40	2.13	53.25	52.4	1.62
04.29.2018	2600	Head	40	2.34	58.5	56.9	2.81
04.26.2018	750	Body	80	0.705	8.81	8.76	0.57
04.26.2018	835	Body	80	0.792	9.9	9.57	3.45
04.27.2018	1800	Body	40	1.55	38.75	38.90	2.22
04.27.2018	1900	Body	40	1.64	41.0	40.1	2.24
04.30.2018	2450	Body	40	2.15	53.75	51.8	3.76
04.30.2018	2600	Body	40	2.21	55.25	54.5	1.38

11 EUT Testing Position

This EUT was tested in ten different positions. They are right cheek/right tilted/left cheek/left tilted for head, Front/Back/Right Side/Top Side/Bottom Side of the EUT with phantom 10 mm gap, as illustrated below, please refer to Appendix B for the test setup photos.

11.1 Handset Reference Points

- The vertical centreline passes through two points on the front side of the handset – the midpoint of the width w_t of the handset at the level of the acoustic output, and the midpoint of the width w_b of the bottom of the handset.
- The horizontal line is perpendicular to the vertical centreline and passes the center of the acoustic output. The horizontal line is also tangential to the handset at point A.
- The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centreline is not necessarily parallel to the front face of the handset, especially for clamshell handsets, handsets with flip covers, and other irregularly shaped handsets.

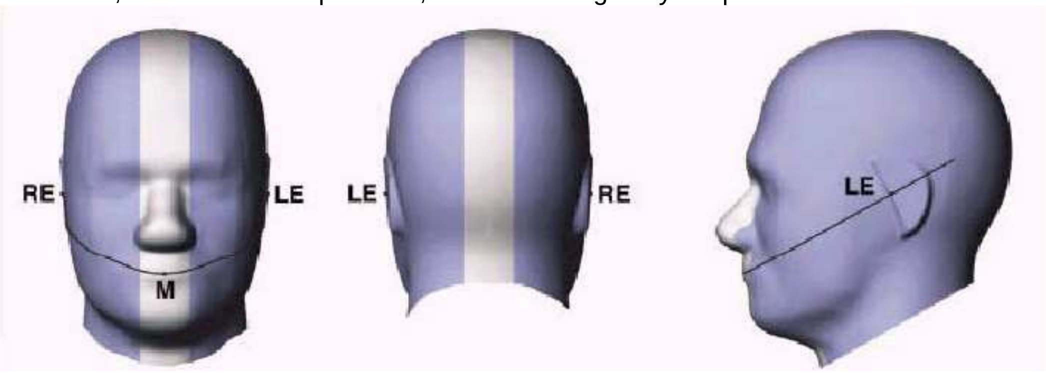


Fig.11.1 Illustration for Front, Back and Side of SAM Phantom

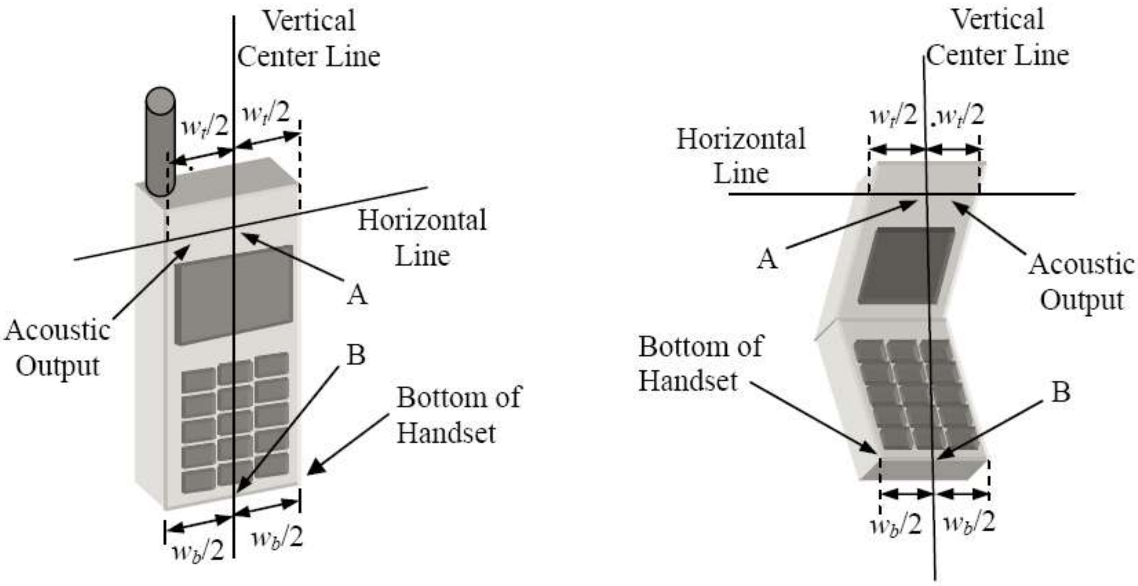


Fig. 11.2 Illustration for Handset Vertical and Horizontal Reference Lines

11.2 Positioning for Cheek / Touch

- To position the device with the vertical center line of the body of the device and the horizontal line crossing the center piece in a plane parallel to the sagittal plane of the phantom. While maintaining the device in this plane, align the vertical center line with the reference plane containing the three ear and mouth reference point (M: Mouth, RE: Right Ear and LE: Left Ear) and align the center of the ear piece with the line RE-LE.
- To move the device towards the phantom with the ear piece aligned with the line LE-RE until the phone touched the ear. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the phone until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost (see below figure)

Fig. 11.3 Illustration for Cheek Position

11.3 Positioning for Ear / 15º Tilt

- To position the device in the “cheek” position described above.
- While maintaining the device the reference plane described above and pivoting against the ear, moves it outward away from the mouth by an angle of 15 degrees or until contact with the ear is lost (see figure below).

Fig.11.4 Illustration for Tilted Position

11.4 SAR Evaluations near the Mouth/Jaw Regions of the SAM Phantom

Antennas located near the bottom of a phone may require SAR measurements around the mouth and jaw regions of the SAM head phantom. This typically applies to clam-shell style phones that are generally longer in the unfolded normal use positions or to certain older style long rectangular phones.
Under these circumstances, the following procedures apply, adopted from the FCC guidance on SAR handsets document FCC KDB Publication 648474 D04v01r03. The SAR required in these regions of SAM should be measured using a flat phantom. The phone should be positioned with a separation distance of 4 mm between the ear reference point (ERP) and the outer surface of the flat phantom shell. While maintaining this distance at the ERP location, the low (bottom) edge of the phone should be lowered from the phantom to establish the same separation distance between the peak SAR locations identified by the truncated partial SAR distribution measured with the SAM phantom. The distance from the peak SAR location to the phone is determined by the straight line passing perpendicularly through the phantom surface. When it is not feasible to maintain 4 mm separation at the ERP while also establishing the required separation at the peak SAR location, the top edge of the phone will be allowed to touch the phantom with a separation < 4 mm at the ERP. The phone should not be tilted to the left or right while placed in this inclined position to the flat phantom.

11.5 Body Worn Accessory Configurations

- To position the device parallel to the phantom surface with either keypad up or down.
- To adjust the device parallel to the flat phantom.
- To adjust the distance between the device surface and the flat phantom to 10 mm or holster surface and the flat phantom to 0 mm.

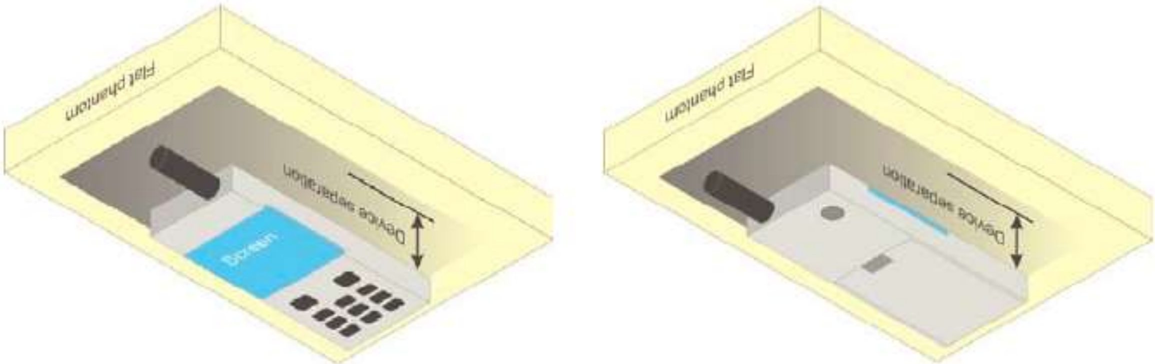


Fig.11.5 Illustration for Body Worn Position

11.6 Wireless Router (Hotspot) Configurations

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

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions. Therefore, SAR must be evaluated for each frequency transmission and mode separately and summed with the WIFI transmitter according to KDB 648474 publication procedures. The “Portable Hotspot” feature on the handset was NOT activated, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal.

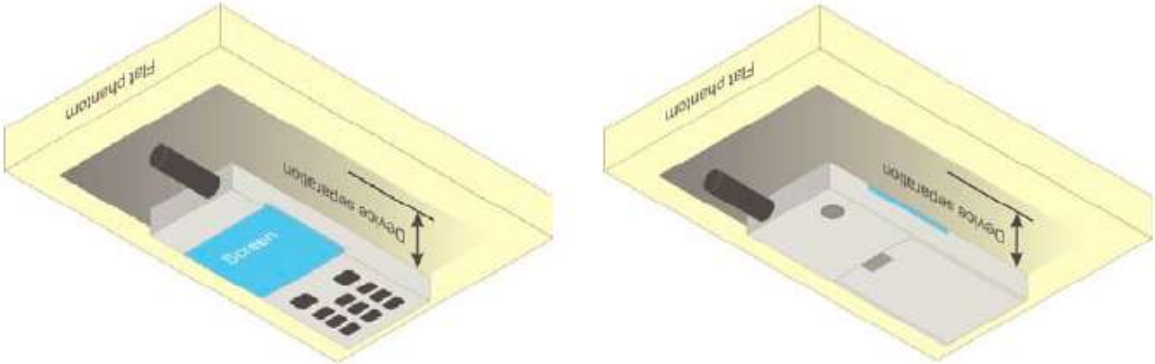


Fig.11.6 Illustration for Hotspot Position

12 Measurement Procedures

The measurement procedures are as bellows:

<Conducted power measurement>

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

<Conducted power measurement>

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

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

- Power reference measurement
- Area scan
- Zoom scan
- Power drift measurement

12.1 Spatial Peak SAR Evaluation

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

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

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

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

12.2 Power Reference Measurement

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

12.3 Area & Zoom Scan Procedures

First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an Area Scan is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan is required. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR-distribution over 10g. Area scan and zoom scan resolution setting follows KDB 865664 D01v01r04 quoted below.

<table>
<tr><td colspan="3"></td><td>≤ 3 GHz</td><td>> 3 GHz</td></tr>
<tr><td colspan="3">Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 ± 1 mm</td><td>½·δ·ln(2) ± 0.5 mm</td></tr>
<tr><td colspan="3">Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30° ± 1°</td><td>20° ± 1°</td></tr>
<tr><td colspan="3" rowspan="2">Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}</td><td>≤ 2 GHz: ≤ 15 mm
2 – 3 GHz: ≤ 12 mm</td><td>3 – 4 GHz: ≤ 12 mm
4 – 6 GHz: ≤ 10 mm</td></tr>
<tr><td colspan="2">When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.</td></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>≤ 2 GHz: ≤ 8 mm
2 – 3 GHz: ≤ 5 mm*</td><td>3 – 4 GHz: ≤ 5 mm*
4 – 6 GHz: ≤ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{Zoom}(n)$</td><td>≤ 5 mm</td><td>3 – 4 GHz: ≤ 4 mm
4 – 5 GHz: ≤ 3 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface</td><td>≤ 4 mm</td><td>3 – 4 GHz: ≤ 3 mm
4 – 5 GHz: ≤ 2.5 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">≤ 1.5·$\Delta z_{Zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>≥ 30 mm</td><td>3 – 4 GHz: ≥ 28 mm
4 – 5 GHz: ≥ 25 mm
5 – 6 GHz: ≥ 22 mm</td></tr>
<tr><td colspan="5">Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.
* When zoom scan is required and the reported SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.</td></tr>
</table>

12.4 Volume Scan Procedures

The volume scan is used for assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the EUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing. When all volume scan were completed, the software, SEMCAD post-processor scan combine and subsequently superpose these measurement data to calculating the multiband SAR.

12.5 SAR Averaged Methods

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

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

12.6 Power Drift Monitoring

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In DASY measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of EUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in dB. If the power drifts more than 5%, the SAR will be retested.

13 Conducted RF Output Power

13.1 GSM Conducted Power

Band: GSM 850	Burst Average Power (dBm)			Frame-Average Power(dBm)		
Channel	128	190	251	128	190	251
Frequency (MHz)	824.2	836.6	848.8	824.2	836.6	848.8
GSM (GMSK, Voice)	32.52	**32.67**	32.65	23.49	23.64	23.62
GPRS (GMSK, 1 TX slot)	32.51	32.65	32.62	23.48	23.62	23.59
GPRS (GMSK, 2 TX slots)	31.74	31.85	31.86	25.72	25.83	25.84
GPRS (GMSK, 3 TX slots)	29.94	30.08	30.11	25.68	25.82	25.85
GPRS (GMSK, 4 TX slots)	28.79	28.90	**29.03**	25.78	25.89	**26.02**
EGPRS (8PSK, 1 TX slot)	26.57	26.56	26.75	17.54	17.53	17.72
EGPRS (8PSK, 2 TX slots)	25.13	25.27	25.40	19.11	19.25	19.38
EGPRS (8PSK, 3 TX slots)	22.75	22.83	22.96	18.49	18.57	18.70
EGPRS (8PSK, 4 TX slots)	21.43	21.57	21.63	18.42	18.56	18.62

Remark:

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

Note:

1. For Head SAR testing, GSM Voice mode should be evaluated, therefore the EUT was set in GSM 850 Voice mode.
2. For Body worn SAR testing, GSM Voice mode should be evaluated, therefore the EUT was set in GSM 850 Voice mode.
3. For Hotspot mode SAR testing, GPRS and EGPRS mode should be evaluated, therefore the EUT was set in GPRS 4 TX slots mode due to the highest frame-averaged power.
4. For GPRS multi time slots SAR measurement, when the measured maximum output power levels are within 0.25 dB of each other, test the configuration with the most number of time slots.
5. Per KDB447498 D01v06, the maximum output power channel is used for SAR testing and for further SAR test reduction.
6. The EUT do not support DTM and VoIP function.

Band: GSM 1900	Burst Average Power (dBm)			Frame-Average Power(dBm)		
Channel	512	661	810	512	661	810
Frequency (MHz)	1850.2	1880.0	1909.8	1850.2	1880.0	1909.8
GSM (GMSK, Voice)	**29.94**	29.76	29.65	20.91	20.73	20.62
GPRS (GMSK, 1 TX slot)	29.93	29.75	29.63	20.90	20.72	20.60
GPRS (GMSK, 2 TX slots)	29.23	29.11	29.02	23.21	23.09	23.00
GPRS (GMSK, 3 TX slots)	27.47	27.44	27.37	23.21	23.18	23.11
GPRS (GMSK, 4 TX slots)	**26.40**	26.30	26.26	**23.39**	23.29	23.25
EGPRS (8PSK, 1 TX slot)	26.64	26.62	26.57	17.61	17.59	17.54
EGPRS (8PSK, 2 TX slots)	25.60	25.58	25.48	19.58	19.56	19.46
EGPRS (8PSK, 3 TX slots)	23.40	23.41	23.39	19.14	19.15	19.13
EGPRS (8PSK, 4 TX slots)	22.42	22.40	22.33	19.41	19.39	19.32

Remark:

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

Note:

1. For Head SAR testing, GSM Voice mode should be evaluated, therefore the EUT was set in GSM 1900 Voice mode.
2. For Body worn SAR testing, GSM Voice mode should be evaluated, therefore the EUT was set in GSM Voice 1900 mode.
3. For Hotspot mode SAR testing, GPRS and EGPRS mode should be evaluated, therefore the EUT was set in GPRS 4 TX slots mode due to the highest frame-averaged power.
4. Per KDB447498 D01v06, the maximum output power channel is used for SAR testing and for further SAR test reduction.
5. The EUT do not support DTM and VoIP function.

13.2 WCDMA Conducted Power

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

HSDPA Setup Configuration:

a. The EUT was connected to Base Station Rohde & Schwarz CMU200 referred to the Setup Configuration.
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting:
   i. Set Gain Factors (β_c and β_d) and parameters were set according to each
   ii. Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
   iii. Set RMC 12.2kbps + HSDPA mode.
   iv. Set Cell Power = -86 dBm
   v. Set HS-DSCH Configuration Type to FRC (H-set 1, QPSK)
   vi. Select HSDPA Uplink Parameters
   vii. Set Delta ACK, Delta NACK and Delta CQI = 8
   viii. Set Ack-Nack Repetition Factor to 3
   ix. Set CQI Feedback Cycle (k) to 4 ms
   x. Set CQI Repetition Factor to 2
   xi. Power Ctrl Mode = All Up bits
d. The transmitted maximum output power was recorded.

Table 1

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

Note 1: Δ_{ACK}, Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$
Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$.
Note 3: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$.

HSDPA Sub-test setup configuration

HSUPA Setup Configuration:

a. The EUT was connected to Base Station Rohde & Schwarz CMU200 referred to the Setup Configuration.
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting * :
   i. Call Configs = 5.2B, 5.9B, 5.10B, and 5.13.2B with QPSK
   ii. Set the Gain Factors (β_c and β_d) and parameters (AG Index) were set according to each specific sub-test in the following table, C11.1.3, quoted from the TS 34.121
   iii. Set Cell Power = -86 dBm
   iv. Set Channel Type = 12.2k + HSPA
   v. Set UE Target Power
   vi. Power Ctrl Mode= Alternating bits
   vii. Set and observe the E-TFCI
   viii. Confirm that E-TFCI is equal to the target E-TFCI of 75 for sub-test 1, and other subtest's E-TFCI
d. The transmitted maximum output power was recorded.

Table 2

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (1)	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM (2) (dB)	MPR (dB)	AG (4) Index	E-TFCI
1	11/15 (3)	15/15 (3)	64	11/15 (3)	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed1}: 47/15 β_{ed2}: 47/15	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 (4)	15/15 (4)	64	15/15 (4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 8 ⇔ $A_{hs} = \beta_{hs}/\beta_c = 30/15$ ⇔ $\beta_{hs} = 30/15 * \beta_c$.
Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH, HS- DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.
Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 10/15 and β_d = 15/15.
Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 14/15 and β_d = 15/15.
Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g.
Note 6: β_{ed} cannot be set directly; it is set by Absolute Grant Value.

HSUPA Sub-test setup configuration

WCDMA Conducted Power:

WCDMA Average power (dBm)			
Band	WCDMA Band V		
Channel	4132	4183	4233
Frequency (MHz)	826.4	836.6	846.6
AMR 12.2 kbps	22.79	22.68	22.75
RMC 12.2 kbps	**22.80**	22.69	22.76
HSDPA Sub-test 1	21.81	21.78	21.80
HSDPA Sub-test 2	21.41	21.37	21.32
HSDPA Sub-test 3	19.86	19.90	19.70
HSDPA Sub-test 4	19.85	19.87	19.72
HSUPA Sub-test 1	21.33	21.34	21.37
HSUPA Sub-test 2	21.76	21.74	21.79
HSUPA Sub-test 3	19.38	19.45	19.31
HSUPA Sub-test 4	21.78	21.73	21.84
HSUPA Sub-test 5	20.38	20.30	20.34

WCDMA Average power (dBm)			
Band	WCDMA Band IV		
Channel	1312	1413	1513
Frequency (MHz)	1712.4	1732.6	1752.6
AMR 12.2 kbps	22.98	23.20	22.33
RMC 12.2 kbps	23.00	**23.22**	22.34
HSDPA Sub-test 1	22.03	22.25	22.41
HSDPA Sub-test 2	21.65	21.88	22.03
HSDPA Sub-test 3	20.20	20.37	20.36
HSDPA Sub-test 4	20.10	20.32	20.58
HSUPA Sub-test 1	21.59	21.78	21.93
HSUPA Sub-test 2	22.02	22.20	22.35
HSUPA Sub-test 3	19.56	19.83	20.04
HSUPA Sub-test 4	22.06	22.22	22.39
HSUPA Sub-test 5	20.68	20.82	20.84

WCDMA Average power (dBm)			
Band	WCDMA Band II		
Channel	9262	9400	9538
Frequency (MHz)	1852.4	1880.0	1907.6
AMR 12.2 kbps	23.08	22.79	22.67
RMC 12.2 kbps	**23.10**	22.80	22.68
HSDPA Sub-test 1	22.17	21.90	21.73
HSDPA Sub-test 2	21.72	21.45	21.28
HSDPA Sub-test 3	20.22	19.89	19.76
HSDPA Sub-test 4	20.23	20.10	19.73
HSUPA Sub-test 1	21.66	21.37	21.27
HSUPA Sub-test 2	22.16	21.87	21.70
HSUPA Sub-test 3	19.68	19.32	19.27
HSUPA Sub-test 4	22.17	21.90	21.76
HSUPA Sub-test 5	20.69	20.37	20.31

Note:

1. Applying the subtest setup in Table C.11.1.3 of 3GPP TS 34.121-1
2. Per KDB 941225 D01, RMC 12.2kbps mode is used to evaluate SAR due the highest output power. If AMR 12.2 kbps power is < 0.25dB higher than RMC 12.2kbps, SAR tests with AMR 12.2 kbps can be excluded.
3. AMR, HSDPA RF power will not be larger than RMC 12.2kbps, detailed information is included in Tune-up Procure exhibit.

13.3 LTE Conducted Power

13.3.1 Largest channel bandwidth standalone SAR test requirements

QPSK with 1 RB allocation

Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required for 1 RB allocation; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel.8 When the reported SAR of a required test channel is > 1.45 W/kg, SAR is required for all three RB offset configurations for that required test channel.

QPSK with 50% RB allocation

The procedures required for 1 RB allocation in section 4.2.1 are applied to measure the SAR for QPSK with 50% RB allocation.9

QPSK with 100% RB allocation

For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation in sections 4.2.1 and 4.2.2 are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.

Higher order modulations

For each modulation besides QPSK; e.g., 16-QAM, 64-QAM, apply the QPSK procedures in sections 4.2.1, 5.2.2 and 4.2.3 to determine the QAM configurations that may need SAR measurement. For each configuration identified as required for testing, SAR is required only when the highest maximum output power for the configuration in the higher order modulation is > ½ dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is > 1.45 W/kg.

13.3.2 Other channel bandwidth standalone SAR test requirements

For the other channel bandwidths used by the device in a frequency band, apply all the procedures required for the largest channel bandwidth in section 4.2 to determine the channels and RB configurations that need SAR testing and only measure SAR when the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is > ½ dB higher than the equivalent channel configurations in the largest channel bandwidth configuration or the reported SAR of a configuration for the largest channel bandwidth is > 1.45 W/kg. The equivalent channel configuration for the RB allocation, RB offset and modulation etc. is determined for the smaller channel bandwidth according to the same number of RB allocated in the largest channel bandwidth. For example, 50 RB in 10 MHz channel bandwidth does not apply to 5 MHz channel bandwidth; therefore, this cannot be tested in the smaller channel bandwidth. However, 50% RB allocation in 10 MHz channel bandwidth is equivalent to 100% RB allocation in 5 MHz channel bandwidth; therefore, these are the equivalent configurations to be compared to determine the specific channel and configuration in the smaller channel bandwidth that need SAR testing.

LTE Band 2 part

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					18607	18900	19193
					1850.7MHz	1880.0MHz	1909.3MHz
Band 2	1.4	QPSK	1	0	22.23	22.36	22.45
			1	2	22.43	22.45	22.48
			1	5	22.36	22.39	22.45
			3	0	21.38	21.47	21.53
			3	1	21.60	21.45	21.54
			3	2	21.37	21.49	21.50
			6	0	21.53	21.51	21.64
		16QAM	1	0	21.79	21.80	21.63
			1	2	21.86	21.65	21.85
			1	5	21.49	21.40	21.71
			3	0	21.48	21.58	21.67
			3	1	21.34	21.50	21.68
			3	2	21.46	21.35	21.50
			6	0	20.56	20.68	20.86

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					18615	18900	19185
					1851.5MHz	1880.0MHz	1908.5MHz
Band 2	3	QPSK	1	0	22.36	22.38	22.52
			1	7	22.36	22.39	22.47
			1	14	22.38	22.24	22.56
			8	0	21.47	21.46	21.45
			8	4	21.41	21.47	21.61
			8	7	21.39	21.35	21.56
			15	0	21.36	21.47	21.50
		16QAM	1	0	21.51	21.58	21.55
			1	7	21.49	21.48	21.64
			1	14	21.52	21.40	21.74
			8	0	20.36	20.64	20.65
			8	4	20.41	20.50	20.57
			8	7	20.38	20.35	20.62
			15	0	20.37	20.50	20.55

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					18625	18900	19175
					1852.5MHz	1880.0MHz	1907.5MHz
Band 2	5	QPSK	1	0	22.35	22.32	22.47
			1	12	22.36	22.41	22.53
			1	24	22.30	22.36	22.47
			12	0	21.39	21.43	21.68
			12	6	21.38	21.48	21.60
			12	11	21.37	21.38	21.64
			25	0	21.36	21.41	21.75
		16QAM	1	0	21.25	21.46	21.36
			1	12	21.81	21.35	21.72
			1	24	21.41	21.43	21.52
			12	0	20.45	20.53	20.65
			12	6	20.53	20.47	20.63
			12	11	20.35	20.51	20.58
			25	0	20.44	20.40	20.71

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					18650	18900	19150
					1855.0MHz	1880.0MHz	1905.0MHz
Band 2	10	QPSK	1	0	22.48	22.35	22.45
			1	24	22.57	22.41	22.59
			1	49	22.26	22.37	22.41
			25	0	21.55	21.47	21.65
			25	12	21.34	21.42	21.60
			25	24	21.45	21.45	21.47
			50	0	21.54	21.56	21.19
		16QAM	1	0	21.56	21.45	21.38
			1	24	21.53	21.36	21.86
			1	49	21.31	21.53	21.28
			25	0	20.49	20.63	20.68
			25	12	20.50	20.58	20.56
			25	24	20.55	20.44	20.41
			50	0	20.44	20.48	20.64

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					18675	18900	19125
					1857.5MHz	1880.0MHz	1902.5MHz
Band 2	15	QPSK	1	0	22.35	22.31	22.43
			1	37	22.28	22.35	22.41
			1	74	22.42	22.27	22.59
			36	0	21.45	21.47	21.64
			36	16	21.35	21.44	21.60
			36	35	21.37	21.37	21.53
			75	0	21.36	21.44	21.56
		16QAM	1	0	21.51	21.80	21.59
			1	37	21.65	21.67	21.47
			1	74	21.52	21.59	21.35
			36	0	20.52	20.65	20.65
			36	16	20.45	20.49	20.63
			36	35	20.56	20.57	20.51
			75	0	20.46	20.47	20.46

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					18700	18900	19100
					1860.0MHz	1880.0MHz	1900.0MHz
Band 2	20	QPSK	1	0	22.35	22.54	22.13
			1	49	22.14	22.62	22.13
			1	99	22.16	22.22	22.31
			50	0	21.39	21.22	21.57
			50	24	21.37	21.33	21.06
			50	49	21.29	21.35	21.06
			100	0	21.40	20.69	20.99
		16QAM	1	0	21.14	21.04	20.72
			1	49	21.23	21.03	21.30
			1	99	21.34	20.48	20.95
			50	0	20.41	20.57	20.34
			50	24	20.46	20.47	20.63
			50	49	20.49	20.46	20.49
			100	0	20.42	20.58	20.34

LTE Band 4 part

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					19957	20175	20393
					1710.7MHz	1732.5MHz	1754.3MHz
Band 4	1.4	QPSK	1	0	22.35	22.32	22.16
			1	2	22.45	22.45	22.34
			1	5	22.36	22.29	22.29
			3	0	21.45	21.32	21.26
			3	1	21.30	21.30	21.37
			3	2	21.33	21.35	21.27
			6	0	21.45	21.34	21.29
		16QAM	1	0	21.39	21.38	21.32
			1	2	21.77	21.73	21.70
			1	5	21.32	21.34	21.68
			3	0	21.42	21.39	21.41
			3	1	21.29	21.52	21.40
			3	2	21.30	21.48	21.35
			6	0	20.40	20.36	20.45

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					19965	20175	20385
					1711.5MHz	1732.5MHz	1753.5MHz
Band 4	3	QPSK	1	0	22.34	22.36	22.25
			1	7	22.40	22.29	22.36
			1	14	22.30	22.19	22.47
			8	0	21.44	21.36	21.28
			8	4	21.47	21.37	21.31
			8	7	21.46	21.28	21.22
			15	0	21.12	21.35	21.23
		16QAM	1	0	21.45	21.76	21.40
			1	7	21.36	21.83	21.39
			1	14	21.33	21.20	21.35
			8	0	20.59	20.58	20.35
			8	4	20.47	20.37	20.41
			8	7	20.32	20.42	20.36
			15	0	20.48	20.45	20.56

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					19975	20175	20375
					1712.5MHz	1732.5MHz	1752.5MHz
Band 4	5	QPSK	1	0	22.33	22.35	22.45
			1	12	22.35	22.37	22.36
			1	24	22.14	22.47	22.26
			12	0	21.38	21.34	21.35
			12	6	21.40	21.40	21.38
			12	11	21.43	21.35	21.57
			25	0	21.36	21.41	21.25
		16QAM	1	0	21.58	21.45	21.65
			1	12	21.76	21.74	21.47
			1	24	21.63	21.65	21.12
			12	0	20.41	20.45	20.35
			12	6	20.43	20.49	20.58
			12	11	20.42	20.40	20.44
			25	0	20.48	20.39	20.54

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20000	20175	20350
					1715.0MHz	1732.5MHz	1750.0MHz
Band 4	10	QPSK	1	0	22.34	22.45	22.42
			1	24	22.32	22.43	22.14
			1	49	22.14	22.36	22.35
			25	0	21.51	21.41	21.54
			25	12	20.92	21.53	21.41
			25	24	21.13	21.74	21.31
			50	0	21.05	20.95	21.50
		16QAM	1	0	21.41	21.53	21.41
			1	24	21.43	21.41	21.35
			1	49	21.42	21.31	21.15
			25	0	20.53	20.58	20.48
			25	12	20.51	20.46	20.33
			25	24	20.45	20.34	20.39
			50	0	20.39	20.54	20.45

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20025	20175	20325
					1717.5MHz	1732.5MHz	1747.5MHz
Band 4	15	QPSK	1	0	22.13	22.13	21.47
			1	37	22.14	22.25	21.89
			1	74	22.26	22.35	21.96
			36	0	21.13	21.01	21.79
			36	16	21.14	20.86	21.73
			36	35	21.13	20.61	21.54
			75	0	21.04	20.76	21.83
		16QAM	1	0	21.47	20.85	20.94
			1	37	21.15	20.81	21.17
			1	74	21.35	20.36	21.02
			36	0	20.14	20.49	20.35
			36	16	20.56	20.32	20.34
			36	35	20.57	20.45	20.36
			75	0	20.40	20.41	20.52

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20050	20175	20300
					1720.0MHz	1732.5MHz	1745.0MHz
Band 4	20	QPSK	1	0	22.33	22.35	22.36
			1	49	22.10	22.44	22.28
			1	99	22.17	22.13	21.69
			50	0	21.63	21.57	21.43
			50	24	21.28	21.28	21.22
			50	49	21.12	21.16	21.15
			100	0	20.95	20.83	20.91
		16QAM	1	0	21.05	21.13	20.98
			1	49	21.14	21.42	21.48
			1	99	20.53	20.77	20.71
			50	0	20.36	20.35	20.34
			50	24	20.89	20.56	20.45
			50	49	20.45	20.45	20.41
			100	0	20.47	20.37	20.39

LTE Band 5 part:

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20407	20525	20643
					824.7MHz	836.5MHz	848.3MHz
Band 5	1.4	QPSK	1	0	22.78	22.56	22.58
			1	2	22.84	22.74	22.74
			1	5	22.71	22.65	22.68
			3	0	21.78	21.74	21.74
			3	1	21.74	21.74	21.75
			3	2	21.62	21.78	21.71
			6	0	21.85	21.79	21.86
		16QAM	1	0	22.32	22.01	21.63
			1	2	22.02	21.96	22.23
			1	5	22.41	21.94	21.89
			3	0	21.74	21.89	21.95
			3	1	21.89	21.78	22.02
			3	2	21.74	21.71	21.89
			6	0	20.95	20.93	20.84

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20415	20525	20635
					825.5MHz	836.5MHz	847.5MHz
Band 5	3	QPSK	1	0	22.78	22.76	22.68
			1	7	22.89	22.74	22.76
			1	14	22.78	22.76	22.45
			8	0	21.89	21.89	21.86
			8	4	21.93	21.93	21.82
			8	7	21.82	21.89	21.79
			15	0	21.93	21.84	21.88
		16QAM	1	0	21.89	21.89	21.78
			1	7	21.79	21.36	21.82
			1	14	21.76	21.81	21.65
			8	0	21.45	21.45	20.83
			8	4	21.56	21.65	20.78
			8	7	21.63	21.75	20.98
			15	0	20.84	20.89	20.74

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20425	20525	20625
					826.5MHz	836.5MHz	846.5MHz
Band 5	5	QPSK	1	0	22.75	22.75	22.74
			1	12	22.75	22.76	22.68
			1	24	22.65	22.74	22.61
			12	0	21.83	21.85	21.86
			12	6	21.83	21.76	21.77
			12	11	21.84	21.80	21.76
			25	0	21.90	21.90	21.83
		16QAM	1	0	21.98	21.89	22.22
			1	12	21.43	21.95	22.24
			1	24	21.87	21.79	22.03
			12	0	20.87	20.85	20.78
			12	6	20.90	20.81	20.74
			12	11	20.75	20.72	20.80
			25	0	20.78	20.67	20.84

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20450	20525	20600
					829MHz	836.5MHz	844MHz
Band 5	10	QPSK	1	0	22.78	22.75	22.75
			1	24	22.85	22.84	22.95
			1	49	22.76	22.64	22.74
			25	0	21.94	21.86	21.85
			25	12	21.85	21.84	21.83
			25	24	21.82	21.83	21.81
			50	0	21.94	21.87	21.88
		16QAM	1	0	21.76	21.95	22.19
			1	24	21.82	22.34	22.02
			1	49	21.45	22.24	22.20
			25	0	20.89	20.95	20.86
			25	12	20.84	20.88	20.76
			25	24	20.86	20.72	20.82
			50	0	20.84	20.85	20.86

LTE Band 7 part:

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20775	21100	21425
					2502.5MHz	2535.0MHz	2567.5MHz
Band 7	5	QPSK	1	0	21.61	21.59	21.78
			1	12	21.75	21.68	21.68
			1	24	21.56	21.96	21.53
			12	0	20.85	20.85	20.59
			12	6	20.85	20.68	20.65
			12	11	20.86	20.57	20.55
			25	0	20.79	20.76	20.69
		16QAM	1	0	20.76	20.51	20.64
			1	12	20.81	20.75	20.78
			1	24	20.53	20.83	20.75
			12	0	20.56	20.33	20.56
			12	6	20.43	20.45	20.87
			12	11	20.45	20.36	20.45
			25	0	20.34	20.43	20.47

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20800	21100	21400
					2505.0MHz	2535.0MHz	2565.0MHz
Band 7	10	QPSK	1	0	21.65	21.57	21.58
			1	24	21.74	21.65	21.69
			1	49	21.78	21.45	21.48
			25	0	20.78	20.68	20.68
			25	12	20.86	20.71	20.69
			25	24	20.96	20.69	20.85
			50	0	20.91	20.76	20.75
		16QAM	1	0	20.81	20.39	20.47
			1	24	20.89	20.75	20.48
			1	49	20.56	20.73	20.71
			25	0	20.34	20.44	20.35
			25	12	20.36	20.64	20.47
			25	24	20.41	20.85	20.58
			50	0	20.44	20.47	20.44

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20825	21100	21375
					2507.5MHz	2535.0MHz	2562.5MHz
Band 7	15	QPSK	1	0	21.65	21.48	21.74
			1	37	21.70	21.90	21.69
			1	74	21.78	21.86	21.58
			36	0	20.89	20.74	20.64
			36	16	20.85	20.75	20.69
			36	35	20.78	20.67	20.70
			75	0	20.74	20.74	20.78
		16QAM	1	0	20.95	20.75	20.74
			1	37	20.96	20.77	20.75
			1	74	20.77	20.68	20.51
			36	0	20.45	20.35	20.44
			36	16	20.47	20.45	20.34
			36	35	20.66	20.41	20.65
			75	0	20.34	20.46	20.34

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20850	21100	21350
					2510.0MHz	2535.0MHz	2560.0MHz
Band 7	20	QPSK	1	0	21.45	21.35	21.35
			1	49	21.78	21.60	21.65
			1	99	21.68	21.25	21.78
			50	0	20.83	20.58	21.47
			50	24	20.92	20.67	20.86
			50	49	20.95	20.58	20.73
			100	0	20.75	20.68	20.65
		16QAM	1	0	21.15	20.65	20.45
			1	49	21.35	20.57	20.36
			1	99	21.07	20.47	20.57
			50	0	20.35	20.35	20.40
			50	24	20.47	20.39	20.57
			50	49	20.36	20.37	20.65
			100	0	20.34	20.41	20.37

LTE Band 12 part:

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					23017	23095	23175
					699.7MHz	707.5MHz	715.3MHz
Band 12	1.4	QPSK	1	0	22.05	22.41	22.56
			1	2	22.56	22.53	22.67
			1	5	22.67	22.56	22.54
			3	0	21.44	21.57	21.54
			3	1	21.41	21.44	21.67
			3	2	21.56	21.49	21.56
			6	0	21.64	21.57	21.57
		16QAM	1	0	21.57	21.92	21.95
			1	2	21.53	21.65	21.68
			1	5	21.68	21.68	21.57
			3	0	21.58	21.47	21.73
			3	1	21.62	21.47	21.62
			3	2	21.63	21.59	21.63
			6	0	20.59	20.59	20.57

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					23025	23095	23165
					700.5MHz	707.5MHz	714.5MHz
Band 12	3	QPSK	1	0	22.59	22.47	22.47
			1	7	22.47	22.46	22.46
			1	14	22.53	22.59	22.45
			8	0	21.40	21.38	21.60
			8	4	21.56	21.54	21.58
			8	7	21.57	21.46	21.49
			15	0	21.57	21.53	21.50
		16QAM	1	0	21.53	21.63	21.57
			1	7	21.63	21.55	21.43
			1	14	21.52	21.70	21.31
			8	0	20.57	20.49	20.58
			8	4	20.63	20.53	20.53
			8	7	20.74	20.54	20.65
			15	0	20.58	20.41	20.47

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					23035	23095	23155
					701.5MHz	707.5MHz	713.5MHz
Band 12	5	QPSK	1	0	22.47	22.35	22.45
			1	12	22.39	22.47	22.34
			1	24	22.48	22.63	22.14
			12	0	21.41	21.46	21.46
			12	6	21.47	21.49	21.35
			12	11	21.41	21.35	21.53
			25	0	21.54	21.54	21.16
		16QAM	1	0	21.83	21.52	21.06
			1	12	21.62	21.54	21.54
			1	24	21.53	21.60	21.34
			12	0	20.54	20.45	20.35
			12	6	20.53	20.39	20.46
			12	11	20.66	20.42	20.41
			25	0	20.51	20.48	20.31

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					23060	23095	23130
					704MHz	707.5MHz	711MHz
Band 12	10	QPSK	1	0	22.69	22.58	22.46
			1	24	22.79	22.56	22.54
			1	49	22.35	22.42	22.85
			25	0	21.68	21.55	21.33
			25	12	21.53	21.43	21.36
			25	24	21.73	21.64	21.37
			50	0	20.97	20.88	20.86
		16QAM	1	0	20.98	21.03	21.04
			1	24	21.13	21.14	20.98
			1	49	21.04	21.13	20.86
			25	0	20.68	20.45	20.34
			25	12	20.47	20.34	20.39
			25	24	20.66	20.39	20.42
			50	0	20.43	20.41	20.33

LTE Band 17 part:

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					23755	23790	23825
					706.5MHz	710.0MHz	713.5MHz
Band 17	5	QPSK	1	0	22.65	22.59	22.58
			1	12	22.67	22.70	22.76
			1	24	22.52	22.56	22.36
			12	0	21.68	21.67	21.25
			12	6	21.72	21.59	21.68
			12	11	21.65	21.62	21.62
			25	0	21.70	21.67	21.19
		16QAM	1	0	21.76	21.72	21.26
			1	12	21.88	21.77	21.16
			1	24	21.77	21.65	21.21
			12	0	20.80	20.65	20.65
			12	6	20.79	20.61	21.43
			12	11	20.55	20.59	20.52
			25	0	20.72	20.65	20.34

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					23780	23790	23800
					709.0MHz	710.0MHz	711.0MHz
Band 17	10	QPSK	1	0	22.39	22.02	21.89
			1	24	22.29	22.13	22.13
			1	49	21.95	22.16	21.96
			25	0	21.18	21.13	21.06
			25	12	21.17	21.13	21.04
			25	24	21.12	21.03	21.18
			50	0	21.23	21.09	21.14
		16QAM	1	0	21.68	21.17	21.23
			1	24	21.25	21.34	21.65
			1	49	21.17	21.22	21.18
			25	0	20.69	20.34	20.47
			25	12	20.66	20.65	20.36
			25	24	20.34	20.43	20.32
			50	0	20.31	20.37	20.37

13.4 WLAN 2.4 GHz Band Conducted Power

Average Power (dBm)				
Channel	Frequency (MHz)	802.11 b	802.11 g	802.11n (HT20)
CH 01	2412	**17.71**	15.70	15.69
CH 06	2437	17.60	**15.74**	15.74
CH 11	2462	17.40	15.44	15.47

Average Power (dBm)		
Channel	Frequency (MHz)	802.11n (HT40)
CH 03	2422	13.90
CH 06	2437	13.81
CH 09	2452	13.62

Note:

1. Per KDB 447498 D01v06, the 1-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:
   [(*max. power of channel, including tune-up tolerance, mW*) / (*min. test separation distance, mm*)] · [√f(GHz)] ≤ 3.0 for 1-g SAR, where
   - f(GHz) is the RF channel transmit frequency in GHz
   - Power and distance are rounded to the nearest mW and mm before calculation
   - The result is rounded to one decimal place for comparison

Channel	Frequency (GHz)	Max. Tune-up Power (dBm)	Max. Power (mW)	Test distance (mm)	Result	exclusion thresholds for 1-g SAR
b/CH 01	2.412	18.0	63.10	5	19.56	3.0
g/CH 06	2.437	16.0	39.81	5	12.42	3.0

2. Base on the result of note1, RF exposure evaluation of 802.11 b mode is required.
3. Per KDB 248227 D01v02r02, choose the highest output power channel to test SAR and determine further SAR exclusion.
4. Per KDB 248227 D01v02r02, In the 2.4 GHz band, separate SAR procedures are applied to DSSS and OFDM configurations to simplify DSSS test requirements. SAR is not required for the following 2.4 GHz OFDM conditions:
   1) When KDB Publication 447498 SAR test exclusion applies to the OFDM configuration.
   2) When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.
5. The output power of all data rate were pre-scan, just the worst case (the lowest data rate) of all mode were shown in report.
6. Per KDB 248227 D01V02r02 section 2.2, when the EUT in continuously transmitting mode, the actual duty cycle is 98.3%, so the duty cycle factor is 1.02.

13.5 Bluetooth Conducted Power

Average Power (dBm) (Bluetooth)				
Channel	Frequency (MHz)	GFSK	π/4-DQPSK	8DPSK
CH 01	2402	**3.65**	2.22	2.25
CH 39	2441	2.97	2.58	2.64
CH 78	2480	2.93	2.52	2.49

Average Power (dBm)		
Channel	Frequency (MHz)	BLE
CH 00	2402	2.39
CH 20	2442	2.88
CH 39	2480	2.84

Note:

1. Per KDB 447498 D01v06, the 1-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:
   [(*max. power of channel, including tune-up tolerance, mW*) / (*min. test separation distance, mm*)] · [√f(GHz)] ≤ 3.0 for 1-g SAR, where
   - f(GHz) is the RF channel transmit frequency in GHz
   - Power and distance are rounded to the nearest mW and mm before calculation
   - The result is rounded to one decimal place for comparison

Channel	Frequency (GHz)	Max. tune-up Power (dBm)	Max. Power (mW)	Test distance (mm)	Result	exclusion thresholds for 1-g SAR
CH 01	2.402	4.0	2.51	5	0.78	3.0

2. The max. tune-up power was provided by manufacturer, base on the result of note 1, RF exposure evaluation is not required.
3. The output power of all data rate were pre-scan, just the worst case of all mode were shown in report.
4. When the minimum *test separation distance* is < 5 mm, a distance of 5 mm according is applied to determine SAR test exclusion.

14 Exposure Positions Consideration

14.1 EUT Antenna Locations

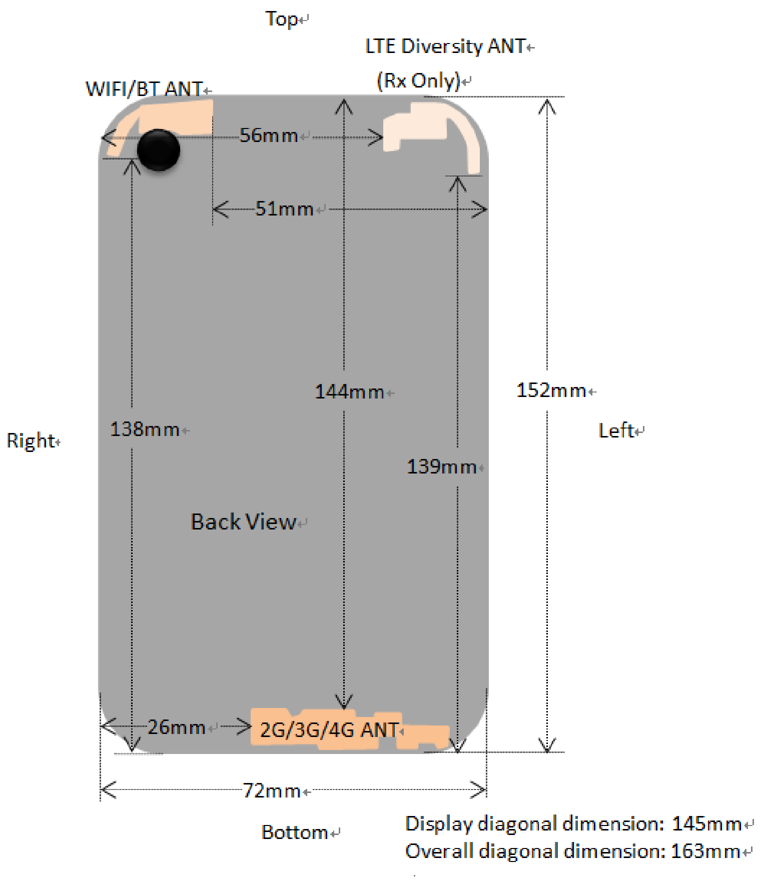


Fig.14.1 EUT Antenna Locations

14.2 Test Positions Consideration

Distance of Antennas to EUT edge/surface Test distance: 10mm						
Antennas	**Back**	**Front**	**Top Side**	**Bottom Side**	**Right Side**	**Left Side**
2G/3G/4G	<25mm	<25mm	144mm	<25mm	26mm	<25mm
WLAN & Bluetooth	<25mm	<25mm	<25mm	138mm	<25mm	51mm

Test Positions Test distance: 10mm						
Antennas	**Back**	**Front**	**Top Side**	**Bottom Side**	**Right Side**	**Left Side**
2G/3G/4G	Yes	Yes	No	Yes	No	Yes
WLAN & Bluetooth	Yes	Yes	Yes	No	Yes	No

Note:

1. Head/Body-worn/Hotspot mode SAR assessments are required.
2. Referring to KDB 941225 D06 v02r01, when the overall device length and width are ≥ 9cm * 5cm, the test distance is 10mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge.
3. Per KDB 447498 D01v06, for handsets the test separation distance is determined by the smallest distance between the outer surface of the device and the user, which is 0 mm for head SAR, 10 mm for hotspot SAR, and 10 mm for body-worn SAR.
4. Per KDB 648474 D04 v01r03, when hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg

15 SAR Test Results Summary

15.1 Standalone Head SAR Data

➢ GSM Head SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
1	GSM850/Voice	Right Cheek	190	836.6	32.67	-0.29	33.0	**0.039**	1.079	0.042
	GSM850/Voice	Right Tilted	190	836.6	32.67	-0.21	33.0	0.013	1.079	0.014
	GSM850/Voice	Left Cheek	190	836.6	32.67	-0.19	33.0	0.034	1.079	0.037
	GSM850/Voice	Left Tilted	190	836.6	32.67	-0.32	33.0	0.010	1.079	0.011
2	GSM1900/Voice	Right Cheek	512	1850.2	29.94	0.10	30.0	**0.011**	1.014	0.011
	GSM1900/Voice	Right Tilted	512	1850.2	29.94	0.28	30.0	0.005	1.014	0.005
	GSM1900/Voice	Left Cheek	512	1850.2	29.94	0.37	30.0	0.007	1.014	0.007
	GSM1900/Voice	Left Tilted	512	1850.2	29.94	-0.33	30.0	0.003	1.014	0.003
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ WCDMA Head SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
3	Band V/RMC	Right Cheek	4132	826.4	22.80	-0.17	23.0	**0.057**	1.047	0.060
	Band V/RMC	Right Tilted	4132	826.4	22.80	-0.22	23.0	0.021	1.047	0.022
	Band V/RMC	Left Cheek	4132	826.4	22.80	-0.37	23.0	0.054	1.047	0.057
	Band V/RMC	Left Tilted	4132	826.4	22.80	-0.10	23.0	0.016	1.047	0.017
	Band IV/RMC	Right Cheek	1412	1732.6	23.22	0.13	23.5	0.021	1.067	0.022
	Band IV/RMC	Right Tilted	1412	1732.6	23.22	0.19	23.5	0.008	1.067	0.009
4	Band IV/RMC	Left Cheek	1412	1732.6	23.22	0.00	23.5	**0.023**	1.067	0.025
	Band IV/RMC	Left Tilted	1412	1732.6	23.22	0.25	23.5	0.009	1.067	0.010
	Band II/RMC	Right Cheek	9262	1852.4	23.10	-0.25	23.5	0.017	1.096	0.019
	Band II/RMC	Right Tilted	9262	1852.4	23.10	0.18	23.5	0.005	1.096	0.005
5	Band II/RMC	Left Cheek	9262	1852.4	23.10	0.10	23.5	**0.034**	1.096	0.037
	Band II/RMC	Left Tilted	9262	1852.4	23.10	-0.27	23.5	0.013	1.096	0.014
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ LTE 20MHz QPSK 1RB Head SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
6	Band2/RB#49	Right Cheek	18900	1880.0	22.62	-0.19	23.0	**0.035**	1.091	0.038
	Band2/RB#49	Right Tilted	18900	1880.0	22.62	-0.11	23.0	0.013	1.091	0.014
	Band2/RB#49	Left Cheek	18900	1880.0	22.62	0.20	23.0	0.014	1.091	0.015
	Band2/RB#49	Left Tilted	18900	1880.0	22.62	0.08	23.0	0.006	1.091	0.007
7	Band4/RB#49	Right Cheek	20175	1732.5	22.44	-0.28	22.5	**0.090**	1.014	0.091
	Band4/RB#49	Right Tilted	20175	1732.5	22.44	-0.13	22.5	0.041	1.014	0.042
	Band4/RB#49	Left Cheek	20175	1732.5	22.44	0.16	22.5	0.043	1.014	0.044
	Band4/RB#49	Left Tilted	20175	1732.5	22.44	0.17	22.5	0.025	1.014	0.025
8	Band7/RB#49	Right Cheek	20850	2510.0	21.78	0.26	22.0	**0.009**	1.052	0.009
	Band7/RB#49	Right Tilted	20850	2510.0	21.78	-0.31	22.0	0.003	1.052	0.003
	Band7/RB#49	Left Cheek	20850	2510.0	21.78	0.12	22.0	0.007	1.052	0.007
	Band7/RB#49	Left Tilted	20850	2510.0	21.78	0.22	22.0	0.002	1.052	0.002
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ LTE 10MHz QPSK 1RB Head SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
9	Band5/RB#24	Right Cheek	20600	844.0	22.95	-0.23	23.0	**0.058**	1.012	0.059
	Band5/RB#24	Right Tilted	20600	844.0	22.95	0.34	23.0	0.020	1.012	0.020
	Band5/RB#24	Left Cheek	20600	844.0	22.95	0.15	23.0	0.051	1.012	0.052
	Band5/RB#24	Left Tilted	20600	844.0	22.95	0.08	23.0	0.016	1.012	0.016
	Band12/RB#49	Right Cheek	23130	711.0	22.85	-0.27	23.0	0.048	1.035	0.050
	Band12/RB#49	Right Tilted	23130	711.0	22.85	-0.30	23.0	0.022	1.035	0.023
10	Band12/RB#49	Left Cheek	23130	711.0	22.85	-0.12	23.0	**0.064**	1.035	0.066
	Band12/RB#49	Left Tilted	23130	711.0	22.85	-0.10	23.0	0.029	1.035	0.030
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ LTE 20MHz QPSK 50%RB Head SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
11	Band2/RB#0	Right Cheek	19100	1900.0	21.57	0.26	22.0	**0.035**	1.104	0.039
	Band2/RB#0	Right Tilted	19100	1900.0	21.57	0.21	22.0	0.012	1.104	0.013
	Band2/RB#0	Left Cheek	19100	1900.0	21.57	-0.24	22.0	0.024	1.104	0.026
	Band2/RB#0	Left Tilted	19100	1900.0	21.57	-0.35	22.0	0.008	1.104	0.009
12	Band4/RB#0	Right Cheek	20050	1720.0	21.63	0.07	22.0	**0.076**	1.089	0.083
	Band4/RB#0	Right Tilted	20050	1720.0	21.63	0.25	22.0	0.033	1.089	0.036
	Band4/RB#0	Left Cheek	20050	1720.0	21.63	0.19	22.0	0.041	1.089	0.045
	Band4/RB#0	Left Tilted	20050	1720.0	21.63	-0.13	22.0	0.020	1.089	0.022
13	Band7/RB#0	Right Cheek	21350	2560.0	21.47	0.24	21.5	**0.007**	1.007	0.007
	Band7/RB#0	Right Tilted	21350	2560.0	21.47	0.33	21.5	0.002	1.007	0.002
	Band7/RB#0	Left Cheek	21350	2560.0	21.47	-0.10	21.5	0.005	1.007	0.005
	Band7/RB#0	Left Tilted	21350	2560.0	21.47	0.18	21.5	0.001	1.007	0.001
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ LTE 10MHz QPSK 50%RB Head SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
14	Band5/RB#0	Right Cheek	20450	829.0	21.94	0.24	22.0	**0.059**	1.014	0.060
	Band5/RB#0	Right Tilted	20450	829.0	21.94	0.18	22.0	0.022	1.014	0.022
	Band5/RB#0	Left Cheek	20450	829.0	21.94	0.16	22.0	0.052	1.014	0.053
	Band5/RB#0	Left Tilted	20450	829.0	21.94	0.20	22.0	0.020	1.014	0.020
	Band12/RB#24	Right Cheek	23060	704.0	21.73	0.22	22.0	0.061	1.064	0.065
	Band12/RB#24	Right Tilted	23060	704.0	21.73	-0.07	22.0	0.029	1.064	0.031
15	Band12/RB#24	Left Cheek	23060	704.0	21.73	-0.32	22.0	**0.074**	1.064	0.079
	Band12/RB#24	Left Tilted	23060	704.0	21.73	-0.13	22.0	0.031	1.064	0.033
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ WLAN 2.4 GHz Head SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	D.C Factor	Reported SAR_{1g} (W/kg)
	2.4GHz/802.11b	Right Cheek	01	2412	17.71	0.19	18.0	0.139	1.069	1.02	0.152
	2.4GHz/802.11b	Right Tilted	01	2412	17.71	-0.01	18.0	0.190	1.069	1.02	0.207
	2.4GHz/802.11b	Left Cheek	01	2412	17.71	-0.20	18.0	0.192	1.069	1.02	0.209
16	2.4GHz/802.11b	Left Tilted	01	2412	17.71	0.12	18.0	**0.282**	1.069	1.02	0.307
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak					**1.6 W/kg (mW/g) Averaged over 1g**						

Uncontrolled Exposure/General Population	

Note:

1. Per KDB 447498 D01v06, for each exposure position, if the highest output power channel Reported SAR ≤ 0.8W/kg, other channels SAR testing is not necessary.
2. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required when the measured SAR is ≥ 0.8W/kg.
3. Per KDB 941225 D05v02r05, 100% RB allocation SAR measurement is not required when the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg.
4. Per KDB 248227 D01v02r02, for 802.11b DSSS , when the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in that exposure configuration.
5. Per KDB 248227 D01v02r02, OFDM SAR is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg. Cuz the maximum output power specified for OFDM and DSSS are 37.5mW(15.74dBm) and 59.02mW(17.71dBm), the scaled SAR would be 0.307×(37.5/59.02)=0.195W/Kg, therefore, SAR is not required for OFDM.
6. According to KDB 865664 D02v01r02, SAR plot is required for the highest measured SAR in each exposure configuration, wireless mode and frequency band combination.

15.2 Standalone Body SAR

➢ GSM Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
	GSM850/Voice	Front	190	836.6	32.67	0.15	33.0	0.037	1.079	0.040
17	GSM850/Voice	Back	190	836.6	32.67	-0.07	33.0	**0.059**	1.079	0.064
18	GSM1900/Voice	Front	512	1850.2	29.94	-0.40	30.0	**0.114**	1.014	0.116
	GSM1900/Voice	Back	512	1850.2	29.94	0.10	30.0	0.093	1.014	0.094
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ WCDMA Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
	Band V/RMC	Front	4132	826.4	22.80	0.02	23.0	0.056	1.047	0.059
19	Band V/RMC	Back	4132	826.4	22.80	-0.20	23.0	**0.100**	1.047	0.105
20	Band IV/RMC	Front	1412	1732.6	23.22	-0.08	23.5	**0.158**	1.067	0.169
	Band IV/RMC	Back	1412	1732.6	23.22	0.02	23.5	0.112	1.067	0.120
21	Band II/RMC	Front	9262	1852.4	23.10	-0.18	23.5	**0.204**	1.096	0.224
	Band II/RMC	Back	9262	1852.4	23.10	0.16	23.5	0.143	1.096	0.157
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ LTE 20MHz QPSK 1RB Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
22	Band2/RB#49	Front	18900	1880.0	22.62	0.16	23.0	**0.228**	1.091	0.249
	Band2/RB#49	Back	18900	1880.0	22.62	-0.01	23.0	0.131	1.091	0.143
23	Band4/RB#49	Front	20175	1732.5	22.44	-0.23	22.5	**0.167**	1.014	0.169
	Band4/RB#49	Back	20175	1732.5	22.44	0.02	22.5	0.122	1.014	0.124
24	Band7/RB#49	Front	20850	2510.0	21.78	-0.24	22.0	**0.236**	1.052	0.248
	Band7/RB#49	Back	20850	2510.0	21.78	-0.35	22.0	0.214	1.052	0.225
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ LTE 10MHz QPSK 1RB Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
	Band5/RB#24	Front	20600	844.0	22.95	-0.08	23.0	0.058	1.012	0.059
25	Band5/RB#24	Back	20600	844.0	22.95	-0.31	23.0	**0.076**	1.012	0.077
	Band12/RB#49	Front	23130	711.0	22.85	0.02	23.0	0.097	1.035	0.100
26	Band12/RB#49	Back	23130	711.0	22.85	-0.18	23.0	**0.120**	1.035	0.124
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ LTE 20MHz QPSK 50%RB Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
27	Band2/RB#0	Front	19100	1900.0	21.57	-0.34	22.0	**0.230**	1.104	0.254
	Band2/RB#0	Back	19100	1900.0	21.57	0.25	22.0	0.176	1.104	0.194
28	Band4/RB#0	Front	20050	1720.0	21.63	-0.19	22.0	**0.138**	1.089	0.150
	Band4/RB#0	Back	20050	1720.0	21.63	-0.02	22.0	0.104	1.089	0.113

29	Band7/RB#0	Front	21350	2560.0	21.47	-0.24	21.5	**0.195**	1.007	0.196
	Band7/RB#0	Back	21350	2560.0	21.47	-0.32	21.5	0.177	1.007	0.178
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ LTE 10MHz QPSK 50%RB Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
	Band5/RB#0	Front	20450	829.0	21.94	0.19	22.0	0.049	1.014	0.050
30	Band5/RB#0	Back	20450	829.0	21.94	0.04	22.0	**0.076**	1.014	0.077
	Band12/RB#24	Front	23060	704.0	21.73	0.01	22.0	0.095	1.064	0.101
31	Band12/RB#24	Back	23060	704.0	21.73	-0.03	22.0	**0.117**	1.064	0.124
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ WLAN 2.4 GHz Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	D.C Factor	Reported SAR_{1g} (W/kg)
	2.4GHz/802.11b	Front	01	2412	17.71	0.21	18.0	0.039	1.069	1.02	0.043
32	2.4GHz/802.11b	Back	01	2412	17.71	0.03	18.0	**0.056**	1.069	1.02	0.061
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**						

Note:

1. Body-worn SAR testing was performed at 10mm separation, and this distance is determined by the handset manufacturer that there will be body-worn accessories that users may acquire at the time of equipment certification, to enable users to purchase aftermarket body-worn accessories with the required minimum separation.
2. Per KDB 941225 D06v02r01, when the same wireless modes and device transmission configurations are required for testing body-worn accessories and hotspot mode, it is not necessary to test body-worn accessory SAR for the same device orientation if the test separation distance for hotspot mode is more conservative than that used for body-worn accessories.
3. Body-worn exposure conditions are intended to voice call operations, therefore GSM voice call is selected to be tested.
4. Per KDB 648474 D04v01r03, when the *Reported* SAR for a body-worn accessory measured without a headset connected to the handset is ≤ 1.2 W/kg, SAR testing with a headset connected to the handset is not required.
5. The WLAN SAR perform the front and back position, due considered the simultaneous SAR for body-worn.
6. Per KDB 447498 D01v06, for each exposure position, if the highest output channel Reported SAR ≤0.8W/kg, other channels SAR testing is not necessary.
7. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required when the measured SAR is ≥0.8W/kg.
8. Per KDB 941225 D05v02r05, 100% RB allocation SAR measurement is not required when the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg.
9. According to KDB 865664 D02v01r02, SAR plot is required for the highest measured SAR in each exposure configuration, wireless mode and frequency band combination.

15.3 Body SAR in Hotspot Mode

➢ GSM Body SAR in Hotspot mode

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
	GPRS850/4 slots	Front	251	848.8	29.03	-0.03	29.5	0.077	1.114	0.086
33	GPRS850/4 slots	Back	251	848.8	29.03	0.17	29.5	**0.143**	1.114	0.159
	GPRS850/4 slots	Left	251	848.8	29.03	0.29	29.5	0.068	1.114	0.076
	GPRS850/4 slots	Bottom	251	848.8	29.03	0.12	29.5	0.039	1.114	0.043
	GPRS1900/4 slots	Front	512	1850.2	26.40	-0.20	26.5	0.255	1.023	0.261
	GPRS1900/4 slots	Back	512	1850.2	26.40	-0.25	26.5	0.227	1.023	0.232
	GPRS1900/4 slots	Left	512	1850.2	26.40	-0.15	26.5	0.164	1.023	0.168
34	GPRS1900/4 slots	Bottom	512	1850.2	26.40	-0.12	26.5	**0.456**	1.023	0.466
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ WCDMA Body SAR in Hotspot mode

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
	Band V/RMC	Front	4132	826.4	22.80	0.02	23.0	0.056	1.047	0.059
19	Band V/RMC	Back	4132	826.4	22.80	-0.20	23.0	**0.100**	1.047	0.105
	Band V/RMC	Left	4132	826.4	22.80	0.22	23.0	0.023	1.047	0.024
	Band V/RMC	Bottom	4132	826.4	22.80	-0.14	23.0	0.030	1.047	0.031
	Band IV/RMC	Front	1412	1732.6	23.22	-0.08	23.5	0.158	1.067	0.169
	Band IV/RMC	Back	1412	1732.6	23.22	0.02	23.5	0.112	1.067	0.120
	Band IV/RMC	Left	1412	1732.6	23.22	0.11	23.5	0.086	1.067	0.092
35	Band IV/RMC	Bottom	1412	1732.6	23.22	0.15	23.5	**0.324**	1.067	0.346
	Band II/RMC	Front	9262	1852.4	23.10	-0.18	23.5	0.204	1.096	0.224
	Band II/RMC	Back	9262	1852.4	23.10	0.16	23.5	0.143	1.096	0.157
	Band II/RMC	Left	9262	1852.4	23.10	0.27	23.5	0.091	1.096	0.100
36	Band II/RMC	Bottom	9262	1852.4	23.10	0.34	23.5	**0.407**	1.096	0.446
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ LTE 20MHz QPSK 1RB Body SAR in Hotspot mode

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
	Band2/RB#49	Front	18900	1880.0	22.62	0.16	23.0	0.228	1.091	0.249
	Band2/RB#49	Back	18900	1880.0	22.62	-0.01	23.0	0.131	1.091	0.143
	Band2/RB#49	Left	18900	1880.0	22.62	0.08	23.0	0.072	1.091	0.079
37	Band2/RB#49	Bottom	18900	1880.0	22.62	0.17	23.0	**0.417**	1.091	0.455
	Band4/RB#49	Front	20175	1732.5	22.44	-0.23	22.5	0.167	1.014	0.169
	Band4/RB#49	Back	20175	1732.5	22.44	0.02	22.5	0.122	1.014	0.124
	Band4/RB#49	Left	20175	1732.5	22.44	-0.14	22.5	0.088	1.014	0.089
38	Band4/RB#49	Bottom	20175	1732.5	22.44	-0.08	22.5	**0.203**	1.014	0.206
24	Band7/RB#49	Front	20850	2510.0	21.78	-0.24	22.0	**0.236**	1.052	0.248
	Band7/RB#49	Back	20850	2510.0	21.78	-0.35	22.0	0.214	1.052	0.225
	Band7/RB#49	Left	20850	2510.0	21.78	0.13	22.0	0.061	1.052	0.064
	Band7/RB#49	Bottom	20850	2510.0	21.78	0.22	22.0	0.168	1.052	0.177
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ LTE 10MHz QPSK 1RB Body SAR in Hotspot mode

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
	Band5/RB#24	Front	20600	844.0	22.95	-0.08	23.0	0.058	1.012	0.059
25	Band5/RB#24	Back	20600	844.0	22.95	-0.31	23.0	**0.076**	1.012	0.077
	Band5/RB#24	Left	20600	844.0	22.95	0.26	23.0	0.018	1.012	0.018
	Band5/RB#24	Bottom	20600	844.0	22.95	0.02	23.0	0.025	1.012	0.025
	Band12/RB#49	Front	23130	711.0	22.85	0.02	23.0	0.097	1.035	0.100
26	Band12/RB#49	Back	23130	711.0	22.85	-0.18	23.0	**0.120**	1.035	0.124
	Band12/RB#49	Left	23130	711.0	22.85	0.17	23.0	0.033	1.035	0.034
	Band12/RB#49	Bottom	23130	711.0	22.85	-0.12	23.0	0.020	1.035	0.021
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ LTE 20MHz QPSK 50%RB Body SAR in Hotspot mode

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
	Band2/RB#0	Front	19100	1900.0	21.57	-0.34	22.0	0.230	1.104	0.254
	Band2/RB#0	Back	19100	1900.0	21.57	0.25	22.0	0.176	1.104	0.194
	Band2/RB#0	Left	19100	1900.0	21.57	0.31	22.0	0.102	1.104	0.113
39	Band2/RB#0	Bottom	19100	1900.0	21.57	0.24	22.0	**0.425**	1.104	0.469
	Band4/RB#0	Front	20050	1720.0	21.63	-0.19	22.0	0.138	1.089	0.150
	Band4/RB#0	Back	20050	1720.0	21.63	-0.02	22.0	0.104	1.089	0.113
	Band4/RB#0	Left	20050	1720.0	21.63	-0.23	22.0	0.087	1.089	0.095
40	Band4/RB#0	Bottom	20050	1720.0	21.63	-0.31	22.0	**0.213**	1.089	0.232
29	Band7/RB#0	Front	21350	2560.0	21.47	-0.24	21.5	**0.195**	1.007	0.196
	Band7/RB#0	Back	21350	2560.0	21.47	-0.32	21.5	0.177	1.007	0.178
	Band7/RB#0	Left	21350	2560.0	21.47	0.17	21.5	0.113	1.007	0.114
	Band7/RB#0	Bottom	21350	2560.0	21.47	0.08	21.5	0.135	1.007	0.136
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ LTE 10MHz QPSK 50%RB Body SAR in Hotspot mode

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
	Band5/RB#0	Front	20450	829.0	21.94	0.19	22.0	0.049	1.014	0.050
30	Band5/RB#0	Back	20450	829.0	21.94	0.04	22.0	**0.076**	1.014	0.077
	Band5/RB#0	Left	20450	829.0	21.94	0.12	22.0	0.030	1.014	0.030
	Band5/RB#0	Bottom	20450	829.0	21.94	0.01	22.0	0.021	1.014	0.021
	Band12/RB#24	Front	23060	704.0	21.73	0.01	22.0	0.095	1.064	0.101
31	Band12/RB#24	Back	23060	704.0	21.73	-0.03	22.0	**0.117**	1.064	0.124
	Band12/RB#24	Left	23060	704.0	21.73	-0.25	22.0	0.037	1.064	0.039
	Band12/RB#24	Bottom	23060	704.0	21.73	-0.33	22.0	0.021	1.064	0.022
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ WLAN 2.4GHz Body SAR in Hotspot mode

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	D.C Factor	Reported SAR_{1g} (W/kg)
	2.4GHz/802.11b	Front	01	2412	17.71	0.21	18.0	0.039	1.069	1.02	0.043
	2.4GHz/802.11b	Back	01	2412	17.71	0.03	18.0	0.056	1.069	1.02	0.061
	2.4GHz/802.11b	Right	01	2412	17.71	0.30	18.0	0.028	1.069	1.02	0.031
41	2.4GHz/802.11b	Top	01	2412	17.71	-0.34	18.0	**0.066**	1.069	1.02	0.072
ANSI / IEEE C95.1 – SAFETY LIMIT					**1.6 W/kg (mW/g)**						

Spatial Peak Uncontrolled Exposure/General Population	Averaged over 1g

Note:

1. Per KDB 447498 D01v06, for each exposure position, if the highest output channel Reported SAR ≤0.8W/kg, other channels SAR testing is not necessary.
2. Additional WLAN SAR testing was performed for simultaneous transmission analysis.
3. For Hotspot SAR testing, per KDB 941225 D06v02r01, for EUT dimension ≥ 9cm*5cm, the test distance is 10mm. SAR must be measured for all surfaces and sides with a transmitting antenna located within 2.5cm from that surface or edge.
4. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. If HSDPA output power is < 0.25dB higher than RMC 12.2kbps, or Reported SAR with RMC 12.2kbps setting is ≤ 1.2W/kg, HSDPA SAR evaluation can be excluded.
5. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required when the measured SAR is ≥0.8W/kg.
6. Per KDB 648474 D04v01r03, when the Reported SAR for a body-worn accessory measured without a headset connected to the handset is ＞ 1.2 W/kg, SAR testing with a headset connected to the handset is required.
7. Per KDB 941225 D05v02r05, 100% RB allocation SAR measurement is not required when the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel.
8. According to KDB 865664 D02v01r02, SAR plot is required for the highest measured SAR in each exposure configuration, wireless mode and frequency band combination.

15.4 Multi-Band Simultaneous Transmission Considerations

➢ **Simultaneous Transmission Capabilities**

According to FCC KDB Publication 447498 D01v06, transmitters are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds. Possible transmission paths for the EUT are shown in below Figure and are color-coded to indicate communication modes which share the same path. Modes which share the same transmission path cannot transmit simultaneously with one another.

Path 1	Path 2
GSM/WCDMA/LTE	Bluetooth/WLAN

Fig.15.1 Simultaneous Transmission Paths

➢ **Simultaneous Transmission Procedures**

This device contains transmitters that may operate simultaneously. Therefore simultaneous transmission analysis is required. Per FCC KDB 447498 D01v06, simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is ≤ 1.6 W/kg. When standalone SAR is not required to be measured, per FCC KDB 447498 D01v06 4.3.2), the following equation must be used to estimate the standalone 1g SAR for simultaneous transmission assessment involving that transmitter.

$$\text{Estimated SAR} = \frac{\sqrt{f(GHz)}}{7.5} \cdot \frac{\text{Max. power of channel, mW}}{\text{Min. Separation Distance, mm}}$$

Mode	Max. tune-up Power (dBm)	Exposure Position	Head	Body
		Test Distance (mm)	0	10
Bluetooth	4.0	Estimated SAR (W/kg)	0.104	0.052

Note:

1. When the minimum *test separation distance* is < 5 mm, a distance of 5 mm according is applied to determine estimated SAR.

➢ **Multi-Band simultaneous Transmission Consideration**

	Position	Applicable Combination
Simultaneous Transmission Consideration	Head	WWAN (Voice) + WLAN 2.4 GHz
		WWAN (Voice) + Bluetooth
	Body	WWAN (Voice) + WLAN 2.4 GHz
		WWAN (Voice) + Bluetooth
	Hotspot	WWAN (Voice) + WLAN 2.4 GHz

Note:

1. WLAN 2.4GHz Band and Bluetooth share the same antenna, and cannot transmit simultaneously.
2. GSM/WCDMA/LTE shares the same antenna, and cannot transmit simultaneously.
3. The Report SAR summation is calculated based on the same configuration and test position.
4. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
   i. Scalar SAR summation < 1.6 W/kg.
   ii. SPLSR = $(SAR_1 + SAR_2)^{1.5}$ / (*min. separation distance, mm*), and the peak separation distance is determined from the square root of $[(x_1-x_2)^2 + (y_1-y_2)^2 + (z_1-z_2)^2]$, where (x_1, y_1, z_1) and (x_2, y_2, z_2) are the coordinates of the extrapolated peak SAR locations in the zoom scan If SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary
   iii. Simultaneously transmission SAR measurement, and the Reported multi-band SAR < 1.6 W/kg

15.5 SAR Simultaneous Transmission Analysis

➢ **Head Simultaneous Transmission**

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
GSM850	Right Cheek	0.042	0.152	0.194
	Right Tilted	0.014	0.207	0.221
	Left Cheek	0.037	0.209	0.246
	Left Tilted	0.011	0.307	0.318

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	Σ SAR (W/kg)
GSM850	Right Cheek	0.042	0.104	0.146
	Right Tilted	0.014	0.104	0.118
	Left Cheek	0.037	0.104	0.141
	Left Tilted	0.011	0.104	0.115

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
GSM 1900	Right Cheek	0.011	0.152	0.163
	Right Tilted	0.005	0.207	0.212
	Left Cheek	0.007	0.209	0.216
	Left Tilted	0.003	0.307	0.310

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	Σ SAR (W/kg)
GSM 1900	Right Cheek	0.011	0.104	0.115
	Right Tilted	0.005	0.104	0.109
	Left Cheek	0.007	0.104	0.111
	Left Tilted	0.003	0.104	0.107

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
WCDMA Band V	Right Cheek	0.060	0.152	0.212
	Right Tilted	0.022	0.207	0.229
	Left Cheek	0.057	0.209	0.266
	Left Tilted	0.017	0.307	0.324

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	Σ SAR (W/kg)
WCDMA Band V	Right Cheek	0.060	0.104	0.164
	Right Tilted	0.022	0.104	0.126
	Left Cheek	0.057	0.104	0.161
	Left Tilted	0.017	0.104	0.121

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
WCDMA Band IV	Right Cheek	0.022	0.152	0.174
	Right Tilted	0.009	0.207	0.216
	Left Cheek	0.025	0.209	0.234
	Left Tilted	0.010	0.307	0.317

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	Σ SAR (W/kg)
WCDMA Band IV	Right Cheek	0.022	0.104	0.126
	Right Tilted	0.009	0.104	0.113
	Left Cheek	0.026	0.104	0.13
	Left Tilted	0.010	0.104	0.114

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
WCDMA Band II	Right Cheek	0.019	0.152	0.171
	Right Tilted	0.005	0.207	0.212
	Left Cheek	0.037	0.209	0.246
	Left Tilted	0.014	0.307	0.321

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	Σ SAR (W/kg)
WCDMA Band II	Right Cheek	0.019	0.104	0.123
	Right Tilted	0.005	0.104	0.109
	Left Cheek	0.037	0.104	0.141
	Left Tilted	0.014	0.104	0.118

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 2	Right Cheek	0.039	0.152	0.191
	Right Tilted	0.014	0.207	0.221

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 2	Right Cheek	0.039	0.104	0.143
	Right Tilted	0.014	0.104	0.118

	Left Cheek	0.026	0.209	0.235
	Left Tilted	0.009	0.307	0.316

	Left Cheek	0.026	0.104	0.130
	Left Tilted	0.009	0.104	0.113

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 4	Right Cheek	0.091	0.152	0.243
	Right Tilted	0.042	0.207	0.249
	Left Cheek	0.045	0.209	0.254
	Left Tilted	0.025	0.307	0.332

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 4	Right Cheek	0.091	0.104	0.195
	Right Tilted	0.042	0.104	0.146
	Left Cheek	0.045	0.104	0.149
	Left Tilted	0.025	0.104	0.129

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 5	Right Cheek	0.060	0.152	0.212
	Right Tilted	0.022	0.207	0.229
	Left Cheek	0.053	0.209	0.262
	Left Tilted	0.020	0.307	0.327

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 5	Right Cheek	0.060	0.104	0.164
	Right Tilted	0.022	0.104	0.126
	Left Cheek	0.053	0.104	0.157
	Left Tilted	0.020	0.104	0.124

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 7	Right Cheek	0.009	0.152	0.161
	Right Tilted	0.003	0.207	0.210
	Left Cheek	0.007	0.209	0.216
	Left Tilted	0.002	0.307	0.309

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 7	Right Cheek	0.009	0.104	0.113
	Right Tilted	0.003	0.104	0.107
	Left Cheek	0.007	0.104	0.111
	Left Tilted	0.002	0.104	0.106

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 12	Right Cheek	0.065	0.152	0.217
	Right Tilted	0.031	0.207	0.238
	Left Cheek	0.079	0.209	0.288
	Left Tilted	0.033	0.307	0.340

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 12	Right Cheek	0.065	0.104	0.169
	Right Tilted	0.031	0.104	0.135
	Left Cheek	0.079	0.104	0.183
	Left Tilted	0.033	0.104	0.137

➢ **Body worn Simultaneous Transmission**

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
GSM850	Front	0.040	0.043	0.083
	Back	0.064	0.061	0.125

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	Σ SAR (W/kg)
GSM850	Front	0.040	0.052	0.092
	Back	0.064	0.052	0.116

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
GSM 1900	Front	0.116	0.043	0.159
	Back	0.094	0.061	0.155

WWAN Mode	Position	WWAN SAR1g (W/kg)	Bluetooth Estimated SAR1g (W/kg)	Σ SAR (W/kg)
GSM 1900	Front	0.116	0.052	0.168
	Back	0.094	0.052	0.146

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
WCDMA Band V	Front	0.059	0.043	0.102
	Back	0.105	0.061	0.166

WWAN Mode	Position	WWAN SAR1g (W/kg)	Bluetooth Estimated SAR1g (W/kg)	Σ SAR (W/kg)
WCDMA Band V	Front	0.059	0.052	0.111
	Back	0.105	0.052	0.157

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
WCDMA Band IV	Front	0.169	0.043	0.212
	Back	0.120	0.061	0.181

WWAN Mode	Position	WWAN SAR1g (W/kg)	Bluetooth Estimated SAR1g (W/kg)	Σ SAR (W/kg)
WCDMA Band IV	Front	0.169	0.052	0.221
	Back	0.120	0.052	0.172

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
WCDMA Band II	Front	0.224	0.043	0.267
	Back	0.157	0.061	0.218

WWAN Mode	Position	WWAN SAR1g (W/kg)	Bluetooth Estimated SAR1g (W/kg)	Σ SAR (W/kg)
WCDMA Band II	Front	0.228	0.052	0.28
	Back	0.157	0.052	0.209

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 2	Front	0.254	0.043	0.297
	Back	0.194	0.061	0.255

WWAN Mode	Position	WWAN SAR1g (W/kg)	Bluetooth Estimated SAR1g (W/kg)	Σ SAR (W/kg)
LTE Band 2	Front	0.254	0.052	0.306
	Back	0.194	0.052	0.246

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 4	Front	0.169	0.043	0.212
	Back	0.124	0.061	0.185

WWAN Mode	Position	WWAN SAR1g (W/kg)	Bluetooth Estimated SAR1g (W/kg)	Σ SAR (W/kg)
LTE Band 4	Front	0.169	0.052	0.221
	Back	0.124	0.052	0.176

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 5	Front	0.059	0.043	0.102
	Back	0.077	0.061	0.138

WWAN Mode	Position	WWAN SAR1g (W/kg)	Bluetooth Estimated SAR1g (W/kg)	Σ SAR (W/kg)
LTE Band 5	Front	0.059	0.052	0.111
	Back	0.077	0.052	0.129

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 7	Front	0.248	0.043	0.291
	Back	0.225	0.061	0.286

WWAN Mode	Position	WWAN SAR1g (W/kg)	Bluetooth Estimated SAR1g (W/kg)	Σ SAR (W/kg)
LTE Band 7	Front	0.248	0.052	0.300
	Back	0.225	0.052	0.277

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 12	Front	0.101	0.043	0.144
	Back	0.124	0.061	0.185

WWAN Mode	Position	WWAN SAR1g (W/kg)	Bluetooth Estimated SAR1g (W/kg)	Σ SAR (W/kg)
LTE Band 12	Front	0.101	0.052	0.153
	Back	0.124	0.052	0.176

- **Hotspot mode Simultaneous Transmission**

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
GSM850	Front	0.086	0.043	0.129
	Back	0.159	0.061	0.220
	Left	0.076	/	0.076
	Right	/	0.031	0.031
	Top	/	0.072	0.072
	Bottom	0.043	/	0.043

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
GSM 1900	Front	0.261	0.043	0.304
	Back	0.232	0.061	0.293
	Left	0.168	/	0.168
	Right	/	0.031	0.031
	Top	/	0.072	0.072
	Bottom	0.466	/	0.466

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
WCDMA Band V	Front	0.059	0.043	0.102
	Back	0.105	0.061	0.166
	Left	0.024	/	0.024
	Right	/	0.031	0.031
	Top	/	0.072	0.072
	Bottom	0.031	/	0.031

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
WCDMA Band IV	Front	0.169	0.043	0.212
	Back	0.120	0.061	0.181
	Left	0.092	/	0.092
	Right	/	0.031	0.031
	Top	/	0.072	0.072
	Bottom	0.398	/	0.398

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
WCDMA Band II	Front	0.224	0.043	0.267
	Back	0.157	0.061	0.218
	Left	0.100	/	0.100
	Right	/	0.031	0.031
	Top	/	0.072	0.072
	Bottom	0.446	/	0.446

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 2	Front	0.254	0.043	0.297
	Back	0.194	0.061	0.255
	Left	0.113	/	0.113
	Right	/	0.031	0.031
	Top	/	0.072	0.072
	Bottom	0.469	/	0.469

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 4	Front	0.169	0.043	0.212
	Back	0.124	0.061	0.185
	Left	0.095	/	0.095
	Right	/	0.031	0.031
	Top	/	0.072	0.072
	Bottom	0.232	/	0.232

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 5	Front	0.059	0.043	0.102
	Back	0.077	0.061	0.138
	Left	0.030	/	0.030
	Right	/	0.031	0.031
	Top	/	0.072	0.072
	Bottom	0.025	/	0.025

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 7	Front	0.248	0.043	0.291
	Back	0.225	0.061	0.286
	Left	0.114	/	0.114

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 12	Front	0.101	0.043	0.144
	Back	0.124	0.061	0.185
	Left	0.039	/	0.039

	Right	/	0.031	0.031
	Top	/	0.072	0.072
	Bottom	0.177	/	0.177

	Right	/	0.031	0.031
	Top	/	0.072	0.072
	Bottom	0.022	/	0.022

- **Simultaneous Transmission Conclusion**

The above numerical summed SAR results for all the case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v06.

15.6 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 A evaluation of uncertainty. The evaluation of uncertainty by means other than the statistical analysis of a series of observation is termed a Type B evaluation of uncertainty. Each component of uncertainty, however evaluated, is represented by an estimated standard deviation, termed standard uncertainty, which is determined by the positive square root of the estimated variance.

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

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

Uncertainty Distributions	Normal	Rectangular	Triangular	U-Shape
Multi-plying Factor	1/k(b)	$1/\sqrt{3}$	$1/\sqrt{6}$	$1/\sqrt{2}$

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 B evaluation using the usual "root-sum-squares" (RSS) methods of combining standard deviations by taking the positive square root of the estimated variances.

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

Uncertainty Component	Section	Uncert. Value	Prob. Dist.	Div.	(C_i) (1 g)	(C_i) (10 g)	Std. Unc. (1 g)	Std. Unc. (10 g)	V_i
Measurement System									
Probe Calibration	E.2.1	±7.4%	N	1	1	1	±7.4%	±7.4%	∞
Axial Isotropy	E.2.2	±1.2%	R	$\sqrt{3}$	0.7	0.7	±0.49%	±0.49%	∞
Hemispherical Isotropy	E.2.2	±3.2%	R	$\sqrt{3}$	0.7	0.7	±1.29%	±1.29%	∞
Boundary Effects	E.2.3	±1.0%	R	$\sqrt{3}$	1	1	±0.58%	±0.58%	∞
Linearity	E.2.4	±0.9%	R	$\sqrt{3}$	1	1	±0.52%	±0.52%	∞
System Detection Limits	E.2.5	±0.25%	R	$\sqrt{3}$	1	1	±0.14%	±0.14%	∞
Readout Electronics	E.2.6	±0.3%	N	1	1	1	±0.3%	±0.3%	∞
Response Time	E.2.7	±0.8%	R	$\sqrt{3}$	1	1	±0.46%	±0.46%	∞
Integration Time	E.2.8	±2.6%	R	$\sqrt{3}$	1	1	±1.5%	±1.5%	∞
RF Ambient Noise	E.6.1	±3.0%	R	$\sqrt{3}$	1	1	±1.73%	±1.73%	∞
RF Ambient Reflections	E.6.1	±3.0%	R	$\sqrt{3}$	1	1	±1.73%	±1.73%	∞
Probe positioner mechanical tolerances	E.6.2	±0.4%	R	$\sqrt{3}$	1	1	±0.23%	±0.23%	∞
Probe positioning tolerance with respect to the phantom shell surface	E.6.3	±2.9%	R	$\sqrt{3}$	1	1	±1.67%	±1.67%	∞
Interpolation, extrapolation, and integration algorithm For max. SAR Evaluation.	E.5	±1.0%	R	$\sqrt{3}$	1	1	±0.58%	±0.58%	∞
Test Sample Related									
Device Positioning	E.4.2	±4.6%	N	1	1	1	±4.6%	±4.6%	M-1
Device Holder	E.4.1	±5.2%	N	1	1	1	±5.2%	±5.2%	M-1
Power Drift	6.6.2	±5.0%	R	$\sqrt{3}$	1	1	±2.89%	±2.89%	∞
Phantom and Setup									
Phantom Uncertainty	E.3.1	±4.0%	R	$\sqrt{3}$	1	1	±2.31%	±2.31%	∞
Liquid Conductivity(Target)	E.3.2	±5.0%	N	1	0.78	0.71	±1.85%	±1.24%	∞
Liquid Conductivity(Meas.)	E.3.3	±2.5%	N	1	0.23	0.26	±1.64%	±1.08%	M
Liquid Permittivity(Target)	E.3.2	±5.0%	R	$\sqrt{3}$	0.78	0.71	±1.73%	±1.41%	∞
Liquid Permittivity(Meas.)	E.3.3	±2.5%	R	$\sqrt{3}$	0.23	0.26	±1.5%	±1.23%	M
Combined Standard Uncertainty (RSS)							±12.05%	±11.89%	
Expanded Uncertainty (95% Confidence Level, k = 2)							±24.10%	±23.78%	

Uncertainty Budget for frequency range 300 MHz to 3 GHz according to IEEE1528-2013

15.7 Measurement Conclusion

The SAR evaluation indicates that the EUT complies with the RF radiation exposure limits of the FCC and Industry Canada, with respect to all parameters subject to this test. These measurements were taken to simulate the RF effects of RF exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The results and statements relate only to the item(s) tested. Please note that the absorption and distribution of electromagnetic energy in the body are very complex phenomena that depend on the mass, shape, and size of the body, the orientation of the body with respect to the field vectors, and the electrical properties of both the body and the environment. Other variables that may play a substantial role in possible biological effects are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease). Because various factors may interact with one another to vary the specific biological outcome of an exposure to electromagnetic fields, any protection guide should consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables.

16 Reference

[1]. FCC 47 CFR Part 2 “Frequency Allocations and Radio Treaty Matters; General Rules and Regulations”

[2]. ANSI/IEEE Std. C95.1-1992, “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz”, September 1992

[3]. IEEE Std. 1528-2013, “Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, September2013

[4]. SPEAG DASY52 System Handbook

[5]. FCC KDB 248227 D01 v02r02, “SAR GUIDANCE FOR IEEE 802.11 (Wi-Fi) TRANSMITTERS”, October 2015

[6]. FCC KDB 447498 D01 v06, “RF EXPOSURE PROCEDURES AND EQUIPMENT AUTHORIZATION POLICIES FOR MOBILE AND PORTABLE DEVICES”, October 2015

[7]. FCC KDB 648474 D04 v01r03, “SAR EVALUATION CONSIDERATIONS FOR WIRELESS HANDSETS”, October 2015

[8]. FCC KDB 941225 D01 v03r01, “3G SAR MEAUREMENT PROCEDURES”, October 2015

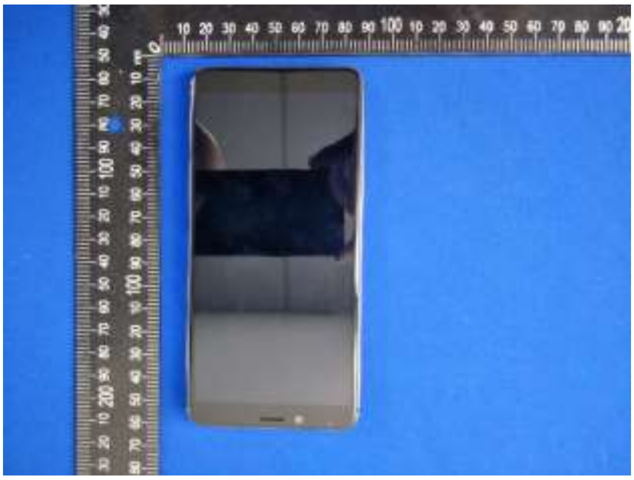
[9]. FCC KDB 941225 D05 v02r05, “SAR EVALUATION CONSIDERATIONS FOR LTE DEVICES”, Dec 2015

[10]. FCC KDB 941225 D03 v01, “Recommended SAR Test Reduction Procedures for GSM / GPRS / EDGE”, December 2008

[11]. FCC KDB 941225 D06 v02r01, " SAR EVALUATION PROCEDURES FOR PORTABLE DEVICES WITH WIRELESS ROUTER CAPABILITIES", October 2015

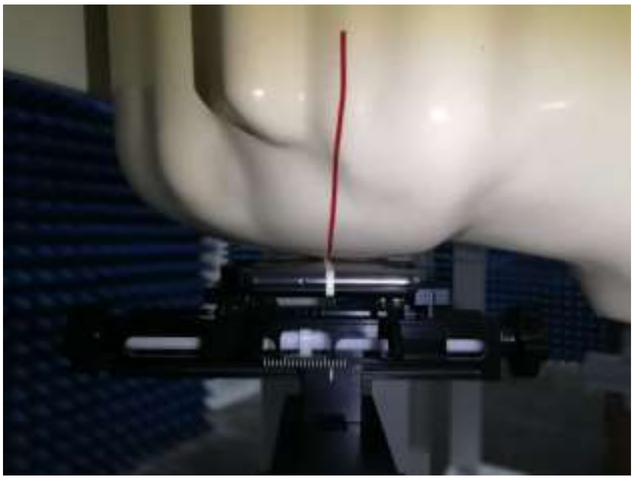
[12]. FCC KDB 865664 D01 v01r04, “SAR MEASUREMENT REQUIREMENTS FOR 100 MHz TO 6 GHz”, August 2015

Appendix A: EUT Photos

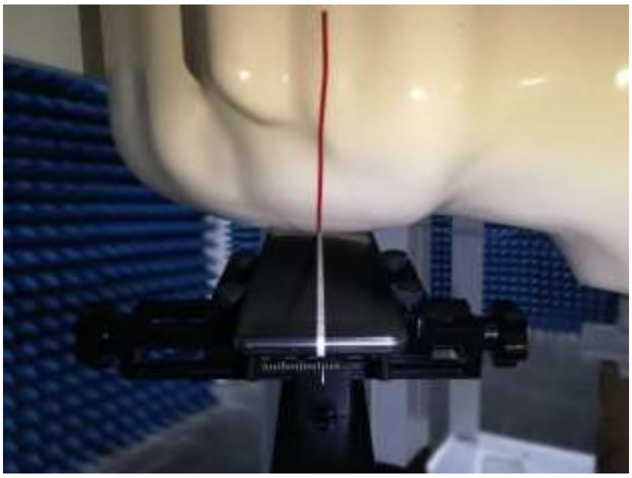



Appendix B: Test Setup Photos

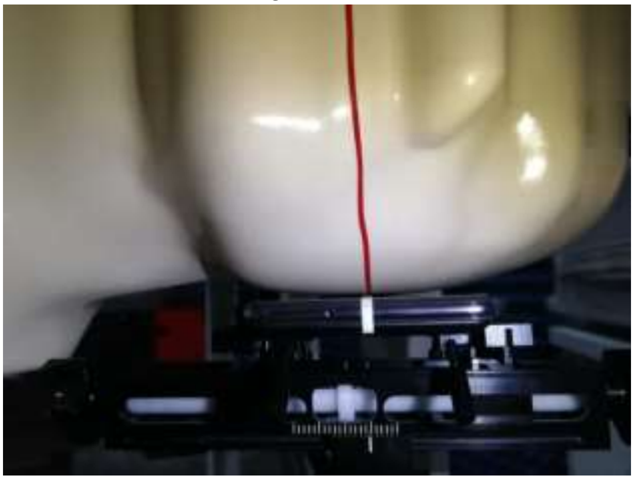
Head



Right Cheek



Right Tilted

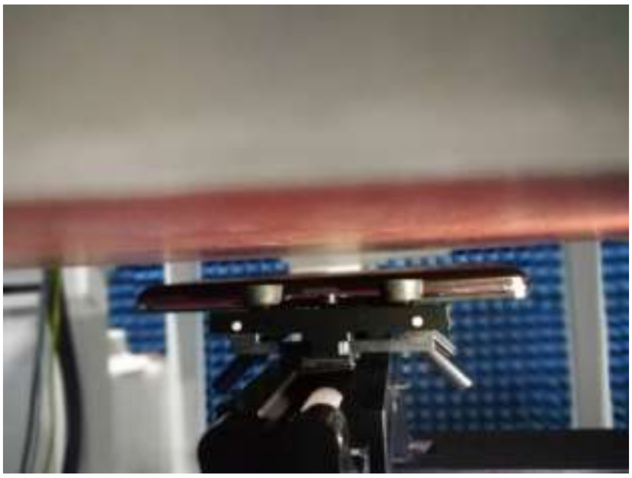


Left Cheek

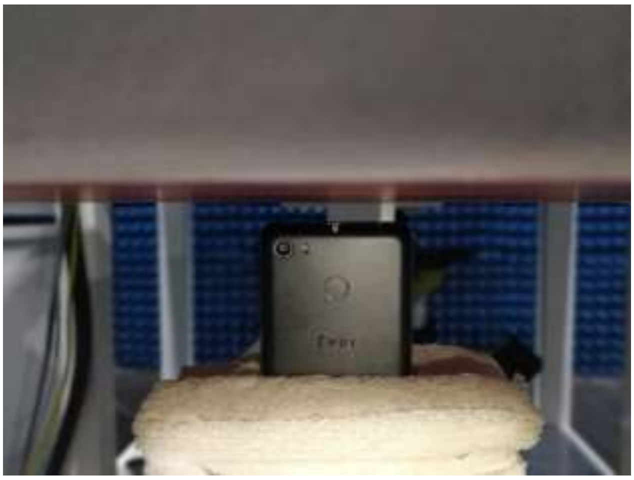
Left Tilted

Body

Front side (10mm)



Back side(10mm)



Top side(10mm)

Bottom side(10mm)

Left side(10mm)

Right side(10mm)

Appendix C: Plots of SAR System Check

Test Laboratory: CCIS Date/Time: 04.24.2018 07:35:33

DUT: Dipole 750 MHz; Type: D750V3; Serial: SN: 1118

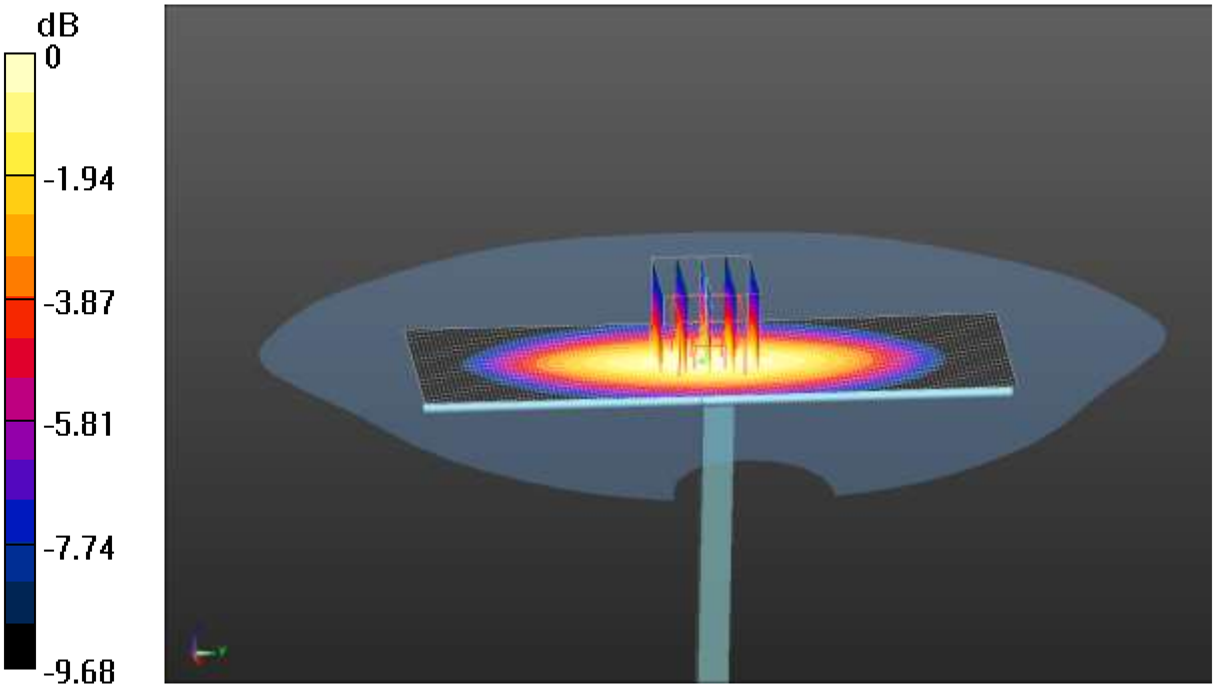
Communication System: UID 0, CW (0); Frequency: 750 MHz; Duty Cycle: 1:1
Medium parameters used: f = 750 MHz; $\sigma = 0.867$ S/m; $\varepsilon_r = 41.783$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(9.83, 9.83, 9.83); Calibrated: 06.27.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1373; Calibrated: 03.22.2018
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

System Performance Check at Frequency 750 MHz Head Tissue/d=15mm, Pin=80 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 32.29 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 1.04 W/kg
SAR(1 g) = 0.697 W/kg; SAR(10 g) = 0.455 W/kg
Maximum value of SAR (measured) = 0.865 W/kg

System Performance Check at Frequency 750 MHz Head Tissue/d=15mm, Pin=80 mW, dist=2.0mm (EX-Probe)/Area Scan (41x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.852 W/kg



0 dB = 0.852 W/kg = -0.70 dBW/kg

Test Laboratory: CCIS Date/Time: 04.24.2018 07:57:01

DUT: Dipole 835 MHz; Type: D835V2; Serial: SN: 4d154

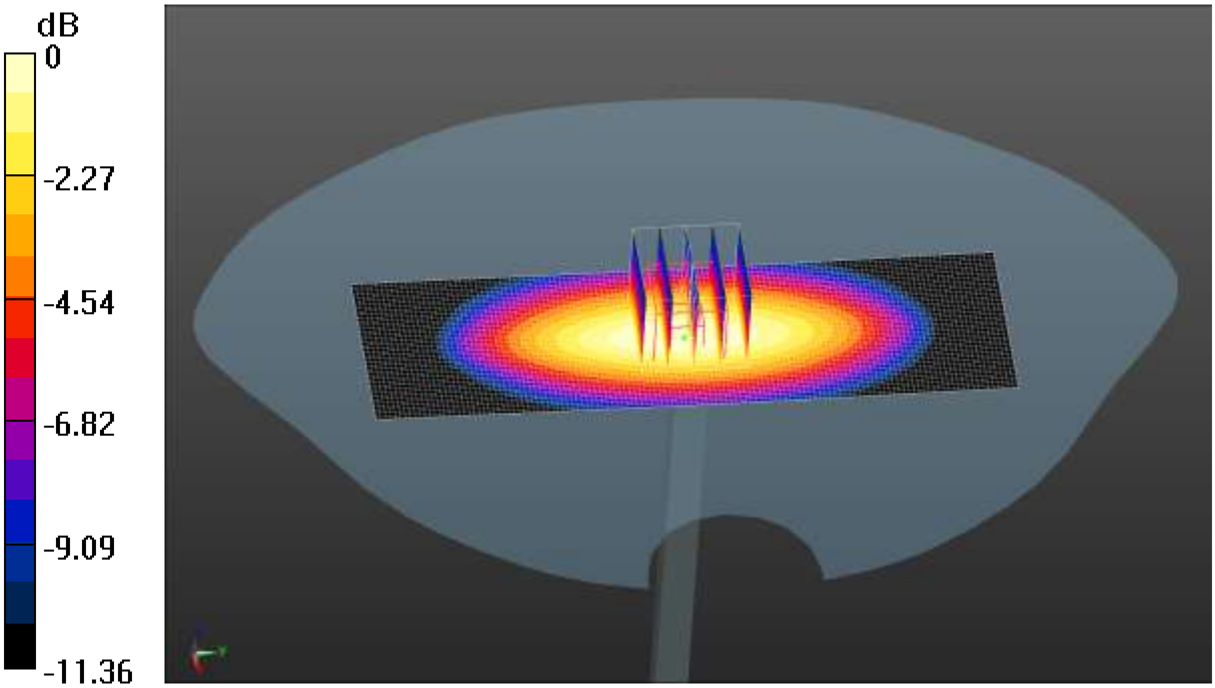
Communication System: UID 0, CW (0); Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.908 S/m; ε_r = 41.514; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(9.54, 9.54, 9.54); Calibrated: 06.27.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1373; Calibrated: 03.22.2018
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

System Performance Check at Frequency 835 MHz Head Tissue/d=15mm, Pin=80 mW, dist=2.0mm (EX-Probe)/Area Scan (41x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.978 W/kg

System Performance Check at Frequency 835 MHz Head Tissue/d=15mm, Pin=80 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 33.46 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.19 W/kg
SAR(1 g) = 0.785 W/kg; SAR(10 g) = 0.492 W/kg
Maximum value of SAR (measured) = 0.961 W/kg



0 dB = 0.961 W/kg = -0.17 dBW/kg

Test Laboratory: CCIS Date/Time: 04.25.2018 07:33:50

DUT: Dipole 1800 MHz; Type: SID1800; Serial: SN: 09/15 DIP IG800-360

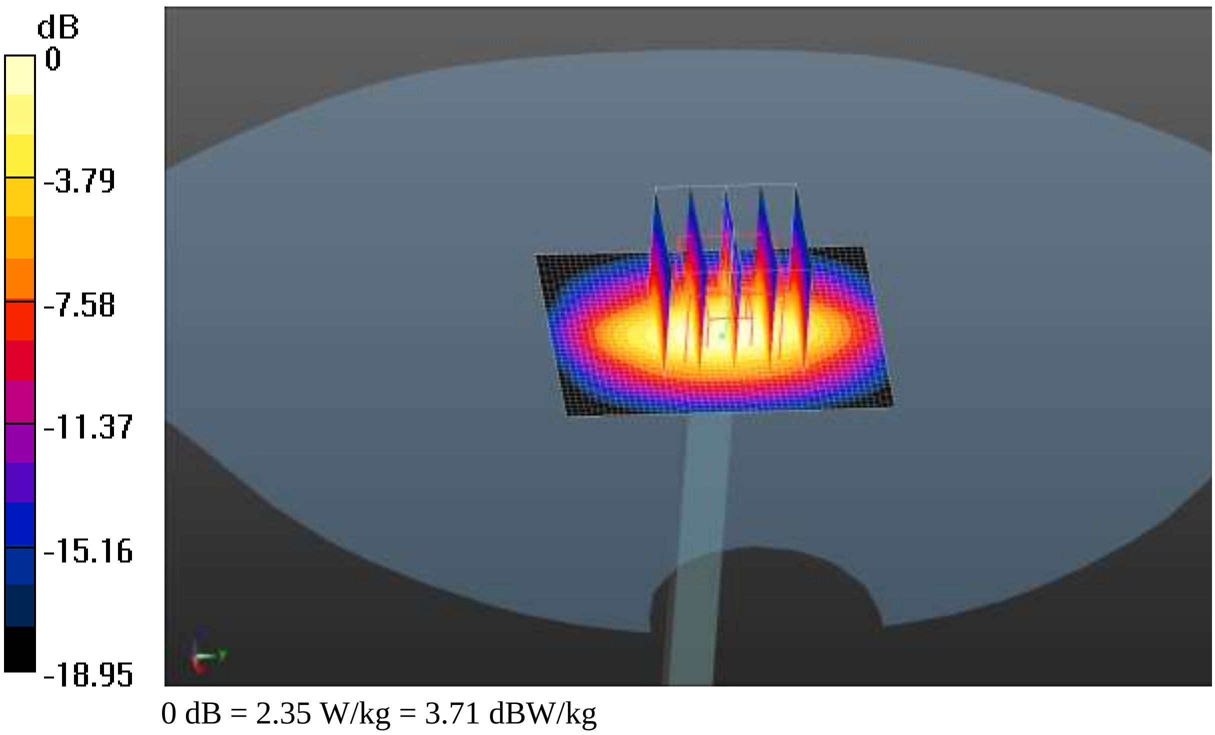
Communication System: UID 0, CW (0); Frequency: 1800 MHz; Duty Cycle: 1:1
Medium parameters used: f = 1800 MHz; σ = 1.395 S/m; ε_r = 40.174; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(8.48, 8.48, 8.48); Calibrated: 06.27.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1373; Calibrated: 03.22.2018
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

System Performance Check at Frequency 1800MHz Head Tissue/d=10mm, Pin=40 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 41.19 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 3.06 W/kg
SAR(1 g) = 1.56 W/kg; SAR(10 g) = 0.799 W/kg
Maximum value of SAR (measured) = 2.28 W/kg

System Performance Check at Frequency 1800MHz Head Tissue/d=10mm, Pin=40 mW, dist=2.0mm (EX-Probe)/Area Scan (41x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 2.35 W/kg



0 dB = 2.35 W/kg = 3.71 dBW/kg

Test Laboratory: CCIS Date/Time: 04.25.2018 07:54:05

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d175

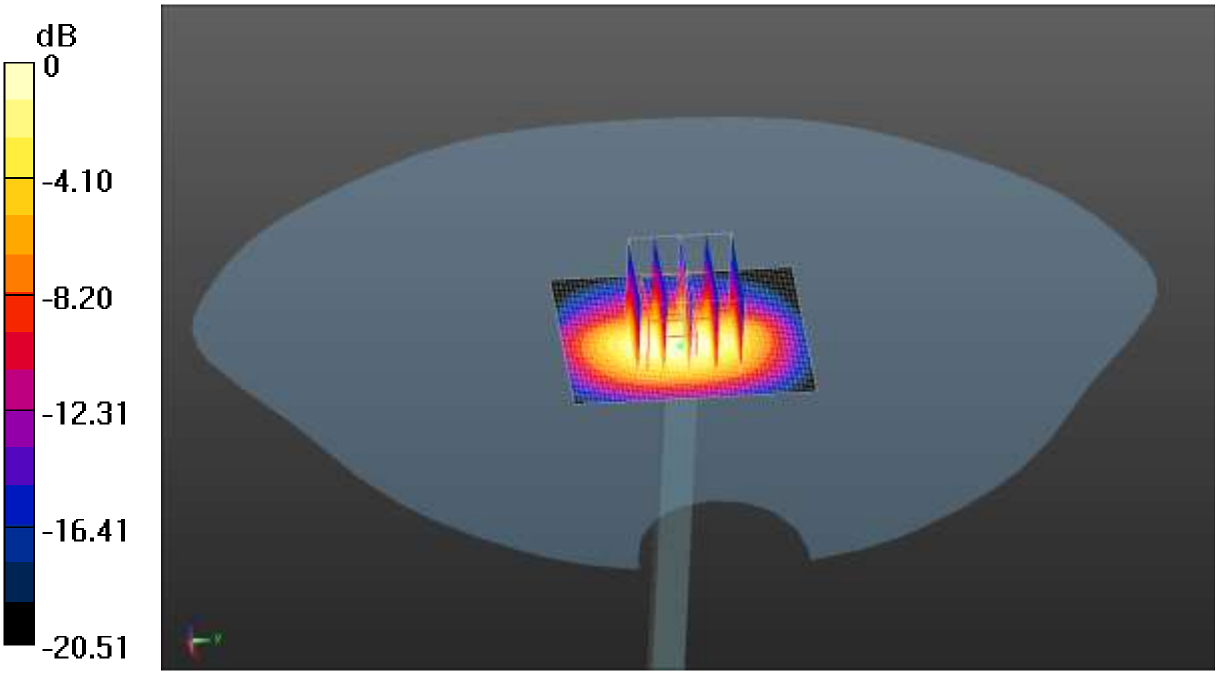
Communication System: UID 0, CW (0); Frequency: 1900 MHz; Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.422 S/m; ε_r = 39.468; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(7.98, 7.98, 7.98); Calibrated: 06.27.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1373; Calibrated: 03.22.2018
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

System Performance Check at Frequency 1900MHz Head Tissue/d=10mm, Pin=40 mW, dist=2.0mm (EX-Probe)/Area Scan (41x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 2.61 W/kg

System Performance Check at Frequency 1900MHz Head Tissue/d=10mm, Pin=40 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 41.55 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 3.25 W/kg
SAR(1 g) = 1.65 W/kg; SAR(10 g) = 0.831 W/kg
Maximum value of SAR (measured) = 2.48 W/kg



0 dB = 2.48 W/kg = 3.94 dBW/kg

Test Laboratory: CCIS　　　　Date/Time: 04.29.2018 08:16:28

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: SN: 910

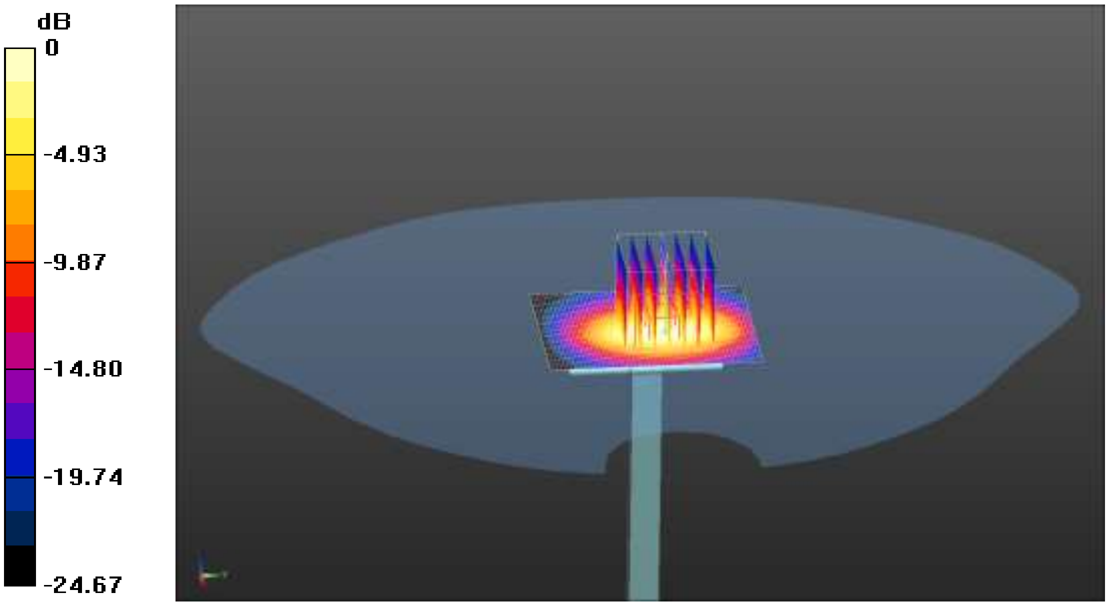
Communication System: UID 0, CW (0); Frequency: 2450 MHz; Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.812 S/m; ε_r = 39.886; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(7.41, 7.41, 7.41); Calibrated: 06.27.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1373; Calibrated: 03.22.2018
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

System Performance Check at Frequency 2450MHz Head Tissue/d=10mm, Pin=40 mW, dist=2.0mm (EX-Probe)/Area Scan (51x61x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 3.56 W/kg

System Performance Check at Frequency 2450MHz Head Tissue/d=10mm, Pin=40 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 40.03 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 4.69 W/kg
SAR(1 g) = 2.13 W/kg; SAR(10 g) = 0.975 W/kg
Maximum value of SAR (measured) = 3.40 W/kg



0 dB = 3.40 W/kg = 5.31 dBW/kg

Test Laboratory: CCIS Date/Time: 04.29.2018 07:38:28

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: SN: 1114

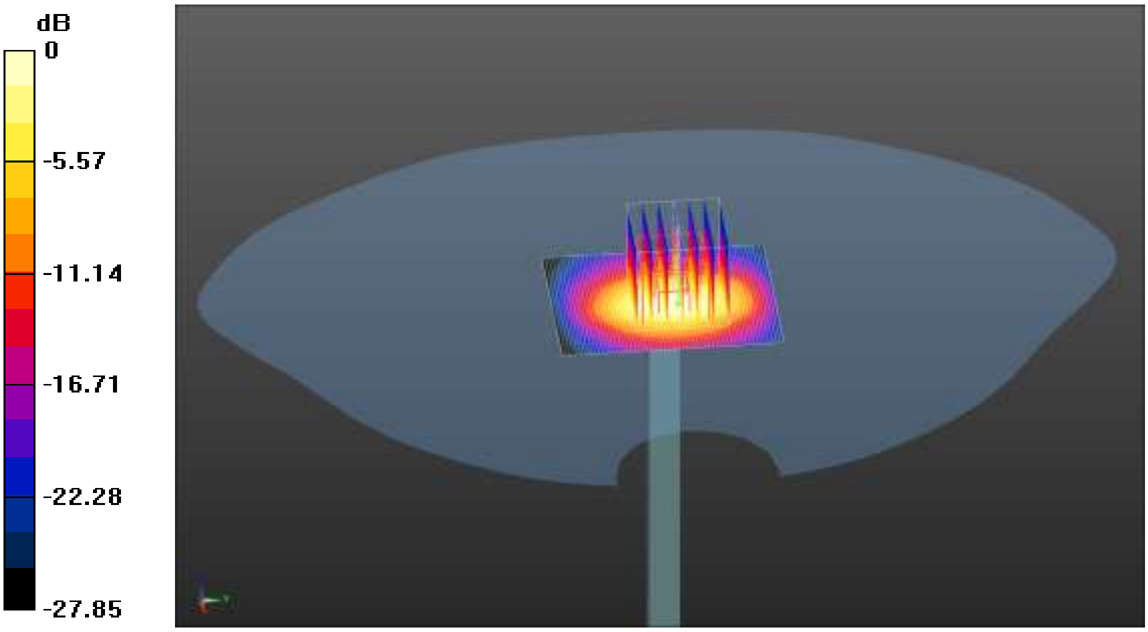
Communication System: UID 0, CW (0); Frequency: 2600 MHz; Duty Cycle: 1:1
Medium parameters used: f = 2600 MHz; σ = 1.988 S/m; ε_r = 38.603; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(7.17, 7.17, 7.17); Calibrated: 06.27.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1373; Calibrated: 03.22.2018
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

System Performance Check at Frequency 2600MHz Head Tissue/d=10mm, Pin=40 mW, dist=2.0mm (EX-Probe)/Zoom Scan(7X7X7) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 42.31 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 5.31 W/kg
SAR(1 g) = 2.34 W/kg; SAR(10 g) = 1.02 W/kg
Maximum value of SAR (measured) = 3.77 W/kg

System Performance Check at Frequency 2600MHz Head Tissue/d=10mm, Pin=40 mW, dist=2.0mm (EX-Probe)/Area Scan (51x61x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 4.01 W/kg



0 dB = 4.01 W/kg = 6.03 dBW/kg

Test Laboratory: CCIS　　　　Date/Time: 04.26.2018 07:40:54

DUT: Dipole 750 MHz; Type: D750V3; Serial: SN: 1118

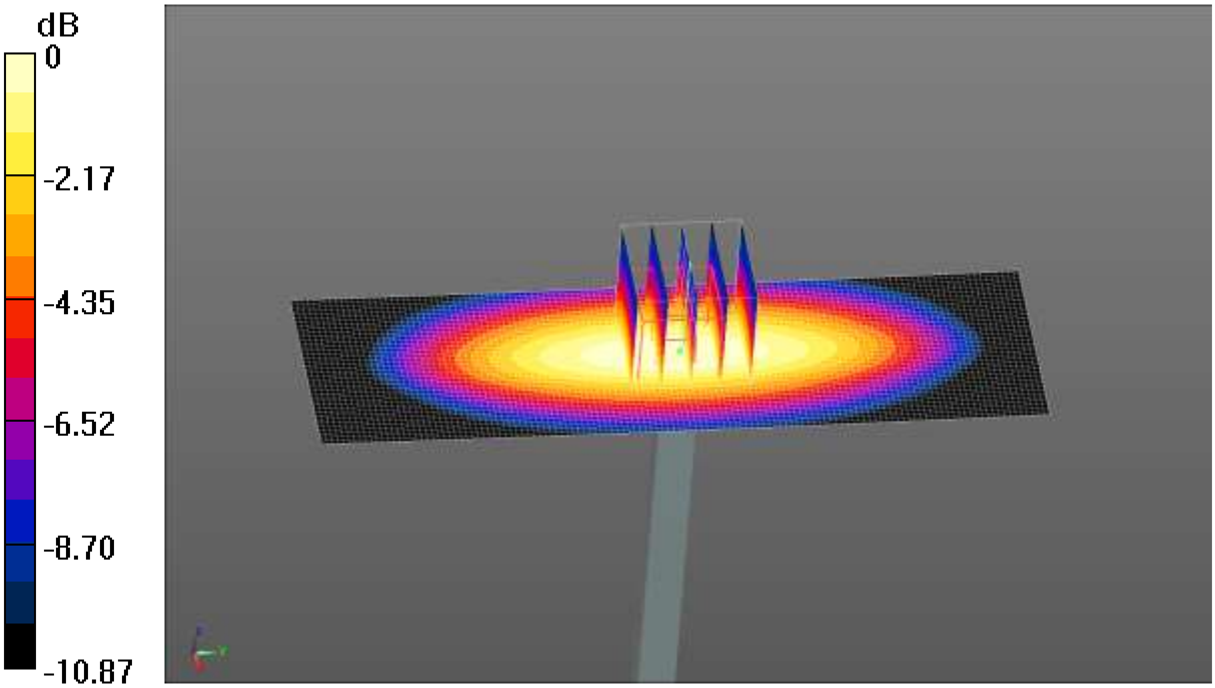
Communication System: UID 0, CW (0); Frequency: 750 MHz; Duty Cycle: 1:1
Medium parameters used: f = 750 MHz; $\sigma = 0.951$ S/m; $\varepsilon_r = 55.262$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(10.06, 10.06, 10.06); Calibrated: 06.27.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1373; Calibrated: 03.22.2018
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1208
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

System Performance Check at Frequency 750 MHz Body Tissue/d=15mm, Pin=80 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 30.61 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 1.07 W/kg
SAR(1 g) = 0.705 W/kg; SAR(10 g) = 0.459 W/kg
Maximum value of SAR (measured) = 0.892 W/kg

System Performance Check at Frequency 750 MHz Body Tissue/d=15mm, Pin=80 mW, dist=2.0mm (EX-Probe)/Area Scan (41x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.891 W/kg



0 dB = 0.891 W/kg = -0.50 dBW/kg

Test Laboratory: CCIS Date/Time: 04.26.2018 08:02:54

DUT: Dipole 835 MHz; Type: D835V2; Serial: SN: 4d154

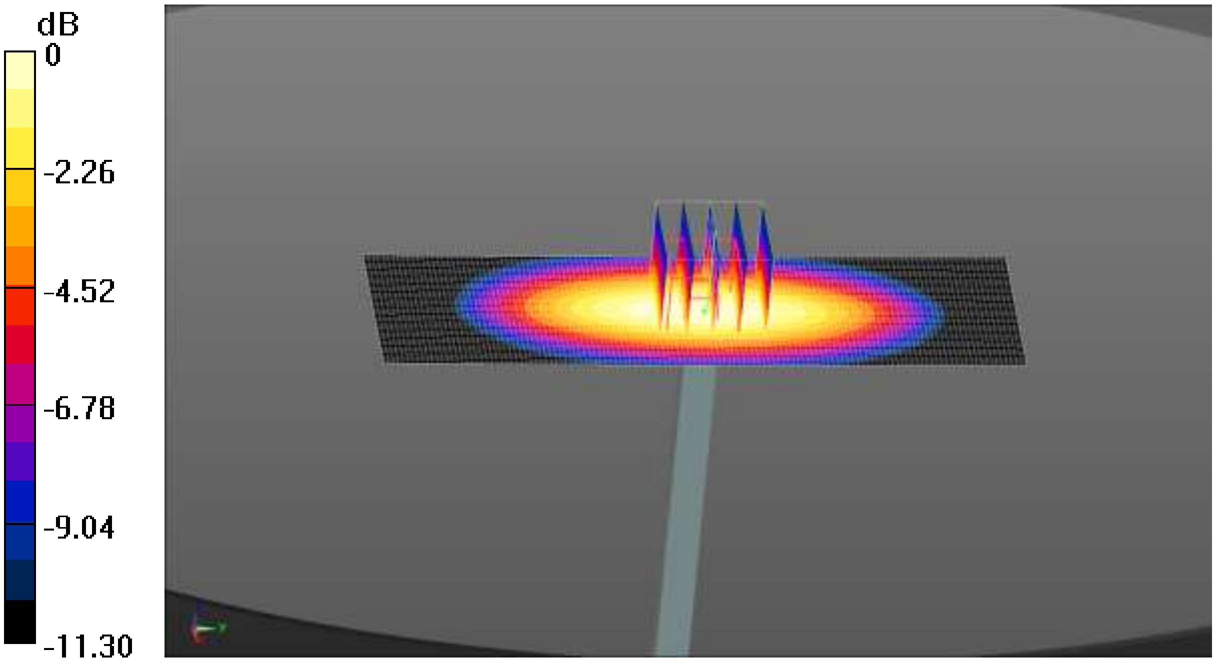
Communication System: UID 0, CW (0); Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 835 MHz; σ = 0.981 S/m; ε_r = 54.824; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(9.79, 9.79, 9.79); Calibrated: 06.27.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1373; Calibrated: 03.22.2018
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1208
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

System Performance Check at Frequency 835 MHz Body Tissue/d=15mm, Pin=80 mW, dist=2.0mm (EX-Probe)/Area Scan (41x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.02 W/kg

System Performance Check at Frequency 835 MHz Body Tissue/d=15mm, Pin=80 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 32.64 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.19 W/kg
SAR(1 g) = 0.792 W/kg; SAR(10 g) = 0.512 W/kg
Maximum value of SAR (measured) = 1.01 W/kg



0 dB = 1.01 W/kg = 0.04 dBW/kg

Test Laboratory: CCIS Date/Time: 04.27.2018 07:44:08

DUT: Dipole 1800 MHz; Type: SID 1800; Serial: SN: 09/15 DIP IG800-360

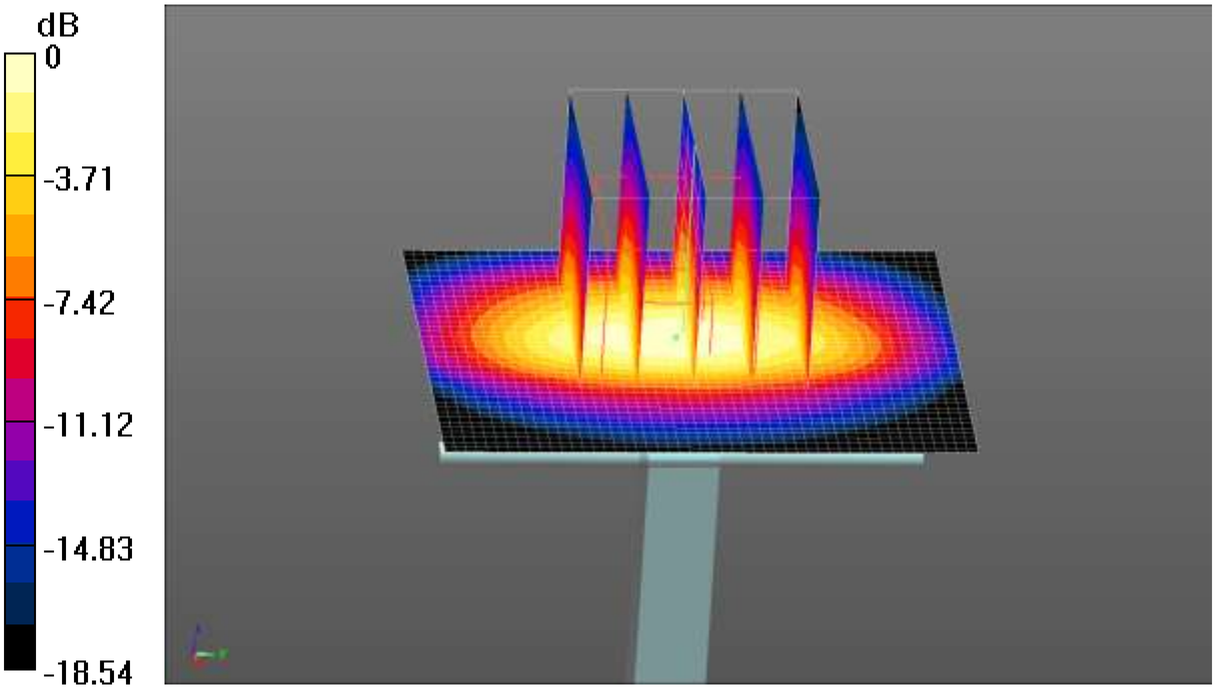
Communication System: UID 0, CW (0); Frequency: 1800 MHz; Duty Cycle: 1:1
Medium parameters used: f = 1800 MHz; σ = 1.503 S/m; ε_r = 52.819; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(8.08, 8.08, 8.08); Calibrated: 06.27.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1373; Calibrated: 03.22.2018
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1208
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

System Performance Check at Frequency 1800MHz Body Tissue/d=10mm, Pin=40 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 37.34 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 2.96 W/kg
SAR(1 g) = 1.55 W/kg; SAR(10 g) = 0.808 W/kg
Maximum value of SAR (measured) = 2.27 W/kg

System Performance Check at Frequency 1800MHz Body Tissue/d=10mm, Pin=40 mW, dist=2.0mm (EX-Probe)/Area Scan (41x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 2.35 W/kg



0 dB = 2.35 W/kg = 3.71 dBW/kg

Test Laboratory: CCIS Date/Time: 04.27.2018 08:12:40

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d175

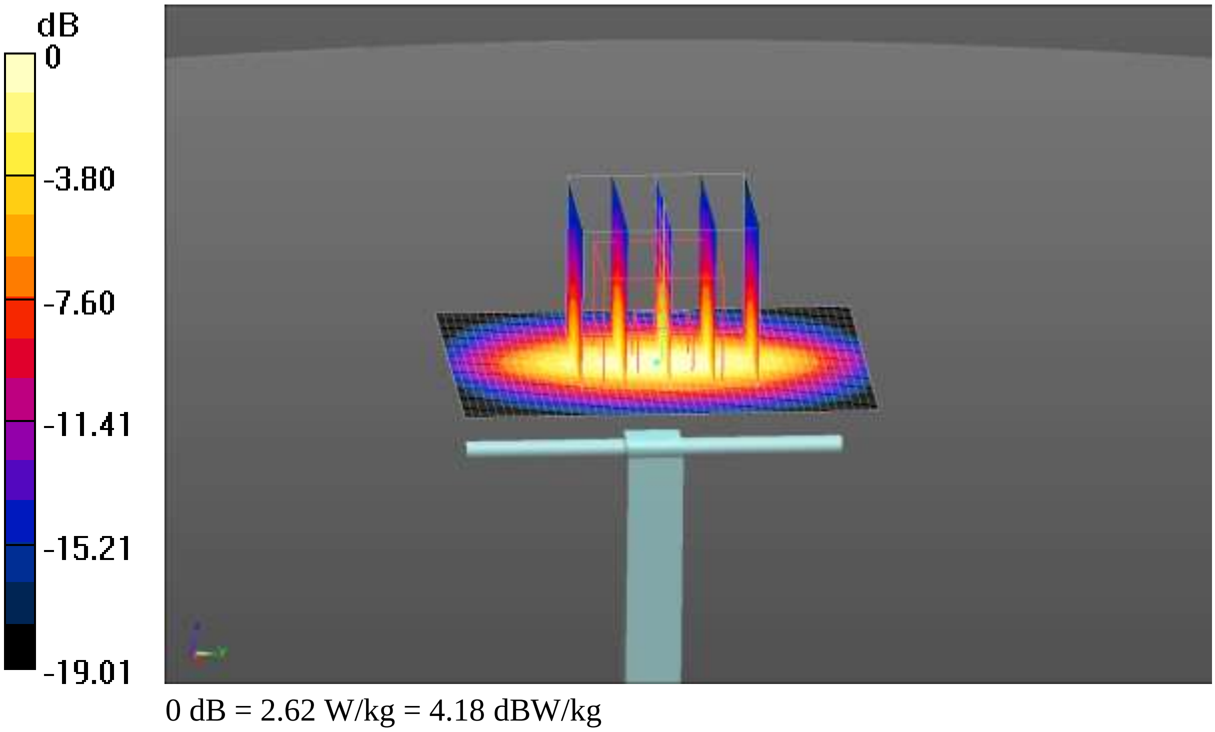
Communication System: UID 0, CW (0); Frequency: 1900 MHz; Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.536 S/m; ε_r = 52.198; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(7.79, 7.79, 7.79); Calibrated: 06.27.2017;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1373; Calibrated: 03.22.2018
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1208
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

System Performance Check at Frequency 1900MHz Body Tissue/d=10mm, Pin=40 mW, dist=2.0mm (EX-Probe)/Area Scan (41x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 2.78 W/kg

System Performance Check at Frequency 1900MHz Body Tissue/d=10mm, Pin=40 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 41.68 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 3.05 W/kg
SAR(1 g) = 1.64 W/kg; SAR(10 g) = 0.833 W/kg
Maximum value of SAR (measured) = 2.62 W/kg



0 dB = 2.62 W/kg = 4.18 dBW/kg

Test Laboratory: CCIS Date/Time: 04.30.2018 11:37:33

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: SN: 910

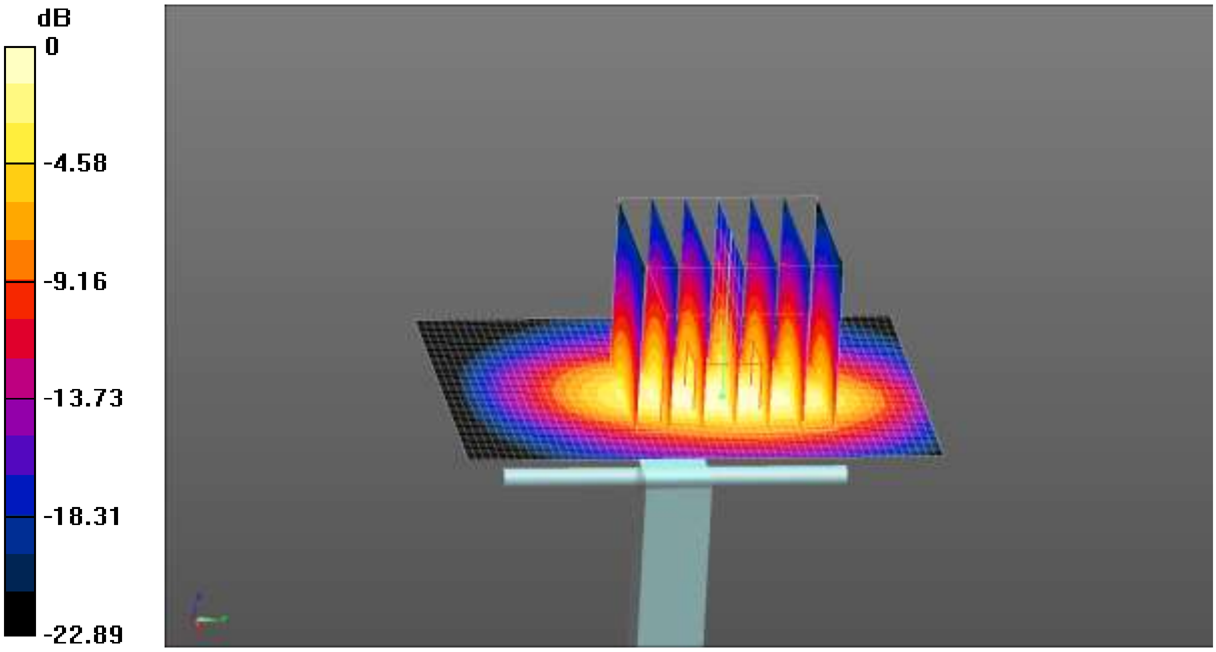
Communication System: UID 0, CW (0); Frequency: 2450 MHz; Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.958 S/m; ε_r = 52.295; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(7.33, 7.33, 7.33); Calibrated: 06.27.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1373; Calibrated: 03.22.2018
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1208
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

System Performance Check at Frequency 2450MHz Body Tissue/d=10mm, Pin=40 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 38.64 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 4.36 W/kg
SAR(1 g) = 2.15 W/kg; SAR(10 g) = 0.991 W/kg
Maximum value of SAR (measured) = 3.33 W/kg

System Performance Check at Frequency 2450MHz Body Tissue/d=10mm, Pin=40 mW, dist=2.0mm (EX-Probe)/Area Scan (51x61x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 3.46 W/kg



0 dB = 3.46 W/kg = 5.39 dBW/kg

Test Laboratory: CCIS   Date/Time: 04.30.2018 12:12:56

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: SN: 1114

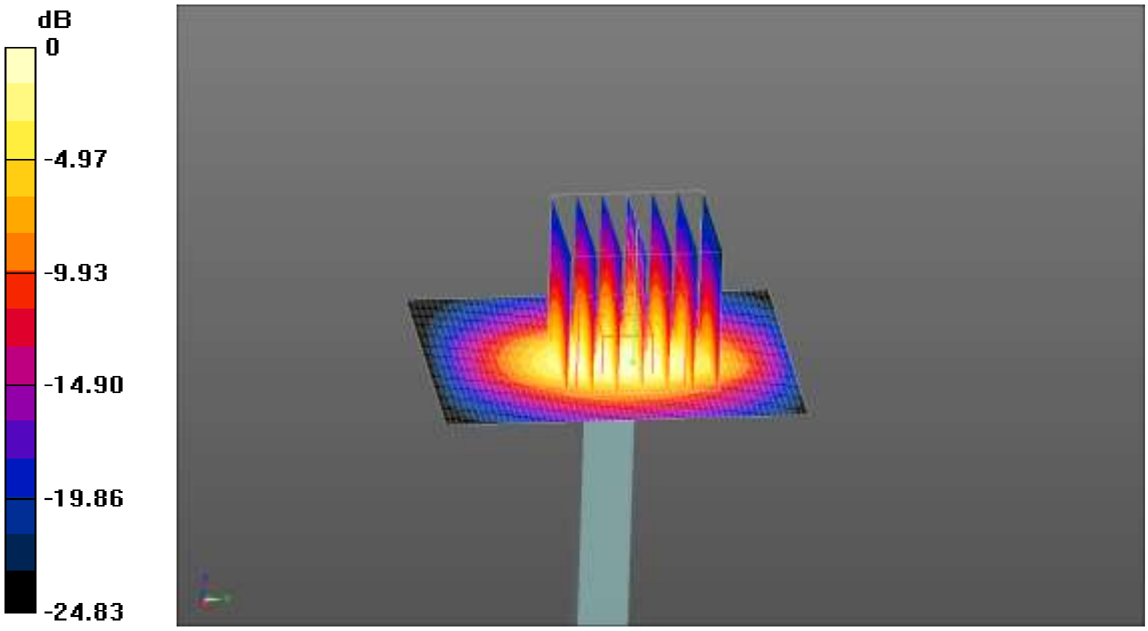
Communication System: UID 0, CW (0); Frequency: 2600 MHz; Duty Cycle: 1:1
Medium parameters used: f = 2600 MHz; σ = 2.18 S/m; ε_r = 51.616; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(7.22, 7.22, 7.22); Calibrated: 06.27.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1373; Calibrated: 03.22.2018
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1208
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

System Performance Check at Frequency 2600MHz Body Tissue/d=10mm, Pin=40mW, dist=2.0mm(EX-Probe)/Area Scan (51x61x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 3.64 W/kg

System Performance Check at Frequency 2600MHz Body Tissue/d=10mm, Pin=40mW, dist=2.0mm(EX-Probe)/Zoom Scan(7X7X7) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 34.01 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 4.69 W/kg
SAR(1 g) = 2.21 W/kg; SAR(10 g) = 0.985 W/kg
Maximum value of SAR (measured) = 3.48 W/kg



0 dB = 3.48 W/kg = 5.42 dBW/kg

Appendix D: Plots of SAR Test Data

Test Laboratory: CCIS   Date/Time: 04.24.2018 20:27:01

DUT: LTE mobile phone; Type: N5704L; Serial: 1#

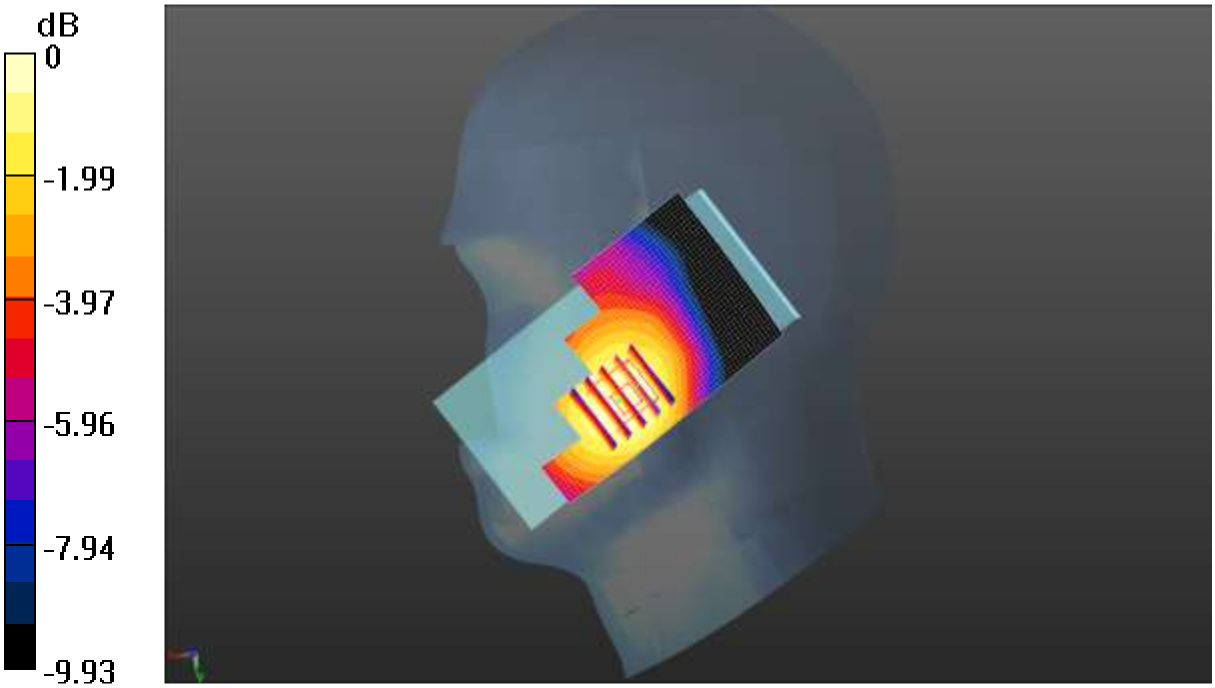
Communication System: UID 0, GSM (0); Frequency: 836.6 MHz; Duty Cycle: 1:8.30042
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.909 S/m; ε_r = 41.508; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(9.54, 9.54, 9.54); Calibrated: 06.27.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1373; Calibrated: 03.22.2018
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

GSM 850 Right Cheek/Middle Channel/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.401 V/m; Power Drift = -0.29 dB
Peak SAR (extrapolated) = 0.0520 W/kg
SAR(1 g) = 0.039 W/kg; SAR(10 g) = 0.029 W/kg
Maximum value of SAR (measured) = 0.0462 W/kg

GSM 850 Right Cheek/Middle Channel/Area Scan (41x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.0472 W/kg



0 dB = 0.0472 W/kg = -13.26 dBW/kg

Test Laboratory: CCIS Date/Time: 04.25.2018 08:59:19

DUT: LTE mobile phone; Type: N5704L; Serial: 1#

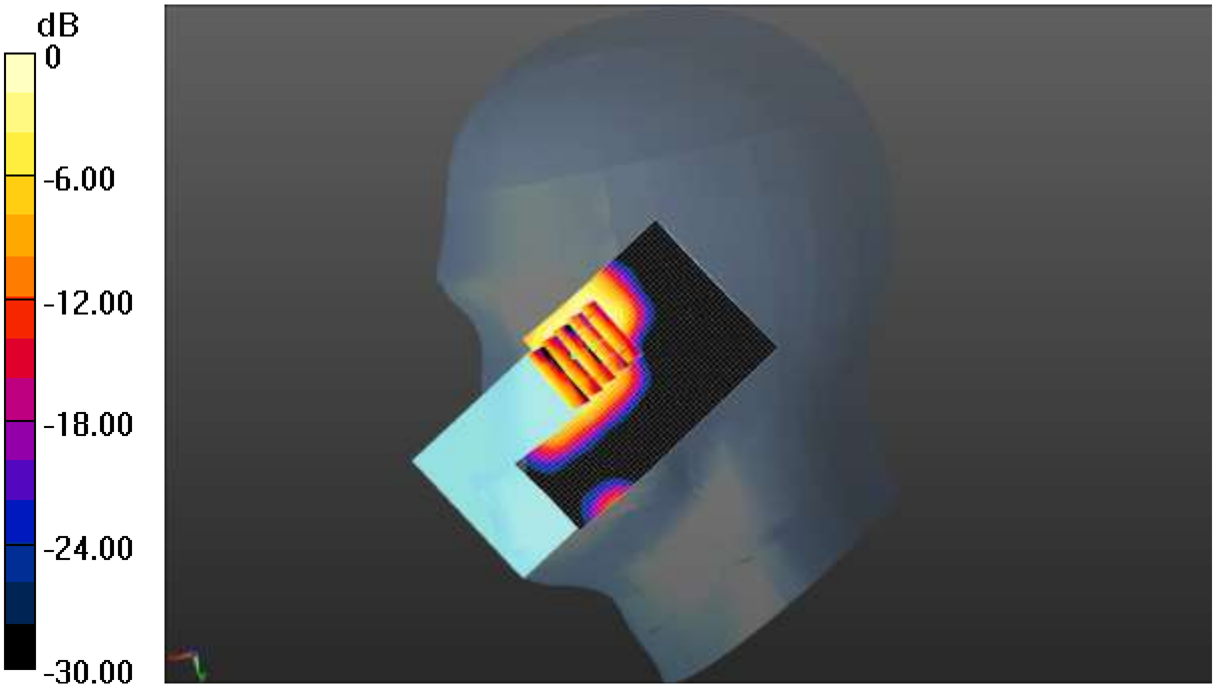
Communication System: UID 0, GSM (0); Frequency: 1850.2 MHz; Duty Cycle: 1:8.30042
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.401 S/m; ε_r = 39.841; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(7.98, 7.98, 7.98); Calibrated: 06.27.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1373; Calibrated: 03.22.2018
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

GSM 1900 Right Cheek/Low Channel/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.769 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 0.0280 W/kg
SAR(1 g) = 0.011 W/kg; SAR(10 g) = 0.0058 W/kg
Maximum value of SAR (measured) = 0.0204 W/kg

GSM 1900 Right Cheek/Low Channel/Area Scan (41x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.0212 W/kg



0 dB = 0.0212 W/kg = -16.74 dBW/kg

Test Laboratory: CCIS Date/Time: 04.24.2018 10:18:07

DUT: LTE mobile phone; Type: N5704L; Serial: 1#

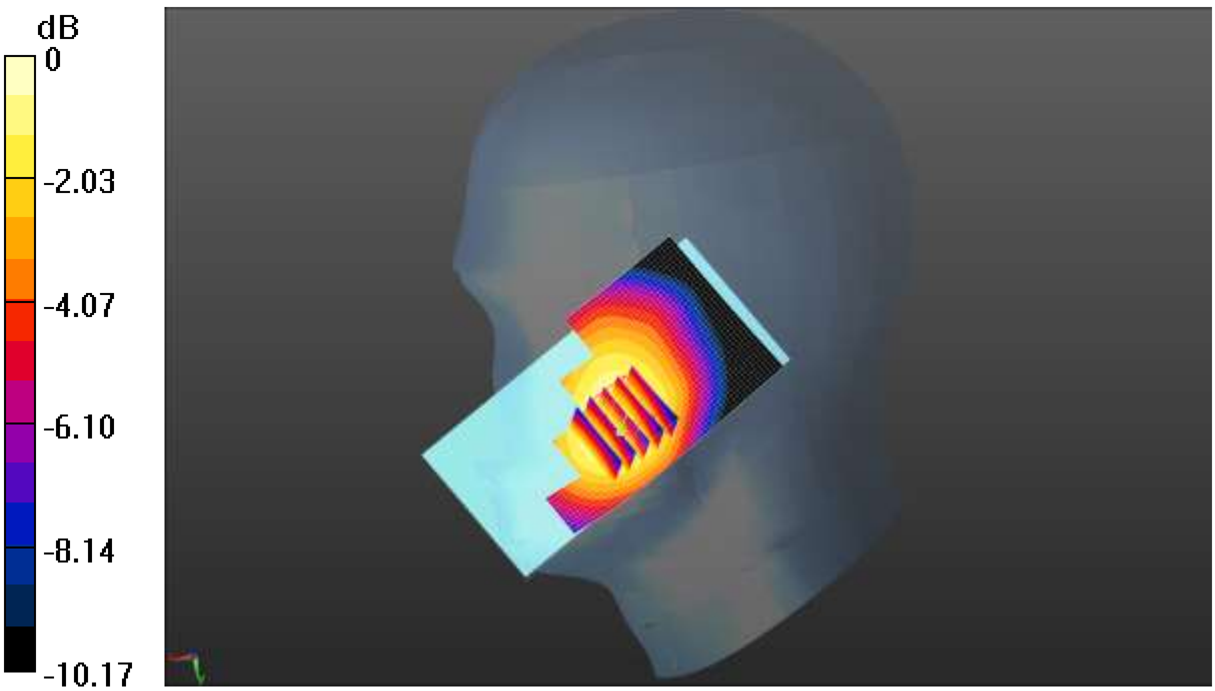
Communication System: UID 0, UMTS-FDD(WCDMA) (0); Frequency: 826.4 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 826.4 MHz; σ = 0.886 S/m; ε_r = 41.779; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(9.54, 9.54, 9.54); Calibrated: 06.27.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1373; Calibrated: 03.22.2018
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

WCDMA 850 Right Cheek/Low Channel/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.139 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 0.0760 W/kg
SAR(1 g) = 0.057 W/kg; SAR(10 g) = 0.043 W/kg
Maximum value of SAR (measured) = 0.0688 W/kg

WCDMA 850 Right Cheek/Low Channel/Area Scan (41x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.0709 W/kg



0 dB = 0.0709 W/kg = -11.49 dBW/kg

Test Laboratory: CCIS Date/Time: 04.25.2018 09:49:23

DUT: LTE mobile phone; Type: N5704L; Serial: 1#

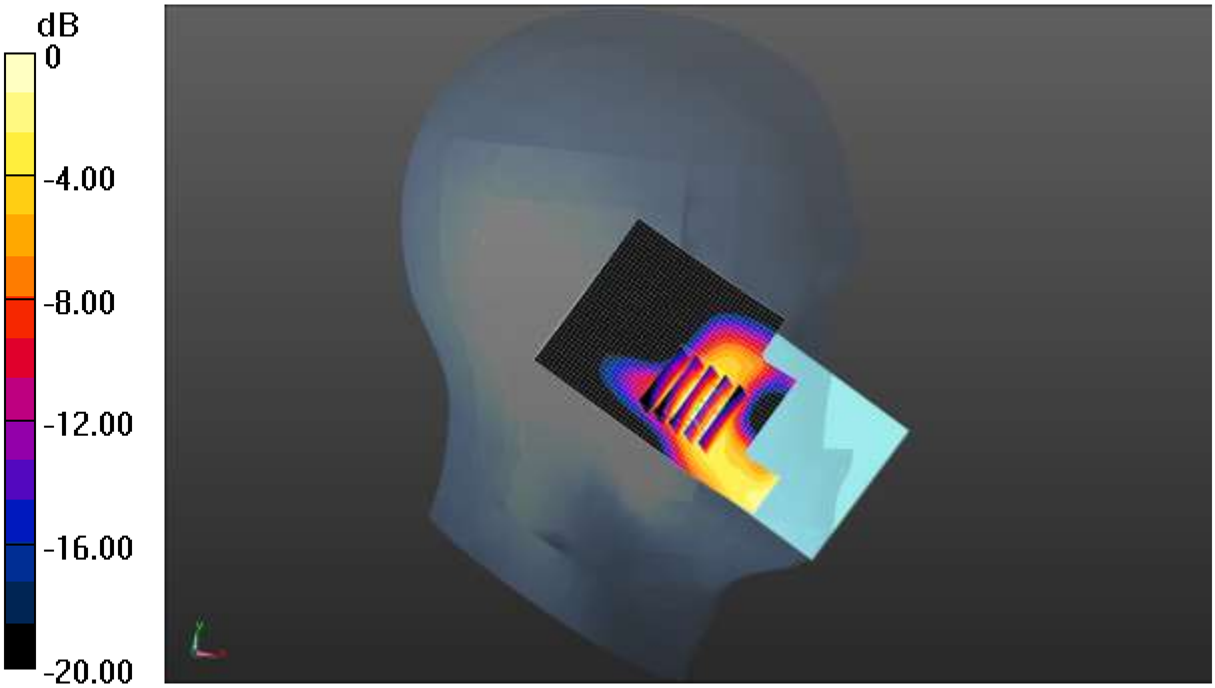
Communication System: UID 0, UMTS-FDD(WCDMA) (0); Frequency: 1732.5 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1732.5 MHz; σ = 1.366 S/m; ε_r = 40.582; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(8.48, 8.48, 8.48); Calibrated: 06.27.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1373; Calibrated: 03.22.2018
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

WCDMA 1700 Left Cheek/Middle Channel/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.341 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.0440 W/kg
SAR(1 g) = 0.023 W/kg; SAR(10 g) = 0.012 W/kg
Maximum value of SAR (measured) = 0.0321 W/kg

WCDMA 1700 Left Cheek/Middle Channel/Area Scan (41x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.0435 W/kg



0 dB = 0.0435 W/kg = -13.62 dBW/kg

Test Laboratory: CCIS Date/Time: 04.25.2018 11:16:05

DUT: LTE mobile phone; Type: N5704L; Serial: 1#

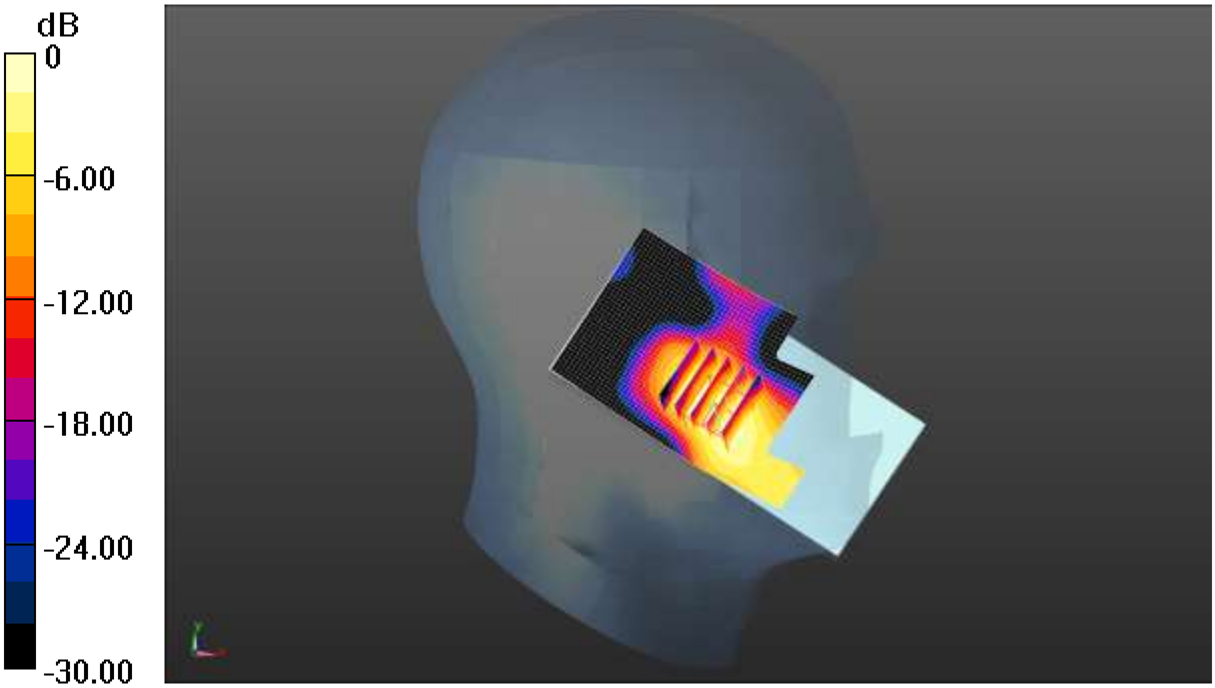
Communication System: UID 0, UMTS-FDD(WCDMA) (0); Frequency: 1852.4 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.409 S/m; ε_r = 39.805; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(7.98, 7.98, 7.98); Calibrated: 06.27.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1373; Calibrated: 03.22.2018
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

WCDMA 1900 Left Cheek/Low Channel/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.5540 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 0.0610 W/kg
SAR(1 g) = 0.034 W/kg; SAR(10 g) = 0.019 W/kg
Maximum value of SAR (measured) = 0.0513 W/kg

WCDMA 1900 Left Cheek/Low Channel/Area Scan (41x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.0682 W/kg



0 dB = 0.0682 W/kg = -11.66 dBW/kg

Test Laboratory: CCIS Date/Time: 04.25.2018 13:15:05

DUT: LTE mobile phone; Type: N5704L; Serial: 1#

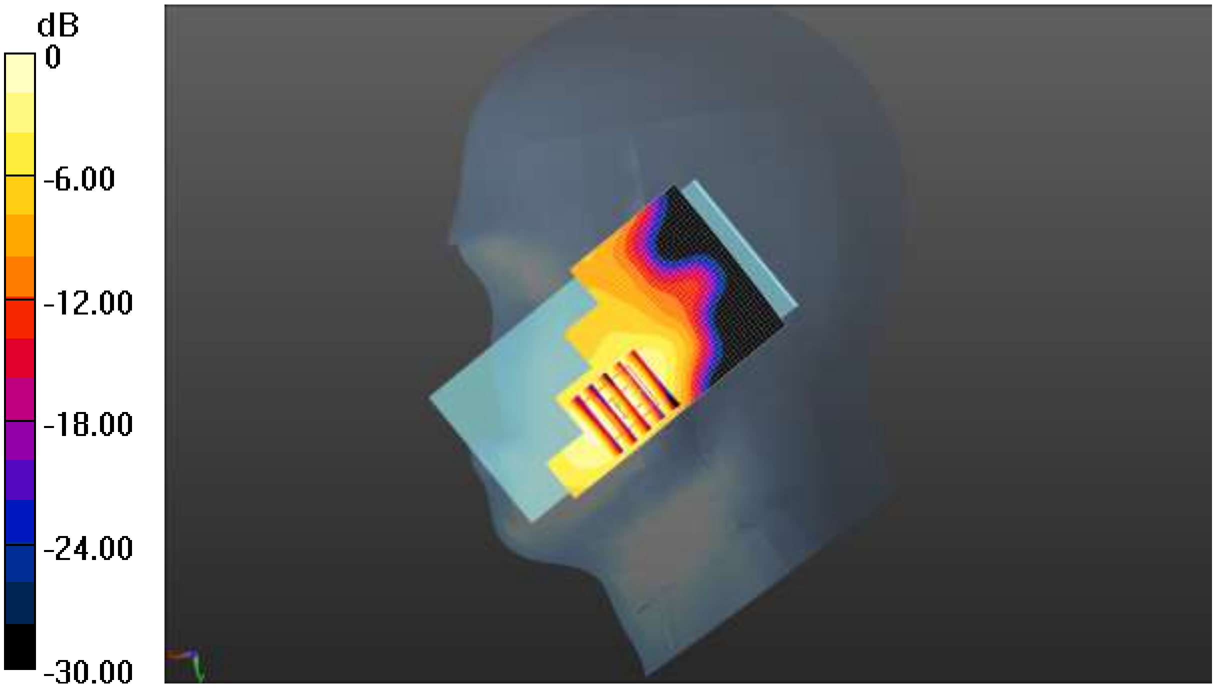
Communication System: UID 0, LTE-Fdd(USA) 1RB QPSK (0); Frequency: 1880 MHz;
Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.418 S/m; ε_r = 39.511; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(7.98, 7.98, 7.98); Calibrated: 06.27.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1373; Calibrated: 03.22.2018
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

LTE Band 2 1RB(20MHz) Right Cheek/Middel Channel/Area Scan (41x61x1):
Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.0525 W/kg

LTE Band 2 1RB(20MHz) Right Cheek/Middel Channel/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.108 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 0.0620 W/kg
SAR(1 g) = 0.035 W/kg; SAR(10 g) = 0.019 W/kg
Maximum value of SAR (measured) = 0.0517 W/kg



0 dB = 0.0517 W/kg = -12.87 dBW/kg

Test Laboratory: CCIS Date/Time: 04.25.2018 16:19:31

DUT: LTE mobile phone; Type: N5704L; Serial: 1#

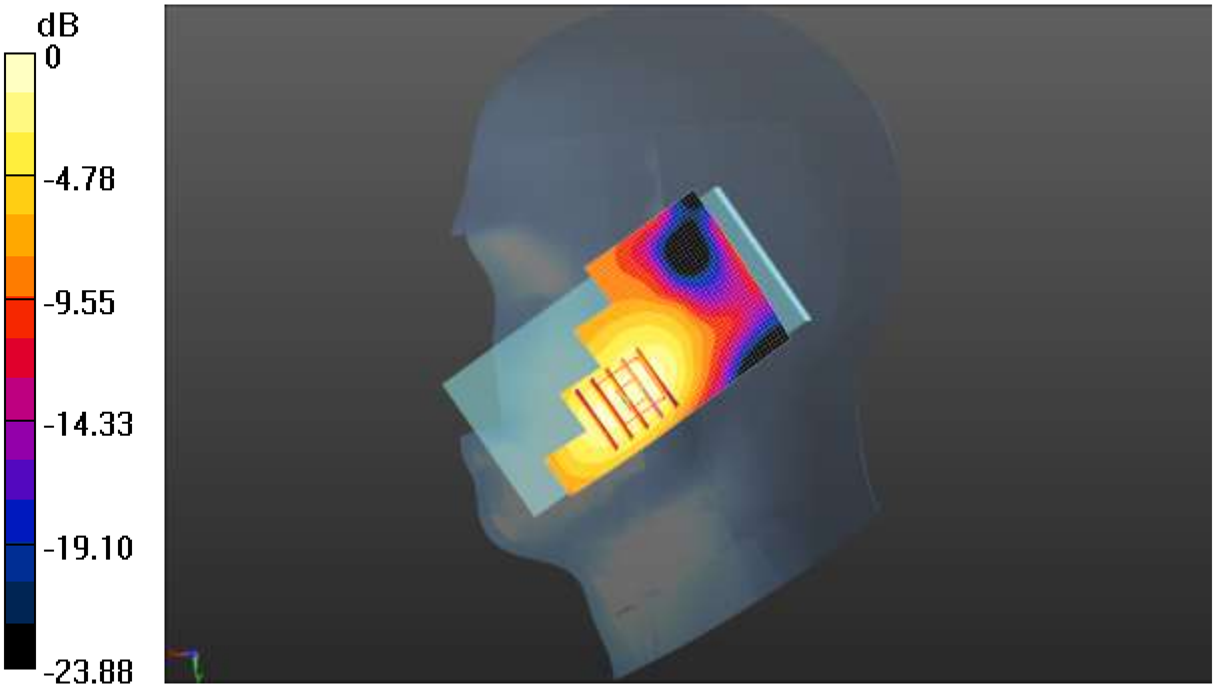
Communication System: UID 0, LTE-Fdd(USA) 1RB QPSK (0); Frequency: 1732.5 MHz;
Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1732.5 MHz; σ = 1.366 S/m; ε_r = 40.582; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(8.48, 8.48, 8.48); Calibrated: 06.27.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1373; Calibrated: 03.22.2018
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

LTE Band 4 1RB(20MHz) Right Cheek/Middle Channel/Area Scan (41x61x1):
Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.128 W/kg

LTE Band 4 1RB(20MHz) Right Cheek/Middle Channel/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.218 V/m; Power Drift = -0.28 dB
Peak SAR (extrapolated) = 0.147 W/kg
SAR(1 g) = 0.090 W/kg; SAR(10 g) = 0.053 W/kg
Maximum value of SAR (measured) = 0.126 W/kg



0 dB = 0.126 W/kg = -9.00 dBW/kg

Test Laboratory: CCIS Date/Time: 04.29.2018 14:17:27

DUT: LTE mobile phone; Type: N5704L; Serial: 1#

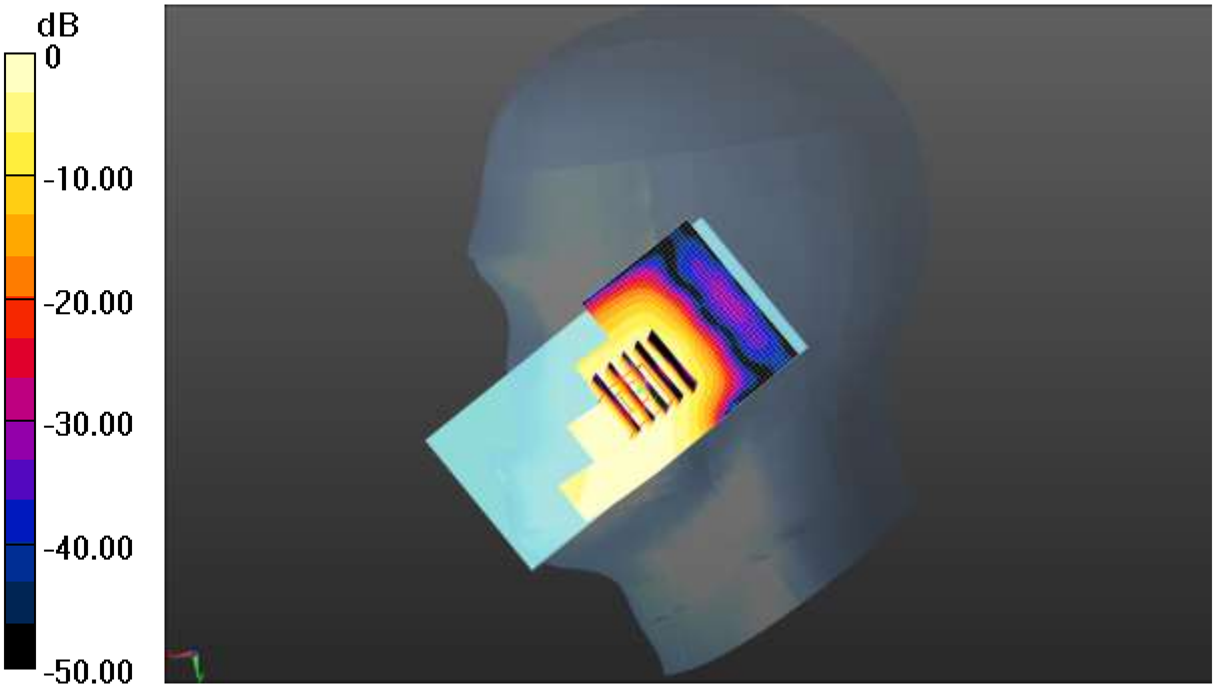
Communication System: UID 0, LTE-Fdd(USA) 1RB QPSK (0); Frequency: 2510 MHz;
Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2510 MHz; σ = 1.908 S/m; ε_r = 39.217; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(7.41, 7.41, 7.41); Calibrated: 06.27.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1373; Calibrated: 03.22.2018
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

LTE Band 7 1RB(20MHz) Right Cheek/Low Channel/Area Scan (41x61x1):
Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.0375 W/kg

LTE Band 7 1RB(20MHz) Right Cheek/Low Channel/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.202 V/m; Power Drift = 0.26 dB
Peak SAR (extrapolated) = 0.0506 W/kg
SAR(1 g) = 0.00911 W/kg; SAR(10 g) = 0.00423 W/kg
Maximum value of SAR (measured) = 0.0170 W/kg



0 dB = 0.0170 W/kg = -17.10 dBW/kg