Certificate #3682.01

TEST REPORT

No. I19D00035-SAR01

For

Client: MobiWire SAS

Production: 4G Smart Phone

Model Name: MobiWire Sora, Altice S32

Brand Name: MobiWire, Altice

FCC ID: QPN-SORA

Hardware Version: V01A

Software Version: MOBIWIRE_GH5024_V01_20190313

Issued date: 2019-05-15

NOTE

1. The test results in this test report relate only to the devices specified in this report.
2. This report shall not be reproduced except in full without the written approval of East China Institute of Telecommunications.
3. KDB has not been approved by A2LA.
4. For the test results, the uncertainty of measurement is not taken into account when judging the compliance with specification, and the results of measurement or the average value of measurement results are taken as the criterion of the compliance with specification directly.

Test Laboratory:
East China Institute of Telecommunications
Add: 7-8F, G Area, No.668, Beijing East Road, Huangpu District, Shanghai, P. R. China
Tel: +86 21 63843300
FAX: +86 21 63843301
E-Mail: welcome@ecit.org.cn

Revision Version

Report Number	Revision	Date	Memo
I19D00035-SAR01	00	2019-05-08	Initial creation of test report
I19D00035-SAR01	01	2019-05-15	Second creation of test report

CONTENTS

1. Test Laboratory

1.1. Testing Location

Company Name	East China Institute of Telecommunications
Address	7-8/F., Area G, No.666, Beijing East Road, Shanghai, China
Postal Code	200001
Telephone	+86 21 63843300
Fax	+86 21 63843301

1.2. Testing Environment

Normal Temperature	18℃-25℃
Relative Humidity	25%-75%

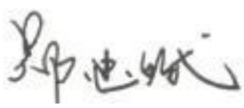
1.3. Project Data

Project Leader	Yu Anlu
Testing Start Date	2019-04-03
Testing End Date	2019-04-26

1.4. Signature

Yan Hang
(Prepared this test report)

Fu Erliang
(Reviewed this test report)



Zheng Zhongbin
(Approved this test report)

2. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **MobiWire Sora, Altice S32** are as follows

Table 2.1: Max. Reported SAR (10g)

Band	SAR 1g(W/Kg)		
	Head	Body worn(10mm)	Hotspot(10mm)
GSM 850	0.184	0.511	0.511
GSM 1900	0.350	1.176	1.256
WCDMA Band2	0.352	0.722	0.948
WCDMA Band5	0.192	0.295	0.295
LTE Band2	0.431	0.916	1.066
LTE Band7	0.285	0.808	**1.292**
2.4G WiFi	0.407	0.109	0.109
5G WiFi	0.219	0.093	0.120

The SAR values found for the Mobile Phone are below the maximum recommended levels of 1.6 W/Kg as averaged over any 1g tissue, 4.0 W/Kg as averaged over any 10g tissue according to the ANSI C95.1-1999.

For body worn operation, this device has been tested and meets FCC RF exposure guidelines when used with any accessory that contains no metal. Use of other accessories may not ensure compliance with FCC RF exposure guidelines.

Table 2.2: Simultaneous SAR

Highest Simultaneous Transmission SAR	Highest SAR 1g Head(W/Kg)	Highest SAR 1g Body worn(10mm) (W/Kg)	Highest SAR 1g Body Hotspot(10mm)
	0.791	1.308	1.424

3. Client Information

3.1. Applicant Information

Company Name	MobiWire SAS
Address	79 AVENUE FRANCOIS ARAGO 92017 NANTERRE CEDEX France.
Telephone	+33668018722
Postcode	N/A

3.2. Manufacturer Information

Company Name	MobiWire SAS
Address	79 AVENUE FRANCOIS ARAGO 92017 NANTERRE CEDEX France.
Telephone	+33668018722
Postcode	N/A

4. Equipment Under Test (EUT) and Ancillary Equipment (AE)

4.1. About EUT

Description:	4G Smart Phone
Model name:	MobiWire Sora, Altice S32
Operation Model(s):	GSM850/GSM900/GSM1800/GSM1900 WCDMA Band I/Band II/Band V/BandVIII LTE 1/2/3/7/20; BT4.2,BLE;WiFi 802.11a,b,g,n GPS;GLONASS;
Tx Frequency:	824.2-848.8MHz(GSM850) 1850.2-1909.8MHz（GSM1900） 1852.4-1907.6 MHz (WCDMA Band II) 826.4-846.6MHz (WCDMA Band V) 1850.7 -1909.3 MHz (LTE Band 2) 2502.5 – 2567.5 MHz (LTE Band 7) 2412- 2462 MHz (WiFi) 5180~5240 MHz(U-NII-1) 5260~5320 MHz(U-NII-2A) 5500~5700 MHz(U-NII-2C) 5745~5825 MHz(U-NII-3) 2402 – 2480 MHz (BT)
Test device Production information: GPRS/EGPRS Class Mode: GPRS/ EGPRS Multislot Class:	Production unit B 12
Device type:	Portable device
Antenna type:	Inner antenna
Accessories/Body-worn configurations:	Battery
Dimensions: Hotspot Mode:	140.75x67.65x10.3mm Support

Note: Photographs of EUT are shown in ANNEX A of this test report.

4.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
N04	354496100008723 354496100008731	V01A	MOBIWIRE_GH5024_V01_20190313	2019-03-09

*EUT ID: is used to identify the test sample in the lab internally.

Note:The product has two SIM, SIM 1 and SIM 2 sharing a chipset does not support simultaneous work, only supports a single transmitter SIM1 or SIM 2, using SIM 1, SIM 2 will be suspended until select SIM 2, stop using the SIM 1, SIM 2 only would working. SIM1 is the worst case.

4.3. Internal Identification of AE used during the test

AE ID*	Description	Type	Manufacturer
BA01	Battery	178156466	veken

*AE ID: is used to identify the test sample in the lab internally.

5. Reference Documents

5.1. Documents supplied by applicant

All technical documents are supplied by the client or manufacturer, which is the basis of testing.

5.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
ANSI C95.1	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.	**1999**
IEEE 1528	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques.	**2013**
KDB648474	Handset SAR	**D04 v01r03**
KDB248227	802 11 WiFi SAR	**D01 v02r02**
KDB447498	General RF Exposure Guidance	**D01 v06**
KDB865664	SAR Measurement 100 MHz to 6 GHz	**D01 v01r04**
KDB865664	RF Exposure Reporting	**D02 v01r02**
KDB941225	3G SAR Procedures	**D01 v03r01**
KDB 941225	SAR for LTE Devices	**D05 v02r04**
KDB941225	hotspot SAR	**D06 v02r01**

6. Specific Absorption Rate (SAR)

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 byexperimental 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:

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

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

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

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

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

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

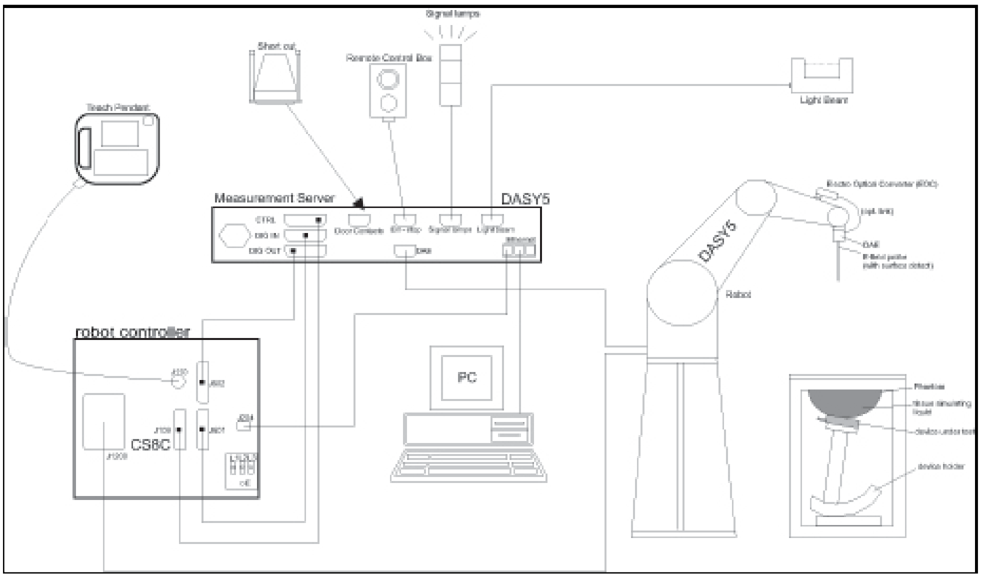
Where: σ is the conductivity of the tissue, ρ is the mass density of tissue and E is the RMS electrical field strength.

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

7. SAR MEASUREMENT SETUP

7.1. Measurement Set-up

The DASY5 system for performing compliance tests is illustrated above graphically. This system consists of the following items:



Picture 7-1 SAR Lab Test Measurement Set-up

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

7.2. DASY5 E-field Probe System

The SAR measurements were conducted with the dosimetric probe designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates. The probe is equipped with an optical multifiber line ending at the front of the probe tip. It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface. Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY5 software reads the reflection durning a software approach and looks for the maximum using 2nd ord curve fitting. The approach is stopped at reaching the maximum.

Probe Specifications:

Model:	**ES3DV3,EX3DV4**
Frequency Range:	**10MHz — 6GHz(EX3DV4)** **10MHz — 4GHz(ES3DV3)**
Calibration:	**In head and body simulating tissue at Frequencies from 835 up to 5800MHz**
Linearity:	**± 0.2 dB(30 MHz to 4 GHz) for ES3DV3** **± 0.2 dB(30 MHz to 6 GHz) for EX3DV4**
Dynamic Range:	**10 mW/kg — 100W/kg**
Probe Length:	**330 mm**
Probe Tip Length:	**20 mm**
Body Diameter:	**12 mm**
Tip Diameter:	**2.5 mm (3.9 mm for ES3DV3)**
Tip-Center:	**1 mm (2.0mm for ES3DV4)**
Application:	**SAR Dosimetry Testing** **Compliance tests of mobile phones** **Dosimetry in strong gradient fields**

Picture7-2 Near-field Probe

Picture 7-3 E-field Probe

7.3. E-field Probe Calibration

Each E-Probe/Probe Amplifier combination has unique calibration parameters. A TEM cell calibration procedure is conducted to determine the proper amplifier settings to enter in the probe parameters. The amplifier settings are determined for a given frequency by subjecting the probe to a known E-field density (1 mW/cm^2) using an RF Signal generator, TEM cell, and RF Power Meter.

The free space E-field from amplified probe outputs is determined in a test chamber. This calibration can be performed in a TEM cell if thefrequency is below 1 GHz and inn a waveguide or other methodologies above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees until the three channels show the maximum reading. The power density readings equates to 1 mW/ cm^2.

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The E-field in the medium correlates with the temperature rise in the dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

$$SAR = C\frac{\Delta T}{\Delta t}$$

Where:

Δt = Exposure time (30 seconds),

C = Heat capacity of tissue (brain or muscle),

ΔT = Temperature increase due to RF exposure.

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

Where:

σ = Simulated tissue conductivity,

ρ = Tissue density (kg/m^3).

7.4. Other Test Equipment

7.4.1. Data Acquisition Electronics(DAE)

The data acquisition electronics consist of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder with a control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information, as well as an optical uplink for commands and the clock.
The mechanical probe mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection.
The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

Picture7-4: DAE

7.4.2. Robot

The SPEAG DASY system uses the high precision robots (DASY5: TX90) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version from Stäubli is used. The Stäubli robot series have many features that are important for our application:

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

Picture7-5: DASY 5

7.4.3. Measurement Server

The Measurement server is based on a PC/104 CPU broad with CPU (DASY5: 400 MHz, Intel Celeron), chipdisk (DASY5: 128MB), RAM (DASY5: 128MB). 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 broad, which is directly connected to the PC/104 bus of the CPU broad.

The measurement server performs all real-time data evaluation of field measurements and surface detection, controls robot movements and handles safety operation. The PC operating system cannot interfere with these time critical processes. All connections are supervised by a watchdog, and disconnection of any of the cables to the measurement server will automatically disarm the robot and disable all program-controlled robot movements. Furthermore, the measurement server is equipped with an expansion port which is reserved for future applications. Please note that this expansion port does not have a standardized pinout, and therefore only devices provided by SPEAG can be connected. Devices from any other supplier could seriously damage the measurement server.

Picture 7-6: Server for DASY 5

7.4.4. Device Holder for 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 5mm distance, a positioning uncertainty of ±0.5mm 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.

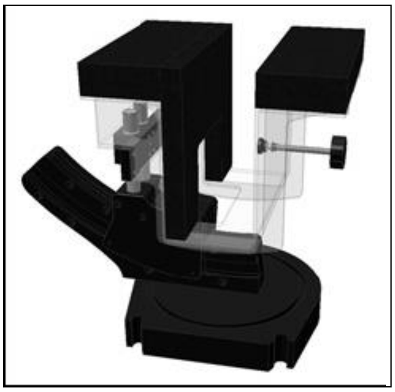
The DASY device holder is designed to cope with the different positions given in the standard. It has two scales for device rotation (with respect to the body axis) and device inclination (with respect to the line between the ear reference points). The rotation centers for both scales is the ear reference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

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

<Laptop Extension Kit>

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

Picture7-7: Device Holder

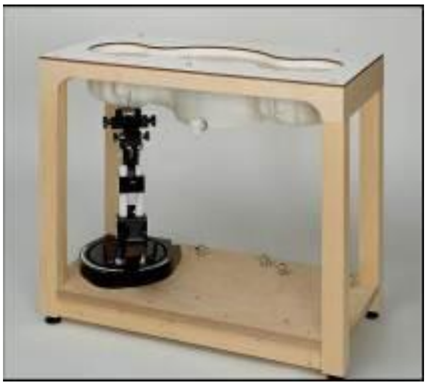


Picture 7-8: Laptop Extension Kit

7.4.5. Phantom

The SAM Twin Phantom V4.0 is constructed of a fiberglass shell integrated in a table. The shape of the shell is based on data from an anatomical study designed to
Represent the 90th percentile of the population. The phantom enables the dissymmetric evaluation of SAR for both left and right handed handset usage, as well as body-worn usage using the flat phantom region. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot. The shell phantom has a 2mm shell thickness (except the ear region where shell thickness increases to 6 mm).

Shell Thickness: 2 ± 0. 2 mm
Filling Volume: Approx. 25 liters
Dimensions: 810 x l000 x 500 mm (H x L x W)
Available: Special

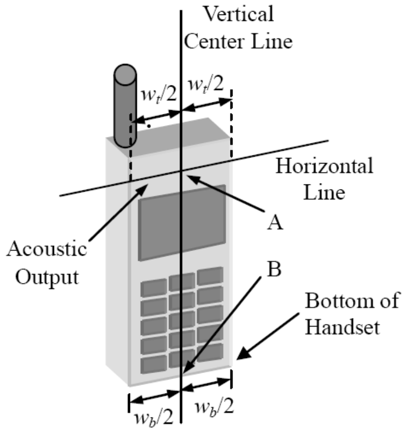


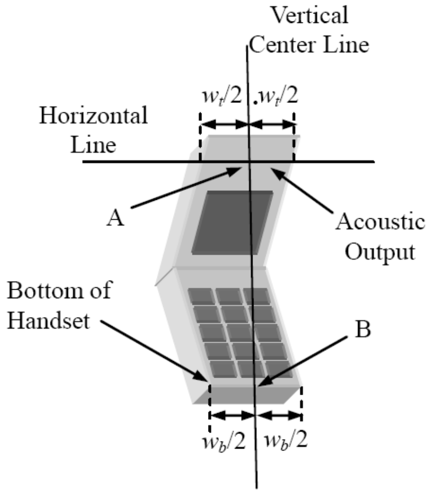
Picture 7-9: SAM Twin Phantom

8. Position of the wireless device in relation to the phantom

8.1. General considerations

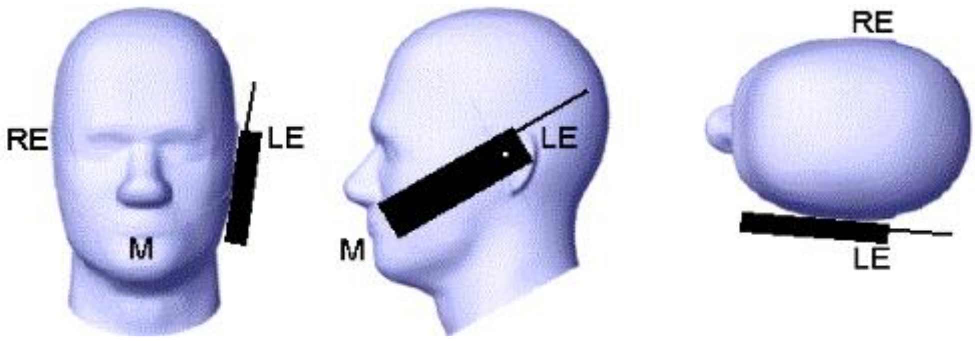
This standard specifies two handset test positions against the head phantom – the “cheek” position and the “tilt” position.



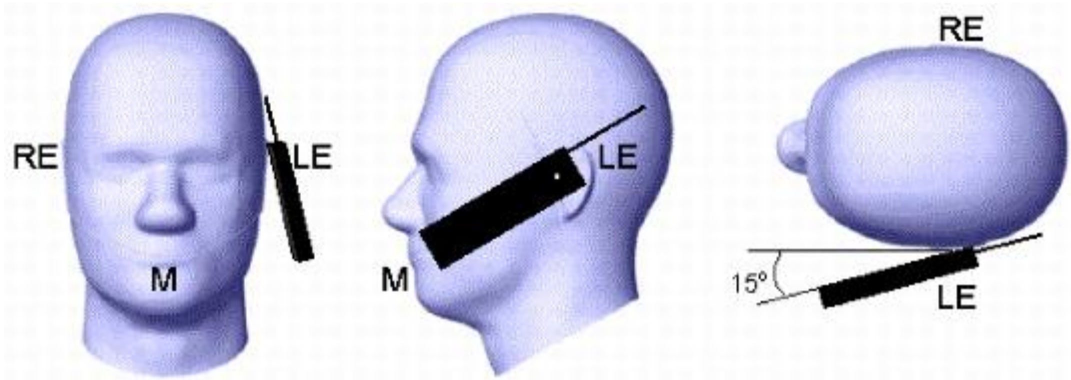


w_t	Width of the handset at the level of the acoustic
w_b	Width of the bottom of the handset
A	Midpoint of the width w_t of the handset at the level of the acoustic output
B	Midpoint of the width w_b of the bottom of the handset

Picture 8-1 Typical “fixed” case handset **Picture 8-2 Typical “clam-shell” case handset**



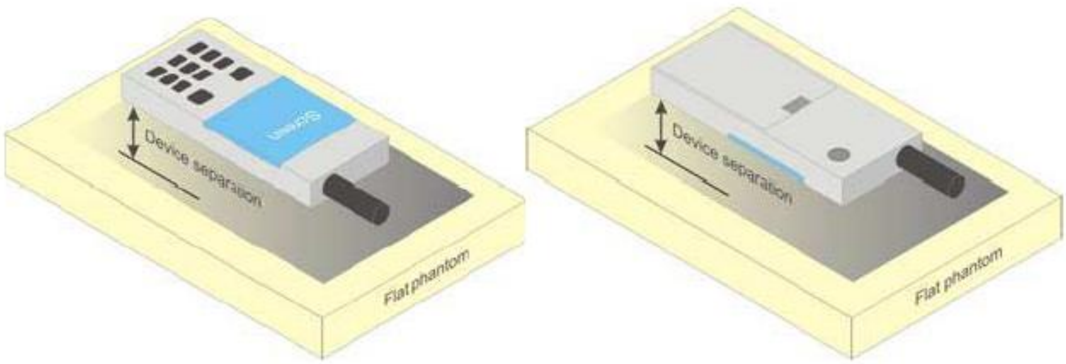
Picture 8-3 Cheek position of the wireless device on the left side of SAM



Picture 8-4 Tilt position of the wireless device on the left side of SAM

8.2. Body-worn device

A typical example of a body-worn device is a mobile phone, wireless enabled PDA or other battery operated wireless device with the ability to transmit while mounted on a person's body using a carry accessory approved by the wireless device manufacturer.

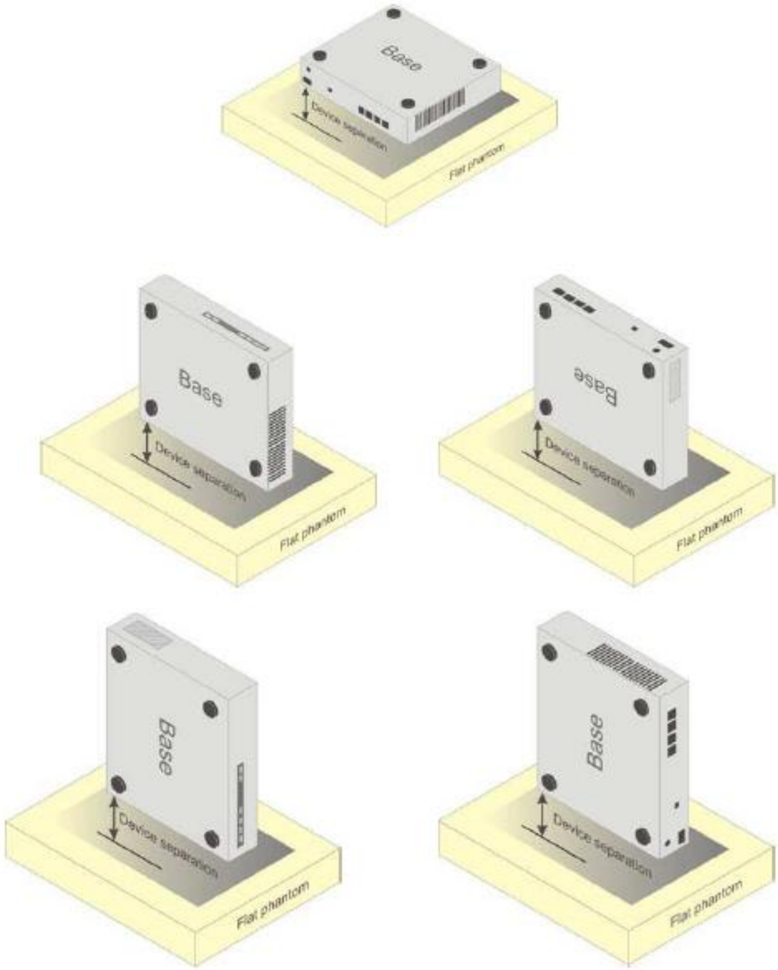


Picture 8-5 Test positions for body-worn devices

8.3. Desktop device

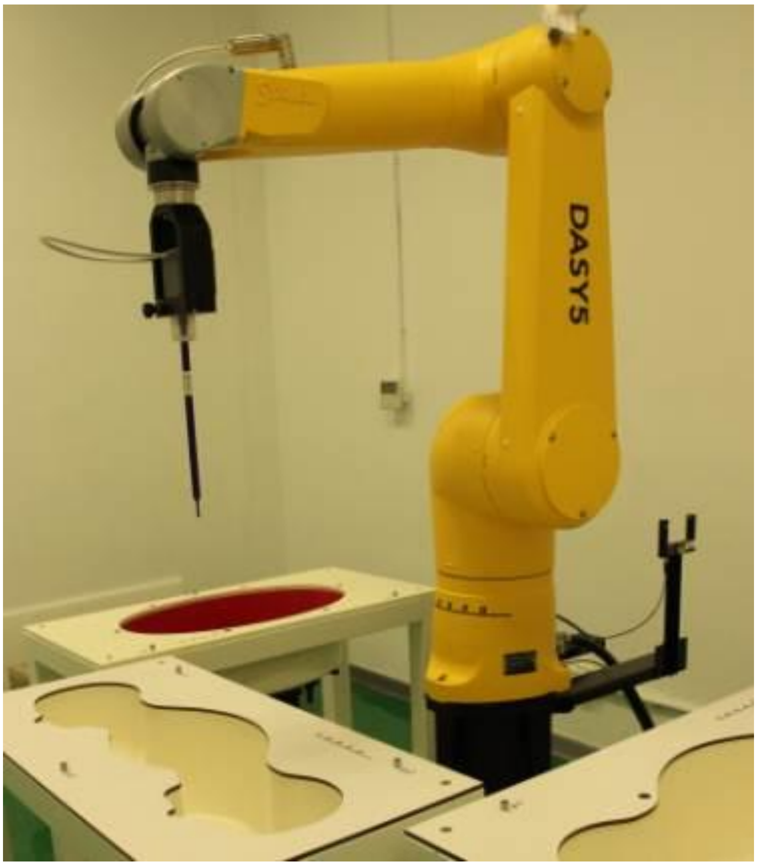
A typical example of a desktop device is a wireless enabled desktop computer plac ed on a table or desk when used.

The DUT shall be positioned at the distance and in the orientation to the phantom thatcorresponds to the intended use as specified by the manufacturer in the user i nstructions. For devices that employ an external antenna with variable positions, tes ts shall be performed for all antenna positions specified. Picture 8-6 shows position s for desktop device SAR tests. If the intended use is not specified, the device sh all be tested directly against the flat phantom.



Picture 8-6 Test positions for desktop devices

8.4. DUT Setup Photos



Picture 8-7: Specific Absorption Rate Test Layout

9. Tissue Simulating Liquids

9.1. Equivalent Tissues

The liquid used for the frequency range of 800-3000 MHz consisted of water, sugar, salt, preventol, glycol monobutyl and Cellulose. The liquid has been previously proven to be suited for worst-case. The Table 9.1 shows the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by the IEEE 1528 and IEC 62209.

Table 9.1. Composition of the Head Tissue Equivalent Matter

Frequency (MHz)	835 Head	835 Body	1900 Head	1900 Body	2450 Head	2450 Body
Ingredients (% by weight)						
Water	41.45	52.5	55.242	69.91	58.79	72.60
Sugar	56.0	45.0	\	\	\	\
Salt	1.45	1.4	0.306	0.13	0.06	0.18
Preventol	0.1	0.1	\	\	\	\
Cellulose	1.0	1.0	\	\	\	\
Glycol Monobutyl	\	\	44.452	29.96	41.15	27.22
Dielectric Parameters Target Value	ε=41.5 σ=0.90	ε=55.2 σ=0.97	ε=40.0 σ=1.40	ε=53.3 σ=1.52	ε=39.2 σ=1.80	ε=52.7 σ=1.95

Table 9.1: Targets for tissue simulating liquid

Frequency(MHz)	Liquid Type	Conductivity(σ)	± 5% Range	Permittivity(ε)	± 5% Range
835	Head	0.90	0.86～0.95	41.5	39.4～43.6
835	Body	0.97	0.92～1.02	55.2	52.4～58.0
1900	Head	1.40	1.33～1.47	40.0	38.0～42.0
1900	Body	1.52	1.44～1.60	53.3	50.6～56.0
2450	Head	1.80	1.71～1.89	39.2	37.2～41.2
2450	Body	1.95	1.85～2.05	52.7	50.1～55.3
2600	Head	1.96	1.86~2.06	39.0	37.1~40.9
2600	Body	2.16	2.05~2.27	52.5	59.9~55.1
5200	Head	4.66	4.43~4.89	36.0	34.2~37.8
5200	Body	5.30	5.04~5.57	49.0	46.6~51.5
5800	Head	5.27	5.01~5.53	35.3	33.5~37.1
5800	Body	6.00	5.70~6.30	48.2	45.8~50.6

9.2. Dielectric Performance

Table 9.3: Dielectric Performance of Head Tissue Simulating Liquid

Measurement Value						
Liquid Temperature: 22.5 ℃						
Type	**Frequency**	**Permittivity ε**	**Drift (%)**	**Conductivity σ**	**Drift (%)**	Test Date
Head	835 MHz	42.956	3.51%	0.939	4.33%	2019/4/3
Head	835 MHz	41.032	-1.13%	0.887	-1.44%	2019/4/17
Head	1900 MHz	38.956	-2.61%	1.397	-0.21%	2019/4/12
Head	2450 MHz	40.406	3.08%	1.815	0.83%	2019/4/17
Head	2600 MHz	38.949	-0.13%	1.942	-0.92%	2019/4/26
Head	5300 MHz	36.981	3.10%	4.751	-0.19%	2019/4/11
Head	5600 MHz	36.403	2.46%	5.08	0.20%	2019/4/11
Head	5800 MHz	36.027	2.06%	5.303	0.63%	2019/4/11
Body	835 MHz	56.664	2.65%	0.998	2.89%	2019/4/3
Body	835 MHz	56.415	2.20%	0.971	0.10%	2019/4/18
Body	1900 MHz	52.046	-2.35%	1.51	-0.66%	2019/4/16
Body	1900 MHz	52.274	-1.92%	1.485	-2.30%	2019/4/26
Body	2450 MHz	52.811	0.21%	1.98	1.54%	2019/4/17
Body	2600 MHz	54.37	3.56%	2.112	-2.22%	2019/4/26
Body	5300 MHz	49.948	2.14%	5.275	-3.39%	2019/4/13
Body	5600 MHz	49.366	1.83%	5.69	-1.73%	2019/4/13
Body	5800 MHz	48.931	0.93%	5.985	3.37%	2019/4/13

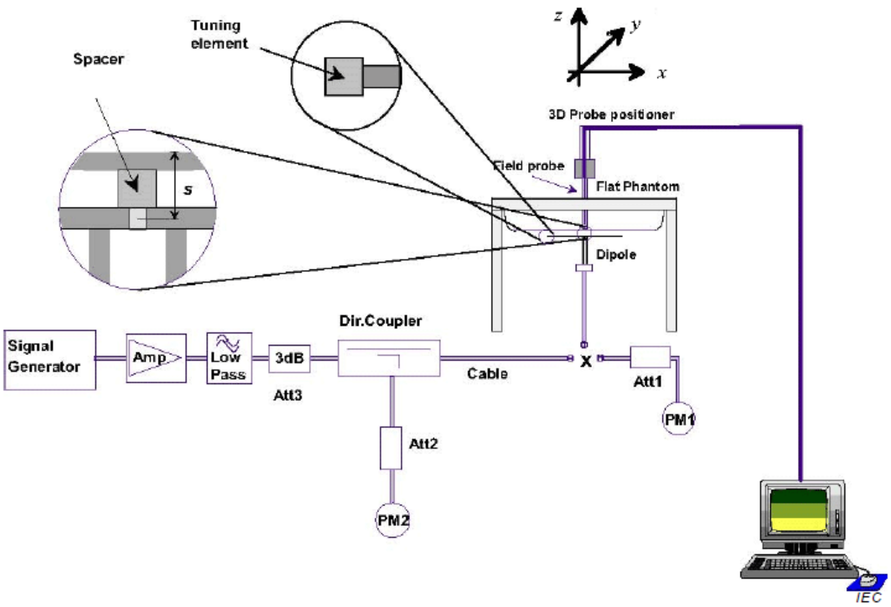
10. System Validation

10.1. System Validation

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 performace check and system validation. System validation kit includes a dipole, tripod holder to fix it underneath the flat phantom and a corresponding distance holder.

10.2. System Setup

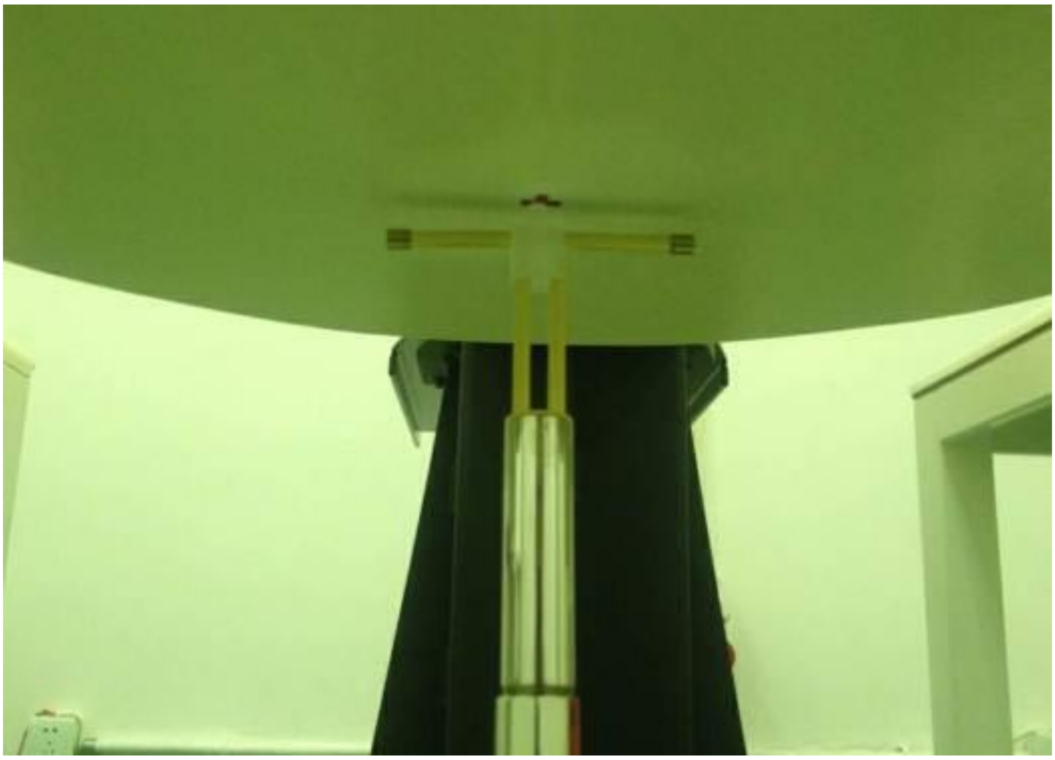
In the simplified setup for system evaluation, the DUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave that comes from a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The equipment setup is shown below:



Picture 10-1 System Setup for System Evaluation

The output power on dipole port must be calibrated to 24 dBm (250mW) before dipole is connected.

The results are normalized to 1 W input power.



Picture 10-2 Photo of Dipole Setup

Table 10.1: System Verification of Head

Verification Results							
Input power level: 1W							
Frequency	**Target value (W/kg)**		**Measured value (W/kg)**		**Deviation**		**Test date**
	10 g Average	**1 g Average**	**10 g Average**	**1 g Average**	**10 g Average**	**1 g Average**	
835 MHz	6.25	9.63	6.48	9.76	3.68%	1.35%	2019/4/3
835 MHz	6.25	9.63	6.2	9.52	-0.80%	-1.14%	2019/4/17
1900 MHz	21.1	40.5	21.44	41.2	1.61%	1.73%	2019/4/12
2450 MHz	24.4	52.4	23.64	51.2	-3.11%	-2.29%	2019/4/17
2600 MHz	25.4	57.2	24.28	54.8	-4.41%	-4.20%	2019/4/26
5300 MHz	21.2	75.8	20.4	72.8	-3.77%	-3.96%	2019/4/11
5600 MHz	22.2	79.3	22.8	81.6	2.70%	2.90%	2019/4/11
5800 MHz	20.7	73.7	20.9	75.3	0.97%	2.17%	2019/4/11

Table 10.2: System Verification of Body

Verification Results							
Input power level: 1W							
Frequency	**Target value (W/kg)**		**Measured value (W/kg)**		**Deviation**		**Test date**
	10 g Average	**1 g Average**	**10 g Average**	**1 g Average**	**10 g Average**	**1 g Average**	
835 MHz	6.4	9.75	6.88	10.36	7.50%	6.26%	2019/4/3
835 MHz	6.4	9.75	6.24	9.48	-2.50%	-2.77%	2019/4/18
1900 MHz	21.2	40.4	20.24	38.36	-4.53%	-5.05%	2019/4/16
1900 MHz	21.2	40.4	20.52	39.56	-3.21%	-2.08%	2019/4/26
2450 MHz	23.5	50.5	24.76	52.8	5.36%	4.55%	2019/4/17
2600 MHz	24.1	54.3	24.08	55.6	-0.08%	2.39%	2019/4/26
5300 MHz	19.8	71.1	20	72.2	1.01%	1.55%	2019/4/13
5600 MHz	21	75.1	21.9	79.8	4.29%	6.26%	2019/4/13
5800 MHz	20.2	72.6	19.6	71.3	-2.97%	-1.79%	2019/4/13

11. Measurement Procedures

11.1. Tests to be performed

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

(a) Power reference measurement

(b) Area scan

(c) Zoom scan

(d) Power drift measurement

The SAR measurement procedures for each of test conditions are as follows:

(a) Make EUT to transm it maximum output power

(b) Measure conducted output power through RF cable

(c) Place the EUT in the specific position of phantom as Appendix D demonstrates.

(d) Measure SAR results for Middle channel or the highest power channel on each testing position.

(e) Measure SAR results for other channels in worst SAR testing position if the reported SAR of highest power channel is larger than 0.8 W/kg

(f) Record the SAR value

11.2. General Measurement Procedure

The area and zoom scan resolutions specified in the table below must be applied to the SAR measurements and fully documented in SAR reports to qualify for TCB approval. Probe boundary effect error compensation is required for measurements with the probe tip closer than half a probe tip diameter to the phantom surface. Both the probe tip diameter and sensor offset distance must satisfy measurement protocols; to ensure probe boundary effect errors are minimized and the higher fields closest to the phantom surface can be correctly measured and extrapolated to the phantom surface for computing 1-g SAR. Tolerances of the post-processing algorithms must be verified by the test laboratory for the scan resolutions used in the SAR measurements, according to the reference distribution functions specified in IEEE Std 1528-2013. The results should be documented as part of the system validation records and may be requested to support test results when all the measurement parameters in the following table are not satisfied.

<table>
<tr><td colspan="3"></td><td>≤ 3 GHz</td><td>> 3 GHz</td></tr>
<tr><td colspan="3">Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 mm ± 1 mm</td><td>½·δ·ln(2) mm ± 0.5 mm</td></tr>
<tr><td colspan="3">Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30° ± 1°</td><td>20° ± 1°</td></tr>
<tr><td colspan="3" rowspan="2">Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}</td><td>≤ 2 GHz: ≤ 15 mm
2 – 3 GHz: ≤ 12 mm</td><td>3 – 4 GHz: ≤ 12 mm
4 – 6 GHz: ≤ 10 mm</td></tr>
<tr><td colspan="2">When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.</td></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>≤ 2 GHz: ≤ 8 mm
2 – 3 GHz: ≤ 5 mm*</td><td>3 – 4 GHz: ≤ 5 mm*
4 – 6 GHz: ≤ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{Zoom}(n)$</td><td>≤ 5 mm</td><td>3 – 4 GHz: ≤ 4 mm
4 – 5 GHz: ≤ 3 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface</td><td>≤ 4 mm</td><td>3 – 4 GHz: ≤ 3 mm
4 – 5 GHz: ≤ 2.5 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">≤ 1.5·$\Delta z_{Zoom}(n-1)$ mm</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>≥ 30 mm</td><td>3 – 4 GHz: ≥ 28 mm
4 – 5 GHz: ≥ 25 mm
5 – 6 GHz: ≥ 22 mm</td></tr>
<tr><td colspan="5">Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see IEEE Std 1528-2013 for details.
* When zoom scan is required and the <u>reported</u> SAR from the area scan based 1-g SAR estimation procedures of KDB Publication 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.</td></tr>
</table>

11.3. WCDMA Measurement Procedures for SAR

The following procedures are applicable to WCDMA handsets operating under 3GPP Release99, Release 5 and Release 6. The default test configuration is to measure SAR with an established radio link between the DUT and a communication test set using a 12.2kbps RMC (reference measurement channel) configured in Test Loop Mode 1. SAR is selectively confirmed for other physical channel configurations (DPCCH &$DPDCH_n$), HSDPA and HSPA (HSUPA/HSDPA) modes according to output power, exposure conditions and device operating capabilities. Both uplink and downlink should be configured with the same RMC or AMR, when required. SAR for Release 5 HSDPA and Release 6 HSPA are measured using the applicable FRC (fixed reference channel) and E-DCH reference channel configurations. Maximum output power is verified according to applicable versions of 3GPP TS 34.121 and SAR must be measured according to these maximum output conditions. When Maximum Power Reduction (MPR) is not implemented according to Cubic Metric (CM) requirements for Release 6 HSPA, the following procedures do not apply.

For Release 5 HSDPA Data Devices:

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs}	CM/dB	MPR (dB)
1	2/15	15/15	64	2/15	4/15	1.5	0.5
2	12/15	15/15	64	12/15	24/25	2.0	1
3	15/15	8/15	64	15/8	30/15	2.0	1
4	15/15	4/15	64	15/4	30/15	2.0	1

For Release 6 HSUPA Data Devices

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

11.4. Bluetooth & WiFi Measurement Procedures for SAR

Normal network operating configurations are not suitable for measuring the SAR of 802.11 transmitters in general. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure that the results are consistent and reliable.

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in a test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters. The test frequencies should correspond to actual channel frequencies defined for domestic use. SAR for devices with switched diversity should be measured with only one antenna transmitting at a time during each SAR measurement, according to a fixed modulation and data rate. The same data pattern should be used for all measurements.

11.5. Power Drift

To control the output power stability during the SAR test, DASY4 system calculates the power drift by measuring the E-field at the same location at the beginning and at the end of the measurement for each test position. These drift values can be found in Section 14 labeled as: (Power Drift [dB]). This ensures that the power drift during one measurement is within 5%.

12. Conducted Output Power

12.1. Manufacturing tolerance

Table 12.1: GSM Speech

GSM 850			
Channel	Channel 128	Channel 190	Channel 251
Maximum Target Value (dBm)	33	33	33
GSM1900			
Channel	Channel 512	Channel 661	Channel 810
Maximum Target Value (dBm)	30	30	30

Table 12.2: GPRS (GMSK Modulation)

GSM 850				
Channel		**128**	**190**	**251**
1 Txslots	Maximum Target Value (dBm)	33	33	33
2 Txslots	Maximum Target Value (dBm)	32	32	32
3 Txslots	Maximum Target Value (dBm)	30.5	30.5	30.5
4 Txslots	Maximum Target Value (dBm)	29.5	29.5	29.5
GSM 1900				
Channel		**512**	**661**	**810**
1 Txslots	Maximum Target Value (dBm)	30	30	30
2 Txslots	Maximum Target Value (dBm)	29.5	29.5	29.5
3 Txslots	Maximum Target Value (dBm)	27.5	27.5	27.5
4 Txslots	Maximum Target Value (dBm)	26.5	26.5	26.5

Table 12.3: EGPRS (8-PSK Modulation)

GSM 850				
Channel		**128**	**190**	**251**
1 Txslots	Maximum Target Value (dBm)	28	28	28
2 Txslots	Maximum Target Value (dBm)	26	26	26
3 Txslots	Maximum Target Value (dBm)	24	24	24
4 Txslots	Maximum Target Value (dBm)	23	23	23
GSM 1900				
Channel		**512**	**661**	**810**
1 Txslots	Maximum Target Value (dBm)	27	27	27
2 Txslots	Maximum Target Value (dBm)	26	26	26
3 Txslots	Maximum Target Value (dBm)	24.5	24.5	24.5
4 Txslots	Maximum Target Value (dBm)	23.5	23.5	23.5

Table 12.4: WCDMA

WCDMA Band II			
Channel	Channel 9262	Channel 9400	Channel 9538
Maximum Target Value (dBm)	22.5	22.5	22.5

WCDMA Band II **HSDPA**				
Channel		9262	9400	9538
1	Maximum Target Value (dBm)	21.5	21.5	21.5
2	Maximum Target Value (dBm)	21.5	21.5	21.5
3	Maximum Target Value (dBm)	21	21	21
4	Maximum Target Value (dBm)	21	21	21
WCDMA Band II **HSUPA**				
Channel		9262	9400	9538
1	Maximum Target Value (dBm)	21	21	21

2	Maximum Target Value (dBm)	21.5	21.5	21.5
3	Maximum Target Value (dBm)	21	21	21
4	Maximum Target Value (dBm)	21.5	21.5	21.5
5	Maximum Target Value (dBm)	21.5	21.5	21.5

Table 12.5: WCDMA

WCDMA Band V			
Channel	4132	4183	4233
Maximum Target Value (dBm)	23	23	23

WCDMA Band V **HSDPA**				
Channel		4132	4183	4233
1	Maximum Target Value (dBm)	22	22	22
2	Maximum Target Value (dBm)	22	22	22
3	Maximum Target Value (dBm)	22	22	22
4	Maximum Target Value (dBm)	22	22	22
WCDMA Band V **HSUPA**				
Channel		4132	4183	4233
1	Maximum Target Value (dBm)	22	22	22
2	Maximum Target Value (dBm)	22	22	22
3	Maximum Target Value (dBm)	21	21	21
4	Maximum Target Value (dBm)	22	22	22
5	Maximum Target Value (dBm)	22	22	22

Table 12.6: LTE

LTE Band2			
RB Size	1	50%	100%
Maximum Target Value (dBm)	22	21	21
LTE Band7			
RB Size	1	50%	100%
Maximum Target Value (dBm)	19.5	18.5	18.5

Table 12.7: WiFi

WiFi 802.11b 2.4G			
Channel	Channel 1	Channel 6	Channel 11
Maximum Target Value (dBm)	19.5	19.5	19.5
WiFi 802.11g 2.4G			
Channel	Channel 1	Channel 6	Channel 11
Maximum Target Value (dBm)	18	18	18
WiFi 802.11n 20M 2.4G			
Channel	Channel 1	Channel 6	Channel 11
Maximum Target Value (dBm)	17	17	17
WiFi 802.11n 40M 2.4G			
Channel	Channel 3	Channel 6	Channel 9
Maximum Target Value (dBm)	16	16	16

WiFi 802.11a				
Band	U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
Maximum Target Value (dBm)	14	14	13	12
WiFi 802.11n HT20				
Band	U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
Maximum Target Value (dBm)	14	14	13	12
WiFi 802.11n HT40				
Band	U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
Maximum Target Value (dBm)	14	14	13	13

Table 12.8: Bluetooth

Bluetooth			
Channel	Channel 0	Channel 39	Channel 78
Maximum Target Value (dBm)	8	8	8

Table 12.9: BLE

Bluetooth			
Channel	Channel 0	Channel 19	Channel 39
Maximum Target Value (dBm)	8	8	8

12.2. GSM Measurement result

Table 12.10: The conducted power measurement results for GSM

GSM 850MHZ	Conducted Power (dBm)		
	Channel 128(824.2MHz)	**Channel 190(836.6MHz)**	**Channel 251(848.8MHz)**
	32.52	32.58	32.51
GSM 1900MHZ	**Conducted Power(dBm)**		
	Channel 512(1850.2MHz)	**Channel 661(1880 MHz)**	**Channel 810(1909.8MHz)**
	29.89	29.86	29.65

Table 12.11: The conducted power measurement results for GPRS/EGPRS

GSM 850 GMSK	Measured Power (dBm)			calculation	Averaged Power (dBm)		
	128	**190**	**251**		**128**	**190**	**251**
1 Txslot	32.52	32.59	32.57	-9.03dB	23.49	23.56	23.54
2 Txslots	31.25	31.2	31.3	-6.02dB	25.23	25.18	25.28
3 Txslots	29.32	29.27	29.36	-4.26dB	25.06	25.01	25.1
4 Txslots	28.21	28.17	28.25	-3.01dB	25.2	25.16	25.24
GSM 1900 GMSK	Measured Power (dBm)			calculation	Averaged Power (dBm)		
	512	**661**	**810**		**512**	**661**	**810**
1 Txslot	29.89	29.83	29.61	-9.03dB	20.86	20.8	20.58
2 Txslots	29.08	29.04	28.83	-6.02dB	23.06	23.02	22.81
3Txslots	27.25	27.23	27.03	-4.26dB	22.99	22.97	22.77
4 Txslots	26.23	26.21	26.01	-3.01dB	23.22	23.2	23

Table 12.12: The conducted power measurement results for E-GPRS

GSM 850 8-PSK	Measured Power (dBm)			calculation	Averaged Power (dBm)		
	128	**190**	**251**		**128**	**190**	**251**
1 Txslot	26.2	26.31	26.02	-9.03dB	17.17	17.28	16.99
2 Txslots	25.04	24.75	24.62	-6.02dB	19.02	18.73	18.6
3 Txslots	22.74	22.86	23.13	-4.26dB	18.48	18.6	18.87
4 Txslots	21.98	22.1	21.82	-3.01dB	18.97	19.09	18.81
GSM 1900 8-PSK	Measured Power (dBm)			calculation	Averaged Power (dBm)		
	512	**661**	**810**		**512**	**661**	**810**
1 Txslot	26.71	26.9	26.71	-9.03dB	17.68	17.87	17.68
2 Txslots	25.72	25.77	25.78	-6.02dB	19.7	19.75	19.76
3 Txslots	24.12	23.99	23.76	-4.26dB	19.86	19.73	19.5
4 Txslots	22.99	23.03	22.84	-3.01dB	19.98	20.02	19.83

NOTES:

1) Division Factors

To average the power, the division factor is as follows:

1TX-slot = 1 transmit time slot out of 8 time slots=> conducted power divided by (8/1) => -9.03dB

2TX-slots = 2 transmit time slots out of 8 time slots=> conducted power divided by (8/2) => -6.02dB

3TX-slots = 3 transmit time slots out of 8 time slots=> conducted power divided by (8/3) => -4.26dB

4TX-slots = 4 transmit time slots out of 8 time slots=> conducted power divided by (8/4) => -3.01dB

According to the conducted power as above, the body measurements are performed with 2Txslots for 850MHz ; 4Txslots for1900MHz;

12.3. WCDMA Measurement result

Table 12.13: The conducted Power for WCDMA

Item	band	WCDMA BAND II result(dBm)		
	ARFCN	9262 (1852.4MHz)	9400 (1880.0MHz)	9538 (1907.6MHz)
WCDMA	\	22.36	22.21	22.12
HSDPA	1	21.44	21.43	21.4
	2	21.35	21.34	21.32
	3	20.95	20.96	20.98
	4	20.93	20.94	20.97
HSUPA	1	20.88	20.89	20.86
	2	21.41	21.43	21.44
	3	20.48	20.49	20.43
	4	21.44	21.43	21.49
	5	21.38	21.39	21.36
Item	band	WCDMA BAND V result(dBm)		
	ARFCN	Channel 4132 (826.4MHz)	Channel 4183 (836.6MHz)	Channel 4233 (846.6MHz)
WCDMA	\	22.47	22.49	22.58
HSDPA	1	21.63	21.64	21.59
	2	21.6	21.58	21.61
	3	21.21	21.24	21.23
	4	21.14	21.16	21.18
HSUPA	1	21.14	21.17	21.13
	2	21.66	21.67	21.68
	3	20.84	20.86	20.83
	4	21.67	21.69	21.7
	5	21.63	21.61	21.64

12.4. LTE Measurement result

Table 12.14: The conducted Power for LTE Band 2/7

LTE-FDD Band 2			Actual output Power (dBm)					
			High	Middle	Low	High	Middle	Low
RB allocation	RB offset (Start RB)	Modula-tion	1.4MHz			3MHz		
			19193	18900	18607	19185	18900	18615
1RB	High	QPSK	21.13	20.69	20.67	20.74	20.57	20.52
		16QAM	20.03	19.89	19.95	20.05	19.92	19.86
	Middle	QPSK	21.05	20.97	20.62	20.91	20.73	20.72
		16QAM	20.14	19.98	19.99	20.29	20.14	20.02
	Low	QPSK	21.14	20.74	20.46	20.78	20.56	20.60
		16QAM	19.97	19.87	19.87	20.11	19.98	19.99
50%RB	High	QPSK	21.09	20.79	20.56	19.86	19.69	19.65
		16QAM	19.88	19.68	19.65	18.91	18.72	18.73
	Middle	QPSK	21.09	20.69	20.60	19.92	19.74	19.68
		16QAM	19.93	19.74	19.74	18.95	18.81	18.78
	Low	QPSK	21.00	20.71	20.55	19.91	19.72	19.69
		16QAM	19.84	19.71	19.69	18.94	18.76	18.73
100%RB	/	QPSK	20.10	19.94	19.67	19.89	19.69	19.65
		16QAM	18.92	18.92	18.74	18.92	18.80	18.70
RB allocation	RB offset (Start RB)	Modula-tion	5MHz			10MHz		
			19175	18900	18625	19150	18900	18650
1RB	High	QPSK	20.63	20.44	20.40	20.71	20.53	20.46
		16QAM	19.96	19.82	19.86	20.01	19.96	19.84
	Middle	QPSK	20.97	20.74	20.69	20.87	20.65	20.63
		16QAM	20.27	20.09	20.04	20.16	20.05	20.05
	Low	QPSK	20.66	20.47	20.48	20.83	20.56	20.57
		16QAM	19.98	19.85	19.84	20.13	19.89	20.01
50%RB	High	QPSK	19.79	19.63	19.61	19.79	19.68	19.68
		16QAM	18.81	18.68	18.67	18.77	18.66	18.68
	Middle	QPSK	19.95	19.77	19.73	19.95	19.72	19.71
		16QAM	18.94	18.76	18.76	18.93	18.71	18.70
	Low	QPSK	19.96	19.71	19.66	20.07	19.84	19.76
		16QAM	18.95	18.76	18.69	19.01	18.79	18.75
100%RB	/	QPSK	19.95	19.74	19.69	19.96	19.78	19.75
		16QAM	18.91	18.69	18.67	18.91	18.76	18.76

LTE-FDD Band 2			Actual output Power (dBm)					
			High	Middle	Low	High	Middle	Low
RB allocation	RB offset (Start RB)	Modula-tion	15MHz			20MHz		
			19125	18900	18675	19100	18900	18700
1RB	High	QPSK	20.66	20.60	20.37	20.52	20.52	20.12
		16QAM	20.00	19.96	19.74	19.88	19.90	19.48
	Middle	QPSK	20.79	20.62	20.56	21.22	21.03	21.05
		16QAM	20.04	19.97	19.92	20.20	20.12	20.09
	Low	QPSK	20.89	20.52	20.54	20.71	20.33	20.37
		16QAM	20.18	19.84	19.91	20.10	19.66	19.78
50%RB	High	QPSK	19.81	19.66	19.67	19.77	19.63	19.78
		16QAM	18.81	18.73	18.70	18.70	18.65	18.78
	Middle	QPSK	19.94	19.70	19.69	20.03	19.78	19.68
		16QAM	18.94	18.74	18.69	19.00	18.75	18.71
	Low	QPSK	19.97	19.78	19.74	19.94	19.83	19.73
		16QAM	18.98	18.79	18.75	18.87	18.77	18.71
100%RB	/	QPSK	19.91	19.77	19.72	19.81	19.73	19.74
		16QAM	18.89	18.73	18.73	18.77	18.71	18.72

LTE-FDD Band 7			Actual output Power (dBm)					
			High	Middle	Low	High	Middle	Low
RB allocation	RB offset (Start RB)	Modula-tion	5MHz			10MHz		
			21425	21100	20775	21400	21100	20800
1RB	High	QPSK	18.43	18.39	18.35	18.55	18.49	18.52
		16QAM	17.76	17.72	17.63	17.84	17.83	17.84
	Middle	QPSK	18.70	18.62	18.63	18.63	18.63	18.60
		16QAM	18.05	17.97	17.93	17.94	17.94	17.94
	Low	QPSK	18.42	18.35	18.43	18.49	18.47	18.48
		16QAM	17.76	17.68	17.74	17.76	17.77	17.83
50%RB	High	QPSK	17.64	17.60	17.58	17.78	17.73	17.73
		16QAM	16.64	16.62	16.58	16.75	16.70	16.67
	Middle	QPSK	17.70	17.65	17.66	17.73	17.69	17.72
		16QAM	16.71	16.64	16.63	16.69	16.66	16.66
	Low	QPSK	17.61	17.56	17.58	17.74	17.66	17.71
		16QAM	16.62	16.61	16.55	16.70	16.61	16.66
100%RB	/	QPSK	17.67	17.62	17.61	17.77	17.72	17.73

RB allocation	RB offset (Start RB)	Modulation	15MHz			20MHz		
		16QAM	16.61	16.56	16.56	16.72	16.65	16.68
			21375	21100	20825	21350	21100	20850
1RB	High	QPSK	18.52	18.47	18.42	18.32	18.26	18.28
		16QAM	17.81	17.78	17.75	17.59	17.65	17.60
	Middle	QPSK	18.54	18.52	18.54	18.61	18.62	18.60
		16QAM	17.81	17.86	17.81	17.85	17.97	17.96
	Low	QPSK	18.43	18.37	18.46	18.22	18.20	18.25
		16QAM	17.65	17.73	17.74	17.56	17.57	17.61
50%RB	High	QPSK	17.77	17.73	17.72	17.71	17.72	17.71
		16QAM	17.14	16.65	16.66	16.75	16.67	16.68
	Middle	QPSK	17.74	17.69	17.69	17.77	17.71	17.69
		16QAM	16.65	16.62	16.62	16.72	16.69	16.69
	Low	QPSK	17.70	17.64	17.65	17.66	17.60	17.58
		16QAM	16.59	16.58	16.60	16.61	16.55	16.54
100%RB	/	QPSK	17.77	17.69	17.70	17.74	17.63	17.66
		16QAM	16.66	16.59	16.60	16.66	16.60	16.60

12.5. WiFi and BT Measurement result

Table 12.15: The conducted power for Bluetooth

GFSK			
Channel	Ch0 (2402 MHz)	Ch39 (2441MHz)	CH78 (2480MHz)
Conducted Output Power (dBm)	6.65	7.81	6.77
π/4 DQPSK			
Channel	Ch0 (2402 MHz)	Ch39 (2441MHz)	CH78 (2480MHz)
Conducted Output Power (dBm)	5.41	6.52	5.42
8DPSK			
Channel	Ch0 (2402 MHz)	Ch39 (2441MHz)	CH78 (2480MHz)
Conducted Output Power (dBm)	5.41	6.49	5.42

Table 12.16: The conducted power for BLE

GFSK			
Channel	Ch0 (2402 MHz)	Ch19 (2440MHz)	CH39 (2480MHz)
Conducted Output Power (dBm)	6.7	7.8	6.8

NOTE: According to KDB447498 D01 BT standalone SAR are not required, because maximum average output power is less than 10mW.

When the standalone SAR test exclusion is applied to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to the following to determine simultaneous transmission SAR test exclusion:

(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]·[√f(GHz)/x] W/kg for test separation distances ≤ 50 mm;
where x = 7.5 for 1-g SAR, and x = 18.75 for 10-g SAR.

SAR head value of BT is 0.265 W/Kg for 1g. SAR body value of BT is 0.132 W/Kg for 1g.

The default power measurement procedures are:

a) Power must be measured at each transmit antenna port according to the DSSS and OFDM transmission configurations in each standalone and aggregated frequency band.

b) Power measurement is required for the transmission mode configuration with the highest maximum output power specified for production units.

1) When the same highest maximum output power specification applies to multiple transmission modes, the largest channel bandwidth configuration with the lowest order modulation and lowest data rate is measured.

2) When the same highest maximum output power is specified for multiple largest channel bandwidth configurations with the same lowest order modulation or lowest order modulation and lowest data rate, power measurement is required for all equivalent 802.11 configurations with the same maximum output power.

c) For each transmission mode configuration, power must be measured for the highest and lowest channels; and at the mid-band channel(s) when there are at least 3 channels. For configurations with multiple mid-band channels, due to an even number of channels, both channels should be measured.

During WLAN SAR testing EUT is configured with the WLAN continuous TX tool, and the transmission duty factor was monitored on the spectrum analyzer with zero-span setting, the duty cycle is 100%.

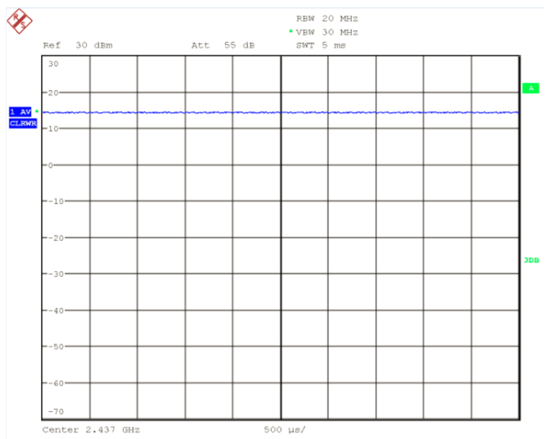
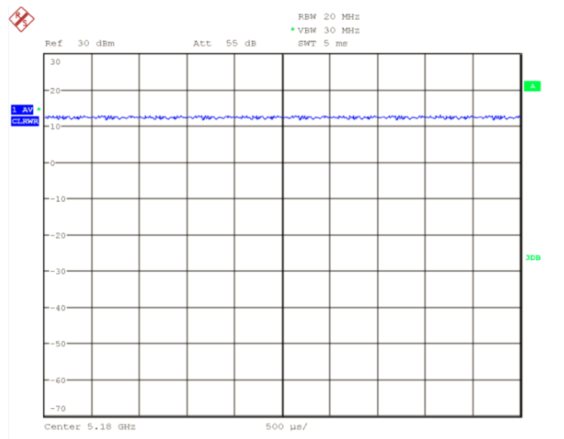
802.11b	802.11a
	

Table 12.17: The average conducted power for WiFi

Mode	Channel	Frequence	Average power(dBm)
802.11 b	1	2412 MHZ	19.32
	6	2437 MHZ	18.97
	11	2462 MHZ	19.02
802.11 g	1	2412 MHZ	16.13
	6	2437 MHZ	17.50
	11	2462 MHZ	15.95
802.11 n 20M	1	2412 MHZ	15.88
	6	2437 MHZ	16.97
	11	2462 MHZ	15.78
802.11 n 40M	3	2422 MHZ	14.09
	6	2437 MHZ	15.94
	9	2452 MHZ	13.96

Mode	Channel	Frequence MHz	Average Power (dBm)
802.11a	36	5180	13.22
	40	5200	13.18
	44	5220	13.02
	48	5240	13.66
	52	5260	13.49
	56	5280	12.40
	60	5300	13.23

	64	5320	13.22
	100	5500	12.27
	104	5520	12.64
	108	5540	12.17
	112	5560	12.71
	116	5580	12.18
	132	5660	11.89
	136	5680	12.10
	140	5700	11.53
	149	5745	11.75
	153	5765	11.75
	157	5785	11.58
	161	5805	11.92
	165	5825	12.17
802.11n 20M	36	5180	13.33
	40	5200	13.33
	44	5220	13.37
	48	5240	13.74
	52	5260	13.53
	56	5280	12.42
	60	5300	13.4
	64	5320	13.28
	100	5500	12.38
	104	5520	12.18
	108	5540	12.08
	112	5560	12.19
	116	5580	12.74
	132	5660	12.04
	136	5680	12.00
	140	5700	11.5
	149	5745	11.32
	153	5765	11.66
	157	5785	11.6
	161	5805	11.83
	165	5825	12.17
802.11n 40M	38	5190	13.53
	46	5230	13.93
	54	5270	13.85
	62	5310	13.67
	102	5510	12.78
	110	5550	12.13
	134	5670	12.17

	151	5755	12.26
	159	5795	12.16

2.4 GHz 802.11g/n OFDM SAR Test Exclusion Requirements

When SAR measurement is required for 2.4 GHz 802.11g/n OFDM configurations, the measurement and test reduction procedures for OFDM are applied. SAR is not required for the following 2.4 GHz OFDM conditions.

a) When KDB Publication 447498 D01 SAR test exclusion applies to the OFDM configuration.

b) When the highest *reported* SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

5GHz 802.11a/n OFDM SAR Test Exclusion Requirements

For devices that operate in both U-NII-1 and U-NII-2A bands using the same transmitter and antenna(s), SAR test reduction is determined according to the following

1) When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, each band is tested independently for SAR.

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

The highest reported SAR for Main Antenna is adjusted by the ratio of U-NII-1 to U-NII-2A specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg . So WiFi Antenna U-NII-1 mode is not required.

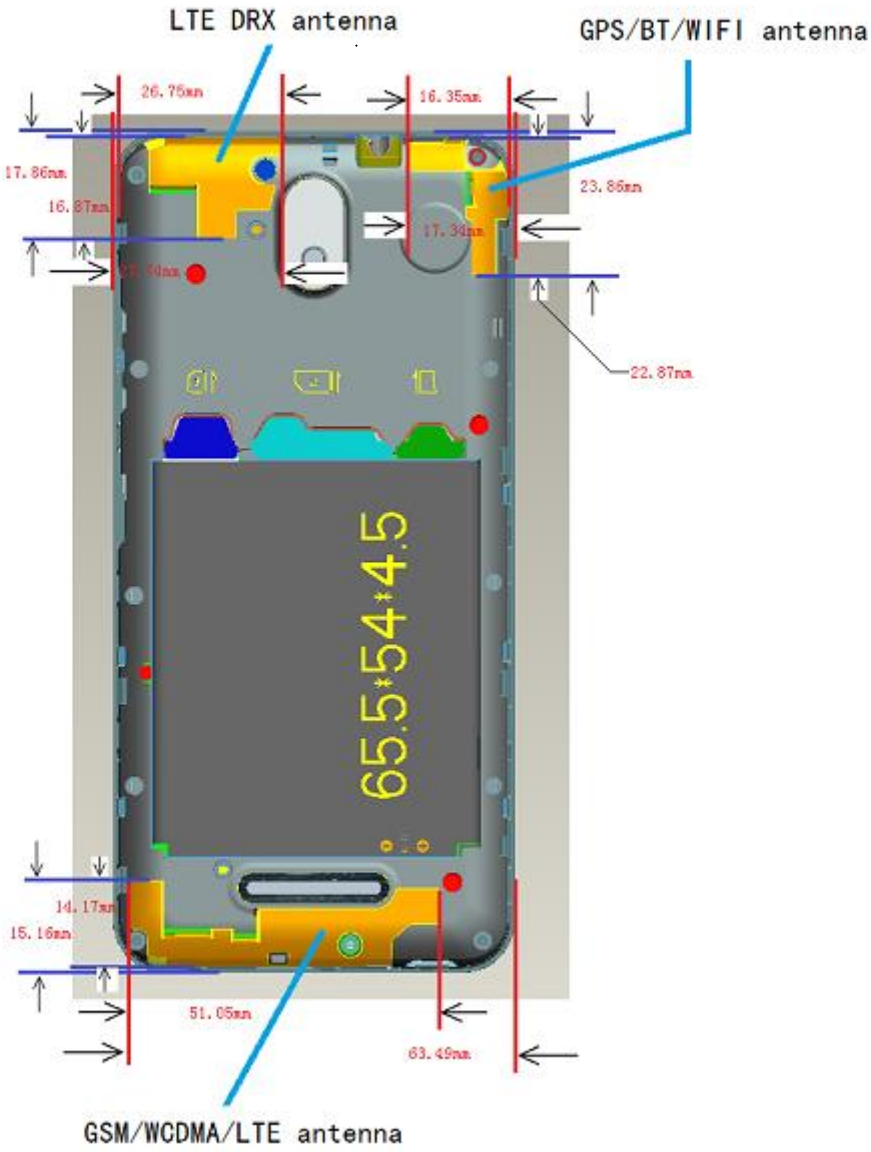
13. Simultaneous TX SAR Considerations

13.1. Introduction

The following procedures adopted from “FCC SAR Considerations for Cell Phones with Multiple Transmitters” are applicable to handsets with built-in unlicensed transmitters such as 802.11 a/b/g and Bluetooth devices which may simultaneously transmit with the licensed transmitter.

For this device, the BT and WiFi can transmit simultaneous with other transmitters.

13.2. Transmit Antenna Separation Distances



Picture 12.1 Antenna Locations

13.3. Standalone SAR Test Exclusion Considerations

Standalone 1-g head or body SAR evaluation by measurement or numerical simulation is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

The 1-g SAR test exclusion threshold 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

According to the KDB447498 appendix A, the SAR test exclusion threshold for 2450MHz at 5mm test separation distances is 10mW.

$$\frac{\text{(max. power of channel, including tune-up tolerance, mW)}}{\text{(min. test separation distance, mm)}} * \sqrt{\text{Frequency (GHz)}} \leqslant 3.0$$

Based on the above equation, Bluetooth SAR was not required:

Evaluation=1.987＜3.0

13.4. SAR Measurement Positions

According to the KDB941225 D06 Hot Spot SAR v01, the edges with less than 2.5 cm distance to the antennas need to be tested for SAR.

SAR Measurement Positions						
Antenna Mode	Phantom	Ground	Left	Right	Top	Bottom
WWAN	Yes	Yes	Yes	Yes	No	Yes
WLAN	Yes	Yes	No	Yes	Yes	No

14. SAR Test Result

Table 14.1: SAR Values(GSM 850 MHz Band-Head)

Frequency		Mode /Band	Side	Test Position	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.										
836.6	190	GSM850	Left	Touch	1	32.58	33	1.102	0.167	0.184	0.02
836.6	190	GSM850	Left	Tilt	/	32.58	33	1.102	0.06	0.066	0.03
836.6	190	GSM850	Right	Touch	/	32.58	33	1.102	0.153	0.169	-0.07
836.6	190	GSM850	Right	Tilt	/	32.58	33	1.102	0.077	0.085	0.12

Table 14.2: SAR Values (GSM 850 MHz Band-Body)

Frequency		Mode /Band	Service /Headset	Test Position	Spacing (mm)	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.											
Hotspot & Body worn												
836.6	190	GPRS 2TS	Class12	Toward Phantom	10	/	31.2	32	1.202	0.234	0.281	0.05
836.6	190	GPRS 2TS	Class12	Toward Ground	10	2	31.2	32	1.202	0.425	0.511	0.12
Hotspot												
836.6	190	GPRS 2TS	Class12	Toward Left	10	/	31.2	32	1.202	0.146	0.176	0.04
836.6	190	GPRS 2TS	Class12	Toward Right	10	/	31.2	32	1.202	0.091	0.109	0.13
836.6	190	GPRS 2TS	Class12	Toward Bottom	10	/	31.2	32	1.202	0.135	0.162	0.06

Table 14.3: SAR Values(GSM 1900 MHz Band-Head)

Frequency		Mode /Band	Side	Test Position	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.										
1850.2	512	GSM1900	Left	Touch	/	29.86	30	1.033	0.297	0.307	0.14
1850.2	512	GSM1900	Left	Tilt	/	29.86	30	1.033	0.109	0.113	-0.06
1850.2	512	GSM1900	Right	Touch	3	29.86	30	1.033	0.339	0.350	-0.11
1850.2	512	GSM1900	Right	Tilt	/	29.86	30	1.033	0.0915	0.094	0.08

Table 14.4: SAR Values (GSM 1900 MHz Band-Body)

Frequency		Mode /Band	Service /Headset	Test Position	Spacing (mm)	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.											
Hotspot & Body worn												
1850.2	512	GPRS 4TS	Class12	Toward Phantom	10	/	26.23	26.5	1.064	1.000	1.064	0.17
1909.8	810	GPRS 4TS	Class12	Toward Phantom	10	/	26.23	26.5	1.064	0.626	0.666	0.08
1880	661	GPRS 4TS	Class12	Toward Phantom	10	/	26.23	26.5	1.064	0.791	0.842	-0.02
1850.2	512	GPRS 4TS	Class12	Toward Ground	10	/	26.23	26.5	1.064	0.861	0.916	0.08
1909.8	810	GPRS 4TS	Class12	Toward Ground	10	/	26.01	26.5	1.119	0.903	1.011	0.07
1880	661	GPRS 4TS	Class12	Toward Ground	10	/	26.21	26.5	1.069	1.100	1.176	0.03
Hotspot												
1850.2	512	GPRS 4TS	Class12	Toward Left	10	/	26.23	26.5	1.064	0.791	0.842	-0.02
1850.2	512	GPRS 4TS	Class12	Toward Right	10	/	26.23	26.5	1.064	0.180	0.192	0.07
1850.2	512	GPRS 4TS	Class12	Toward Bottom	10	4	26.23	26.5	1.064	1.180	1.256	-0.03
1909.8	810	GPRS 4TS	Class12	Toward Bottom	10	/	26.01	26.5	1.119	0.820	0.918	0.07

1880	661	GPRS 4TS	Class12	Toward Bottom	10	/	26.21	26.5	1.069	0.642	0.686	0.05
Repeated												
1850.2	512	GPRS 4TS	Class12	Toward Bottom	10	/	26.23	26.5	1.064	1.080	1.149	-0.15

Table 14.5: SAR Values(WCDMA Band II-Head)

Frequency		Mode /Band	Side	Test Position	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.										
1880	9400	Band II	Left	Touch	/	22.21	22.5	1.069	0.252	0.269	0.19
1880	9400	Band II	Left	Tilt	/	22.21	22.5	1.069	0.0711	0.076	-0.11
1880	9400	Band II	Right	Touch	5	22.21	22.5	1.069	0.329	0.352	0.14
1880	9400	Band II	Right	Tilt	/	22.21	22.5	1.069	0.0835	0.089	0.04

Table 14.6: SAR Values (WCDMA Band II-Body)

Frequency		Mode /Band	Service /Headset	Test Position	Spacing (mm)	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.											
Hotspot & Body worn												
1880	9400	Band II	12.2kbps RMC	Toward Phantom	10	/	22.21	22.5	1.069	0.675	0.722	0.04
1880	9400	Band II	12.2kbps RMC	Toward Ground	10	/	22.21	22.5	1.069	0.506	0.541	0.10
Hotspot												
1880	9400	Band II	12.2kbps RMC	Toward Left	10	/	22.21	22.5	1.069	0.106	0.113	-0.01
1880	9400	Band II	12.2kbps RMC	Toward Right	10	/	22.21	22.5	1.069	0.175	0.187	0.10
1880	9400	Band II	12.2kbps RMC	Toward Bottom	10	/	22.21	22.5	1.069	0.814	0.870	0.00
1907.6	9538	Band II	12.2kbps RMC	Toward Bottom	10	/	22.12	22.5	1.091	0.832	0.908	0.05
1852.4	9262	Band II	12.2kbps RMC	Toward Bottom	10	/	22.36	22.5	1.033	0.880	0.909	0.09
Repeated												
1852.4	9262	Band II	12.2kbps RMC	Toward Bottom	10	6	22.36	22.5	1.033	0.918	0.948	0.09

Table 14.7: SAR Values(WCDMA Band V-Head)

Frequency		Mode /Band	Side	Test Position	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.										
836.6	4183	Band V	Left	Touch	7	22.49	23	1.125	0.171	0.192	0.07
836.6	4183	Band V	Left	Tilt	/	22.49	23	1.125	0.0836	0.094	0.08
836.6	4183	Band V	Right	Touch	/	22.49	23	1.125	0.157	0.177	0.08.
836.6	4183	Band V	Right	Tilt	/	22.49	23	1.125	0.0706	0.079	0.09

Table 14.8: SAR Values (WCDMA Band V-Body)

Frequency		Mode /Band	Service /Headset	Test Position	Spacing (mm)	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.											
Hotspot & Body worn												
836.6	4183	Band V	12.2kbps RMC	Toward Phantom	10	/	22.49	23	1.125	0.144	0.162	-0.02
836.6	4183	Band V	12.2kbps RMC	Toward Ground	10	/	22.49	23	1.125	0.231	0.260	0.02
846.6	4233	Band V	12.2kbps RMC	Toward Ground	10	8	22.40	23	1.148	0.257	0.295	-0.06
826.4	4132	Band V	12.2kbps RMC	Toward Ground	10	/	22.33	23	1.167	0.193	0.225	0.05
Hotspot												
836.6	4183	Band V	12.2kbps RMC	Toward Left	10	/	22.49	23	1.125	0.106	0.119	-0.03
836.6	4183	Band V	12.2kbps RMC	Toward Right	10	/	22.49	23	1.125	0.0643	0.072	0.10
836.6	4183	Band V	12.2kbps RMC	Toward Bottom	10	/	22.49	23	1.125	0.0702	0.079	0.13

Table 14.9: SAR Values (LTE Band 2 - Head)

Frequency		Configuration	Side	Test Position	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.										
1900	19100	QPSK_20MHz_1RB_ 50 offset High	Left	Touch	/	21.22	22	1.197	0.321	0.384	0.06
1900	19100	QPSK_20MHz_1RB_ 50 offset High	Left	Tilt	/	21.22	22	1.197	0.151	0.181	0.03
1900	19100	QPSK_20MHz_1RB_ 50 offset High	Right	Touch	9	21.22	22	1.197	0.360	0.431	0.08
1900	19100	QPSK_20MHz_1RB_ 50 offset High	Right	Tilt	/	21.22	22	1.197	0.151	0.181	0.01
1900	19100	QPSK_20MHz_50RB_ 25 offset High	Left	Touch	/	20.03	21	1.250	0.229	0.286	0.06
1900	19100	QPSK_20MHz_50RB_ 25 offset High	Left	Tilt	/	20.03	21	1.250	0.107	0.134	0.01
1900	19100	QPSK_20MHz_50RB_ 25 offset High	Right	Touch	/	20.03	21	1.250	0.268	0.335	0.04
1900	19100	QPSK_20MHz_50RB_ 25 offset High	Right	Tilt	/	20.03	21	1.250	0.110	0.138	0.07

Table 14.10: SAR Values (LTE Band 2 - Body)

Frequency		Configuration	Test Position	Spacing (mm)	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.										
Hotspot & Body worn											
1900	19100	QPSK_20MHz_1RB_ 50 offset High	Toward Phantom	10	/	21.22	22	1.197	0.753	0.901	0.03
1880	18900	QPSK_20MHz_1RB_ 50 offset Middle	Toward Phantom	10	/	21.03	22	1.250	0.701	0.876	0.01
1860	18700	QPSK_20MHz_1RB_ 50 offset Low	Toward Phantom	10	/	21.05	22	1.245	0.736	0.916	-0.02
1900	19100	QPSK_20MHz_1RB_ 50 offset High	Toward Ground	10	/	21.22	22	1.197	0.502	0.601	-0.08
1900	19100	QPSK_20MHz_50RB_ 25 offset High	Toward Phantom	10	/	20.03	21	1.250	0.546	0.683	-0.00
1900	19100	QPSK_20MHz_50RB_ 25 offset High	Toward Ground	10	/	20.03	21	1.250	0.362	0.453	-0.03
Hotspot											
1900	19100	QPSK_20MHz_1RB_ 50 offset High	Toward Left	10	/	21.22	22	1.197	0.114	0.136	0.02

1900	19100	QPSK_20MHz_1RB_ 50 offset High	Toward Right	10	/	21.22	22	1.197	0.192	0.230	0.15
1900	19100	QPSK_20MHz_1RB_ 50 offset High	Toward Bottom	10	/	21.22	22	1.197	0.714	0.854	-0.08
1880	18900	QPSK_20MHz_1RB_ 50 offset Middle	Toward Bottom	10	/	21.03	22	1.250	0.702	0.878	-0.15
1860	18700	QPSK_20MHz_1RB_ 50 offset Low	Toward Bottom	10	/	21.05	22	1.245	0.765	0.952	-0.10
1900	19100	QPSK_20MHz_50RB_ 25 offset High	Toward Left	10	/	20.03	21	1.250	0.0873	0.109	0.13
1900	19100	QPSK_20MHz_50RB_ 25 offset High	Toward Right	10	/	20.03	21	1.250	0.149	0.186	0.15
1900	19100	QPSK_20MHz_50RB_ 25 offset High	Toward Bottom	10	/	20.03	21	1.250	0.724	0.905	-0.02
1880	18900	QPSK_20MHz_50RB_ 25 offset Middle	Toward Bottom	10	/	19.78	21	1.324	0.803	1.063	0.05
1860	18700	QPSK_20MHz_50RB_ 25 offset Low	Toward Bottom	10	/	19.68	21	1.355	0.705	0.955	0.09
1880	18900	QPSK_20MHz_100RB_ 0 offset Middle	Toward Bottom	10	/	19.73	21	1.340	0.702	0.940	0.08
Repeated											
1880	18900	QPSK_20MHz_50RB_ 25 offset Middle	Toward Bottom	10	10	19.78	21	1.324	0.805	1.066	0.09

Table 14.11: SAR Values (LTE Band 7 - Head)

Frequency		Configuration	Side	Test Position	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.										
2535	21100	QPSK_20MHz_1RB_ 50 offset Middle	Left	Touch	/	18.62	19.5	1.225	0.096	0.118	0.03
2535	21100	QPSK_20MHz_1RB_ 50 offset Middle	Left	Tilt	/	18.62	19.5	1.225	0.064	0.078	0.07
2535	21100	QPSK_20MHz_1RB_ 50 offset Middle	Right	Touch	11	18.62	19.5	1.225	0.233	0.285	0.06
2535	21100	QPSK_20MHz_1RB_ 50 offset Middle	Right	Tilt	/	18.62	19.5	1.225	0.039	0.048	-0.15
2535	21100	QPSK_20MHz_50RB_ 50 offset Middle	Left	Touch	/	17.72	18.5	1.197	0.090	0.108	0.01
2535	21100	QPSK_20MHz_50RB_ 50 offset Middle	Left	Tilt	/	17.72	18.5	1.197	0.049	0.059	0.01
2535	21100	QPSK_20MHz_50RB_ 50 offset Middle	Right	Touch	/	17.72	18.5	1.197	0.181	0.217	0.02
2535	21100	QPSK_20MHz_50RB_ 25 offset Middle	Right	Tilt	/	17.72	18.5	1.197	0.030	0.036	0.03

Table 14.12: SAR Values (LTE Band 7 - Body)

Frequency MHz	Frequency Ch.	Configuration	Test Position	Spacing (mm)	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Hotspot & Body worn											
2535	21100	QPSK_20MHz_1RB_ 50 offset Middle	Toward Phantom	10	/	18.62	19.5	1.225	0.364	0.446	0.07
2535	21100	QPSK_20MHz_1RB_ 50 offset Middle	Toward Ground	10	/	18.62	19.5	1.225	0.660	0.808	0.18
2535	21100	QPSK_20MHz_50RB_ 50 offset Middle	Toward Phantom	10	/	17.72	18.5	1.197	0.282	0.337	0.16
2535	21100	QPSK_20MHz_50RB_ 50 offset Middle	Toward Ground	10	/	17.72	18.5	1.197	0.517	0.619	0.07
Hotspot											
2535	21100	QPSK_20MHz_1RB_ 50 offset Middle	Toward Left	10	/	18.62	19.5	1.225	0.054	0.066	0.13
2535	21100	QPSK_20MHz_1RB_ 50 offset Middle	Toward Right	10	/	18.62	19.5	1.225	0.090	0.110	-0.11
2535	21100	QPSK_20MHz_1RB_ 50 offset Middle	Toward Bottom	10	/	18.62	19.5	1.225	0.993	1.216	-0.07
2510	20850	QPSK_20MHz_1RB_ 50 offset Low	Toward Bottom	10	12	18.60	19.5	1.230	1.05	1.292	0.07
2560	21350	QPSK_20MHz_1RB_ 50 offset High	Toward Bottom	10	/	18.61	19.5	1.227	0.939	1.153	-0.06
2535	21100	QPSK_20MHz_50RB_ 50 offset Middle	Toward Left	10	/	17.72	18.5	1.197	0.042	0.050	-0.14
2535	21100	QPSK_20MHz_50RB_ 50 offset Middle	Toward Right	10	/	17.72	18.5	1.197	0.069	0.083	-0.07
2535	21100	QPSK_20MHz_50RB_ 50 offset Middle	Toward Bottom	10	/	17.72	18.5	1.197	0.776	0.929	0.11
2510	20850	QPSK_20MHz_50RB_ 50 offset Low	Toward Bottom	10	/	17.71	18.5	1.199	0.764	0.916	0.12
2560	21350	QPSK_20MHz_50RB_ 50 offset High	Toward Bottom	10	/	17.71	18.5	1.199	0.821	0.985	0.14
2535	21100	QPSK_20MHz_100RB_ 0 offset Middle	Toward Bottom	10	/	17.63	18.5	1.222	0.828	1.012	0.09
Repeated											
2510	20850	QPSK_20MHz_1RB_ 50 offset Low	Toward Bottom	10	/	18.60	19.5	1.230	1.05	1.292	0.09

Table 14.13: SAR Values (WiFi 802.11b - Head)

Frequency		Mode /Band	Side	Test Position	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.										
2412	1	WiFi 2450	Left	Touch	/	19.32	19.5	1.042	0.206	0.215	-0.18
2412	1	WiFi 2450	Left	Tilt	/	19.32	19.5	1.042	0.127	0.132	0.12
2412	1	WiFi 2450	Right	Touch	/	19.32	19.5	1.042	0.336	0.350	0.14
2412	1	WiFi 2450	Right	Tilt	/	19.32	19.5	1.042	0.208	0.217	0.15
2462	11	WiFi 2450	Right	Touch	13	19.02	19.5	1.117	0.364	0.407	0.12
2437	6	WiFi 2450	Right	Touch	/	18.97	19.5	1.130	0.348	0.393	0.03

Table 14.14: SAR Values (WiFi 802.11b - Body)

Frequency		Mode /Band	Service /Headset	Test Position	Spacing (mm)	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.											
Hotspot & Body worn												
2412	1	WiFi 2450	802.11b	Toward Phantom	10	/	19.32	19.5	1.042	0.0546	0.057	0.04
2412	1	WiFi 2450	802.11b	Toward Ground	10	/	19.32	19.5	1.042	0.0758	0.079	0.01
2462	11	WiFi 2450	802.11b	Toward Ground	10	/	19.02	19.5	1.117	0.0848	0.095	0.12
2437	6	WiFi 2450	802.11b	Toward Ground	10	14	18.97	19.5	1.130	0.0968	0.109	0.03
Hotspot												
2412	1	WiFi 2450	802.11b	Toward Left	10	/	19.32	19.5	1.042	0.0420	0.044	0.01
2412	1	WiFi 2450	802.11b	Toward Right	10	/	19.32	19.5	1.042	0.00849	0.009	0.09
2412	1	WiFi 2450	802.11b	Toward Top	10	12	19.32	19.5	1.042	0.0368	0.038	-0.01

Table 14.15: SAR Values (WiFi 802.11n - Head)

Frequency		Mode /Band	Side	Test Position	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.										
5270	54	WiFi U-NII-2A	Left	Touch	/	13.85	14	1.035	0.076	0.079	0.03
5270	54	WiFi U-NII-2A	Left	Tilt	/	13.85	14	1.035	0.073	0.076	0.01
5270	54	WiFi U-NII-2A	Right	Touch	15	13.85	14	1.035	0.212	0.219	0.03
5270	54	WiFi U-NII-2A	Right	Tilt	/	13.85	14	1.035	0.147	0.152	0.05

Table 14.16: SAR Values (WiFi 802.11n - Body)

Frequency		Mode /Band	Service /Headset	Test Position	Spacing (mm)	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.											
Hotspot & Body worn												
5270	54	WiFi U-NII-2A	802.11n	Toward Phantom	10	/	13.85	14	1.035	0.09	0.093	-0.03
5270	54	WiFi U-NII-2A	802.11n	Toward Ground	10	/	13.85	14	1.035	0.087	0.090	0.03
Hotspot												
5270	54	WiFi U-NII-2A	802.11n	Toward Left	10	16	13.85	14	1.035	0.116	0.120	-0.01
5270	54	WiFi U-NII-2A	802.11n	Toward Right	10	/	13.85	14	1.035	<0.01	<0.01	0.01
5270	54	WiFi U-NII-2A	802.11n	Toward Top	10	/	13.85	14	1.035	0.044	0.046	-0.03

Table 14.17: SAR Values (WiFi 802.11n - Head)

Frequency		Mode /Band	Side	Test Position	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.										
5510	102	WiFi U-NII-2C	Left	Touch	/	12.78	14	1.324	0.046	0.061	0.01
5510	102	WiFi U-NII-2C	Left	Tilt	/	12.78	14	1.324	0.038	0.050	0.02
5510	102	WiFi U-NII-2C	Right	Touch	17	12.78	14	1.324	0.12	0.159	0.04
5510	102	WiFi U-NII-2C	Right	Tilt	/	12.78	14	1.324	0.106	0.140	-0.03

Table 14.18: SAR Values (WiFi 802.11n - Body)

Frequency		Mode /Band	Service /Headset	Test Position	Spacing (mm)	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.											
Hotspot & Body worn												
5510	102	WiFi U-NII-2C	802.11N	Toward Phantom	10	/	12.78	14	1.324	<0.01	<0.01	0.02
5510	102	WiFi U-NII-2C	802.11N	Toward Ground	10	/	12.78	14	1.324	0.03	0.040	-0.03
Hotspot												
5510	102	WiFi U-NII-2C	802.11N	Toward Left	10	18	12.78	14	1.324	0.04	0.053	0.01
5510	102	WiFi U-NII-2C	802.11N	Toward Right	10	/	12.78	14	1.324	<0.01	<0.01	0.03
5510	102	WiFi U-NII-2C	802.11N	Toward Top	10	/	12.78	14	1.324	0.009	0.012	0.01

Table 14.19: SAR Values (WiFi 802.11n - Head)

Frequency		Mode /Band	Side	Test Position	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.										
5755	151	WiFi U-NII-3	Left	Touch	/	12.26	14	1.493	0.052	0.078	0.01
5755	151	WiFi U-NII-3	Left	Tilt	/	12.26	14	1.493	<0.01	<0.01	0.03
5755	151	WiFi U-NII-3	Right	Touch	19	12.26	14	1.493	0.077	0.115	0.01
5755	151	WiFi U-NII-3	Right	Tilt	/	12.26	14	1.493	0.070	0.105	0.01

Table 14.20: SAR Values (WiFi 802.11n - Body)

Frequency		Mode /Band	Service /Headset	Test Position	Spacing (mm)	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.											
Hotspot & Body worn												
5755	151	WiFi U-NII-3	802.11N	Toward Phantom	10	/	12.26	14	1.493	<0.01	<0.01	-0.03
5755	151	WiFi U-NII-3	802.11N	Toward Ground	10	/	12.26	14	1.493	0.035	0.052	0.01
Hotspot												
5755	151	WiFi U-NII-3	802.11N	Toward Left	10	20	12.26	14	1.493	0.036	0.054	0.00
5755	151	WiFi U-NII-3	802.11N	Toward Right	10	/	12.26	14	1.493	<0.01	<0.01	0.05
5755	151	WiFi U-NII-3	802.11N	Toward Top	10	/	12.26	14	1.493	0.011	0.016	0.03

15. Simultaneous TX SAR Considerations

Table15.1 Simultaneous transmission SAR

Standalone SAR for 2G(W/Kg)					
Test Position			GSM 850	GSM 1900	Highest SAR
Head	Left	Cheek	0.184	0.307	0.307
		Tilt 15°	0.066	0.113	0.113
	Right	Cheek	0.169	0.350	0.35
		Tilt 15°	0.085	0.094	0.094
Hotspot &Body-worn 10 mm	Phantom Side		0.281	1.064	1.064
	Ground Side		0.511	1.176	1.176
Hotspot 10 mm	Left Side		0.176	0.842	0.842
	Right Side		0.109	0.192	0.192
	Top Side		--	--	--
	Bottom Side		0.162	1.256	1.256

Standalone SAR for 3G(W/Kg)					
Test Position			WCDMA Band II	WCDMA BandV	Highest SAR
Head	Left	Cheek	0.269	0.192	0.269
		Tilt 15°	0.076	0.094	0.094
	Right	Cheek	0.352	0.177	0.352
		Tilt 15°	0.089	0.079	0.089
Hotspot &Body-worn 10 mm	Phantom Side		0.722	0.162	0.722
	Ground Side		0.541	0.295	0.541
Hotspot 10 mm	Left Side		0.113	0.119	0.119
	Right Side		0.187	0.072	0.187
	Top Side		--	--	--
	Bottom Side		0.948	0.079	0.948

Standalone SAR for 4G (W/Kg)					
Test Position			LTE Band 2	LTE Band 7	Highest SAR
Head	Left	Cheek	0.384	0.118	0.384
		Tilt 15°	0.181	0.078	0.181
	Right	Cheek	0.431	0.285	0.431
		Tilt 15°	0.181	0.048	0.181
Hotspot &Body- worn 10 mm	Phantom Side		0.916	0.446	0.916
	Ground Side		0.601	0.808	0.808
Hotspot 10 mm	Left Side		0.136	0.066	0.136
	Right Side		0.230	0.110	0.23
	Top Side		--	--	--
	Bottom Side		1.066	1.292	1.292

Simultaneous multi-band transmission									
Test Position			2G	3G	4G	2.4GHz		5GHz	SUM
						BT	WiFi	WiFi	
Head(1g)	Left	Cheek	0.307	0.269	0.384	0.265	0.407	0.079	0.791
		Tilt 15°	0.113	0.094	0.181	0.265	0.132	0.076	0.446
	Right	Cheek	0.35	0.352	0.431	0.265	0.350	0.219	0.781
		Tilt 15°	0.094	0.089	0.181	0.265	0.217	0.152	0.446
Hotspot &Body-worn 10 mm(1g)	Phantom Side		1.064	0.722	0.916	0.132	0.057	0.093	1.196
	Ground Side		1.176	0.541	0.808	0.132	0.109	0.090	1.308
Hotspot 10 mm(1g)	Left Side		0.842	0.119	0.136	0.132	0.044	0.120	0.974
	Right Side		0.192	0.187	0.23	0.132	0.009	0.01	0.362
	Top Side		--	--	--	0.132	0.038	0.046	0.132
	Bottom Side		1.256	0.948	1.292	0.132	--	--	1.424

According to the conducted power measurement result, we can draw the conclusion that: stand-alone SAR for WiFi should be performed. Then, simultaneous transmission SAR for WiFi/BT is considered with measurement results of GSM/WCDMA/LTE/CDMA and WiFi/BT. According to the above table, the sum of reported SAR values for GSM/WCDMA/LTECDMA and WiFi<1.6W/kg. So the simultaneous transmission SAR is not required for WiFi/BT transmitter.

16. SAR Measurement Variability

SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium.

The following procedures are applied to determine if repeated measurements are required.

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps2) through 4) do not apply.

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

3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45W/kg (~ 10% from the 1-g SAR limit).

4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

Table 16.1: SAR Measurement Variability for Body Value (1g)

Frequency		Configuration	Test Position	Original SAR (W/kg)	First Repeated SAR (W/kg)	The Ratio
MHz	Ch.					
1850.2	512	GPRS 4TS	Bottom	1.180	1.080	1.093
1852.4	9262	12.2kbps RMC	Bottom	0.880	0.918	1.043
1880	18900	QPSK_20MHz_50RB_ 25 offset Middle	Bottom	0.803	0.805	1.002
2510	20850	QPSK_20MHz_1RB_ 50 offset Low	Bottom	1.05	1.05	1.000

Note: According to the KDB 865664 D01repeated measurement is not required when the original highest measured SAR is < 0.8 W/kg.

17. Test Equipments Utilized

17.1. SAR Test System

Item.	Instrument Name	Type	Serial Number	Manufacturer	Calibration Date	Valid Period
01	Network analyzer	N5242A	MY51221755	Agilent	Dec 17, 2018	1 year
02	Power meter	NRVD	102257	RS	May 11, 2018	1 year
03	Power sensor	NRV-Z5	100241			
			100644			
04	Signal Generator	E4438C	MY49072044	Agilent	May 11, 2018	1 Year
05	Amplifier	NTWPA-0086010F	12023024	rflight	No Calibration Requested	
06	Coupler	778D	MY4825551	Agilent	May 11, 2018	1 year
07	BTS	E5515C	MY50266468	Agilent	Dec 17, 2018	1 year
		MT8820C	6201240338	Anritsu	Dec 17, 2018	1 year
08	E-field Probe	ES3DV3	3252	SPEAG	Sep 4,2018	1 year
		EX3DV4	7401	SPEAG	Jan 5,2019	1 year
09	DAE	SPEAG DAE4	1244	SPEAG	Dec 13, 2018	1 year
10	Dipole Validation Kit	SPEAG D835V2	4d112	SPEAG	Oct 25,2018	3 year
		SPEAG D1900V2	5d151	SPEAG	Dec 6,2017	3 year
		SPEAG D2450V2	858	SPEAG	Oct 26,2018	3 year
		SPEAG D2600V2	1031	SPEAG	Nov 1,2018	3 year
		SPEAG D5GHzV2	1172	SPEAG	Mar 30,2018	3 year

18. Measurement Uncertainty

Measurement uncertainty evaluation for SAR test

Error Description	Unc. value, ±%	Prob. Dist.	Div.	c_i 1g	c_i 10g	Std.Unc. ±%,1g	Std.Unc. ±%,10g	V_i V_{eff}
Measurement System								
Probe Calibration	6.0	N	1	1	1	6.0	6.0	∞
Axial Isotropy	0.5	R	$\sqrt{3}$	0.7	0.7	0.2	0.2	∞
Hemispherical Isotropy	2.6	R	$\sqrt{3}$	0.7	0.7	1.1	1.1	∞
Boundary Effects	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
Linearity	0.6	R	$\sqrt{3}$	1	1	0.3	0.3	∞
System Detection Limits	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
Readout Electronics	0.7	N	1	1	1	0.7	0.7	∞
Response Time	0	R	$\sqrt{3}$	1	1	0	0	∞
Integration Time	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
RF Ambient Noise	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
RF Ambient Reflections	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
Probe Positioner	1.5	R	$\sqrt{3}$	1	1	0.9	0.9	∞
Probe Positioning	2.9	R	$\sqrt{3}$	1	1	1.7	1.7	∞
Max. SAR Eval.	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
Test Sample Related								
Device Positioning	2.9	N	1	1	1	2.9	2.9	145
Device Holder	3.6	N	1	1	1	3.6	3.6	5
Phantom and Setup								
Phantom Uncertainty	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
Liquid Conductivity (target)	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (meas.)	2.5	N	1	0.64	0.43	1.6	1.1	∞
Liquid Permittivity (target)	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (meas.)	2.5	N	1	0.6	0.49	1.5	1.2	∞
Combined Std. Uncertainty		RSS				9.27	9.07	
Expanded STD Uncertainty		k=2				18.53	18.14	

Measurement uncertainty evaluation for system validation

Error Description	Unc. value, ±%	Prob. Dist.	Div.	c_i 1g	c_i 10g	Std.Unc. ±%,1g	Std.Unc. ±%,10g	V_i V_{eff}
Measurement System								
Probe Calibration	6.0	N	1	1	1	6.0	6.0	∞
Axial Isotropy	0.5	R	$\sqrt{3}$	0.7	0.7	0.2	0.2	∞
Hemispherical Isotropy	2.6	R	$\sqrt{3}$	0.7	0.7	1.1	1.1	∞
Boundary Effects	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
Linearity	0.6	R	$\sqrt{3}$	1	1	0.3	0.3	∞
System Detection Limits	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
Readout Electronics	0.7	N	1	1	1	0.7	0.7	∞
Response Time	0	R	$\sqrt{3}$	1	1	0	0	∞
Integration Time	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
RF Ambient Noise	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
RF Ambient Reflections	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
Probe Positioner	1.5	R	$\sqrt{3}$	1	1	0.9	0.9	∞
Probe Positioning	2.9	R	$\sqrt{3}$	1	1	1.7	1.7	∞
Max. SAR Eval.	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
Diople								
Power Drift	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
Dipole Positioning	2.0	N	1	1	1	2.0	2.0	∞
Dipole Input Power	5.0	N	1	1	1	5.0	5.0	∞
Phantom and Setup								
Phantom Uncertainty	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
Liquid Conductivity (target)	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (meas.)	2.5	N	1	0.64	0.43	1.6	1.1	∞
Liquid Permittivity (target)	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (meas.)	2.5	N	1	0.6	0.49	1.5	1.2	∞
Combined Std Uncertainty						±11.2%	±10.9%	387
Expanded Std Uncertainty						**±22.4%**	**±21.8%**	

Measurement uncertainty evaluation for Fast SAR test

Error Description	Unc. value, ±%	Prob. Dist.	Div.	ci	ci	Std.Unc.	Std.Unc.	Vi
				1g	10g	±%,1g	±%,10g	veff
Probe Calibration	6	N	1	1	1	6.00	6.00	∞
Axial Isotropy	0.5	R	√3	0.7	0.7	0.20	0.20	∞
Hemispherical Isotropy	2.6	R	√3	1	1	1.50	1.50	∞
Boundary Effects	0.8	R	√3	0.7	0.7	0.32	0.32	∞
Linearity	0.6	R	√3	1	1	0.35	0.35	∞
System Detection Limits	1	R	√3	1	1	0.58	0.58	∞
Readout Electronics	0.7	R	√3	1	1	0.40	0.40	∞
Response Time	0	N	1	1	1	0.00	0.00	∞
Integration Time	2.6	R	√3	1	1	1.50	1.50	∞
RF Ambient Noise	3	R	√3	1	1	1.73	1.73	∞
RF Ambient Reflections	3	R	√3	1	1	1.73	1.73	∞
Probe Positioner	1.5	R	√3	1	1	0.87	0.87	∞
Probe Positioning	2.9	R	√3	1	1	1.67	1.67	∞
Max. SAR Eval.	1	R	√3	1	1	0.58	0.58	∞
Fast SAR z-Approximation	7	R	√3	1	1	4.04	4.04	∞
Test sample Related								
Test sample Positioning	2.9	N	1	1	1	2.9	2.9	145
Device Holder Uncertainty	3.6	N	1	1	1	3.6	3.6	5
Phantom and Tissue Parameters								
Phantom Uncertainty	4	R	√3	1	1	2.31	2.31	∞
Liquid Conductivity (target)	5	R	√3	0.64	0.43	1.85	1.24	∞
Liquid Conductivity (meas)	2.5	N	1	0.64	0.43	0.92	0.62	∞
Liquid Permittivity (target)	5	R	√3	0.6	0.49	1.73	1.41	∞
Liquid Permittivity (meas)	2.5	N	1	0.6	0.49	0.87	0.71	∞
Combined Std. Uncertainty		RSS				**10.11**	**9.93**	
Expanded STD Uncertainty		k=2				**20.22**	**19.86**	

END OF REPORT BODY

ANNEX A. Graph Results

Fig.1 GSM 850 Left Cheek Middle

Date/Time: 2019/4/3
Electronics: DAE4 Sn1244
Medium parameters used: f = 837 MHz; σ = 0.94 S/m; ε_r = 42.935; ρ = 1000 kg/m^3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: GSM Professional 900MHz; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3252ConvF(6.36, 6.36, 6.36); Calibrated: 9/4/2018
GSM 850 Left Cheek Middle/Area Scan (101x51x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.181 W/kg
GSM 850 Left Cheek Middle/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.520 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.205 W/kg
SAR(1 g) = 0.167 W/kg; SAR(10 g) = 0.128 W/kg
Maximum value of SAR (measured) = 0.174 W/kg

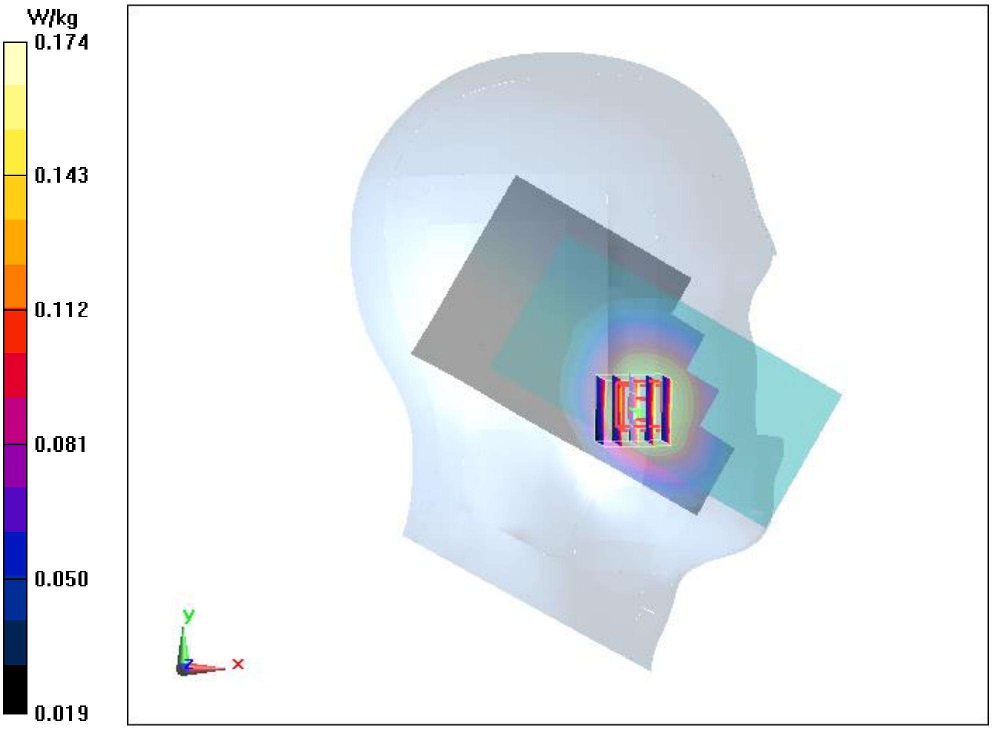


Fig.2 GSM 850 2TS Ground Mode Middle 10mm

Date/Time: 2019/4/3
Electronics: DAE4 Sn1244
Medium parameters used: f = 837 MHz; σ = 0.999 S/m; ε_r = 56.646; ρ = 1000 kg/m^3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: GSM 900MHz GPRS 2TS (0); Frequency: 836.6 MHz; Duty Cycle: 1:4
Probe: ES3DV3 - SN3252ConvF(6.34, 6.34, 6.34); Calibrated: 9/4/2018
GSM 850 2TS Ground Mode Middle 10mm/Area Scan (61x101x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.531 W/kg
GSM 850 2TS Ground Mode Middle 10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.73 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.757 W/kg
SAR(1 g) = 0.425 W/kg; SAR(10 g) = 0.256 W/kg
Maximum of SAR (measured) = 0.466 W/kg

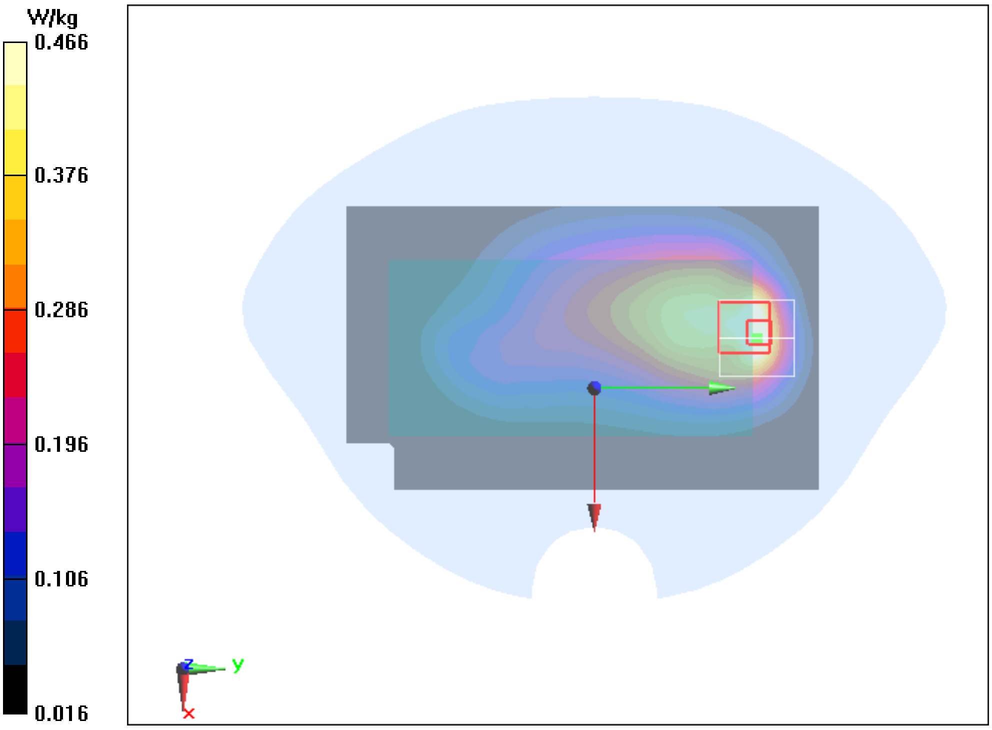


Fig.3 GSM1900MHz Head Right Cheek Middle

Date/Time: 2019/4/12
Electronics: DAE4 Sn1244
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.352 S/m; εr = 39.131; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: GSM 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3252ConvF(5.18, 5.18, 5.18); Calibrated: 9/4/2018
Low Cheek Right GSM 1900MHz/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.350 W/kg
Low Cheek Right GSM 1900MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.952 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.521 W/kg
SAR(1 g) = 0.339 W/kg; SAR(10 g) = 0.211 W/kg.
Maximum value of SAR (measured) = 0.366 W/kg

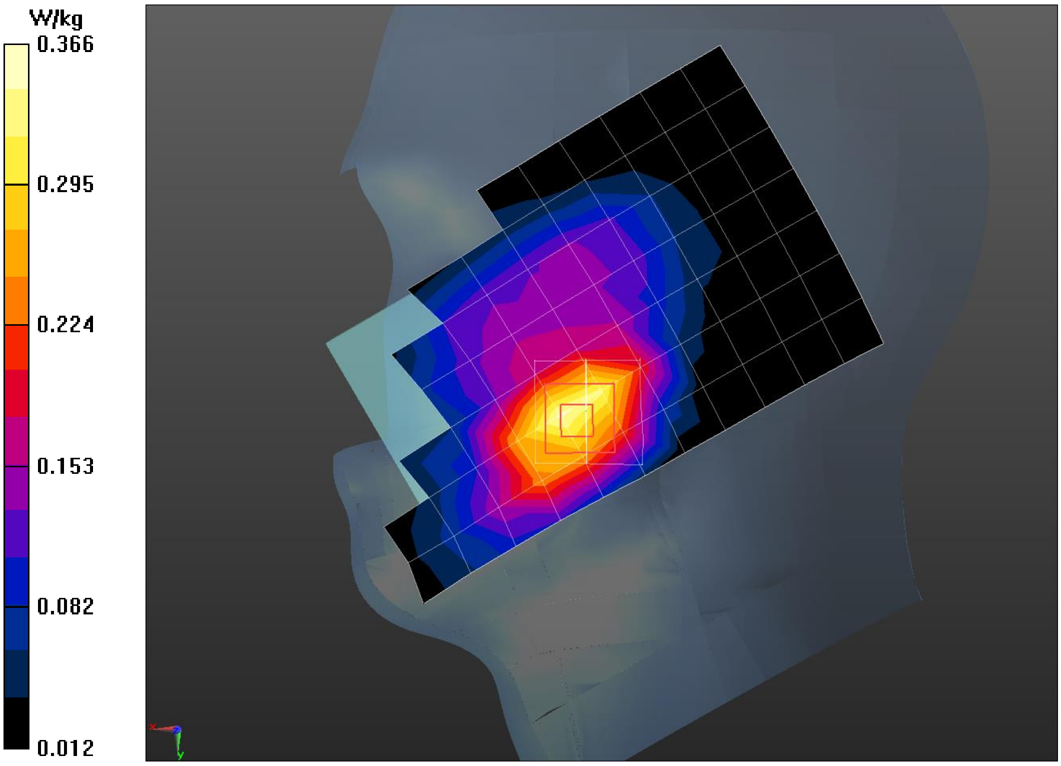


Fig.4 GPRS1900 4TS Bottom Mode Low

Date/Time: 2019/4/26
Electronics: DAE4 Sn1244
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.505 S/m; ε_r = 52.239; ρ = 1000 kg/m^3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: GSM 1800MHz GPRS 4TS (0); Frequency: 1850.2 MHz; Duty Cycle: 1:2
Probe: ES3DV3 - SN3252ConvF(4.77, 4.77, 4.77); Calibrated: 9/4/2018
GPRS1900 4TS Bottom Mode Low/Area Scan (41x61x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.947 W/kg
GPRS1900 4TS Bottom Mode Low/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 27.51 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 2.05 W/kg
SAR(1 g) = 1.18 W/kg; SAR(10 g) = 0.622 W/kg
Maximum value of SAR (measured) = 1.36 W/kg

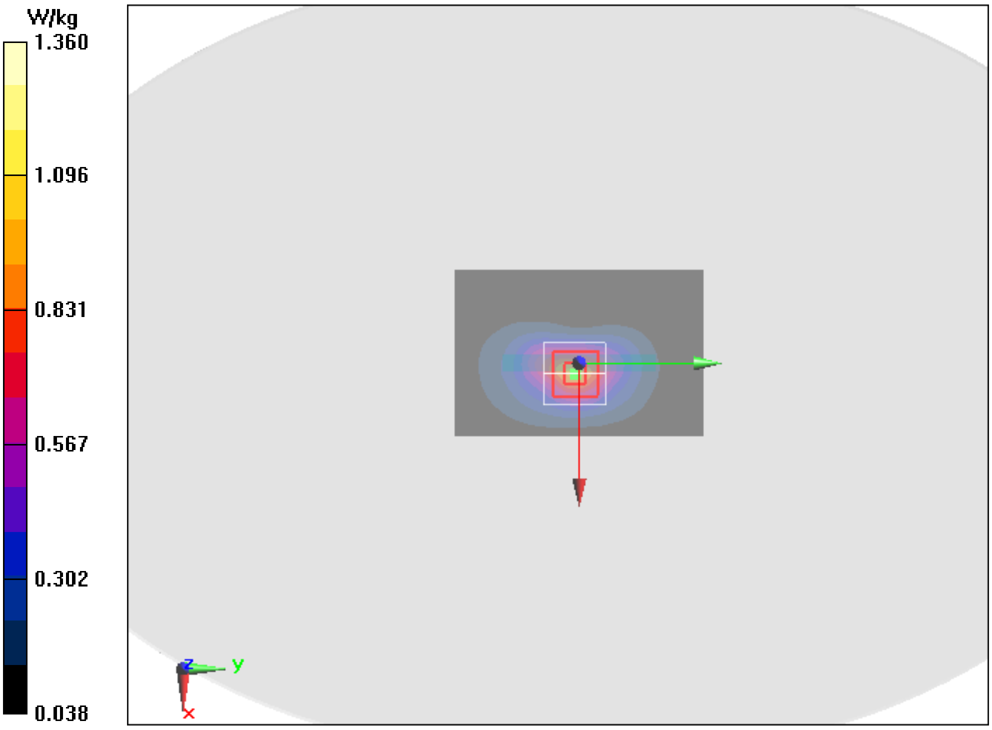


Fig.5 WCDMA Band II Head Right Cheek High

Date/Time: 2019/4/16
Electronics: DAE4 Sn1244
Medium parameters used: f = 1880 MHz; σ = 1.378 S/m; εr = 39.039; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: WCDMA Band 2; Frequency: 1880 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(5.18, 5.18, 5.18); Calibrated: 9/4/2018
Middle Cheek Right WCDMA Band II/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.349 W/kg
Middle Cheek Right WCDMA Band II/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.326 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.519 W/kg
SAR(1 g) = 0.329 W/kg; SAR(10 g) = 0.201 W/kg
Maximum value of SAR (measured) = 0.359 W/kg

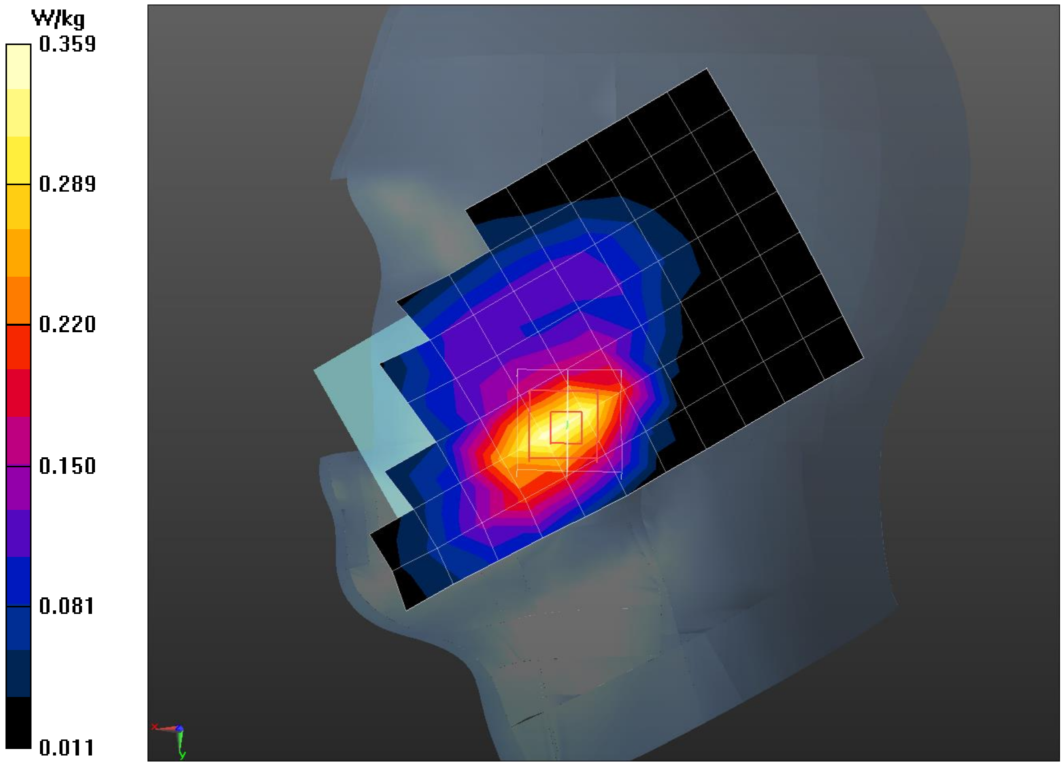


Fig.6 WCDMA B2 Bottom Mode Low Repeated

Date/Time: 2019/4/26
Electronics: DAE4 Sn1244
Medium parameters used (extrapolated): f = 1852.4 MHz; σ = 1.437 S/m; ε_r = 52.455; ρ = 1000 kg/m^3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: WCDMA Professional Band Ⅱ; Frequency: 1852.4 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.77, 4.77, 4.77); Calibrated: 9/4/2018

WCDMA B2 Bottom Mode Low Repeated/Area Scan (41x61x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.826 W/kg

WCDMA B2 Bottom Mode Low Repeated/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.51 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 1.60 W/kg
SAR(1 g) = 0.918 W/kg; SAR(10 g) = 0.484 W/kg
Maximum value of SAR (measured) = 0.991 W/kg

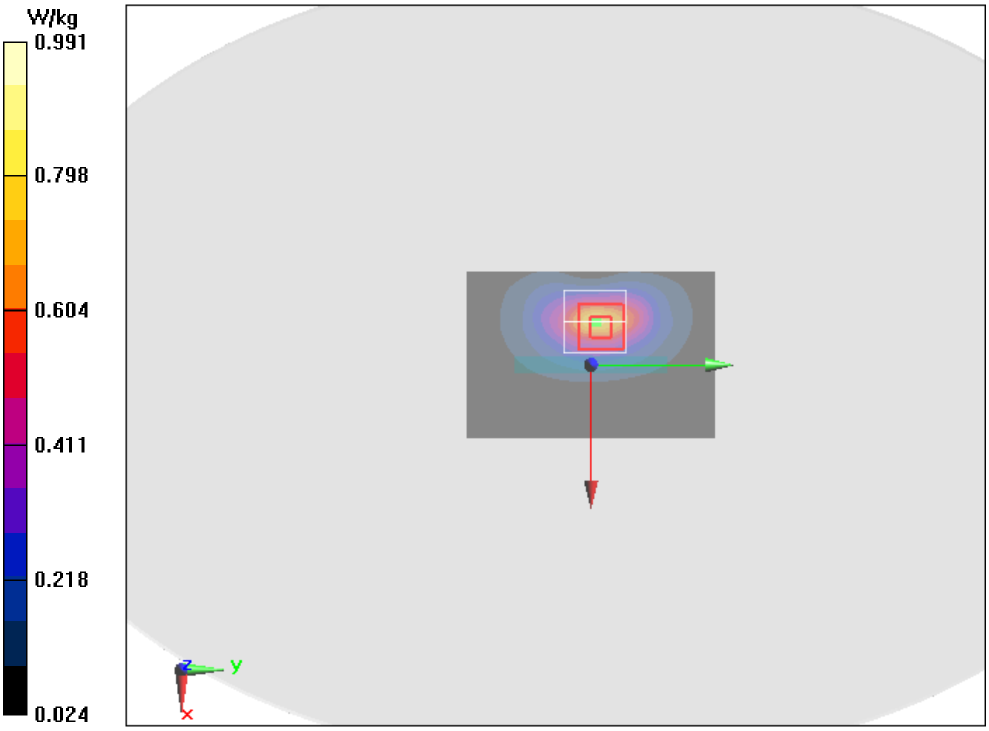


Fig.7 WCDMA Band V Head Left Cheek High

Date/Time: 2019/4/17
Electronics: DAE4 Sn1244
Medium parameters used: f = 837 MHz; σ = 0.889 S/m; εr = 41.018; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃　　Liquid Temperature:22.5 ℃
Communication System: WCDMA Band 5; Frequency: 836.6 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(6.36, 6.36, 6.36); Calibrated: 9/4/2018
Middle Cheek Left WCDMA Band V/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.177 W/kg
Middle Cheek Left WCDMA Band V/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.846 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.210 W/kg
SAR(1 g) = 0.171 W/kg; SAR(10 g) = 0.130 W/kg
Maximum value of SAR (measured) = 0.179 W/kg

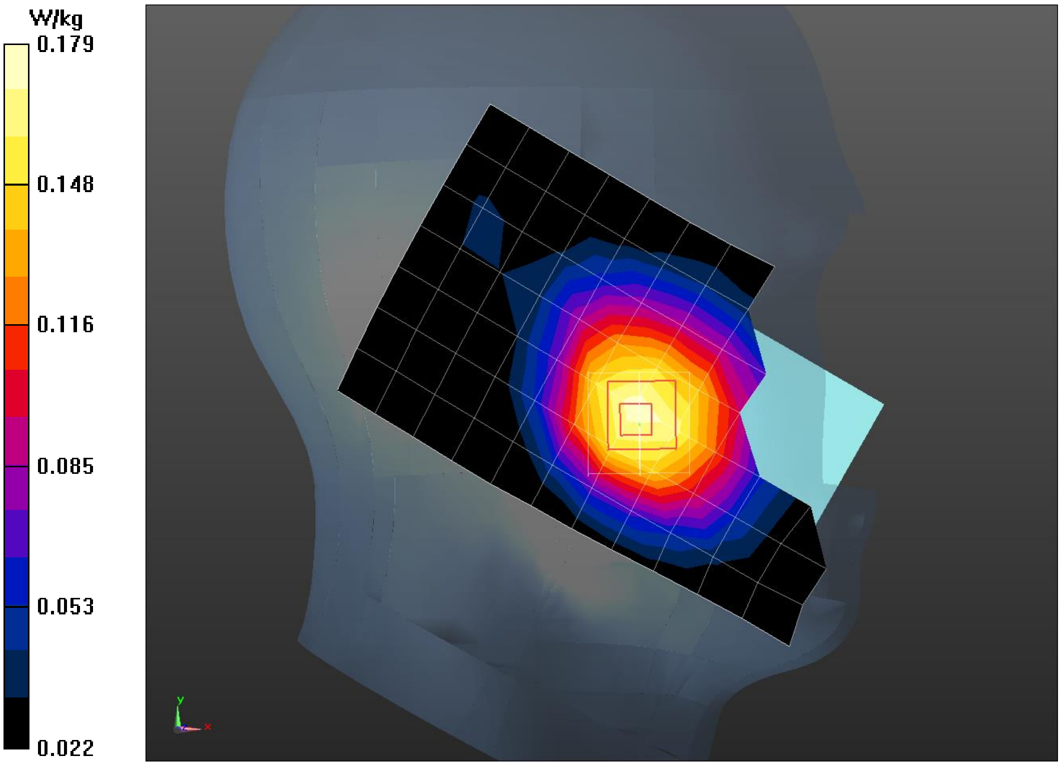


Fig.8 WCDMA Band V Body Toward Ground High

Date/Time: 2019/4/18
Electronics: DAE4 Sn1244
Medium parameters used: f = 847 MHz; σ = 0.981 S/m; εr = 56.327; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: WCDMA Band 5; Frequency: 846.6 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(6.34, 6.34, 6.34); Calibrated: 9/4/2018
High Toward Ground WCDMA Band V/Area Scan (12x20x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.268 W/kg
High Toward Ground WCDMA Band V/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.41 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.359 W/kg
SAR(1 g) = 0.257 W/kg; SAR(10 g) = 0.185 W/kg
Maximum value of SAR (measured) = 0.273 W/kg

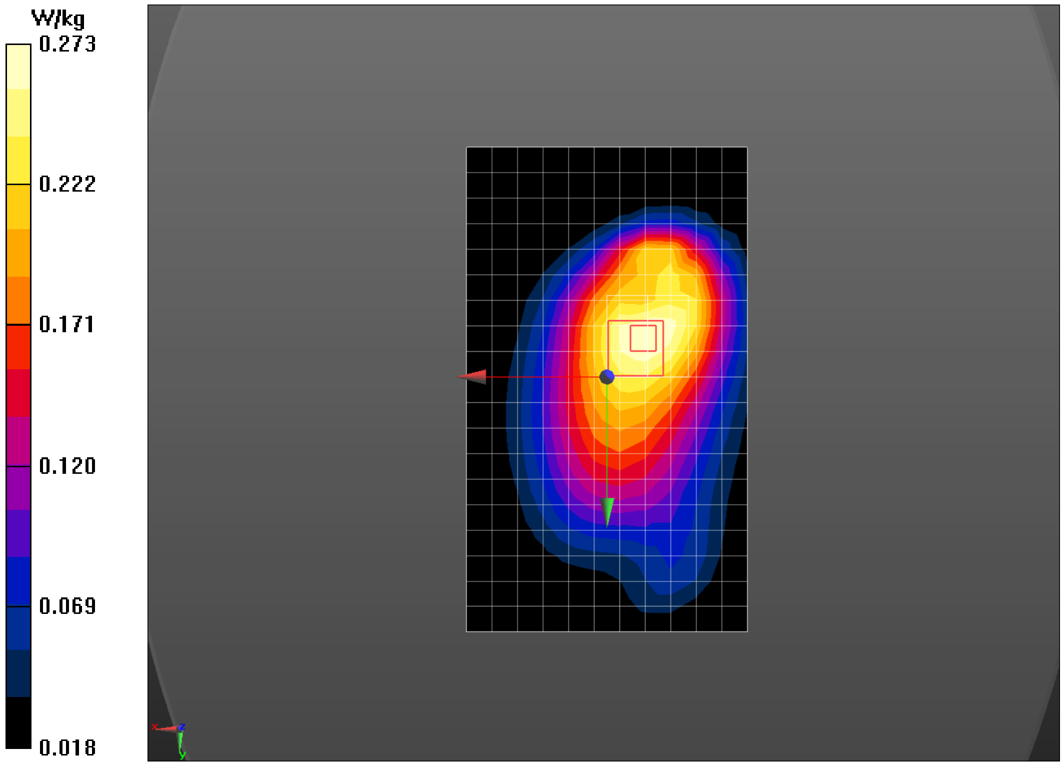


Fig.9 LTE Band 2 Head Right Cheek High

Date/Time: 2019/4/12
Electronics: DAE4 Sn1244
Medium parameters used: f = 1900 MHz; σ = 1.397 S/m; εr = 38.956; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃   Liquid Temperature:22.5 ℃
Communication System: LTE Band 2 ; Frequency: 1900 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(5.18, 5.18, 5.18); Calibrated: 9/4/2018
High Cheek Right LTE Band 2 20MHz 1RB 50 offset/Area Scan (8x13x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.374 W/kg
High Cheek Right LTE Band 2 20MHz 1RB 50 offset/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.917 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.576 W/kg
SAR(1 g) = 0.360 W/kg; SAR(10 g) = 0.216 W/kg
Maximum value of SAR (measured) = 0.394 W/kg

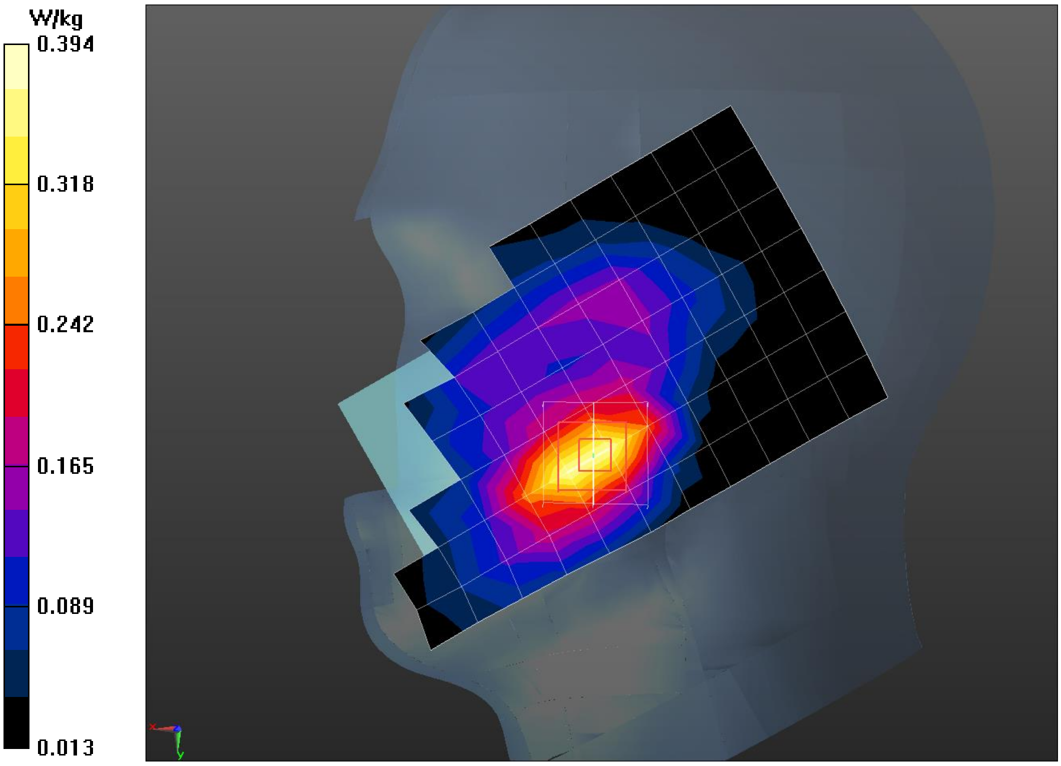


Fig.10 LTE B2 20MHz 50RB 25offset Bottom Mode Middle Repeated

Date/Time: 2019/4/26
Electronics: DAE4 Sn1244
Medium parameters used (extrapolated): f = 1880 MHz; σ = 1.464 S/m; ε_r = 52.35; ρ = 1000 kg/m^3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: LTE Band 2 Professional 1900MHz; Frequency: 1880 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.77, 4.77, 4.77); Calibrated: 9/4/2018

LTE B2 20MHz 50RB 25offset Bottom Mode Middle Repeated/Area Scan (41x61x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.907 W/kg

LTE B2 20MHz 50RB 25offset Bottom Mode Middle Repeated/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 22.46 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 1.42 W/kg
SAR(1 g) = 0.805 W/kg; SAR(10 g) = 0.415 W/kg
Maximum value of SAR (measured) = 0.925 W/kg

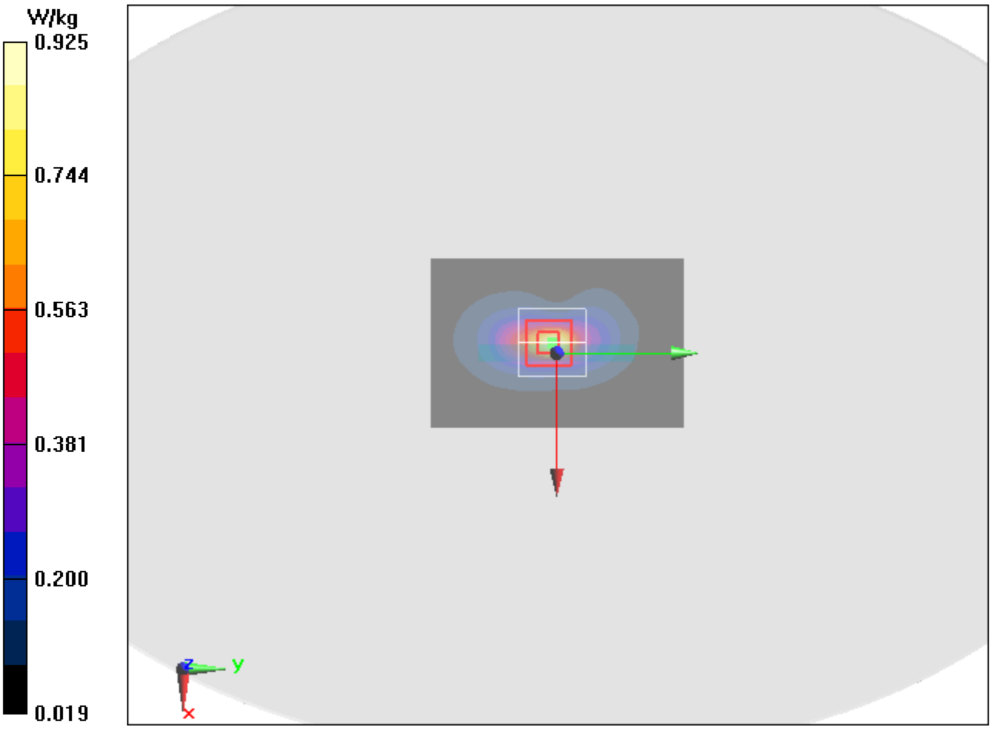


Fig.11 LTE B7 20MHz 1RB 50offset Right Cheek Middle

Date/Time: 2019/4/26
Electronics: DAE4 Sn1244
Medium parameters used: f = 2535 MHz; σ = 1.868 S/m; ε_r = 39.209; ρ = 1000 kg/m^3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: LTE Band 7 Professional 2600MHz; Frequency: 2535 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.74, 4.74, 4.74); Calibrated: 9/4/2018
LTE B7 20MHz 1RB 50offset Right Cheek Middle/Area Scan (101x51x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.265 W/kg
LTE B7 20MHz 1RB 50offset Right Cheek Middle/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.516 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.443 W/kg
SAR(1 g) = 0.233 W/kg; SAR(10 g) = 0.117 W/kg
Maximum value of SAR (measured) = 0.262 W/kg

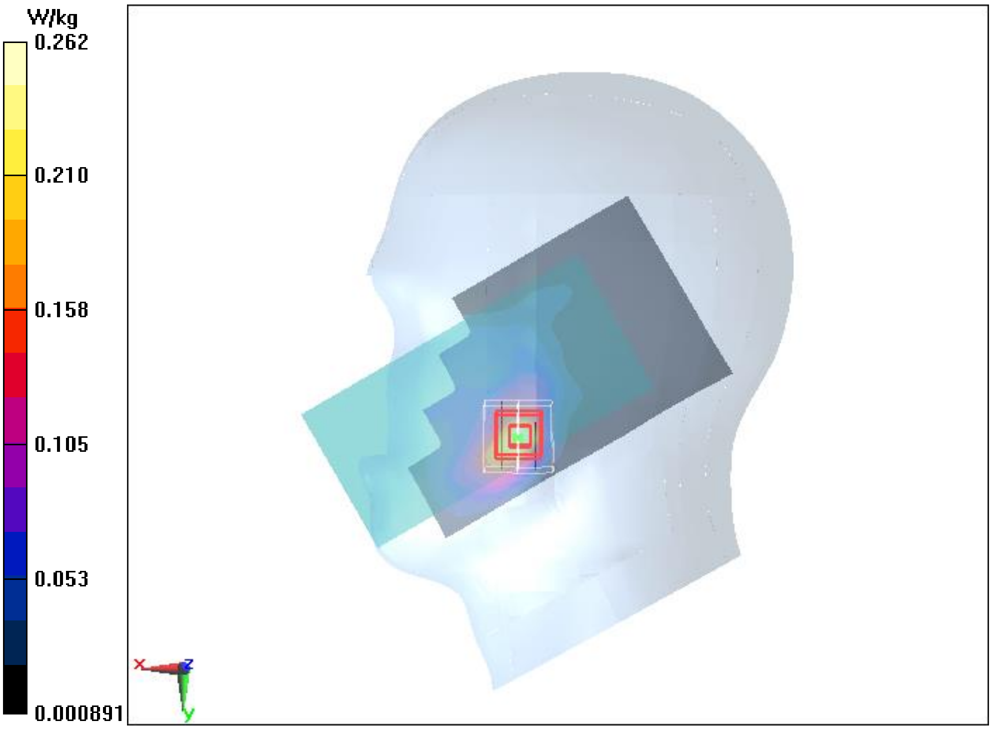


Fig.12 LTE B7 20MHz 1RB 50offset Bottom Mode Low

Date/Time: 2019/4/26
Electronics: DAE4 Sn1244
Medium parameters used: f = 2510 MHz; σ = 1.998 S/m; ε_r = 54.622; ρ = 1000 kg/m^3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: LTE Band 7 Professional 2600MHz; Frequency: 2510 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.41, 4.41, 4.41); Calibrated: 9/4/2018
LTE B7 20MHz 1RB 50offset Bottom Mode Low/Area Scan (61x101x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 1.23 W/kg
LTE B7 20MHz 1RB 50offset Bottom Mode Low/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 23.91 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 2.07 W/kg
SAR(1 g) = 1.05 W/kg; SAR(10 g) = 0.502 W/kg
Maximum value of SAR (measured) = 1.19 W/kg

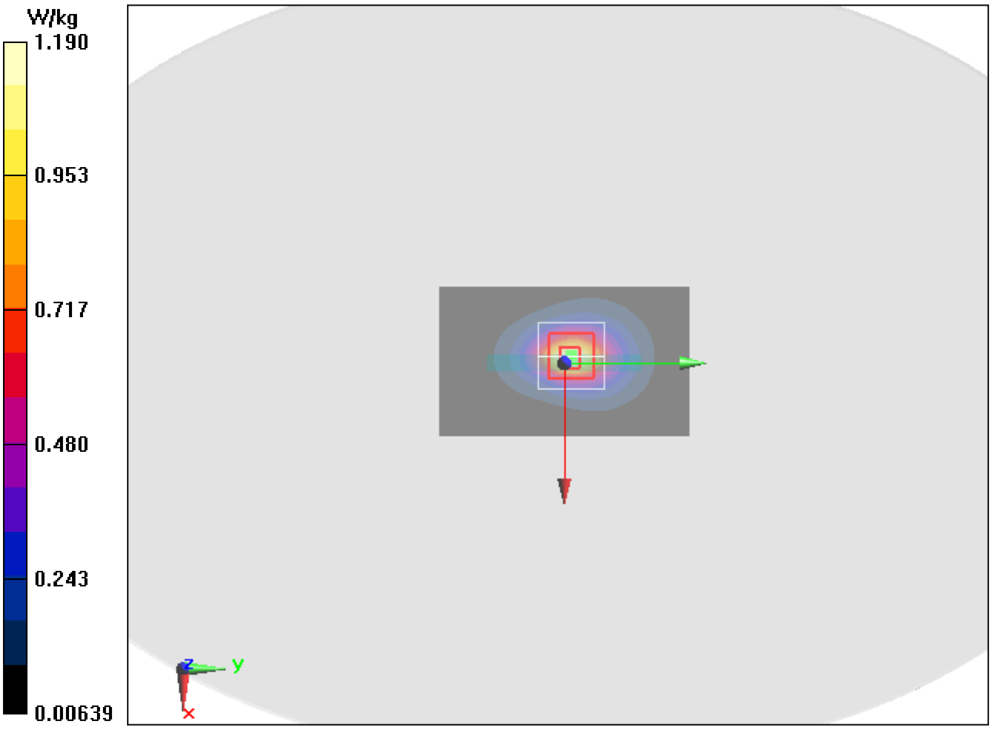


Fig.13 WIFI 802.11b Head Right Cheek High

Date/Time: 2019/4/17
Electronics: DAE4 Sn1244
Medium parameters used: f = 2462 MHz; σ = 1.834 S/m; εr = 40.413; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: Wi-Fi ; Frequency: 2462 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.74, 4.74, 4.74); Calibrated: 9/4/2018
High Cheek Right WIFI 802.11b 11M 2/Area Scan (10x16x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.359 W/kg
High Cheek Right WIFI 802.11b 11M 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.872 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.766 W/kg
SAR(1 g) = 0.364 W/kg; SAR(10 g) = 0.182 W/kg
Maximum value of SAR (measured) = 0.397 W/kg

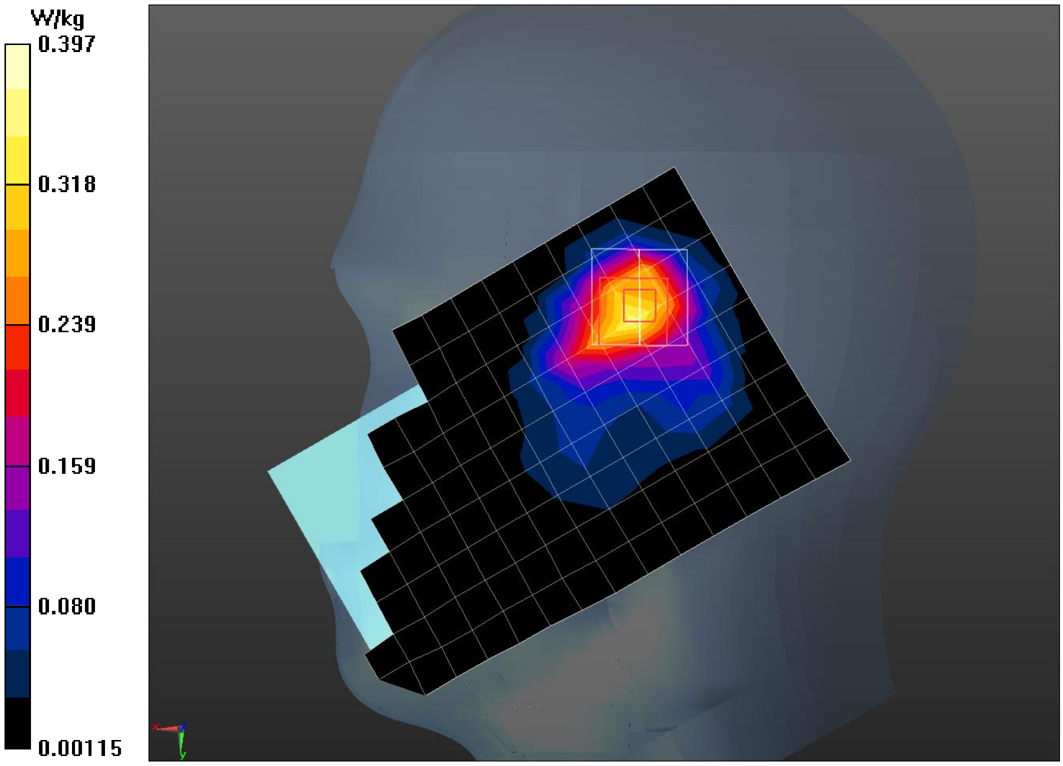


Fig.14 WIFI 802.11b Body Toward Ground Middle

Date/Time: 2019/4/17
Electronics: DAE4 Sn1244
Medium parameters used: f = 2437 MHz; σ = 1.963 S/m; εr = 52.862; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃   Liquid Temperature:22.5 ℃
Communication System: Wi-Fi ; Frequency: 2437 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.41, 4.41, 4.41); Calibrated: 9/4/2018
Middle Toward Ground WIFI 802.11b 11M/Area Scan (10x16x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.101 W/kg
Middle Toward Ground WIFI 802.11b 11M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.210 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.187 W/kg
SAR(1 g) = 0.097 W/kg; SAR(10 g) = 0.049 W/kg
Maximum value of SAR (measured) = 0.108 W/kg

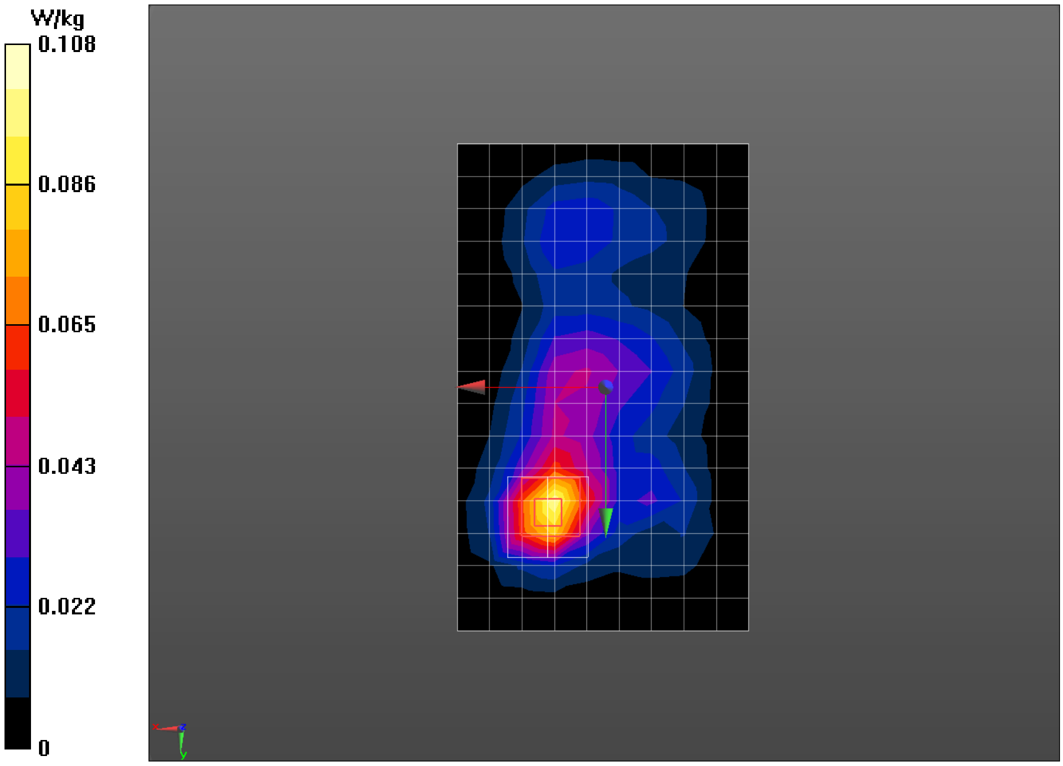


Fig.15 WIFI 5G Right Cheek Middle

Date/Time: 2019/4/11
Electronics: DAE4 Sn1244
Medium parameters used: f = 5270 MHz; σ = 4.718 S/m; ε_r = 37.041; ρ = 1000 kg/m^3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: 5GHz U-NII-2A 5GHz; Frequency: 5270 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN7401ConvF(5.82, 5.82, 5.82); Calibrated: 1/15/2019

WIFI 5G Right Cheek Middle/Area Scan (181x101x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.583 W/kg

WIFI 5G Right Cheek Middle/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 0 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 2.04 W/kg
SAR(1 g) = 0.212 W/kg; SAR(10 g) = 0.057 W/kg
Maximum of SAR (measured) = 0.621 W/kg

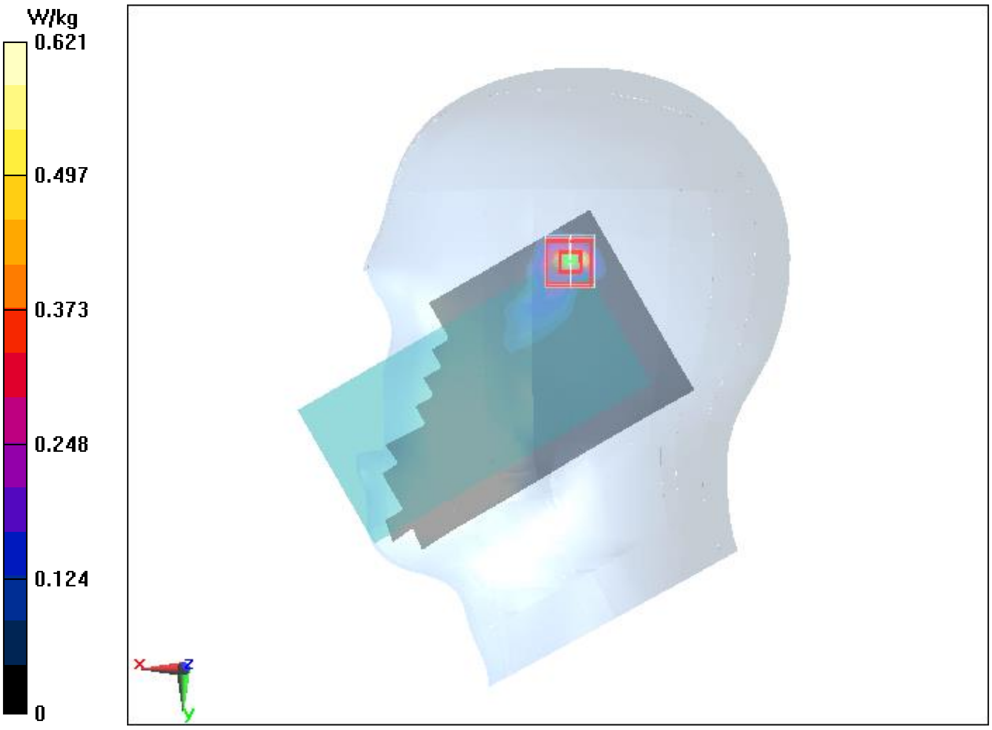


Fig.16 WIFI 5G Left Mode Middle

Date/Time: 2019/4/13
Electronics: DAE4 Sn1244
Medium parameters used: f = 5270 MHz; σ = 5.238 S/m; ε_r = 49.998; ρ = 1000 kg/m^3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: 5GHz U-NII-2A 5GHz; Frequency: 5270 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN7401ConvF(5.26, 5.26, 5.26); Calibrated: 1/15/2019
WIFI 5G Left Mode Middle/Area Scan (41x181x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.322 W/kg
WIFI 5G Left Mode Middle/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 0.5870 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.488 W/kg
SAR(1 g) = 0.116 W/kg; SAR(10 g) = 0.040 W/kg
Maximum of SAR (measured) = 0.313 W/kg

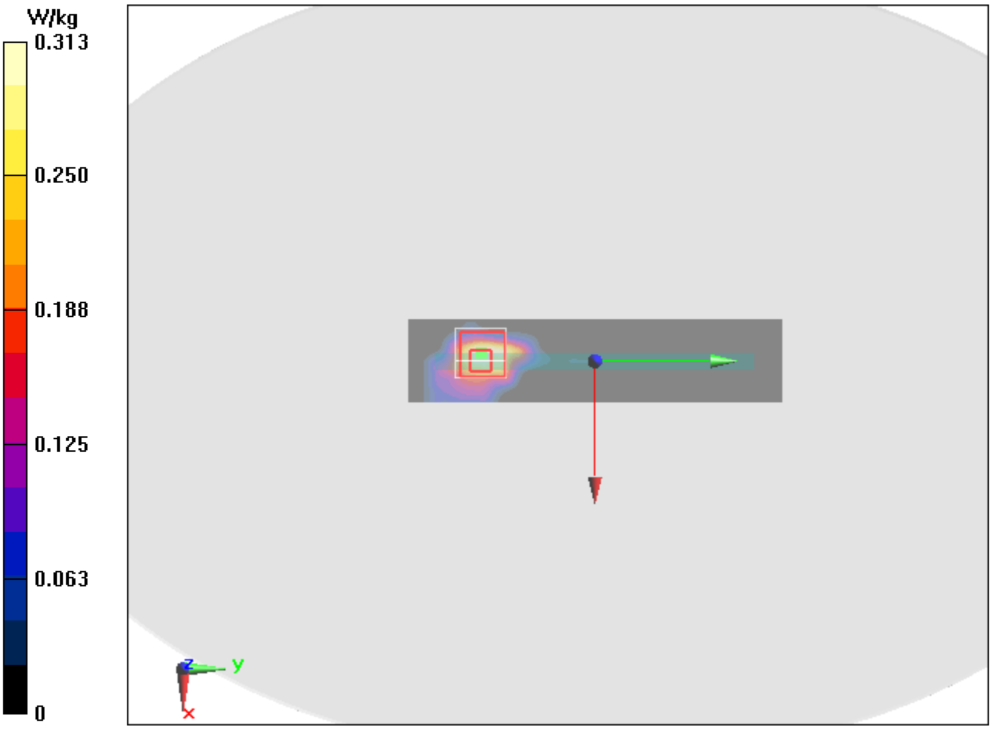


Fig.17 WIFI 5G Right Cheek Middle

Date/Time: 2019/4/11
Electronics: DAE4 Sn1244
Medium parameters used: f = 5510 MHz; σ = 4.981 S/m; ε_r = 36.573; ρ = 1000 kg/m^3
Ambient Temperature:22.5 ℃　　Liquid Temperature:22.5 ℃
Communication System: 5GHz U-NII-2C 5GHz; Frequency: 5510 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN7401ConvF(5.2, 5.2, 5.2); Calibrated: 1/15/2019

WIFI 5G Right Cheek Middle/Area Scan (181x101x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.601 W/kg

WIFI 5G Right Cheek Middle/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 0.6560 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.651 W/kg
SAR(1 g) = 0.120 W/kg; SAR(10 g) = 0.032 W/kg
Maximum of SAR (measured) = 0.391 W/kg

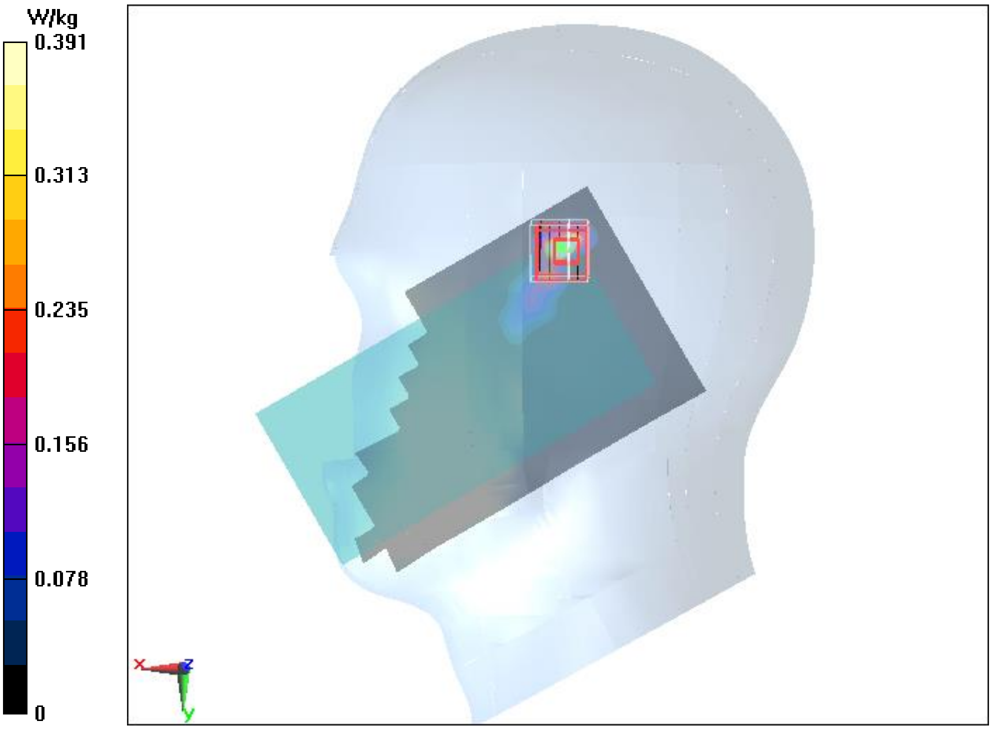


Fig.18 WIFI 5G Left Mode Middle

Date/Time: 2019/4/13
Electronics: DAE4 Sn1244
Medium parameters used: f = 5510 MHz; σ = 5.572 S/m; ε_r = 49.528; ρ = 1000 kg/m^3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: 5GHz U-NII-2C 5GHz; Frequency: 5510 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN7401ConvF(4.66, 4.66, 4.66); Calibrated: 1/15/2019
WIFI 5G Left Mode Middle/Area Scan (41x101x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.131 W/kg
WIFI 5G Left Mode Middle/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 0 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.308 W/kg
SAR(1 g) = 0.040 W/kg; SAR(10 g) = 0.014 W/kg
Maximum of SAR (measured) = 0.135 W/kg

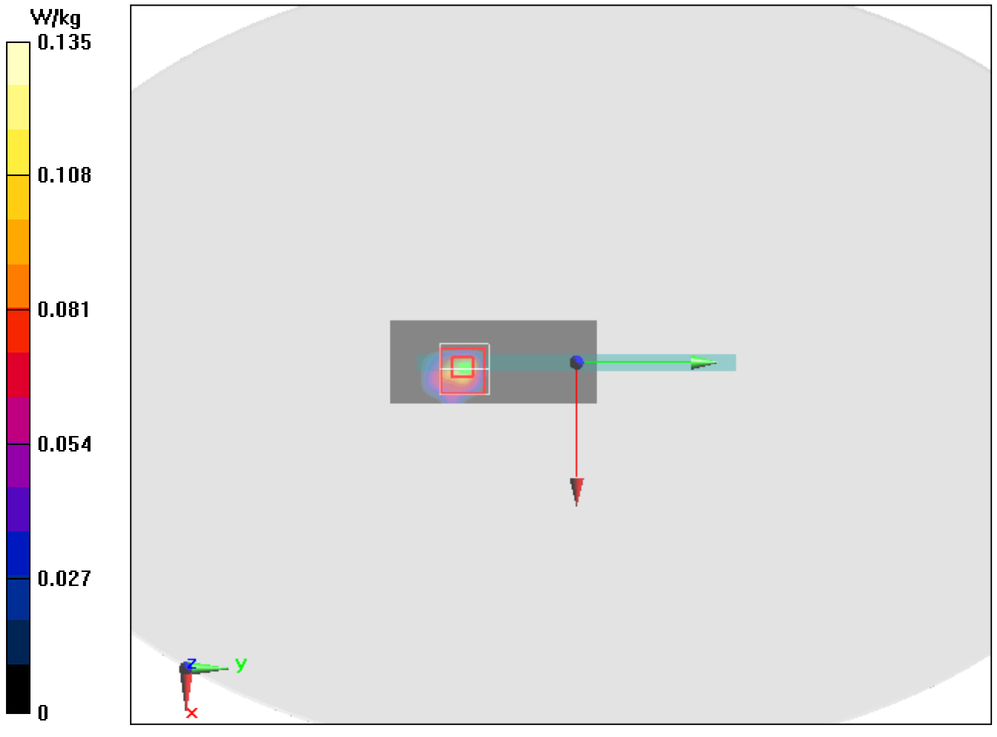


Fig.19 WIFI 5G Right Cheek Middle

Date/Time: 2019/4/11
Electronics: DAE4 Sn1244
Medium parameters used: f = 5755 MHz; σ = 5.253 S/m; ε_r = 36.111; ρ = 1000 kg/m^3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: 5GHz U-NII-3 5GHz; Frequency: 5755 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN7401ConvF(5.25, 5.25, 5.25); Calibrated: 1/15/2019
WIFI 5G Right Cheek Middle/Area Scan (181x101x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.463 W/kg
WIFI 5G Right Cheek Middle/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 0 V/m; Power Drift =0.01 dB
Peak SAR (extrapolated) = 0.434 W/kg
SAR(1 g) = 0.077 W/kg; SAR(10 g) = 0.021 W/kg
Maximum of SAR (measured) = 0.248 W/kg

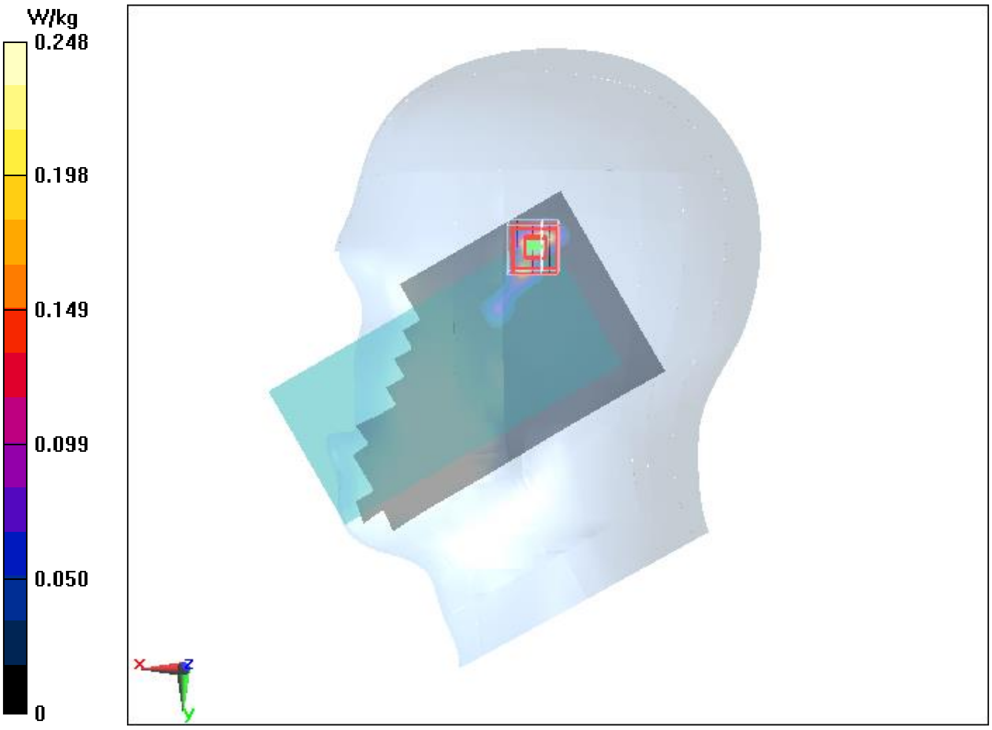
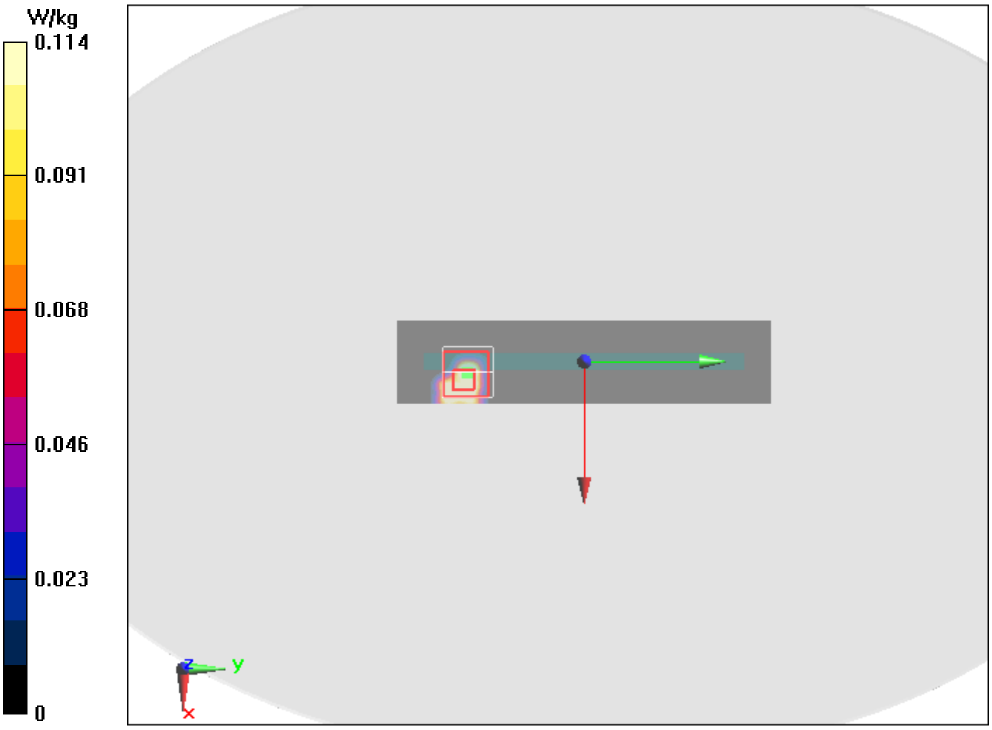


Fig.20 WIFI 5G Left Mode Middle

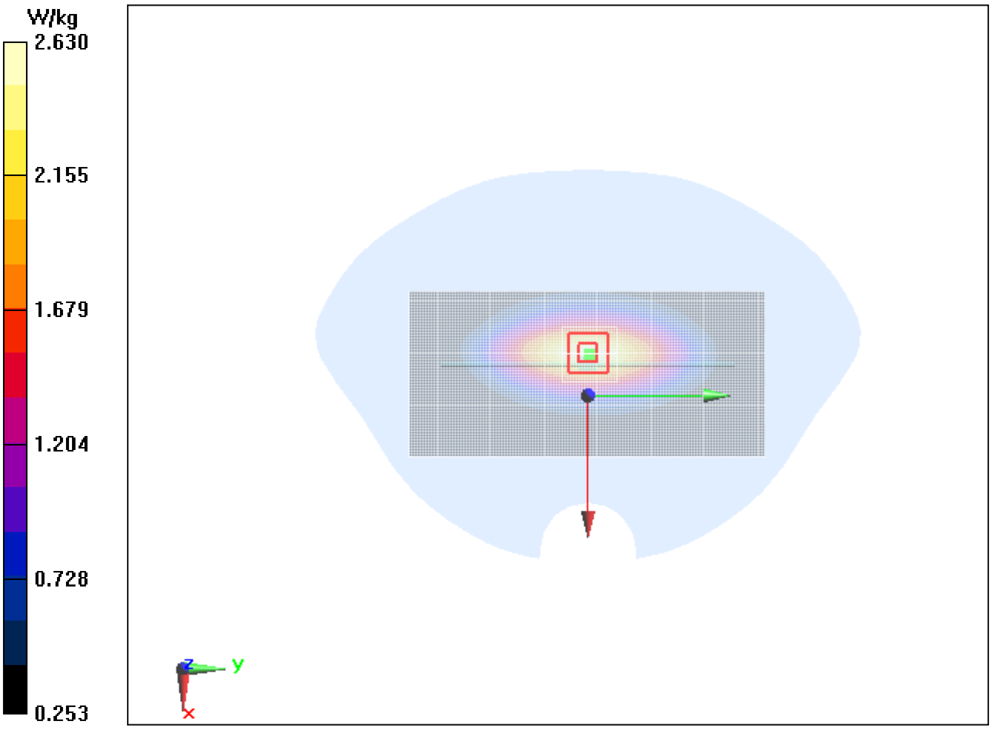
Date/Time: 2019/4/13
Electronics: DAE4 Sn1244
Medium parameters used: f = 5755 MHz; σ = 5.924 S/m; ε_r = 49.01; ρ = 1000 kg/m^3
Ambient Temperature:22.5 ℃   Liquid Temperature:22.5 ℃
Communication System: 5GHz U-NII-3 5GHz; Frequency: 5755 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN7401ConvF(4.69, 4.69, 4.69); Calibrated: 1/15/2019
WIFI 5G Left Mode Middle/Area Scan (41x181x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.223 W/kg
WIFI 5G Left Mode Middle/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 0 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.467 W/kg
SAR(1 g) = 0.036 W/kg; SAR(10 g) = 0.012 W/kg
Maximum of SAR (measured) = 0.114 W/kg



ANNEX B. System Validation Results

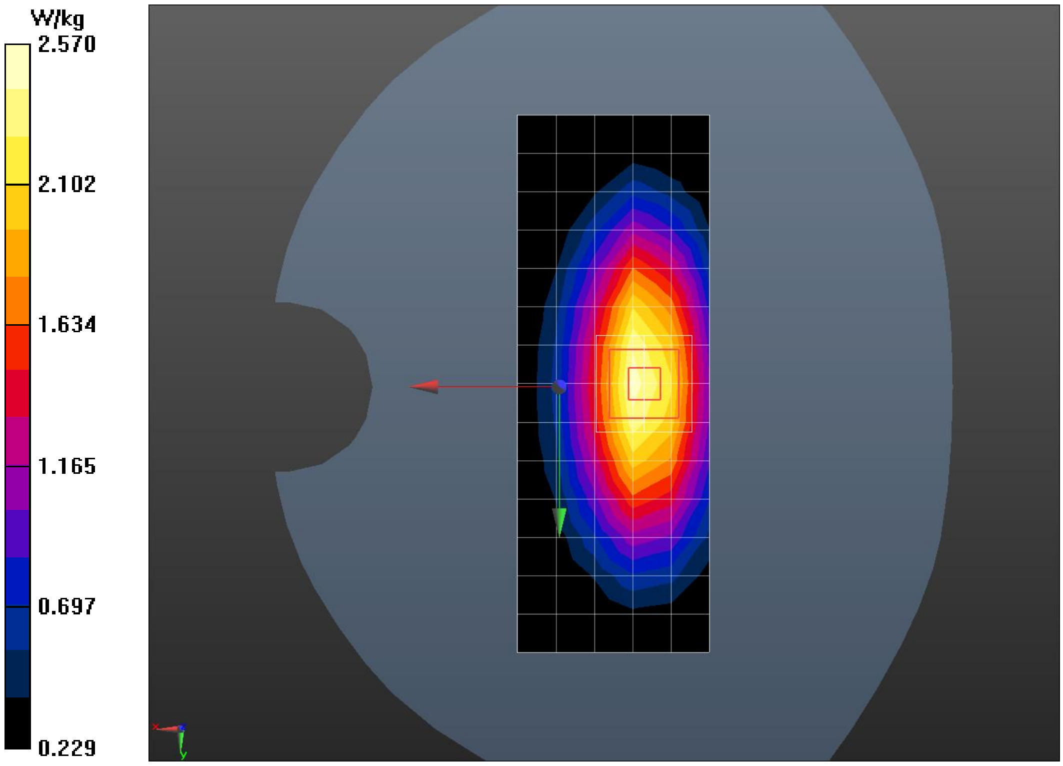
Head 835 MHz

Date/Time: 2019/4/3
Electronics: DAE4 Sn1244
Medium parameters used: f = 835 MHz; σ = 0.939 S/m; ε_r = 42.956; ρ = 1000 kg/m^3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: CW 835MHz; Frequency: 835 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(6.36, 6.36, 6.36); Calibrated: 9/4/2018
System Validation/Area Scan (61x131x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 2.54 W/kg
System Validation/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 51.20 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.58 W/kg
SAR(1 g) = 2.44 W/kg; SAR(10 g) = 1.62 W/kg
Maximum value of SAR (measured) = 2.63 W/kg



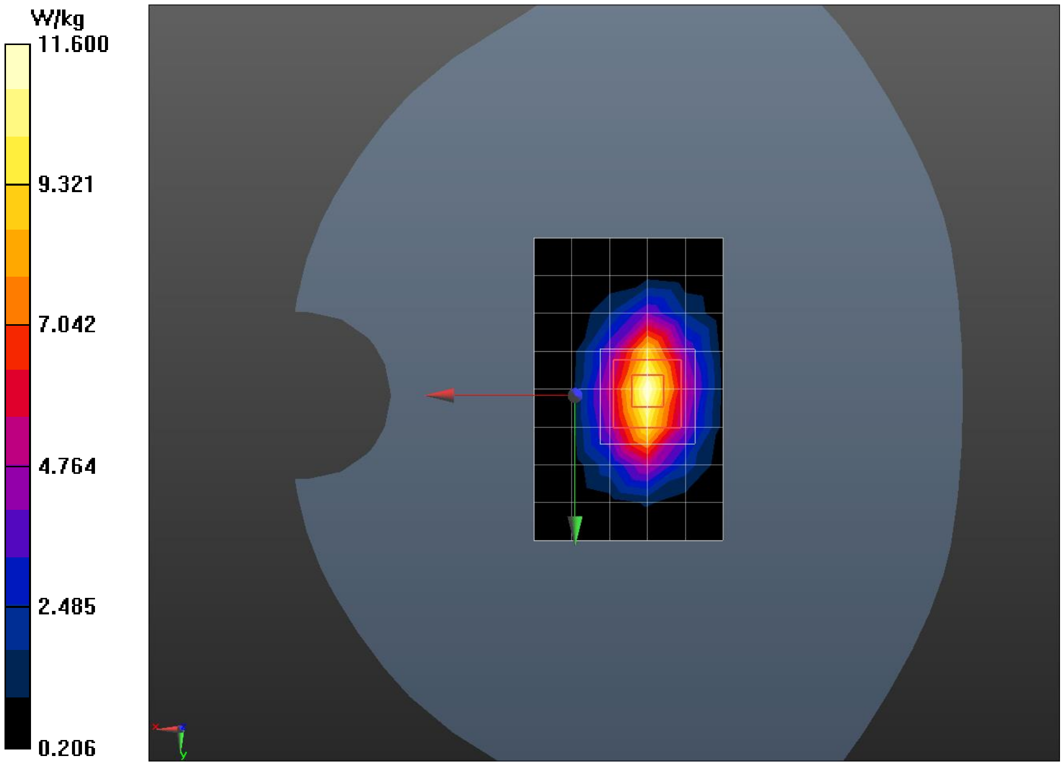
Head 835MHz

Date/Time: 2019/4/17
Electronics: DAE4 Sn1244
Medium parameters used: f = 835 MHz; σ = 0.887 S/m; εr = 41.032; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(6.36, 6.36, 6.36); Calibrated: 9/4/2018
System Check Dipole 835MHz/Area Scan (6x15x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 2.50 W/kg
System Check Dipole 835MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 48.91 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 3.56 W/kg
SAR(1 g) = 2.38 W/kg; SAR(10 g) = 1.55 W/kg
Maximum value of SAR (measured) = 2.57 W/kg



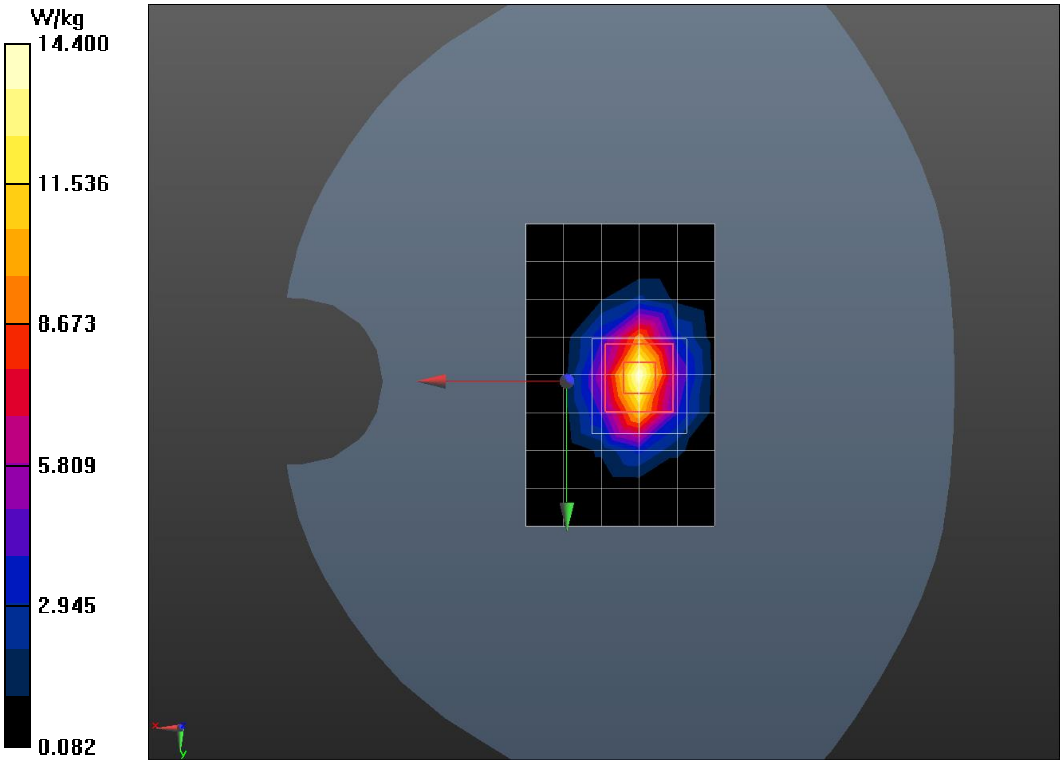
Head 1900MHz

Date/Time: 2019/4/12
Electronics: DAE4 Sn1244
Medium parameters used: f = 1900 MHz; σ = 1.397 S/m; εr = 38.956; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃   Liquid Temperature:22.5 ℃
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(5.18, 5.18, 5.18);
System Check Dipole 1900 MHz/Area Scan (6x9x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 11.7 W/kg
System Check Dipole 1900 MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 82.85 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 19.2 W/kg
SAR(1 g) = 10.3 W/kg; SAR(10 g) = 5.36 W/kg
Maximum value of SAR (measured) = 11.6 W/kg



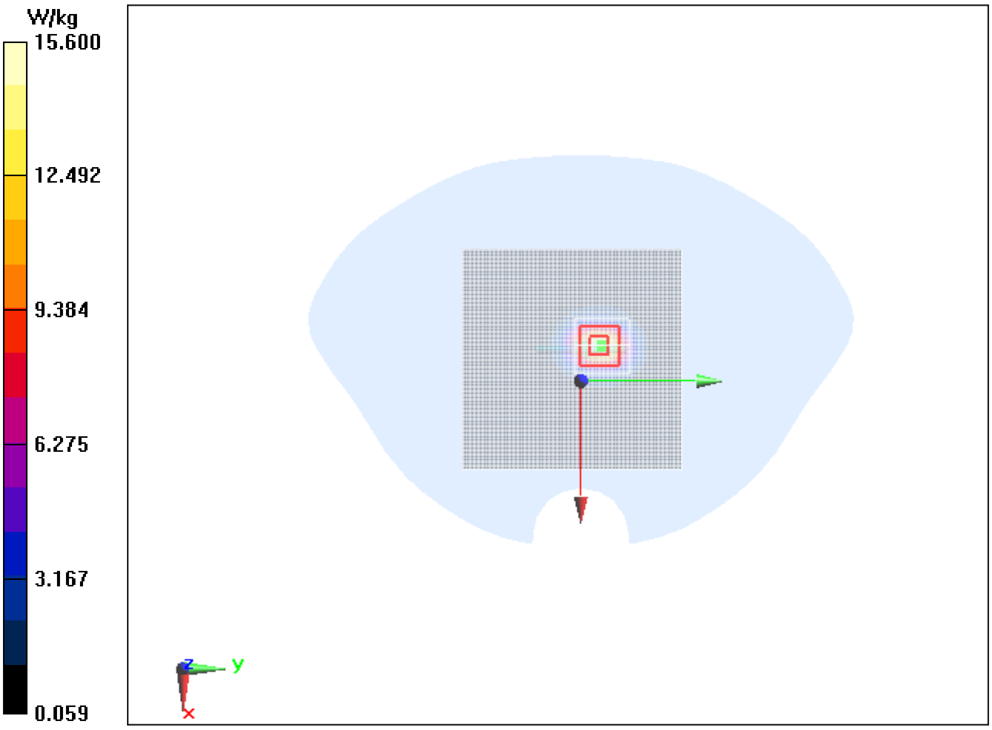
Head 2450MHz

Date/Time: 2019/4/17
Electronics: DAE4 Sn1244
Medium parameters used: f = 2450 MHz; σ = 1.815 S/m; εr = 40.406; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: CW ; Frequency: 2450 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.74, 4.74, 4.74); Calibrated: 9/4/2018
System Check Dipole 2450 MHz/Area Scan (6x9x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 14.4 W/kg
System Check Dipole 2450 MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 79.81 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 26.9 W/kg
SAR(1 g) = 12.8 W/kg; SAR(10 g) = 5.91 W/kg



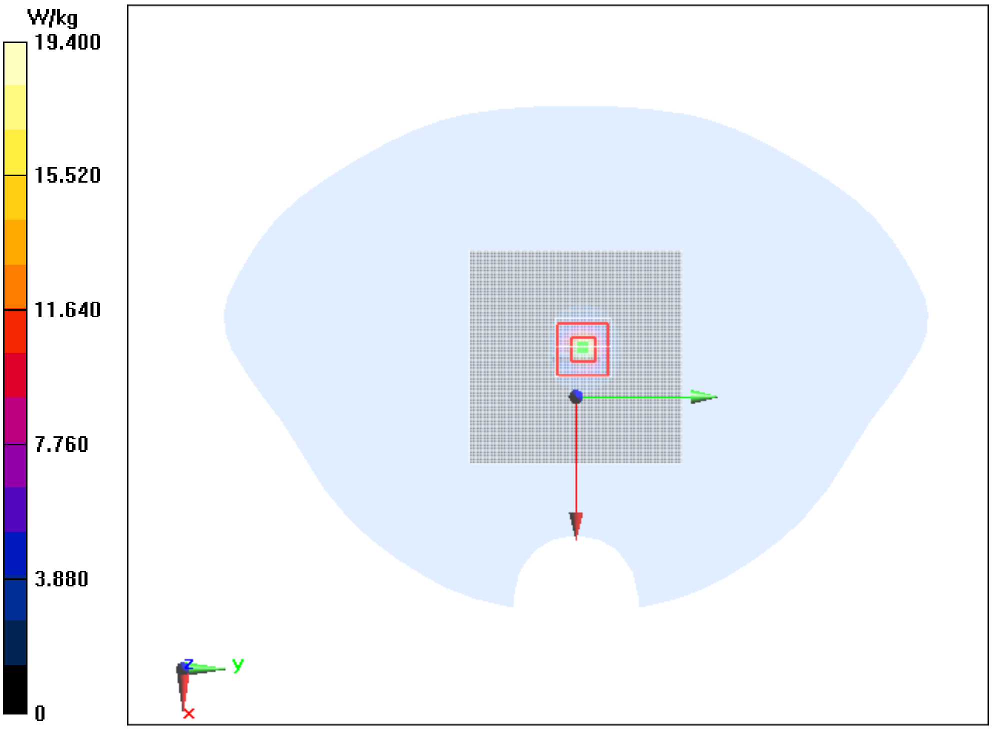
Head 2600 MHz

Date/Time: 2019/4/26
Electronics: DAE4 Sn1244
Medium parameters used: f = 2600 MHz; σ = 1.942 S/m; ε_r = 38.949; ρ = 1000 kg/m^3
Ambient Temperature:22.5 ℃   Liquid Temperature:22.5 ℃
Communication System: CW 2600MHz;   Frequency: 2600 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.46, 4.46, 4.46); Calibrated: 9/4/2018
System Validation/Area Scan (101x101x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 16.2 W/kg
System Validation/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 76.67 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 29.8 W/kg
SAR(1 g) = 13.7 W/kg; SAR(10 g) = 6.07 W/kg
Maximum value of SAR (measured) = 15.6 W/kg



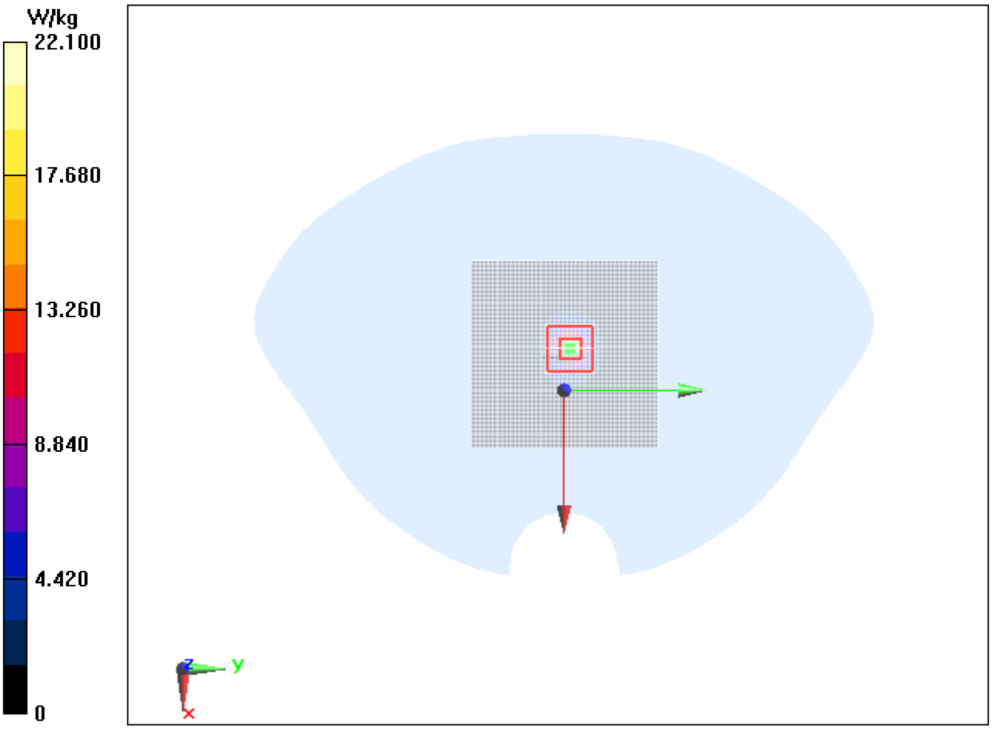
Head 5300MHz

Date/Time: 2019/4/11
Electronics: DAE4 Sn1244
Medium parameters used: f = 5300 MHz; σ = 4.751 S/m; ε_r = 36.981; ρ = 1000 kg/m^3
Ambient Temperature:22.5 ℃   Liquid Temperature:22.5 ℃
Communication System: CW 5GHz; Frequency: 5300 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN7401ConvF(5.82, 5.82, 5.82); Calibrated: 1/15/2019
System Validation 5300MHz/Area Scan (91x91x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 18.5 W/kg
System Validation 5300MHz/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (7x7x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 58.29 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 33.2 W/kg
SAR(1 g) = 7.28 W/kg; SAR(10 g) = 2.04 W/kg
Maximum of SAR (measured) = 19.4 W/kg



Head 5600MHz

Date/Time: 2019/4/11
Electronics: DAE4 Sn1244
Medium parameters used: f = 5600 MHz; σ = 5.08 S/m; ε_r = 36.403; ρ = 1000 kg/m^3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: CW 5GHz; Frequency: 5600 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN7401ConvF(5.2, 5.2, 5.2); Calibrated: 1/15/2019
System Validation 5600MHz/Area Scan (91x91x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 21.3 W/kg
System Validation 5600MHz/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (7x7x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 62.87 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 39.1 W/kg
SAR(1 g) = 8.16 W/kg; SAR(10 g) = 2.28 W/kg
Maximum value of SAR (measured) = 22.1 W/kg



Head 5800MHz

Date/Time: 2019/4/11
Electronics: DAE4 Sn1244
Medium parameters used: f = 5800 MHz; σ = 5.303 S/m; ε_r = 36.027; ρ = 1000 kg/m^3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: CW 5GHz; Frequency: 5800 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN7401ConvF(5.25, 5.25, 5.25); Calibrated: 1/15/2019

System Validation 5800MHz/Area Scan (91x91x1):

Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 20.3 W/kg

System Validation 5800MHz/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (7x7x7)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 57.37 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 37.3 W/kg
SAR(1 g) = 7.53 W/kg; SAR(10 g) = 2.09 W/kg
Maximum of SAR (measured) = 20.5 W/kg