FCC SAR REPORT

Applicant: SWAGTEK

Address of Applicant: 10205 NW 19th Street,STE 101, Miami, FL33172,USA

Equipment Under Test (EUT)

Product Name: 2.4 inch 3G Feature phone

Model No.: B8K,Kite,K8

Trade mark: LOGIC,iSWAG, UNONU

FCC ID: O55243221

Applicable standards: FCC 47 CFR Part 2.1093

Date of Test: 31 Aug., 2021~03 Sep., 2021

Test Result: Maximum Reported1-g SAR (W/kg)
Head: 0.293 Body: 1.116 Hotspot: 1.116

Authorized Signature:

Bruce Zhang
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the JYT product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

2 Version

Version No.	Date	Description
00	24 Sep., 2021	*Original*

Tested by:	Vieta Zhang	***Date:***	24 Sep., 2021
	Test Engineer		
Reviewed by:	Wiby Zhang	***Date:***	24 Sep., 2021
	Project Engineer		

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4 SAR Results Summary

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

<Highest Reported standalone SAR Summary>

Exposure Position	Frequency Band	Reported 1-g SAR (W/kg)	Equipment Class	Highest Reported 1-g SAR (W/kg)
Head	GSM 850	0.192	PCE	0.293
	GSM 1900	0.061		
	WCDMA Band V	0.232		
	WCDMA Band II	0.293		
	WLAN 2.4GHz	0.204	DTS	
Body (10 mm Gap)	GSM 850	1.116	PCE	1.116
	GSM 1900	0.535		
	WCDMA Band V	0.587		
	WCDMA Band II	0.228		
	WLAN 2.4GHz	0.308	DTS	
Hotspot (10 mm Gap)	GSM 850	1.116	PCE	1.116
	GSM 1900	0.535		
	WCDMA Band V	0.587		
	WCDMA Band II	0.228		
	WLAN 2.4GHz	0.308	DTS	

<Highest Reportedsimultaneous SAR Summary>

Exposure Position	Frequency Band	Reported 1-g SAR (W/kg)	Equipment Class	Highest ReportedSimultaneous Transmission 1-g SAR (W/kg)
Back	GPRS 850 2Slots	1.116	PCE	1.424
	WLAN 2.4GHz	0.308	DTS	

Note:

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

5 General Information

5.1 Client Information

Applicant:	SWAGTEK
Address:	10205 NW 19th Street, STE 101, Miami, FL33172, USA
Manufacturer:	SWAGTEK
Address:	10205 NW 19th Street, STE 101, Miami, FL33172, USA

5.2 General Description of EUT

Product Name:	2.4 inch 3G Feature phone			
Model No.:	B8K, Kite, K8			
Category of device	Portable device			
Operation Frequency:	2G :	GSM850: 824.2~848.8 MHz	PCS 1900: 1850.2~1909.8 MHz	
	3G :	Band II: 1852.4~1907.6 MHz	Band V: 826.4~846.6 MHz	
	Wi-Fi:	2412MHz~2462MHz		
	Bluetooth: 2402 MHz ~ 2480 MHz			
Modulation technology:	2G:	☒Voice(GMSK)	☒GPRS(GMSK)	
	3G:	☒RCM(QPSK)	☒HSUPA(QPSK)	☒HSDPA(QPSK,16QAM)
	Wi-Fi:	☒802.11b(DSSS)	☒802.11g/n (OFDM)	
	Bluetooth:	☒BDR(GFSK)	☒EDR(π/4-DQPSK, 8DPSK)	☒LE(GFSK)
Antenna Type:	Internal Antenna			
Antenna Gain:	GSM850:1.25dBi WCDMA Band V: 1.23dBi Bluetooth:1.45dBi	PCS1900:1.15dBi WCDMA Band II: 1.16dBi 2.4G Wi-Fi:1.45dBi		
(E)GPRS Class:	(E)GPRS Class: 12			
Dimensions (L*W*H):	130mm (L)× 53mm (W)× 13mm (H)			
Accessories information:	Adapter: Model: CHARGER | CARGADOR Input:100-240V AC,50/60Hz 0.1A Output:5.0V DC 500mA	Battery: RechargeableLi-ion Battery 3.7V/1400mAh Headset: Support headset		
Remark:	Model No.: B8K, Kite, K8 were identical inside, the electrical circuit design, layout, components used and internal wiring, with only difference being trademark.LOGIC is for B8K. iSWAG is for Kite.UNONU is for K8.			
Test Sample Condition:	The test samples were provided in good working order with no visibledefects.			

5.3 Maximum RF Output Power

Mode	Average Power (dBm)	
	GSM 850	GSM 1900
GSM (Voice)	33.27	29.92
GPRS (1TX Slot)	33.30	29.93
GPRS (2TX Slots)	32.67	29.26
GPRS (3TX Slots)	30.88	28.30
GPRS (4TX Slots)	29.61	26.33

Mode	Average Power (dBm)	
	WCDMA Band V	WCDMA Band II
AMR 12.2 kbps	22.71	22.73
RMC 12.2 kbps	22.79	22.86
HSDPA Sub-test 1	21.75	21.30
HSDPA Sub-test 2	21.40	20.73
HSDPA Sub-test 3	21.31	20.78
HSDPA Sub-test 4	21.27	20.75
HSUPA Sub-test 1	19.83	19.25
HSUPA Sub-test 2	20.30	19.74
HSUPA Sub-test 3	20.85	20.25
HSUPA Sub-test 4	19.83	19.21
HSUPA Sub-test 5	21.74	21.26

WLAN 2.4 GHz Band Average Power (dBm)				
Mode/Band	b	g	n (HT-20)	n (HT-40)
WLAN 2.4GHz	11.75	11.93	11.97	11.32

Bluetooth Average Power (dBm)				
Mode/Band	1 Mbps(GFSK)	2 Mbps(π/4DQPSK)	3 Mbps (8DPSK)	LE (BT 4.0)
Bluetooth	0.127	-0.134	0.021	-3.767

5.4 Environment of Test Site

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

5.5 Test Sample Plan

Sample Number	Used for Test Items
3#	SAR

Remark: *JianYan Testing Group Shenzhen Co., Ltd. is only responsible for the test project data of the above samples, and will keep the above samples for a month.*

5.6 Test Location

JianYan Testing Group Shenzhen Co., Ltd.
No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community,Xinqiao Street, Bao'an District, Shenzhen, Guangdong,People's Republic of China.
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Email: info-JYTee@lets.com, Website: http://www.ccis-cb.com

6 Introduction

6.1 Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SARdistribution in a biological body is complicated and is usually carried out by experimental techniques or numericalmodeling. 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. Ingeneral, 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) anincremental mass (dm) contained in a volume element (dv) of a given density (ρ). The equation description is asbelow:

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

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

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

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

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

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

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

7 RF Exposure Limits

7.1 Uncontrolled Environment

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

7.2 Controlled Environment

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

7.3 RF Exposure Limits

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

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

Note:

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

8 SAR Measurement System

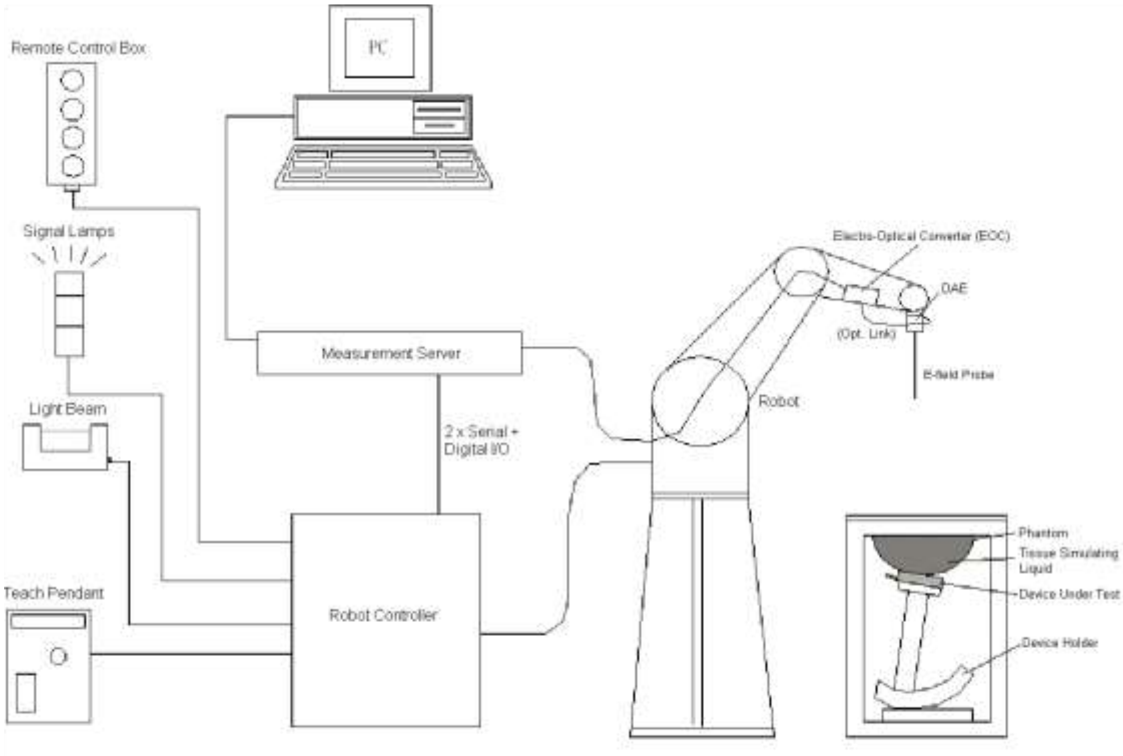


Fig.8.1 SPEAG DASY System Configurations

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

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

Component details are described in the following sub-sections.

8.1 E-Field Probe

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

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

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

Fig.8.2 Photo of E-Field Probe

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

8.2 Data Acquisition Electronics (DAE)

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

Fig. 8.3 Photo of DAE

8.3 Robot

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

- High precision (repeatability 0.02 mm)
- High reliability (industrial design)
- Low maintenance costs (virtually maintenance free due to direct drive gears; nobelt drives)
- Jerk-free straight movements
- Low ELF interference (motor control fields shielded via the closed metallic constructionshields)

Fig. 8.4 Photo of Robot

8.4 Measurement Server

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

Fig. 8.5 Photo of Server for DASY5

8.5 Light Beam Unit

The light beam switch allows automatic "tooling" of the probe. During the process, the actualposition of the probe tip with respect to the robot arm is measured, as well as the probe lengthand the horizontal probe offset. The software then corrects all movements, such that the robotcoordinates are valid for the probe tip.
The repeatability of this process is better than0.1 mm. If a position has been taught with analigned probe, the same position will be reachedwith another aligned probe within 0.1 mm, even ifthe other probe has different dimensions. Duringprobe rotations, the probe tip will keep its actualposition.

Fig. 8.6 Photo of Light Beam

8.6 Phantom

<SAM Twin Phantom>

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

Fig. 8.7Photo of SAM Twin Phantom

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

<ELI4 Phantom>

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

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

The phantom can be used with the following tissue simulating liquids:

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

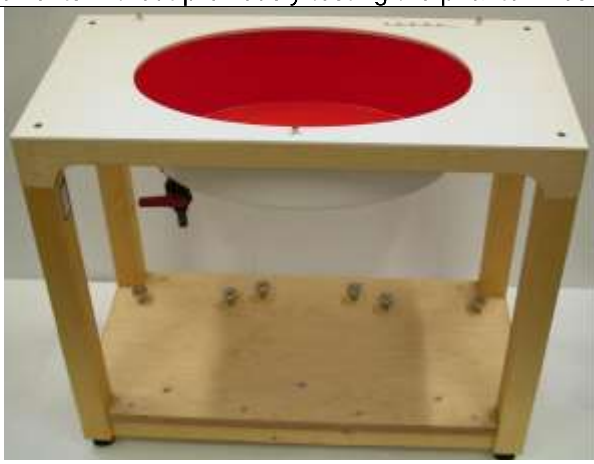


Fig.8.8 Photo of ELI4 Phantom

8.7 Device Holder

<Device Holder for SAM Twin Phantom>

The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5 mm distance, a positioning uncertainty of ± 0.5 mm would produce a SAR uncertainty of ± 20 %. Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards. The DASY device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation center for both scales is the ear reference point (ERP). Thus the device needs no repositioning when changing the angles. The DASY device holder is constructed of low-low POM material having the following dielectric parameters: relative permittivity ε = 3 and loss tangent δ = 0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.
 **Fig. 8.9 Photo of Device Holder**

8.8 Data storage and Evaluation

- **Data Storage**

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

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

- **Data Evaluation**

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

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

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

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

The formula for each channel can be given as:

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

WithV_i = compensated signal of channel i, (i = x, y, z)
U_i= input signal of channel i, (i = x, y, z)
cf = crest factor of exciting field (DASY parameter)
dcp^i= diode compression point (DASY parameter)
From the compensated input signals, the primary field data for each channel can be evaluated:

E- Field Probes: $E_i = \sqrt{\frac{v_i}{Norm_i \cdot ConvF}}$

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

WithV_i = compensated signal of channel i, (i = x, y, z)
$Norm_i$= senor sensitivity of channel i, (i = x, y, z), µV/ (V/m) ^{2}
ConvF = sensitivity enhancement in solution
a_{ij}= sensor sensitivity factors for H-field probes
f = carrier frequency (GHz)
E_i = electric field strength of channel i in V/m
Hi = magnetic field strength of channel i in A/m
The RSS value of the field components gives the total field strength (Hermitian magnitude):

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

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

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

With SAR = local specific absorption rate in mW/g
E_{tot}= total field strength in V/m
σ = conductivity in (mho/m) or (Siemens/m)
ρ= equipment tissue density in g/cm^3
Note that the density is set to 1, to account for actual head tissue density rather than the density of the tissue simulating liquid.

8.9 Test Equipment List

Manufacturer	Equipment Description	Model	Management Number	Cal. Information	
				Last Cal.	Due Date
SPEAG	835MHz System Validation Kit	D835V2	WXJ023-1	06.11.2019	06.10.2022
SPEAG	1900MHz System Validation Kit	D1900V2	WXJ023-2	06.11.2019	06.10.2022
SPEAG	2450MHz System Validation Kit	D2450V2	WXJ023-3	06.10.2019	06.09.2022
SPEAG	Data Acquisition Electronics	DAE4	WXJ021-1	05.26.2021	05.25.2022
SPEAG	Dosimetric E-Field Probe	EX3DV4	WXJ022	09.23.2020	09.22.2021
SPEAG	DASY 52 Measurement Software	DASY 52	Version 52.10.4.1527	N.C.R	N.C.R
SPEAG	DASY 52 File ConversionSoftware	SEMCAD X	Version 14.6.14 (7483)	N.C.R	N.C.R
SPEAG	Phantom	Twin Phantom	WXG008-3	N.C.R	N.C.R
SPEAG	Phantom	ELI V5.0	WXG008-4	N.C.R	N.C.R
SPEAG	Phone Positioner	N/A	WXG008-5	N.C.R	N.C.R
Stäubli	Robot	TX60L	WXG008-2	N.C.R	N.C.R
R&S	Universal Radio Communication Tester	CMU200	WXJ008-2	06.18.2020	06.17.2022
HP	Network Analyzer	8753D	WXJ024	06.18.2020	06.17.2022
KEYSIGHT	EPM Series Power Meter	N1914A	WXJ075	08.29.2021	08.28.2022
KEYSIGHT	E-Series Power Sensor	E9300H	WXJ075-1	08.29.2021	08.28.2022
KEYSIGHT	E-Series Power Sensor	E9300H	WXJ075-2	08.29.2021	08.28.2022
KEYSIGHT	Signal Generator	N5173B	WXJ006-7	03.25.2021	03.24.2022
Huber Suhner	RF Cable	SUCOFLEX	WXG008-13	See Note 3	
Huber Suhner	RF Cable	SUCOFLEX	WXG008-14	See Note 3	
Huber Suhner	RF Cable	SUCOFLEX	WXG008-15	See Note 3	
Weinschel	Attenuator	23-3-34	WXG008-16	See Note 3	
Anritsu	Directional Coupler	MP654A	WXG008-17	See Note 3	
SPEAG	Dielectric Assessment Kit	3.5 Probe	WXG008-7	See Note 4	
SPEAG	DAK Measurement Software	DAK	Version: DAK 3.5	N.C.R	
TXC	Broadband Amplifier	BBA018000	WXG008-11	See Note 5	

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

9 Tissue Simulating Liquids

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

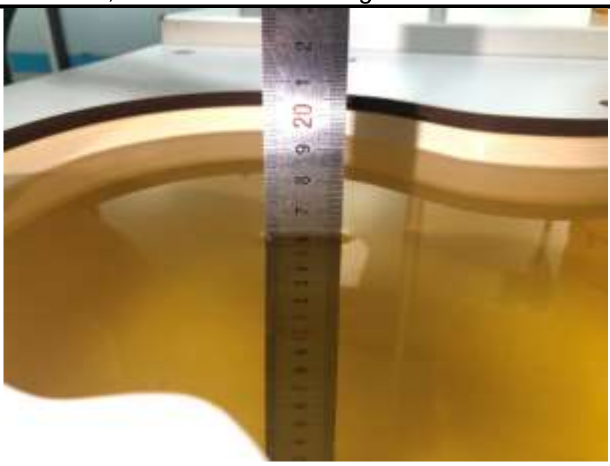


Fig. 9.1 Photo of Liquid Height for Head SAR (700MHz~1000MHz)(depth>15cm)

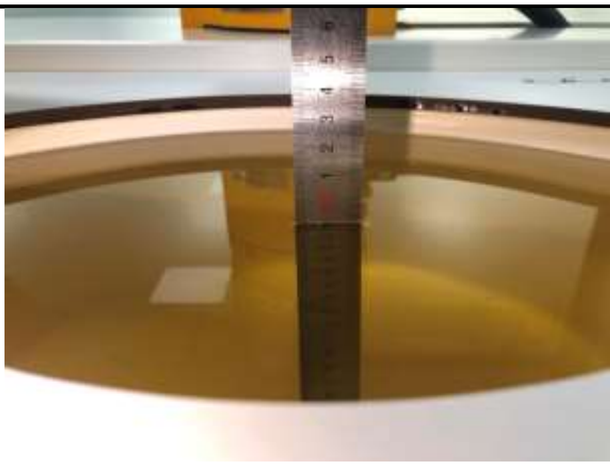


Fig. 9.2 Photo of Liquid Height for Body SAR (700MHz~1000MHz)(depth>15cm)

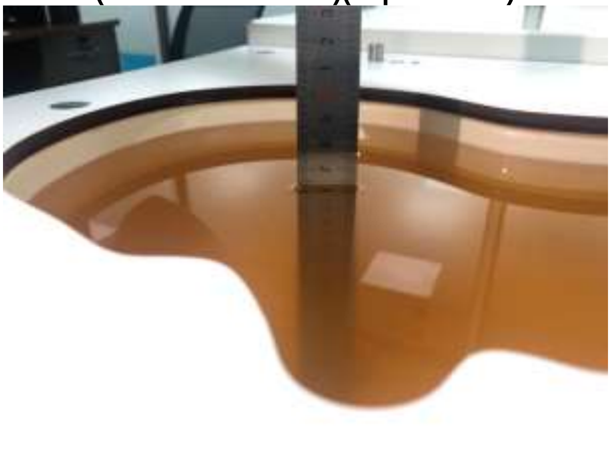


Fig. 9.3 Photo of Liquid Height for Head SAR (1700MHz~2000MHz)(depth>15cm)

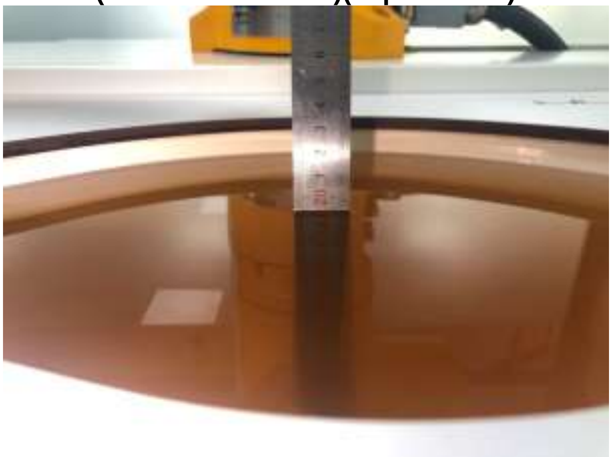


Fig. 9.4 Photo of Liquid Height for Body SAR (1700MHz~2000MHz) (depth>15cm)

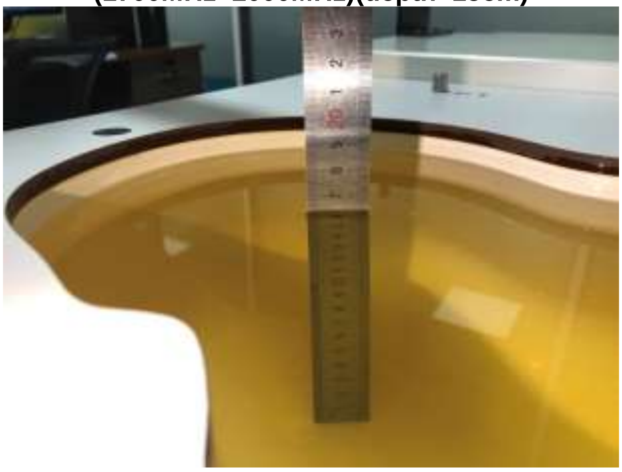


Fig. 9.5 Photo of Liquid Height for Head SAR (2000MHz~2600MHz) (depth>15cm)

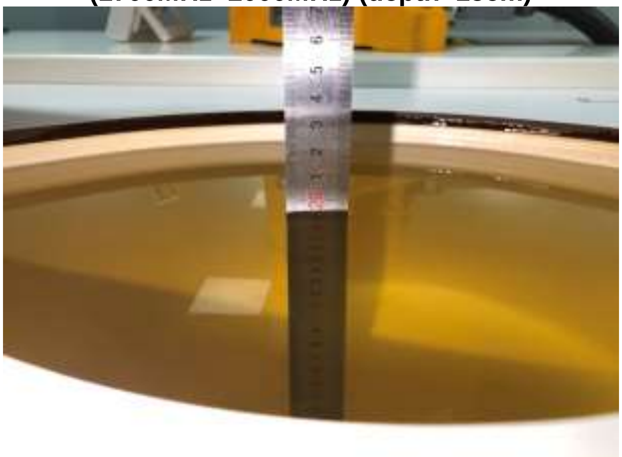


Fig. 9.6Photo of Liquid Height for Body SAR (2000MHz~2600MHz) (depth>15cm)

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

Target Frequency (MHz)	εr	σ(S/m)
150	52.3	0.76
300	45.3	0.87
450	43.5	0.87
835	41.5	0.90
900	41.5	0.97
915	41.5	0.98
1450	40.5	1.20
1610	40.3	1.29
1800-2000	40.0	1.40
2450	39.2	1.80
3000	38.5	2.40
5800	35.3	5.27

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

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

Frequency (MHz)	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (εr)	Conductivity Target(σ)	Permittivity Target(εr)	Delta (σ)%	Delta (εr)%	Limit (%)	Date (mm/dd/yy)
835	21.5	0.91	42.76	0.90	41.5	1.11	3.04	±5	09.02.2021
1900	21.3	1.44	39.85	1.40	40.0	2.86	-0.37	±5	09.03.2021
2450	21.6	1.86	38.46	1.80	39.2	3.33	-1.89	±5	08.31.2021

10 SAR System Verification

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

- **Purpose of System Performance check**

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

- **System Setup**

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

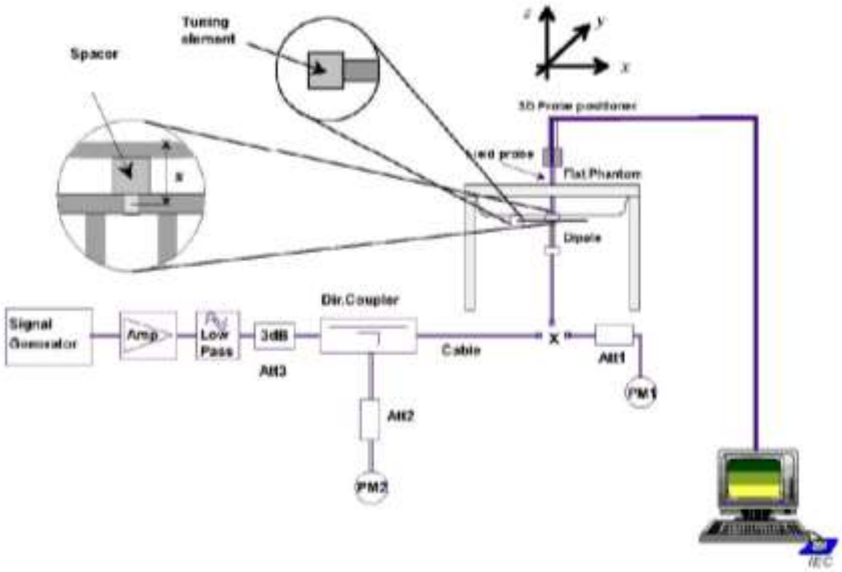


Fig.10.1 System Verification Setup Diagram

Fig.10.2 Photo of Dipole setup

➢ **System Verification Results**

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

Date (mm/dd/yy)	Frequency (MHz)	Power fed onto dipole (mW)	Measured 1g SAR (W/kg)	Normalized to 1W 1g SAR (W/kg)	1W Target 1g SAR (W/kg)	Deviation (%)
09.02.2021	835	80	0.792	9.90	9.49	4.32
09.03.2021	1900	40	1.53	38.25	39.4	-2.92
08.31.2021	2450	40	2.14	53.5	52.6	1.71

11 EUT Testing Position

This EUT was tested in ten different positions. They are right cheek/right tilted/left cheek/left tilted for head, Front/Back/Right Side/Top Side/Bottom Side of the EUT with phantom 1 cm gap, as illustrated below, please refer to Appendix B for the test setup photos.

11.1 Handset Reference Points

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

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

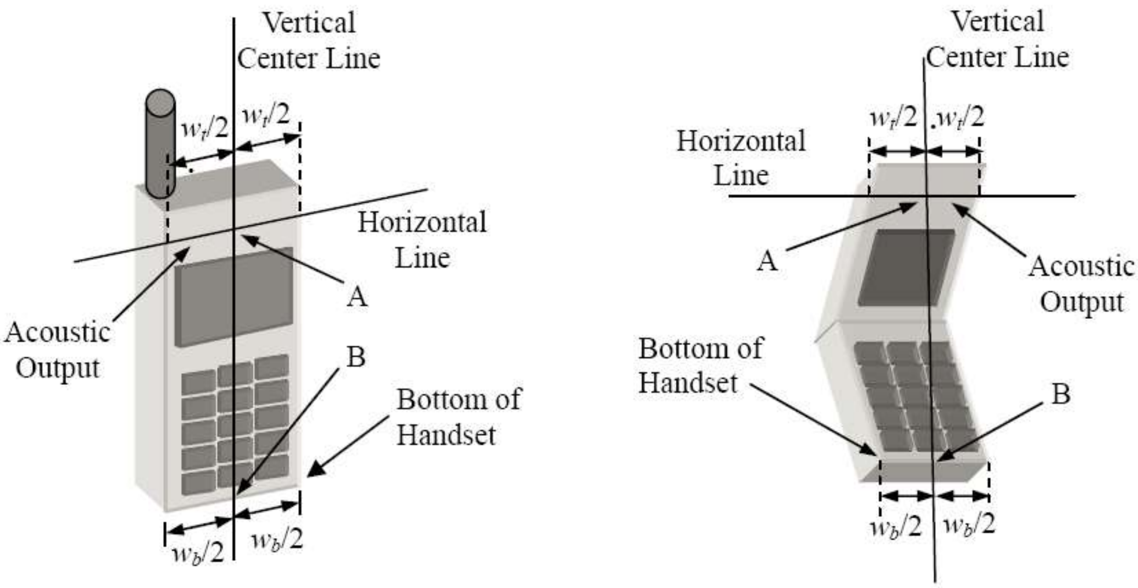


Fig. 11.2Illustration for Handset Vertical and Horizontal Reference Lines

11.2 Positioning for Cheek / Touch

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

Fig. 11.3 Illustration for Cheek Position

11.3 Positioning for Ear / 15º Tilt

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

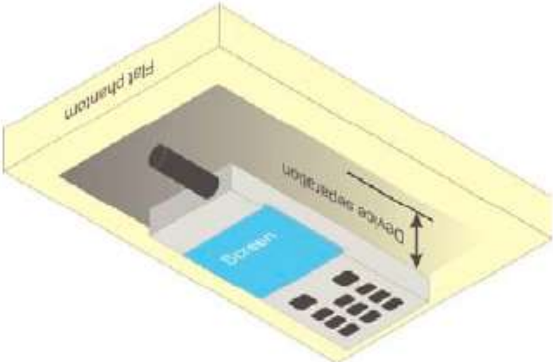
Fig.11.4 Illustration for Tilted Position

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

Antennas located near the bottom of a phone may require SAR measurements around the mouth and jaw regions of the SAM head phantom. This typically applies to clam-shell style phones that are generally longer in the unfolded normal use positions or to certain older style long rectangular phones.
Under these circumstances, the following procedures apply, adopted from the FCC guidance on document FCC KDB Publication 648474 D04v01r03. The SAR required in these regions of SAMshould be measured using a flat phantom. The phone should be positioned with a separation distance of4 mm between the ear reference point (ERP) and the outer surface of the flat phantom shell. While maintaining this distance at the ERP location, the low (bottom) edge of the phone should be lowered from the phantom to establish the same separation distance between the peak SAR locations identified by the truncated partial SAR distribution measured with the SAM phantom. The distance from the peak SARlocation to the phone is determined by the straight line passing perpendicularly through the phantomsurface. When it is not feasible to maintain 4 mm separation at the ERP while also establishing therequired separation at the peak SAR location, the top edge of the phone will be allowed to touch thephantom with a separation < 4 mm at the ERP. The phone should not be tilted to the left or right whileplaced in this inclined position to the flat phantom.

11.5 Body Worn Accessory Configurations

- To position the device parallel to the phantom surface with either keypad up or down.
- To adjust the device parallel to the flat phantom.
- To adjust the distance between the device surface and the flat phantom to 1.5 cm or holster surface and the flat phantom to 0 cm.



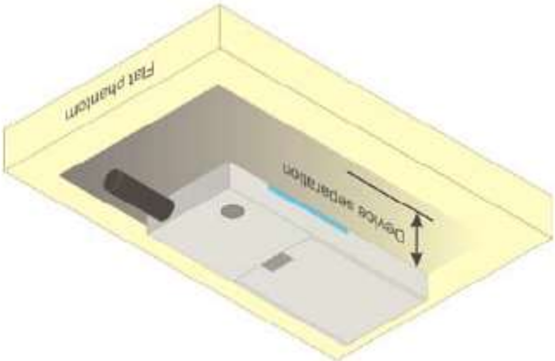


Fig.11.5 Illustration for Body Worn Position

11.6 Wireless Router (Hotspot) Configurations

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

When the user enables the personalwireless router functions for the handset, actual operations includesimultaneous transmission of both the WIFI transmitter and another licensed transmitter. Bothtransmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated forSAR under actual use conditions. Therefore, SAR must be evaluated for each frequency transmissionand mode separately and summed with the WIFI transmitter according to KDB 648474 publicationprocedures. The “Portable Hotspot” feature on the handset was NOT activated, to ensure the SARmeasurements were evaluated for a single transmission frequency RF signal.

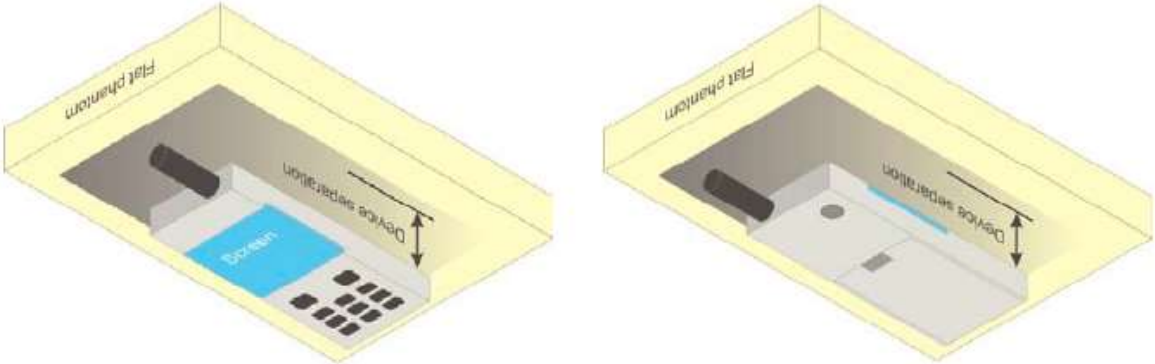


Fig.11.6 Illustration for Hotspot Position

12 Measurement Procedures

The measurement procedures are as bellows:

<Conducted power measurement>

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

<Conducted power measurement>

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

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

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

12.1 Spatial Peak SAR Evaluation

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

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

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

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

12.2 Power Reference Measurement

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

12.3 Area & Zoom Scan Procedures

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

<table>
<tr><th colspan="3"></th><th>$\leq$ 3 GHz</th><th>> 3 GHz</th></tr>
<tr><td colspan="3">Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 ± 1 mm</td><td>$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ 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>$\leq$ 2 GHz: $\leq$ 15 mm
2 – 3 GHz: $\leq$ 12 mm</td><td>3 – 4 GHz: $\leq$ 12 mm
4 – 6 GHz: $\leq$ 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 $\leq$ 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>$\leq$ 2 GHz: $\leq$ 8 mm
2 – 3 GHz: $\leq$ 5 mm*</td><td>3 – 4 GHz: $\leq$ 5 mm*
4 – 6 GHz: $\leq$ 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>$\leq$ 5 mm</td><td>3 – 4 GHz: $\leq$ 4 mm
4 – 5 GHz: $\leq$ 3 mm
5 – 6 GHz: $\leq$ 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>$\leq$ 4 mm</td><td>3 – 4 GHz: $\leq$ 3 mm
4 – 5 GHz: $\leq$ 2.5 mm
5 – 6 GHz: $\leq$ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>$\geq$ 30 mm</td><td>3 – 4 GHz: $\geq$ 28 mm
4 – 5 GHz: $\geq$ 25 mm
5 – 6 GHz: $\geq$ 22 mm</td></tr>
<tr><td colspan="5">Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.
* When zoom scan is required and the <u>reported</u> SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is $\leq$ 1.4 W/kg, $\leq$ 8 mm, $\leq$ 7 mm and $\leq$ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.</td></tr>
</table>

12.4 Volume Scan Procedures

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

12.5 SAR Averaged Methods

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

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

12.6 Power Drift Monitoring

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

13 Conducted RF Output Power

13.1 GSM Conducted Power

Band: GSM 850	Burst Average Power (dBm)			Frame-Average Power(dBm)		
Channel	128	190	251	128	190	251
Frequency (MHz)	824.2	836.6	848.8	824.2	836.6	848.8
GSM (GMSK, Voice)	**33.27**	33.25	33.23	24.27	24.25	24.23
GPRS (GMSK, 1 TX slot)	33.30	33.20	33.10	24.30	24.20	24.10
GPRS (GMSK, 2 TX slots)	**32.67**	32.63	32.61	**26.67**	26.63	26.61
GPRS (GMSK, 3 TX slots)	30.88	30.83	30.78	26.62	26.57	26.52
GPRS (GMSK, 4 TX slots)	29.61	29.59	29.48	26.61	26.59	26.48

Remark:

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

Note:

1. For Head SAR testing, GSM Voice mode should be evaluated, therefore the EUT was set in GSM 850 Voice mode.
2. For Body worn SAR testing, GSM Voice mode should be evaluated, therefore the EUT was set in GSM 850 Voice mode.
3. For Hotspot mode SAR testing, GPRS and EGPRS mode should be evaluated, therefore the EUT was set in GPRS 4 TX slots mode due to the highest frame-averaged power.
4. Per KDB447498 D01v06, the maximum output power channel is used for SAR testing and for further SAR test reduction.
5. The EUT do not support DTM and VoIP function.

Band: GSM 1900	Burst Average Power (dBm)			Frame-Average Power(dBm)		
Channel	512	661	810	512	661	810
Frequency (MHz)	1850.2	1880.0	1909.8	1850.2	1880.0	1909.8
GSM (GMSK, Voice)	**29.92**	29.84	29.75	20.92	20.84	20.75
GPRS (GMSK, 1 TX slot)	29.93	29.77	29.66	20.93	20.77	20.66
GPRS (GMSK, 2 TX slots)	29.26	29.23	29.10	23.26	23.23	23.10
GPRS (GMSK, 3 TX slots)	28.28	**28.30**	28.17	24.02	**24.04**	23.91
GPRS (GMSK, 4 TX slots)	26.26	26.33	26.16	23.26	23.33	23.16

Remark:

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

Note:

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

13.2 WCDMA Conducted Power

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

HSDPA Setup Configuration:

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

Table 1

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

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

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

Note 3: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$.

HSDPA Sub-test setup configuration

HSUPA Setup Configuration:

a. The EUT was connected to Base Station Rohde & Schwarz CMU200referred to the SetupConfiguration.
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting * :
   i. Call Configs = 5.2B, 5.9B, 5.10B, and 5.13.2B with QPSK
   ii. Set the Gain Factors (β_c and β_d) and parameters (AG Index) were set according to each specific sub-test inthe following table, C11.1.3, quoted from the TS 34.121
   iii. Set Cell Power = -86 dBm
   iv. Set Channel Type = 12.2k + HSPA
   v. Set UE Target Power
   vi. Power Ctrl Mode= Alternating bits
   vii. Set and observe the E-TFCI
   viii. Confirm that E-TFCI is equal to the target E-TFCI of 75 for sub-test 1, and other subtest's E-TFCI
d. The transmitted maximum output power was recorded.

Table 2

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

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

HSUPA Sub-test setup configuration

WCDMA Conducted Power:

WCDMA Average power (dBm)			
Band	WCDMA Band V		
Channel	4132	4183	4233
Frequency (MHz)	826.4	836.6	846.6
AMR 12.2 kbps	22.71	22.67	22.69
RMC 12.2 kbps	**22.79**	22.77	22.76
HSDPA Sub-test 1	21.75	21.72	21.66
HSDPA Sub-test 2	21.40	21.36	21.30
HSDPA Sub-test 3	21.31	21.29	21.21
HSDPA Sub-test 4	21.27	21.26	21.18
HSUPA Sub-test 1	19.80	19.79	19.83
HSUPA Sub-test 2	20.30	20.29	20.26
HSUPA Sub-test 3	20.85	20.81	20.75
HSUPA Sub-test 4	19.82	19.83	19.82
HSUPA Sub-test 5	21.74	21.73	21.30

WCDMA Average power (dBm)			
Band	WCDMA Band II		
Channel	9262	9400	9538
Frequency (MHz)	1852.4	1880.0	1907.6
AMR 12.2 kbps	22.69	22.68	22.73
RMC 12.2 kbps	22.75	22.76	**22.86**
HSDPA Sub-test 1	21.30	20.84	21.03
HSDPA Sub-test 2	20.73	20.23	20.51
HSDPA Sub-test 3	20.78	20.25	20.56
HSDPA Sub-test 4	20.75	20.22	20.58
HSUPA Sub-test 1	19.25	18.73	19.12
HSUPA Sub-test 2	19.74	19.28	19.58
HSUPA Sub-test 3	20.25	19.86	20.05
HSUPA Sub-test 4	19.21	18.82	19.08
HSUPA Sub-test 5	21.26	20.73	20.97

Note:

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

13.3 WLAN 2.4 GHz Band Conducted Power

Average Power (dBm)				
Channel	Frequency (MHz)	802.11 b	802.11 g	802.11n (HT20)
CH 01	2412	11.54	11.93	**11.97**
CH 06	2437	**11.75**	11.74	11.95
CH 11	2462	11.42	11.60	11.54

Average Power (dBm)		
Channel	Frequency (MHz)	802.11n (HT40)
CH 03	2422	9.60
CH 06	2437	11.32
CH 09	2452	9.10

Note:

1. Per KDB 447498 D01v06, the 1-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤50 mm are determined by:
   [(*max. power of channel, including tune-up tolerance, mW*)/ (*min. test separation distance, mm*)] · [√f(GHz)] ≤ 3.0 for1-g SAR, where
   - f(GHz) is the RF channel transmit frequency in GHz
   - Power and distance are rounded to the nearest mW and mm before calculation
   - The result is rounded to one decimal place for comparison

Channel	Frequency (GHz)	Max. Tune-up Power (dBm)	Max. Power (mW)	Test distance (mm)	Result	exclusion thresholds for 1-g SAR
b/CH 06	2.437	12.5	17.78	5	5.55	3.0
n20/CH 01	2.412	12.5	17.78	5	5.51	3.0

2. Base on the result of note1, RF exposure evaluation of 802.11 b mode is required.
3. Per KDB 248227 D01v02r02, choose the highest output power channel to test SAR and determine further SAR exclusion.
4. Per KDB 248227 D01v02r02, In the 2.4 GHz band, separate SAR procedures are applied to DSSS and OFDM configurations to simplify DSSS test requirements.SAR is not required for the following 2.4 GHz OFDM conditions:
   1) When KDB Publication 447498 SAR test exclusion applies to the OFDM configuration.
   2) When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.
5. The output power of all data rate were pre-scan, just the worst case (the lowest data rate) of all mode were shown in report.
6. Per KDB 248227 D01V02r02 section 2.2, when the EUT in continuously transmitting mode, the actual duty cycle is 99.7%, so the duty cycle factor is 1.01.

13.4 Bluetooth Conducted Power

Average Power (dBm)(Bluetooth)				
Channel	Frequency (MHz)	GFSK	π/4-DQPSK	8DPSK
CH 00	2402	-0.535	-0.805	-0.503
CH 39	2441	**0.127**	-0.134	0.021
CH 78	2480	-0.167	-0.295	-0.166

Average Power (dBm)		
Channel	Frequency (MHz)	BLE
CH 00	2402	-4.348
CH 20	2442	-3.767
CH 39	2480	-4.216

Note:

1. Per KDB 447498 D01v06, the 1-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤50 mm are determined by:
   [(*max. power of channel, including tune-up tolerance, mW*)/ (*min. test separation distance, mm*)] · [√f(GHz)] ≤ 3.0 for1-g SAR, where
   - f(GHz) is the RF channel transmit frequency in GHz
   - Power and distance are rounded to the nearest mW and mm before calculation
   - The result is rounded to one decimal place for comparison

Channel	Frequency (GHz)	Max. tune-up Power (dBm)	Max. Power (mW)	Test distance (mm)	Result	exclusion thresholds for 1-g SAR
39	2441	0.5	1.12	5	0.35	3.0

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

14 Exposure Positions Consideration

14.1 EUT Antenna Locations

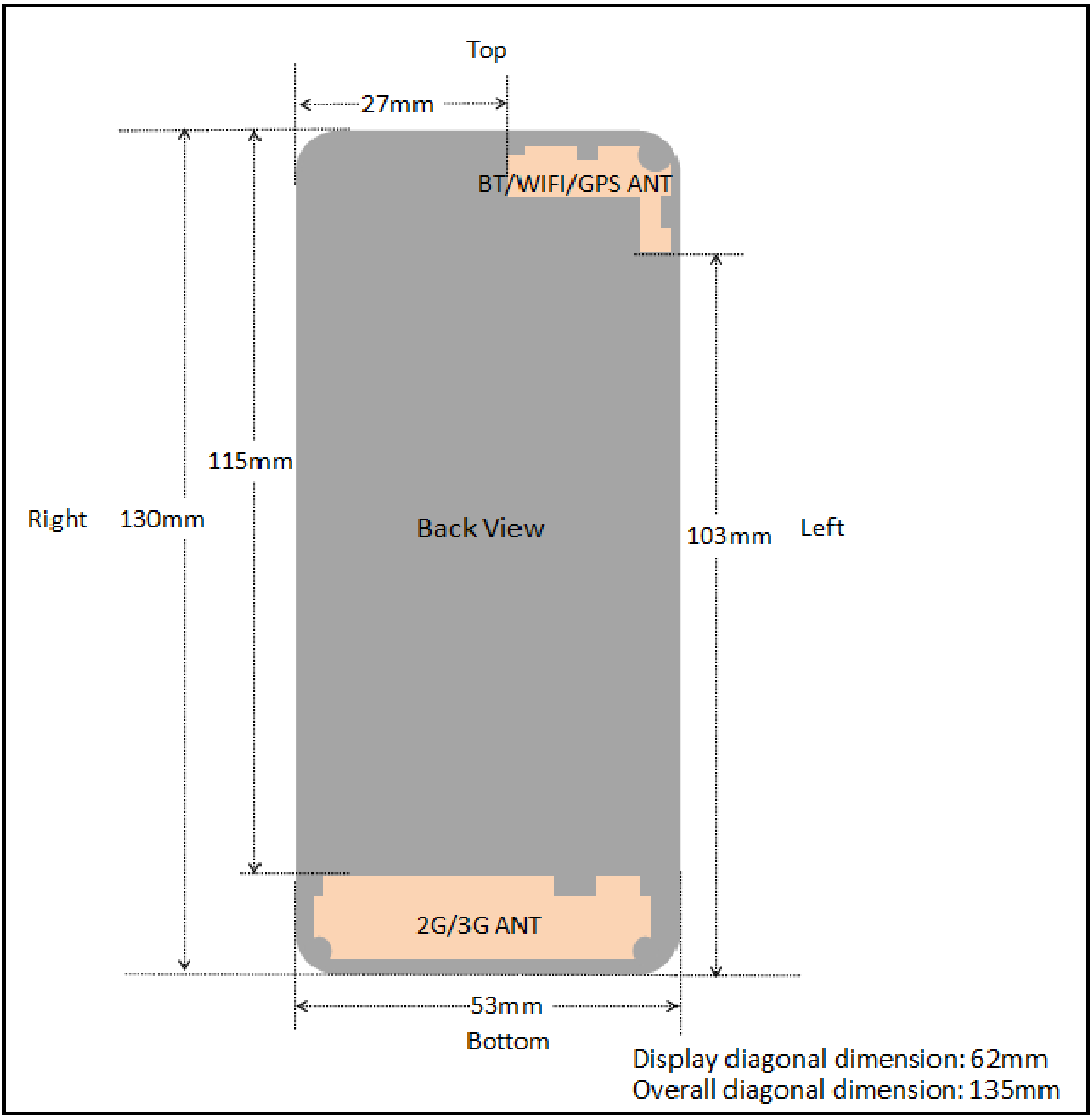


Fig.14.1 EUT Antenna Locations

Note: This antenna diagram is only used as a reference for the distance from the antenna to each edge. For the specific shape of the antenna, please refer to the physical photo.

14.2 Test Positions Consideration

Distance of Antennas to EUT edge/surface Test distance: 10mm						
Antennas	**Back**	**Front**	**Top Side**	**Bottom Side**	**Right Side**	**Left Side**
2G/3G	<25mm	<25mm	108mm	<25mm	<25mm	<25mm
WLAN & Bluetooth	<25mm	<25mm	<25mm	103mm	27mm	<25mm

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

Note:

1. Head/Body-worn/Hotspot mode SAR assessments are required.
2. Referring to KDB 941225 D06v02r01, when the overall device length and width are ≥ 9cm * 5cm, the test distance is 10mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge.
3. Per KDB 447498 D01v06, for handsets the test separation distance is determined by the smallest distance between the outer surface of the device and the user, which is 0 mm for head SAR, 10 mm for hotspot SAR, and 10 mm for body-worn SAR.

15 SAR Test Results Summary

15.1 Standalone Head SAR Data

➢ GSM Head SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
	GSM850/Voice	Right Cheek	128	824.2	33.27	-0.06	33.5	0.162	1.054	0.171
	GSM850/Voice	Right Tilted	128	824.2	33.27	0.01	33.5	0.068	1.054	0.072
1	GSM850/Voice	Left Cheek	128	824.2	33.27	0.00	33.5	**0.182**	1.054	0.192
	GSM850/Voice	Left Tilted	128	824.2	33.27	0.06	33.5	0.105	1.054	0.111
	GSM1900/Voice	Right Cheek	512	1850.2	29.92	0.05	30.5	0.042	1.143	0.048
	GSM1900/Voice	Right Tilted	512	1850.2	29.92	0.01	30.5	0.015	1.143	0.017
2	GSM1900/Voice	Left Cheek	512	1850.2	29.92	0.02	30.5	**0.053**	1.143	0.061
	GSM1900/Voice	Left Tilted	512	1850.2	29.92	-0.06	30.5	0.023	1.143	0.026
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ WCDMA Head SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
	Band V/RMC	Right Cheek	4132	826.4	22.79	0.10	23.0	0.186	1.05	0.195
	Band V/RMC	Right Tilted	4132	826.4	22.79	0.07	23.0	0.101	1.05	0.106
3	Band V/RMC	Left Cheek	4132	826.4	22.79	-0.06	23.0	**0.221**	1.05	0.232
	Band V/RMC	Left Tilted	4132	826.4	22.79	-0.11	23.0	0.123	1.05	0.129
	Band II/RMC	Right Cheek	9538	1907.6	22.86	-0.01	23.5	0.206	1.159	0.239
	Band II/RMC	Right Tilted	9538	1907.6	22.86	0.05	23.5	0.114	1.159	0.132
4	Band II/RMC	Left Cheek	9538	1907.6	22.86	-0.08	23.5	**0.253**	1.159	0.293
	Band II/RMC	Left Tilted	9538	1907.6	22.86	0.06	23.5	0.158	1.159	0.183
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ WLAN 2.4 GHz Head SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	D.C Factor	Reported SAR_{1g} (W/kg)
5	2.4GHz/802.11b	Right Cheek	6	2437	11.75	0.01	12.0	**0.193**	1.059	1.000	0.204
	2.4GHz/802.11b	Right Tilted	6	2437	11.75	0.04	12.0	0.158	1.059	1.000	0.167
	2.4GHz/802.11b	Left Cheek	6	2437	11.75	-0.04	12.0	0.086	1.059	1.000	0.091
	2.4GHz/802.11b	Left Tilted	6	2437	11.75	-0.12	12.0	0.074	1.059	1.000	0.078
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**						

Note:

1. Per KDB 447498 D01v06, for each exposure position, if the highest output power channel Reported SAR ≤0.8W/kg, other channels SAR testing is not necessary.
2. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required when the measuredSAR is ≥0.8W/kg.
3. PerKDB248227 D01v02r02, for 802.11b DSSS , when the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in that exposure configuration.
4. According toKDB 865664 D02v01r02, SAR plot is required for the highest measured SAR in each exposure configuration, wireless mode and frequency band combination.

15.2 Standalone Body SAR

➢ GSM Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
	GPRS850/2 slots	Front	128	824.2	32.67	0.04	33.0	0.728	1.079	0.786
	GPRS850/2 slots	Back	128	824.2	32.67	-0.01	33.0	0.899	1.079	0.970
	GPRS850/2 slots	Back	190	836.6	32.63	0.06	33.0	0.870	1.089	0.947
6	GPRS850/2 slots	Back	251	848.8	32.61	0.02	33.0	**1.020**	1.094	1.116
	GPRS850/2 slots	**Back**	**251**	**848.8**	**32.61**	**0.06**	**33.0**	**1.000**	**1.094**	**1.094**
	GPRS1900/3 slots	Front	661	1880	28.30	0.06	29.0	0.268	1.175	0.315
7	GPRS1900/3 slots	Back	661	1880	28.30	0.03	29.0	**0.455**	1.175	0.535
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ WCDMA Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
	Band V/RMC	Front	4132	826.4	22.79	0.02	23.0	0.502	1.050	0.527
8	Band V/RMC	Back	4132	826.4	22.79	0.01	23.0	**0.559**	1.050	0.587
	Band II/RMC	Front	9538	1907.6	22.86	-0.11	23.5	0.088	1.159	0.102
9	Band II/RMC	Back	9538	1907.6	22.86	-0.08	23.5	**0.197**	1.159	0.228
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ WLAN 2.4 GHz Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	D.C Factor	Reported SAR_{1g} (W/kg)
	2.4GHz/802.11b	Front	6	2437	11.75	-0.14	12.0	0.044	1.059	1.01	0.047
10	2.4GHz/802.11b	Back	6	2437	11.75	0.08	12.0	**0.291**	1.059	1.01	0.308
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**						

Note:

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

15.3 Body SAR in Hotspot Mode

➢ GSM Body SAR in Hotspot mode

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
	GPRS850/2 slots	Front	128	824.2	32.67	0.04	33.0	0.728	1.079	0.786
	GPRS850/2 slots	Back	128	824.2	32.67	-0.01	33.0	0.899	1.079	0.970
	GPRS850/2 slots	Back	190	836.6	32.63	0.06	33.0	0.870	1.089	0.947
6	GPRS850/2 slots	Back	251	848.8	32.61	0.02	33.0	**1.020**	1.094	1.116
	GPRS850/2 slots	**Back**	**251**	**848.8**	**32.61**	**0.06**	**33.0**	**1.000**	**1.094**	**1.094**
	GPRS850/2 slots	Left	128	824.2	32.67	0.02	33.0	0.633	1.079	0.683
	GPRS850/2 slots	Right	128	824.2	32.67	-0.08	33.0	0.628	1.079	0.678
	GPRS850/2 slots	Bottom	128	824.2	32.67	0.05	33.0	0.158	1.079	0.170
7	GPRS1900/3 slots	Front	661	1880	28.30	0.06	29.0	0.268	1.175	0.315
	GPRS1900/3 slots	Back	661	1880	28.30	0.03	29.0	**0.455**	1.175	0.535
	GPRS1900/3 slots	Left	661	1880	28.30	0.05	29.0	0.106	1.175	0.125
	GPRS1900/3 slots	Right	661	1880	28.30	-0.05	29.0	0.125	1.175	0.147
	GPRS1900/3 slots	Bottom	661	1880	28.30	-0.06	29.0	0.216	1.175	0.254
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ WCDMA Body SAR in Hotspot mode

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
	Band V/RMC	Front	4132	826.4	22.79	0.02	23.0	0.502	1.050	0.527
8	Band V/RMC	Back	4132	826.4	22.79	0.01	23.0	**0.559**	1.050	0.587
	Band V/RMC	Left	4132	826.4	22.79	0.06	23.0	0.325	1.050	0.341
	Band V/RMC	Right	4132	826.4	22.79	-0.14	23.0	0.342	1.050	0.359
	Band V/RMC	Bottom	4132	826.4	22.79	-0.08	23.0	0.131	1.050	0.138
	Band II/RMC	Front	9538	1907.6	22.86	-0.11	23.5	0.088	1.159	0.102
9	Band II/RMC	Back	9538	1907.6	22.86	-0.08	23.5	**0.197**	1.159	0.228
	Band II/RMC	Left	9538	1907.6	22.86	0.05	23.5	0.045	1.159	0.052
	Band II/RMC	Right	9538	1907.6	22.86	-0.01	23.5	0.052	1.159	0.060
	Band II/RMC	Bottom	9538	1907.6	22.86	0.07	23.5	0.155	1.159	0.180
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ WLAN 2.4GHz Body SAR in Hotspot mode

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	D.C Factor	Reported SAR_{1g} (W/kg)
	2.4GHz/802.11b	Front	6	2437	11.75	-0.14	12.0	0.044	1.059	1.01	0.047
10	2.4GHz/802.11b	Back	6	2437	11.75	0.08	12.0	**0.291**	1.059	1.01	0.308
	2.4GHz/802.11b	Left	6	2437	11.75	0.06	12.0	0.136	1.059	1.01	0.144
	2.4GHz/802.11b	Top	6	2437	11.75	-0.05	12.0	0.114	1.059	1.01	0.121
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**						

Note:

1. Per KDB 447498 D01v06, for each exposure position, if the highest output channel Reported SAR ≤0.8W/kg, otherchannels SAR testing is not necessary.
2. Additional WLAN SAR testing was performed for simultaneous transmission analysis.
3. For Hotspot SAR testing, per KDB 941225 D06v02r01, for EUT dimension ≥ 9cm*5cm, the test distance is 10mm. SAR mustbe measured for all surfaces and sides with a transmitting antenna located within 2.5cm from that surface or edge.
4. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. If HSDPA output power is <0.25dB higher than RMC 12.2kbps, or Reported SAR with RMC 12.2kbps setting is ≤ 1.2W/kg, HSDPA SAR evaluationcan be

excluded.

5. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required when the measuredSAR is ≥0.8W/kg.
6. According toKDB 865664 D02v01r02, SAR plot is required for the highest measured SAR in each exposure configuration, wireless mode and frequency band combination.
7. Per KDB248227 D01v02r02, OFDM SARis not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.Cuz the maximum output powerspecified for OFDM and DSSS are 17.78mW(12.5dBm) and 17.78mW(12.5dBm), the scaled SAR would be 0.308×(17.78/17.78)=0.308W/Kg < 1.2 W/kg, therefore, SAR is not required for OFDM.
8. Highlight part of test data means repeated test.

15.4 Repeated SAR measurement

Band/ Mode	Test Position	CH.	Freq. (MHz)	Measured SAR (W/kg)				
				Original	1st Repeated		2nd Repeated	
					Value	Ratio	Value	Ratio
GPRS850/2 slots	Back	251	848.8	1.02	1.00	1.02	/	/
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population				**1.6 W/kg (mW/g) Averaged over 1g**				

Note:

1. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when themeasuredSAR is ≥0.8W/kg
2. Per KDB 865664 D01v01r04, if the ratio of *original* and *repeated* is ≤ 1.2and the measured SAR <1.45W/kg,only one repeated measurement is required.

15.5 Multi-Band Simultaneous Transmission Considerations

➢ **Simultaneous Transmission Capabilities**

AccordingtoFCC KDB Publication 447498 D01v06, transmitters are considered to be transmittingsimultaneously when there is overlapping transmission, with the exception of transmissions duringnetwork hand-offs with maximum hand-off duration less than 30 seconds. Possible transmission paths forthe EUT are shown in below Figure and are color-coded to indicate communication modes which share thesame path. Modes which share the same transmission path cannot transmit simultaneously with oneanother.

Path 1	Path 2
GSM/WCDMA	Bluetooth/WLAN

Fig.15.1 Simultaneous Transmission Paths

➢ **Simultaneous Transmission Procedures**

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

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

Mode	Max. tune-up Power (dBm)	Exposure Position	Head	Body	Hotspot
		Test Distance (mm)	0	10	10
Bluetooth	0.127	Estimated SAR (W/kg)	0.043	0.021	0.021

Note:

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

➢ **Multi-Band simultaneous Transmission Consideration**

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

Note:

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

15.6 SAR Simultaneous Transmission Analysis

➢ **Head Simultaneous Transmission**

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	ΣSAR (W/kg)
GSM850	Right Cheek	0.171	0.204	0.375
	Right Tilted	0.072	0.167	0.239
	Left Cheek	0.192	0.091	0.283
	Left Tilted	0.111	0.078	0.189

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	ΣSAR (W/kg)
GSM850	Right Cheek	0.171	0.043	0.214
	Right Tilted	0.072	0.043	0.115
	Left Cheek	0.192	0.043	0.235
	Left Tilted	0.111	0.043	0.154

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	ΣSAR (W/kg)
GSM 1900	Right Cheek	0.048	0.204	0.252
	Right Tilted	0.017	0.167	0.184
	Left Cheek	0.061	0.091	0.152
	Left Tilted	0.026	0.078	0.104

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	ΣSAR (W/kg)
GSM 1900	Right Cheek	0.048	0.043	0.091
	Right Tilted	0.017	0.043	0.060
	Left Cheek	0.061	0.043	0.104
	Left Tilted	0.026	0.043	0.069

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	ΣSAR (W/kg)
WCDMA Band IV	Right Cheek	0.195	0.204	0.399
	Right Tilted	0.106	0.167	0.273
	Left Cheek	0.232	0.091	0.323
	Left Tilted	0.129	0.078	0.207

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	ΣSAR (W/kg)
WCDMA Band IV	Right Cheek	0.195	0.043	0.238
	Right Tilted	0.106	0.043	0.149
	Left Cheek	0.232	0.043	0.275
	Left Tilted	0.129	0.043	0.172

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	ΣSAR (W/kg)
WCDMA Band II	Right Cheek	0.239	0.204	0.443
	Right Tilted	0.132	0.167	0.299
	Left Cheek	0.293	0.091	0.384
	Left Tilted	0.183	0.078	0.261

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	ΣSAR (W/kg)
WCDMA Band II	Right Cheek	0.239	0.043	0.282
	Right Tilted	0.132	0.043	0.175
	Left Cheek	0.293	0.043	0.336
	Left Tilted	0.183	0.043	0.226

➢ **Body worn Simultaneous Transmission**

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	ΣSAR (W/kg)
GSM850	Front	0.786	0.047	0.833
	Back	1.116	0.308	1.424

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	ΣSAR (W/kg)
GSM850	Front	0.786	0.021	0.807
	Back	1.116	0.021	1.137

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	ΣSAR (W/kg)
GSM 1900	Front	0.315	0.047	0.362
	Back	0.535	0.308	0.843

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	ΣSAR (W/kg)
GSM 1900	Front	0.315	0.021	0.336
	Back	0.535	0.021	0.556

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	ΣSAR (W/kg)
WCDMA Band V	Front	0.527	0.047	0.574
	Back	0.587	0.308	0.895

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	ΣSAR (W/kg)
WCDMA Band V	Front	0.527	0.021	0.548
	Back	0.587	0.021	0.608

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	ΣSAR (W/kg)
WCDMA Band II	Front	0.102	0.047	0.149
	Back	0.228	0.308	0.536

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	ΣSAR (W/kg)
WCDMA Band II	Front	0.102	0.021	0.123
	Back	0.228	0.021	0.249

➢ **Hotspot mode Simultaneous Transmission**

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	ΣSAR (W/kg)		WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	ΣSAR (W/kg)
GSM850	Front	0.786	0.047	0.833		GSM850	Front	0.786	0.021	0.807
	Back	1.116	0.308	1.424			Back	1.116	0.021	1.137
	Left	0.683	0.144	0.827			Left	0.683	0.021	0.704
	Right	0.678	/	0.678			Right	0.678	0.021	0.699
	Top	/	0.121	0.121			Top	/	0.021	0.021
	Bottom	0.170	/	0.170			Bottom	0.170	0.021	0.191

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	ΣSAR (W/kg)		WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	ΣSAR (W/kg)
GSM 1900	Front	0.315	0.047	0.362		GSM 1900	Front	0.315	0.021	0.336
	Back	0.535	0.308	0.843			Back	0.535	0.021	0.556
	Left	0.125	0.144	0.269			Left	0.125	0.021	0.146
	Right	0.147	/	0.147			Right	0.147	0.021	0.168
	Top	/	0.121	0.121			Top	/	0.021	0.021
	Bottom	0.254	/	0.254			Bottom	0.254	0.021	0.275

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	ΣSAR (W/kg)		WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	ΣSAR (W/kg)
WCDMA Band IV	Front	0.527	0.047	0.574		WCDMA Band IV	Front	0.527	0.021	0.548
	Back	0.587	0.308	0.895			Back	0.587	0.021	0.608
	Left	0.341	0.144	0.485			Left	0.341	0.021	0.362
	Right	0.359	/	0.359			Right	0.359	0.021	0.380
	Top	/	0.121	0.121			Top	/	0.021	0.021
	Bottom	0.138	/	0.138			Bottom	0.138	0.021	0.159

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	ΣSAR (W/kg)		WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	ΣSAR (W/kg)
WCDMA Band II	Front	0.102	0.047	0.149		WCDMA Band II	Front	0.102	0.021	0.123
	Back	0.228	0.308	0.536			Back	0.228	0.021	0.249
	Left	0.052	0.144	0.196			Left	0.052	0.021	0.073
	Right	0.060	/	0.060			Right	0.060	0.021	0.081
	Top	/	0.121	0.121			Top	/	0.021	0.021
	Bottom	0.180	/	0.180			Bottom	0.180	0.021	0.201

➢ **Simultaneous Transmission Conclusion**

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

15.7 Measurement Uncertainty

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

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

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

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

Standard Uncertainty for Assumed Distribution

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

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

Uncertainty Component	Section	Uncert. Value	Prob. Dist.	Div.	(C_i) (1 g)	(C_i) (10 g)	Std. Unc. (1 g)	Std. Unc. (10 g)	V_i
Measurement System									
Probe Calibration	E.2.1	±7.4%	N	1	1	1	±7.4%	±7.4%	∞
Axial Isotropy	E.2.2	±1.2%	R	$\sqrt{3}$	0.7	0.7	±0.49%	±0.49%	∞
Hemispherical Isotropy	E.2.2	±0.9%	R	$\sqrt{3}$	0.7	0.7	±0.36%	±0.36%	∞
Boundary Effects	E.2.3	±1.0%	R	$\sqrt{3}$	1	1	±0.58%	±0.58%	∞
Linearity	E.2.4	±0.9%	R	$\sqrt{3}$	1	1	±0.52%	±0.52%	∞
System Detection Limits	E.2.5	±0.25%	R	$\sqrt{3}$	1	1	±0.14%	±0.14%	∞
Readout Electronics	E.2.6	±0.3%	N	1	1	1	±0.3%	±0.3%	∞
Response Time	E.2.7	±0.8%	R	$\sqrt{3}$	1	1	±0.46%	±0.46%	∞
Integration Time	E.2.8	±2.6%	R	$\sqrt{3}$	1	1	±1.5%	±1.5%	∞
RF Ambient Noise	E.6.1	±3.0%	R	$\sqrt{3}$	1	1	±1.73%	±1.73%	∞
RF Ambient Reflections	E.6.1	±3.0%	R	$\sqrt{3}$	1	1	±1.73%	±1.73%	∞
Probe positioner mechanical tolerances	E.6.2	±0.4%	R	$\sqrt{3}$	1	1	±0.23%	±0.23%	∞
Probe positioning tolerance with respect to the phantom shell surface	E.6.3	±2.9%	R	$\sqrt{3}$	1	1	±1.68%	±1.68%	∞
Interpolation, extrapolation, and integration algorithm For max. SAR Evaluation.	E.5	±1.0%	R	$\sqrt{3}$	1	1	±0.58%	±0.58%	∞
Test Sample Related									
Device Positioning	E.4.2	±4.6%	N	1	1	1	±4.6%	±4.6%	M-1
Device Holder	E.4.1	±5.2%	N	1	1	1	±5.2%	±5.2%	M-1
Power Drift	6.6.2	±5.0%	R	$\sqrt{3}$	1	1	±2.89%	±2.89%	∞
Phantom and Setup									
Phantom Uncertainty	E.3.1	±4.0%	R	$\sqrt{3}$	1	1	±2.31%	±2.31%	∞
Liquid conductivity (measured value)	E.3.3	±3.33%	N	1	0.78	0.71	±2.6%	±2.6%	M
Liquid dielectric constant (measured value)	E.3.3	±3.25%	N	1	0.23	0.26	±0.75%	±0.85%	M
Liquid Conductivity - Temperature Uncertainty	E.3.4	±1.3%	R	$\sqrt{3}$	0.78	0.71	±0.59%	±0.53%	∞
Liquid Dielectric Constant - Temperature Uncertainty	E.3.4	±1.1%	R	$\sqrt{3}$	0.23	0.26	±0.15%	±0.17%	∞
Combined Standard Uncertainty (RSS)							±11.56%	±11.50%	
Expanded Uncertainty (95% Confidence Level, k = 2)							±23.11%	±23.0%	

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

15.8 Measurement Conclusion

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

16 Reference

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

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

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

[11]. FCC KDB 865664 D01 v01r04, “SAR MEASUREMENT REQUIREMENTS FOR 100 MHz TO 6 GHz”, August2015

Appendix A: Plots of SAR System Check

Test Laboratory: JYTSZ Date: 09.02.2021

DUT: Dipole 835 MHz; Type: D835V2; Serial: SN:4D154

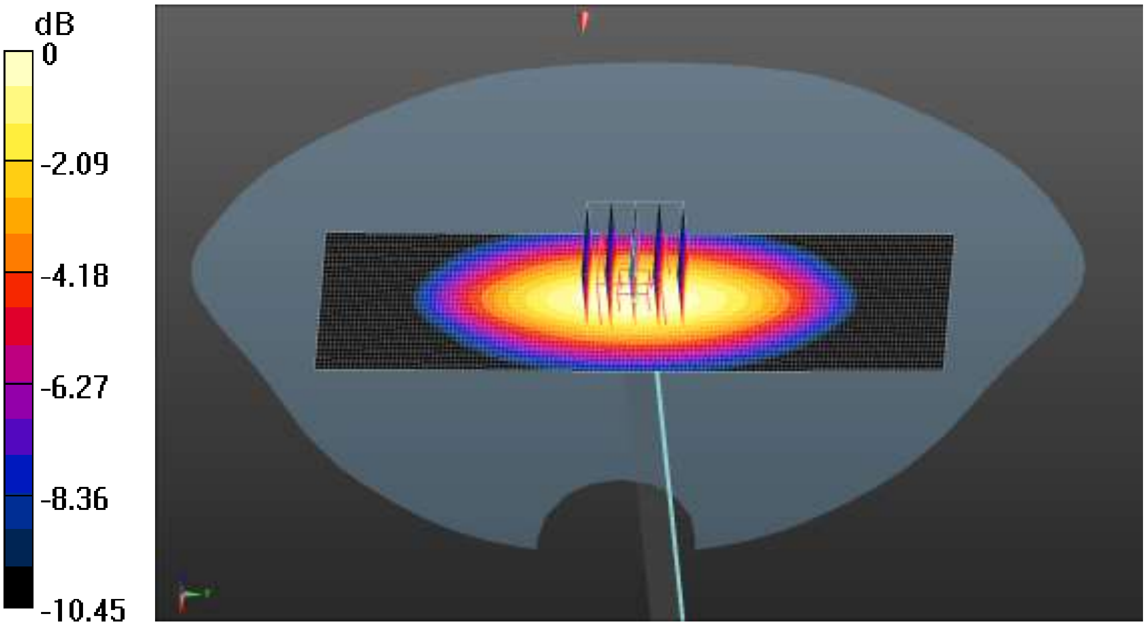
Communication System: UID 0, CW (0); Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.908 S/m; ε_r = 42.761; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(9.71, 9.71, 9.71) @ 835 MHz; Calibrated: 09.23.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1452; Calibrated: 05.26.2021
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

System Performance Check at Frequency 835 MHz Head Tissue/d=15mm, Pin=80 mW, dist=1.4mm (EX-Probe)/Area Scan (41x141x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.11 W/kg

System Performance Check at Frequency 835 MHz Head Tissue/d=15mm, Pin=80 mW, dist=1.4mm (EX-Probe)/Zoom Scan (7x7x7) (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 35.53 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.32 W/kg
SAR(1 g) = 0.792 W/kg; SAR(10 g) = 0.507 W/kg
Smallest distance from peaks to all points 3 dB below = 17.6 mm
Ratio of SAR at M2 to SAR at M1 = 60.2%
Maximum value of SAR (measured) = 1.11 W/kg



0 dB = 1.11 W/kg = 0.45 dBW/kg

Test Laboratory: JYTSZ Date: 09.03.2021

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

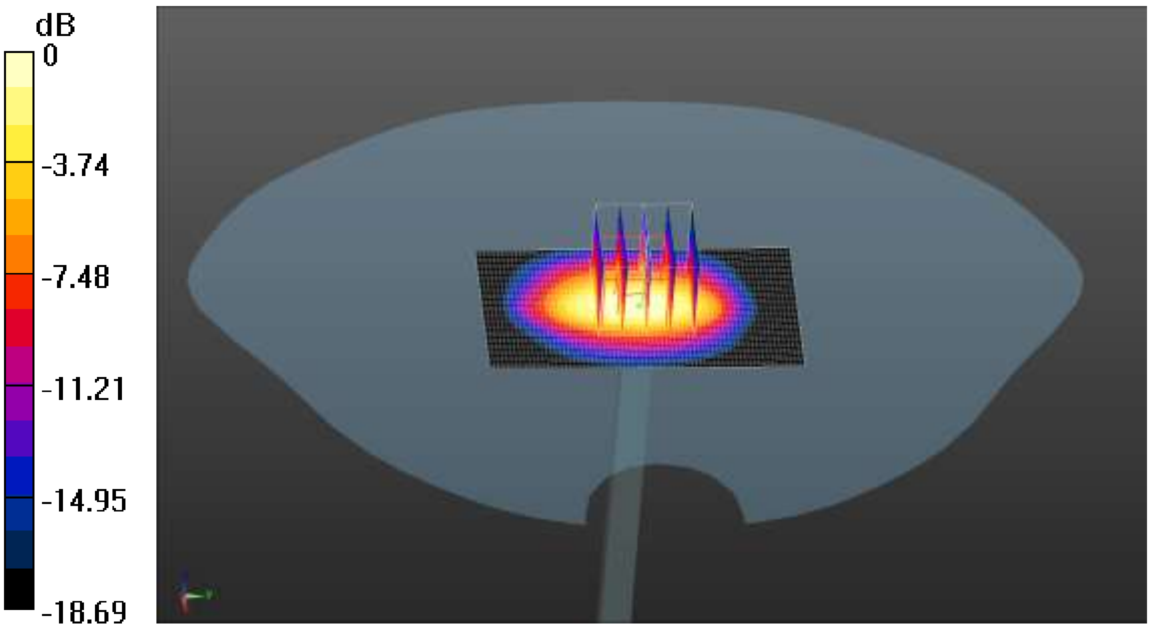
Communication System: UID 0, CW (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.443 S/m; ε_r = 39.852; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(8.14, 8.14, 8.14) @ 1900 MHz; Calibrated: 09.23.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1452; Calibrated: 05.26.2021
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

System Performance Check at Frequency 1900 MHz Head Tissue/d=10mm, Pin=40 mW, dist=1.4mm (EX-Probe)/Area Scan (41x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 2.55 W/kg

System Performance Check at Frequency 1900 MHz Head Tissue/d=10mm, Pin=40 mW, dist=1.4mm (EX-Probe)/Zoom Scan (7x7x7) (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 42.04 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 3.08 W/kg
SAR(1 g) = 1.53 W/kg; SAR(10 g) = 0.810 W/kg
Smallest distance from peaks to all points 3 dB below = 9.2 mm
Ratio of SAR at M2 to SAR at M1 = 52.3%
Maximum value of SAR (measured) = 2.48 W/kg



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

Test Laboratory: JYTSZ   Date: 08.31.2021

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

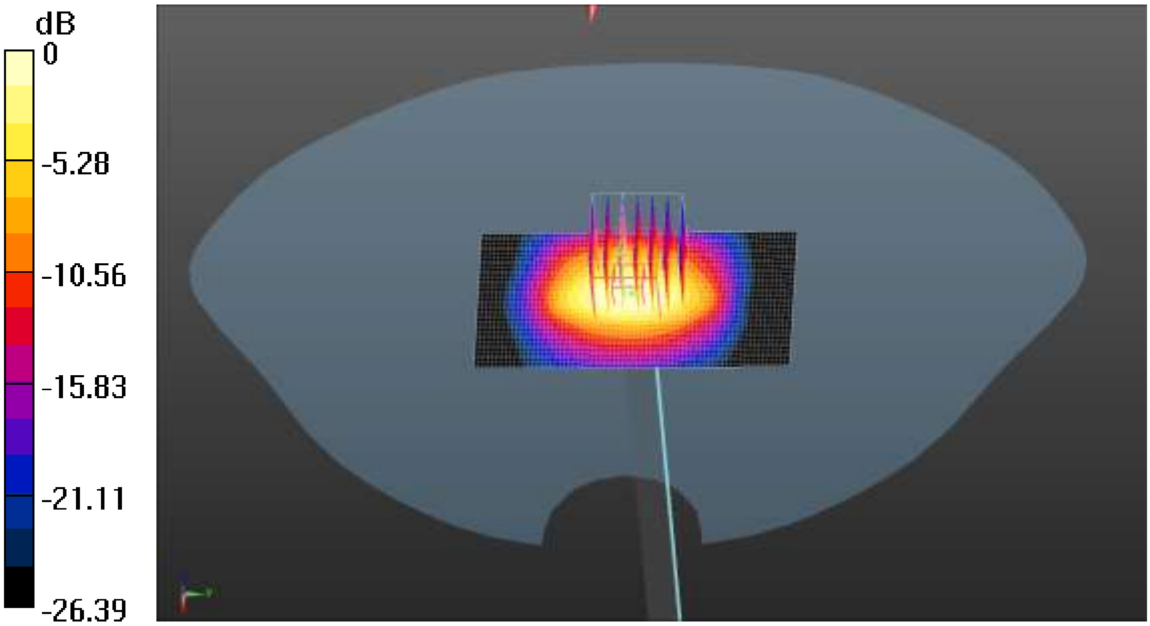
Communication System: UID 0, CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.858 S/m; ε_r = 38.463; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(7.58, 7.58, 7.58) @ 2450 MHz; Calibrated: 09.23.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1452; Calibrated: 05.26.2021
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

System Performance Check at Frequency 2450 MHz Head Tissue/d=10mm, Pin=40 mW, dist=1.4mm (EX-Probe)/Area Scan (41x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 3.45 W/kg

System Performance Check at Frequency 2450 MHz Head Tissue/d=10mm, Pin=40 mW, dist=1.4mm (EX-Probe)/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 44.46 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 4.52 W/kg
SAR(1 g) = 2.14 W/kg; SAR(10 g) = 0.987 W/kg
Smallest distance from peaks to all points 3 dB below = 10.2 mm
Ratio of SAR at M2 to SAR at M1 = 44.9%
Maximum value of SAR (measured) = 3.38 W/kg



0 dB = 3.38 W/kg = 5.29 dBW/kg

Appendix B: Plots of SAR Test Data

Test Laboratory: JYTSZ　　　　　　　　　　　　　　　　Date: 09.02.2021

DUT: Smart Phone; Type: B8K; Serial: 3#

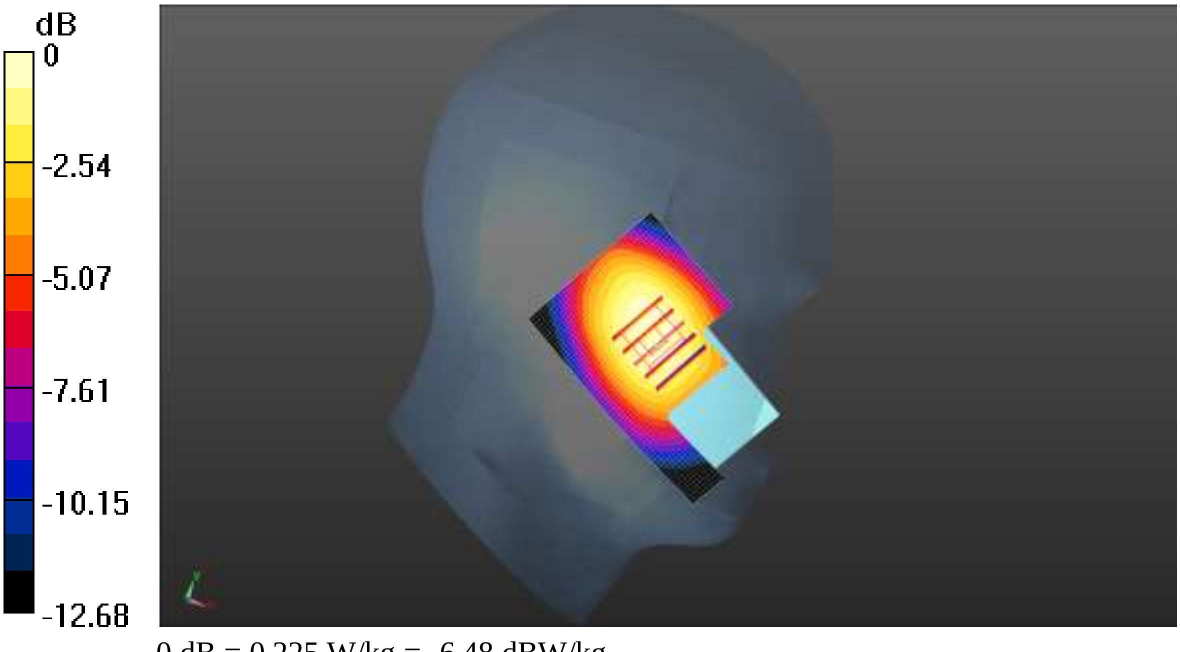
Communication System: UID 0, GSM (0); Frequency: 824.2 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 824.2 MHz; σ = 0.901 S/m; ε_r = 42.361; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(9.71, 9.71, 9.71) @ 824.2 MHz; Calibrated: 09.23.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1452; Calibrated: 05.26.2021
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

GSM 850 Left Cheek/Low Channel/Area Scan (41x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.220 W/kg

GSM 850 Left Cheek/Low Channel/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.556 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 0.253 W/kg
SAR(1 g) = 0.182 W/kg; SAR(10 g) = 0.130 W/kg
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid
Ratio of SAR at M2 to SAR at M1 = 71.9%
Maximum value of SAR (measured) = 0.225 W/kg



0 dB = 0.225 W/kg = -6.48 dBW/kg

Test Laboratory: JYTSZ　　Date: 09.03.2021

DUT: Smart Phone; Type: B8K; Serial: 3#

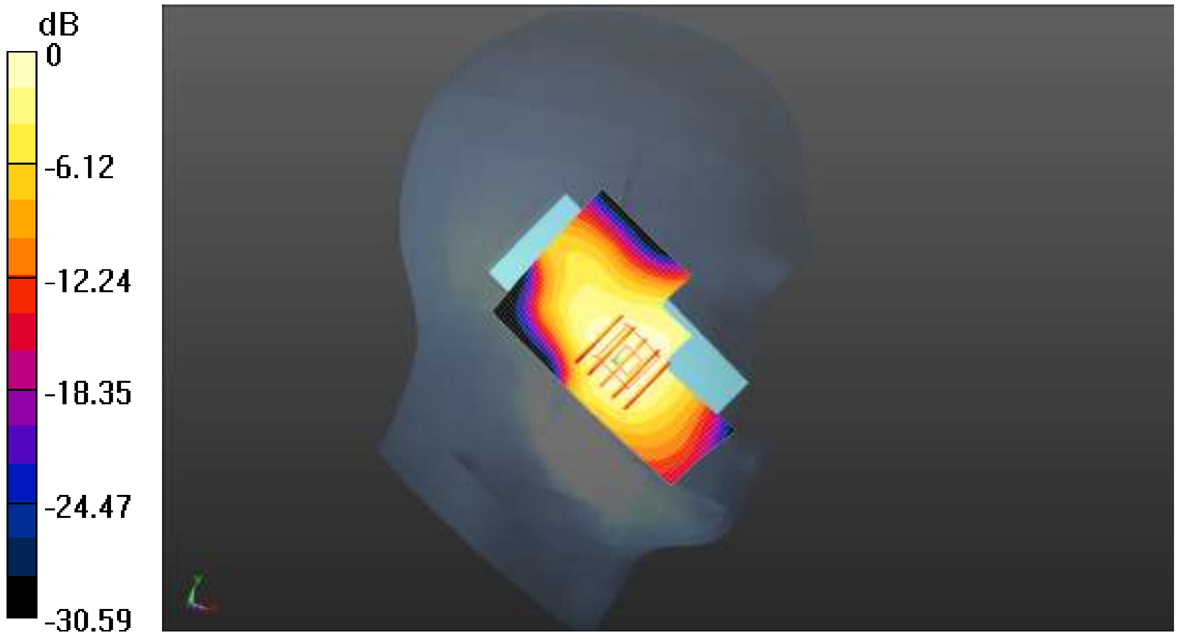
Communication System: UID 0, GSM (0); Frequency: 1850.2 MHz;Duty Cycle: 1:8.30042
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.43 S/m; ε_r = 39.929; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(8.14, 8.14, 8.14) @ 1850.2 MHz; Calibrated: 09.23.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1452; Calibrated: 05.26.2021
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

GSM 1900 Left Cheek/Low Channel/Area Scan (41x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.0785 W/kg

GSM 1900 Left Cheek/Low Channel/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.305 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.0840 W/kg
SAR(1 g) = 0.053 W/kg; SAR(10 g) = 0.032 W/kg
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid
Ratio of SAR at M2 to SAR at M1 = 63.2%
Maximum value of SAR (measured) = 0.0711 W/kg



0 dB = 0.0711 W/kg = -11.48 dBW/kg

Test Laboratory: JYTSZ Date: 09.02.2021

DUT: Smart Phone; Type: B8K; Serial: 3#

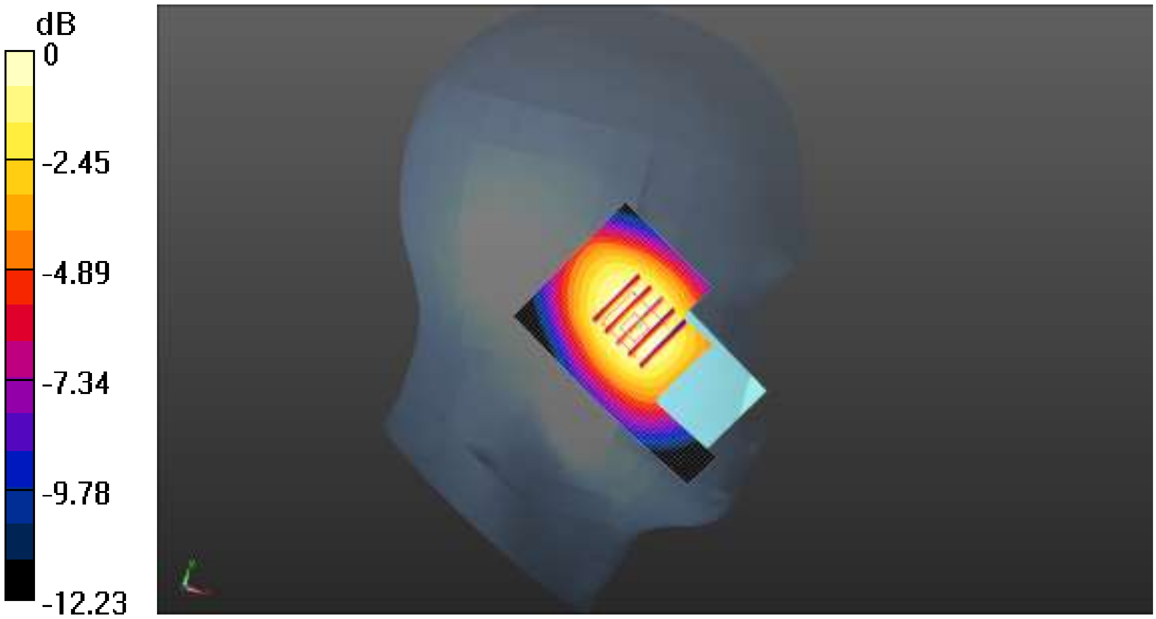
Communication System: UID 0, UMTS-FDD(WCDMA) (0); Frequency: 826.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 826.4 MHz; σ = 0.9 S/m; ε_r = 42.374; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(9.71, 9.71, 9.71) @ 826.4 MHz; Calibrated: 09.23.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1452; Calibrated: 05.26.2021
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

WCDMA 850 Left Cheek/Low Channel/Area Scan (41x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.278 W/kg

WCDMA 850 Left Cheek/Low Channel/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.069 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.307 W/kg
SAR(1 g) = 0.221 W/kg; SAR(10 g) = 0.156 W/kg
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid
Ratio of SAR at M2 to SAR at M1 = 73%
Maximum value of SAR (measured) = 0.275 W/kg



0 dB = 0.275 W/kg = -5.61 dBW/kg

Test Laboratory: JYTSZ   Date: 09.03.2021

DUT: Smart Phone; Type: B8K; Serial: 3#

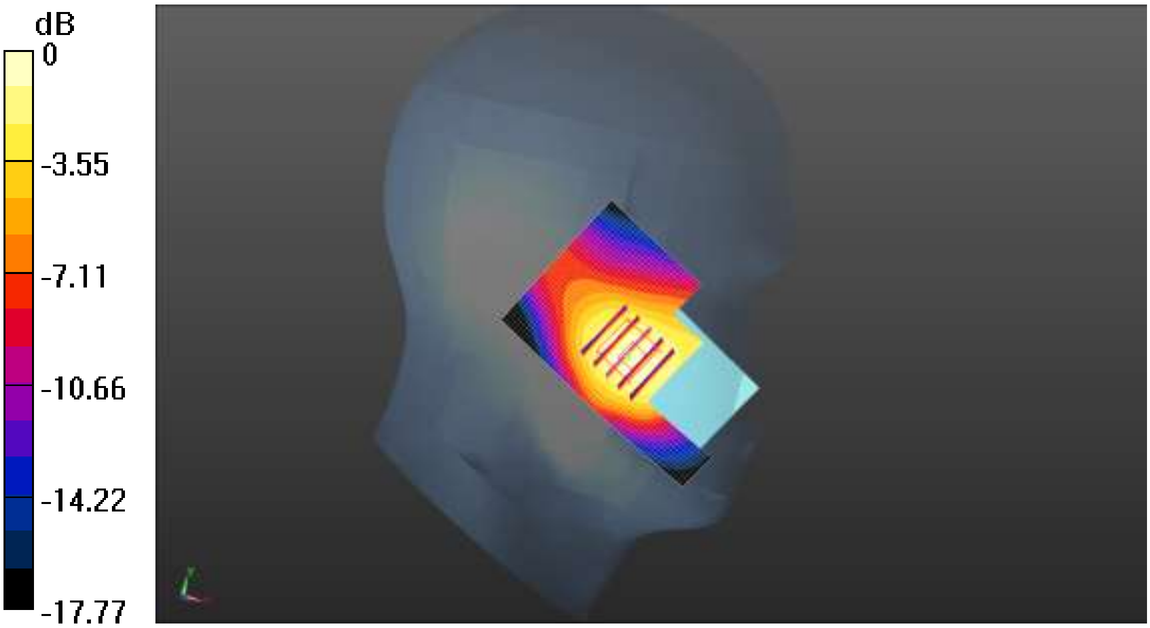
Communication System: UID 0, UMTS-FDD(WCDMA) (0); Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1907.6 MHz; σ = 1.437 S/m; ε_r = 39.875; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(8.14, 8.14, 8.14) @ 1907.6 MHz; Calibrated: 09.23.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1452; Calibrated: 05.26.2021
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

WCDMA 1900 Left Cheek/High Channel/Area Scan (41x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.339 W/kg

WCDMA 1900 Left Cheek/High Channel/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.121 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 0.409 W/kg
SAR(1 g) = 0.253 W/kg; SAR(10 g) = 0.154 W/kg
Smallest distance from peaks to all points 3 dB below = 15.8 mm
Ratio of SAR at M2 to SAR at M1 = 62.3%
Maximum value of SAR (measured) = 0.353 W/kg



0 dB = 0.353 W/kg = -4.52 dBW/kg

Test Laboratory: JYTSZ Date: 08.31.2021

DUT: Smart Phone; Type: B8K; Serial: 3#

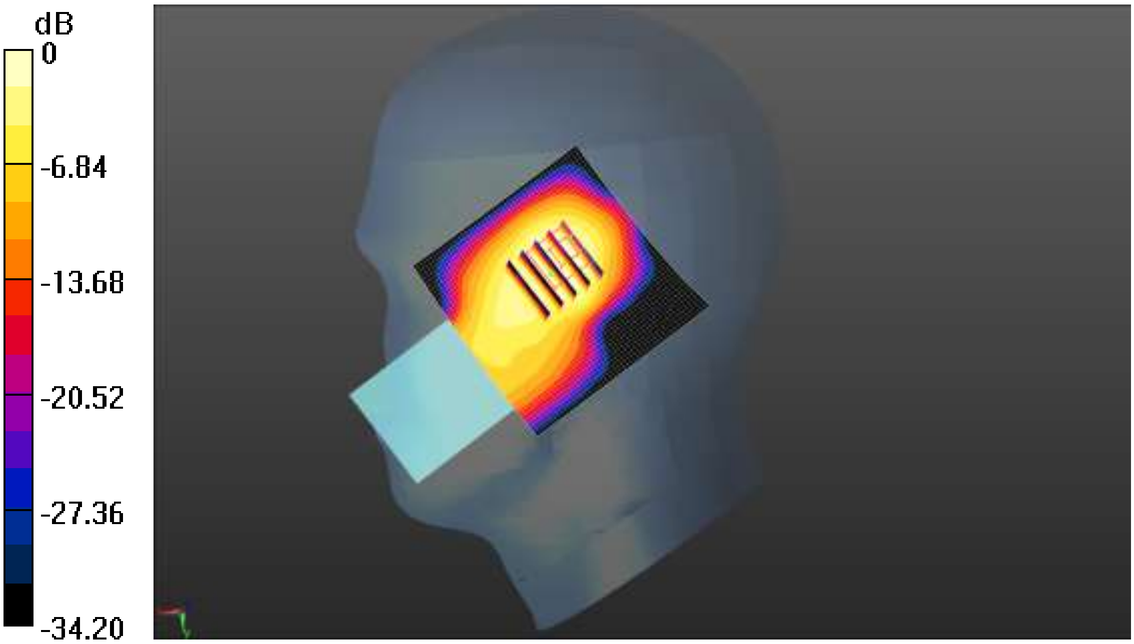
Communication System: UID 0, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps) (0);
Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.844 S/m; ε_r = 38.857; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(7.58, 7.58, 7.58) @ 2437 MHz; Calibrated: 09.23.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1452; Calibrated: 05.26.2021
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

WIFI Right Cheek/Middle Channel/Area Scan (51x51x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.324 W/kg

WIFI Right Cheek/Middle Channel/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.705 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.412 W/kg
SAR(1 g) = 0.193 W/kg; SAR(10 g) = 0.087 W/kg
Smallest distance from peaks to all points 3 dB below = 13.2 mm
Ratio of SAR at M2 to SAR at M1 = 46.7%
Maximum value of SAR (measured) = 0.308 W/kg



0 dB = 0.308 W/kg = -5.11 dBW/kg

Test Laboratory: JYTSZ Date: 09.02.2021

DUT: Smart Phone; Type: B8K; Serial: 3#

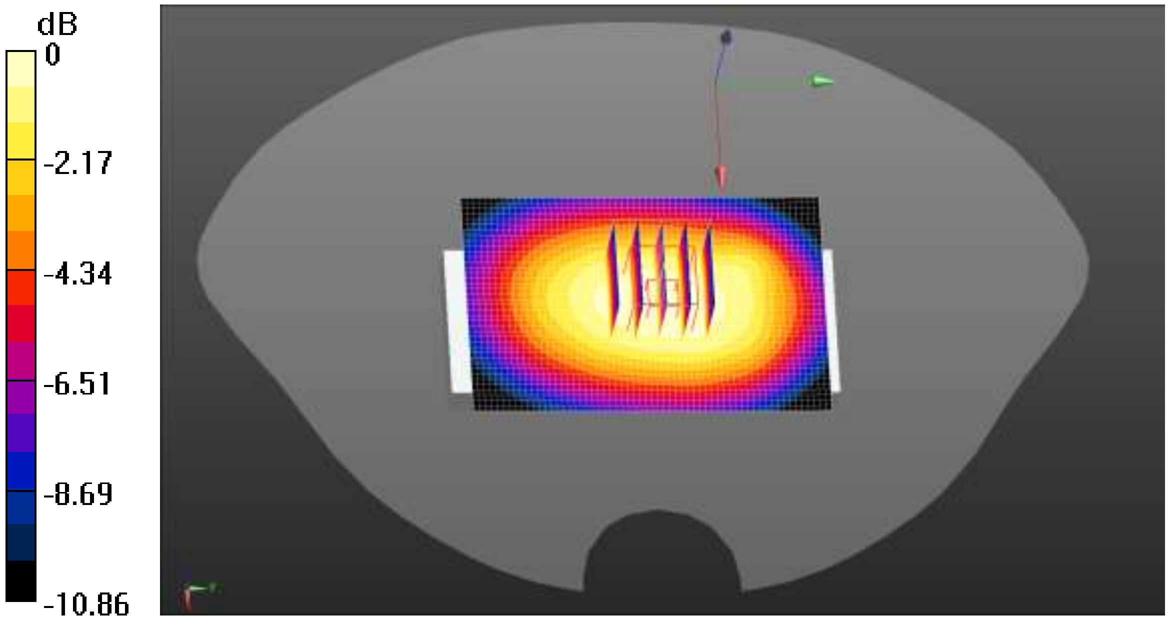
Communication System: UID 0, GPRS(2 Slots) (0); Frequency: 848.8 MHz;Duty Cycle: 1:4.10015
Medium parameters used (interpolated): f = 848.8 MHz; σ = 0.913 S/m; ε_r = 42.467; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(9.71, 9.71, 9.71) @ 848.8 MHz; Calibrated: 09.23.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1452; Calibrated: 05.26.2021
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

GPRS 850 2Slots Body Back/High Channel/Area Scan (41x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.33 W/kg

GPRS 850 2Slots Body Back/High Channel/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 39.22 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.52 W/kg
SAR(1 g) = 1.02 W/kg; SAR(10 g) = 0.727 W/kg
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid
Ratio of SAR at M2 to SAR at M1 = 68.4%
Maximum value of SAR (measured) = 1.34 W/kg



0 dB = 1.34 W/kg = 1.27 dBW/kg

Test Laboratory: JYTSZ Date: 09.03.2021

DUT: Smart Phone; Type: B8K; Serial: 3#

Communication System: UID 0, GPRS(3 Slots) (0); Frequency: 1880 MHz;Duty Cycle: 1:2.77971
Medium parameters used: f = 1880 MHz; σ = 1.439 S/m; ε_r = 39.928; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

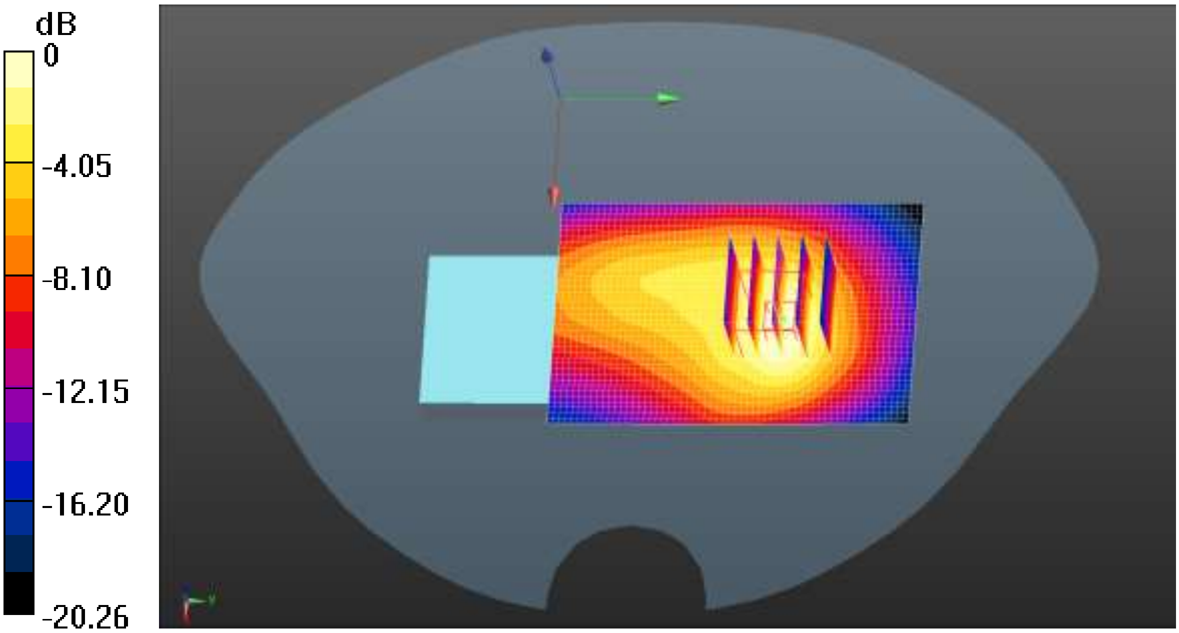
- Probe: EX3DV4 - SN3924; ConvF(8.14, 8.14, 8.14) @ 1880 MHz; Calibrated: 09.23.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1452; Calibrated: 05.26.2021
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

GPRS 1900 3Slots Body Back/Middle Channel/Area Scan (41x61x1):

Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.655 W/kg

GPRS 1900 3Slots Body Back/Middle Channel/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.85 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.802 W/kg
SAR(1 g) = 0.455 W/kg; SAR(10 g) = 0.249 W/kg
Smallest distance from peaks to all points 3 dB below = 11.2 mm
Ratio of SAR at M2 to SAR at M1 = 57.6%
Maximum value of SAR (measured) = 0.673 W/kg



0 dB = 0.673 W/kg = -1.72 dBW/kg

Test Laboratory: JYTSZ Date: 09.02.2021

DUT: Smart Phone; Type: B8K; Serial: 3#

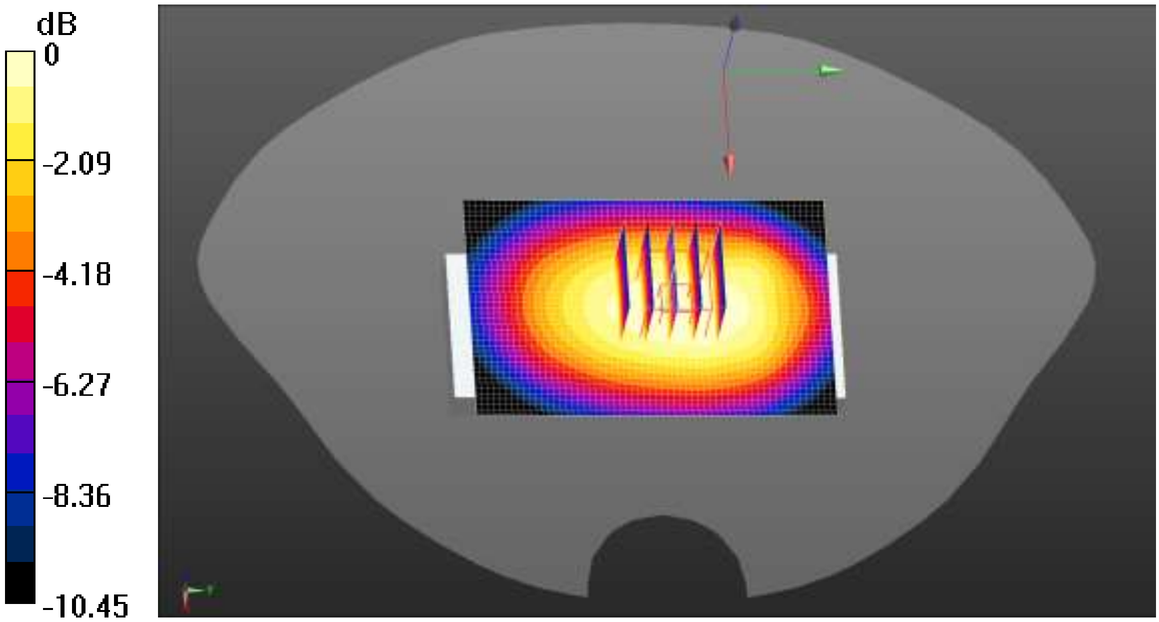
Communication System: UID 0, UMTS-FDD(WCDMA) (0); Frequency: 826.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 826.4 MHz; σ = 0.9 S/m; ε_r = 42.374; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(9.71, 9.71, 9.71) @ 826.4 MHz; Calibrated: 09.23.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1452; Calibrated: 05.26.2021
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

WCDMA 850 Body Back/Low Channel/Area Scan (41x61x1): Interpolated grid: dx=2.000 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.711 W/kg

WCDMA 850 Body Back/Low Channel/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 28.73 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.823 W/kg
SAR(1 g) = 0.559 W/kg; SAR(10 g) = 0.393 W/kg
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid
Ratio of SAR at M2 to SAR at M1 = 68.3%
Maximum value of SAR (measured) = 0.722 W/kg



0 dB = 0.722 W/kg = -1.41 dBW/kg

Test Laboratory: JYTSZ Date: 09.03.2021

DUT: Smart Phone; Type: B8K; Serial: 3#

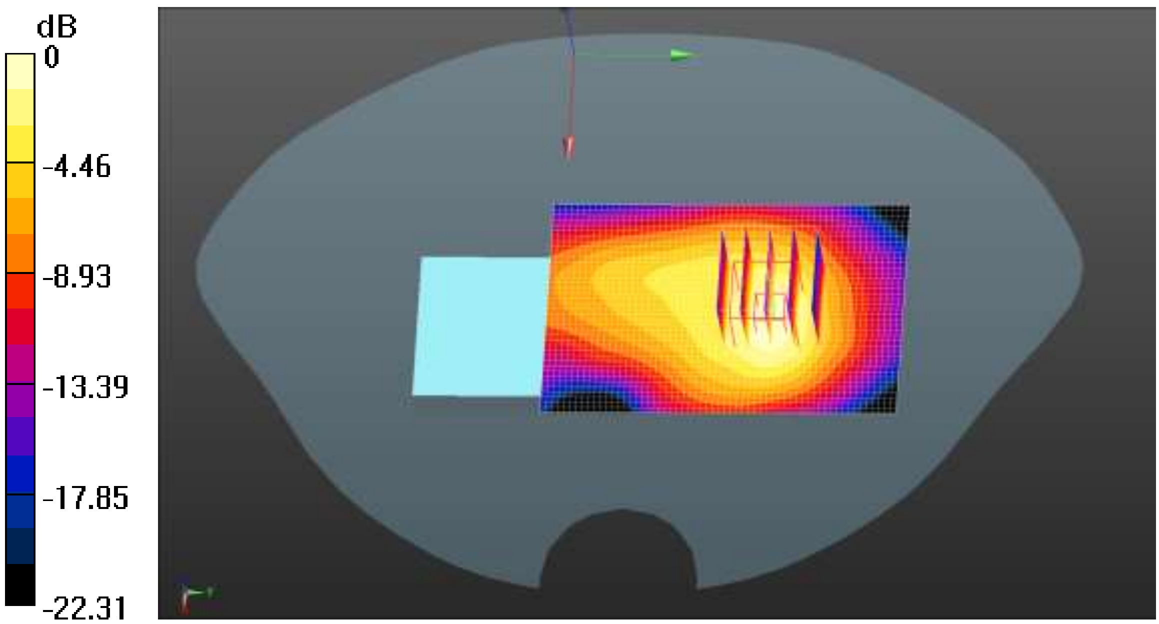
Communication System: UID 0, UMTS-FDD(WCDMA) (0); Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1907.6 MHz; σ = 1.437 S/m; ε_r = 39.875; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(8.14, 8.14, 8.14) @ 1907.6 MHz; Calibrated: 09.23.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1452; Calibrated: 05.26.2021
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

WCDMA 1900 Body Back/High Channel/Area Scan (41x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.279 W/kg

WCDMA 1900 Body Back/High Channel/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.834 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 0.347 W/kg
SAR(1 g) = 0.197 W/kg; SAR(10 g) = 0.107 W/kg
Smallest distance from peaks to all points 3 dB below = 11.2 mm
Ratio of SAR at M2 to SAR at M1 = 58.8%
Maximum value of SAR (measured) = 0.292 W/kg



0 dB = 0.292 W/kg = -5.35 dBW/kg

Test Laboratory: JYTSZ Date: 08.31.2021

DUT: Smart Phone; Type: B8K; Serial: 3#

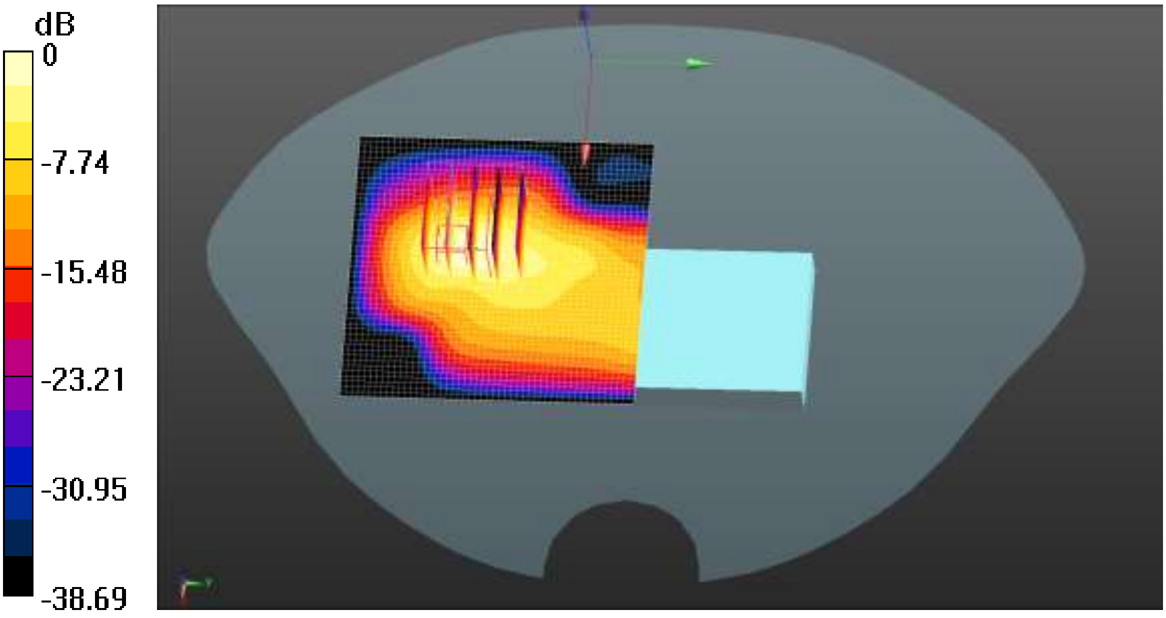
Communication System: UID 0, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps) (0);
Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.844 S/m; ε_r = 38.857; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(7.58, 7.58, 7.58) @ 2437 MHz; Calibrated: 09.23.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1452; Calibrated: 05.26.2021
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

WIFI Body Back/Middle Channel/Area Scan (51x51x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.481 W/kg

WIFI Body Back/Middle Channel/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.976 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.651 W/kg
SAR(1 g) = 0.291 W/kg; SAR(10 g) = 0.117 W/kg
Smallest distance from peaks to all points 3 dB below = 8 mm
Ratio of SAR at M2 to SAR at M1 = 46.7%
Maximum value of SAR (measured) = 0.504 W/kg



0 dB = 0.504 W/kg = -2.98 dBW/kg

Appendix C: System Calibration Certificate

Calibration information for E-field probes

In Collaboration with speag CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2512 Fax: +86-10-62304633-2504
E-mail: cttl@chinatttl.com Http://www.chinattl.cn

中国认可 国际互认 校准 CALIBRATION CNAS L0570

Client CCIS Certificate No: Z20-60314

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN : 3924
Calibration Procedure(s)	FF-Z11-004-02 Calibration Procedures for Dosimetric E-field Probes
Calibration date:	September 23, 2020

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements(SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature(22±3)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	101919	16-Jun-20(CTTL, No.J20X04344)	Jun-21
Power sensor NRP-Z91	101547	16-Jun-20(CTTL, No.J20X04344)	Jun-21
Power sensor NRP-Z91	101548	16-Jun-20(CTTL, No.J20X04344)	Jun-21
Reference 10dBAttenuator	18N50W-10dB	10-Feb-20(CTTL, No.J20X00525)	Feb-22
Reference 20dBAttenuator	18N50W-20dB	10-Feb-20(CTTL, No.J20X00526)	Feb-22
Reference Probe EX3DV4	SN 7307	29-May-20(SPEAG, No.EX3-7307_May20)	May-21
DAE4	SN 1556	4-Feb-20(SPEAG, No.DAE4-1556_Feb20)	Feb-21
Secondary Standards	**ID #**	**Cal Date(Calibrated by, Certificate No.)**	**Scheduled Calibration**
SignalGenerator MG3700A	6201052605	23-Jun-20(CTTL, No.J20X04343)	Jun-21
Network Analyzer E5071C	MY46110673	10-Feb-20(CTTL, No.J20X00515)	Feb-21

	Name	Function	Signature
Calibrated by:	Yu Zongying	SAR Test Engineer	余宗英
Reviewed by:	Lin Hao	SAR Test Engineer	林浩
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: September 25, 2020

TTL In Collaboration with s p e a g CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2512 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com Http://www.chinattl.cn

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A,B,C,D	modulation dependent linearization parameters
Polarization Φ	Φ rotation around probe axis
Polarization θ	θ rotation around an axis that is in the plane normal to probe axis (at measurement center), i θ=0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013

b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016

c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010

d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization θ=0 (f≤900MHz in TEM-cell; f>1800MHz: waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below ConvF).
- *NORM(f)x,y,z = NORMx,y,z* frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics.
- *Ax,y,z; Bx,y,z; Cx,y,z;VRx,y,z:*A,B,C are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f≤800MHz) and inside waveguide using analytical field distributions based on power measurements for f >800MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty valued are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx,y,z* ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from±50MHz to±100MHz.
- *Spherical isotropy (3D deviation from isotropy):* in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset:* The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle:* The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

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DASY/EASY – Parameters of Probe: EX3DV4 – SN:3924

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm(μV/(V/m)^2)[A]	0.50	0.42	0.67	±10.0%
DCP(mV)[B]	101.3	100.1	99.8	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	172.6	±1.9%
		Y	0.0	0.0	1.0		149.2	
		Z	0.0	0.0	1.0		200.0	

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor k=2, which for a normal distribution Corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of Norm X, Y, Z do not affect the E^2-field uncertainty inside TSL (see Page 4 and Page 5).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainly is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

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DASY/EASY – Parameters of Probe: EX3DV4 – SN:3924

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz][C]	Relative Permittivity[F]	Conductivity (S/m)[F]	ConvF X	ConvF Y	ConvF Z	Alpha[G]	Depth[G] (mm)	Unct. (k=2)
750	41.9	0.89	10.11	10.11	10.11	0.40	0.75	±12.1%
835	41.5	0.90	9.71	9.71	9.71	0.18	1.20	±12.1%
900	41.5	0.97	9.67	9.67	9.67	0.21	1.15	±12.1%
1750	40.1	1.37	8.43	8.43	8.43	0.20	1.11	±12.1%
1900	40.0	1.40	8.14	8.14	8.14	0.22	1.14	±12.1%
2300	39.5	1.67	7.83	7.83	7.83	0.48	0.72	±12.1%
2450	39.2	1.80	7.58	7.58	7.58	0.50	0.75	±12.1%
2600	39.0	1.96	7.35	7.35	7.35	0.60	0.69	±12.1%
5250	35.9	4.71	5.42	5.42	5.42	0.45	1.32	±13.3%
5600	35.5	5.07	4.85	4.85	4.85	0.50	1.20	±13.3%
5750	35.4	5.22	4.96	4.96	4.96	0.55	1.20	±13.3%

[C] Frequency validity above 300 MHz of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.
[F] At frequency below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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DASY/EASY – Parameters of Probe: EX3DV4 – SN:3924

Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz][C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha[G]	Depth[G] (mm)	Unct. (k=2)
750	55.5	0.96	10.06	10.06	10.06	0.40	0.82	±12.1%
835	55.2	0.97	9.70	9.70	9.70	0.18	1.36	±12.1%
900	55.0	1.05	9.72	9.72	9.72	0.28	1.04	±12.1%
1750	53.4	1.49	8.16	8.16	8.16	0.20	1.28	±12.1%
1900	53.3	1.52	7.78	7.78	7.78	0.21	1.34	±12.1%
2300	52.9	1.81	7.65	7.65	7.65	0.47	0.85	±12.1%
2450	52.7	1.95	7.50	7.50	7.50	0.55	0.78	±12.1%
2600	52.5	2.16	7.29	7.29	7.29	0.66	0.69	±12.1%
5250	48.9	5.36	4.86	4.86	4.86	0.50	1.40	±13.3%
5600	48.5	5.77	4.24	4.24	4.24	0.60	1.30	±13.3%
5750	48.3	5.94	4.35	4.35	4.35	0.55	1.45	±13.3%

[C] Frequency validity above 300 MHz of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

[F] At frequency below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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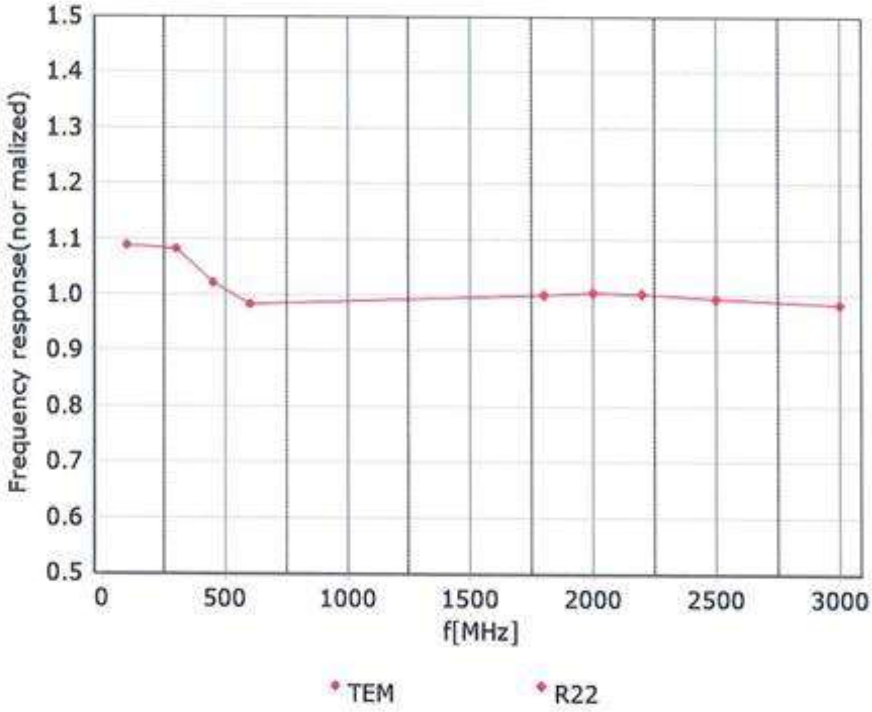
Frequency Response of E-Field
(TEM-Cell: ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field: ±7.4% (*k*=2)

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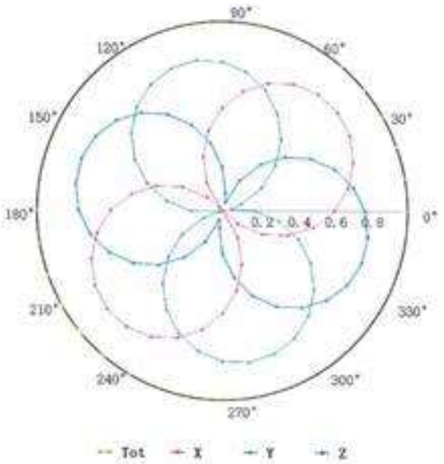
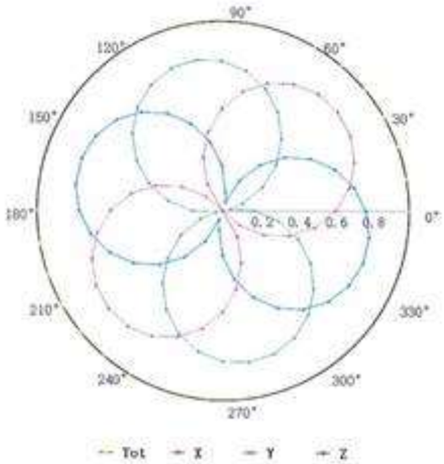
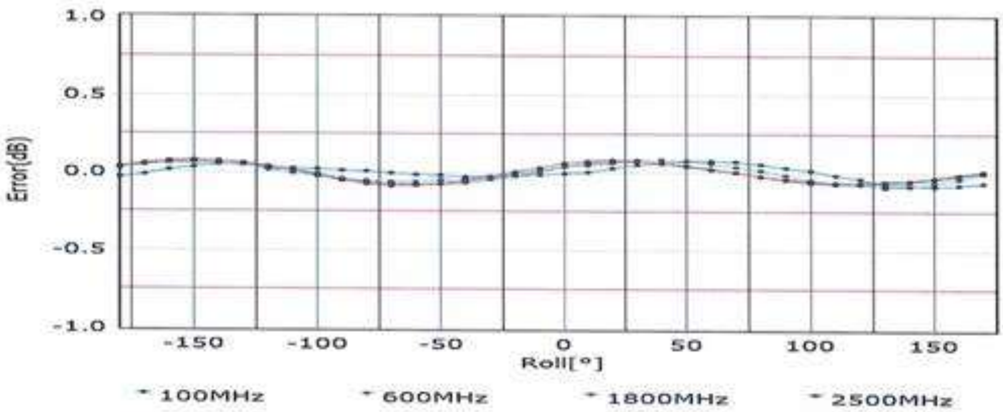
Receiving Pattern (Φ), θ=0°

f=600 MHz, TEM



f=1800 MHz, R22





Uncertainty of Axial Isotropy Assessment: ±1.2% (k=2)

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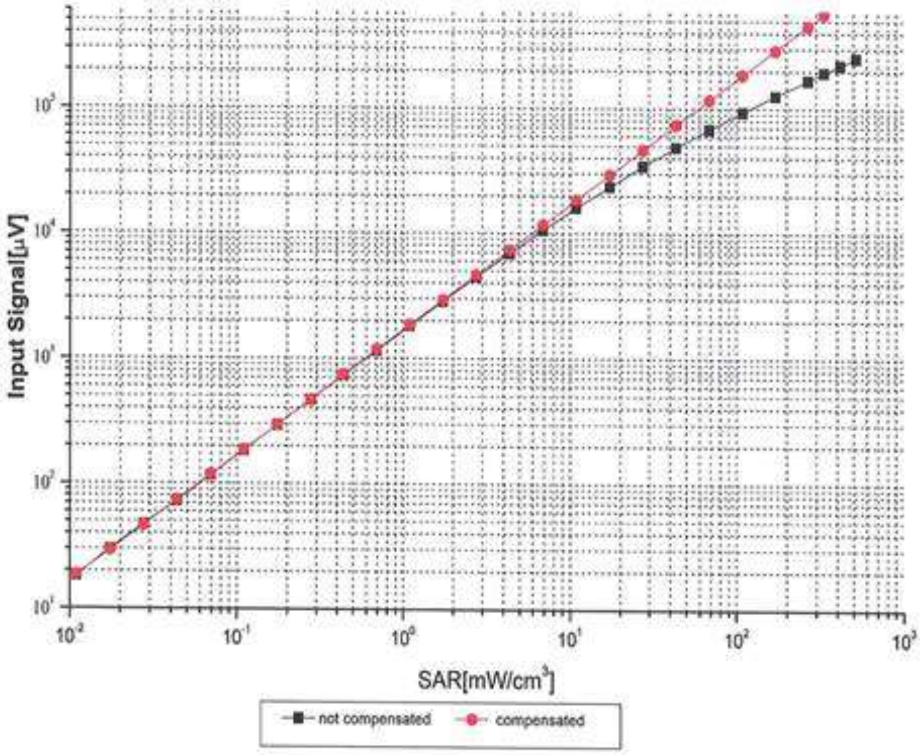
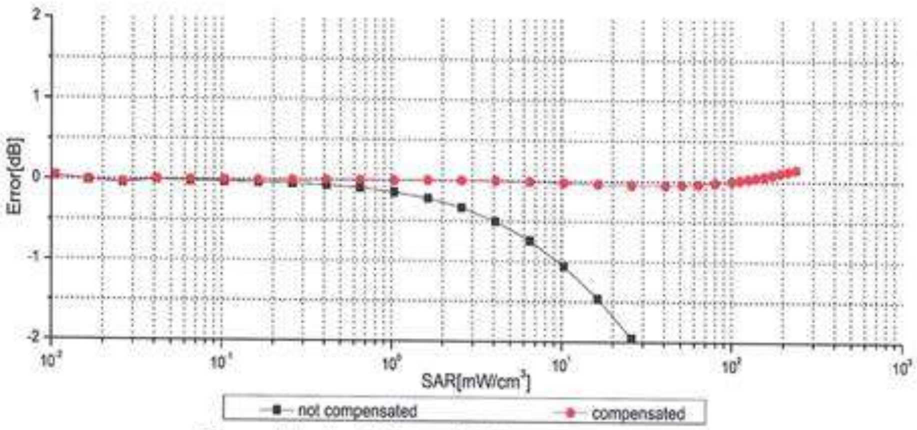
Dynamic Range f(SAR$_{head}$)
(TEM cell, f = 900 MHz)





Uncertainty of Linearity Assessment: ±0.9% (k=2)

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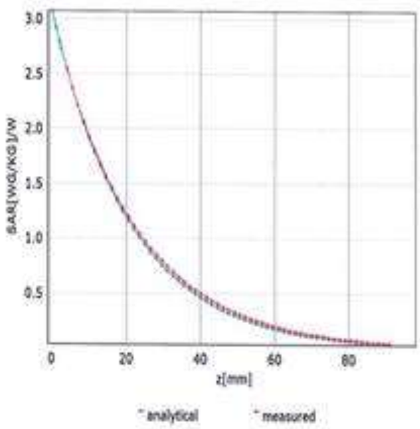
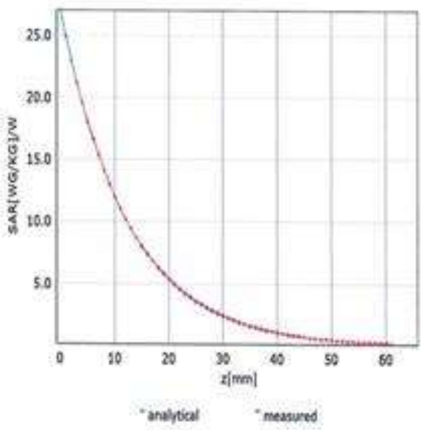
Conversion Factor Assessment

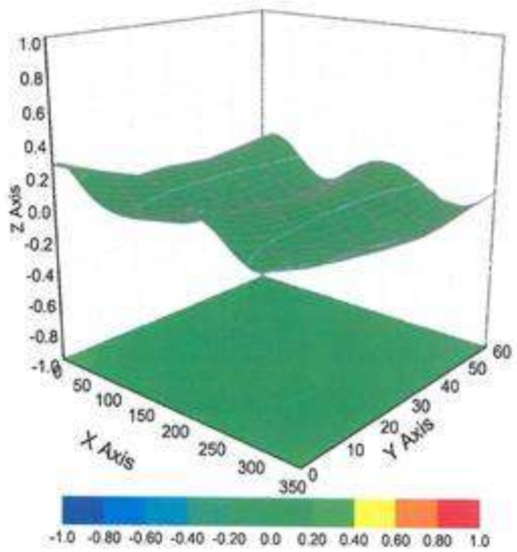
f=750 MHz,WGLS R9(H_convF)



f=1750 MHz,WGLS R22(H_convF)



Deviation from Isotropy in Liquid



Uncertainty of Spherical Isotropy Assessment: ±3.2% (*k*=2)

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DASY/EASY – Parameters of Probe: EX3DV4 – SN:3924

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	159
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disable
Probe Overall Length	337mm
Probe Body Diameter	10mm
Tip Length	10mm
Tip Diameter	2.5mm
Probe Tip to Sensor X Calibration Point	1mm
Probe Tip to Sensor Y Calibration Point	1mm
Probe Tip to Sensor Z Calibration Point	1mm
Recommended Measurement Distance from Surface	1.4mm

Calibration information for Dipole

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Client CCIS Certificate No: Z19-60175

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d154
Calibration Procedure(s)	FF-Z11-003-01 Calibration Procedures for dipole validation kits
Calibration date:	June 11, 2019

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements(SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature(22±3)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	106277	20-Aug-18 (CTTL, No.J18X06862)	Aug-19
Power sensor NRP8S	104291	20-Aug-18 (CTTL, No.J18X06862)	Aug-19
Reference Probe EX3DV4	SN 7514	27-Aug-18(SPEAG,No.EX3-7514_Aug18)	Aug-19
DAE4	SN 1556	20-Aug-18(SPEAG,No.DAE4-1556_Aug18)	Aug-19
Secondary Standards	**ID #**	**Cal Date(Calibrated by, Certificate No.)**	**Scheduled Calibration**
Signal Generator E4438C	MY49071430	23-Jan-19 (CTTL, No.J19X00336)	Jan-20
NetworkAnalyzer E5071C	MY46110673	24-Jan-19 (CTTL, No.J19X00547)	Jan-20

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	赵静
Reviewed by:	Lin Hao	SAR Test Engineer	林浩
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: June 14, 2019

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

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Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORMx,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013

b) IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016

c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010

d) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor k=2, which for a normal distribution Corresponds to a coverage probability of approximately 95%.

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Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY52	52.10.2.1504
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.1 ± 6 %	0.89 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.35 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.49 W/kg ± 18.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.57 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.33 W/kg ± 18.7 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.0 ± 6 %	0.97 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.40 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**9.57 W /kg ± 18.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	1.58 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**6.31 W/kg ± 18.7 % (k=2)**

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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.9Ω- 3.09jΩ
Return Loss	- 29.0dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.3Ω- 4.87jΩ
Return Loss	- 24.9dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.277 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG

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DASY5 Validation Report for Head TSL Date: 06.11.2019

Test Laboratory: CTTL, Beijing, China

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

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium parameters used: f = 835 MHz; σ = 0.886 S/m; ε_r = 41.12; ρ = 1000 kg/m3

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7514; ConvF(9.09, 9.09, 9.09) @ 835 MHz; Calibrated: 8/27/2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 8/20/2018
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

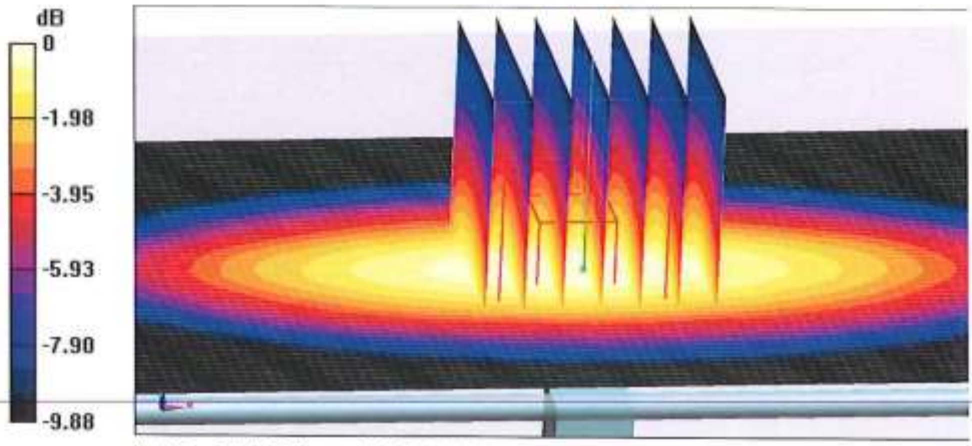
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 58.27 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 3.45 W/kg

SAR(1 g) = 2.35 W/kg; SAR(10 g) = 1.57 W/kg

Maximum value of SAR (measured) = 3.09 W/kg



0 dB = 3.09 W/kg = 4.90 dBW/kg

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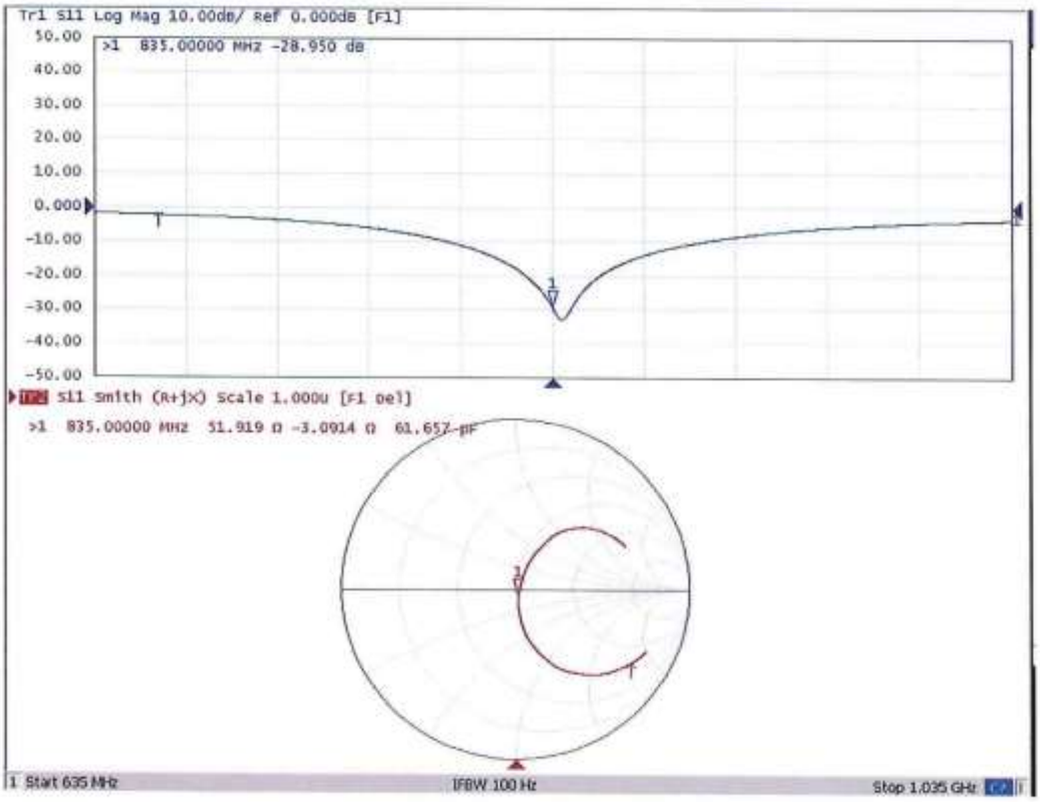
Impedance Measurement Plot for Head TSL



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DASY5 Validation Report for Body TSL Date: 06.11.2019

Test Laboratory: CTTL, Beijing, China

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

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium parameters used: f = 835 MHz; σ = 0.973 S/m; ε_r = 55; ρ = 1000 kg/m3

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7514; ConvF(9.47, 9.47, 9.47) @ 835 MHz; Calibrated: 8/27/2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 8/20/2018
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

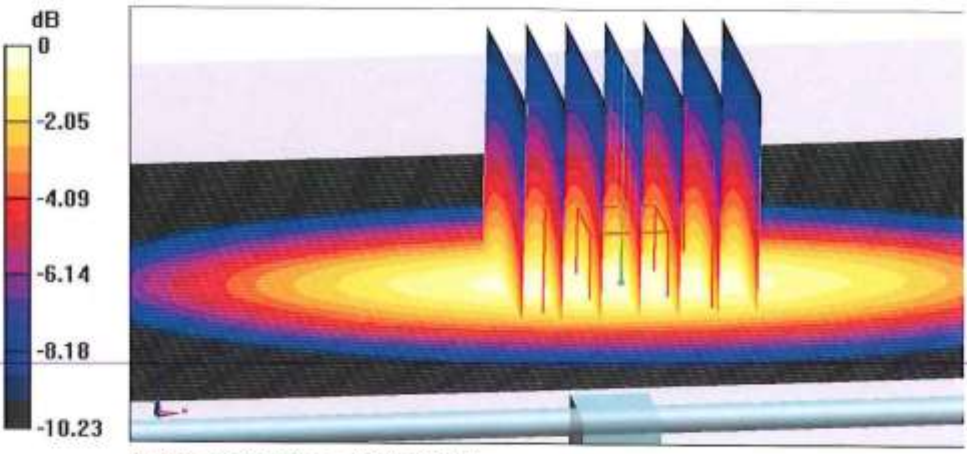
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.93 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 3.67 W/kg

SAR(1 g) = 2.4 W/kg; SAR(10 g) = 1.58 W/kg

Maximum value of SAR (measured) = 3.23 W/kg



0 dB = 3.23 W/kg = 5.09 dBW/kg

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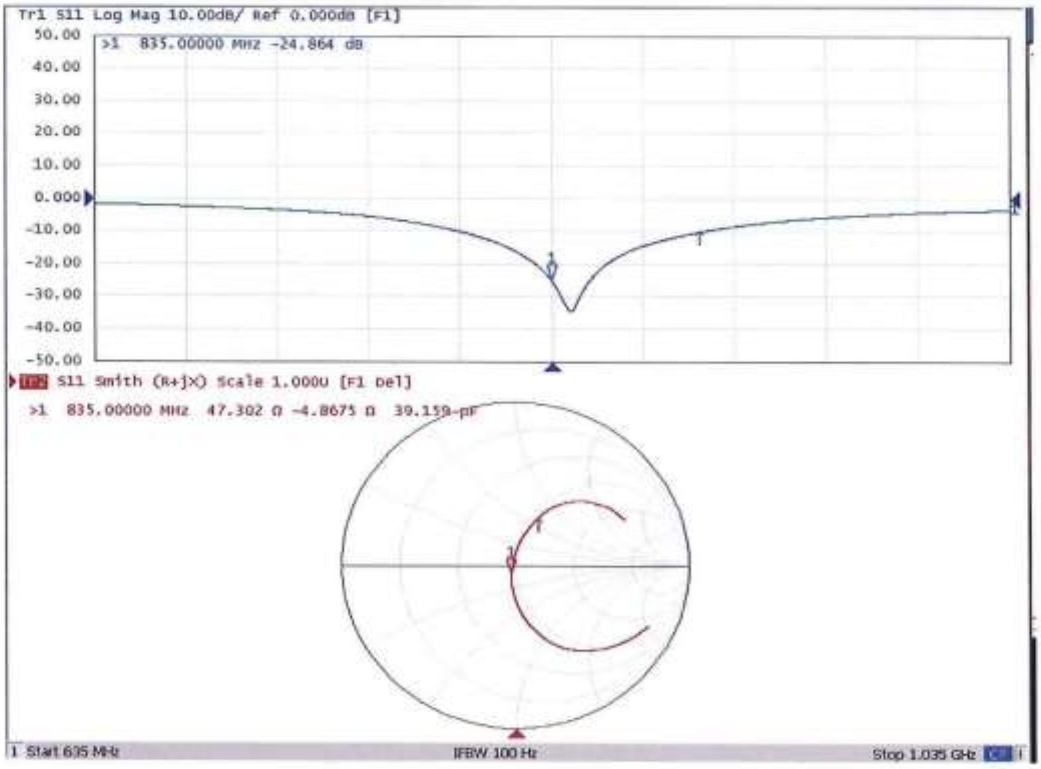
Impedance Measurement Plot for Body TSL



Dipole Impedance and Return Loss calibration Report

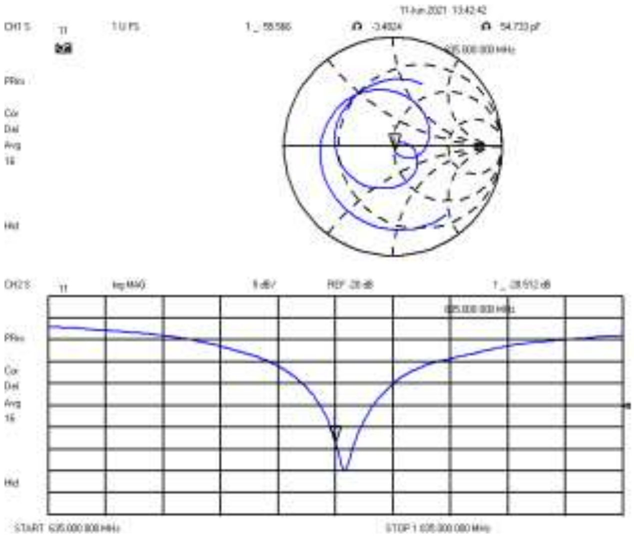
Object:	D835V2 - SN: 4d154
Calibration Date:	June 11, 2021
Calibrationreference:	IEEE Std 1528:2013, IEC 62209-1:2006, FCC KDB 865664 D01
Calibrated By:	Janet Wei (Janet Wei, SAR project engineer)
Reviewed By:	Winner Zhang (Winner Zhang, Technical manager)

Environment of Test Site

Temperature:	21 ~ 23°C
Humidity:	50~60% RH
Atmospheric Pressure:	1011 mbar

Test Data

Measurement Plot for Head TSL In 2021



Comparison with Original report

Items	Calibrated By CTTL	Calibrated By JYT In 2021	Deviation	Limit
Impendence for Head TSL	51.9Ω–3.09jΩ	55.57Ω–3.48jΩ	3.67Ω–0.39jΩ	±5Ω
Return Loss for Head TSL	-29.0	-28.51	-1.69%	±20%(No less than 20 dB)

Result

Compliance

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CNAS L0570

Client CCIS Certificate No: Z19-60176

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d175
Calibration Procedure(s)	FF-Z11-003-01 Calibration Procedures for dipole validation kits
Calibration date:	June 11, 2019

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements(SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature(22±3)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	106277	20-Aug-18 (CTTL, No.J18X06862)	Aug-19
Power sensor NRP8S	104291	20-Aug-18 (CTTL, No.J18X06862)	Aug-19
Reference Probe EX3DV4	SN 7514	27-Aug-18(SPEAG,No.EX3-7514_Aug18)	Aug-19
DAE4	SN 1556	20-Aug-18(SPEAG,No.DAE4-1556_Aug18)	Aug-19
Secondary Standards	**ID #**	**Cal Date(Calibrated by, Certificate No.)**	**Scheduled Calibration**
Signal Generator E4438C	MY49071430	23-Jan-19 (CTTL, No.J19X00336)	Jan-20
NetworkAnalyzer E5071C	MY46110673	24-Jan-19 (CTTL, No.J19X00547)	Jan-20

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	赵静
Reviewed by:	Lin Hao	SAR Test Engineer	林浩
Approved by:	Qi Dianyuan	SAR Project Leader	齐殿元

Issued: June 14, 2019

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lossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORMx,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013

b) IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016

c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010

d) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor k=2, which for a normal distribution Corresponds to a coverage probability of approximately 95%.

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Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY52	52.10.2.1504
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.2 ± 6 %	1.39 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.79 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**39.4 W/kg ± 18.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	5.07 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**20.4 W/kg ± 18.7 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.2 ± 6 %	1.50 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.1 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**40.5 W/kg ± 18.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	5.23 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.0 W/kg ± 18.7 % (k=2)**

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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.7Ω+ 5.93jΩ
Return Loss	- 24.3dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.8Ω+ 5.24jΩ
Return Loss	- 24.7dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.064 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG

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DASY5 Validation Report for Head TSL Date: 06.10.2019

Test Laboratory: CTTL, Beijing, China

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

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium parameters used: f = 1900 MHz; σ = 1.387 S/m; ε_r = 40.2; ρ = 1000 kg/m3

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7514; ConvF(7.73, 7.73, 7.73) @ 1900 MHz; Calibrated: 8/27/2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 8/20/2018
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

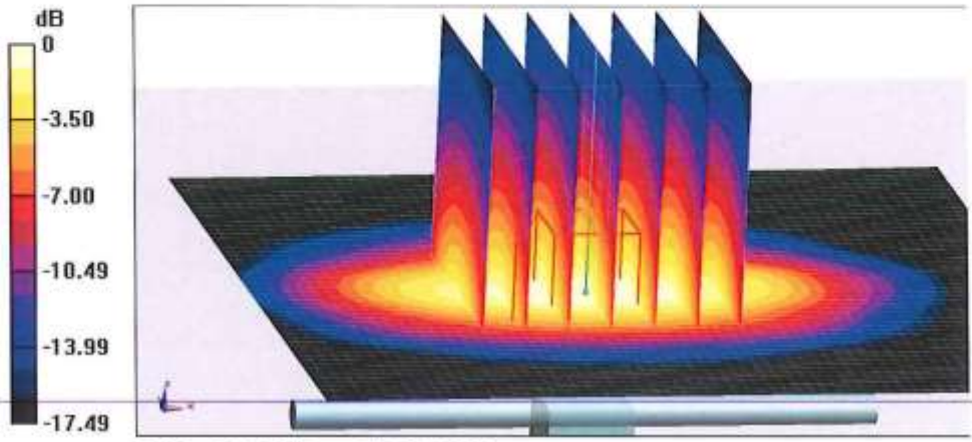
System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 98.94 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 18.9 W/kg

SAR(1 g) = 9.79 W/kg; SAR(10 g) = 5.07 W/kg

Maximum value of SAR (measured) = 15.6 W/kg



0 dB = 15.6 W/kg = 11.93 dBW/kg

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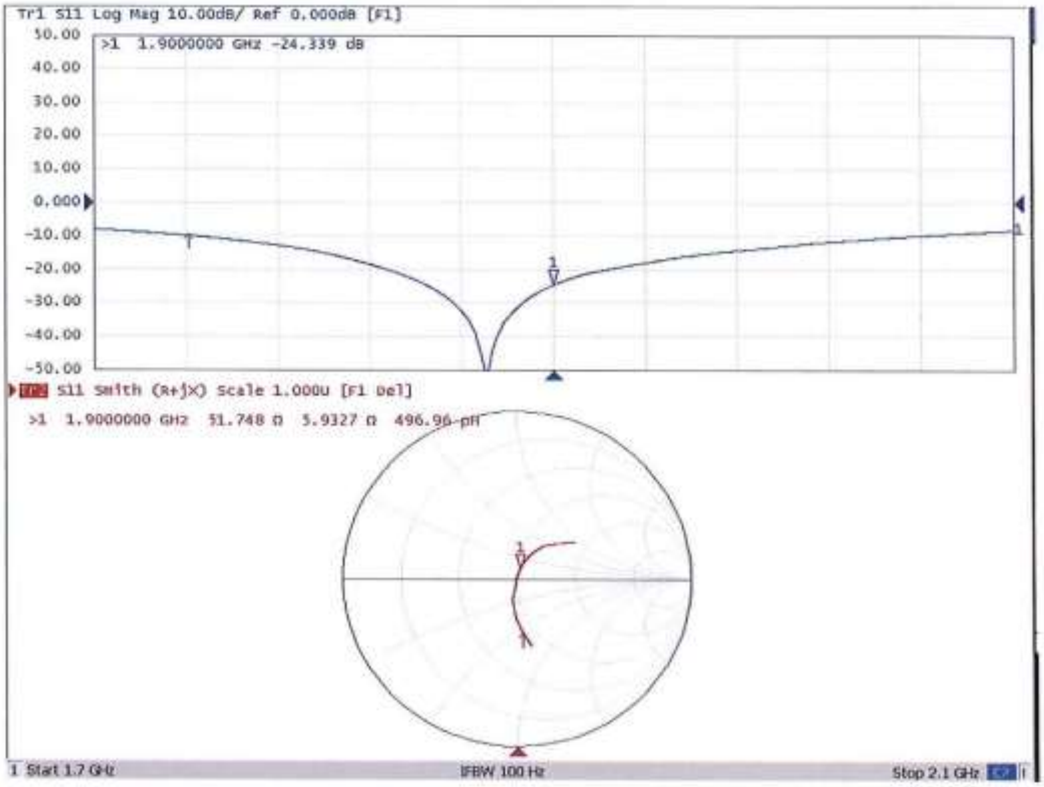
Impedance Measurement Plot for Head TSL



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DASY5 Validation Report for Body TSL Date: 06.11.2019

Test Laboratory: CTTL, Beijing, China

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

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium parameters used: f = 1900 MHz; σ = 1.499 S/m; ε_r = 52.18; ρ = 1000 kg/m3

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7514; ConvF(7.53, 7.53, 7.53) @ 1900 MHz; Calibrated: 8/27/2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 8/20/2018
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

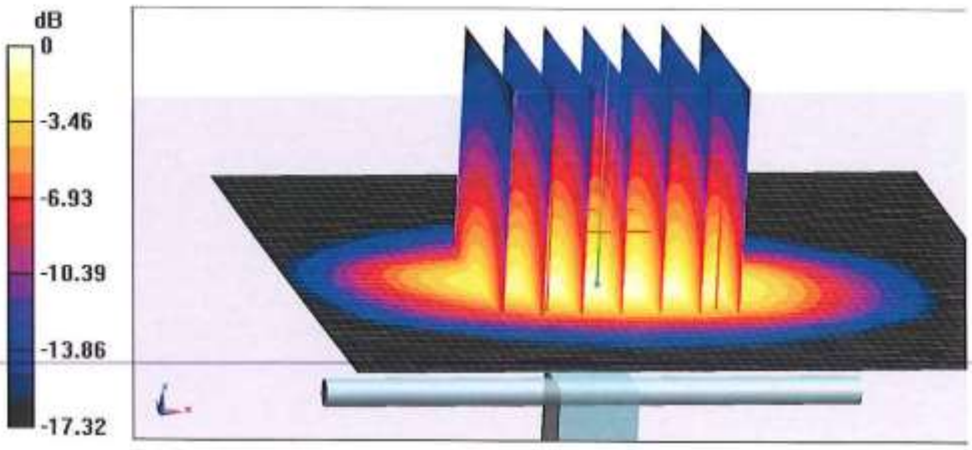
System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 88.67 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 18.9 W/kg

SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.23 W/kg

Maximum value of SAR (measured) = 15.6 W/kg



0 dB = 15.6 W/kg = 11.93 dBW/kg

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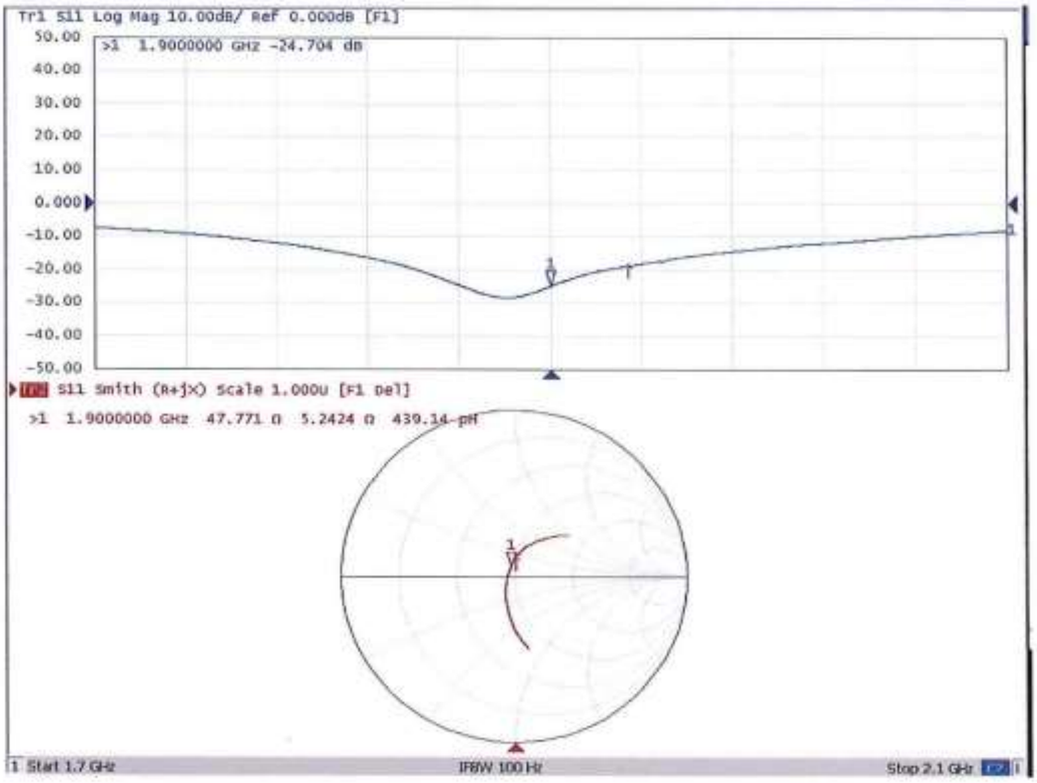
Impedance Measurement Plot for Body TSL



Dipole Impedance and Return Loss calibration Report

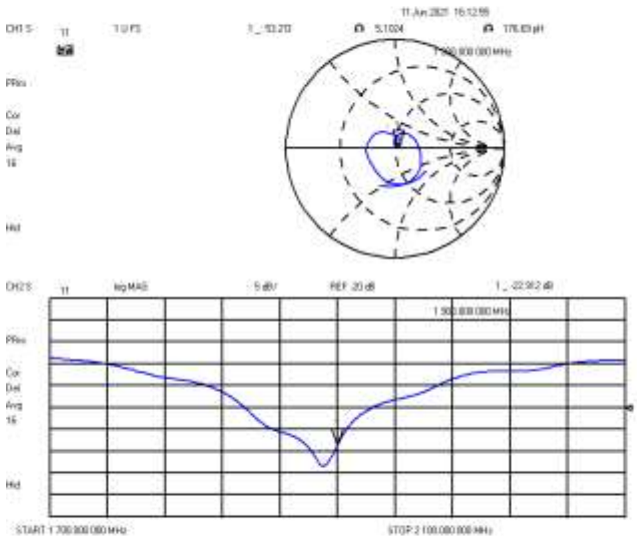
Object:	D1900V2 - SN: 5d175
Calibration Date:	June 11, 2021
Calibrationreference:	IEEE Std 1528:2013, IEC 62209-1:2006, FCC KDB 865664 D01
Calibrated By:	Janet Wei (Janet Wei, SAR project engineer)
Reviewed By:	Winner Zhang (Winner Zhang, Technical manager)

Environment of Test Site

Temperature:	18 ~ 25°C
Humidity:	50~60% RH
Atmospheric Pressure:	1011 mbar

Test Data

Measurement Plot for Head TSL In 2021



Comparison with Original report

Items	Calibrated By CTTL	Calibrated By JYT In 2021	Deviation	Limit
Impendence for Head TSL	51.7Ω+5.93 jΩ	53.21Ω+5.10jΩ	1.51Ω-0.83jΩ	±5Ω
Return Loss for Head TSL	-24.3dB	-22.91dB	-5.72%	±20%(No less than 20 dB)

Result

Compliance

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Client CCIS Certificate No: Z19-60177

CALIBRATION CERTIFICATE

Object	D2450V2 - SN: 910
Calibration Procedure(s)	FF-Z11-003-01 Calibration Procedures for dipole validation kits
Calibration date:	June 10, 2019

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements(SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature(22±3)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	106277	20-Aug-18 (CTTL, No.J18X06862)	Aug-19
Power sensor NRP8S	104291	20-Aug-18 (CTTL, No.J18X06862)	Aug-19
Reference Probe EX3DV4	SN 7514	27-Aug-18(SPEAG,No.EX3-7514_Aug18)	Aug-19
DAE4	SN 1556	20-Aug-18(SPEAG,No.DAE4-1556_Aug18)	Aug-19
Secondary Standards	**ID #**	**Cal Date(Calibrated by, Certificate No.)**	**Scheduled Calibration**
Signal Generator E4438C	MY49071430	23-Jan-19 (CTTL, No.J19X00336)	Jan-20
NetworkAnalyzer E5071C	MY46110673	24-Jan-19 (CTTL, No.J19X00547)	Jan-20

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	赵静
Reviewed by:	Lin Hao	SAR Test Engineer	林浩
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: June 14, 2019

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Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORMx,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013

b) IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016

c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010

d) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor k=2, which for a normal distribution Corresponds to a coverage probability of approximately 95%.

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Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY52	52.10.2.1495
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.8 ± 6 %	1.83 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.2 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**52.6 W/kg ± 18.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	6.11 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.4 W/kg ± 18.7 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.1 ± 6 %	1.96 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	12.8 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**50.9 W/kg ± 18.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	5.94 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**23.7 W/kg ± 18.7 % (k=2)**

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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.1Ω+ 2.51 jΩ
Return Loss	- 26.8dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	52.3Ω+ 3.40 jΩ
Return Loss	- 27.9dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.020 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG

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DASY5 Validation Report for Head TSL Date: 06.10.2019

Test Laboratory: CTTL, Beijing, China

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

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium parameters used: f = 2450 MHz; σ = 1.825 S/m; ε_r = 39.75; ρ = 1000 kg/m3

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7514; ConvF(6.95, 6.95, 6.95) @ 2450 MHz; Calibrated: 8/27/2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 8/20/2018
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

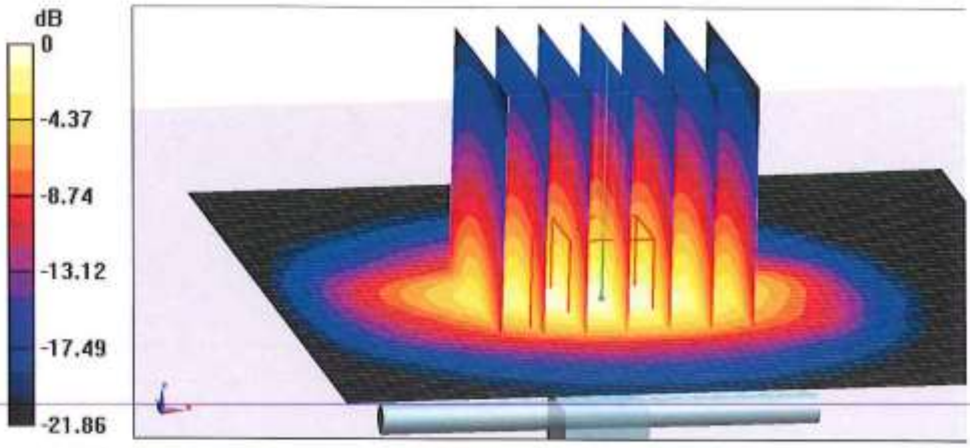
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 97.66 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 27.4 W/kg

SAR(1 g) = 13.2 W/kg; SAR(10 g) = 6.11 W/kg

Maximum value of SAR (measured) = 22.3 W/kg



0 dB = 22.3 W/kg = 13.48 dBW/kg

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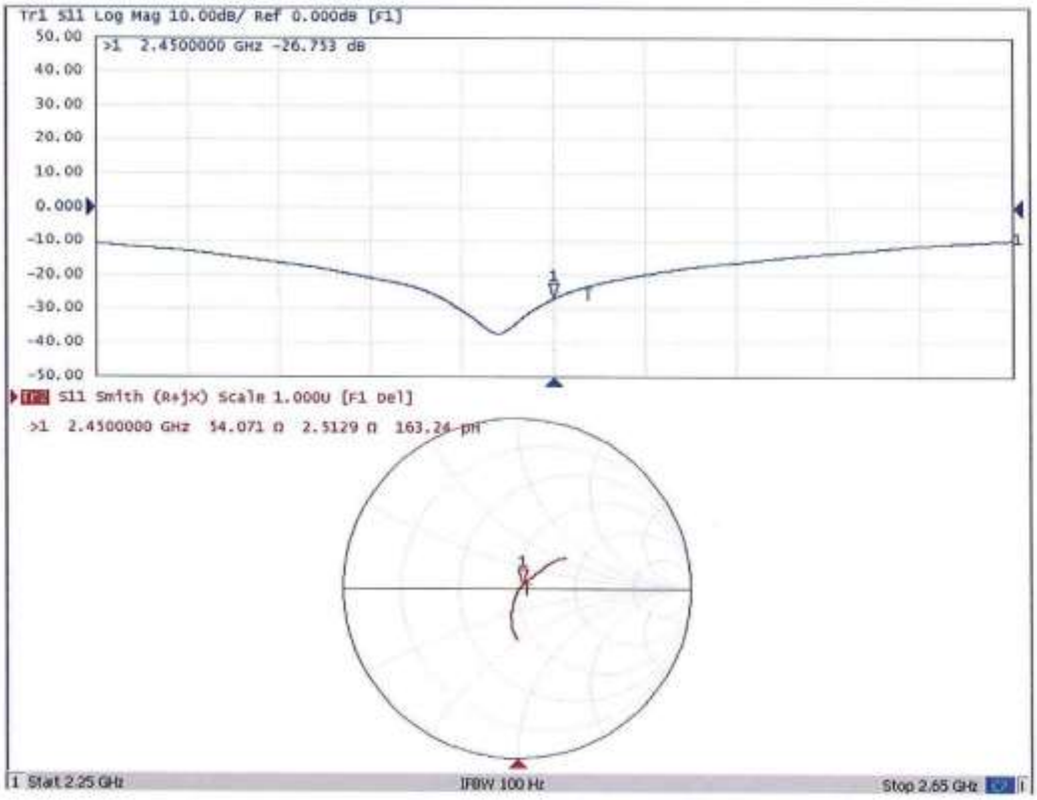
E-mail: cttl@chinattl.com http://www.chinattl.cn

Impedance Measurement Plot for Head TSL



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E-mail: cttl@chinattl.com http://www.chinattl.cn

DASY5 Validation Report for Body TSL Date: 06.10.2019

Test Laboratory: CTTL, Beijing, China

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

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium parameters used: f = 2450 MHz; σ = 1.962 S/m; ε_r = 52.06; ρ = 1000 kg/m3

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7514; ConvF(7.13, 7.13, 7.13) @ 2450 MHz; Calibrated: 8/27/2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 8/20/2018
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

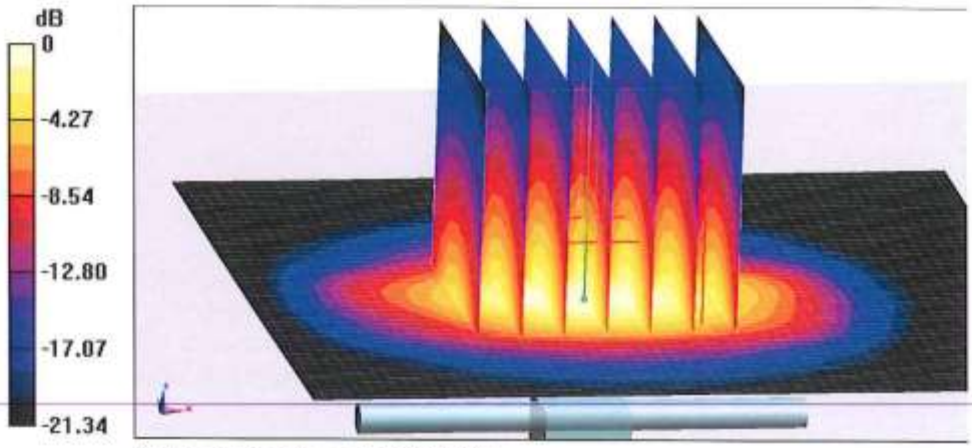
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 89.63 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 26.4 W/kg

SAR(1 g) = 12.8 W/kg; SAR(10 g) = 5.94 W/kg

Maximum value of SAR (measured) = 21.3 W/kg



0 dB = 21.3 W/kg = 13.28 dBW/kg

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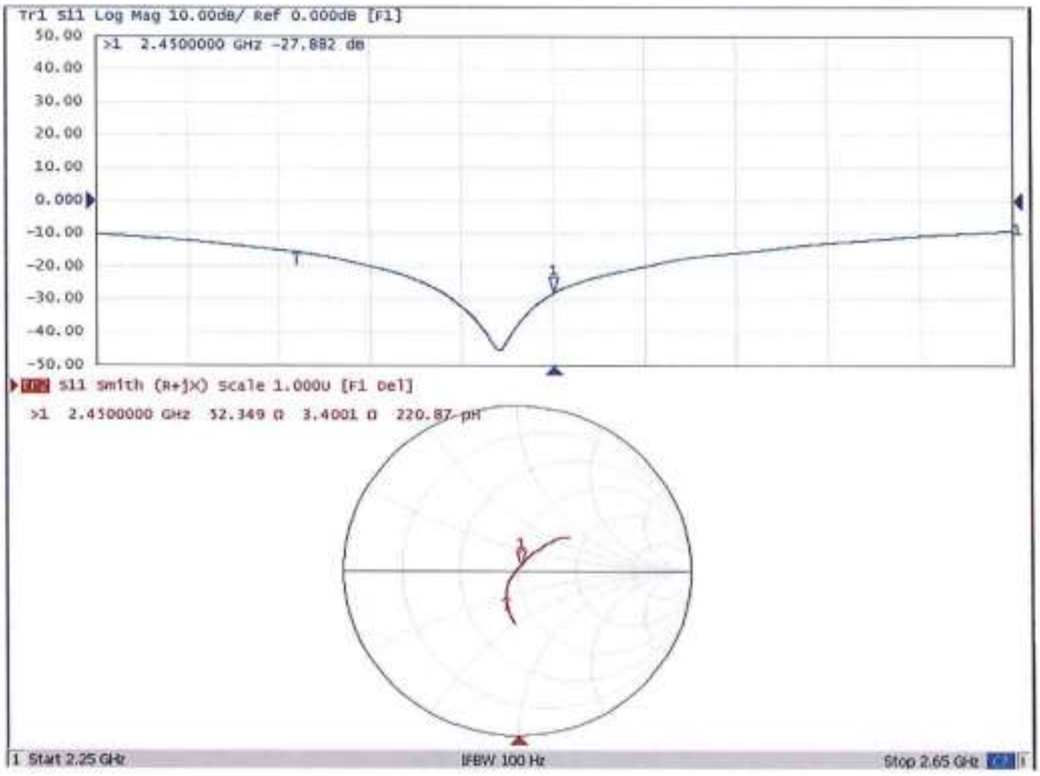
Impedance Measurement Plot for Body TSL



Dipole Impedance and Return Loss calibration Report

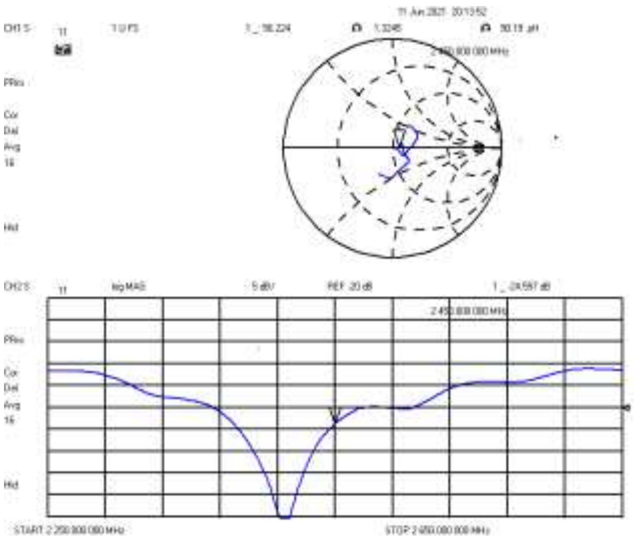
Object:	D2450V2 - SN: 910
Calibration Date:	June 11, 2021
Calibrationreference:	IEEE Std 1528:2013, IEC 62209-1:2006, FCC KDB 865664 D01
Calibrated By:	Janet Wei (Janet Wei, SAR project engineer)
Reviewed By:	Winner Zhang (Winner Zhang, Technical manager)

Environment of Test Site

Temperature:	18 ~ 25°C
Humidity:	50~60% RH
Atmospheric Pressure:	1011 mbar

Test Data

Measurement Plot for Head TSL In 2021



Comparison with Original report

Items	Calibrated By CTTL	Calibrated By JYT In 2021	Deviation	Limit
Impendence for Head TSL	54.1Ω+2.51jΩ	56.22Ω+1.32jΩ	2.12Ω-1.19jΩ	±5Ω
Return Loss for Head TSL	-26.8dB	-24.56dB	-8.36%	±20%(No less than 20 dB)

Result

Compliance

Calibration information for DAE

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **CCIS (Auden)**

Certificate No: **DAE4-1452_May21**

CALIBRATION CERTIFICATE

Object	DAE4 - SD 000 D04 BM - SN: 1452
Calibration procedure(s)	QA CAL-06.v30 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	May 26, 2021

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	07-Sep-20 (No:28647)	Sep-21

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Auto DAE Calibration Unit	SE UWS 053 AA 1001	07-Jan-21 (in house check)	In house check: Jan-22
Calibrator Box V2.1	SE UMS 006 AA 1002	07-Jan-21 (in house check)	In house check: Jan-22

	Name	Function	Signature
Calibrated by:	Adrian Gehring	Laboratory Technician	A.G.
Approved by:	Sven Kühn	Deputy Manager	i.V.

Issued: May 26, 2021

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: DAE4-1452_May21 Page 1 of 5

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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S Servizio svizzero di taratura
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Accreditation No.: **SCS 0108**

Glossary

DAE	data acquisition electronics
Connector angle	information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
  - *DC Voltage Measurement Linearity:* Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
  - *Common mode sensitivity:* Influence of a positive or negative common mode voltage on the differential measurement.
  - *Channel separation:* Influence of a voltage on the neighbor channels not subject to an input voltage.
  - *AD Converter Values with inputs shorted:* Values on the internal AD converter corresponding to zero input voltage
  - *Input Offset Measurement*: Output voltage and statistical results over a large number of zero voltage measurements.
  - *Input Offset Current:* Typical value for information; Maximum channel input offset current, not considering the input resistance.
  - *Input resistance:* Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.
  - *Low Battery Alarm Voltage:* Typical value for information. Below this voltage, a battery alarm signal is generated.
  - *Power consumption:* Typical value for information. Supply currents in various operating modes.

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1μV , full range = -100...+300 mV

Low Range: 1LSB = 61nV , full range = -1.......+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	404.348 ± 0.02% (k=2)	404.687 ± 0.02% (k=2)	405.256 ± 0.02% (k=2)
Low Range	3.99425 ± 1.50% (k=2)	3.99683 ± 1.50% (k=2)	4.01673 ± 1.50% (k=2)

Connector Angle

Connector Angle to be used in DASY system	51.0 ° ± 1 °

Appendix (Additional assessments outside the scope of SCS0108)

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	200035.36	0.42	0.00
Channel X	+ Input	20006.81	0.84	0.00
Channel X	- Input	-20003.88	1.82	-0.01
Channel Y	+ Input	200037.10	2.34	0.00
Channel Y	+ Input	20004.84	-0.89	-0.00
Channel Y	- Input	-20007.39	-1.50	0.01
Channel Z	+ Input	200033.27	-1.83	-0.00
Channel Z	+ Input	20003.78	-1.97	-0.01
Channel Z	- Input	-20006.83	-0.82	0.00

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	2001.37	0.05	0.00
Channel X	+ Input	200.96	-0.33	-0.16
Channel X	- Input	-199.17	-0.61	0.31
Channel Y	+ Input	2000.80	-0.39	-0.02
Channel Y	+ Input	200.07	-1.12	-0.56
Channel Y	- Input	-200.08	-1.28	0.65
Channel Z	+ Input	2001.07	-0.11	-0.01
Channel Z	+ Input	200.38	-0.77	-0.38
Channel Z	- Input	-199.93	-1.12	0.57

2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	1.67	-0.11
	- 200	0.56	-1.39
Channel Y	200	-2.77	-3.79
	- 200	1.75	1.13
Channel Z	200	-22.37	-22.78
	- 200	21.31	21.31

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	1.56	-3.85
Channel Y	200	6.97	-	3.25
Channel Z	200	8.35	4.50	-

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Telephone: +86 (0) 755 23118282 Fax: +86 (0) 755 23116366, E-mail:info-JYTee@lets.com

4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	16028	16039
Channel Y	15789	16121
Channel Z	15769	16454

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	0.79	-0.02	2.36	0.41
Channel Y	-0.13	-1.32	1.53	0.52
Channel Z	-0.36	-1.38	0.84	0.39

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance (Typical values for information)

	Zeroing (kOhm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

8. Low Battery Alarm Voltage (Typical values for information)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (Typical values for information)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.01	+6	+14
Supply (- Vcc)	-0.01	-8	-9

------End of Report------