FCC SAR TEST REPORT

For

SWAGTEK

10.1 inch 4G Tablet

Model No.: T10L, Stream 10, NT10

FCC ID: O55104320

Prepared For	:	**SWAGTEK**
Address	:	10205 NW 19th St. STE101, Miami, Florida, United States, 33172
Prepared By	:	Shenzhen Anbotek Compliance Laboratory Limited
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Report Number	:	SZAWW191017009-01
Date of Test	:	Dec.14, 2020 ~ Dec.18,2020
Date of Report	:	Dec.21,2020

Contents

TEST REPORT

Applicant	:	SWAGTEK
Manufacturer	:	SWAGTEK
Product Name	:	10.1 inch 4G Tablet
Model No.	:	T10L, Stream 10, NT10
Trade Mark	:	LOGIC, iSWAG, UNONU
Rating(s)	:	DC 3.8V from battery

Test Standard(s) : **IEEE 1528-2013; IEC 62209-2:2010;ANSI/IEEE C95.1:2005; FCC 47 CFR Part 2 (2.1093:2013);**

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the IEEE 1528-2013, IEC 62209-2:2010, FCC 47 CFR Part 2 (2.1093:2013), ANSI/IEEE C95.1:2005requirements.

Thisreportappliestoabovetestedsampleonlyandshallnotbereproducedinpartwithoutwrittenapprovalof ShenzhenAnbotekComplianceLaboratoryLimited.

Date of Test Dec.14, 2020 ~ Dec.18,2020

Anbotek (SZ) Compliance Laboratory Limited Anbotek Product Safety * Approved *

Prepared By Bobby Wang
(Engineer/Bobby Wang)

Reviewer Calvin Liu
(Supervisor / Calvin Liu)

Approved & Authorized Signer Tom Chen
(Manager/TomChen)

Version

Version No.	Date	Description
01	Dec.21,2020	Original

1. Statement of Compliance

ThemaximumresultsofSpecificAbsorptionRate(SAR)foundduringtestingareasfollows.

<Highest SAR Summary>

Frequency Band	Highest Reported 1g-SAR(W/Kg)		SAR Test Limit (W/Kg)
	Body	Hotspot	
GSM 850	0.753	0.731	1.6
PCS 1900	0.652	0.612	1.6
WCDMA Band 2	0.609	0.583	1.6
WCDMA Band 5	0.634	0.562	1.6
LTE Band 4	0.659	0.608	1.6
LTE Band 5	0.912	0.787	1.6
LTE Band 7	0.682	0.654	1.6
LTE Band 12	0.754	0.714	1.6
WIFI 2.4G	0.538	0.525	1.6
Simultaneous SAR	1.450		1.6
Test Result		Pass	

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-2005, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013.

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2. General Information

2.1 Client Information

Applicant:	**SWAGTEK**
Address of Applicant:	10205 NW 19th St. STE101, Miami, Florida, United States, 33172
Manufacture:	**SWAGTEK**
Address of Manufacture:	10205 NW 19th St. STE101, Miami, Florida, United States, 33172

2.2 Testing Laboratory Information

Test Site:	Shenzhen Anbotek Compliance Laboratory Limited
Address:	1/F.,Building1,SECIndustrialPark,No.0409QianhaiRoad,NanshanDistrict,Shenzhen,Guangdong,China

2.3 Description of Equipment Under Test(EUT)

Product Name:	10.1 inch 4G Tablet
Model/Type reference:	T10L
Power supply:	DC 3.8V from battery
Hardware version:	SF960C-G-MB-V1.0
Software version:	LOGIC_T10L_TIGO_18092020
GSM	
Operation Band:	GSM850, PCS1900
Supported Type:	GSM/GPRS/EGPRS
Power Class:	GSM850:Power Class 4 PCS1900:Power Class 1
Modulation Type:	GMSK for GPRS, 8-PSK for EGPRS
GSM Release Version	R6
GPRS Multislot Class	12
Antenna type:	12

Antenna gain:	FPC antenna
WCDMA	
Operation Band:	FDD Band II, FDD Band V
Power Class:	Power Class 3
Modilation Type:	QPSK for HSUPA/HSDPA
WCDMA Release Version:	Rel-R8
HSDPA Category:	Category 14
HSUPA Category:	Category 6
Antenna type:	FPC antenna
Antenna Gain:	-0.5 dBi for WCDMA Band V; 1.2dBi for WCDMA Band II
LTE	
Operation Band:	E-UTRA Band 4, band5, band7, band12
Support Bandwidth:	Band 4: 1.4MHz, 3MHz,5MHz,10MHz,15MHz,20MHz Band 5: 1.4MHz,3MHz,5MHz,10MHz Band 7: 5MHz,10MHz,15MHz,20MHz Band 12: 1.4MHz,3MHz,5MHz,10MHz
TX/RXFrequency Range:	Band 4: 1710MHz-1755MHz/2110MHz-2155MHz Band 5: 824MHz-849MHz/869MHz-894MHz Band 7: 2500MHz-2570MHz/2620MHz-2690MHz Band 12: 699MHz-716MHz/729MHz-746MHz
Modulation Type:	QPSK, 16QAM
Release Version:	Release 10
Category:	Cat 4
Antenna Type:	FPC antenna
Antenna Gain:	0.8dBi for LTE Band 4 0.8dBi for LTE Band 5 0.5 dBi for LTE Band 7 -3.5 dBi for LTE Band 12
WIFI	
Supported type:	802.11b/802.11g/802.11n(H20)

Modulation:	802.11b: DSSS 802.11g/802.11n(H20): OFDM
Operation frequency:	802.11b/802.11g/802.11n(H20): 2412MHz~2462MHz
Channel number:	802.11b/802.11g/802.11n(H20): 11
Channel separation:	5MHz
Antenna type:	FPC antenna
Antenna gain:	1.50dBi
Bluetooth :	
Supported Type:	Bluetooth BR/EDR
Modulation:	GFSK, π/4DQPSK, 8DPSK
Operation frequency:	2402MHz~2480MHz
Channel number:	79
Channel separation:	1MHz
Antenna type:	FPC antenna
Antenna gain:	1.50dBi
Bluetooth LE	
Supported type:	Bluetooth low Energy
Modulation:	GFSK
Operation frequency:	2402MHz to 2480MHz
Channel number:	40
Channel separation:	2 MHz
Antenna type:	FPC antenna
Antenna gain:	1.50dBi

2.4 Device Category and SAR Limits

This device belongs to portable device category because its radiating structure is allowed to be used within 20 centimeters of the body of the user. according to IEEE Std C95.1, 1999:((IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 KHz to 300 GHz).
It specifies the maximum exposure limit of 1.6 W/kg as averaged over any 1 gram of tissue for portable devices bei ng used within 20 cm of the user in the uncontrolled environment.

2.5 Applied Standard

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards:

- IEEE 1528-2013
- FCC 47 CFR Part 2 (2.1093:2013)
- ANSI/IEEE C95.1:2005
- IEC 62209-2:2010
- IEC 62209-2:2010
- KDB 248227 D01
- KDB 447498 D01
- KDB 616217 D04
- KDB 648474 D04
- KDB 865664 D01
- KDB 941225 D01
- KDB 941225 D06
- KDB 941225 D07

2.6 Environment of Test Site

Items	Required	Actual
Temperature (℃)	18-25	22~23
Humidity (%RH)	30-70	55~65

2.7 Test Configuration

The device was controlled by using a base station emulator. Communication between the device and the emulator was established by air link. The distance between the EUT and the antenna of the emulator is larger than 50 cm and the output power radiated from the emulator antenna is at least 30 dB smaller than the output power of EUT. The EUT was set from the emulator to radiate maximum output power during all tests. For WLAN SAR testing, WLAN engineering testing software installed on the EUT can provide continuous transmitting RF signal.

3. Specific Absorption Rate (SAR)

3.1 Introduction

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

3.2 SAR Definition

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

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

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

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

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

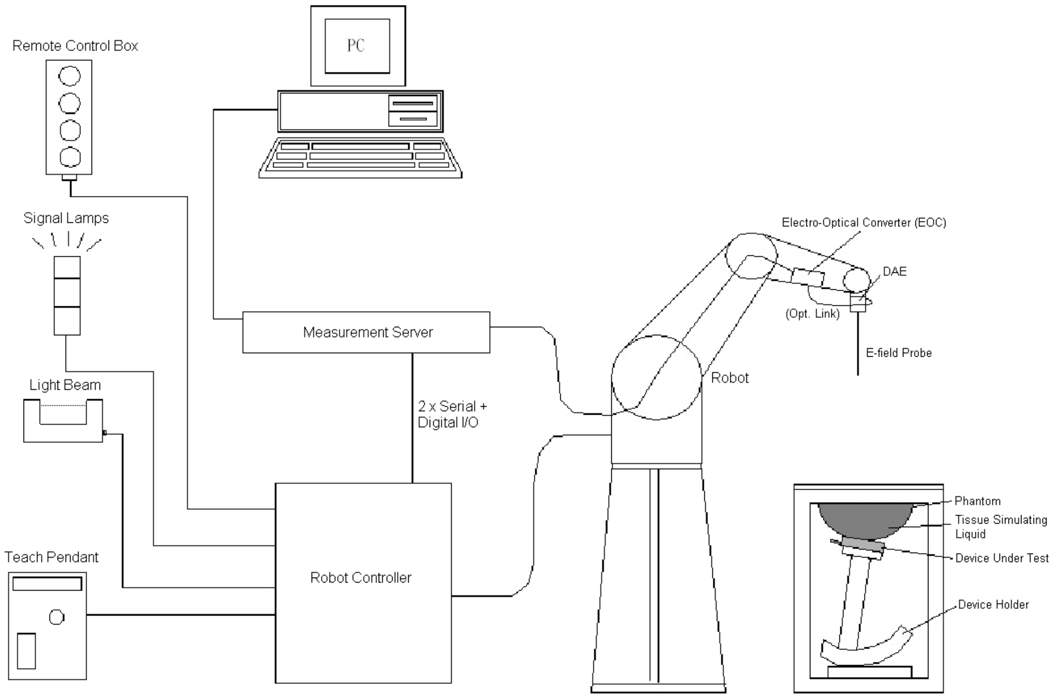
Where: C is the specific head capacity, δT is the temperature rise and δtisthe exposure duration, or related to the electrical field in the tissue by

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

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

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

4. SAR Measurement System



DASY System Configurations

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

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

components are described in details in the following sub-sections.

4.1 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	10 MHz to 6 GHz; Linearity: ± 0.2 dB
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 µW/g to 100 W/kg; Linearity: ± 0.2 dB (noise: typically < 1 µW/g)
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm

Photo of EX3DV4

➢ **E-Field Probe Calibration**

Each probe needs to be calibrated according to a dosimetric assessment procedure with accuracy better than ± 10%. The spherical isotropy shall be evaluated and within ± 0.25dB. The sensitivity parameters (NormX, NormY, and NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested. The calibration data can be referred to appendix C of this report.

4.2 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 200MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80dB.

Photo of DAE

4.3 Robot

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

- High precision (repeatability ±0.035 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)

Photo of DASY5

4.4 Measurement Server

The measurement server is based on a PC/104 CPU board with CPU (DASY5: 400 MHz, Intel Celeron), chipdisk (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.

Photo of Server for DASY5

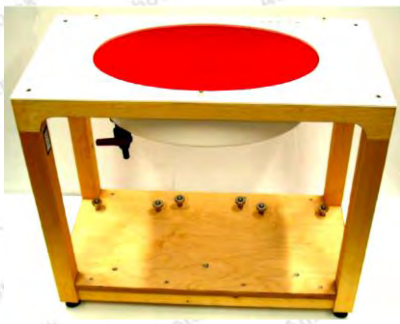
4.5 Phantom

<SAM Twin Phantom>

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

Shell Thickness	2 ± 0.2 mm (sagging: <1%)	
Filling Volume	Approx. 30 liters	
Dimensions	Major ellipse axis: 600 mm Minor axis:400 mm	**Photo of ELI4 Phantom**

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

4.6 Device Holder

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 ±0.5mm would produce a SAR uncertainty of ± 20%. Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards.

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

Device Holder

4.7 Data Storage and Evaluation

- Data Storage

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

The measured data can be visualized or exported in different units or formats, depending on the selected probe type (e.g., [V/m], [A/m], [W/kg]). 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 factor	$ConvF_i$
	- Diode compression point	dcp_i
Device parameters：	- Frequency	f
	- Crest factor	cf
Media parameters：	- Conductivity	σ
	- Density	ρ

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

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

The formula for each channel can be given as：

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

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

U_i = input signal of channel i, (i = x, y, z)

cf = crest factor of exciting field (DASY parameter)

dcp_i = diode compression point (DASY parameter)

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

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

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

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

$Norm_i$= sensor sensitivity of channel i, (i = x, y, z), µV/(V/m)^2 for E-field Probes

ConvF= sensitivity enhancement in solution

a_{ij}= sensor sensitivity factors for H-field probes

f = carrier frequency [GHz]

E_i= electric field strength of channel i in V/m

H_i= magnetic field strength of channel i in A/m

The RSS value of the field components gives the total field strength (Hermitian magnitude):

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

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

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

with SAR = local specific absorption rate in W/kg

E_{tot}= total field strength in V/m

σ = conductivity in [mho/m] or [Siemens/m]

ρ = equivalent tissue density in g/cm^3

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

5. Test Equipment List

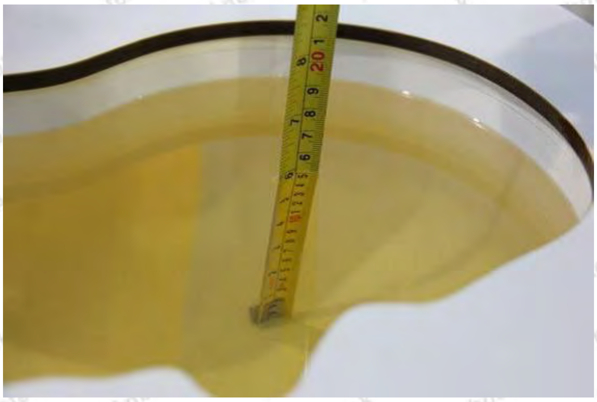
Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	750MHz System Validation Kit	D750V3	1163	Sep.03,2019	Sep.02,2022
SPEAG	835MHz System Validation Kit	D835V2	4d154	Jun.16,2018	Jun.15,2021
SPEAG	1750MHz System Validation Kit	D1750V2	1021	Jul.03,2019	Jul.02,2022
SPEAG	1900MHz System Validation Kit	D1900V2	5d175	Jun.15,2019	Jun.14,2022
SPEAG	2450MHz System Validation Kit	D2450V2	910	Jun.15,2018	Jun.14,2021
SPEAG	2600MHz System Validation Kit	D2600V2	1058	Jun.19,2019	Jun.18,2022
SPEAG	Data Acquisition Electronics	DAE4	387	Sep.06.2020	Sep.05.2021
SPEAG	Dosimetric E-Field Probe	EX3DV4	7396	May.06,2020	May.05,2021
Agilent	ENA Series Network Analyzer	E5071C	MY46317418	Nov.03,2020	Nov.02, 2021
SPEAG	DAK	DAK-3.5	1226	NCR	NCR
SPEAG	ELI Phantom	QDOVA004AA	2058	NCR	NCR
AR	Amplifier	ZHL-42W	QA1118004	NCR	NCR
Agilent	Power Meter	N1914A	MY50001102	Nov.03, 2020	Nov.02, 2021
Agilent	Power Sensor	N8481H	MY51240001	Nov.03, 2020	Nov.02, 2021
R&S	Spectrum Analyzer	N9020A	MY51170037	Nov.03, 2020	Nov.02, 2021
Agilent	Signal Generation	N5182A	MY48180656	Nov.03, 2020	Nov.02, 2021
Worken	Directional Coupler	0110A05601O-10	COM5BNW1A2	Nov.03, 2020	Nov.02, 2021

Note:

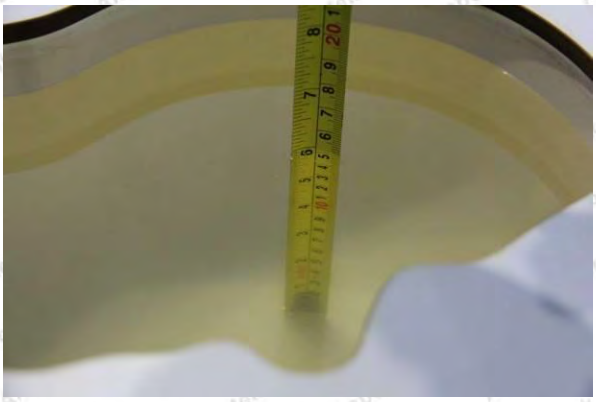
1. The calibration certificate of DASY can be referred to appendix C of this report.
2. The dipole calibration interval can be extended to 3 years with justification. The dipoles are also not physically damaged, or repaired during the interval.
3. The Insertion Loss calibration of Dual Directional Coupler 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 Agilent.
5. In system check we need to monitor the level on the power meter, and adjust the power amplifier level to have precise power level to the dipole; the measured SAR will be normalized to 1W input power according to the ratio of 1W to the input power to the dipole. For system check, the calibration of the power amplifier is deemed not critically required for correct measurement; the power meter is critical and we do have calibration for it

6. 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. 6.1. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm, which is shown as followed:



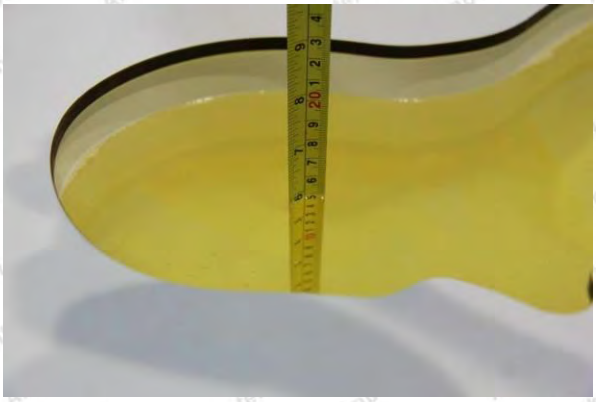
Liquid depth in the Head&body Phantom (750MHz)



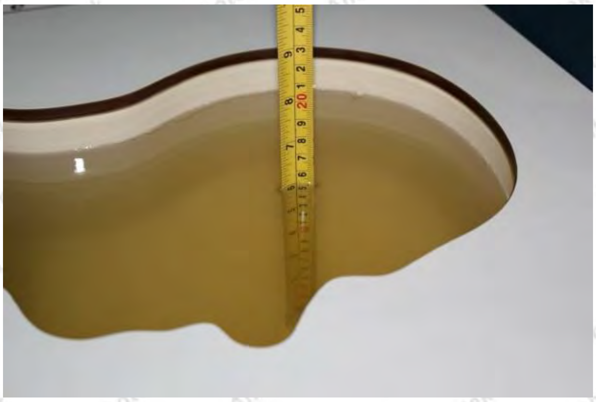
Liquid depth in the Head&body Phantom (835MHz)

Liquid depth in the Head&body Phantom (1750MHz)

Liquid depth in the Head&body Phantom (1900MHz)



Liquid depth in the Head&body Phantom (2450MHz)



Liquid depth in the Head&body Phantom (2600MHz)

The following table gives the recipes for tissue simulating liquid.

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (εr)
For Head								
900	40.3	57.9	0.2	1.4	0.2	0	0.97	41.5
1750	55.2	0	0	0.3	0	44.5	1.37	40.1
1800,1900,2000	55.2	0	0	0.3	0	44.5	1.40	40.0
2450	55.0	0	0	0	0	45.0	1.80	39.2
For Body								
900	50.8	48.2	0	0.9	0.1	0	0.97	55.2
1750	70.2	0	0	0.4	0	29.4	1.49	53.4
1800,1900,2000	70.2	0	0	0.4	0	29.4	1.52	53.3
2450	68.6	0	0	0	0	31.4	1.95	52.7

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The following table shows the measuring results for simulating liquid.

Dielectric Performance of Tissue Simulating Liquid

Tissue Type	Measured Frequency (MHz)	Target Tissue		Measured Tissue				Liquid Temp.	Test Data
		σ	εr	σ	Dev. (±5%)	εr	Dev. (±5%)		
750B	750	0.96	55.5	0.94	-2.08%	55.32	-0.32%	22.4	12/15/2020
835B	900	0.97	55.2	0.99	2.06%	54.68	-0.94%	22.6	12/14/2020
1750B	1750	1.49	53.4	1.52	2.01%	54.11	1.33%	22.4	12/14/2020
1900B	1900	1.52	53.3	1.48	-2.63%	53.29	-0.02%	22.6	12/15/2020
2450B	2450	1.95	52.7	1.97	1.03%	50.54	-4.10%	22.7	12/16/2020
2600B	2600	2.16	52.5	2.10	-2.78%	51.34	-2.21%	22.5	12/16/2020

7. System Verification Procedures

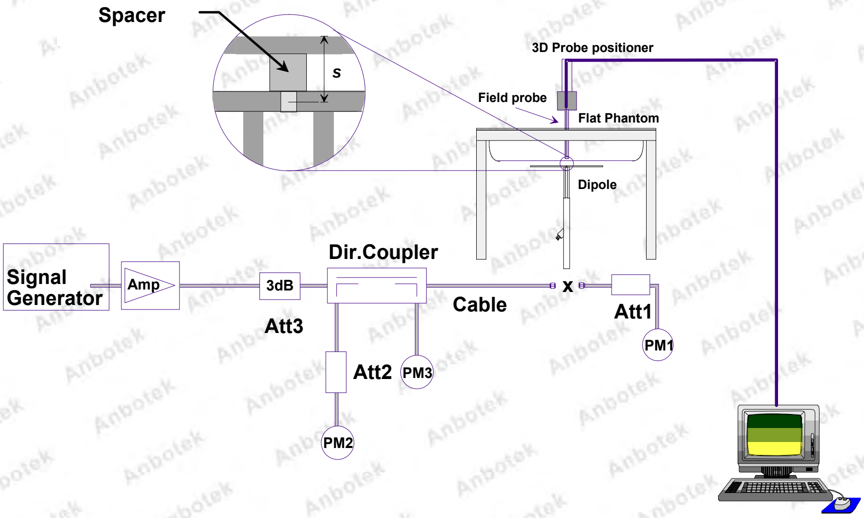
Each DASY system is equipped with one or more system validation kits. These units, together with the predefined measurement procedures within the DASY software, enable the user to conduct the system performance check and system validation. System validation kit includes a dipole, tripod holder to fix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



System Setup for System Evaluation

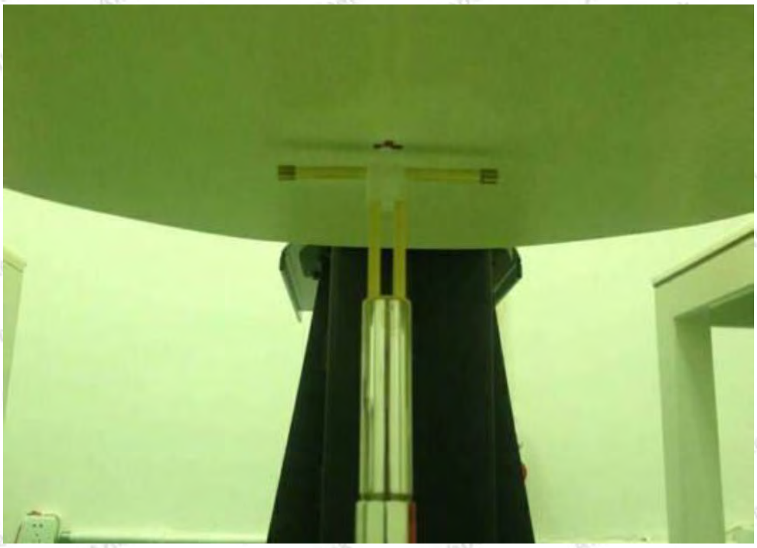


Photo of Dipole Setup

➢ **Validation Results**

Comparing to the original SAR value provided by SPEAG, the verification data should be within its specification of 10 %. The table below shows the target SAR and measured SAR after normalized to 1W input power. It indicates that the system performance check can meet the variation criterion and the plots can be referred to Appendix A of this report.

Frequency (MHz)	Liquid Type	Power fed onto reference dipole (mW)	Targeted SAR (W/kg)	Measured SAR (W/kg)	Normalized SAR (W/kg)	Deviation (%)	Date
750B	Body	250	8.78	2.19	8.76	-0.23%	12/15/2020
835B	Body	250	9.57	2.41	9.64	0.73%	12/14/2020
1750B	Body	250	36.7	9.16	36.64	-0.16%	12/14/2020
1900B	Body	250	40.1	10.05	40.20	0.25%	12/15/2020
2450B	Body	250	51.8	12.96	51.84	0.08%	12/16/2020
2600B	Body	250	56.8	14.22	56.88	0.14%	12/16/2020

Note:

1. The graph results see system check.
2. Target Values used derive from the calibration certificate.

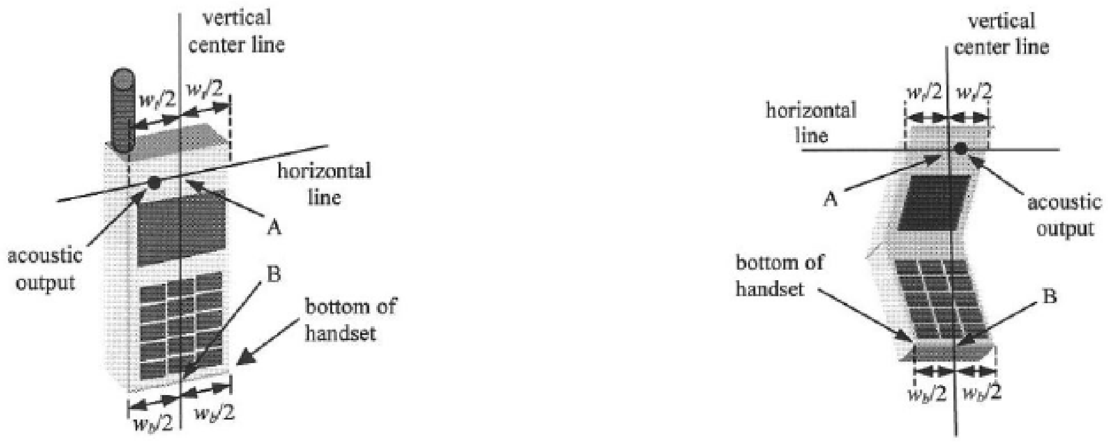
8. EUT Testing Position

8.1. Define two imaginary lines on the handset

(a) The vertical centerline 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.

(b) The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output. The horizontal line is also tangential to the face of the handset at point A.

(c) 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 centerline is not necessarily parallel to the front face of the handset, especially for clamshell handsets, handsets with flip covers, and other irregularly shaped handsets.

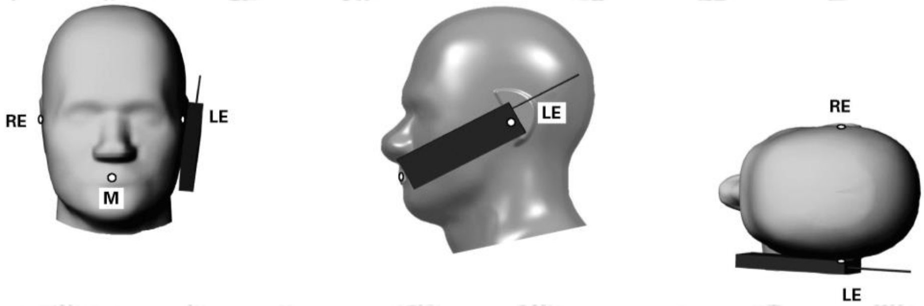


Handset Vertical and Horizontal Reference Lines

8.2. Position for Cheek/Touch

(a) 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.

(b) 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.

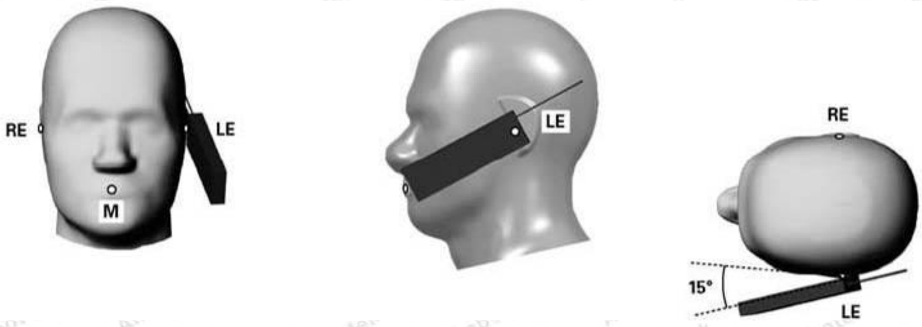


Cheek Position

8.3. Position for Ear / 15° Tilt

(a) To position the device in the “cheek” position described above.

(b) 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 Fig. 8.3).

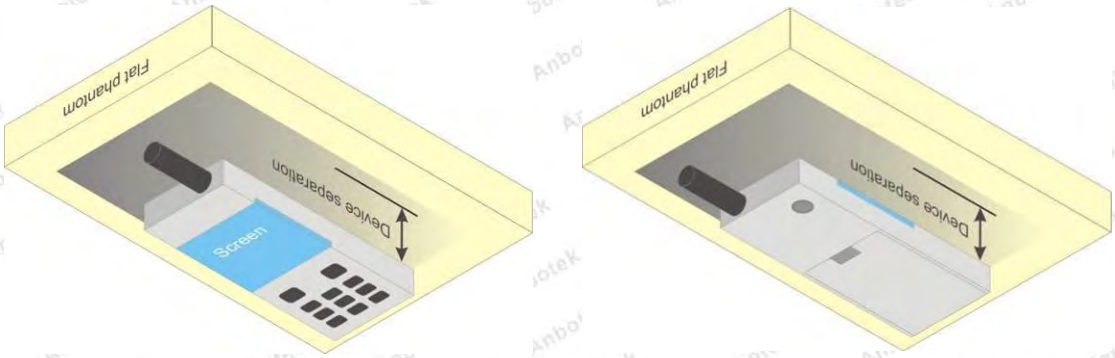


Tilt Position

8.4. Body Worn Position

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration. Per KDB 648474 D04, body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB 447498 D01 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for body-worn accessory, measured without a headset connected to the handset is < 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a handset attached to the handset.

Accessories for body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are test with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-chip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.



Body Worn Position

9. Measurement Procedures

The measurement procedures are as follows:

(a) Use base station simulator (if applicable) or engineering software to transmit RF power continuously (continuous Tx) in the middle channel.
(b) Keep EUT to radiate maximum output power or 100% duty factor (if applicable)
(c) Measure output power through RF cable and power meter.
(d) Place the EUT in the positions as setup photos demonstrates.
(e) Set scan area, grid size and other setting on the DASY software.
(f) Measure SAR transmitting at the middle channel for all applicable exposure positions.
(g) Identify the exposure position and device configuration resulting the highest SAR
(h) Measure SAR at the lowest and highest channels at the worst exposure position and device configuration if applicable.

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

(a) Power reference measurement
(b) Area scan
(c) Zoom scan
(d) Power drift measurement

9.1 Spatial Peak SAR Evaluation

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

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

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

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

surface

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

9.2 Power Reference Measurement

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

9.3 Area & Zoom Scan Procedures

The area scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum found in the scanned area, within a range of the global maximum. The range (in dB0 is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan), if only one zoom scan follows the area scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the numberof zoom scans has to be increased accordingly.

Area scan parameters extracted from FCC KDB 865664 D01 SAR measurement 100 MHz to 6 GHz.

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

9.4 Zoom Scan Procedures

Zoom scans are used assess the peak spatial SAR values within a cubic averaging volume containing 1 gram and 10 gram of simulated tissue. The zoom scan measures points (refer to table below) within a cube shoes base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the zoom scan evaluates the averaged SAR for 1 gram and 10 gram and displays these values next to the job's label.

Zoom scan parameters extracted from FCC KDB 865664 D01 SAR measurement 100 MHz to 6 GHz.

Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.

* When zoom scan is required and the *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

9.5 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 postprocessor can combine and subsequently superpose these measurement data to calculating the multiband SAR.

9.6 Power Drift Monitoring

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the same settings. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

10.Conducted Power

<GSM Conducted power>

Conducted power measurement results (GSM850/1900)

Mode	Txslot	Burst Average Power (dBm)			Tune-up Limit (dBm)	Calculation (dB)	Frame-Averaged Power (dBm)		
		128	190	251			128	190	251
GSM		32.09	32.33	32.22	33	-9.03	23.06	23.30	23.19
GPRS 850 (GMSK)	1Txslot	32.66	32.11	32.55	33	-9.03	23.63	23.08	23.52
	2Txslot	29.69	29.82	29.76	30	-6.02	23.67	23.80	23.74
	3Txslot	27.56	27.27	27.41	28	-4.26	23.30	23.01	23.15
	4Txslot	25.54	25.83	25.98	26	-3.01	22.53	22.82	22.97
EGPRS 850 (8PSK)	1 Txslot	26.83	25.83	26.04	27	-9.03	17.80	16.80	17.01
	2Txslot	24.74	24.87	24.88	25	-6.02	18.72	18.85	18.86
	3Txslot	22.20	22.72	22.85	23	-4.26	17.94	18.46	18.59
	4Txslot	20.78	20.75	20.74	21	-3.01	17.77	17.74	17.73
Mode	Txslot	Burst Average Power (dBm)			Tune-up Limit (dBm)	Calculation (dB)	Frame-Averaged Power (dBm)		
		512	661	810			128	190	251
GSM		30.24	30.32	29.80	31	-9.03	21.21	21.29	20.77
GPRS 1900 (GMSK)	1Txslot	30.31	30.90	30.74	31	-9.03	21.28	21.87	21.71
	2Txslot	27.05	27.49	27.45	28	-6.02	21.03	21.47	21.43
	3Txslot	24.74	24.73	24.76	25	-4.26	20.48	20.47	20.50
	4Txslot	23.54	23.75	23.25	24	-3.01	20.53	20.74	20.24
EGPRS 1900 (8PSK)	1 Txslot	25.28	25.55	25.63	26	-9.03	16.25	16.52	16.60
	2Txslot	23.46	23.81	23.83	24	-6.02	17.44	17.79	17.81
	3Txslot	21.24	21.90	21.46	22	-4.26	16.98	17.64	17.20
	4Txslot	19.83	20.00	20.52	21	-3.01	16.82	16.99	17.51

NOTES:

1) Division Factors

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

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

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

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

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

2) According to the conducted power as above, the body& hotspot SAR was test at the highest frame-average power GPRS 2 Tx slots for GSM850and GPRS 1 Tx slots for PCS1900.

<WCDMA Conducted power>

Conducted power measurement results (WCDMA Band II/V)

Item	Band	FDD Band II result (dBm)			Tune-up Limit (dBm)
		Test Channel			
	ARFCN	9262	9400	9538	
AMR	12.2kbps AMR	22.92	22.99	22.84	24
RMC	12.2kbps RMC	23.78	23.61	23.49	24
HSDPA	Sub - Test 1	21.91	22.03	22.44	23
	Sub - Test 2	21.18	21.38	20.80	22
	Sub - Test 3	21.54	21.73	21.57	22
	Sub - Test 4	20.17	20.82	19.76	21
HSUPA	Sub - Test 1	21.82	21.70	22.52	23
	Sub - Test 2	21.51	20.70	21.51	22
	Sub - Test 3	20.76	20.79	21.32	22
	Sub - Test 4	19.81	20.40	20.45	21
	Sub - Test 5	20.09	20.12	20.72	21

Item	Band	FDD Band V result (dBm)			Tune-up Limit (dBm)
		Test Channel			
	ARFCN	4132	4183	4233	
AMR	12.2kbps AMR	22.80	22.80	22.79	24
RMC	12.2kbps RMC	23.81	23.56	23.28	24
HSDPA	Sub - Test 1	22.60	22.68	22.83	23
	Sub - Test 2	20.87	21.78	20.71	22
	Sub - Test 3	21.17	21.74	20.82	22
	Sub - Test 4	20.47	20.76	19.82	21
HSUPA	Sub - Test 1	21.93	22.85	22.00	23
	Sub - Test 2	21.75	20.75	20.92	22
	Sub - Test 3	20.82	21.48	21.48	22
	Sub - Test 4	20.28	20.55	20.13	21
	Sub - Test 5	20.78	19.70	19.82	21

Per KDB 941225 D01 v02, RMC 12.2kbps setting is used to evaluate SAR. If AMR 12.2kbps power is < 0.25dB higher than RMC 12.2kbps, SAR tests with AMR 12.2kbps can be excluded.

<LTE Conducted Power>

Conducted Power Measurement Results (LTE FDD Band 4)

TX Channel Bandwidth	RB Size/Offset	Frequency (MHz)	Average Power [dBm]		Tune-up Limit (dBm)	
			QPSK	16QAM	QPSK	16QAM
1.4 MHz	1 RB low	1710.7	23.40	22.47	23.5	23.0
		1732.5	22.63	21.77	23.5	23.0
		1754.3	22.76	21.83	23.5	23.0
	1 RB mid	1710.7	22.51	21.45	23.5	23.0
		1732.5	22.89	21.94	23.5	23.0
		1754.3	23.07	22.06	23.5	23.0
	1 RB high	1710.7	23.18	22.18	23.5	23.0
		1732.5	22.74	21.63	23.5	23.0
		1754.3	23.26	22.30	23.5	23.0
	50% RB low	1710.7	23.06	22.12	23.5	23.0
		1732.5	22.28	21.25	23.5	23.0
		1754.3	22.43	21.42	23.5	23.0
	50% RB mid	1710.7	22.21	21.34	23.5	23.0
		1732.5	22.60	21.46	23.5	23.0
		1754.3	22.81	21.87	23.5	23.0
	50% RB High	1710.7	22.91	21.89	23.5	23.0
		1732.5	22.44	21.46	23.5	23.0
		1754.3	22.96	21.82	23.5	23.0
	100% RB	1710.7	22.80	21.90	23.5	23.0
		1732.5	22.02	20.97	23.5	23.0
		1754.3	22.14	21.24	23.5	23.0
3 MHz	1 RB low	1711.5	23.01	21.95	23.5	23.0
		1732.5	23.28	22.34	23.5	23.0
		1753.5	22.70	21.73	23.5	23.0
	1 RB mid	1711.5	22.99	22.04	23.5	23.0
		1732.5	23.32	22.22	23.5	23.0
		1753.5	23.41	22.37	23.5	23.0
	1 RB high	1711.5	22.67	21.54	23.5	23.0
		1732.5	23.14	22.24	23.5	23.0
		1753.5	22.82	21.74	23.5	23.0
	50% RB low	1711.5	22.71	21.74	23.5	23.0
		1732.5	22.94	21.84	23.5	23.0
		1753.5	22.35	21.37	23.5	23.0
	50% RB mid	1711.5	22.70	21.72	23.5	23.0
		1732.5	23.00	22.00	23.5	23.0

		1753.5	23.13	22.15	23.5	23.0
	50% RB High	1711.5	22.41	21.26	23.5	23.0
		1732.5	22.88	21.93	23.5	23.0
		1753.5	22.55	21.46	23.5	23.0
	100% RB	1711.5	22.42	21.34	23.5	23.0
		1732.5	22.62	21.54	23.5	23.0
		1753.5	22.02	21.02	23.5	23.0
5 MHz	1 RB low	1712.5	22.87	21.81	23.5	23.0
		1732.5	23.34	22.26	23.5	23.0
		1752.5	22.76	21.65	23.5	23.0
	1 RB mid	1712.5	22.72	21.59	23.5	23.0
		1732.5	23.39	22.35	23.5	23.0
		1752.5	23.34	22.42	23.5	23.0
	1 RB high	1712.5	23.05	21.98	23.5	23.0
		1732.5	22.90	22.03	23.5	23.0
		1752.5	23.07	22.16	23.5	23.0
	50% RB low	1712.5	22.59	21.46	23.5	23.0
		1732.5	23.03	22.15	23.5	23.0
		1752.5	22.45	21.40	23.5	23.0
	50% RB mid	1712.5	22.41	21.41	23.5	23.0
		1732.5	23.14	22.00	23.5	23.0
		1752.5	23.03	22.14	23.5	23.0
	50% RB High	1712.5	22.74	21.66	23.5	23.0
		1732.5	22.55	21.61	23.5	23.0
		1752.5	22.72	21.82	23.5	23.0
	100% RB	1712.5	22.30	21.39	23.5	23.0
		1732.5	22.75	21.87	23.5	23.0
		1752.5	22.19	21.05	23.5	23.0
10 MHz	1 RB low	1715.0	22.75	21.66	23.5	23.0
		1732.5	22.68	21.76	23.5	23.0
		1750.0	23.41	22.41	23.5	23.0
	1 RB mid	1715.0	23.50	22.50	23.5	23.0
		1732.5	22.67	21.77	23.5	23.0
		1750.0	23.40	22.45	23.5	23.0
	1 RB high	1715.0	22.52	21.60	23.5	23.0
		1732.5	23.05	21.97	23.5	23.0
		1750.0	23.11	22.08	23.5	23.0
	50% RB low	1715.0	22.50	21.62	23.5	23.0
		1732.5	22.39	21.54	23.5	23.0
		1750.0	23.13	22.11	23.5	23.0

	50% RB mid	1715.0	23.23	22.17	23.5	23.0
		1732.5	22.42	21.46	23.5	23.0
		1750.0	23.10	22.00	23.5	23.0
	50% RB High	1715.0	22.24	21.16	23.5	23.0
		1732.5	22.72	21.73	23.5	23.0
		1750.0	22.86	21.77	23.5	23.0
	100% RB	1715.0	22.17	21.27	23.5	23.0
		1732.5	22.06	21.01	23.5	23.0
		1750.0	22.86	21.95	23.5	23.0
15 MHz	1 RB low	1717.5	23.14	22.07	23.5	23.0
		1732.5	22.75	21.76	23.5	23.0
		1747.5	22.75	21.82	23.5	23.0
	1 RB mid	1717.5	22.93	22.03	23.5	23.0
		1732.5	22.52	21.52	23.5	23.0
		1747.5	22.94	21.86	23.5	23.0
	1 RB high	1717.5	23.12	22.03	23.5	23.0
		1732.5	23.30	22.42	23.5	23.0
		1747.5	23.33	22.35	23.5	23.0
	50% RB low	1717.5	22.82	21.97	23.5	23.0
		1732.5	22.42	21.33	23.5	23.0
		1747.5	22.46	21.36	23.5	23.0
	50% RB mid	1717.5	22.68	21.54	23.5	23.0
		1732.5	22.24	21.22	23.5	23.0
		1747.5	22.61	21.68	23.5	23.0
	50% RB High	1717.5	22.84	21.83	23.5	23.0
		1732.5	22.96	21.95	23.5	23.0
		1747.5	23.08	22.11	23.5	23.0
	100% RB	1717.5	22.48	21.51	23.5	23.0
		1732.5	22.13	21.10	23.5	23.0
		1747.5	22.20	21.21	23.5	23.0
20 MHz	1 RB low	1720.0	23.50	22.39	23.5	23.0
		1732.5	23.04	21.98	23.5	23.0
		1745.0	23.11	22.02	23.5	23.0
	1 RB mid	1720.0	22.53	21.39	23.5	23.0
		1732.5	23.04	22.00	23.5	23.0
		1745.0	22.55	21.54	23.5	23.0
	1 RB high	1720.0	23.33	22.35	23.5	23.0
		1732.5	22.69	21.58	23.5	23.0
		1745.0	22.65	21.69	23.5	23.0
	50% RB low	1720.0	23.24	22.15	23.5	23.0

		1732.5	22.70	21.59	23.5	23.0
		1745.0	22.77	21.90	23.5	23.0
	50% RB mid	1720.0	22.18	21.03	23.5	23.0
		1732.5	22.78	21.76	23.5	23.0
		1745.0	22.24	21.33	23.5	23.0
	50% RB High	1720.0	23.06	22.14	23.5	23.0
		1732.5	22.37	21.26	23.5	23.0
		1745.0	22.36	21.43	23.5	23.0
	100% RB	1720.0	22.91	21.98	23.5	23.0
		1732.5	22.36	21.35	23.5	23.0
		1745.0	22.42	21.50	23.5	23.0

Conducted Power Measurement Results (LTE FDD Band 5)

TX Channel Bandwidth	RB Size/Offset	Frequency (MHz)	Average Power [dBm]		Tune-up Limit (dBm)	
			QPSK	16QAM	QPSK	16QAM
1.4 MHz	1 RB low	824.7	22.75	21.75	23.5	23.0
		836.5	22.78	21.79	23.5	23.0
		848.3	23.30	22.35	23.5	23.0
	1 RB mid	824.7	22.60	21.47	23.5	23.0
		836.5	23.06	21.99	23.5	23.0
		848.3	22.96	22.07	23.5	23.0
	1 RB high	824.7	22.64	21.77	23.5	23.0
		836.5	23.07	21.95	23.5	23.0
		848.3	23.17	22.31	23.5	23.0
	50% RB low	824.7	22.49	21.39	23.5	23.0
		836.5	22.53	21.58	23.5	23.0
		848.3	22.95	21.93	23.5	23.0
	50% RB mid	824.7	22.25	21.27	23.5	23.0
		836.5	22.74	21.60	23.5	23.0
		848.3	22.64	21.70	23.5	23.0
	50% RB High	824.7	22.30	21.43	23.5	23.0
		836.5	22.80	21.81	23.5	23.0
		848.3	22.89	21.97	23.5	23.0
	100% RB	824.7	22.22	21.08	23.5	23.0
		836.5	22.19	21.18	23.5	23.0
		848.3	22.70	21.82	23.5	23.0
3 MHz	1 RB low	825.5	23.24	22.17	23.5	23.0
		836.5	22.68	21.74	23.5	23.0
		847.5	23.15	22.26	23.5	23.0

	1 RB mid	825.5	23.10	22.07	23.5	23.0
		836.5	23.13	22.01	23.5	23.0
		847.5	22.73	21.69	23.5	23.0
	1 RB high	825.5	22.69	21.66	23.5	23.0
		836.5	22.84	21.81	23.5	23.0
		847.5	23.41	22.51	23.5	23.0
	50% RB low	825.5	22.93	21.83	23.5	23.0
		836.5	22.37	21.52	23.5	23.0
		847.5	22.81	21.86	23.5	23.0
	50% RB mid	825.5	22.79	21.76	23.5	23.0
		836.5	22.85	21.95	23.5	23.0
		847.5	22.40	21.55	23.5	23.0
	50% RB High	825.5	22.37	21.50	23.5	23.0
		836.5	22.56	21.66	23.5	23.0
		847.5	23.10	22.15	23.5	23.0
	100% RB	825.5	22.68	21.54	23.5	23.0
		836.5	22.07	21.16	23.5	23.0
		847.5	22.54	21.61	23.5	23.0
5 MHz	1 RB low	826.5	23.22	22.08	23.5	23.0
		836.5	23.13	22.25	23.5	23.0
		846.5	22.73	21.59	23.5	23.0
	1 RB mid	826.5	23.01	22.02	23.5	23.0
		836.5	22.97	22.07	23.5	23.0
		846.5	22.67	21.53	23.5	23.0
	1 RB high	826.5	23.24	22.15	23.5	23.0
		836.5	22.89	21.76	23.5	23.0
		846.5	23.23	22.27	23.5	23.0
	50% RB low	826.5	22.94	21.97	23.5	23.0
		836.5	22.86	21.90	23.5	23.0
		846.5	22.42	21.33	23.5	23.0
	50% RB mid	826.5	22.76	21.84	23.5	23.0
		836.5	22.72	21.72	23.5	23.0
		846.5	22.33	21.33	23.5	23.0
	50% RB High	826.5	22.92	21.81	23.5	23.0
		836.5	22.60	21.54	23.5	23.0
		846.5	22.89	21.86	23.5	23.0
	100% RB	826.5	22.64	21.69	23.5	23.0
		836.5	22.59	21.66	23.5	23.0
		846.5	22.17	21.26	23.5	23.0
10 MHz	1 RB low	829.0	22.61	21.51	23.5	23.0

		836.5	23.19	22.22	23.5	23.0
		844.0	22.62	21.62	23.5	23.0
	1 RB mid	829.0	22.51	21.40	23.5	23.0
		836.5	22.78	21.70	23.5	23.0
		844.0	23.41	22.29	23.5	23.0
	1 RB high	829.0	23.17	22.11	23.5	23.0
		836.5	23.11	21.97	23.5	23.0
		844.0	23.24	22.27	23.5	23.0
	50% RB low	829.0	22.33	21.29	23.5	23.0
		836.5	22.86	21.82	23.5	23.0
		844.0	22.35	21.28	23.5	23.0
	50% RB mid	829.0	22.23	21.29	23.5	23.0
		836.5	22.43	21.58	23.5	23.0
		844.0	23.14	22.21	23.5	23.0
	50% RB High	829.0	22.89	21.89	23.5	23.0
		836.5	22.86	21.79	23.5	23.0
		844.0	22.89	21.85	23.5	23.0
	100% RB	829.0	22.02	21.03	23.5	23.0
		836.5	22.57	21.60	23.5	23.0
		844.0	22.09	21.09	23.5	23.0

Conducted Power Measurement Results (LTE FDD Band 7)

TX Channel Bandwidth	RB Size/Offset	Frequency (MHz)	Average Power [dBm]		Tune-up Limit (dBm)	
			QPSK	16QAM	QPSK	16QAM
5 MHz	1 RB low	2502.5	22.90	21.97	23.5	23.0
		2535	22.87	21.89	23.5	23.0
		2567.5	22.89	21.87	23.5	23.0
	1 RB mid	2502.5	23.27	22.14	23.5	23.0
		2535	23.15	22.00	23.5	23.0
		2567.5	22.64	21.52	23.5	23.0
	1 RB high	2502.5	22.89	21.78	23.5	23.0
		2535	22.61	21.63	23.5	23.0
		2567.5	23.47	22.40	23.5	23.0
	50% RB low	2502.5	22.60	21.59	23.5	23.0
		2535	22.53	21.40	23.5	23.0
		2567.5	22.57	21.63	23.5	23.0
	50% RB mid	2502.5	22.96	22.05	23.5	23.0
		2535	22.84	21.89	23.5	23.0
		2567.5	22.31	21.38	23.5	23.0

	50% RB High	2502.5	22.57	21.59	23.5	23.0
		2535	22.34	21.49	23.5	23.0
		2567.5	23.20	22.08	23.5	23.0
	100% RB	2502.5	22.32	21.43	23.5	23.0
		2535	22.27	21.34	23.5	23.0
		2567.5	22.28	21.27	23.5	23.0
10 MHz	1 RB low	2505	22.99	22.11	23.5	23.0
		2535	22.87	22.00	23.5	23.0
		2565	22.65	21.72	23.5	23.0
	1 RB mid	2505	22.97	21.89	23.5	23.0
		2535	22.74	21.81	23.5	23.0
		2565	23.18	22.19	23.5	23.0
	1 RB high	2505	22.82	21.78	23.5	23.0
		2535	23.34	22.29	23.5	23.0
		2565	22.61	21.51	23.5	23.0
	50% RB low	2505	22.72	21.64	23.5	23.0
		2535	22.57	21.49	23.5	23.0
		2565	22.31	21.36	23.5	23.0
	50% RB mid	2505	22.69	21.81	23.5	23.0
		2535	22.41	21.36	23.5	23.0
		2565	22.87	21.86	23.5	23.0
	50% RB High	2505	22.47	21.58	23.5	23.0
		2535	23.06	22.15	23.5	23.0
		2565	22.28	21.40	23.5	23.0
	100% RB	2505	22.42	21.38	23.5	23.0
		2535	22.32	21.32	23.5	23.0
		2565	22.06	21.00	23.5	23.0
15 MHz	1 RB low	2507.5	23.47	22.44	23.5	23.0
		2535	22.75	21.87	23.5	23.0
		2562.5	23.12	22.15	23.5	23.0
	1 RB mid	2507.5	23.14	22.14	23.5	23.0
		2535	22.91	21.96	23.5	23.0
		2562.5	22.74	21.87	23.5	23.0
	1 RB high	2507.5	22.80	21.77	23.5	23.0
		2535	23.26	22.26	23.5	23.0
		2562.5	23.00	21.85	23.5	23.0
	50% RB low	2507.5	23.16	22.24	23.5	23.0
		2535	22.47	21.49	23.5	23.0
		2562.5	22.82	21.71	23.5	23.0
	50% RB mid	2507.5	22.81	21.93	23.5	23.0

		2535	22.60	21.66	23.5	23.0
		2562.5	22.49	21.41	23.5	23.0
	50% RB High	2507.5	22.50	21.55	23.5	23.0
		2535	22.94	21.85	23.5	23.0
		2562.5	22.69	21.83	23.5	23.0
	100% RB	2507.5	22.83	21.73	23.5	23.0
		2535	22.20	21.24	23.5	23.0
		2562.5	22.47	21.38	23.5	23.0
20 MHz	1 RB low	2510	22.72	21.78	23.5	23.0
		2535	22.51	21.51	23.5	23.0
		2560	23.25	22.38	23.5	23.0
	1 RB mid	2510	23.03	22.08	23.5	23.0
		2535	22.85	21.72	23.5	23.0
		2560	23.37	22.46	23.5	23.0
	1 RB high	2510	23.48	22.56	23.5	23.0
		2535	23.26	22.36	23.5	23.0
		2560	22.87	21.88	23.5	23.0
	50% RB low	2510	22.42	21.45	23.5	23.0
		2535	22.21	21.11	23.5	23.0
		2560	22.90	22.04	23.5	23.0
	50% RB mid	2510	22.68	21.69	23.5	23.0
		2535	22.60	21.58	23.5	23.0
		2560	23.08	21.94	23.5	23.0
	50% RB High	2510	23.16	22.06	23.5	23.0
		2535	22.96	21.95	23.5	23.0
		2560	22.61	21.48	23.5	23.0
	100% RB	2510	22.09	21.03	23.5	23.0
		2535	21.87	20.80	23.5	23.0
		2560	22.59	21.56	23.5	23.0

Conducted Power Measurement Results (LTE FDD Band 12)

TX Channel Bandwidth	RB Size/Offset	Frequency (MHz)	Average Power [dBm]		Tune-up Limit (dBm)	
			QPSK	16QAM	QPSK	16QAM
1.4 MHz	1 RB low	699.7	22.84	21.93	23.5	23.0
		707.5	23.02	21.98	23.5	23.0
		715.3	22.67	21.76	23.5	23.0
	1 RB mid	699.7	23.25	22.40	23.5	23.0
		707.5	23.10	22.12	23.5	23.0
		715.3	23.00	21.97	23.5	23.0
	1 RB high	699.7	22.50	21.56	23.5	23.0

		707.5	23.22	22.19	23.5	23.0
		715.3	22.99	22.14	23.5	23.0
	50% RB low	699.7	22.57	21.64	23.5	23.0
		707.5	22.73	21.69	23.5	23.0
		715.3	22.36	21.25	23.5	23.0
	50% RB mid	699.7	22.99	21.91	23.5	23.0
		707.5	22.75	21.64	23.5	23.0
		715.3	22.65	21.54	23.5	23.0
	50% RB High	699.7	22.15	21.12	23.5	23.0
		707.5	22.90	21.94	23.5	23.0
		715.3	22.72	21.61	23.5	23.0
	100% RB	699.7	22.32	21.43	23.5	23.0
		707.5	22.48	21.61	23.5	23.0
		715.3	22.05	21.08	23.5	23.0
3 MHz	1 RB low	700.5	22.61	21.49	23.5	23.0
		707.5	22.61	21.51	23.5	23.0
		714.5	22.57	21.58	23.5	23.0
	1 RB mid	700.5	22.64	21.50	23.5	23.0
		707.5	22.69	21.80	23.5	23.0
		714.5	22.75	21.88	23.5	23.0
	1 RB high	700.5	22.62	21.55	23.5	23.0
		707.5	22.98	21.92	23.5	23.0
		714.5	23.17	22.18	23.5	23.0
	50% RB low	700.5	22.35	21.44	23.5	23.0
		707.5	22.32	21.43	23.5	23.0
		714.5	22.25	21.38	23.5	23.0
	50% RB mid	700.5	22.31	21.38	23.5	23.0
		707.5	22.37	21.33	23.5	23.0
		714.5	22.50	21.59	23.5	23.0
	50% RB High	700.5	22.27	21.12	23.5	23.0
		707.5	22.70	21.75	23.5	23.0
		714.5	22.84	21.96	23.5	23.0
	100% RB	700.5	22.08	21.01	23.5	23.0
		707.5	21.97	20.85	23.5	23.0
		714.5	21.96	21.02	23.5	23.0
5 MHz	1 RB low	701.5	22.61	21.70	23.5	23.0
		707.5	22.62	21.56	23.5	23.0
		713.5	22.95	22.06	23.5	23.0
	1 RB mid	701.5	22.70	21.60	23.5	23.0
		707.5	23.09	22.15	23.5	23.0

		713.5	22.58	21.72	23.5	23.0
	1 RB high	701.5	22.50	21.57	23.5	23.0
		707.5	23.22	22.08	23.5	23.0
		713.5	23.16	22.12	23.5	23.0
	50% RB low	701.5	22.36	21.41	23.5	23.0
		707.5	22.33	21.32	23.5	23.0
		713.5	22.70	21.62	23.5	23.0
	50% RB mid	701.5	22.36	21.50	23.5	23.0
		707.5	22.84	21.81	23.5	23.0
		713.5	22.28	21.28	23.5	23.0
	50% RB High	701.5	22.20	21.28	23.5	23.0
		707.5	22.88	21.85	23.5	23.0
		713.5	22.87	21.76	23.5	23.0
	100% RB	701.5	22.03	21.15	23.5	23.0
		707.5	22.02	21.09	23.5	23.0
		713.5	22.38	21.32	23.5	23.0
10 MHz	1 RB low	704.0	22.56	21.62	23.5	23.0
		707.5	22.81	21.69	23.5	23.0
		711.0	22.86	21.93	23.5	23.0
	1 RB mid	704.0	23.49	22.51	23.5	23.0
		707.5	23.39	22.34	23.5	23.0
		711.0	23.15	22.14	23.5	23.0
	1 RB high	704.0	22.63	21.51	23.5	23.0
		707.5	23.39	22.51	23.5	23.0
		711.0	22.56	21.45	23.5	23.0
	50% RB low	704.0	22.26	21.11	23.5	23.0
		707.5	22.50	21.38	23.5	23.0
		711.0	22.52	21.57	23.5	23.0
	50% RB mid	704.0	23.23	22.20	23.5	23.0
		707.5	23.14	22.16	23.5	23.0
		711.0	22.85	21.89	23.5	23.0
	50% RB High	704.0	22.33	21.19	23.5	23.0
		707.5	23.11	22.02	23.5	23.0
		711.0	22.25	21.18	23.5	23.0
	100% RB	704.0	21.95	21.08	23.5	23.0
		707.5	22.16	21.04	23.5	23.0
		711.0	22.20	21.34	23.5	23.0

<WIFI 2.4GHz Conducted Power>

Mode	Channel	Frequency (MHz)	AVG Power(dBm)	Test Rate Data
802.11b	1	2412	12.84	1 Mbps
	6	2437	14.58	1 Mbps
	11	2462	13.89	1 Mbps
802.11g	1	2412	11.71	6 Mbps
	6	2437	13.96	6 Mbps
	11	2462	11.47	6 Mbps
802.11n(20MHz)	1	2412	11.26	MCS0
	6	2437	13.19	MCS0
	11	2462	12.93	MCS0

<Bluetooth Conducted Power>

Conducted Power Measurement Results (Bluetooth)

Mode	Channel	Frequency(MHz)	Conducted Peak Output Power	
			(dBm)	(mW)
GFSK	00	2402	4.578	2.869
	39	2441	6.024	4.003
	78	2480	4.180	2.618
π/4DQPSK	00	2402	3.847	2.425
	39	2441	4.925	3.108
	78	2480	3.293	2.135
8DPSK	00	2402	3.778	2.387
	39	2441	5.063	3.208
	78	2480	3.366	2.171
BLE GFSK	00	2402	-8.452	0.143
	19	2440	-4.932	0.321
	39	2480	-6.437	0.227

Note:

Per KDB 447498 D01, the 1-g and 10-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 for 1-g SAR and] ≤7.5 for 10-g extremity SAR

- 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

Test Frequency (MHz)	Minimum Separation Distance (mm)	Max. Output Power (dBm)	Output Power with tune up (dBm)	Output Power (mW)	calculated value	exclusion thresholds
2441.00	5	6.024	7	5.012	1.6	3

Note:

Per KDB 447498 D01, when the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion. The test exclusion threshold is 1.6which is⩽ 3, SAR testing is not required.

.Transmit Antennas

Distance of The Antenna to the EUT surface and edge						
Antennas	**Front**	**Back**	**Top Side**	**Bottom Side**	**Left Side**	**Right Side**
WWAN	<25mm	<25mm	<25mm	>25mm	<25mm	>25mm
BT&WLAN	<25mm	<25mm	<25mm	>25mm	>25mm	>25mm

Positions for SAR tests; Hotspot mode						
Antennas	**Front**	**Back**	**Top Side**	**Bottom Side**	**Left Side**	**Right Side**
WWAN	Yes	Yes	Yes	No	Yes	No
BT&WLAN	Yes	Yes	Yes	No	No	No

General Note: Referring to KDB 941225 D06 v02, SAR must be measured for all sides and surfaces with a transmitting antenna located with 25mm from that surface or edge.

11.SAR Test Results Summary

General Note:

1. Per KDB 447498 D01v05r01, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
   Scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
   Reported SAR(W/kg)= Measured SAR(W/kg) Scaling Factor*
2. Per KDB 447498 D01v05r01, for each exposure position, if the highest output channel reported SAR≤0.8W/kg, other channels SAR testing are not necessary
3. Per KDB 941225 D05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
6. Per KDB 941225 D05, 16QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05, 16QAM SAR testing is not required.
7. Per KDB 941225 D05, Smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05, smaller bandwidth SAR testing is not required.

1. Per KDB865664 D01, for each frequency band, **repeated SAR measurement is required** only when the measured SAR is ≥0.8W/Kg; if the deviation among the repeated measurement is ≤20%,and the measured SAR <1.45W/Kg, only one repeated measurement is required.

SAR Values GSM 850

Test Position	Channel/ Frequency(MHz)	Test Mode	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ±0.21dB	Limit SAR_{1g} 1.6 W/kg			
						Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Graph Results
Test position of Body-worn accessory(Distance 0mm)										
Rear Side	190/836.6	2Txslots	1:4.15	30.00	29.82	-0.10	0.722	1.04	0.753	Figure 1
Front Side	190/836.6	2Txslots	1:4.15	30.00	29.82	-0.05	0.604	1.04	0.630	N/A
Hotspot Mode (Distance 10mm)										
Rear Side	190/836.6	2Txslots	1:4.15	30.00	29.82	0.02	0.701	1.04	0.731	N/A
Front Side	190/836.6	2Txslots	1:4.15	30.00	29.82	-0.04	0.586	1.04	0.611	N/A
Left Edge	190/836.6	2Txslots	1:4.15	30.00	29.82	0.02	0.354	1.04	0.369	N/A
Right Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Top Edge	190/836.6	2Txslots	1:4.15	30.00	29.82	0.03	0.611	1.04	0.637	N/A
Bottom Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Worst Case Position of Body with EGPRS(Distance 0mm)										
Front Side	190/836.6	2Txslots	1:4.15	25.00	24.87	-0.07	0.533	1.03	0.549	N/A

Note: 1.The value with green color is the maximum SAR Value of each test band.

2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is optional for such test configuration(s).

3.When multiple slots are used, SAR should be tested to account for the maximum source-based time-averaged output power.

4. Per FCC KDB Publication 648474 D04, SAR was evaluated without a headset connected to the device. Since the reported SAR was ≤ 1.2 W/kg, no additional SAR evaluations using a headset cable were required.

5.When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode

SAR Values PCS 1900

Test Position	Channel/ Frequency(MHz)	Test Mode	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ± 0.21dB	Limit SAR_{1g} 1.6 W/kg			
						Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Graph Results
Test position of Body-worn accessory(Distance0mm)										
Rear Side	661/1880	1Txslots	1:4.15	31.00	30.90	0.06	0.637	1.02	0.652	Figure 2
Front Side	661/1880	1Txslots	1:4.15	31.00	30.90	-0.10	0.574	1.02	0.587	N/A
Test position of Hotspot Mode (Distance 10mm)										
Rear Side	661/1880	1Txslots	1:4.15	31.00	30.90	0.05	0.598	1.02	0.612	N/A
Front Side	661/1880	1Txslots	1:4.15	31.00	30.90	-0.03	0.485	1.02	0.496	N/A
Left Edge	661/1880	1Txslots	1:4.15	31.00	30.90	0.05	0.278	1.02	0.284	N/A
Right Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Top Edge	661/1880	2Txslots	1:4.15	31.00	30.90	-0.07	0.564	1.02	0.577	N/A
Bottom Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Worst Case Position of Body with EGPRS(Distance 0mm)										
Front Side	661/1880	2Txslots	1:4.15	24.00	23.81	-0.01	0.368	1.04	0.384	N/A

Note: 1.The value with green color is the maximum SAR Value of each test band.

2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is optional for such test configuration(s).

3.When multiple slots are used, SAR should be tested to account for the maximum source-based time-averaged output power.

4. Per FCC KDB Publication 648474 D04, SAR was evaluated without a headset connected to the device. Since the reported SAR was ≤ 1.2 W/kg, no additional SAR evaluations using a headset cable were required.

5.When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode

SAR Values [WCDMA Band V]

Test Position	Channel/ Frequency (MHz)	Test Mode	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ± 0.21dB	Limit SAR$_{1g}$ 1.6 W/kg			
						Drift (dB)	Measured SAR$_{1g}$ (W/kg)	Scaling Factor	Reported SAR$_{1g}$ (W/kg)	Graph Results
Test position ofBody-worn accessory(Distance0mm)										
Rear Side	4183/836.6	RMC 12.2K	1:1	24.00	23.56	-0.07	0.573	1.11	0.634	Figure 3
Front Side	4183/836.6	RMC 12.2K	1:1	24.00	23.56	0.10	0.426	1.11	0.471	N/A
Test position of Body-worn accessory &Hotspot Mode (Distance 10mm)										
Rear Side	4183/836.6	RMC 12.2K	1:1	24.00	23.56	-0.09	0.527	1.11	0.583	N/A
Front Side	4183/836.6	RMC 12.2K	1:1	24.00	23.56	0.04	0.405	1.11	0.448	N/A
Left Edge	4183/836.6	RMC 12.2K	1:1	24.00	23.56	0.03	0.238	1.11	0.263	N/A
Right Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Top Edge	4183/836.6	RMC 12.2K	1:1	24.00	23.56	0.05	0.476	1.11	0.527	N/A
Bottom Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Note: 1.The value with green color is the maximum SAR Value of each test band.

2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is optional for such test configuration(s).

3.When multiple slots are used, SAR should be tested to account for the maximum source-based time-averaged output power.

4. Per FCC KDB Publication 648474 D04, SAR was evaluated without a headset connected to the device. Since the reported SAR was ≤ 1.2 W/kg, no additional SAR evaluations using a headset cable were required.

5.When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode

SAR Values [WCDMA Band II]

Test Position	Channel/ Frequency (MHz)	Test Mode	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ± 0.21dB	Limit SAR_{1g} 1.6 W/kg			
						Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Graph Results
Test position of Body-worn accessory(Distance0mm)										
Rear Side	9400/1880	RMC 12.2K	1:1	24.00	23.61	-0.12	0.557	1.09	0.609	Figure4
Front Side	9400/1880	RMC 12.2K	1:1	24.00	23.61	0.07	0.403	1.09	0.441	N/A
Test position of Body-worn accessory &Hotspot Mode (Distance 10mm)										
Rear Side	9400/1880	RMC 12.2K	1:1	24.00	23.61	0.03	0.514	1.09	0.562	N/A
Front Side	9400/1880	RMC 12.2K	1:1	24.00	23.61	0.05	0.374	1.09	0.409	N/A
Left Edge	9400/1880	RMC 12.2K	1:1	24.00	23.61	0.04	0.205	1.09	0.224	N/A
Right Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Top Edge	9400/1880	RMC 12.2K	1:1	24.00	23.61	-0.03	0.422	1.09	0.462	N/A
Bottom Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Note: 1.The value with green color is the maximum SAR Value of each test band.
2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is optional for such test configuration(s).
3.When multiple slots are used, SAR should be tested to account for the maximum source-based time-averaged output power.
4. Per FCC KDB Publication 648474 D04, SAR was evaluated without a headset connected to the device. Since the reported SAR was ≤ 1.2 W/kg, no additional SAR evaluations using a headset cable were required.
5.When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode

SAR Values [LTE Band 4]

Test Position	Channel/ Frequency (MHz)	Test Mode	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ± 0.21dB	Limit SAR_{1g} 1.6 W/kg			
						Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Graph Results
Test position of Body-worn accessory(Distance0mm)										
Rear Side	1720.0	20M/1RB	1:1	23.50	23.33	-0.07	0.625	1.04	0.650	Figure 5
Front Side	1720.0	20M/1RB	1:1	23.50	23.33	0.10	0.548	1.04	0.570	N/A
Rear Side	1720.0	20M/50%RB	1:1	23.50	23.24	-0.05	0.621	1.06	0.659	N/A
Front Side	1720.0	20M/50%RB	1:1	23.50	23.24	0.01	0.542	1.06	0.575	N/A
Test position of Hotspot Mode (Distance 10mm)										
Rear Side	1720.0	20M/1RB	1:1	23.50	23.33	-0.12	0.585	1.04	0.608	N/A
Front Side	1720.0	20M/1RB	1:1	23.50	23.33	0.06	0.415	1.04	0.432	N/A
Left Edge	1720.0	20M/1RB	1:1	23.50	23.33	0.05	0.304	1.04	0.316	N/A
Right Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Top Edge	1720.0	20M/1RB	1:1	23.50	23.33	0.02	0.452	1.04	0.470	N/A
Bottom Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Rear Side	1720.0	20M/50%RB	1:1	23.50	23.24	-0.03	0.534	1.06	0.567	N/A
Front Side	1720.0	20M/50%RB	1:1	23.50	23.24	0.10	0.402	1.06	0.427	N/A
Left Edge	1720.0	20M/50%RB	1:1	23.50	23.24	0.05	0.289	1.06	0.307	N/A
Right Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Top Edge	1720.0	20M/50%RB	1:1	23.50	23.24	0.06	0.428	1.06	0.454	N/A
Bottom Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Note: 1.The value with green color is the maximum SAR Value of each test band.
2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is optional for such test configuration(s).
3.When multiple slots are used, SAR should be tested to account for the maximum source-based time-averaged output power.
4. Per FCC KDB Publication 648474 D04, SAR was evaluated without a headset connected to the device. Since the reported SAR was ≤ 1.2 W/kg, no additional SAR evaluations using a headset cable were required.
5.When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode

SAR Values [LTE Band 5]

Test Position	Channel/ Frequency (MHz)	Test Mode	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ± 0.21dB	Limit SAR1g 1.6 W/kg			
						Drift (dB)	Measured SAR1g (W/kg)	Scaling Factor	Reported SAR1g (W/kg)	Graph Results
Test position ofBody-worn accessory(Distance0mm)										
Rear Side	844.0	10M/1RB	1:1	23.50	23.41	-0.01	0.893	1.02	0.912	Figure 6
Front Side	844.0	10M/1RB	1:1	23.50	23.41	0.05	0.755	1.02	0.771	N/A
Rear Side	829.0	10M/1RB	1:1	23.50	23.17	0.10	0.835	1.08	0.901	N/A
Rear Side	836.5	10M/1RB	1:1	23.50	23.14	0.07	0.824	1.09	0.895	N/A
Rear Side	844.0	10M/50%RB	1:1	23.50	23.14	-0.09	0.822	1.09	0.893	N/A
Front Side	844.0	10M/50%RB	1:1	23.50	23.14	-0.03	0.713	1.09	0.775	N/A
Rear Side	829.0	10M/50%RB	1:1	23.50	22.89	-0.05	0.711	1.15	0.818	N/A
Rear Side	836.5	10M/50%RB	1:1	23.50	22.86	0.04	0.706	1.16	0.818	N/A
Rear Side	836.5	100%RB	1:1	23.50	22.57	0.10	0.687	1.24	0.851	N/A
Test position of Body-worn accessory& Hotspot Mode (Distance 10mm)										
Rear Side	844.0	10M/1RB	1:1	23.50	23.41	0.07	0.747	1.02	0.763	N/A
Front Side	844.0	10M/1RB	1:1	23.50	23.41	0.04	0.625	1.02	0.638	N/A
Left Edge	844.0	10M/1RB	1:1	23.50	23.41	0.06	0.368	1.02	0.376	N/A
Right Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Top Edge	844.0	10M/1RB	1:1	23.50	23.41	0.03	0.654	1.02	0.668	N/A
Bottom Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Rear Side	844.0	10M/50%RB	1:1	23.50	23.14	-0.07	0.724	1.09	0.787	N/A
Front Side	844.0	10M/50%RB	1:1	23.50	23.14	-0.01	0.611	1.09	0.664	N/A
Left Edge	844.0	10M/50%RB	1:1	23.50	23.14	-0.04	0.351	1.09	0.381	N/A
Right Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Top Edge	844.0	10M/50%RB	1:1	23.50	23.14	-0.05	0.628	1.09	0.682	N/A
Bottom Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Note: 1.The value with green color is the maximum SAR Value of each test band.
2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is optional for such test configuration(s).
3.When multiple slots are used, SAR should be tested to account for the maximum source-based time-averaged output power.
4. Per FCC KDB Publication 648474 D04, SAR was evaluated without a headset connected to the device. Since the reported SAR was ≤ 1.2 W/kg, no additional SAR evaluations using a headset cable were required.
5.When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode

SAR Values [LTE Band 7]

Test Position	Channel/ Frequency (MHz)	Test Mode	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ± 0.21dB	Limit SAR_{1g} 1.6 W/kg			
						Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Graph Results
Test position of Body-worn accessory(Distance0mm)										
Rear Side	2510	20M/1RB	1:1	23.50	23.48	-0.02	0.657	1.00	0.660	Figure 7
Front Side	2510	20M/1RB	1:1	23.50	23.48	0.11	0.544	1.00	0.547	N/A
Rear Side	2510	20M/50%RB	1:1	23.50	23.16	-0.05	0.631	1.08	0.682	N/A
Front Side	2510	20M/50%RB	1:1	23.50	23.16	-0.03	0.517	1.08	0.559	N/A
Test position of Hotspot Mode (Distance 10mm)										
Rear Side	2510	20M/1RB	1:1	23.50	23.48	0.05	0.635	1.00	0.638	N/A
Front Side	2510	20M/1RB	1:1	23.50	23.48	0.11	0.489	1.00	0.491	N/A
Left Edge	2510	20M/1RB	1:1	23.50	23.48	-0.04	0.211	1.00	0.212	N/A
Right Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Top Edge	2510	20M/1RB	1:1	23.50	23.48	-0.03	0.505	1.00	0.507	N/A
Bottom Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Rear Side	2510	20M/50%RB	1:1	23.50	23.16	-0.07	0.605	1.08	0.654	N/A
Front Side	2510	20M/50%RB	1:1	23.50	23.16	-0.02	0.472	1.08	0.510	N/A
Left Edge	2510	20M/50%RB	1:1	23.50	23.16	-0.05	0.205	1.08	0.222	N/A
Right Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Top Edge	2510	20M/50%RB	1:1	23.50	23.16	-0.09	0.493	1.08	0.533	N/A
Bottom Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Note: 1.The value with green color is the maximum SAR Value of each test band.
2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is optional for such test configuration(s).
3.When multiple slots are used, SAR should be tested to account for the maximum source-based time-averaged output power.
4. Per FCC KDB Publication 648474 D04, SAR was evaluated without a headset connected to the device. Since the reported SAR was ≤ 1.2 W/kg, no additional SAR evaluations using a headset cable were required.
5.When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode

SAR Values [LTE Band 12]

Test Position	Channel/ Frequency (MHz)	Test Mode	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ± 0.21dB	Limit SAR_{1g} 1.6 W/kg			
						Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Graph Results
Test position ofBody-worn accessory(Distance0mm)										
Rear Side	704.0	10M/1RB	1:1	23.50	23.49	0.02	0.752	1.00	0.754	Figure 8
Front Side	704.0	10M/1RB	1:1	23.50	23.49	0.05	0.684	1.00	0.686	N/A
Rear Side	704.0	10M/50%RB	1:1	23.50	23.23	0.02	0.705	1.06	0.750	N/A
Front Side	704.0	10M/50%RB	1:1	23.50	23.23	-0.04	0.657	1.06	0.699	N/A
Test position of Hotspot Mode (Distance 10mm)										
Rear Side	704.0	10M/1RB	1:1	23.50	23.49	0.02	0.687	1.00	0.689	N/A
Front Side	704.0	10M/1RB	1:1	23.50	23.49	0.05	0.498	1.00	0.499	N/A
Left Edge	704.0	10M/1RB	1:1	23.50	23.49	-0.03	0.274	1.00	0.275	N/A
Right Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Top Edge	704.0	10M/1RB	1:1	23.50	23.49	-0.03	0.514	1.00	0.515	N/A
Bottom Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Rear Side	704.0	10M/50%RB	1:1	23.50	23.23	0.02	0.671	1.06	0.714	N/A
Front Side	704.0	10M/50%RB	1:1	23.50	23.23	-0.04	0.475	1.06	0.505	N/A
Left Edge	704.0	10M/1RB	1:1	23.50	23.23	-0.03	0.262	1.06	0.279	N/A
Right Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Top Edge	704.0	10M/1RB	1:1	23.50	23.23	-0.03	0.511	1.06	0.544	N/A
Bottom Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Note: 1.The value with green color is the maximum SAR Value of each test band.
2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is optional for such test configuration(s).
3.When multiple slots are used, SAR should be tested to account for the maximum source-based time-averaged output power.
4. Per FCC KDB Publication 648474 D04, SAR was evaluated without a headset connected to the device. Since the reported SAR was ≤ 1.2 W/kg, no additional SAR evaluations using a headset cable were required.
5.When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode

SAR Values [WIFI2.4G]

Test Position	Channel/ Frequency (MHz)	Service	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ± 0.21dB	Limit SAR1g 1.6 W/kg			
						Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Graph Results
Test position of Body-worn accessory(Distance0mm)										
Rear Side	6/2437	DSSS	1:1	15.00	14.58	-0.06	0.488	1.10	0.538	Figure 9
Front Side	6/2437	DSSS	1:1	15.00	14.58	-0.075	0.475	1.10	0.523	N/A
Test position of Hotspot Mode (Distance 10mm)										
Rear Side	6/2437	DSSS	1:1	15.00	14.58	-0.03	0.477	1.10	0.525	N/A
Front Side	6/2437	DSSS	1:1	15.00	14.58	0.02	0.452	1.10	0.498	N/A
Left Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Right Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Top Edge	6/2437	DSSS	1:1	15.00	14.58	-0.07	0.413	1.10	0.455	N/A
Bottom Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Note: 1. The value with green color is the maximum SAR Value of each test band.
2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is optional for such test configuration(s).
3.Per KDB 248227-SAR is measured using the highest measured maximum output power channel for the initial test configuration.
4. Per KDB 248227- Channels with measured maximum output power within ¼ dB of each other are considered to have the same maximum output, When there are multiple test channels with the same measured maximum output power, the channel closest to mid-band frequency is selected for SAR measurement. And when there are multiple test channels with the same measured maximum output power and equal separation from mid-band frequency; for example, high and low channels or two mid-band channels, the higher frequency (number) channel is selected for SAR measurement.
5. Per KDB 248227- 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 the ODFM SAR test is not required.

Remark: The highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power was 0.502 W/Kg(0.538*(14/15)= 0.502) So ODFM SAR test is not required.

12. SAR Measurement Variability

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

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

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

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

SAR Measurement Variability

Frequency (MHz_	Mode	Test Position	Spacing (mm)	Original SAR (W/kg)	First Repeated SAR (W/kg)	The Ratio	Second Repeated SAR (W/kg)
844.0	LTE band 5 10M/1RB Body-worn	Rear Side	0	0.893	0.911	1.02	N/A
829.0	LTE band 5 10M/1RB Body-worn	Rear Side	0	0.835	0.860	1.03	N/A
836.5	LTE band 5 10M/1RB Body-worn	Rear Side	0	0.824	0.849	1.03	N/A
844.0	LTE band 5 10M/50% RB Body-worn	Rear Side	0	0.822	0.830	1.01	N/A

13.Simultaneous Transmission Analysis

Application Simultaneous Transmission information:

Mode	Air-Interface	Simultaneous?	Hotspot?
1	WWAN+BT2.4G	YES	No
2	WWAN+WLAN2.4G	YES	YES

NOTE:

1) The EUT support WWAN(GSM/WCDMA/LTE), WLAN(WIFI 2.4GHz/BT) technology.
2) WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.
3) The Reported SAR summation is calculated based on the same configuration and test position.
4) Per KDB 447498 D01, simultaneous transmission SAR is compliant if,
   a) Scalar SAR summation < 1.6W/kg.
   b) SPLSR = (SAR1 + SAR2) $^{1.5}$ / (min. separation distance, mm), and the peak separation distance is determined from the square root of \[(x1-x2) ^{2} + (y1-y2) ^{2} + (z1-z2) ^{2}], where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan
   c) If SPLSR≦0.04, simultaneously transmission SAR measurement is not necessary
   d) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg
5) For simultaneous transmission analysis, Bluetooth SAR is estimated per KDB 447498 D01v05r02 based on the formula below.
   a) (max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] .[√f(GHz)/ x] W/kg for test separation distances≤50 mm; where x = 7.5 for 1-g SAR, and x = 18.75 for 10-g SAR.
   b) When the minimum separation distance is < 5mm, the distance is used 5mm to determine SAR test exclusion.
   c) 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distances is > 50 mm.

Estimated stand alone SAR					
Communication system	Frequency (MHz)	Configuration	Maximum Power (including tune-up tolerance) (dBm)	Separation Distance (mm)	Estimated SAR_{1-g} (W/kg)
Bluetooth*	2441	Body Worn	7	5	0.209

Simultaneous and Hotspot SAR test exclusion considerations:

Simultaneous Transmission WWAN+WLAN/BT

	GSM 850	GSM 1900	WCDMA Band V	WCDMA Band II	LTE Band 4	LTE Band 5	LTE Band 7	LTE Band 12	WIFI 2.4G	BT	MAX. ΣSAR_{1g}	Peak location separation ratio
Rear Side	0.753	0.652	0.634	0.609	0.659	0.912	0.682	0.754	0.538	0.209	1.450	N/A
Front Side	0.630	0.587	0.471	0.441	0.575	0.775	0.559	0.699	0.523	0.209	1.298	N/A

MAX. ΣSAR_{1g} = 1.450 W/kg<1.6W/kg, so the Simultaneous transmission SAR with volume scan are not required for WIFI 2.4G/BT and GSM/WCDMA/LTE

WWAN+WLAN Hotspot mode:

Hotspot SAR for WIFI 2.4G and GSM/WCDMA/ LTE

	GSM 850	GSM 1900	WCDMA Band V	WCDMA Band II	LTE Band 4	LTE Band 5	LTE Band 7	LTE Band 12	WIFI 2.4G	MAX. ΣSAR_{1g}	Peak location separation ratio
Rear Side	0.731	0.612	0.583	0.562	0.608	0.787	0.654	0.714	0.525	1.312	N/A
Front Side	0.611	0.496	0.448	0.409	0.432	0.664	0.510	0.505	0.498	1.162	N/A
Left Edge	0.369	0.284	0.263	0.224	0.316	0.381	0.222	0.279	N/A	0.381	N/A
Right Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Top Edge	0.637	0.577	0.527	0.462	0.470	0.682	0.533	0.544	0.455	1.137	N/A
Bottom Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

MAX. ΣSAR_{1g} = 1.312 W/kg<1.6W/kg, so the Simultaneous transmission SAR with volume scan are not required for WIFI 2.4G and GSM/WCDMA/LTE

14.Measurement Uncertainty

NO	Source	Uncert. ai（%）	Prob. Dist.	Div. k	ci (1g)	ci (10g)	Stand.Uncert. ui (1g)	Stand.Uncert. ui (10g)	*Veff*
1	Repeat	0. 4	N	1	1	1	0. 4	0. 4	9
Instrument									
2	Probe calibration	7	N	2	1	1	3.5	3.5	∞
3	Axial isotropy	4.7	R	$\sqrt{3}$	0.7	0.7	1.9	1.9	∞
4	Hemispherical isotropy	9.4	R	$\sqrt{3}$	0.7	0.7	3.9	3.9	∞
5	Boundary effect	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
6	Linearity	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
7	Detection limits	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
8	Readout electronics	0.3	N	1	1	1	0.3	0.3	∞
9	Response time	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
10	Integration time	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
11	Ambient noise	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
12	Ambient reflections	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
13	Probe positioner mech. restrictions	0.4	R	$\sqrt{3}$	1	1	0.2	0.2	∞
14	Probe positioning with respect to phantom shell	2.9	R	$\sqrt{3}$	1	1	1.7	1.7	∞
15	Max.SAR evaluation	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞

Test sample related									
16	Device positioning	3.8	N	1	1	1	3.8	3.8	99
17	Device holder	5.1	N	1	1	1	5.1	5.1	5
18	Drift of output power	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
Phantom and set-up									
19	Phantom uncertainty	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
20	Liquid conductivity (target)	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
21	Liquid conductivity (meas)	2.5	N	1	0.64	0.43	1.6	1.2	∞
22	Liquid Permittivity (target)	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.5	∞
23	Liquid Permittivity (meas)	2.5	N	1	0.6	0.49	1.5	1.2	∞
Combined standard			RSS	$U_C = \sqrt{\sum_{i=1}^{n} C_i^2 U_i^2}$			11.4%	11.3%	236
Expanded uncertainty(P=95%)		$U = k\,U_C$,k=2					**22.8%**	**22.6%**	

Appendix A. EUT Photos and Test Setup Photos

Body Front

Body Back

Top side

Bottom side

Left side

Right side

Appendix B. Plots of SAR System Check

System Performance Check at 750 MHz Body

Date: 12/15/2020

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1163

Communication System: CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium parameters used: f =750MHz; σ = 0.94 mho/m; εr = 55.32; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(10.09, 10.09, 10.09); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: 09.06.2020
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (61x131x1): Measurement grid: dx=15.00 mm, dy=15.00 mm

Maximum value of SAR (interpolated) = 2.31 W/kg

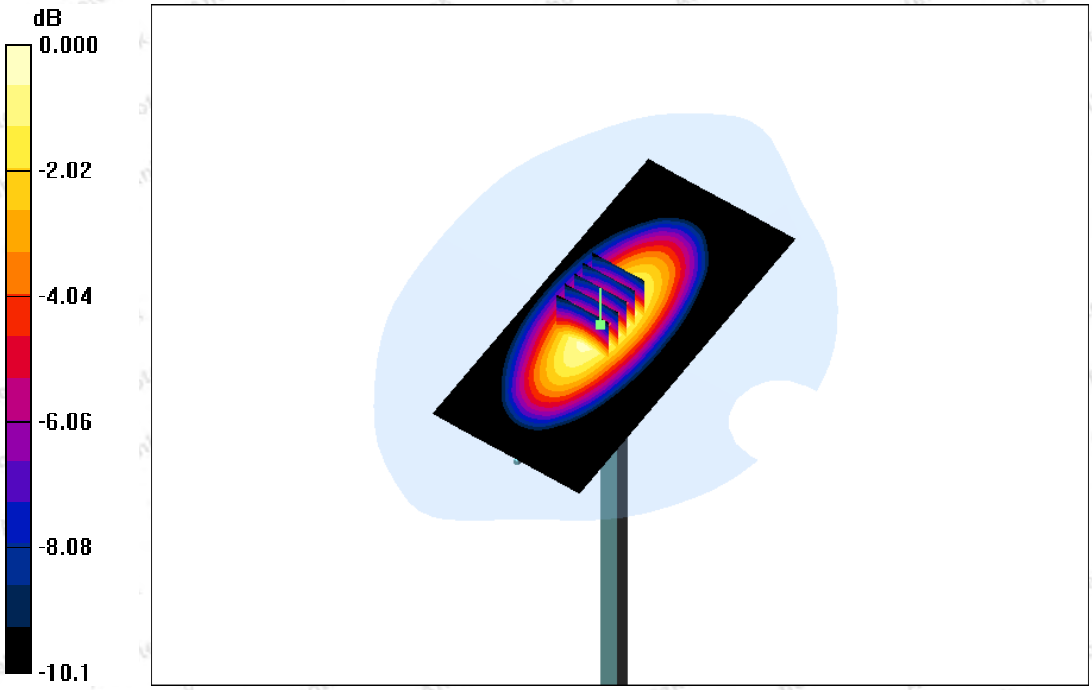
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 49.1 V/m; Power Drift = -0.141 dB

Peak SAR (extrapolated) = 3.20 W/kg

SAR(1 g) = 2.19W/kg; SAR(10 g) = 1.43 W/kg

Maximum value of SAR (measured) = 2.40 W/kg



System Performance Check 750MHz Body 250mW

System Performance Check at 835 MHz Body

Date: 12/14/2020

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

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium parameters used: f =835MHz; σ = 0.99 mho/m; εr = 54.68; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(9.88, 9.88, 9.88); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: 09.06.2020
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (61x61x1): Measurement grid: dx=15.00 mm, dy=15.00 mm

Maximum value of SAR (interpolated) = 2.72 W/kg

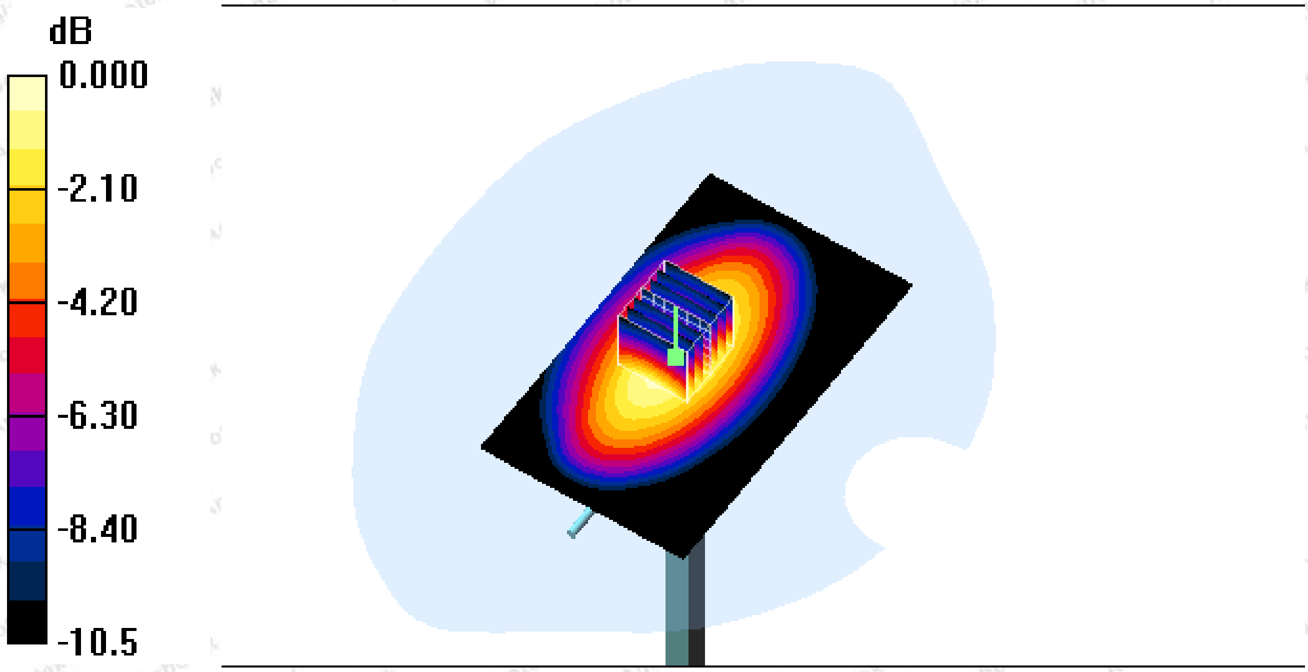
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 54.523 V/m; Power Drift = -0.01dB

Peak SAR (extrapolated) = 4.068 W/kg

SAR(1 g) = 2.41W/kg; SAR(10 g) = 1.55 W/kg

Maximum value of SAR (measured) = 2.81 W/kg



System Performance Check 835MHz Body 250mW

System Performance Check at 1750 MHz Body

Date: 12/14/2020

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1021

Communication System: CW; Frequency: 1750MHz; Duty Cycle: 1:1

Medium parameters used: f =1750MHz; σ = 1.52mho/m; εr = 54.11; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(8.24, 8.24, 8.24); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: 09.06.2020
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (61x61x1): Measurement grid: dx=15.00 mm, dy=15.00 mm

Maximum value of SAR (interpolated) = 12.60 W/kg

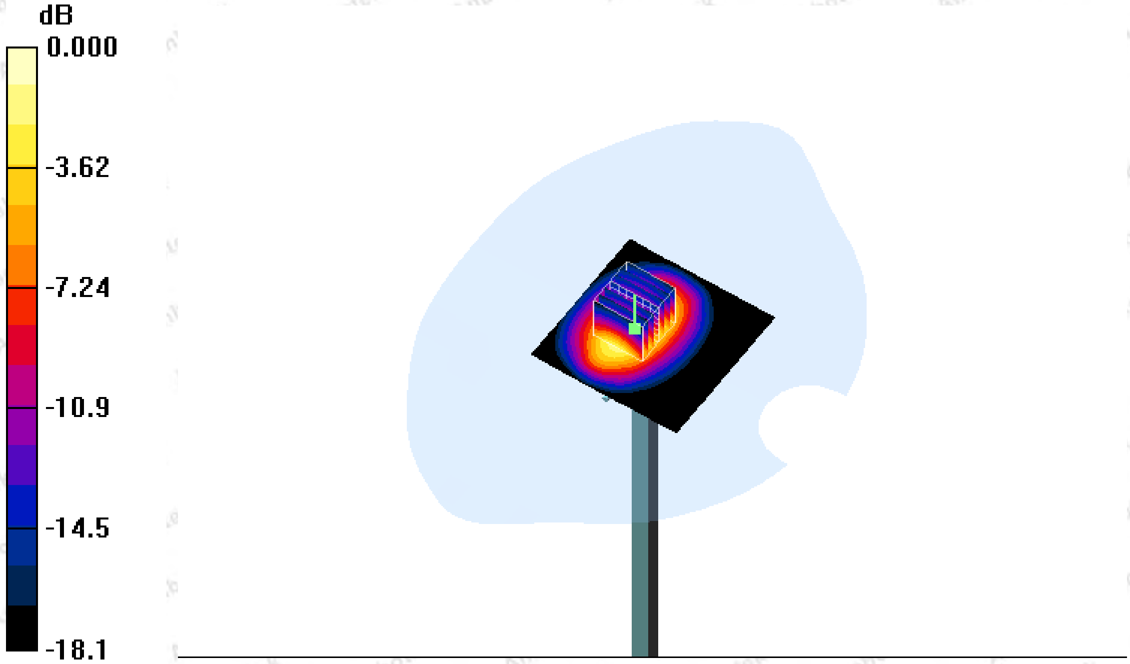
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 81.17 V/m; Power Drift = 0.03dB

Peak SAR (extrapolated) = 15.81 W/kg

SAR(1 g) =9.16W/kg; SAR(10 g) = 4.74 W/kg

Maximum value of SAR (measured) = 12.71 W/kg



0 dB = 12.71W/kg

System Performance Check 1750MHz Body 250mW

System Performance Check at 1900 MHz Body

Date: 12/15/2020

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

Communication System: CW; Frequency: 1900MHz; Duty Cycle: 1:1

Medium parameters used: f =1900MHz; σ = 1.48 mho/m; εr = 53.29; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(7.97, 7.97, 7.97); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: 09.06.2020
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (61x61x1): Measurement grid: dx=15.00 mm, dy=15.00 mm

Maximum value of SAR (interpolated) = 12.8 W/kg

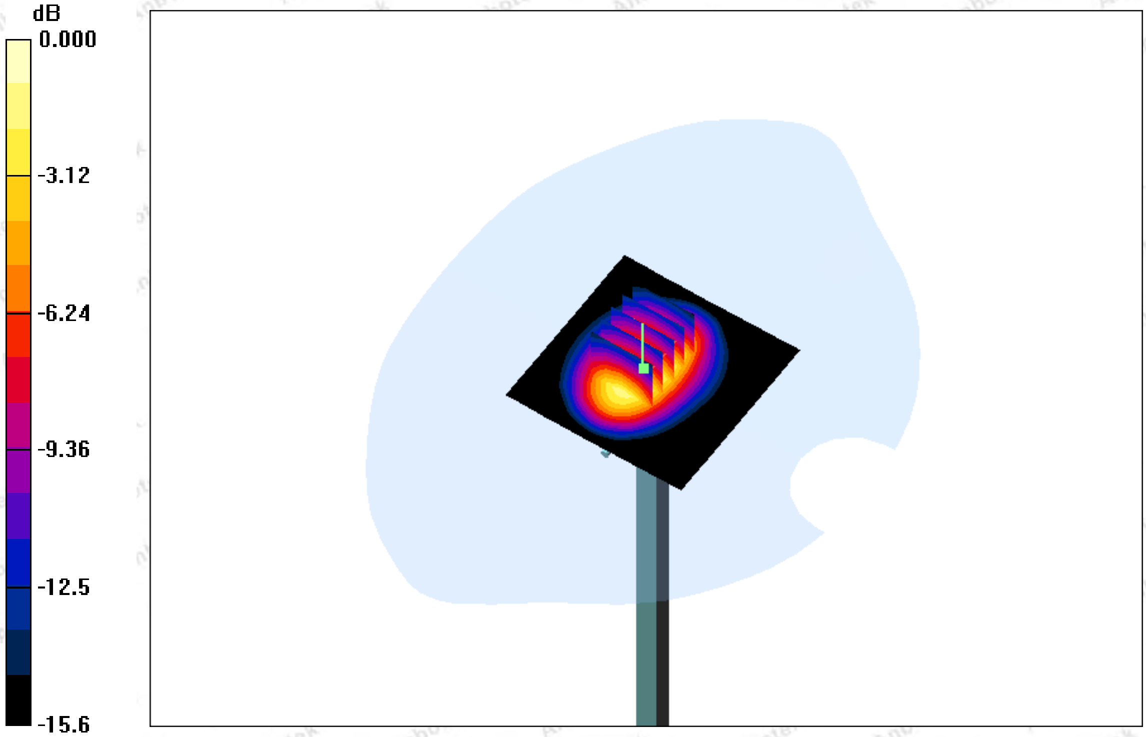
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 85.9 V/m; Power Drift = 0.109 dB

Peak SAR (extrapolated) = 19.7 W/kg

SAR(1 g) = 10.05W/kg; SAR(10 g) = 5.39W/kg

Maximum value of SAR (measured) = 12.47W/kg



0 dB = 12.47W/kg

System Performance Check 1900MHz Body 250mW

System Performance Check at 2450MHz Body

Date: 12/16/2020

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

Communication System: CW; Frequency: 2450MHz; Duty Cycle: 1:1

Medium parameters used: f =2450MHz; σ = 1.97 mho/m; εr = 50.54; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(7.53, 7.53, 7.53); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: 09.06.2020
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (61x61x1): Measurement grid: dx=15.00 mm, dy=15.00 mm

Maximum value of SAR (interpolated) = 16.2W/kg

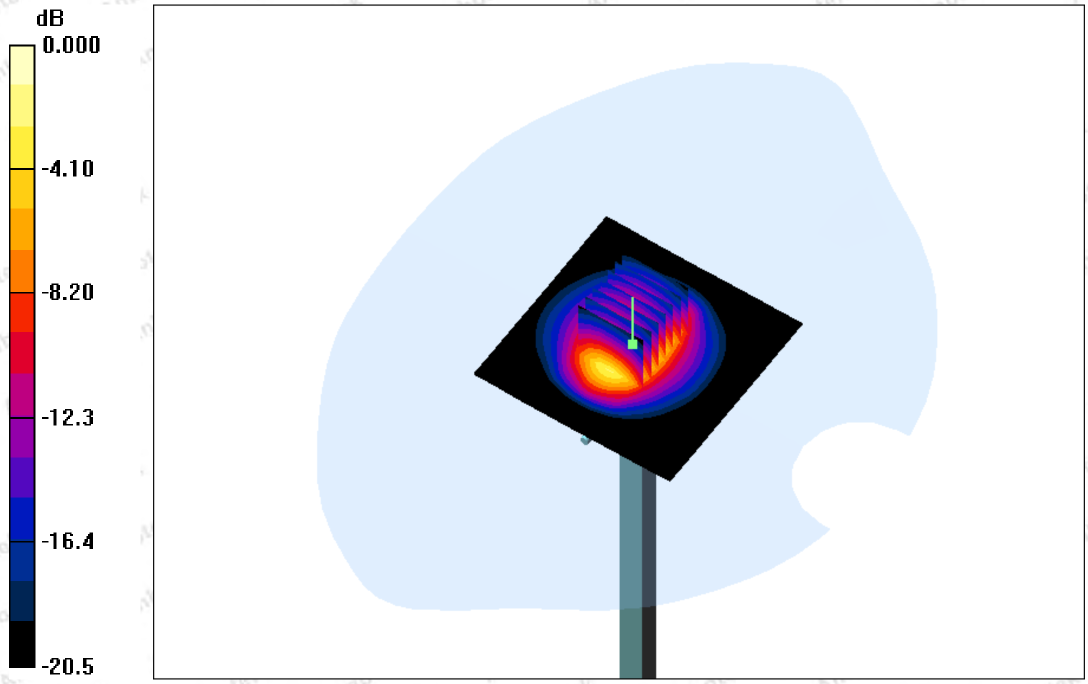
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 89.5 V/m; Power Drift = 0.017 dB

Peak SAR (extrapolated) = 27.0 W/kg

SAR(1 g) = 12.96W/kg; SAR(10 g) = 6.47W/kg

Maximum value of SAR (measured) = 15.59W/kg



0 dB = 15.59W/kg

System Performance Check 2450MHz Body 250mW

System Performance Check at 2600MHz Body

Date: 12/16/2020

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1058

Communication System: CW; Frequency: 2600MHz; Duty Cycle: 1:1

Medium parameters used: f =2600MHz; σ =2.10 mho/m; εr = 51.34; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(7.38, 7.38, 7.38); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: 09.06.2020
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (61x61x1): Measurement grid: dx=15.00 mm, dy=15.00 mm

Maximum value of SAR (interpolated) = 25.1W/kg

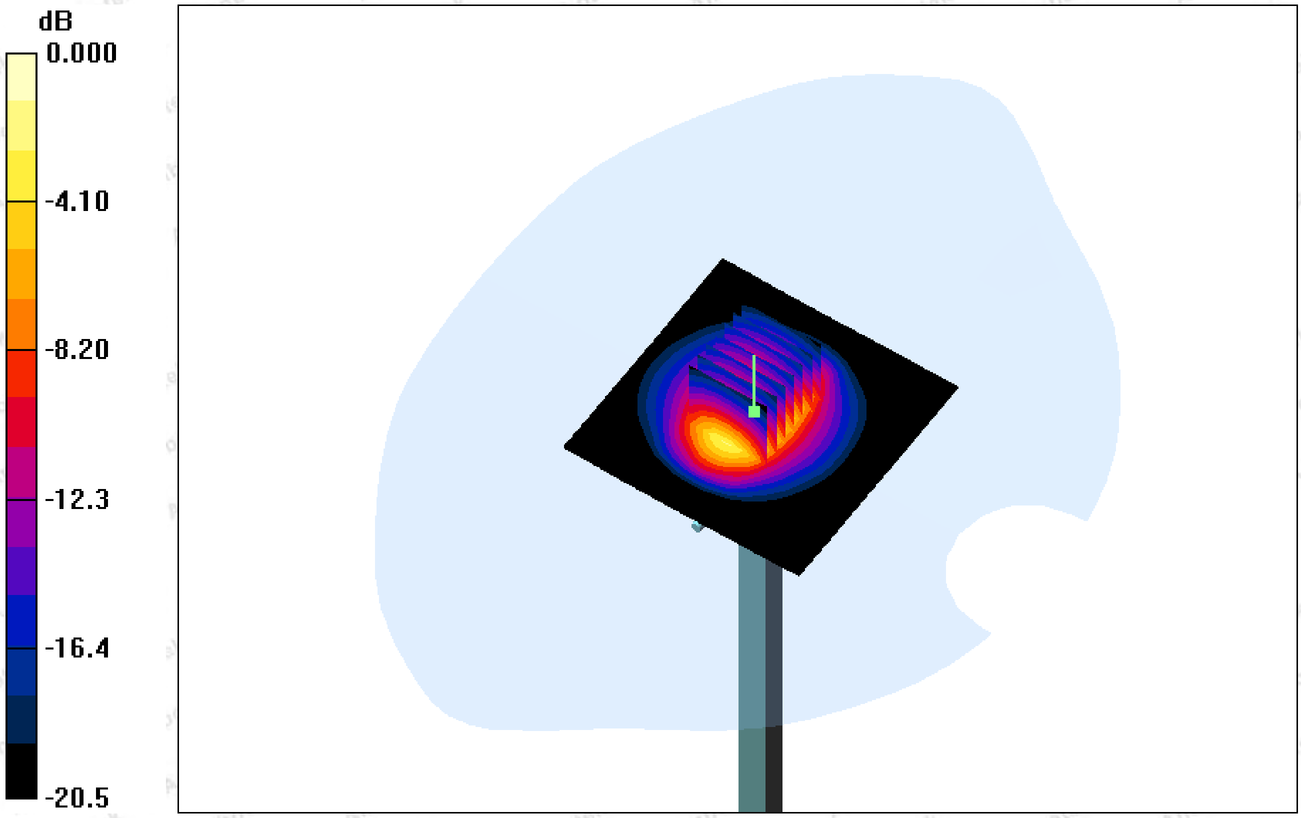
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 89.4 V/m; Power Drift = 0.018 dB

Peak SAR (extrapolated) = 34.1 W/kg

SAR(1 g) = 14.22W/kg; SAR(10 g) = 6.39W/kg

Maximum value of SAR (measured) = 22.98W/kg



0 dB = 22.98W/kg

System Performance Check 2600MHz Body 250mW

Appendix C. Plots of SAR Test Data

SAR plots for **the highest measured SAR** in each exposure configuration, wireless mode and frequency band combination according to FCC KDB 865664 D02

GSM850_Rear side_0mm

Date: 14/12/2020

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): f =836.6 MHz; σ = 0.965 mho/m; εr = 55.94; ρ = 1000 kg/m3;

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(9.88, 9.88, 9.88); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: 09.06.2020
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.925 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value =24.66 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) =1.66 W/kg

SAR(1 g) = 0.722 W/kg; SAR(10 g) = 0.301 W/kg

Maximum value of SAR (measured) = 1.14 W/kg

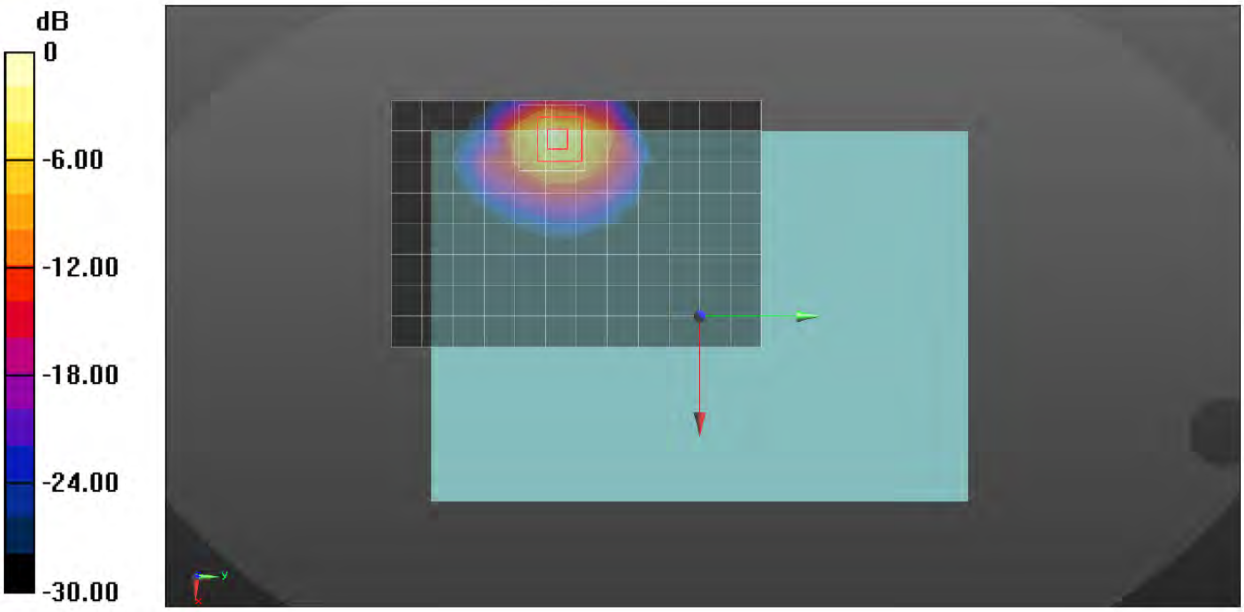


Figure 1: GSM850_Front side_0mm

PCS 1900_Rear side_0mm

Date: 12/15/2020

Communication System: PCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1880 MHz; σ = 1.558 mho/m; εr = 52.99; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(7.97, 7.97, 7.97); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: 09.06.2020
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.801W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 28.81 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 1.40 W/kg

SAR(1 g) = 0.637W/kg; SAR(10 g) = 0.316W/kg

Maximum value of SAR (measured) = 0.927W/kg

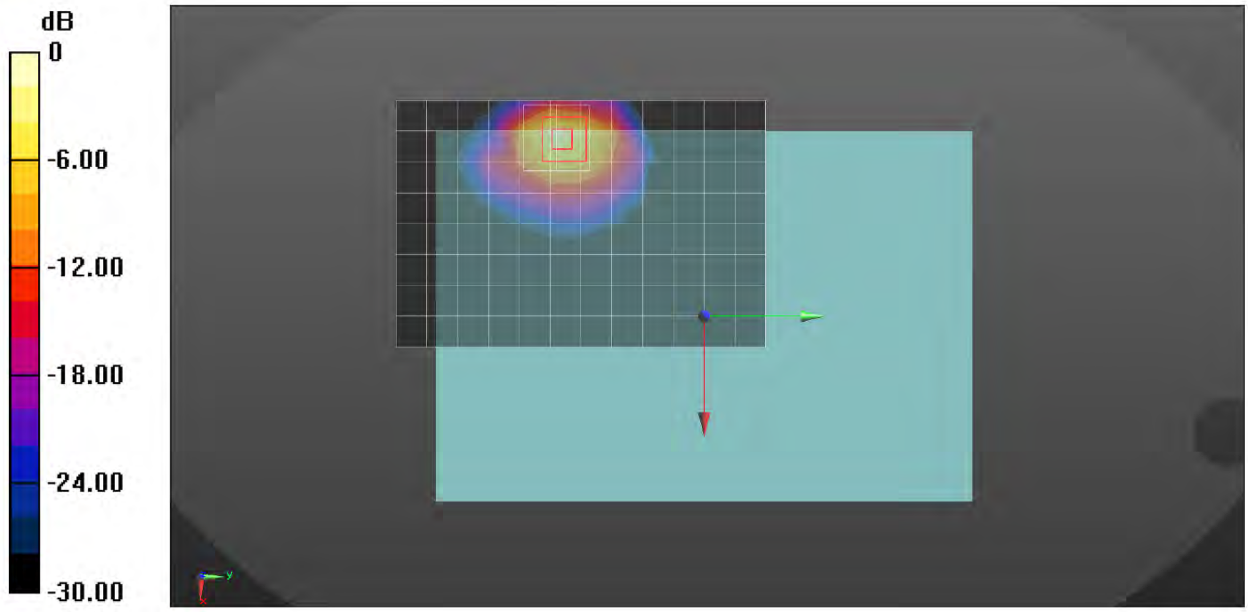


Figure 2: PCS1900_Rear side_0mm

WCDMA Band V_RCM _Rear side_0mm

Date: 12/14/2020

Communication System: W850; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium parameters used: f = 837 MHz; σ = 1.01 mho/m; εr = 55.5; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(9.88, 9.88, 9.88); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: 09.06.2020
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.659W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 26.52 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 1.17 W/kg

SAR(1 g) = 0.573W/kg; SAR(10 g) = 0.297W/kg

Maximum value of SAR (measured) = 0.780W/kg

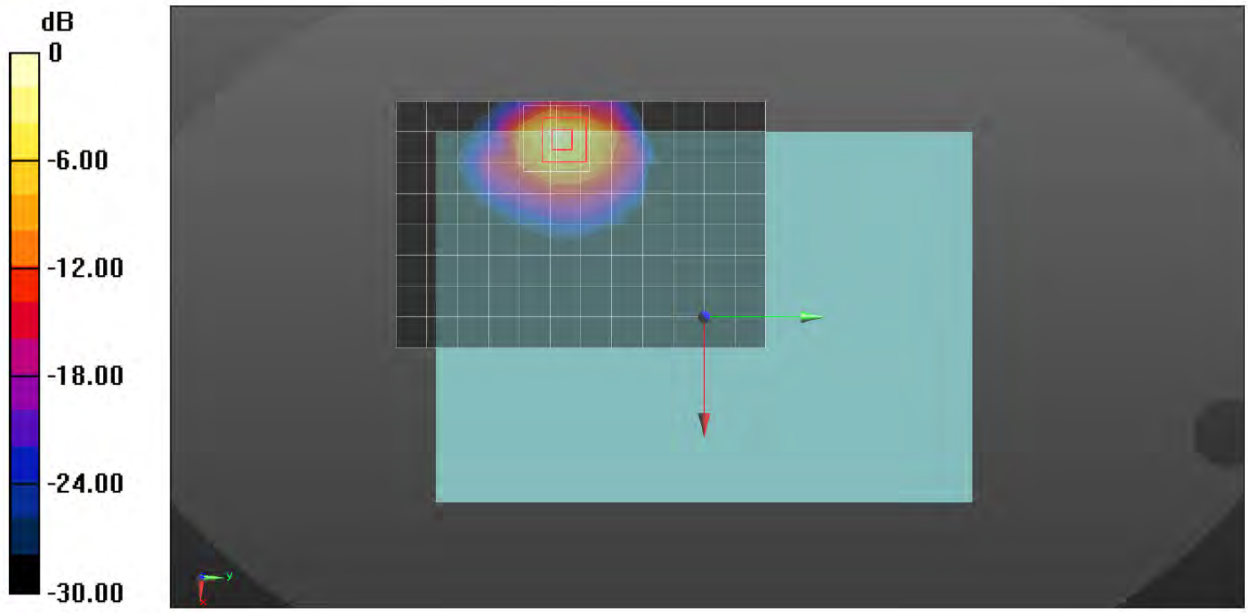


Figure 3: WCDMA Band V_RCM _ Rear side_0mm

WCDMA Band II_RCM _Rear side_0mm

Date: 12/15/2020

Communication System: W1900; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1880 MHz; σ = 1.48 mho/m; εr = 52.9; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(7.97, 7.97, 7.97); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: 09.06.2020
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.657W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 26.97 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 1.30W/kg

SAR(1 g) = 0.557W/kg; SAR(10 g) = 0.276W/kg

Maximum value of SAR (measured) = 0.809W/kg

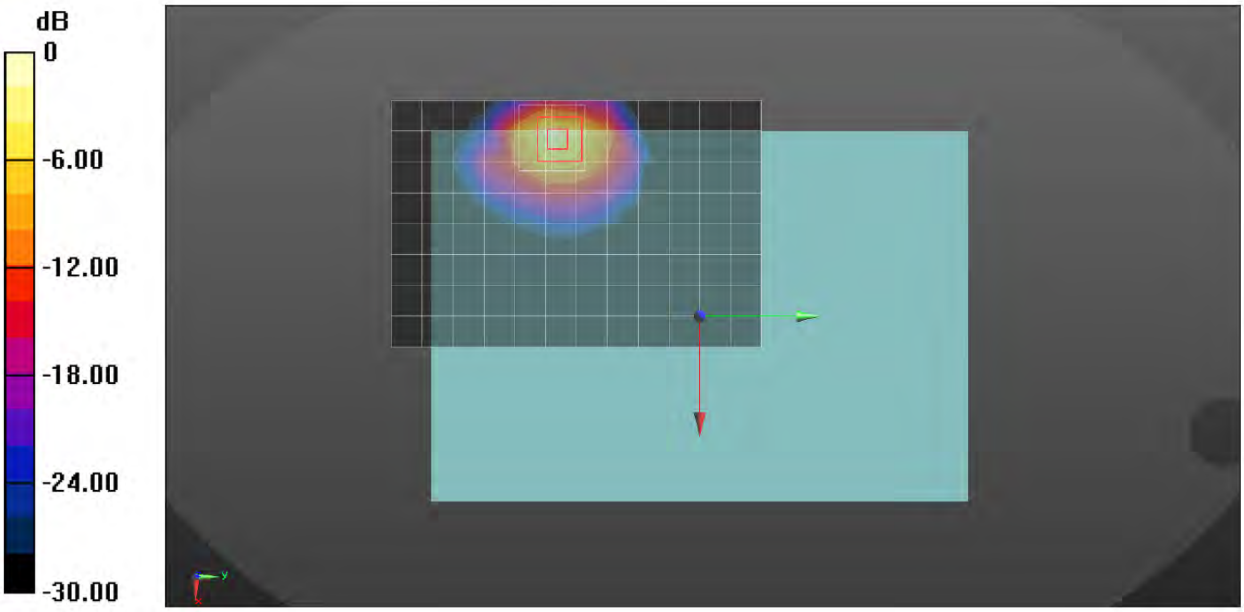


Figure 4: WCDMA Band II_RCM _ Rear side_0mm

LTE Band 4_QPSK _Rear side_0mm

Date: 12/14/2020

Communication System: LTE B4; Frequency: 1732.5 MHz;Duty Cycle: 1:1

Medium parameters used: f = 1732.5 MHz; σ = 1.49 mho/m; εr = 52.2; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(8.24, 8.24, 8.24); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: 09.06.2020
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.781 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 21.86 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) =1.24W/kg

SAR(1 g) = 0.625 W/kg; SAR(10 g) = 0.370 W/kg

Maximum value of SAR (measured) = 0.953 W/kg

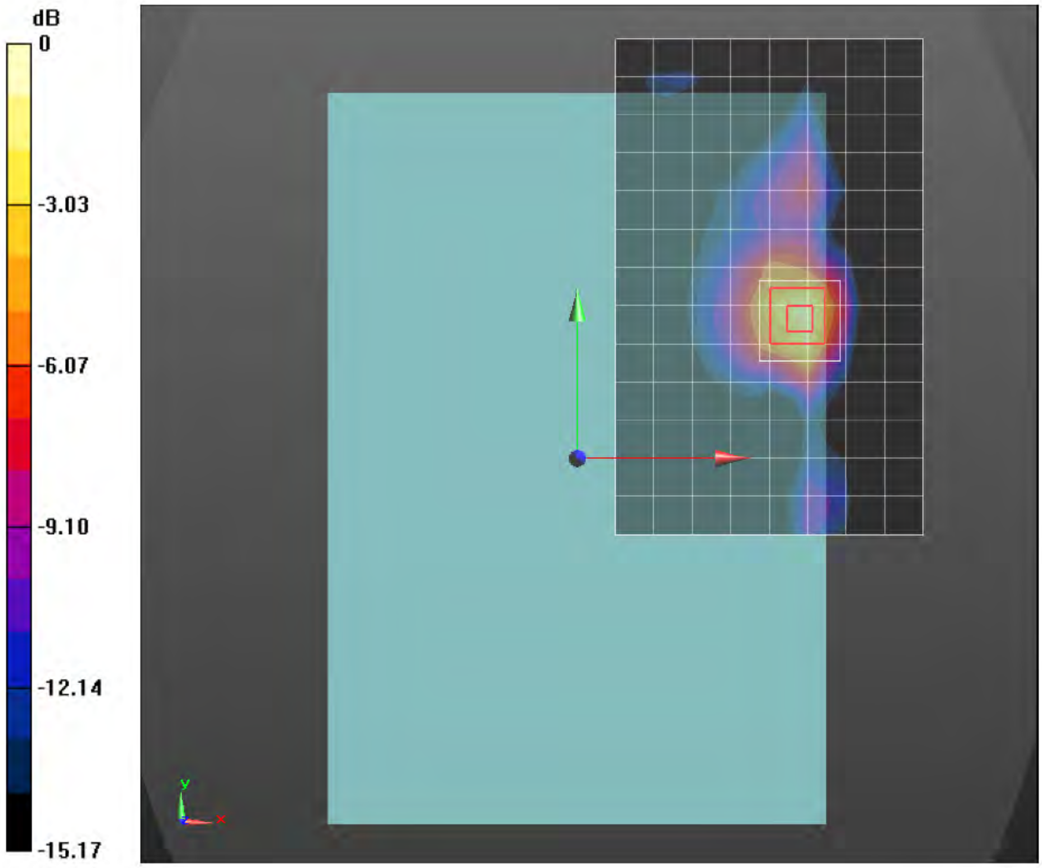


Figure 5: LTE Band 4_QPSK _ Rear side_0mm

LTE Band 5_QPSK _Rear side_0mm

Date: 12/14/2020

Communication System: LTE B5; Frequency: 844.0MHz;Duty Cycle: 1:1
Medium parameters used: f = 844.0 MHz; σ = 0.979 S/m; εr = 55.306; ρ = 1000 kg/m3
Phantom section: Flat Section
DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(9.88, 9.88, 9.88); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: 09.06.2020
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.20W/kg
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 33.92 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.65 W/kg
SAR(1 g) = 0.893W/kg; SAR(10 g) = 0.485W/kg
Maximum value of SAR (measured) =1.20W/kg

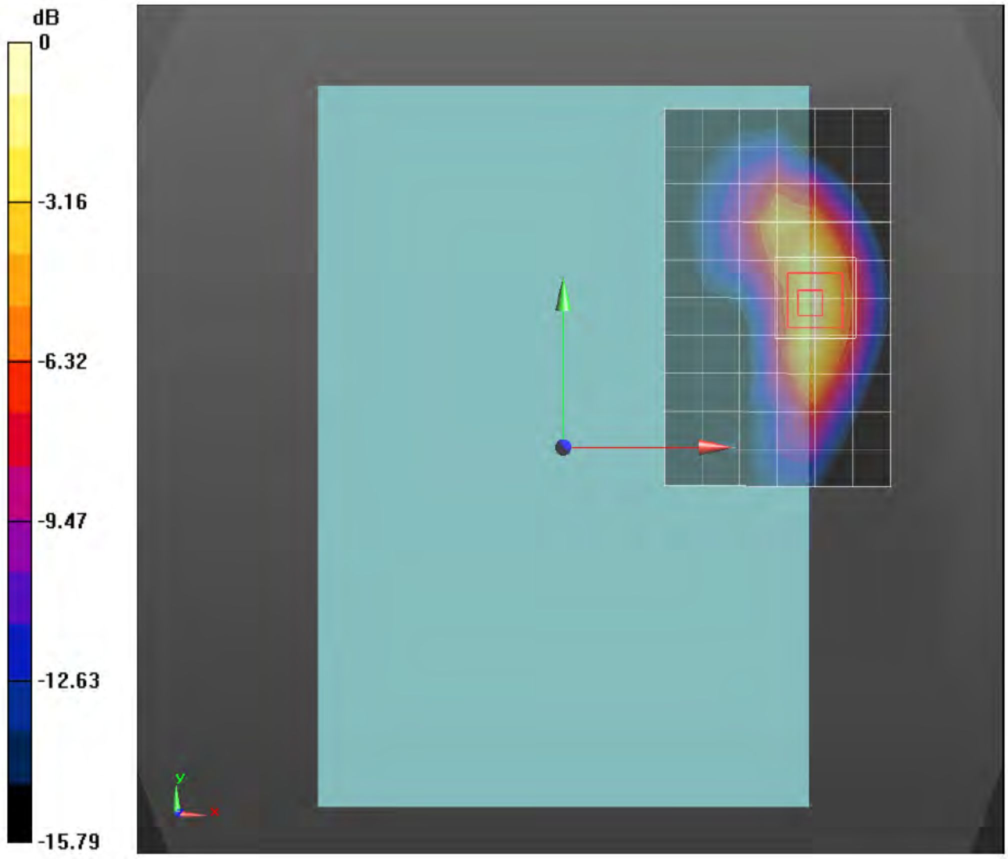


Figure 6: LTE Band 5 _QPSK _ Rear side_0mm

LTE Band 7_QPSK _Rear side_0mm

Date: 12/16/2020

Communication System: LTE B7; Frequency: 2560MHz;Duty Cycle: 1:1

Medium parameters used: f = 2560 MHz; σ= 1.88 mho/m; εr = 50.5; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(7.38, 7.38, 7.38); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: 09.06.2020
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.809W/kg

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

Reference Value = 29.16 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 1.24 W/kg

SAR(1 g) = 0.657W/kg; SAR(10 g) = 0.360W/kg

Maximum value of SAR (measured) = 0.814W/kg

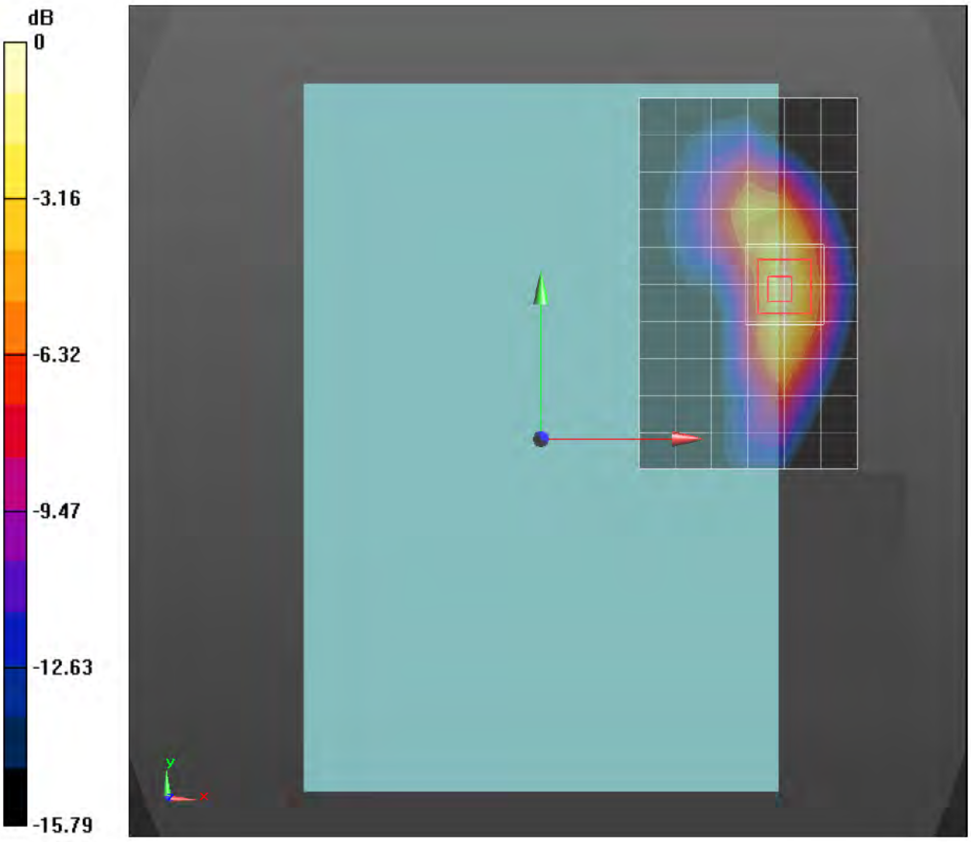


Figure 7: LTE Band 7 _QPSK _ Rear side_0mm

LTE Band 12_QPSK _Rear side_0mm

Date: 12/15/2020

Communication System: LTE B12; Frequency: 711.0MHz;Duty Cycle: 1:1

Medium parameters used: f = 711.0MHz; σ = 0.952 mho/m; εr = 55.5; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(10.09, 10.09, 10.09); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: 09.06.2020
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.701W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 25.47 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 1.37 W/kg

SAR(1 g) = 0.752W/kg; SAR(10 g) = 0.411W/kg

Maximum value of SAR (measured) = 1.08W/kg

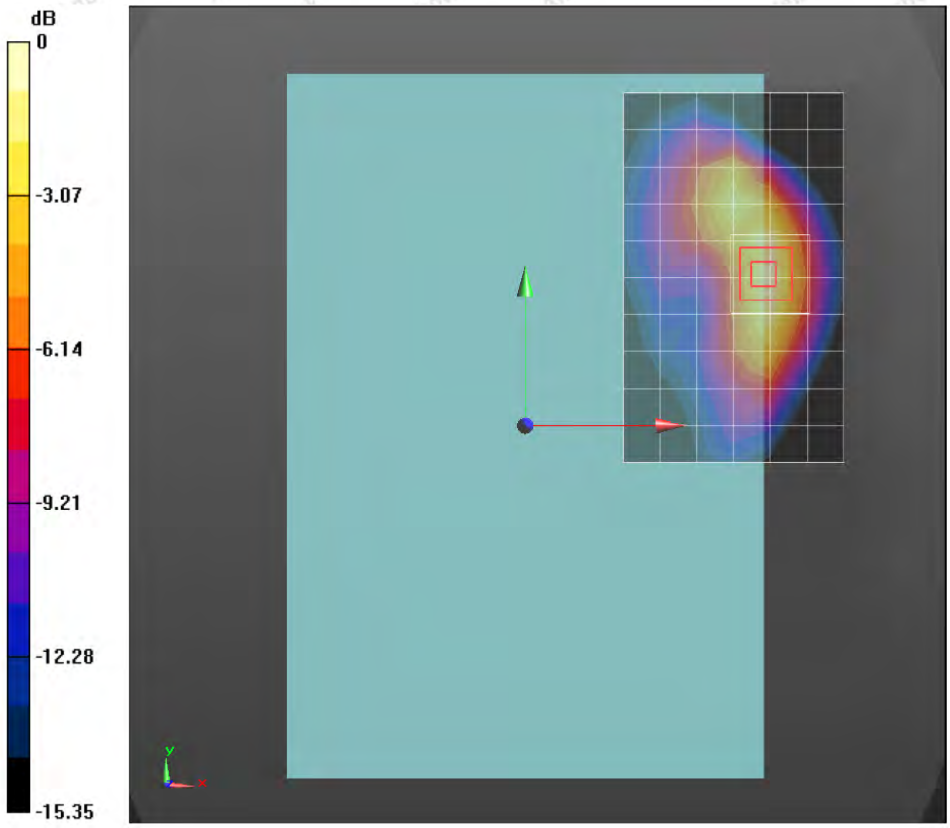


Figure 8: LTE Band 12 _QPSK _ Rear side_0mm

WLAN2.4G_Rear side_0mm

Date: 12/16/2020

Communication System: 802.11; Frequency: 2437 MHz;Duty Cycle: 1:1

Medium parameters used: f = 2437 MHz; σ = 1.97 mho/m; εr = 52.4; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 –7396; ConvF(7.53, 7.53, 7.53); Calibrated: 5/6/2020;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: 09.06.2020
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670;

Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (7x10x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (interpolated) = 0.65W/kg

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

Reference Value = 15.44 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 0.81 W/kg

SAR(1 g) = 0.488 W/kg; SAR(10 g) = 0.145 W/kg

Maximum value of SAR (measured) = 1.01 W/kg

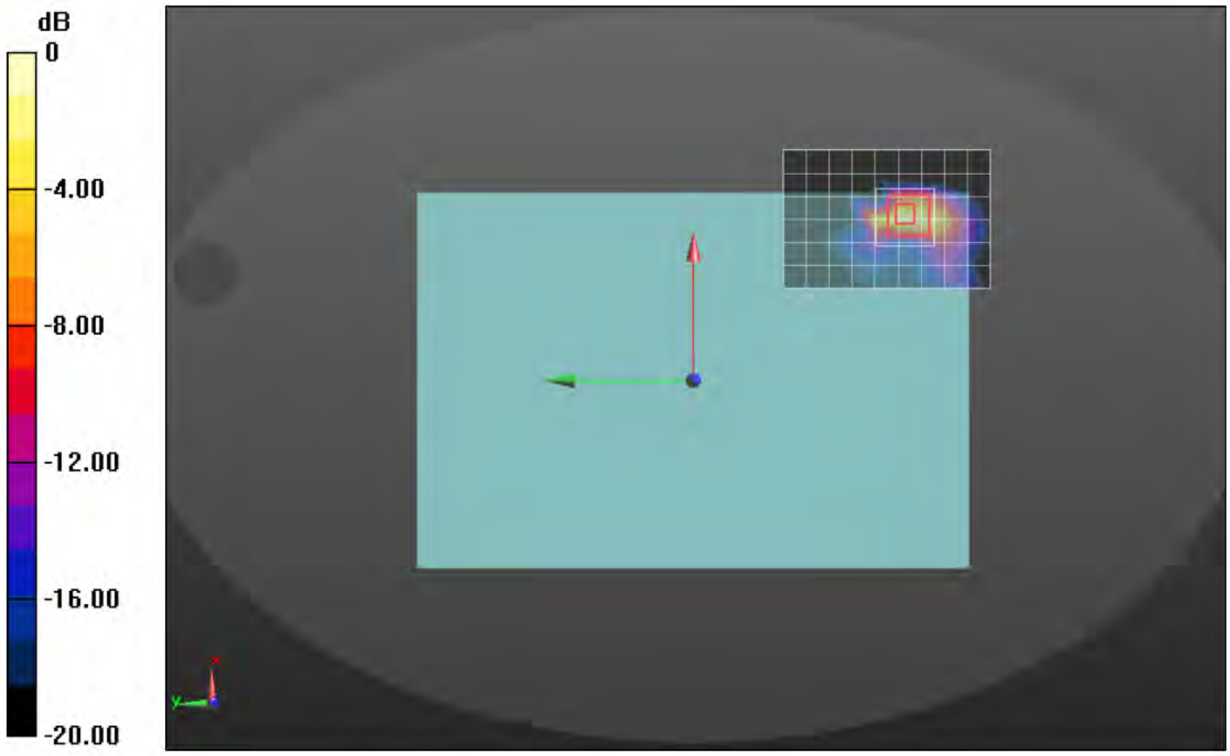


Figure 9: WLAN 2.4G_ Rear side_0mm

Appendix D. DASY System Calibration Certificate

In Collaboration with s p e a g CALIBRATION LABORATORY

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中国认可 国际互认 校准 CALIBRATION CNAS L0570

Client Anbotek (Auden) Certificate No: Z20-68716

CALIBRATION CERTIFICATE

Object EX3DV4 - SN:7396

Calibration Procedure(s) FF-Z11-007-03
Calibration Procedures for Dosimetric E-field Probes

Calibration date: May06, 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	20-Jun-19 (CTTL, No.J18X07447)	Jun-20
Power sensor NRP-Z91	101547	20-Jun-19 (CTTL, No.J18X07447)	Jun-20
Power sensor NRP-Z91	101548	20-Jun-19 (CTTL, No.J18X07447)	Jun-20
Reference10dBAttenuator	18N50W-10dB	13-Mar-20(CTTL,No.J19X01547)	Mar-21
Reference20dBAttenuator	18N50W-20dB	13-Mar-20(CTTL, No.J19X01548)	Mar-21
Reference Probe EX3DV4	SN 7433	26-Sep-19(SPEAG,No.EX3-7433_Sep18)	Sep-20
DAE4	SN 549	13-Dec-19(SPEAG, No.DAE4-549_Dec18)	Dec-20
Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
SignalGeneratorMG3700A	6201052605	27-Jun-19 (CTTL, No.J18X04776)	Jun-20
Network Analyzer E5071C	MY46110673	13-Jan-20 (CTTL, No.J19X00285)	Jan-21

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

Issued: May07, 2020

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

Certificate No: Z20-68716 Page 1 of 11

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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, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300MHz to 3GHz)", February 2005

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).

CTTL In Collaboration with s p e a g CALIBRATION LABORATORY
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Probe EX3DV4

SN: 7396

Calibrated: May 06, 2020

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 7396

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm($\mu V/(V/m)^2$)[A]	0.54	0.53	0.50	±10.0%
DCP(mV)[B]	97.8	104.5	102.5	

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	199.9	±2.4%
		Y	0.0	0.0	1.0		203.3	
		Z	0.0	0.0	1.0		195.0	

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 5 and Page 6).
[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: 7396

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	9.82	9.82	9.82	0.30	0.85	±12.1%
835	41.5	0.90	9.71	9.71	9.71	0.15	1.36	±12.1%
900	41.5	0.97	9.87	9.87	9.87	0.16	1.37	±12.1%
1750	40.1	1.37	8.61	8.61	8.61	0.25	1.04	±12.1%
1900	40.0	1.40	8.13	8.13	8.13	0.24	1.01	±12.1%
2100	39.8	1.49	8.14	8.14	8.14	0.24	1.04	±12.1%
2300	39.5	1.67	7.85	7.85	7.85	0.40	0.75	±12.1%
2450	39.2	1.80	7.57	7.57	7.57	0.50	0.75	±12.1%
2600	39.0	1.96	7.38	7.38	7.38	0.64	0.68	±12.1%
5250	35.9	4.71	5.33	5.33	5.33	0.45	1.30	±13.3%
5600	35.5	5.07	4.89	4.89	4.89	0.45	1.35	±13.3%
5750	35.4	5.22	4.92	4.92	4.92	0.45	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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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 7396

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	10.09	10.09	10.09	0.30	0.90	±12.1%
835	55.2	0.97	9.88	9.88	9.88	0.19	1.32	±12.1%
900	55.0	1.05	9.82	9.82	9.82	0.23	1.15	±12.1%
1750	53.4	1.49	8.24	8.24	8.24	0.24	1.06	±12.1%
1900	53.3	1.52	7.97	7.97	7.97	0.19	1.24	±12.1%
2100	53.2	1.62	8.18	8.18	8.18	0.19	1.39	±12.1%
2300	52.9	1.81	7.88	7.88	7.88	0.55	0.80	±12.1%
2450	52.7	1.95	7.53	7.53	7.53	0.46	0.89	±12.1%
2600	52.5	2.16	7.38	7.38	7.38	0.52	0.80	±12.1%
5250	48.9	5.36	4.93	4.93	4.93	0.45	1.80	±13.3%
5600	48.5	5.77	4.19	4.19	4.19	0.48	1.90	±13.3%
5750	48.3	5.94	4.52	4.52	4.52	0.48	1.95	±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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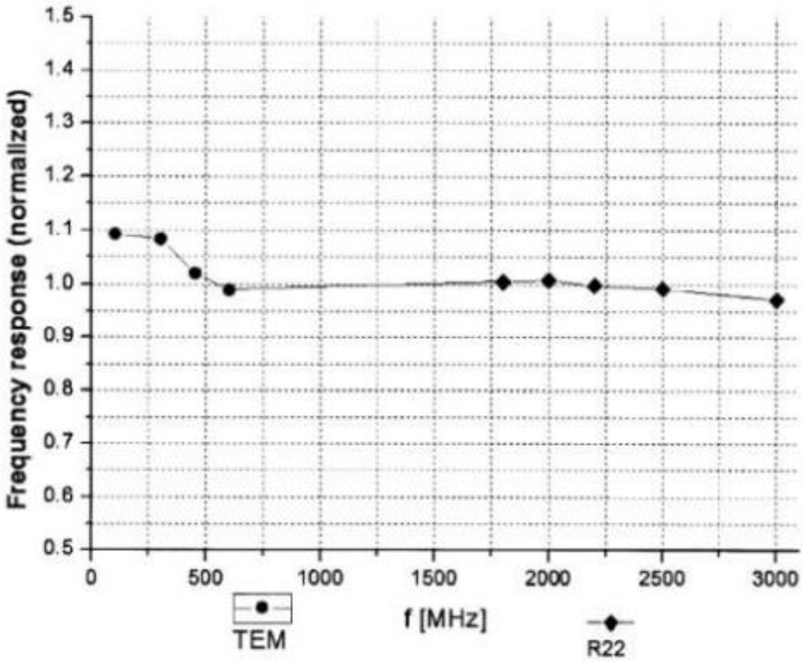
Frequency Response of E-Field
(TEM-Cell: ifi110 EXX, Waveguide: R22)



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

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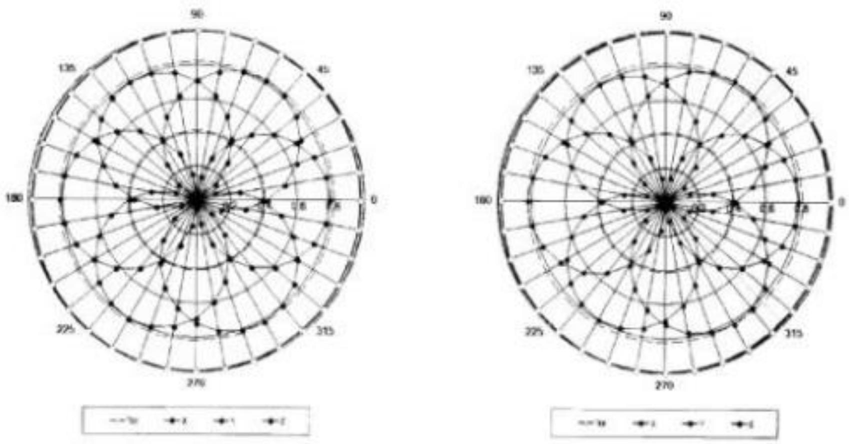
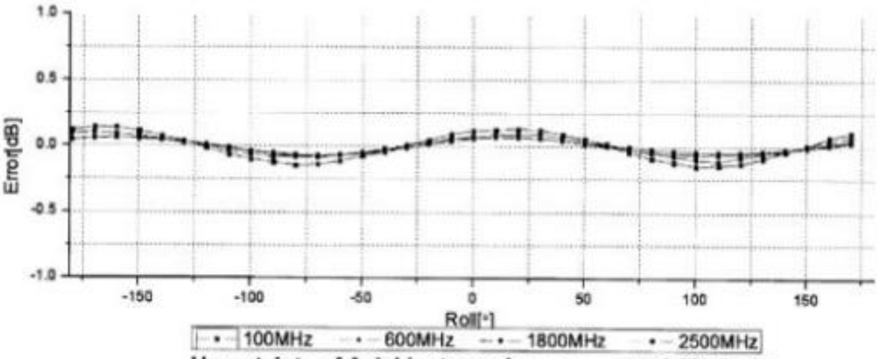
Receiving Pattern (Φ), θ=0°

f=600 MHz, TEM **f=1800 MHz, R22**





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

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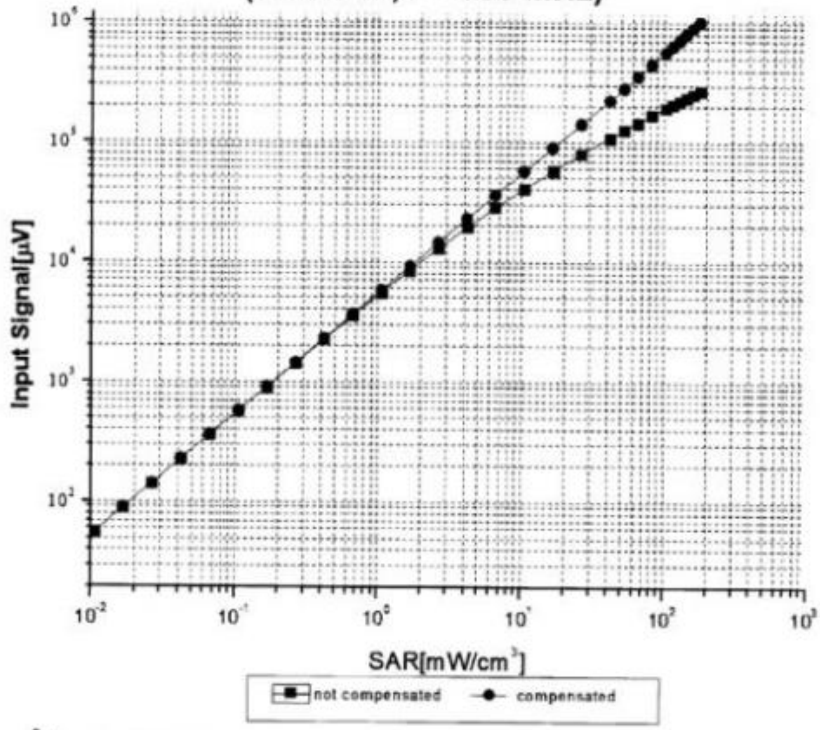
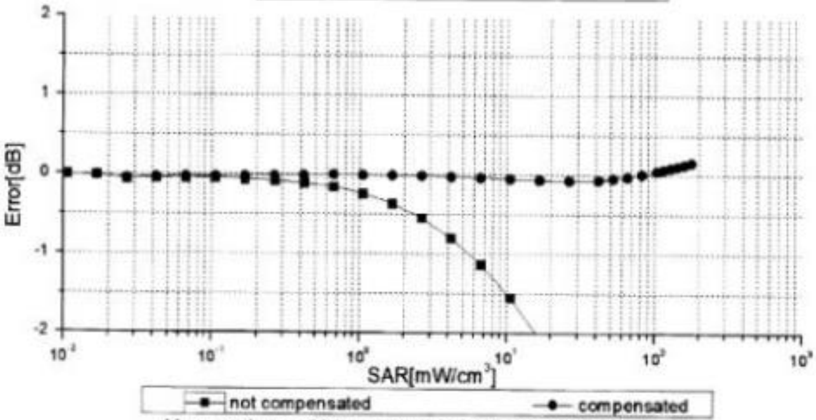
Dynamic Range f(SAR_{head})
(TEM cell, f = 900 MHz)





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

Certificate No: Z20-68716

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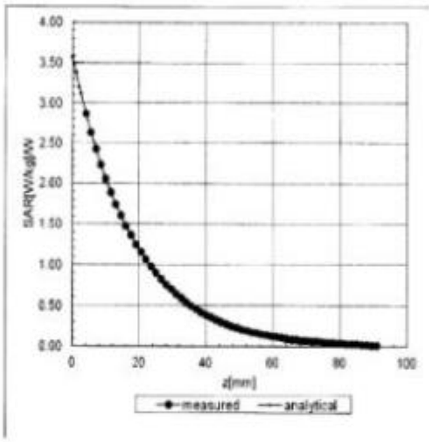
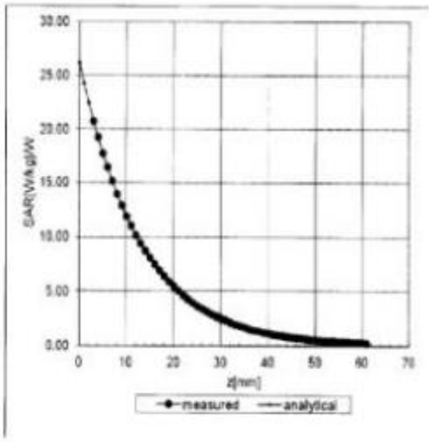
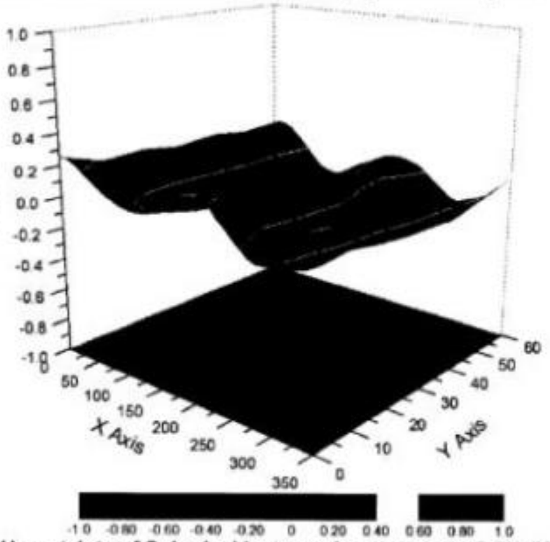
Conversion Factor Assessment

f=900 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: 7396

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	156.9
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disable
Probe Overall Length	337mm
Probe Body Diameter	10mm
Tip Length	9mm
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

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Accreditation No.: **SCS 0108**

Client **Anbotek (Auden)**

Certificate No: **DAE4-387_Sep10**

CALIBRATION CERTIFICATE

Object	DAE4 - SD 000 D04 BM - SN: 387
Calibration procedure(s)	QA CAL-06.v29 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	September 06, 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)°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	15-Aug-20 (No:21092)	Aug-21
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Auto DAE Calibration Unit	SE UWS 053 AA 1001	05-Jan-20 (in house check)	In house check: Jan-21
Calibrator Box V2.1	SE UMS 006 AA 1002	05-Jan-20 (in house check)	In house check: Jan-21

	Name	Function	Signature
Calibrated by:	Dominique Steffen	Laboratory Technician	
Approved by:	Sven Kühn	Deputy Manager	

Issued: September 06, 2020

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

Certificate No: DAE4-387_Sep10 Page 1 of 5

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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	404.489 ± 0.02% (k=2)	404.852 ± 0.02% (k=2)	404.862 ± 0.02% (k=2)
Low Range	3.97827 ± 1.50% (k=2)	3.95875 ± 1.50% (k=2)	3.97982 ± 1.50% (k=2)

Connector Angle

Connector Angle to be used in DASY system	53.0 ° ± 1 °

Appendix (Additional assessments outside the scope of SCS0108)

1. DC Voltage Linearity

High Range		Reading (µV)	Difference (µV)	Error (%)
Channel X	+ Input	200032.85	-3.31	-0.00
Channel X	+ Input	20007.64	1.88	0.01
Channel X	- Input	-20003.48	1.18	-0.01
Channel Y	+ Input	200034.23	-1.43	-0.00
Channel Y	+ Input	20006.60	0.91	0.00
Channel Y	- Input	-20004.04	0.72	-0.00
Channel Z	+ Input	200035.38	-0.83	-0.00
Channel Z	+ Input	20003.69	-2.11	-0.01
Channel Z	- Input	-20006.38	-1.59	0.01

Low Range		Reading (µV)	Difference (µV)	Error (%)
Channel X	+ Input	2001.63	0.08	0.00
Channel X	+ Input	202.29	0.70	0.35
Channel X	- Input	-197.90	0.60	-0.30
Channel Y	+ Input	2001.33	-0.07	-0.00
Channel Y	+ Input	200.86	-0.60	-0.30
Channel Y	- Input	-199.87	-1.23	0.62
Channel Z	+ Input	2001.61	0.27	0.01
Channel Z	+ Input	200.60	-0.70	-0.35
Channel Z	- Input	-199.51	-0.85	0.43

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	13.50	11.56
	- 200	-8.64	-11.18
Channel Y	200	-0.81	-1.28
	- 200	1.05	0.09
Channel Z	200	7.17	6.91
	- 200	-9.46	-9.01

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	-	-1.70	0.33
Channel Y	200	10.70	-	-0.38
Channel Z	200	7.11	7.89	-

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	15969	17466
Channel Y	15661	16162
Channel Z	15990	16190

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	0.73	-2.58	3.29	0.62
Channel Y	0.41	-0.49	1.23	0.40
Channel Z	-0.80	-1.88	0.30	0.42

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

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Client CTTL(South Branch) Certificate No: Z19-60291

CALIBRATION CERTIFICATE

Object	D750V3 - SN: 1163
Calibration Procedure(s)	FF-Z11-003-01 Calibration Procedures for dipole validation kits
Calibration date:	September 3, 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	106276	11-Apr-19 (CTTL, No.J19X02605)	Apr-20
Power sensor NRP6A	101369	11-Apr-19 (CTTL, No.J19X02605)	Apr-20
Reference Probe EX3DV4	SN 3617	31-Jan-19(SPEAG,No.EX3-3617_Jan19)	Jan-20
DAE4	SN 1555	22-Aug-19(CTTL-SPEAG,No.Z19-60295)	Aug-20
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	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: September 6, 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	V52.10.2
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	750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.6 ± 6 %	0.90 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	2.16 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**8.53 W/kg ± 18.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.44 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.70 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	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.9 ± 6 %	0.94 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	2.16 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**8.78 W/kg ± 18.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	1.45 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**5.87 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	50.5Ω- 4.53jΩ
Return Loss	- 26.9dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.5Ω- 3.38jΩ
Return Loss	- 28.5dB

General Antenna Parameters and Design

Electrical Delay (one direction)	0.900 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: 09.03.2019

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1163

Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium parameters used: f = 750 MHz; σ = 0.904 S/m; ε_r = 41.62; ρ = 1000 kg/m3

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3617; ConvF(10.03, 10.03, 10.03) @ 750 MHz; Calibrated: 1/31/2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1555; Calibrated: 8/22/2019
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

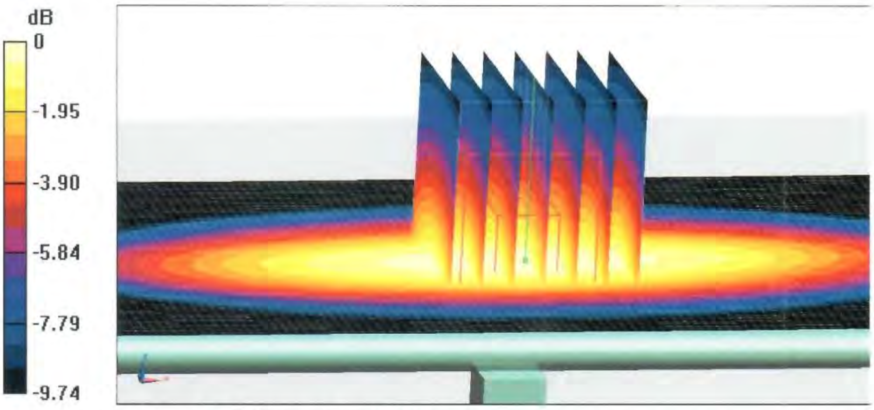
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 55.16 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 3.11 W/kg

SAR(1 g) = 2.16 W/kg; SAR(10 g) = 1.44 W/kg

Maximum value of SAR (measured) = 2.81 W/kg



0 dB = 2.81 W/kg = 4.49 dBW/kg

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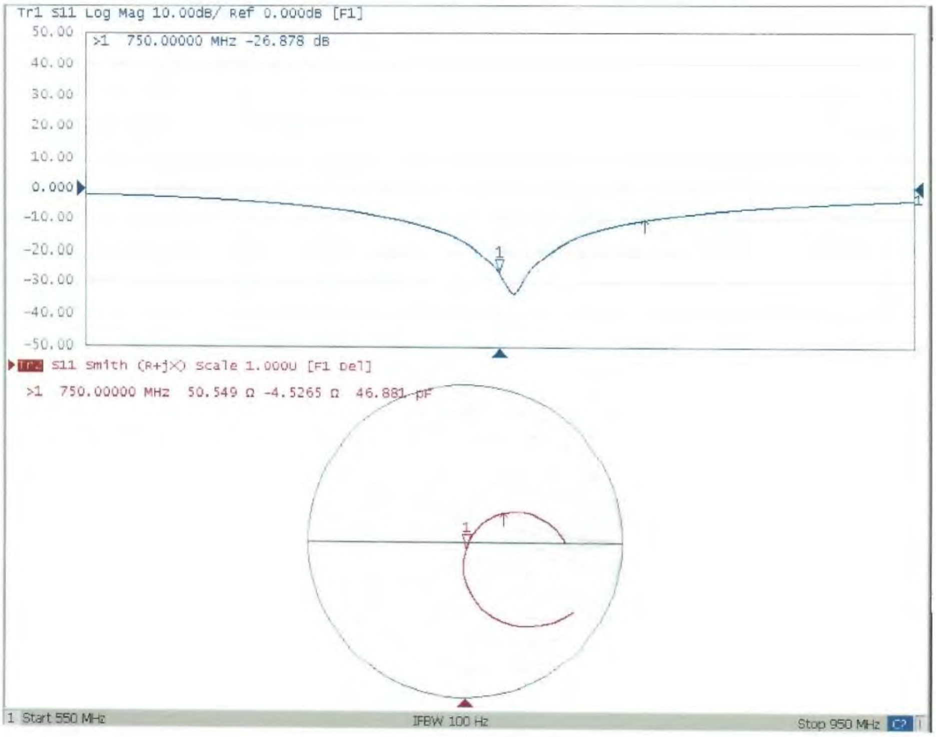
Impedance Measurement Plot for Head TSL



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DASY5 Validation Report for Body TSL Date: 09.03.2019

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1163

Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium parameters used: f = 750 MHz; σ = 0.942 S/m; ε_r = 55.87; ρ = 1000 kg/m3

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3617; ConvF(9.85, 9.85, 9.85) @ 750 MHz; Calibrated: 1/31/2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1555; Calibrated: 8/22/2019
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

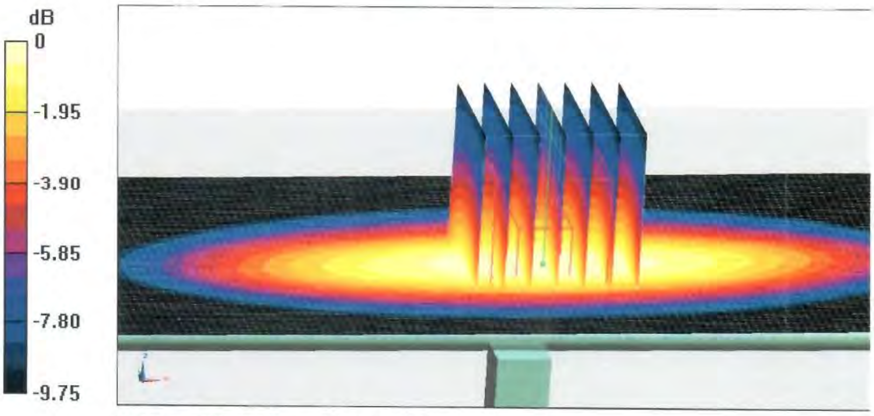
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 52.88 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 3.20 W/kg

SAR(1 g) = 2.16 W/kg; SAR(10 g) = 1.45 W/kg

Maximum value of SAR (measured) = 2.85 W/kg



0 dB = 2.85 W/kg = 4.55 dBW/kg

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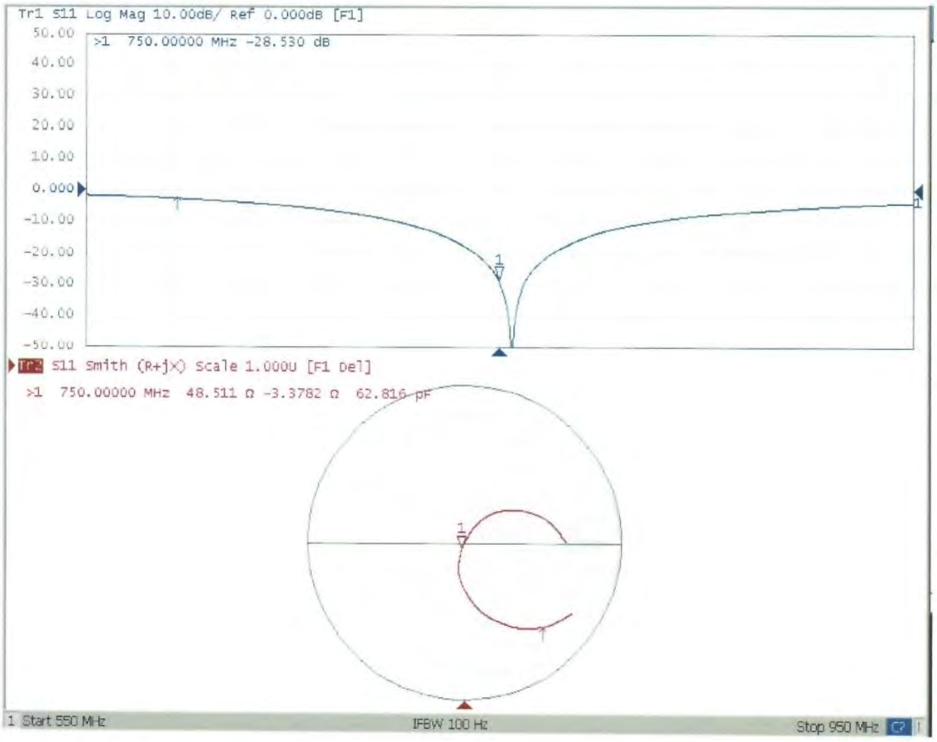
Impedance Measurement Plot for Body TSL



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Client Anbotek (Auden) **Certificate No: Z18-97089**

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d154
Calibration Procedure(s)	FD-Z11-2-003-01 Calibration Procedures for dipole validation kits
Calibration date:	Jun 16, 2018

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	01-Jul-17 (CTTL, No.J17X04256)	Jun-18
Power sensor NRP-Z91	101547	01-Jul-17 (CTTL, No.J17X04256)	Jun-18
Reference Probe EX3DV4	SN 7307	19-Feb-18(SPEAG,No.EX3-7307_Feb18)	Feb-19
DAE4	SN 771	02-Feb-18(CTTL-SPEAG,No.Z18-97011)	Feb-19
Secondary Standards	**ID #**	**Cal Date(Calibrated by, Certificate No.)**	**Scheduled Calibration**
Signal Generator E4438C	MY49071430	01-Feb-18 (CTTL, No.J18X00893)	Jan-19
Network Analyzer E5071C	MY46110673	26-Jan-18 (CTTL, No.J18X00894)	Jan-19

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	[signature]
Reviewed by:	Qi Dianyuan	SAR Project Leader	[signature]
Approved by:	Lu Bingsong	Deputy Director of the laboratory	[signature]

Issued: Jun 17, 2018

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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, "Procedure to measure the Specific Absorption Rate (SAR) For hand-held devices used in close proximity to the ear (frequency range of 300MHz to 3GHz)", February 2005
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	52.8.8.1258
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	41.0 ± 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	2.30 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**9.24 mW /g ± 20.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.50 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**6.02 mW /g ± 20.4 % (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	55.4 ± 6 %	0.99 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	2.43 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**9.57 mW /g ± 20.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	1.61 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**6.36 mW /g ± 20.4 % (k=2)**

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Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.2Ω- 3.11jΩ
Return Loss	- 29.8dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.6Ω- 2.33jΩ
Return Loss	- 27.4dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.508 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: 06.16.2018

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 = 0.891 S/m; ε_r = 40.97; ρ = 1000 kg/m^3

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN7307; ConvF(10.01, 10.01,10.01); Calibrated: 2/19/2018;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn771; Calibrated: 2018-02-02
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

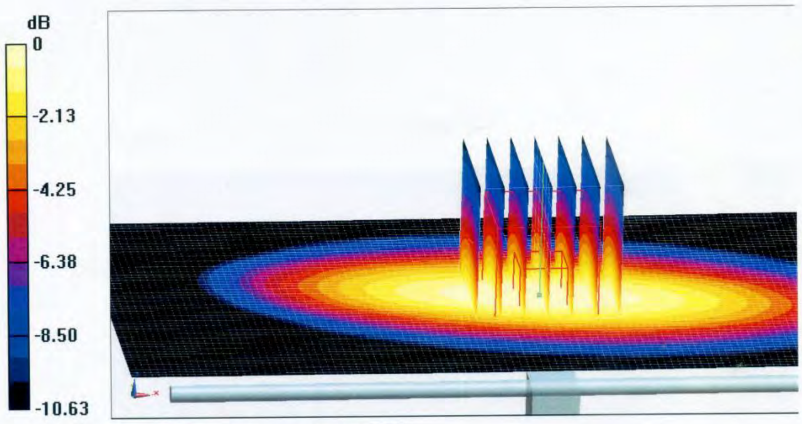
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 58.14V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 3.41 W/kg

SAR(1 g) = 2.3 W/kg; SAR(10 g) = 1.5 W/kg

Maximum value of SAR (measured) = 2.91 W/kg



0 dB = 2.91 W/kg = 4.64 dBW/kg

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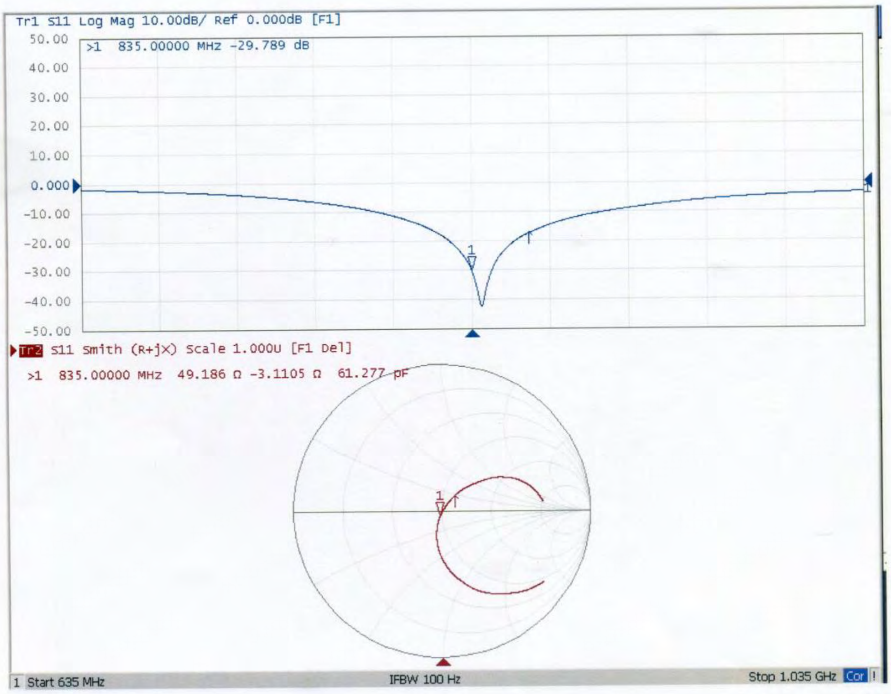
Impedance Measurement Plot for Head TSL



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DASY5 Validation Report for Body TSL Date: 06.16.2018

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 = 0.991 S/m; ε_r = 55.41; ρ = 1000 kg/m^3

Phantom section: Center Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN7307; ConvF(9.83,9.83, 9.83); Calibrated: 2/19/2018;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn771; Calibrated: 2018-02-02
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

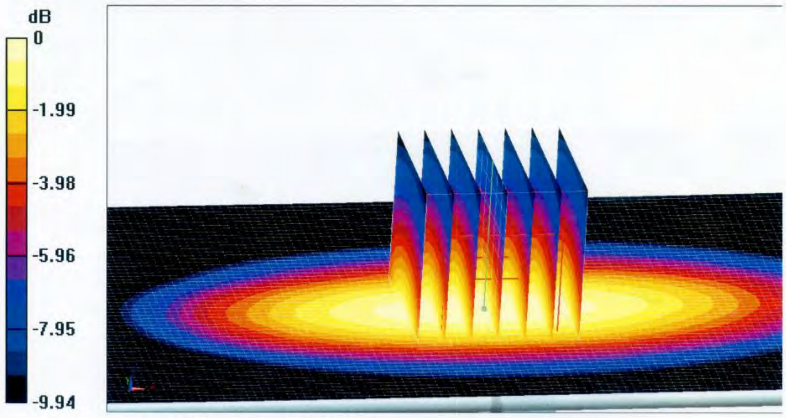
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.01 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 3.53 W/kg

SAR(1 g) = 2.43 W/kg; SAR(10 g) = 1.61 W/kg

Maximum value of SAR (measured) = 3.04 W/kg



0 dB = 3.04 W/kg = 4.83 dBW/kg

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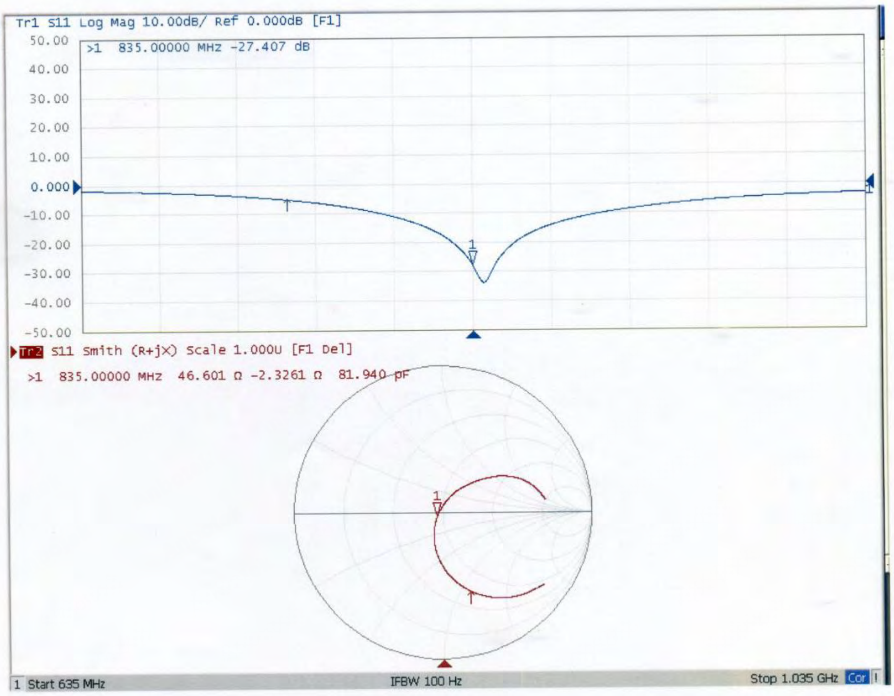
Impedance Measurement Plot for Body TSL



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Client: Anbotek (Auden) Certificate No: Z19-97103

CALIBRATION CERTIFICATE

Object	D1750V2 - SN: 1021
Calibration Procedure(s)	FD-Z11-2-003-01 Calibration Procedures for dipole validation kits
Calibration date:	July 3, 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	101919	27-Jun-19 (CTTL, No.J19X04777)	Jun-20
Power sensor NRP-Z91	101547	27-Jun-19 (CTTL, No.J19X04777)	Jun-20
Reference Probe EX3DV4	SN 7307	19-Feb-19(SPEAG,No.EX3-7307_Feb19)	Feb-20
DAE4	SN 771	02-Feb-19(CTTL-SPEAG,No.Z19-97011)	Feb-20
Secondary Standards	**ID #**	**Cal Date(Calibrated by, Certificate No.)**	**Scheduled Calibration**
Signal Generator E4438C	MY49071430	01-Feb-19 (CTTL, No.J19X00893)	Jan-20
Network Analyzer E5071C	MY46110673	26-Jan-19 (CTTL, No.J19X00894)	Jan-20

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	
Reviewed by:	Qi Dianyuan	SAR Project Leader	
Approved by:	Lu Bingsong	Deputy Director of the laboratory	

Issued: July 4, 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, "Procedure to measure the Specific Absorption Rate (SAR) For hand-held devices used in close proximity to the ear (frequency range of 300MHz to 3GHz)", February 2005

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	52.8.8.1258
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	1750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.5 ± 6 %	1.36 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	9.17 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**36.9 mW /g ± 20.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	4.94 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**19.8 mW /g ± 20.4 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.4	1.49 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.1 ± 6 %	1.51 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	9.25 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**36.7 mW /g ± 20.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	4.94 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**19.7 mW /g ± 20.4 % (k=2)**