Shenzhen CTA Testing Technology Co., Ltd.
Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China

TEST REPORT

Report Reference No.......................:	**CTA240925011**	
FCC ID .... :	**2BLXN-PAD6PLUS**	
Compiled by (position+printed name+signature)..:	File administrators Jinghua Xiao	Jinghua Xiao
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Date of issue.....................................:	Oct.10, 2024	
Testing Laboratory Name ....:	**Shenzhen CTA Testing Technology Co., Ltd.**	
Address...:	Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China	
Applicant's name ....:	**Paitengsheng technology co., ltd**	
Address...:	Room 311, Building C, Hongshengyuan Building, Longgang District, Shenzhen	
Test specification.......................... :		
Standard ....:	**FCC 47CFR §2.1093; ANSI/IEEE C95.1-1992; IEEE 1528-2013; KDB 941225 D01; KDB 941225 D05; KDB 941225 D06; KDB 248227 D01; KDB 648474 D04; KDB 447498 D01; KDB 865664 D01; KDB 865664 D02; KDB 690783 D01**	

Test item description..................... :	**Tablet**
Trade Mark ....:	/
Manufacturer.....................................:	Same as Applicant
Model/Type reference.......................:	Pad6 Plus
Listed Models ....:	Please Refer to Page 7
Rating ....:	DC 3.7V
Result...:	**PASS**

TEST REPORT

Equipment under Test	:	Tablet
Model /Type	:	Pad6 Plus
Listed Models	:	Pad6 Plus, S30pro, 12Spro, Pad5 pro, J5, Z50, P61, S22, X101, Tab14, Tablet, P70, Pad6S, Pad6 pro, P62, P63, P64, P65, P66, Tab1, Tab2, Tab3, Tab4, Tab5, Tab6, Tab7, Tab8, Tab9, Tab10, Tab11, Tab12, Tab13, S23 pro, S22pro, S24 pro, p60, K11, K12, 11pro, 12pro, 13pro, 14pro, 15pro, X11pro, x99, mate60, mate70, mate80, mate90, mate10, mate20, mate30, x98, x97, x96, x94, x93, x92, x91, x99, mate60, mate70, mate80, mate90, mate10, mate20, mate30, x98, x97, x96, x94, x93, x92, x91, Mix 4, Mix 3, Mix 2, Mix 1, Mix 5
Applicant	:	**Paitengsheng technology co., ltd**
Address	:	Room 311, Building C, Hongshengyuan Building, Longgang District, Shenzhen
Manufacturer	:	**Same as Applicant**
Address	:	Same as Applicant

Test Result:	**PASS**

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

※ ※ Revision History ※ ※

REV.	ISSUED DATE	DESCRIPTION
Rev.1.0	Oct.10, 2024	Initial Test Report Release

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1 Statement of Compliance

<Highest SAR Summary>

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 The maximum results of Specific Absorption Rate (SAR) found during testing are as follows.

<Highest SAR Summary>

Frequency Band	Highest Reported 1g-SAR(W/Kg)	Simultaneous Reported SAR (W/Kg)
	Body (0mm)	
GSM 850	0.457	1.294
PCS 1900	0.650	
WCDMA band II	0.479	
WCDMA band V	0.737	
LTE Band 7	0.781	
LTE Band 41	0.667	
WLAN2.4G	0.513	
WLAN5.2G	0.162	
SAR Test Limit (W/Kg)	**1.60**	
Test Result	**PASS**	

2 General Information

2.1 General Remarks

Date of receipt of test sample	:	Sep.11,2024
Testing commenced on	:	Sep.11,2024
Testing concluded on	:	Oct.10, 2024

2.2 Description of Equipment Under Test (EUT)

Product Name:	**Tablet**
Model/Type reference:	**Pad6 Plus**
Listed Models:	Pad6 Plus, S30pro, 12Spro, Pad5 pro, J5, Z50, P61, S22, X101, Tab14, Tablet, P70, Pad6S, Pad6 pro, P62, P63, P64, P65, P66, Tab1, Tab2, Tab3, Tab4, Tab5, Tab6, Tab7, Tab8, Tab9, Tab10, Tab11, Tab12, Tab13, S23 pro, S22pro, S24 pro, p60, K11, K12, 11pro, 12pro, 13pro, 14pro, 15pro, X11pro, x99, mate60, mate70, mate80, mate90, mate10, mate20, mate30, x98, x97, x96, x94, x93, x92, x91, x99, mate60, mate70, mate80, mate90, mate10, mate20, mate30, x98, x97, x96, x94, x93, x92, x91, Mix 4, Mix 3, Mix 2, Mix 1, Mix 5
Power supply:	DC 3.7V
Hardware version:	/
Software version:	/
Bluetooth BLE	
Supported type:	Bluetooth low Energy
Modulation:	GFSK
Operation frequency:	2402MHz to 2480MHz
Channel number:	40
Channel separation:	2 MHz
Support Type:	V5.0
Antenna type:	FPCB antenna
Antenna gain:	0.6 dBi
WIFI2.4G	
Supported type:	802.11b/802.11g/802.11n(H20)/ 802.11n(H40)
Modulation:	802.11b: DSSS 802.11g/802.11n(H20)/ 802.11n(H40): OFDM
Operation frequency:	802.11b/802.11g/802.11n(H20): 2412MHz~2462MHz 802.11n(H40): 2422MHz~2452MHz
Channel number:	802.11b/802.11g/802.11n(H20): 11 802.11n(H40):7

Channel separation:	5MHz			
Antenna type:	FPCB antenna			
Antenna gain:	0.6 dBi			
WIFI5.2G				
Supported type:	20MHz system	40MHz system	80MHz system	160MHz system
	802.11a 802.11n 802.11ac	802.11n 802.11ac	802.11ac	N/A
Operation frequency:	5180MHz-5240MHz	5190MHz-5230MHz	5210MHz	N/A
Modulation:	OFDM	OFDM	OFDM	N/A
Channel number:	9	4	2	N/A
Channel separation:	20MHz	40MHz	80MHz	N/A
Antenna type:	FPCB antenna			
Antenna gain:	-1.7 dBi			
2G				
Modilation Type	GMSK/8PSK			
Antenna Type	FPCB antenna			
GSM/EDGE/GPRS	Supported GSM/GPRS/EGPRS			
GSM/GPRS Power Class	GSM850:Power Class 4/ PCS1900:Power Class 1			
GSM/GPRS Operation Frequency	GSM850 :824.2MHz-848.8MHz/PCS1900:1850.2MHz-1909.8MHz			
GPRS Operation Frequency Band	GPRS850/GPRS1900			
GPRS Multislot Class	Multi-slot Class 12			
EGPRS Multislot Class	Multi-slot Class 12			
Antenna gain:	GSM850:-2.3 dbi,DCS1900: 1.3dbi			
WCDMA				
Operation Band:	FDD Band II & Band V			
Power Class:	Power Class 3			
Modilation Type:	QPSK for WCDMA/HSUPA/HSDPA,16QAM for HSPA+			
Release Version:	R8			
Antenna type:	FPCB antenna			
Antenna gain:	FDD Band II: -1.5dBi FDD Band V: -2.3dBi			
LTE				

Operation Band:	☒E-UTRA Band 7(U.S.-Band) ☒E-UTRA Band 41(U.S.-Band)
Release Version:	Release 9
Category:	Cat 4
Modulation Type:	QPSK, 16QAM
Antenna Description:	FPCB antenna -1.5dBi(max.) For E-UTRA Band 7 -1.5dBi(max.) For E-UTRA Band 41
Category of device:	Portable device
Remark: The above DUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.	

2.3 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. Limit for General Population/Uncontrolled exposure should be applied for this device, it is 1.6 W/kg as averaged over any 1 gram of tissue.

2.4 Applied Standard

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

FCC 47CFR §2.1093	Radiofrequency Radiation Exposure Evaluation: Portable Devices
ANSI/IEEE C95.1-1992	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz – 300 GHz.
IEEE 1528-2013	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
KDB 941225 D01	3G SAR Measurement Procedures v03r01
KDB 941225 D05	SAR for LTE Devices v02r05
KDB 941225 D06	Hotspot Mode SAR v02r01
KDB 248227 D01	SAR Guidance for IEEE 802 11 Wi-Fi SAR v02r02
KDB 648474 D04	Handset SAR v01r03
KDB 447498 D01	General RF Exposure Guidance v06
KDB 865664 D01	SAR Measurement 100 MHz to 6 GHz v01r04
KDB 865664 D02	RF Exposure Reporting v01r02

KDB 690783 D01	SAR Listings on Grants v01r03

2.5 Test Facility

FCC-Registration No.: 517856 Designation Number: CN1318

Shenzhen CTA Testing Technology Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

A2LA-Lab Cert. No.: 6534.01

Shenzhen CTA Testing Technology Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

ISED#: 27890 CAB identifier: CN0127

Shenzhen CTA Testing Technology Co., Ltd. has been listed by Innovation, Science and Economic Development Canada to perform electromagnetic emission measurement.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010.

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:

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

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

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

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

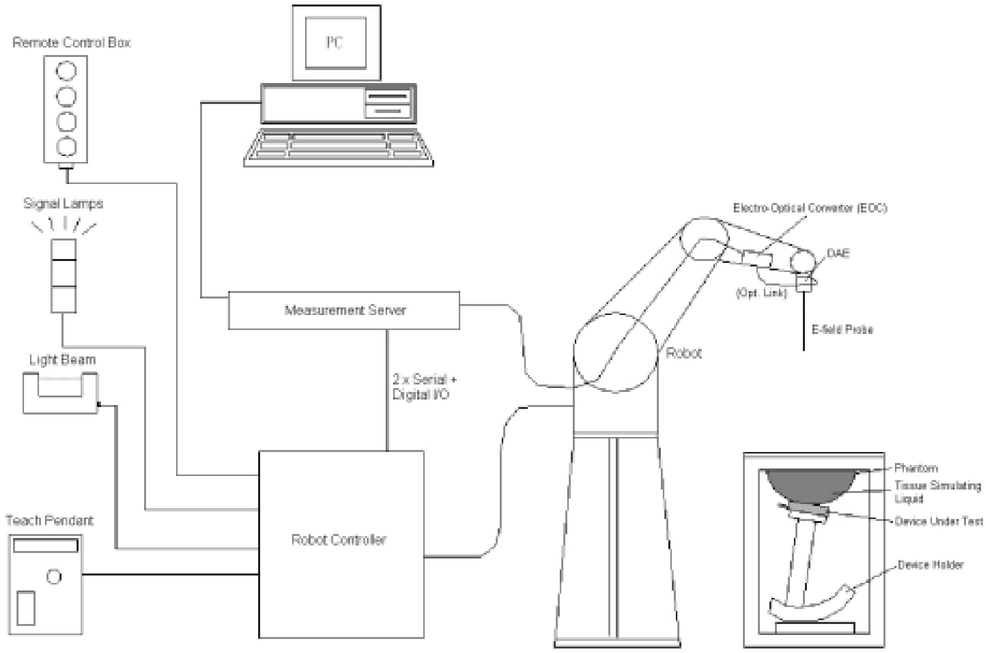
Where: C is the specific head capacity, δT is the temperature rise and δtisthe exposure duration, or related to the electrical field in the tissue by

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

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)	 **Photo of EX3DV4**
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	

➢ 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 controllersystem, 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

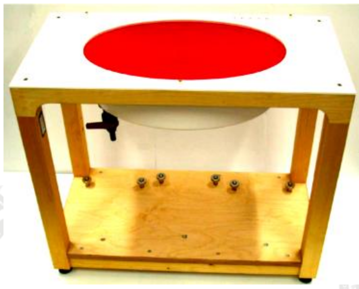


Photo of ELI4 Phantom

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：$E_i = \sqrt{\frac{V_i}{Norm_i \cdot ConvF}}$

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

with V_i = compensated signal of channel i,(i= x, y, z)
$Norm_i$= 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 iin V/m
H_i= magnetic field strength of channel iin 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	835MHz System Validation Kit	D835V2	484	Aug. 25,2023	Aug. 24,2026
SPEAG	1900MHz System Validation Kit	D1900V2	5d002	Aug. 25,2023	Aug. 24,2026
SPEAG	2450MHz System Validation Kit	D2450V2	745	Aug. 28,2023	Aug. 27,2026
SPEAG	2600MHz System Validation Kit	D2600V2	1073	Feb. 17,2023	Feb. 16,2026
SPEAG	5GHz System Validation Kit	D5GHzV2	1301	Feb.16, 2023	Feb.15, 2026
Rohde & Schwarz	UNIVERSAL RADIO COMMUNICATION TESTER	CMW500	1201.0002K50-104209-JC	Nov.05, 2023	Nov.04, 2024
SPEAG	Data Acquisition Electronics	DAE3	373	Jan.03,2024	Jan.02,2025
SPEAG	Dosimetric E-Field Probe	EX3DV4	3805	Nov.23,2023	Nov.22,2024
Agilent	ENA Series Network Analyzer	E5071C	MY46317418	Oct.25, 2023	Oct.24, 2024
SPEAG	DAK	DAK-3.5	1226	Oct.25, 2023	Oct.24, 2024
SPEAG	SAM Twin Phantom	QD000P40CD	1802	NA1	NA1
SPEAG	ELI Phantom	QDOVA004AA	2058	NA1	NA1
AR	Amplifier	ZHL-42W	QA1118004	Oct.25, 2023	Oct.24, 2024
Agilent	Power Meter	N1914A	MY50001102	Oct.25, 2023	Oct.24, 2024
Agilent	Power Sensor	N8481H	MY51240001	Oct.25, 2023	Oct.24, 2024
R&S	Spectrum Analyzer	N9020A	MY51170037	Oct.25, 2023	Oct.24, 2024
Agilent	Signal Generation	N5182A	MY48180656	Oct.25, 2023	Oct.24, 2024
Worken	Directional Coupler	0110A05601O-10	COM5BNW1A2	Oct.25, 2023	Oct.24, 2024

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. “1” : NA as this is not measurement equipment.

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:

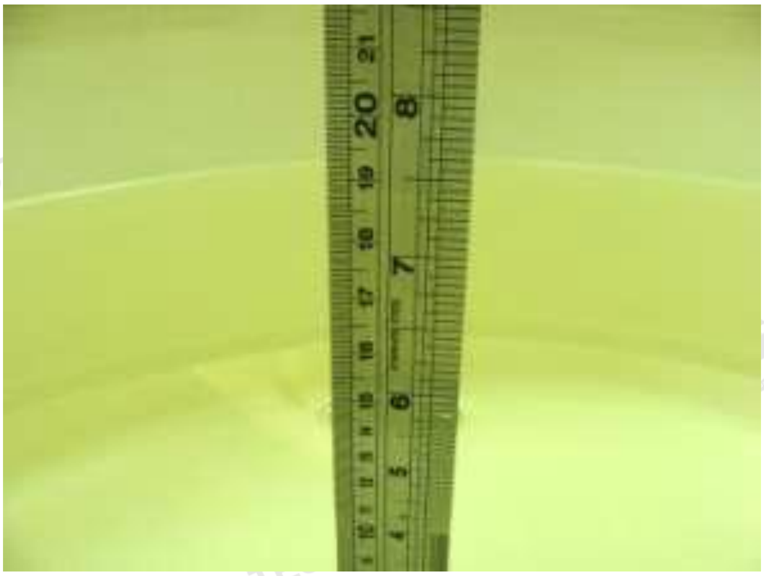


Photo of Liquid Height

The following table gives the recipes for tissue simulating liquid.

Ingredients (% by weight)	Frequency (MHz)				
	450	700-900	1750-2000	2300-2500	2500-2700
Water	38.56	40.30	55.24	55.00	54.92
Salt (NaCl)	3.95	1.38	0.31	0.2	0.23
Sucrose	56.32	57.90	0	0	0
HEC	0.98	0.24	0	0	0
Bactericide	0.19	0.18	0	0	0
Tween	0	0	44.45	44.80	44.85

Salt: 99+% Pure Sodium Chloride
Sucrose: 98+% Pure Sucrose
Water: De-ionized, 16 MΩ+ resistivity
HEC: Hydroxyethyl Cellulose
Tween: Polyoxyethylene (20) sorbitan monolaurate

HSL5GHz is composed of the following ingredients：
Water：50-65%
Mineral oil：10-30%
Emulsifiers：8-25%
Sodium salt：0-1.5%

Table 1： Recipe of Tissue Simulate Liquid

The following table shows the measuring results for simulating liquid.

Measured Frequency (MHz)	Target Tissue		Measured Tissue				Liquid Temp.	Test Data
	εr	σ	εr	Dev. (%)	σ	Dev. (%)		
835	41.5	0.90	40.785	-1.72%	0.863	-4.11%	23.6	Sep.11, 2024
1900	40.0	1.40	40.256	0.64%	1.411	0.79%	22.8	Sep.13, 2024
2450	39.2	1.80	38.965	-0.60%	1.722	-4.33%	22.4	Sep.19, 2024
2600	39.0	1.96	37.225	-4.55%	1.885	-3.83%	22.2	Sep.26, 2024
5250	35.9	4.71	36.336	1.21%	4.623	-1.85%	22.6	Oct.10, 2024

7 System Verification Procedures

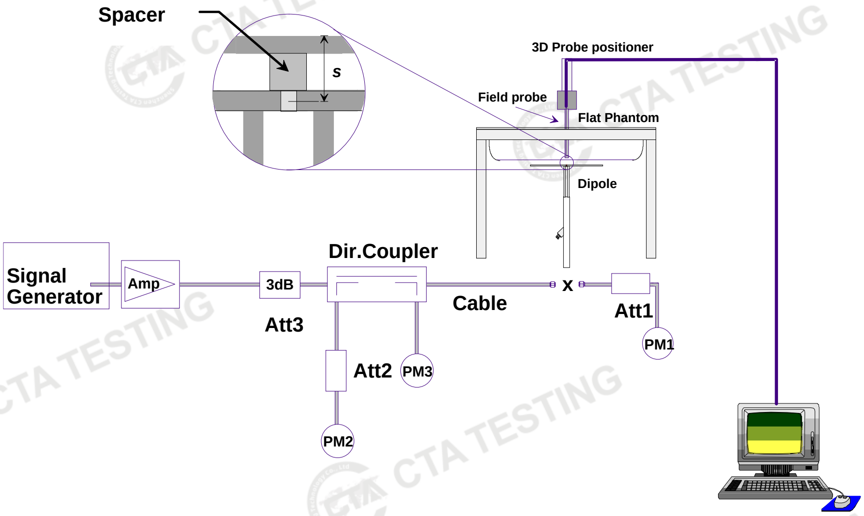
Each DASY system is equipped with one or more system validation kits. These units, together with the predefined measurement procedures within the DASY software, enable the user to conduct the system performance check and system validation. System validation kit includes a dipole, tripod holder to fix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

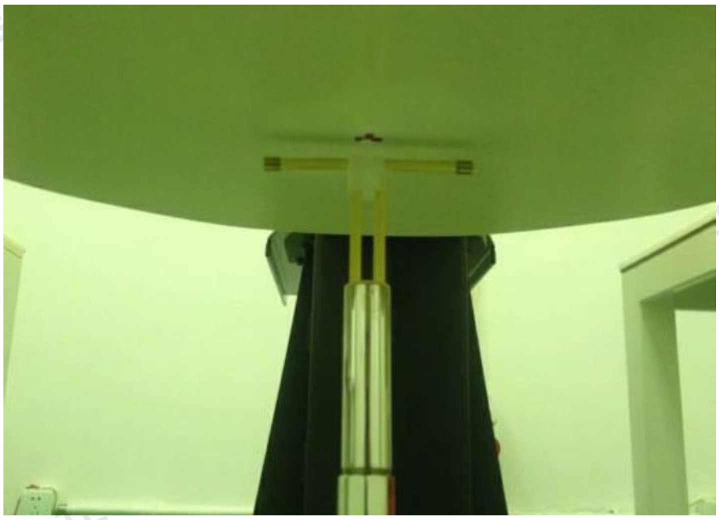


Photo of Dipole Setup

➢ 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.

Date	Frequency (MHz)	Power fed onto reference dipole (mW)	Targeted SAR 1g (W/kg)	Measured SAR1g (W/kg)	Normalized SAR (W/kg)	Deviation (%)
09/11/2024	835	250	9.68	2.44	9.76	0.83%
09/13/2024	1900	250	40.1	10.58	42.32	5.54%
09/19/2024	2450	250	52.7	12.56	50.24	-4.67%
09/26/2024	2600	250	56.8	14.36	57.44	1.13%
10/10/2024	5250	100	77.7	7.85	78.50	1.03%

8 EUT Testing Position

8.1 Body-Supported Device Configurations

According to KDB 616217 section 4.3, SAR should be separately assessed with each surface and separation distance positioned against the flat phantom that correspond to the intended use as specified by the manufacturer. The antennas in tablets are typically located near the back (bottom) surface and/or along the edges of the devices; therefore, SAR evaluation is required for these configurations. Exposures from antennas through the front (top) surface of the display section of a full-size tablet, away from the edges, are generally limited to the user's hands. Exposures to hands for typical consumer transmitters used in tablets are not expected to exceed the extremity SAR limit; therefore, SAR evaluation for the front surface of tablet display screens are generally not necessary, except for tablets that are designed to require continuous operations with the hand(s) next to the antenna(s).

- To position the device parallel to the phantom surface with either keypad up or down.
- To adjust the device parallel to the flat phantom.
- To adjust the distance between the device surface and the flat phantom to 0 mm.
- When each surface is measurement, the SAR Test Exclusion Threshold in KDB 447498 should be applied.

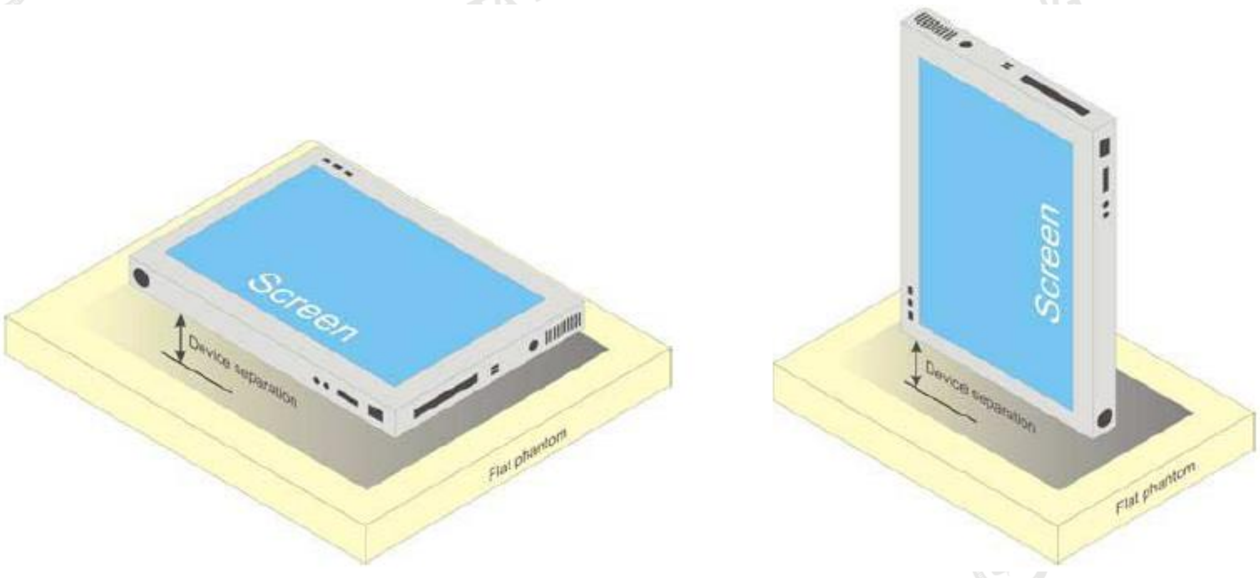


Fig.81 Illustration for Body Position

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 attheworst 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 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 number of zoom scans has to be increased accordingly.

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

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

9.4 Zoom Scan Procedures

Zoom scans are used assess the peak spatial SAR values within a cubic averaging volume containing 1 gram and 10gram 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.

<table>
<tr><th colspan="3"></th><th>≤ 3 GHz</th><th>> 3 GHz</th></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>≤ 2 GHz: ≤ 8 mm
2 – 3 GHz: ≤ 5 mm*</td><td>3 – 4 GHz: ≤ 5 mm*
4 – 6 GHz: ≤ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{Zoom}(n)$</td><td>≤ 5 mm</td><td>3 – 4 GHz: ≤ 4 mm
4 – 5 GHz: ≤ 3 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface</td><td>≤ 4 mm</td><td>3 – 4 GHz: ≤ 3 mm
4 – 5 GHz: ≤ 2.5 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">≤ 1.5·$\Delta z_{Zoom}(n-1)$ mm</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>≥ 30 mm</td><td>3 – 4 GHz: ≥ 28 mm
4 – 5 GHz: ≥ 25 mm
5 – 6 GHz: ≥ 22 mm</td></tr>
<tr><td colspan="5">Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see IEEE Std 1528-2013 for details.
* When zoom scan is required and the <u>reported</u> SAR from the area scan based 1-g SAR estimation procedures of KDB Publication 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.</td></tr>
</table>

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 aggregateSAR, 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

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

10 TEST CONDITIONS AND RESULTS

10.1 Conducted Power Results

<GSM Conducted power>

Band GSM850	Burst Average Power (dBm)				Frame-Average Power (dBm)		
TX Channel	Tune-up limit (dBm)	128	190	251	128	190	251
Frequency (MHz)		824.2	836.6	848.8	824.2	836.6	848.6
GSM	33.00	32.62	32.54	32.87	23.43	23.35	23.68
GPRS (GMSK, 1 Tx slot)	33.00	32.22	32.24	32.13	23.03	23.05	22.94
GPRS (GMSK, 2 Tx slots)	32.00	31.26	30.38	30.63	25.08	24.20	24.45
GPRS (GMSK, 3 Tx slots)	30.00	29.92	29.05	29.39	25.50	24.63	24.97
GPRS (GMSK, 4 Tx slots)	29.00	28.27	28.97	27.12	25.10	**25.80**	23.95
EGPRS (8PSK, 1 Tx slot)	28.50	28.12	28.13	28.15	19.09	19.1	19.12
EGPRS (8PSK, 2 Tx slots)	26.50	26.20	26.15	26.15	20.18	20.13	20.13
EGPRS (8PSK, 3 Tx slots)	24.00	23.76	23.80	23.80	19.5	19.54	19.54
EGPRS (8PSK, 4 Tx slots)	23.50	23.07	23.03	23.03	20.06	20.02	20.02
Band PCS1900	Burst Average Power (dBm)				Frame-Average Power (dBm)		
TX Channel	Tune-up limit (dBm)	512	661	810	512	661	810
Frequency (MHz)		1850.2	1880.0	1909.8	1850.2	1880.0	1909.8
GSM	30.00	29.73	29.82	29.67	20.54	20.63	20.48
GPRS (GMSK, 1 Tx slot)	30.00	29.43	29.28	29.13	20.24	20.09	19.94
GPRS (GMSK, 2 Tx slots)	28.00	27.54	27.22	27.20	21.36	21.04	21.02
GPRS (GMSK, 3 Tx slots)	27.00	26.12	26.01	26.03	21.70	21.59	21.61
GPRS (GMSK, 4 Tx slots)	26.00	25.06	25.83	25.88	21.89	22.66	**22.71**
EGPRS (8PSK, 1 Tx slot)	27.50	27.21	27.22	27.21	18.18	18.19	18.18
EGPRS (8PSK, 2 Tx slots)	26.50	25.10	25.13	25.09	19.08	19.11	19.07
EGPRS (8PSK, 3 Tx slots)	24.00	23.81	23.78	23.78	19.55	19.52	19.52
EGPRS (8PSK, 4 Tx slots)	23.50	23.04	23.05	23.06	20.03	20.04	20.05

Remark: The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots.
The calculated method are shown as below:
Frame-averaged power = Maximum burst averaged power (1 Tx Slot) – 9.03 dB
Frame-averaged power = Maximum burst averaged power (2 Tx Slots) – 6.02 dB
Frame-averaged power = Maximum burst averaged power (3 Tx Slots) - 4.26 dB
Frame-averaged power = Maximum burst averaged power (4 Tx Slots) – 3.01 dB

Note:

1. Per KDB 447498 D01, the maximum output power channel is used for SAR testing and for further SAR test reduction
2. For Data mode SAR testing, GPRS should be evaluated, therefore the EUT was set in corresponding TX slots due to

its highest frame-average power.

<WCDMA Conducted Power>

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

HSDPA Setup Configuration:

a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.

b. The RF path losses were compensated into the measurements.

c. A call was established between EUT and Base Station with following setting:

  i. Set Gain Factors (β_c and β_d) and parameters were set according to each
  ii. Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
  iii. Set RMC 12.2Kbps + HSDPA mode.
  iv. Set Cell Power = -86 dBm
  v. Set HS-DSCH Configuration Type to FRC (H-set 1, QPSK)
  vi. Select HSDPA Uplink Parameters
  vii. Set Delta ACK, Delta NACK and Delta CQI = 8
  viii. Set Ack-Nack Repetition Factor to 3
  ix. Set CQI Feedback Cycle (k) to 4 ms
  x. Set CQI Repetition Factor to 2
  xi. Power Ctrl Mode = All Up bits

d. The transmitted maximum output power was recorded.

Table C.10.1.4: β values for transmitter characteristics tests with HS-DPCCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (Note 4)	15/15 (Note 4)	64	12/15 (Note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with $\beta_{hs} = 30/15 * \beta_c$.

Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, Δ_{ACK} and Δ_{NACK} = 30/15 with $\beta_{hs} = 30/15 * \beta_c$, and Δ_{CQI} = 24/15 with $\beta_{hs} = 24/15 * \beta_c$.

Note 3: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 4: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 11/15 and β_d = 15/15.

Setup Configuration

HSUPA Setup Configuration:

a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.

b. The RF path losses were compensated into the measurements.

c. A call was established between EUT and Base Station with following setting * :

i. Call Configs = 5.2B, 5.9B, 5.10B, and 5.13.2B with QPSK

ii. Set the Gain Factors (β_c and β_d) and parameters (AG Index) were set according to each specific sub-test in the following table, C11.1.3, quoted from the TS 34.121

iii. Set Cell Power = -86 dBm

iv. Set Channel Type = 12.2k + HSPA

v. Set UE Target Power

vi. Power Ctrl Mode= Alternating bits

vii. Set and observe the E-TFCI

viii. Confirm that E-TFCI is equal to the target E-TFCI of 75 for sub-test 1, and other subtest's E-TFCI

d. The transmitted maximum output power was recorded.

Table C.11.1.3: β values for transmitter characteristics tests with HS-DPCCH and E-DCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (Note 5) (Note 6)	β_{ed} (SF)	β_{ed} (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 6)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/225	1309/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed}1: 47/15 β_{ed}2: 47/15	4 4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 (Note 4)	15/15 (Note 4)	64	15/15 (Note 4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with $\beta_{hs} = 30/15 * \beta_c$.

Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH, HS- DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 10/15 and β_d = 15/15.

Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 14/15 and β_d = 15/15.

Note 5: In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.

Note 6: β_{ed} can not be set directly, it is set by Absolute Grant Value.

Setup Configuration

<WCDMA Conducted Power>

WCDMA	Band II (dBm)				Band V (dBm)			
TX Channel	Tune-up limit (dBm)	9262	9400	9538	Tune-up limit (dBm)	4132	4183	4233
Frequency (MHz)		1852.4	1880.0	1907.6		826.4	836.6	846.6
RMC 12.2Kbps	24.00	23.55	23.59	23.55	24.00	23.42	23.47	23.41
HSDPA Subtest-1	23.00	22.94	22.97	22.98	23.00	22.98	22.98	22.99
HSDPA Subtest-2	23.00	22.90	22.82	22.87	23.00	22.85	22.90	22.82
HSDPA Subtest-3	23.00	22.71	22.77	22.81	23.00	22.77	22.71	22.74
HSDPA Subtest-4	23.00	22.76	22.83	22.84	23.00	22.76	22.75	22.77
HSUPA Subtest-1	23.00	22.88	22.79	22.77	23.00	22.71	22.85	22.75
HSUPA Subtest-2	23.00	22.80	22.87	22.86	23.00	22.81	22.85	22.88
HSUPA Subtest-3	23.00	22.73	22.73	22.82	23.00	22.81	22.80	22.78
HSUPA Subtest-4	23.00	22.87	22.84	22.88	23.00	22.85	22.84	22.88
HSUPA Subtest-5	23.00	22.72	22.81	22.77	23.00	22.74	22.77	22.70

General Note

1. Per KDB 941225 D01 v02, RMC 12.2kbps setting is used to evaluate SAR as primary mode. 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.
2. It is expected by the manufacturer that MPR for some HSDPA/HSUPA subtests may differ from the specification of 3GPP, according to the chipset implementation in this model. The implementation and expected deviation are detailed in tune-up procedure exhibit.

<LTE Conducted Power>

LTE Band 7							
BW (MHz)	Modulation	RB Size	RB Offset	Channel/Frequency(MHz)			Tune-up limit (dBm)
				20850	21100	21350	
				2510	2535	2560	
20	QPSK	1	0	23.69	23.36	23.80	24.00
20	QPSK	1	49	23.47	23.41	23.67	24.00
20	QPSK	1	99	23.76	24.03	23.30	25.00
20	QPSK	50	0	22.11	22.44	22.44	23.00
20	QPSK	50	24	22.62	22.60	22.25	23.00
20	QPSK	50	50	22.36	22.50	22.18	23.00
20	QPSK	100	0	22.60	22.71	22.25	23.00
20	16QAM	1	0	22.34	22.19	22.32	23.00
20	16QAM	1	49	22.73	22.61	22.41	23.00
20	16QAM	1	99	22.37	22.62	22.24	23.00
20	16QAM	50	0	21.19	21.37	21.32	22.00
20	16QAM	50	24	21.79	21.55	21.60	22.00
20	16QAM	50	50	21.32	21.47	21.40	22.00
20	16QAM	100	0	21.43	21.65	21.43	22.00
BW (MHz)	Modulation	RB Size	RB Offset	Channel/Frequency(MHz)			Tune-up limit (dBm)
				20825	21100	21375	
				2507.5	2535	2562.5	
15	QPSK	1	0	23.72	23.73	23.84	24.00
15	QPSK	1	37	23.50	23.56	23.45	24.00
15	QPSK	1	74	23.18	23.73	23.29	24.00
15	QPSK	36	0	22.26	22.17	22.25	23.00
15	QPSK	36	20	22.46	22.50	22.36	23.00
15	QPSK	36	39	22.53	22.26	22.26	23.00
15	QPSK	75	0	22.16	22.23	22.71	23.00
15	16QAM	1	0	22.41	22.33	22.65	23.00
15	16QAM	1	37	22.16	22.28	22.57	23.00
15	16QAM	1	74	22.38	22.32	22.36	23.00
15	16QAM	36	0	21.48	21.63	21.79	22.00
15	16QAM	36	20	21.44	21.33	21.59	22.00
15	16QAM	36	39	21.46	21.42	21.30	22.00
15	16QAM	75	0	21.29	21.46	21.54	22.00

BW (MHz)	Modulation	RB Size	RB Offset	Channel/Frequency(MHz)			Tune-up limit (dBm)
				20800	21100	21400	
				2505	2535	2565	
10	QPSK	1	0	23.39	23.68	23.17	24.00
10	QPSK	1	25	23.43	23.92	23.42	24.00
10	QPSK	1	49	23.25	23.31	23.78	24.00
10	QPSK	25	0	22.45	22.49	22.48	23.00
10	QPSK	25	12	22.29	22.45	22.20	23.00
10	QPSK	25	25	22.41	22.40	22.52	23.00
10	QPSK	50	0	22.62	22.54	22.39	23.00
10	16QAM	1	0	22.39	22.61	22.50	23.00
10	16QAM	1	25	22.18	22.22	22.41	23.00
10	16QAM	1	49	22.17	22.19	22.22	23.00
10	16QAM	25	0	21.56	21.54	21.20	22.00
10	16QAM	25	12	21.48	21.56	21.46	22.00
10	16QAM	25	25	21.43	21.50	21.35	22.00
10	16QAM	50	0	21.77	21.65	21.48	22.00
BW (MHz)	Modulation	RB Size	RB Offset	Channel/Frequency(MHz)			Tune-up limit (dBm)
				20775	21100	21425	
				2502.5	2535	2567.5	
5	QPSK	1	0	23.61	23.48	23.08	24.00
5	QPSK	1	12	23.82	23.68	23.77	24.00
5	QPSK	1	24	23.51	23.95	23.59	24.00
5	QPSK	12	0	22.36	22.06	22.21	23.00
5	QPSK	12	7	22.56	22.54	22.23	23.00
5	QPSK	12	13	22.13	22.61	22.38	23.00
5	QPSK	25	0	22.59	22.33	22.51	23.00
5	16QAM	1	0	22.38	22.65	22.38	23.00
5	16QAM	1	12	22.60	22.44	22.26	23.00
5	16QAM	1	24	22.60	22.35	22.41	23.00
5	16QAM	12	0	21.64	21.71	21.74	22.00
5	16QAM	12	7	21.66	21.49	21.84	22.00
5	16QAM	12	13	21.41	21.63	21.31	22.00
5	16QAM	25	0	21.73	21.49	21.49	22.00

LTE Band 41									
BW (MHz)	Modulation	RB Size	RB Offset	Channel/Frequency(MHz)					Tune-up limit (dBm)
				39750	40185	40620	41055	41490	
				2506	2549.5	2593	2636.5	2680	
20	QPSK	1	0	23.57	23.53	23.66	23.67	23.66	24.00
20	QPSK	1	49	23.81	23.53	23.17	23.25	23.40	24.00
20	QPSK	1	99	23.90	23.72	23.83	23.38	23.35	24.00
20	QPSK	50	0	22.17	22.31	22.57	22.52	22.66	23.00
20	QPSK	50	24	22.17	22.50	22.50	22.23	22.06	23.00
20	QPSK	50	50	22.56	22.19	22.08	22.32	22.42	23.00
20	QPSK	100	0	22.59	22.42	22.14	22.31	22.44	23.00
20	16QAM	1	0	22.44	22.36	22.56	22.51	22.64	23.00
20	16QAM	1	49	22.31	22.33	22.46	22.38	22.41	23.00
20	16QAM	1	99	22.11	22.20	22.33	22.22	22.23	23.00
20	16QAM	50	0	21.57	21.55	21.44	21.38	21.36	22.00
20	16QAM	50	24	21.63	21.41	21.46	21.56	21.66	22.00
20	16QAM	50	50	21.55	21.46	21.41	21.28	21.49	22.00
20	16QAM	100	0	21.43	21.54	21.74	21.74	21.77	22.00
BW (MHz)	Modulation	RB Size	RB Offset	Channel/Frequency(MHz)					Tune-up limit (dBm)
				39725	40173	40620	41068	41515	
				2503.5	2548.5	2593	2637.8	2682.5	
15	QPSK	1	0	23.83	23.63	23.59	23.72	23.50	24.00
15	QPSK	1	37	23.19	23.50	23.68	23.29	23.22	24.00
15	QPSK	1	74	23.19	23.36	23.64	23.73	23.64	24.00
15	QPSK	36	0	22.31	22.33	22.53	22.29	22.44	23.00
15	QPSK	36	20	22.09	22.05	22.31	22.21	22.36	23.00
15	QPSK	36	39	22.14	22.03	22.29	22.23	22.34	23.00
15	QPSK	75	0	22.71	22.21	22.6	22.19	22.24	23.00
15	16QAM	1	0	22.37	22.20	22.13	22.16	22.28	23.00
15	16QAM	1	37	22.31	22.24	22.38	22.38	22.57	23.00
15	16QAM	1	74	22.48	22.06	22.30	22.04	22.42	23.00
15	16QAM	36	0	21.48	21.53	21.47	21.34	21.44	22.00
15	16QAM	36	20	21.21	21.26	21.64	21.40	21.60	22.00
15	16QAM	36	39	21.26	21.27	21.45	21.25	21.34	22.00
15	16QAM	75	0	21.34	21.34	21.70	21.69	21.73	22.00

BW (MHz)	Modulation	RB Size	RB Offset	Channel/Frequency(MHz)					Tune-up limit (dBm)
				39700	40160	40620	41080	41540	
				2501	2547	2593	2639	2685	
10	QPSK	1	0	23.64	23.40	23.43	23.24	23.34	24.00
10	QPSK	1	25	23.70	23.73	23.68	23.84	23.85	24.00
10	QPSK	1	49	23.38	23.50	23.73	23.68	23.87	24.00
10	QPSK	25	0	22.27	22.13	22.45	22.38	22.24	23.00
10	QPSK	25	12	22.43	22.44	22.65	22.45	22.55	23.00
10	QPSK	25	25	22.17	22.26	22.33	22.33	22.67	23.00
10	QPSK	50	0	22.35	22.31	22.40	22.38	22.49	23.00
10	16QAM	1	0	22.57	22.41	22.66	22.24	22.16	23.00
10	16QAM	1	25	22.20	22.19	22.54	22.51	22.43	23.00
10	16QAM	1	49	22.39	22.22	22.17	22.25	22.17	23.00
10	16QAM	25	0	21.65	21.61	21.63	21.56	21.50	22.00
10	16QAM	25	12	21.63	21.54	21.76	21.51	21.25	22.00
10	16QAM	25	25	21.52	21.48	21.29	21.27	21.56	22.00
10	16QAM	50	0	21.78	21.60	21.54	21.53	21.22	22.00
BW (MHz)	Modulation	RB Size	RB Offset	Channel/Frequency(MHz)					Tune-up limit (dBm)
				39675	40148	40620	41093	51565	
				2498.5	2545.8	2593	2640.3	2687.5	
5	QPSK	1	0	23.45	23.72	23.99	23.86	23.95	24.00
5	QPSK	1	12	23.80	23.56	23.74	23.46	23.13	24.00
5	QPSK	1	24	23.67	23.78	23.81	23.77	23.78	24.00
5	QPSK	12	0	22.31	22.03	22.23	22.19	22.45	23.00
5	QPSK	12	7	22.51	22.34	22.27	22.17	22.57	23.00
5	QPSK	12	13	22.06	22.33	22.53	22.45	22.46	23.00
5	QPSK	25	0	22.43	22.17	22.24	22.34	22.47	23.00
5	16QAM	1	0	22.42	22.36	22.21	22.44	22.45	23.00
5	16QAM	1	12	22.35	22.23	22.16	22.27	22.28	23.00
5	16QAM	1	24	22.07	22.14	22.46	22.15	22.11	23.00
5	16QAM	12	0	21.24	21.22	21.37	21.63	21.48	22.00
5	16QAM	12	7	21.42	21.27	21.50	21.52	21.36	22.00
5	16QAM	12	13	21.35	21.33	21.37	21.38	21.26	22.00
5	16QAM	25	0	21.51	21.47	21.52	21.55	21.50	22.00

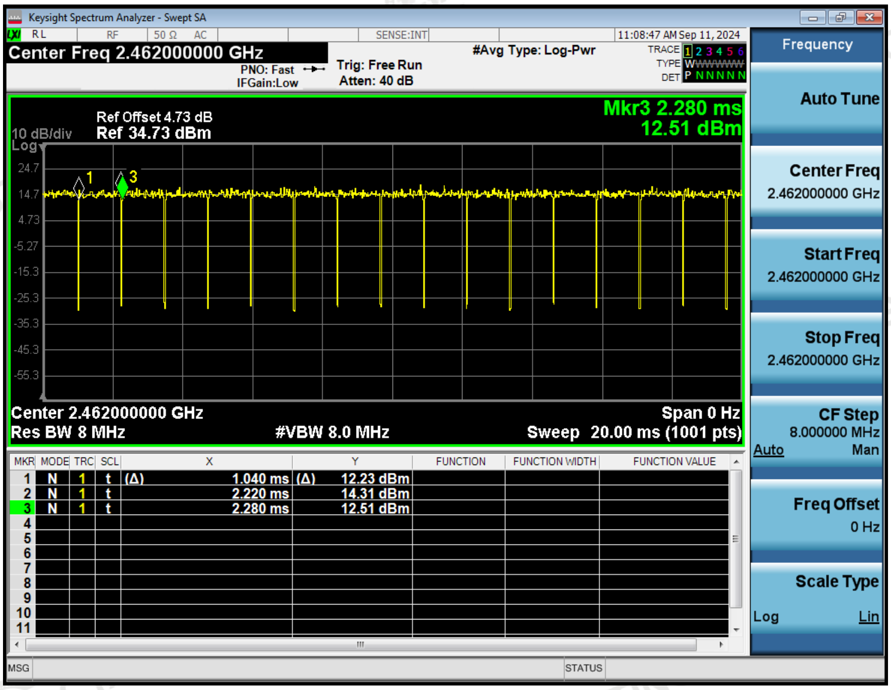
<WLAN 2.4GHz Conducted Power>

Mode	Channel	Frequency (MHz)	Conducted Peak Output Power(dBm)	Conducted Average Output Power(dBm)	Tune-up limit (dBm)
802.11b	1	2412	13.26	11.74	12.00
	6	2437	13.38	11.75	12.00
	11	2462	13.95	12.39	13.00
802.11g	1	2412	17.60	14.14	15.00
	6	2437	17.97	14.39	15.00
	11	2462	18.52	15.12	15.50
802.11n(HT20)	1	2412	18.24	14.4	15.00
	6	2437	18.59	14.93	15.00
	11	2462	19.15	15.59	16.00
802.11n(HT40)	3	2422	19.04	15.42	15.50
	6	2437	18.88	14.93	15.00
	9	2452	18.45	14.54	15.00

WIFI 2.4G [802.11n(HT20)]:

Duty cycle=96.77%

Duty_Cycle_NVNT_ANT1_802_11n(HT20)_2462



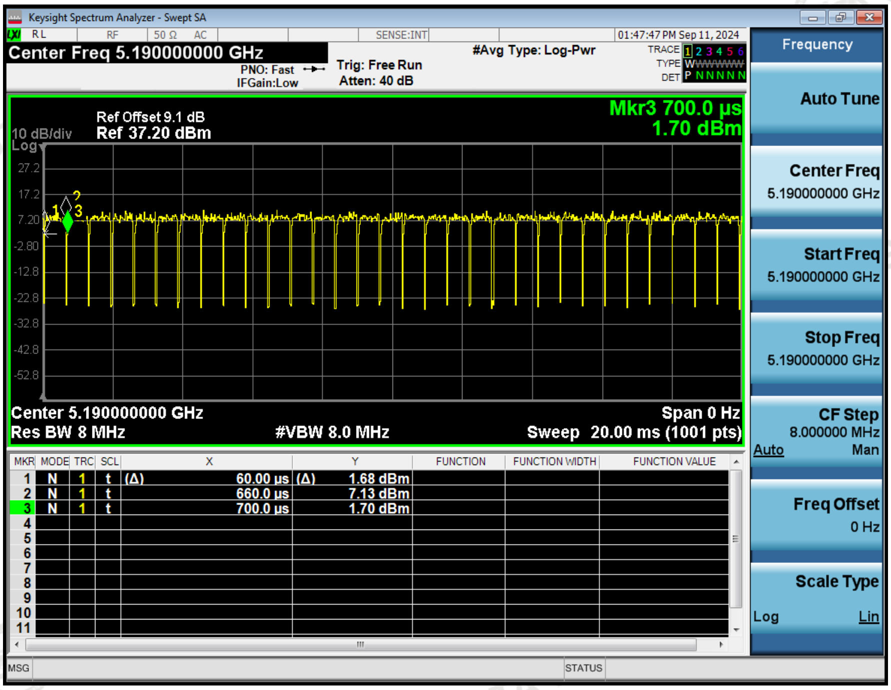
<WLAN 5.2GHz Conducted Power>

Type	Channel	Frequency (MHz)	Conducted Average Output Power(dBm)	Tune-up limit (dBm)
802.11a	36	5180	8.19	8.50
	40	5200	7.58	8.00
	48	5240	7.02	8.00
802.11n(HT20)	36	5180	8.44	8.50
	40	5200	7.96	8.00
	48	5240	7.40	8.00
802.11n(HT40)	38	5190	8.53	9.00
	46	5230	8.00	8.00
802.11ac(HT20)	36	5180	7.33	8.00
	40	5200	7.98	8.00
	48	5240	7.44	8.00
802.11ac(HT40)	38	5190	8.00	8.00
	46	5230	7.36	8.00
802.11ac(HT80)	42	5210	8.06	8.50

WIFI 5.2G [802.11n(HT40)]:

Duty cycle=93.75%

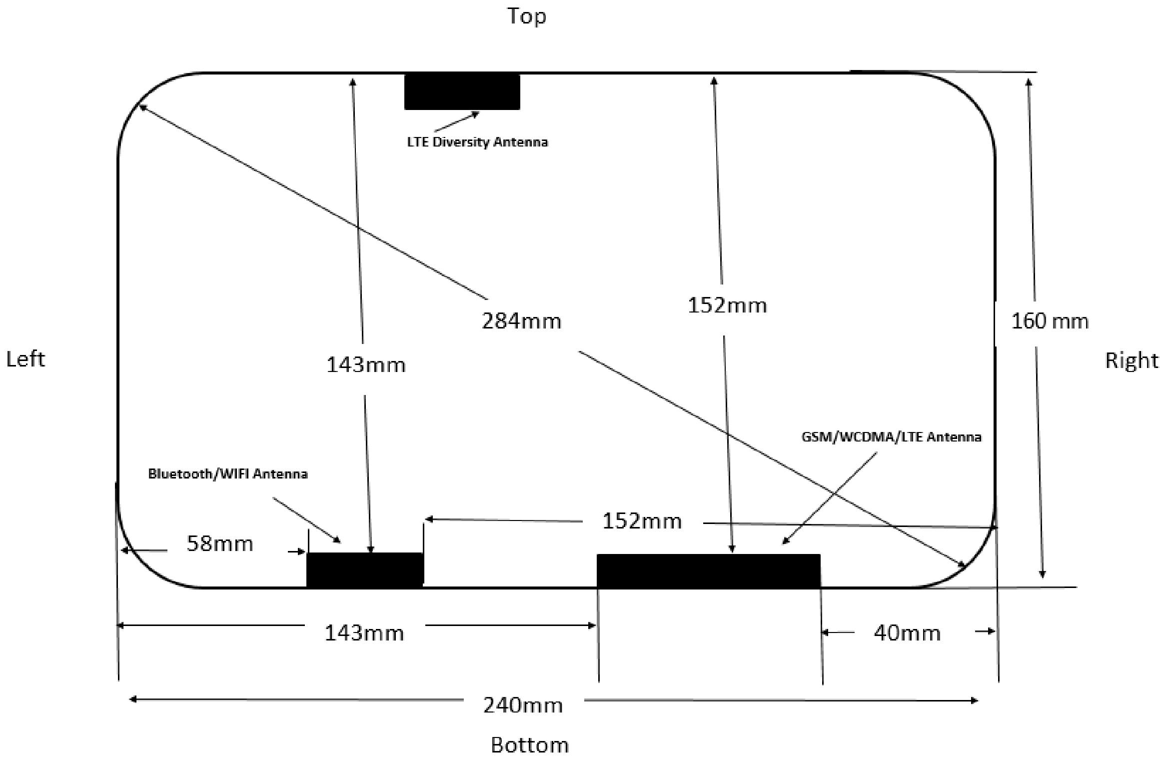
Duty_Cycle_NVNT_ANT1_802_11n(HT40)_5190



<Bluetooth Conducted Power>

Mode	Channel	Frequency (MHz)	Conducted Peak Output Power(dBm)	Conducted Average Output Power(dBm)	Tune-up limit (dBm)
BLE	0	2402	4.15	2.15	2.50
	19	2440	3.99	1.99	2.00
	39	2480	3.58	1.58	2.00

10.2 Transmit Antennas(Rear View)



Distance of The Antenna to the EUT surface and edge						
Antennas	**Front Side**	**Rear Side**	**Top Side**	**Bottom Side**	**Left Side**	**Right Side**
WWAN Main	<5mm	<5mm	152mm	<5mm	143mm	40mm
WLAN/BT	<5mm	<5mm	143mm	<5mm	58mm	152mm

10.3 SAR Test Exclusion and Estimated SAR

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and Product specific 10g SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Test Exclusion Threshold condition is satisfied. These test exclusion conditions are based on source-based time-averaged maximum conducted output power of the RF channel requiring evaluation, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.

SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	*SAR Test Exclusion Threshold* (mW)
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	

MHz	30	35	40	45	50	mm
150	232	271	310	349	387	*SAR Test Exclusion Threshold* (mW)
300	164	192	219	246	274	
450	134	157	179	201	224	
835	98	115	131	148	164	
900	95	111	126	142	158	
1500	73	86	98	110	122	
1900	65	76	87	98	109	
2450	57	67	77	86	96	
3600	47	55	63	71	79	
5200	39	46	53	59	66	
5400	39	45	52	58	65	
5800	37	44	50	56	62	

When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

The test exclusions are applicable only when the minimum test separation distance is > 50 mm and for transmission frequencies between 100 MHz and 6 GHz.

SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and > 50 mm

MHz	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	mm
100	474	481	487	494	501	507	514	521	527	534	541	547	554	561	567	
150	387	397	407	417	427	437	447	457	467	477	487	497	507	517	527	
300	274	294	314	334	354	374	394	414	434	454	474	494	514	534	554	
450	224	254	284	314	344	374	404	434	464	494	524	554	584	614	644	
835	164	220	275	331	387	442	498	554	609	665	721	776	832	888	943	
900	158	218	278	338	398	458	518	578	638	698	758	818	878	938	998	
1500	122	222	322	422	522	622	722	822	922	1022	1122	1222	1322	1422	1522	mW
1900	109	209	309	409	509	609	709	809	909	1009	1109	1209	1309	1409	1509	
2450	96	196	296	396	496	596	696	796	896	996	1096	1196	1296	1396	1496	
3600	79	179	279	379	479	579	679	779	879	979	1079	1179	1279	1379	1479	
5200	66	166	266	366	466	566	666	766	866	966	1066	1166	1266	1366	1466	
5400	65	165	265	365	465	565	665	765	865	965	1065	1165	1265	1365	1465	
5800	62	162	262	362	462	562	662	762	862	962	1062	1162	1262	1362	1462	

According to the table above, Standalone SAR exclusion calculation for this device are as below:

Freq. Band	Frequency (MHz)	Position	Test Separation (mm)	Max Power (dBm)	Max Power (mW)	Exclusion Threshold (mW)	Exclusion (Yes/No)
BT	2402	Rear	5	2.50	1.78	10	Yes
	2402	Left edge	58	2.50	1.78	176	Yes
	2402	Right edge	152	2.50	1.78	1116	Yes
	2402	Top edge	143	2.50	1.78	1026	Yes
	2402	Bottom edge	5	2.50	1.78	10	Yes
Wi-Fi 2.4G	2462	Rear	5	16.00	39.81	10	No
	2462	Left edge	58	16.00	39.81	176	Yes
	2462	Right edge	152	16.00	39.81	1116	Yes
	2462	Top edge	143	16.00	39.81	1026	Yes
	2462	Bottom edge	5	16.00	39.81	10	No
Wi-Fi 5.2G	5190	Rear	5	9.00	7.94	7	No
	5190	Left edge	58	9.00	7.94	146	Yes
	5190	Right edge	152	9.00	7.94	1086	Yes
	5190	Top edge	143	9.00	7.94	996	Yes
	5190	Bottom edge	5	9.00	7.94	7	No

Freq. Band	Frequency (MHz)	Position	Test Separation (mm)	Max Power (dBm)	Max Power (mW)	Exclusion Threshold (mW)	Exclusion (Yes/No)
GSM 850	836.6	Rear	5	25.80	380.19	16	No
	836.6	Left edge	143	25.80	380.19	681.8	Yes
	836.6	Right edge	40	25.80	380.19	131	No
	836.6	Top edge	152	25.80	380.19	732	Yes
	836.6	Bottom edge	5	25.80	380.19	16	No
PCS 1900	1909.8	Rear	5	22.71	186.64	11	No
	1909.8	Left edge	143	22.71	186.64	1039	Yes
	1909.8	Right edge	40	22.71	186.64	87	No
	1909.8	Top edge	152	22.71	186.64	1129	Yes
	1909.8	Bottom edge	5	22.71	186.64	11	No
WCDMA Band II	1880.0	Rear	5	24.00	251.19	11	No
	1880.0	Left edge	143	24.00	251.19	1039	Yes
	1880.0	Right edge	40	24.00	251.19	87	No
	1880.0	Top edge	152	24.00	251.19	1129	Yes
	1880.0	Bottom edge	5	24.00	251.19	11	No
WCDMA Band V	836.6	Rear	5	24.00	251.19	16	No
	836.6	Left edge	143	24.00	251.19	681.8	Yes
	836.6	Right edge	40	24.00	251.19	131	No
	836.6	Top edge	152	24.00	251.19	732	Yes
	836.6	Bottom edge	5	24.00	251.19	16	No
LTE Band 7	2535.0	Rear	5	25.00	316.23	10	No
	2535.0	Left edge	143	25.00	316.23	1026	Yes
	2535.0	Right edge	40	25.00	316.23	77	No
	2535.0	Top edge	152	25.00	316.23	1116	Yes
	2535.0	Bottom edge	5	25.00	316.23	10	No
LTE Band 41	2506.0	Rear	5	24.00	251.19	10	No
	2506.0	Left edge	143	24.00	251.19	1026	Yes
	2506.0	Right edge	40	24.00	251.19	77	No
	2506.0	Top edge	152	24.00	251.19	1116	Yes
	2506.0	Bottom edge	5	24.00	251.19	10	No

From what is shown in the table above, we can draw the conclusion that:

EUT Sides for SAR Testing							
Mode	Exposure Condition	Front	Rear	Left	Right	Top	Bottom
BT	Body	N/A	No	No	No	No	No
WIFI 2.4G	Body	N/A	Yes	No	No	No	Yes
WIFI 5.2G	Body	N/A	Yes	No	No	No	Yes

EUT Sides for SAR Testing							
Mode	Exposure Condition	Front	Rear	Left	Right	Top	Bottom
GSM 850	Body	N/A	Yes	No	Yes	No	Yes
PCS 1900	Body	N/A	Yes	No	Yes	No	Yes
WCDMA Band II	Body	N/A	Yes	No	Yes	No	Yes
WCDMA Band V	Body	N/A	Yes	No	Yes	No	Yes
LTE Band 7	Body	N/A	Yes	No	Yes	No	Yes
LTE Band 41	Body	N/A	Yes	No	Yes	No	Yes

EUT Sides for SAR Testing.

Remark:

According to KDB616217, exposures to hands for typical consumer transmitters used in tablets are not expected to exceed the extremity SAR limit; therefore, SAR evaluation for the front surface of tablet display screens are generally not necessary.

10.4 SAR Test Results

General Note:

1 Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.

a) Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.

b) For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"

c) For WLAN/Bluetooth: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor

2 Per KDB 447498 D01v06, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:

- ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
- ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
- ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz

3 Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.

<Body SAR>

SAR Values [GSM 850]

Plot No.	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR1g (W/kg)	Reported SAR1g (W/kg)
Measured / Reported SAR numbers-Body distance 0mm										
#1	GPRS 4tx slot	Rear	190	836.6	28.97	29.00	1.007	0.06	**0.454**	**0.457**
	GPRS 4tx slot	Right Edge	190	836.6	28.97	29.00	1.007	-0.15	0.366	0.369
	GPRS 4tx slot	Bottom Edge	190	836.6	28.97	29.00	1.007	-0.16	0.436	0.439

SAR Values [PCS 1900]

Plot No.	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR1g (W/kg)	Reported SAR1g (W/kg)
Measured / Reported SAR numbers-Body distance 0mm										
#2	GPRS 4tx slot	Rear	810	1909.8	25.88	26.00	1.028	-0.08	**0.632**	**0.650**
	GPRS 4tx slot	Right Edge	810	1909.8	25.88	26.00	1.028	0.09	0.558	0.574
	GPRS 4tx slot	Bottom Edge	810	1909.8	25.88	26.00	1.028	-0.11	0.609	0.626

SAR Values [WCDMA band II]

Plot No.	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR1g (W/kg)	Reported SAR1g (W/kg)
Measured / Reported SAR numbers-Body distance 0mm										
#3	RMC 12.2K	Rear	9400	1880.0	23.59	24.00	1.099	-0.04	**0.436**	**0.479**
	RMC 12.2K	Right Edge	9400	1880.0	23.59	24.00	1.099	-0.17	0.336	0.369
	RMC 12.2K	Bottom Edge	9400	1880.0	23.59	24.00	1.099	-0.02	0.408	0.448

SAR Values [WCDMA band V]

Plot No.	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR1g (W/kg)	Reported SAR1g (W/kg)
Measured / Reported SAR numbers-Body distance 0mm										
#4	RMC 12.2K	Rear	4183	836.6	23.47	24.00	1.130	-0.11	**0.652**	**0.737**
	RMC 12.2K	Right Edge	4183	836.6	23.47	24.00	1.130	-0.20	0.562	0.635
	RMC 12.2K	Bottom Edge	4183	836.6	23.47	24.00	1.130	-0.19	0.618	0.698

SAR Values [LTE Band 7]

Plot No.	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR1g (W/kg)	Reported SAR1g (W/kg)
Measured / Reported SAR numbers-Body distance 0mm										
#5	20MHz/1RB#99	Rear	21100	2535	24.03	25.00	1.250	0.09	**0.625**	**0.781**
	20MHz/1RB#99	Right Edge	21100	2535	24.03	25.00	1.250	-0.15	0.541	0.676
	20MHz/1RB#99	Bottom Edge	21100	2535	24.03	25.00	1.250	-0.11	0.601	0.751
	20MHz/50RB#24	Rear	20850	2510	22.62	23.00	1.091	0.11	0.578	0.631
	20MHz/50RB#24	Right Edge	20850	2510	22.62	23.00	1.091	-0.16	0.502	0.548
	20MHz/50RB#24	Bottom Edge	20850	2510	22.62	23.00	1.091	-0.18	0.554	0.605

SAR Values [LTE Band 41]

Plot No.	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR1g (W/kg)	Reported SAR1g (W/kg)
Measured / Reported SAR numbers-Body distance 0mm										
#6	20MHz/1RB#99	Rear	39750	2506	23.90	24.00	1.023	-0.02	**0.652**	**0.667**
	20MHz/1RB#99	Right Edge	39750	2506	23.90	24.00	1.023	-0.17	0.564	0.577
	20MHz/1RB#99	Bottom Edge	39750	2506	23.90	24.00	1.023	-0.05	0.629	0.644
	20MHz/50RB#0	Rear	41490	2680	22.66	23.00	1.081	-0.03	0.598	0.647
	20MHz/50RB#0	Right Edge	41490	2680	22.66	23.00	1.081	-0.15	0.516	0.558
	20MHz/50RB#0	Bottom Edge	41490	2680	22.66	23.00	1.081	-0.07	0.566	0.612

SAR Values [WIFI 2.4G]

Plot No.	Mode	Test Position	Ch.	Freq. (MHz)	Duty Cycle Factor	Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
Measured / Reported SAR numbers-Body distance 0mm											
	802.11b	Rear	11	2462	1.005	12.39	13.00	1.151	-0.05	0.345	0.399
	802.11b	Bottom Edge	11	2462	1.005	12.39	13.00	1.151	-0.17	0.318	0.368
#7	802.11n(HT20)	Rear	11	2462	1.033	15.59	16.00	1.099	-0.06	**0.452**	**0.513**
	802.11n(HT20)	Bottom Edge	11	2462	1.033	15.59	16.00	1.099	0.15	0.433	0.492

SAR Values [WIFI 5.2G]

Plot No.	Mode	Test Position	Ch.	Freq. (MHz)	Duty Cycle Factor	Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
Measured / Reported SAR numbers-Body distance 0mm											
#8	802.11n(HT40)	Rear	38	5190	1.067	8.53	9.00	1.114	0.01	**0.136**	**0.162**
	802.11n(HT40)	Bottom Edge	38	5190	1.067	8.53	9.00	1.114	-0.13	0.108	0.128

10.5 Estimated SAR

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

• (max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]·[√f(GHz)/x] W/kg for test separation distances ≤ 50 mm;

Where x = 7.5 for 1-g SAR, and x = 18.75 for 10-g SAR.

When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

Estimated SAR Result

Freq. Band	Frequency (GHz)	Test Position	max. power (dBm)	max. power (mw)	Test Separation (mm)	Estimated 1g SAR (W/kg)
Bluetooth	2.48	Body	2.50	1.78	5	0.075

10.6 Simultaneous Transmission Analysis

Per FCC KD B447498 D01, simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g SAR for all the transmitting antenna in a specific a physical test configuration is ≤1.6 W/Kg. When the sum is greater than the SAR limit, SAR test exclusion is determined by the SAR to peak location separation ratio.

$$\text{Ratio}=\frac{(SAR_1+SAR_2)^{1.5}}{(\text{peak location separation,mm})}<0.04$$

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

Application Simultaneous Transmission information:

No.	Simultaneous Transmission Configurations	Body-worn
1	WWAN (2/3/4G) + WLAN 2.4GHz	Yes
2	WWAN (2/3/4G) + WLAN 5GHz	Yes
3	WWAN (2/3/4G) + Bluetooth	Yes

Note: WLAN and BT share the same antenna and cannot transmitting at the same time.

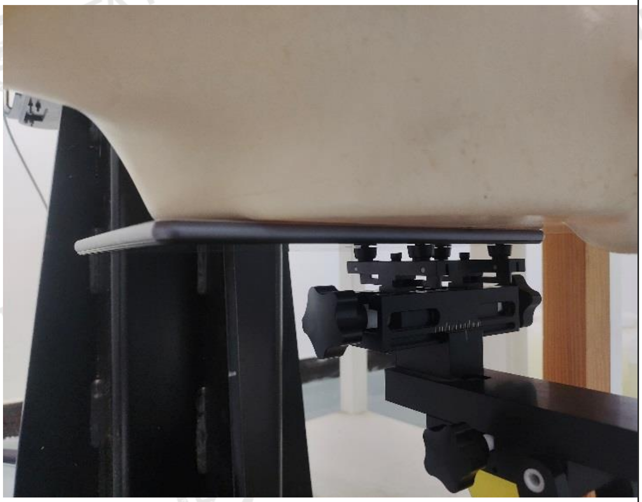
Evaluation of Simultaneous SAR

Simultaneous transmission SAR for WIFI/BT and GSM/WCDMA/ LTE

Exposure Position	1	2	3	4	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+4 Summed 1g SAR (W/kg)	SPLSR
	MAX. WWAN Reported SAR	MAX. WLAN2.4G Reported SAR	MAX. WLAN5G Reported SAR	Bluetooth				
	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)				
Rear	0.781	0.513	0.162	0.075	**1.294**	0.943	0.856	N/A
Right Edge	0.676	/	/	/	0.676	0.676	0.676	N/A
Bottom Edge	0.751	0.492	0.128	0.075	1.243	0.879	0.826	N/A

MAX. ΣSAR_{1g} =**1.294** W/kg<1.6 W/kg, so the Simultaneous transmission SAR with volume scan are not required.

Appendix A. EUT Photos and Test Setup Photos



Rear(0mm)

Right (0mm)

Bottom(0mm)

Appendix B. Plots of SAR System Check

835MHz System Check

Date: 09/11/2024

DUT: Dipole 835 MHz; Type: D835V2; Serial: 484

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

Medium parameters used: f = 835 MHz; σ = 0.863 S/m; ε_r = 40.785; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 – SN3805; ConvF(9.26, 9.26, 9.26); Calibrated: Nov. 23, 2023;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn373; Calibrated:2024/01/03
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

Area Scan (5x18x1): Measured grid: dx=15 mm, dy=1.5 mm

Maximum value of SAR (measured) = 4.65 W/kg

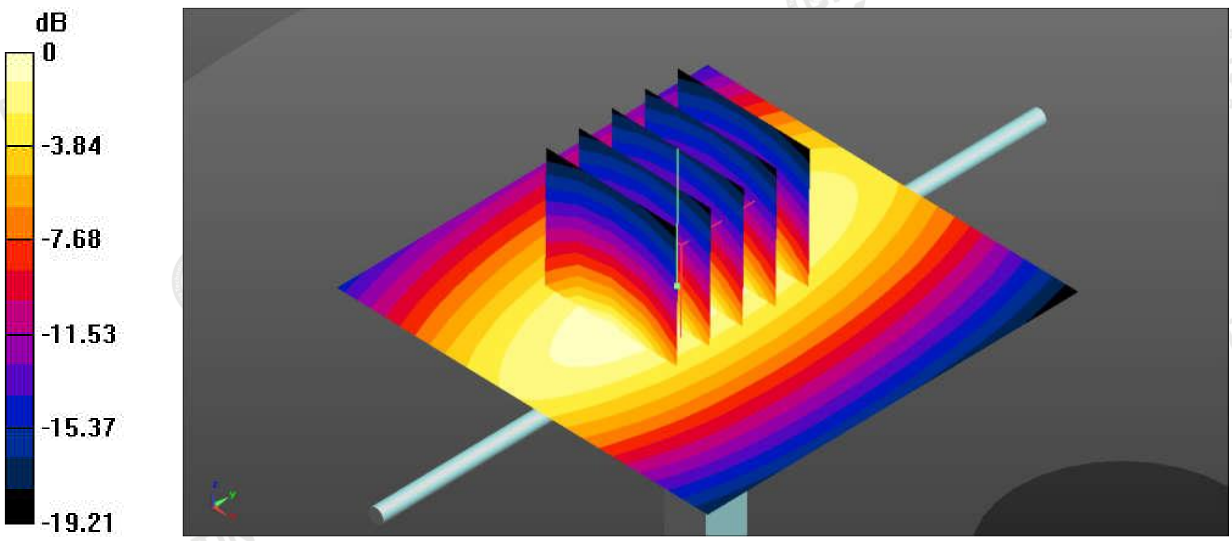
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 78.65 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 3.96 W/kg

SAR(1 g) = 2.44 W/kg; SAR(10 g) = 1.63 W/kg

Maximum value of SAR (measured) =4.58 W/kg



0 dB = 4.58 W/kg

System Performance Check 835MHz 250mW

1900MHz System Check Date: 09/13/2024

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d002

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

Medium parameters used: f = 1900 MHz; σ = 1.411 S/m; εr =40.256; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3805; ConvF(7.85, 7.85, 7.85); Calibrated: Nov. 23, 2023
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn373; Calibrated:2024/01/03
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

Area Scan (6x10x1): Measurement grid: dx=15 mm, dy=15 mm

Maximum value of SAR (measured) = 12.6 W/kg

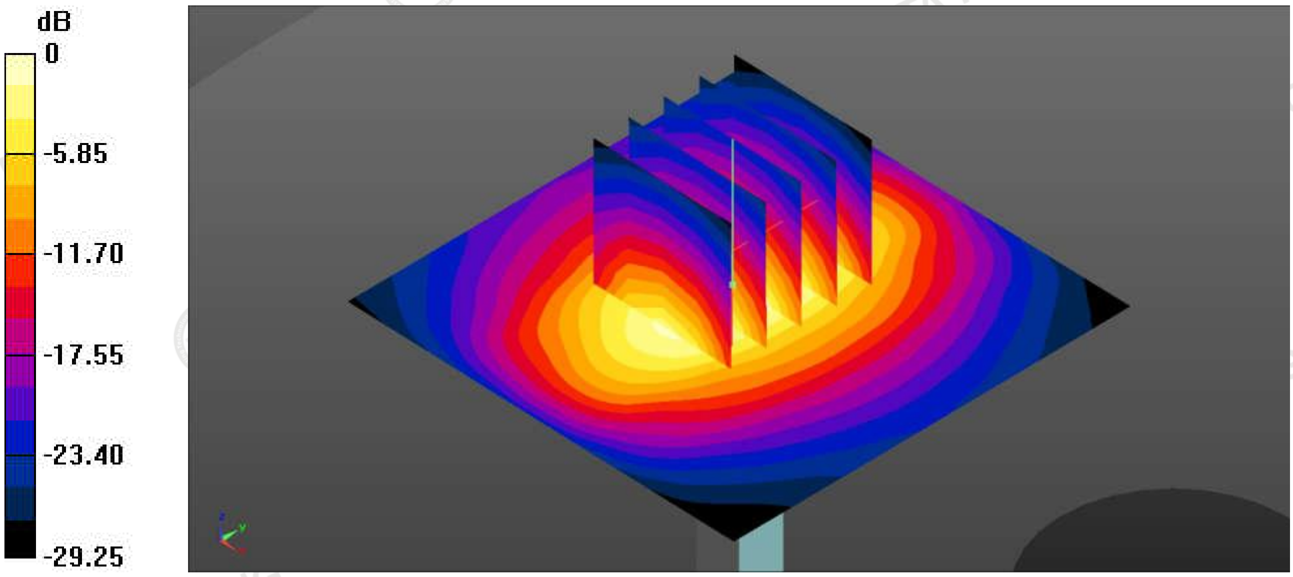
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 66.52 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 18.6 W/kg

SAR(1 g) = 10.58 W/kg; SAR(10 g) = 5.6 W/kg

Maximum value of SAR (measured) = 11.5 W/kg



0 dB = 11.5 W/kg

System Performance Check 1900MHz 250mW

2450MHz System Check

Date: 09/19/2024

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 745

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

Medium parameters used: f = 2450 MHz; σ = 1.722 S/m; εr = 38.965; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3805; ConvF(7.42, 7.42, 7.42); Calibrated: Nov. 23, 2023
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn373; Calibrated:2024/01/03
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

Area Scan (4x8x1): Measurement grid: dx=12 mm, dy=12 mm

Maximum value of SAR (measured) =20.2 W/kg

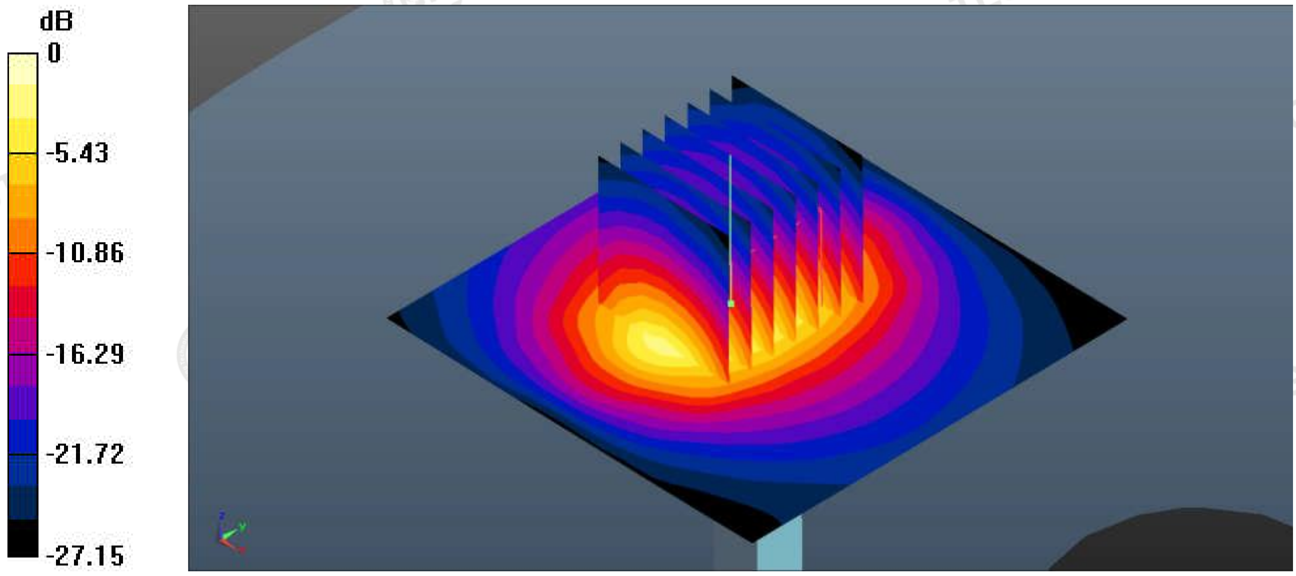
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.32 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 16.3 W/kg

SAR(1 g) = 12.56 W/kg; SAR(10 g) = 6.55 W/kg

Maximum value of SAR (measured) = 19.7 W/kg



0 dB = 19.7 W/kg

System Performance Check 2450MHz 250mW

2600MHz System Check

Date: 09/26/2024

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1073

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

Medium parameters used: f = 2600 MHz; σ = 1.885 S/m; εr = 37.225; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3805; ConvF(7.17, 7.17, 7.17); Calibrated: Nov. 23, 2023
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn373; Calibrated:2024/01/03
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

Area Scan (4x8x1): Measurement grid: dx=12 mm, dy=12 mm

Maximum value of SAR (measured) = 23.2 W/kg

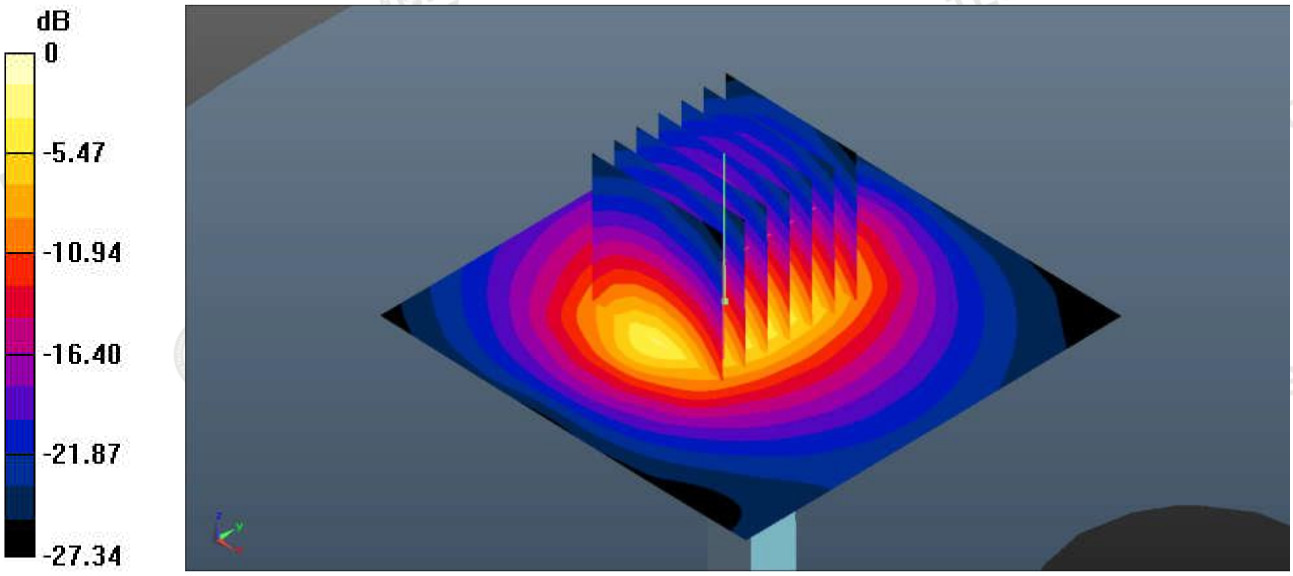
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 48.96 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 26.9 W/kg

SAR(1 g) = 14.36 W/kg; SAR(10 g) = 6.78 W/kg

Maximum value of SAR (measured) = 22.5 W/kg



0 dB = 22.5 W/kg

System Performance Check 2600MHz 250mW

5250MHz System Check

Date: 10/10/2024

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: 1301

Communication System: CW; Frequency: 5250 MHz; Duty Cycle: 1:1

Medium parameters used: f = 5250 MHz; σ =4.623 S/m; εr = 36.336; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3805; ConvF(5.38, 5.38 5.38); Calibrated: Nov. 23, 2023
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn373; Calibrated:2024/01/03
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

Area Scan (5x5x1): Measured grid: dx=10 mm, dy=10 mm

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

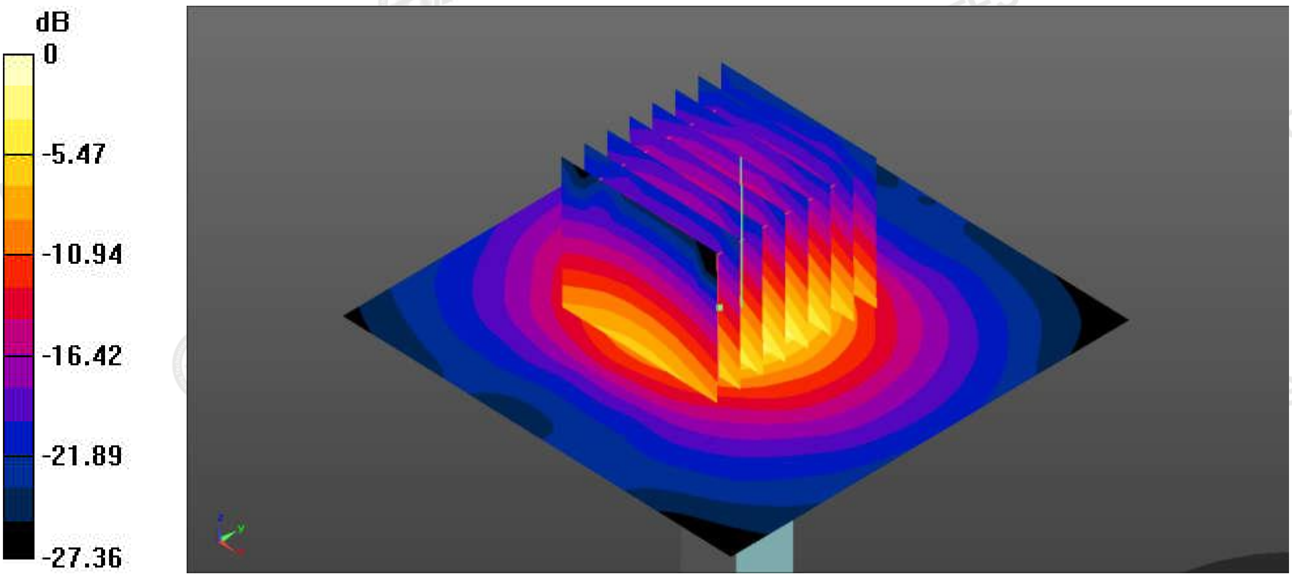
Zoom Scan (7x7x12): Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 45.32 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 11.3 W/kg

SAR(1 g) = 7.85 W/kg; SAR(10 g) = 2.41 W/kg

Maximum value of SAR (measured) = 14.8 W/kg



0 dB = 14.8 W/kg

System Performance Check 5250MHz 100mW

Appendix C. Plots of SAR Test Data

#1

Date: 09/11/2024

GSM850_GPRS(4 TX slots)_Rear_0mm_Ch190

Communication System: UID 0, Generic GSM (0); Frequency: 836.6 MHz; Duty Cycle: 1:2.075

Medium parameters used: f = 836.6 MHz; σ = 0.856 S/m; ε_r = 40.165; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3805; ConvF(9.26, 9.26, 9.26); Calibrated: Nov. 23, 2023
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn373; Calibrated:2024/01/03
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

Front /Area Scan (9x12x1): Measurement grid: dx=15 mm, dy=15 mm

Maximum value of SAR (measured) = 0.441W/kg

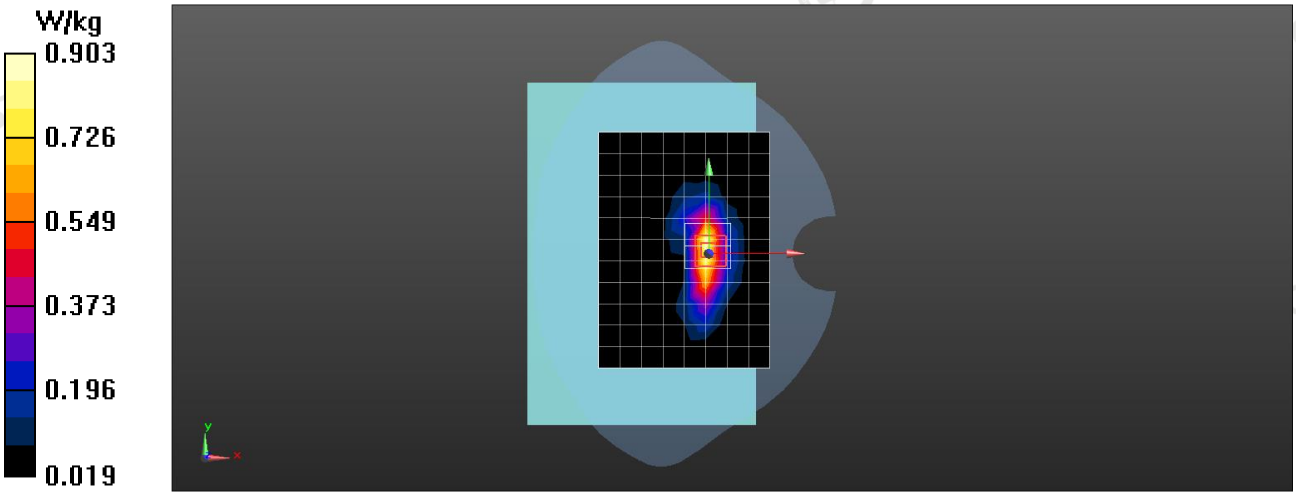
Front /Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value =4.775 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 0.106 W/kg

SAR(1 g) = 0.454 W/kg; SAR(10 g) = 0.301 W/kg

Maximum value of SAR (measured) = 0.436 W/kg



0 dB = 0.436 W/kg

#2

Date: 09/13/2024

PCS1900_GPRS(4 TX slots)_Rear_0mm_Ch810

Communication System: UID 0, Generic GSM (0); Frequency: 1909.8 MHz; Duty Cycle: 1:2.075

Medium parameters used: f = 1909.8 MHz; σ = 1.445 S/m; ε_r =40.987; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3805; ConvF(7.85, 7.85, 7.85); Calibrated: Nov. 23, 2023
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn373; Calibrated:2024/01/03
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

Front /Area Scan (9x12x1): Measurement grid: dx=15 mm, dy=15 mm

Maximum value of SAR (measured) = 0.542 W/kg

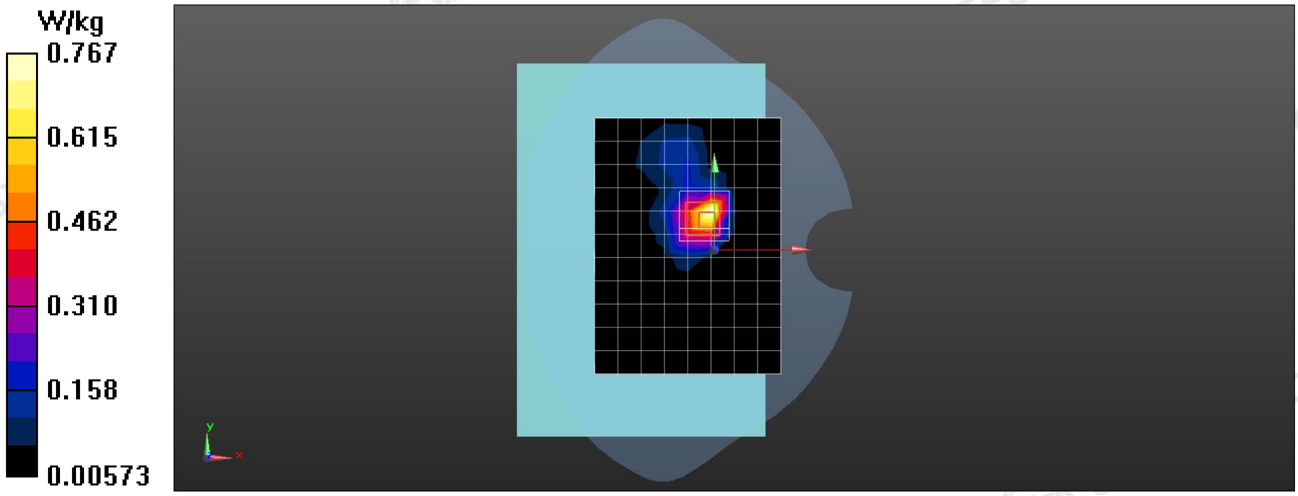
Front /Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.216 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 0.365 W/kg

SAR(1 g) = 0.632 W/Kg; SAR(10 g) = 0.485 W/Kg

Maximum value of SAR (measured) = 0.536 W/Kg



0 dB = 0.536 W/kg

#3

Date: 09/13/2024

WCDMA Band II_RMC 12.2K_Rear_0mm_Ch9400

Communication System: UID 0, Generic WCDMA (0); Frequency: 1880.0 MHz; Duty Cycle: 1:1

Medium parameters used: f = 1880.0 MHz; σ = 1.398 S/m; ε_r = 41.026; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3805; ConvF(7.85, 7.85, 7.85); Calibrated: Nov. 23, 2023
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn373; Calibrated:2024/01/03
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

Front /Area Scan (9x12x1): Measurement grid: dx=15 mm, dy=15 mm

Maximum value of SAR (measured) = 0.333 W/kg

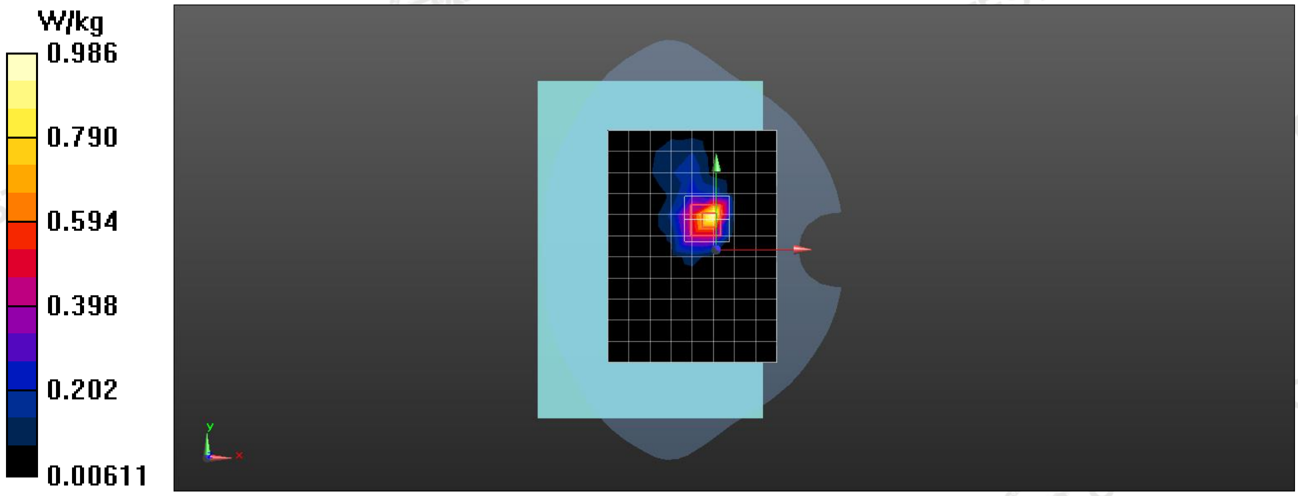
Front /Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.985 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) =0.236 W/kg

SAR(1 g) = 0.436 W/Kg; SAR(10 g) = 0.275 W/Kg

Maximum value of SAR (measured) = 0.319 W/kg



0 dB = 0.319 W/kg

#4

Date: 09/11/2024

WCDMA Band V_ RMC 12.2K_Rear_0mm_Ch4183

Communication System: UID 0, Generic WCDMA (0); Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium parameters used: f = 836.6 MHz; σ = 0.898 S/m; ε_r = 40.968; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3805; ConvF(9.26, 9.26, 9.26); Calibrated: Nov. 23, 2023
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn373; Calibrated:2024/01/03
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

Front /Area Scan (9x12x1): Measurement grid: dx=15 mm, dy=15 mm

Maximum value of SAR (measured) = 0.635 W/kg

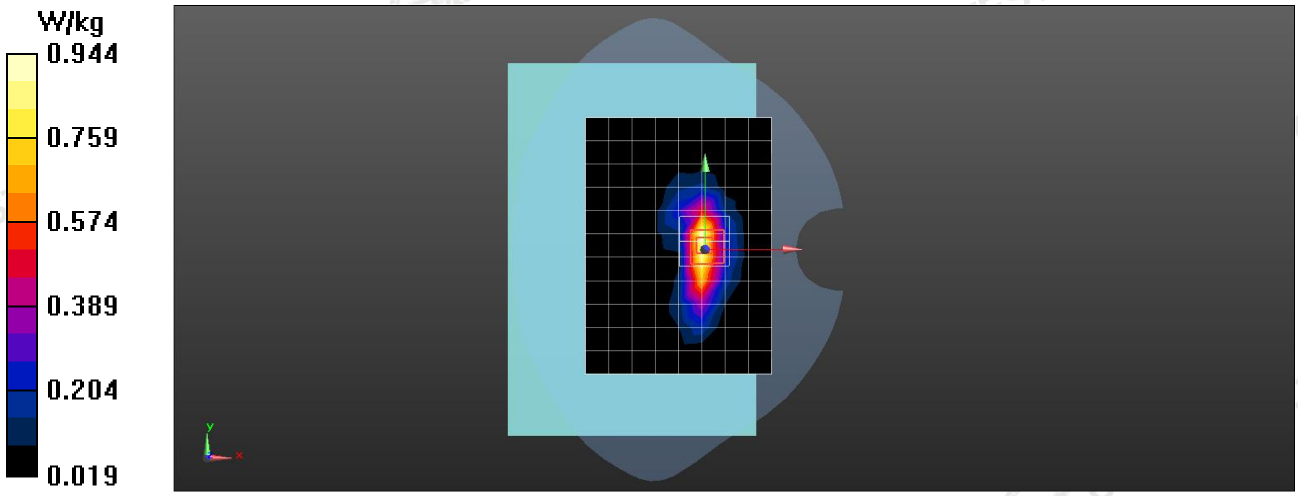
Front /Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.598 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 0.369 W/Kg

SAR(1 g) = 0.652 W/Kg; SAR(10 g) = 0.418 W/Kg

Maximum value of SAR (measured) = 0.618 W/kg



0 dB = 0.618 W/kg

#5

Date: 09/26/2024

LTE Band 7_20MHz/1RB#99_Rear_0mm_Ch21100

Communication System: UID 0, Generic LTE (0); Frequency 2535 MHz; Duty Cycle: 1:1

Medium parameters used: f = 2535 MHz; σ = 1.863 S/m; ε_r = 37.526; ρ = 1000 kg/m3

Phantom section: Flat Section

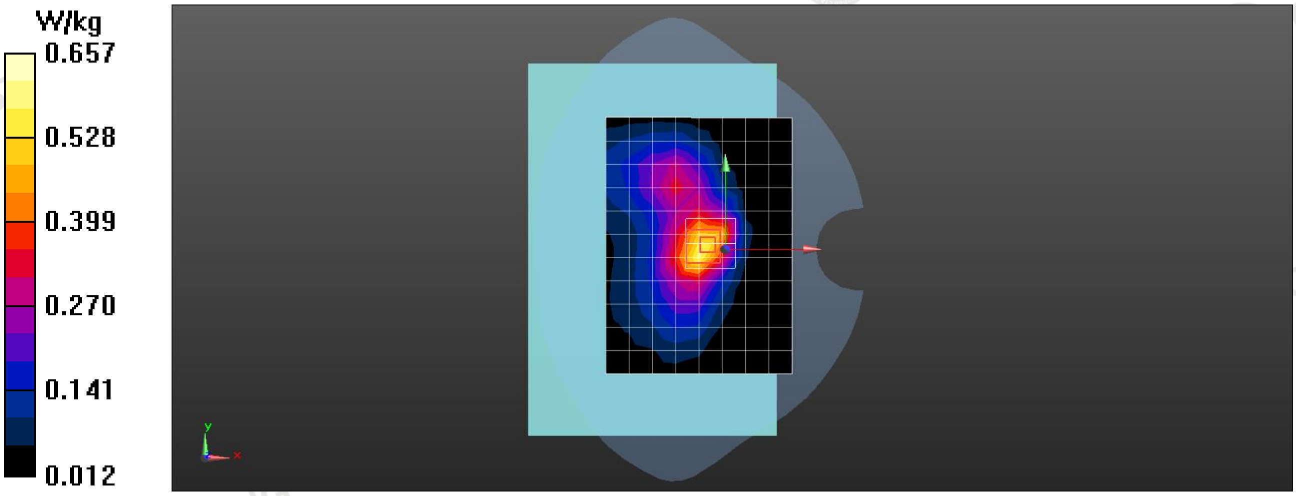
DASY5 Configuration:

- Probe: EX3DV4 - SN3805; ConvF(7.17, 7.17, 7.17); Calibrated: Nov. 23, 2023
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn373; Calibrated:2024/01/03
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

Front /Area Scan (9x12x1): Measurement grid: dx=12 mm, dy=12 mm
Maximum value of SAR (measured) = 0.498 W/kg

Front /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.69 V/m; Power Drift =0.09 dB
Peak SAR (extrapolated) = 0.298 W/kg

SAR(1 g) = 0.625 W/kg; SAR(10 g) = 0.399 W/kg
Maximum value of SAR (measured) = 0.489 W/kg



0 dB = 0.489 W/kg

#6

Date: 09/26/2024

LTE Band 41_20MHz/1RB#99_Rear_0mm_Ch39750

Communication System: UID 0, Generic LTE (0); Frequency: 2506 MHz; Duty Cycle: 1:1

Medium parameters used: f = 2506 MHz; σ = 1.902 S/m; εr =38.965; ρ = 1000 kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3805; ConvF(7.17, 7.17, 7.17); Calibrated: Nov. 23, 2023
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn373; Calibrated:2024/01/03
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

Front /Area Scan (10x15x1): Measurement grid: dx=12 mm, dy=12 mm

Maximum value of SAR (measured) = 0.582 W/kg

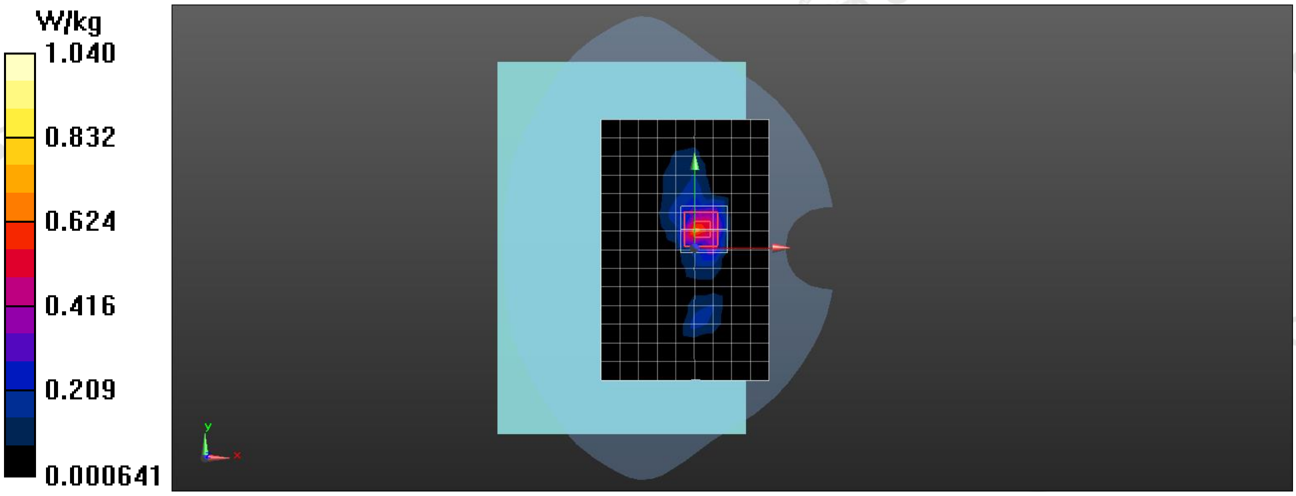
Front /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 44.63 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.366 W/kg

SAR(1 g) = 0.652 W/kg; SAR(10 g) = 0.469 W/kg

Maximum value of SAR (measured) = 0.566 W/kg



0 dB = 0.566 W/kg

#7

Date: 09/19/2024

WIFI2.4G_802.11n(HT20)_Rear_0mm_Ch11

Communication System: UID 0, Generic WIFI (0); Frequency: 2462 MHz; Duty Cycle: 1:1.033

Medium parameters used: f = 2462 MHz; σ = 1.825 S/m; εr =39.857; ρ = 1000 kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3805; ConvF(7.42, 7.42, 7.42); Calibrated: Nov. 23, 2023
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn373; Calibrated:2024/01/03
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

Front /Area Scan (10x13x1): Measurement grid: dx=12 mm, dy=12 mm

Maximum value of SAR (measured) = 0.285 W/kg

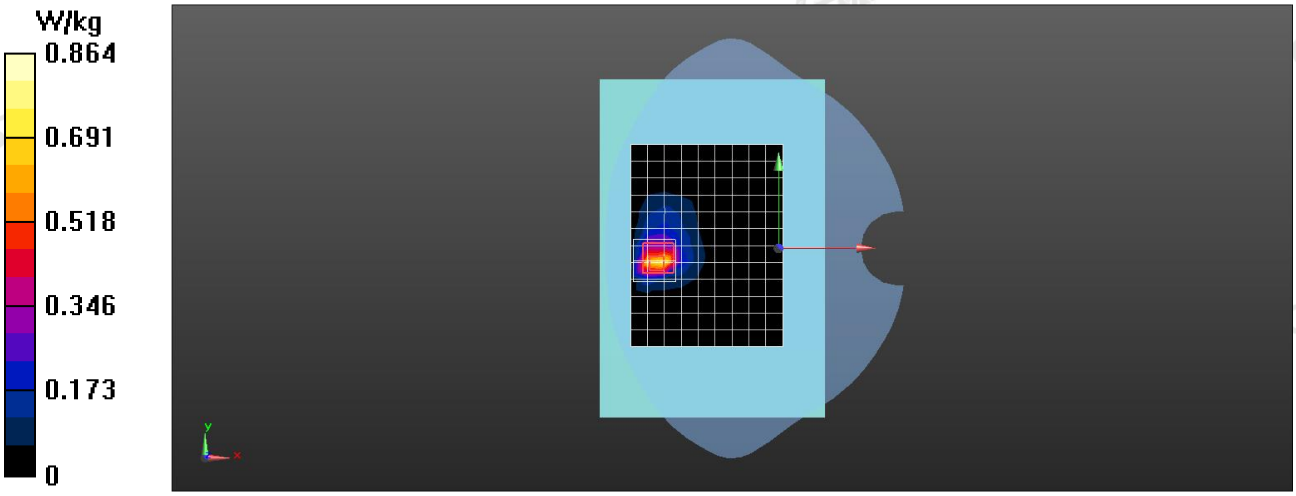
Front /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.524 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 0.125 W/kg

SAR(1 g) = 0.452 W/kg; SAR(10 g) = 0.311 W/kg

Maximum value of SAR (measured) = 0.279 W/kg



0 dB = 0.279 W/kg

#8

Date: 10/10/2024

WLAN 5.2GHz_802.11n(HT40)_Rear_0mm_CH38

Communication System: UID 0, Generic WLAN (0); Frequency: 5190 MHz;Duty Cycle: 1:1.067
Medium parameters used: f = 5190 MHz; σ =4725 S/m; εr = 35.212; ρ = 1000 kg/m3
Phantom section: Flat Section

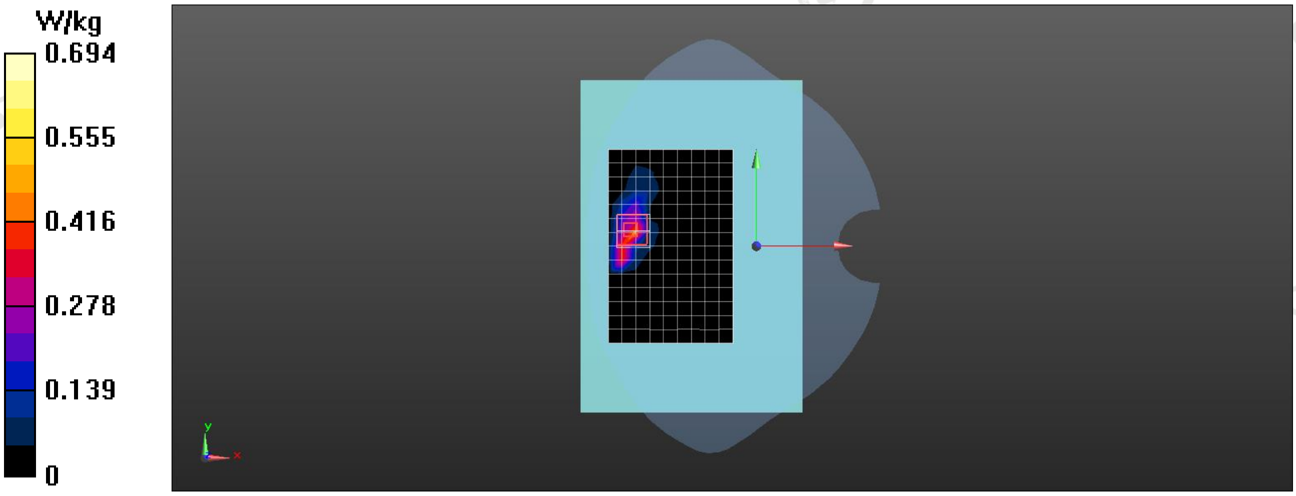
DASY5 Configuration:

- Probe: EX3DV4 - SN3805; ConvF(5.38, 5.38, 5.38); Calibrated: Nov. 23, 2023
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn373; Calibrated:2024/01/03
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

Area Scan (10x15x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.365 W/Kg

Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 2.986 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) =0.125 W/kg

SAR(1 g) = 0.136 W/kg; SAR(10 g) = 0.088 W/kg
Maximum value of SAR (measured) = 0.358 W/Kg



0 dB = 0.358 W/kg

Appendix D. DASY System Calibration Certificate

In Collaboration with s p e a g CALIBRATION LABORATORY
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Client: CTA

Certificate No: 23J02Z80102

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN : 3805

Calibration Procedure(s): FF-Z11-004-02
Calibration Procedures for Dosimetric E-field Probes

Calibration date: November 23, 2023

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	12-Jun-23(CTTL, No.J23X05435)	Jun-24
Power sensor NRP-Z91	101547	12-Jun-23(CTTL, No.J23X05435)	Jun-24
Power sensor NRP-Z91	101548	12-Jun-23(CTTL, No.J23X05435)	Jun-24
Reference 10dBAttenuator	18N50W-10dB	19-Jan-23(CTTL, No.J23X00212)	Jan-25
Reference 20dBAttenuator	18N50W-20dB	19-Jan-23(CTTL, No.J23X00211)	Jan-25
Reference Probe EX3DV4	SN 3846	31-May-23(SPEAG, No.EX-3846_May23)	May-24
DAE4	SN 1555	24-Aug-23(SPEAG, No.DAE4-1555_Aug23)	Aug-24
Secondary Standards	**ID #**	**Cal Date(Calibrated by, Certificate No.)**	**Scheduled Calibration**
SignalGenerator MG3700A	6201052605	12-Jun-23(CTTL, No.J23X05434)	Jun-24
Network Analyzer E5071C	MY46110673	10-Jan-23(CTTL, No.J23X00104)	Jan-24
Reference 10dBAttenuator	BT0520	11-May-23(CTTL, No.J23X04061)	May-25
Reference 20dBAttenuator	BT0267	11-May-23(CTTL, No.J23X04062)	May-25
OCP DAK-3.5	SN 1040	18-Jan-23(SPEAG, No.OCP-DAK3.5-1040_Jan23)	Jan-24

	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: November 28, 2023

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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, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

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

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DASY/EASY – Parameters of Probe: EX3DV4 – SN:3805

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm(μV/(V/m)²)[A]	0.49	0.63	0.45	±10.0%
DCP(mV)[B]	101.4	97.7	101.4	

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	169.0	±2.5%
		Y	0.0	0.0	1.0		189.9	
		Z	0.0	0.0	1.0		155.5	

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

[A] The uncertainties of Norm X, Y, Z do not affect the E^2-field uncertainty inside TSL (see Page 4).
[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:3805

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	9.66	9.66	9.66	0.14	1.30	±12.7%
835	41.5	0.90	9.26	9.26	9.26	0.13	1.43	±12.7%
1750	40.1	1.37	8.16	8.16	8.16	0.23	1.09	±12.7%
1900	40.0	1.40	7.85	7.85	7.85	0.24	1.04	±12.7%
2000	40.0	1.40	7.83	7.83	7.83	0.22	1.13	±12.7%
2300	39.5	1.67	7.66	7.66	7.66	0.40	0.87	±12.7%
2450	39.2	1.80	7.42	7.42	7.42	0.36	0.94	±12.7%
2600	39.0	1.96	7.17	7.17	7.17	0.39	0.97	±12.7%
3300	38.2	2.71	7.01	7.01	7.01	0.47	0.90	±13.9%
3500	37.9	2.91	6.87	6.87	6.87	0.45	1.02	±13.9%
3700	37.7	3.12	6.65	6.65	6.65	0.35	1.25	±13.9%
3900	37.5	3.32	6.60	6.60	6.60	0.40	1.25	±13.9%
4100	37.2	3.53	6.54	6.54	6.54	0.40	1.15	±13.9%
4200	37.1	3.63	6.45	6.45	6.45	0.35	1.35	±13.9%
4400	36.9	3.84	6.36	6.36	6.36	0.40	1.25	±13.9%
4600	36.7	4.04	6.26	6.26	6.26	0.40	1.30	±13.9%
4800	36.4	4.25	6.20	6.20	6.20	0.40	1.38	±13.9%
4950	36.3	4.40	5.95	5.95	5.95	0.40	1.40	±13.9%
5250	35.9	4.71	5.38	5.38	5.38	0.40	1.50	±13.9%
5600	35.5	5.07	4.75	4.75	4.75	0.50	1.30	±13.9%
5750	35.4	5.22	4.88	4.88	4.88	0.45	1.40	±13.9%

[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 up to 6 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

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

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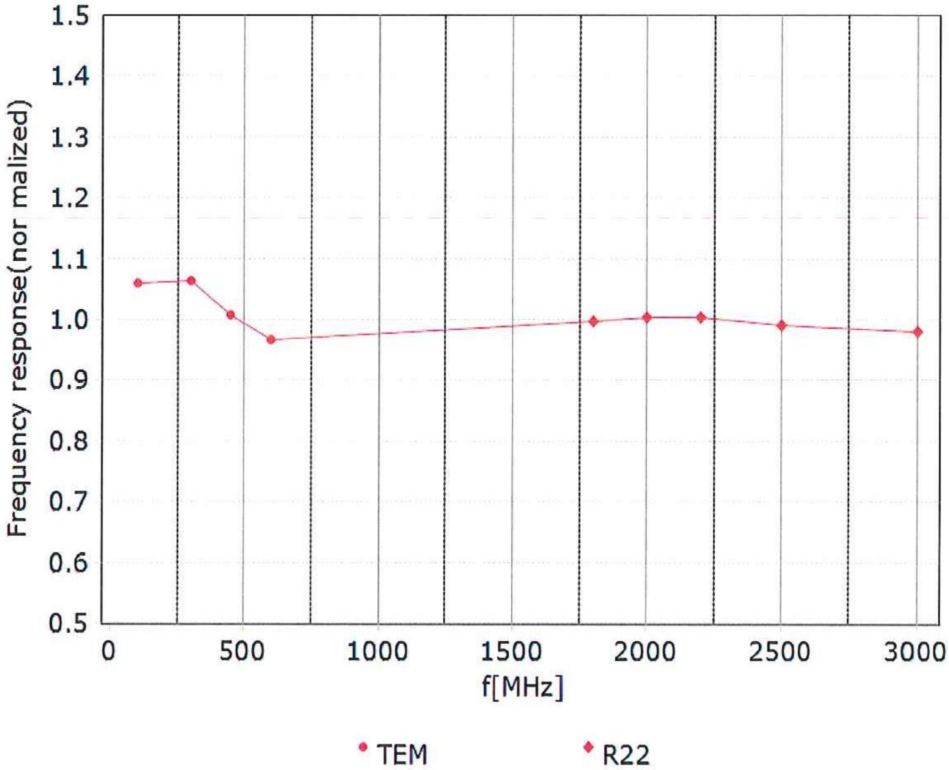
Frequency Response of E-Field
(TEM-Cell: ifi110 EXX, Waveguide: R22)



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

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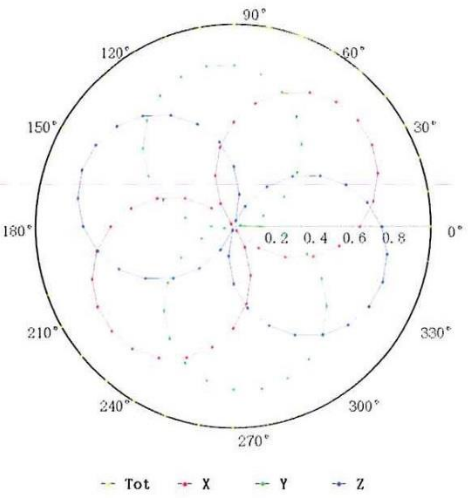
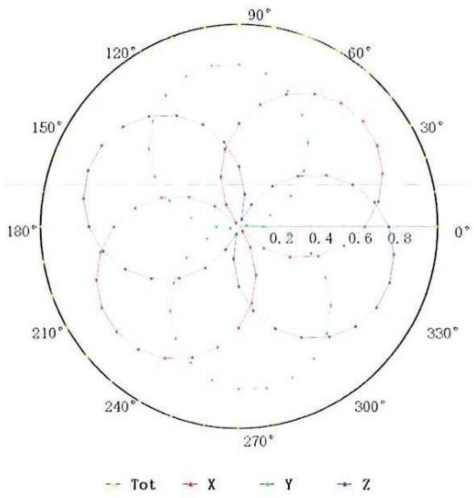
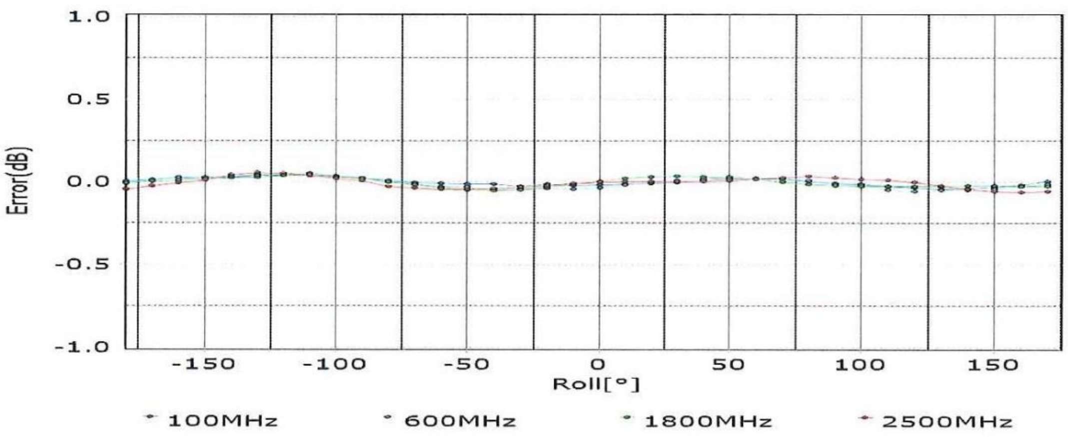
Receiving Pattern (Φ), θ=0°

f=600 MHz, TEM



f=1800 MHz, R22





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

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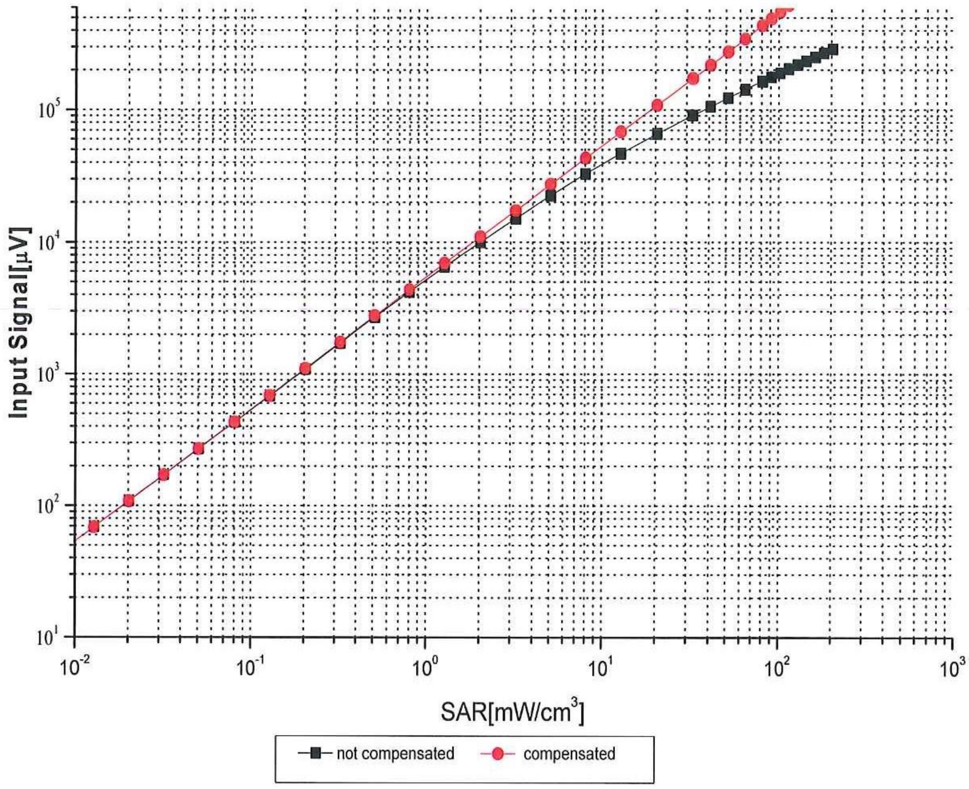
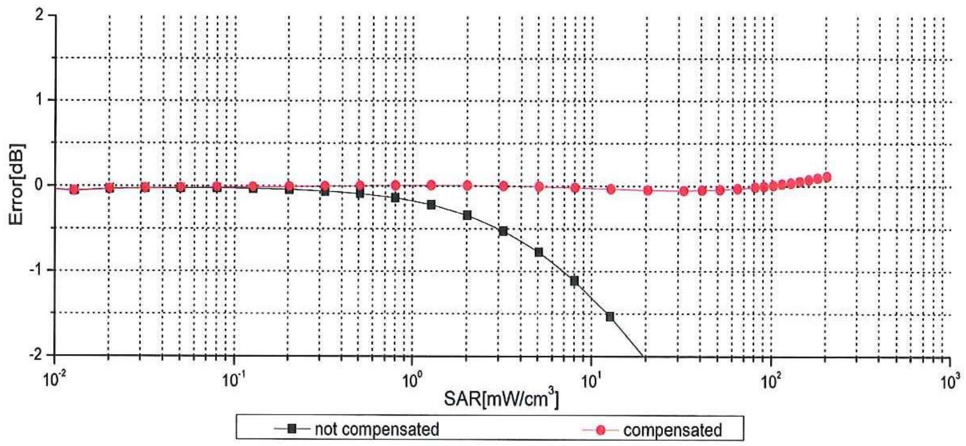
Dynamic Range f(SAR$_{head}$) (TEM cell, f = 900 MHz)





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

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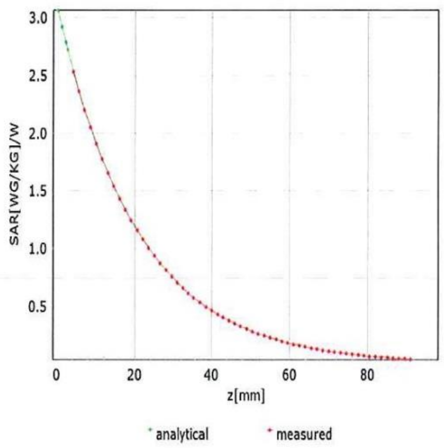
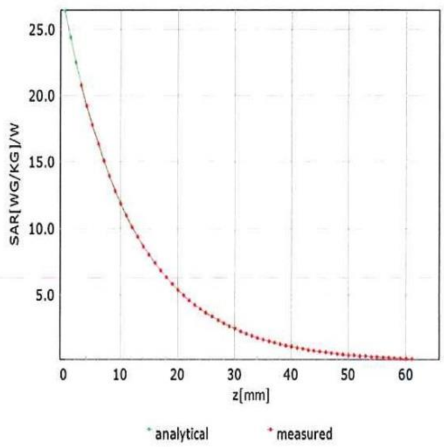
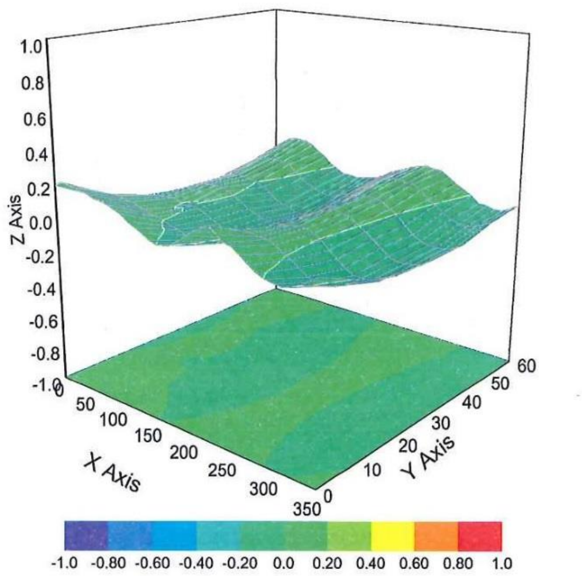
Conversion Factor Assessment

f=750 MHz,WGLS R9(H_convF) **f=1750 MHz,WGLS R22(H_convF)**





Deviation from Isotropy in Liquid



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

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DASY/EASY – Parameters of Probe: EX3DV4 – SN:3805

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	127.3
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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Client: CTA

Certificate No: 23J02Z80217

CALIBRATION CERTIFICATE

Object	DAE3 - SN: 373
Calibration Procedure(s)	FF-Z11-002-01 Calibration Procedure for the Data Acquisition Electronics (DAEx)
Calibration date:	January 03, 2024

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
Process Calibrator 753	1971018	12-Jun-23 (CTTL, No.J23X05436)	Jun-24

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

Issued: January 04, 2024

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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 report provide only calibration results for DAE, it does not contain other performance test results.

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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	402.650 ± 0.15% (k=2)	403.231 ± 0.15% (k=2)	402.697 ± 0.15% (k=2)
Low Range	3.92127 ± 0.7% (k=2)	3.97784 ± 0.7% (k=2)	3.93537 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	293° ± 1 °