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TEST REPORT

For SAR

Report No. .... :	**CHTEW23060031**	Report vertification:
Project No....................................... :	**SHT2304067501EW**	
Applicant's name .... :	**Guangzhou Shangke Information Technology Co., Ltd.**	
Address...:	Room 1205-1212, R&F To-Win Building, No.30 Huaxia Road, Tianhe District, Guangzhou, Guangdong Province,China	
Test item description .... :	**Tablet PC**	
Trade Mark ....:	TECLAST	
Model/Type reference.......................:	TLA002	
Listed Model(s) ....:	TLA001, TLA003, TLA005, TLA006, TLA007, TLA008, TLA009, TLA010, TLA011, TLA012, TLA013, TLA015, TLA016, TLA017, TLA018, TLA019, TLA020, TLA021, TLA022, TLA023, TLA025, TLA026, TLA027, TLA028, TLA029, TLA030, TLC005, TLC006, TLC007, TLC008, TLC009, TLC010, TLC011, TLC012, TLC013, TLC014, TLC015, TLC016, TA10	
Standard .... :	**FCC 47 CFR Part2.1093** **IEEE Std C95.1: 1999 Edition** **IEEE Std 1528: 2013**	
Date of receipt of test sample..........:	Apr.21, 2023	
Date of testing.............................:	Jun.08, 2023- Jun.12, 2023	
Date of issue...............................:	Jun.14, 2023	
Result................. ....:	**PASS**	

Compiled by (position+printedname+signature)...:	File administrators: Fanghui Zhu	Fanghui Zhu
Supervised by (position+printedname+signature)...:	Test Engineer: Weiyang Xiang	Weiyang.Xiang
Approved by (position+printedname+signature)...:	Manager: Hans Hu	Hans Hu

Testing Laboratory Name .... :	**Shenzhen Huatongwei International Inspection Co., Ltd**
Address...:	1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

Contents

1 . Statement of Compliance

Maximum Reported SAR (W/kg @1g)					
Type	Test setting	WWAN	WLAN	BT	Simultaneous TX
Body	Dist.= 0mm	0.907	0.561	0.177	1.468

Note:

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

2 . Test Standards and Report version

2.1. Test Standards

The tests were performed according to following standards:

FCC 47 Part 2.1093: Radiofrequency radiation exposure evaluation: portable devices.
IEEE Std C95.1, 1999 Edition: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz
IEEE Std 1528™-2013: IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques.

FCC published RF exposure KDB procedures:
865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04: SAR Measurement Requirements for 100 MHz to 6 GHz
865664 D02 RF Exposure Reporting v01r02: RF Exposure Compliance Reporting and Documentation Considerations
447498 D04 Interim General RF Exposure Guidance v01: Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies
248227 D01 802 11 Wi-Fi SAR v02r02: SAR Measurement Proceduresfor802.11 a/b/g Transmitters
616217 D04 SAR for laptop and tablets v01r02: SAR Evaluation Requirements for Laptop, Notebook, Netbook and Tablet Computers
941225 D01 3G SAR Procedures v03r01: SAR Measurement Procedures for 3G Devices
941225 D05 SAR for LTE Devices v02r05: SAR Evaluation Considerations for LTE Devices

TCB workshop April, 2019; Page 19, Tissue Simulating Liquids (TSL)

2.2. Report version

Revision No.	Date of issue	Description
N/A	2023-06-14	Original

3. Summary

3.1. Client Information

Applicant:	Guangzhou Shangke Information Technology Co., Ltd.
Address:	Room 1205-1212, R&F To-Win Building, No.30 Huaxia Road, Tianhe District, Guangzhou, Guangdong Province,China
Manufacturer:	Guangzhou Shangke Information Technology Co., Ltd.
Address:	Room 1205-1212, R&F To-Win Building, No.30 Huaxia Road, Tianhe District, Guangzhou, Guangdong Province,China

3.2. Product Description

Main unit		
Name of EUT:	Tablet PC	
Trade Mark:	TECLAST	
Model No.:	TLA002	
Listed Model(s):	TLA001, TLA003, TLA005, TLA006, TLA007, TLA008, TLA009, TLA010, TLA011, TLA012, TLA013, TLA015, TLA016, TLA017, TLA018, TLA019, TLA020, TLA021, TLA022, TLA023, TLA025, TLA026, TLA027, TLA028, TLA029, TLA030, TLC005, TLC006, TLC007, TLC008, TLC009, TLC010, TLC011, TLC012, TLC013, TLC014, TLC015, TLC016, TA10	
Power supply:	DC 3.8V	
Hardware version:	-	
Software version:	-	
Device Dimension:	Length x Width x Thickness (mm):	245 x 155 x5
Device Category:	Portable	
Product stage:	Production unit	
RF Exposure Environment:	General Population/Uncontrolled	
HTW test sample No.:	YPHT23040675001	
Support SIM card quantity:	☒ Single card	☐ Double card

3.3. RF Specification Description

GSM				
Operation Band:	☒ GSM850			
Support type:	☒ GSM	☒ GPRS	☒ EGPRS	
Modulation type:	☒ GMSK	☒ 8PSK		
Power Class:	☒ GSM850: Class 4			
Device Class:	B			
GPRS Multi-Slot Class:	12			
EGPRS Multi-Slot Class:	12			
WCDMA				
Operation Band:	☒ Band V			
Support type:	☒ UMTS Rel. 99 (Voice & Data)		☒ HSDPA	☒ HSUPA
Modulation type:	☒ QPSK			
Power Class:	Class 3			
LTE				
Operation Band:	☒ Band 5			
Support type:	☒Single Carrier	☐ CA-UL	☐ CA-DL	☐ MIMO-UL
Modulation type:	☒ QPSK	☒ 16QAM		
Power Class:	☒ Class 3	☐ Class 2		
Wi-Fi 2.4G				
Support type:	☒ 802.11b	☒ 802.11g	☒ 802.11n	☐ 802.11ax
Support bandwidth:	☒ 20MHz	☒ 40MHz		
Wi-Fi 5G				
Operation Band:	☒ U-NII-1	☐ U-NII-2A	☐ U-NII-2C	☒ U-NII-3
Support type:	☒ 802.11a	☒ 802.11n	☒ 802.11ac	☐ 802.11ax
Support bandwidth:	☒ 20MHz	☒ 40MHz	☒ 80MHz	☐ 160MHz
Bluetooth				
Support type:	☒ BR	☒ EDR	☒ BLE-1Mbps	☒ BLE-2Mbps

3.4. Testing Laboratory Information

Laboratory Name	Shenzhen Huatongwei International Inspection Co., Ltd.	
Laboratory Location	1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China	
Contact information:	Tel: 86-755-26715499 E-mail: cs@szhtw.com.cn http://www.szhtw.com.cn	
Qualifications	Type	Accreditation Number
	FCC	762235

3.5. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Ambient temperature	18 °C to 25 °C
Ambient humidity	30%RH to 70%RH
Air Pressure	950-1050mbar

4. Equipments Used during the Test

Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Cal. date (YY-MM-DD)	Due date (YY-MM-DD)
●	Data Acquisition Electronics DAEx	SPEAG	HTWE0313-05	DAE4	1549	2023/03/27	2024/03/26
●	E-field Probe	SPEAG	HTWE0313-06	EX3DV4	7494	2023/04/17	2024/04/16
●	Universal Radio Communication Tester	R&S	HTWE0323	CMW500	137681	2023/05/04	2024/05/03
Tissue-equivalent liquids Validation							
●	Dielectric Assessment Kit	SPEAG	HTWE0315-02	DAK-3.5	1267	N/A	N/A
●	Dielectric Assessment Kit	SPEAG	HTWE0315-01	DAK-12	1130	N/A	N/A
●	Network analyzer	Keysight	HTWE0331	E5071C	MY46733048	2022/08/29	2023/08/28
System Validation							
●	System Validation Antenna	SPEAG	HTWE0314-01	CLA-150	4024	2021/01/25	2024/01/24
●	System Validation Dipole	SPEAG	HTWE0314-02	D450V3	1102	2021/01/20	2024/01/19
●	System Validation Dipole	SPEAG	HTWE0314-03	D750V3	1180	2021/01/22	2024/01/21
●	System Validation Dipole	SPEAG	HTWE0314-04	D835V2	4d238	2021/01/22	2024/01/21
●	System Validation Dipole	SPEAG	HTWE0314-05	D1750V2	1164	2021/01/22	2024/01/21
●	System Validation Dipole	SPEAG	HTWE0314-06	D1900V2	5d226	2021/01/22	2024/01/21
●	System Validation Dipole	SPEAG	HTWE0314-07	D2450V2	1009	2021/01/25	2024/01/24
●	System Validation Dipole	SPEAG	HTWE0314-08	D2600V2	1150	2021/01/25	2024/01/24
●	System Validation Dipole	SPEAG	HTWE0314-09	D5GHzV2	1273	2021/01/26	2024/01/25
●	Signal Generator	R&S	HTWE0276	SMB100A	114360	2023/05/23	2024/05/22
●	Power Viewer for Windows	R&S		N/A	N/A	N/A	N/A
●	Power sensor	R&S	HTWE0278	NRP18A	101010	2023/05/23	2024/05/22
●	Power sensor	R&S	HTWE0389	NRP18A	101386	2023/03/29	2024/03/28
●	Power Amplifier	BONN	HTWE0336	BLWA 0160-2M	1811887	2022/11/10	2023/11/09
●	Dual Directional Coupler	Mini-Circuits	HTWE0335	ZHDC-10-62-S+	F975001814	2022/11/10	2023/11/09
●	Attenuator	Mini-Circuits	HTWE0333	VAT-3W2+	1819	2022/11/10	2023/11/09
●	Attenuator	Mini-Circuits	HTWE0334	VAT-10W2+	1741	2022/11/10	2023/11/09

Note:

1. *The Probe,Dipole and DAE calibration reference to the Appendix E and F.*
2. *Referring to KDB865664 D01, the dipole calibration interval can be extended to 3 years with justifcatio. The dipole are also not physically damaged or repaired during the interval.*

5. Measurement Uncertainty

Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg and the measured 10-g SAR within a frequency band is < 3.75 W/kg.
The expanded SAR measurement uncertainty must be ≤ 30%, for a confidence interval of k = 2. If these conditions are met, extensive SAR measurement uncertainty analysis described in IEEE Std 1528 is not required in SAR reports submitted for equipment approval.

Therefore, the measurement uncertainty is not required.

6. SAR Measurement System Configuration

6.1. SAR Measurement Set-up

The DASY5 system for performing compliance tests consists of the following items:

A standard high precision 6-axis robot (Stäubli RX family) with controller and software. An arm extension for accommodating the data acquisition electronics (DAE).

A dosimetric probe, i.e. an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.

A data acquisition electronic (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.

A unit to operate the optical surface detector which is connected to the EOC.

The Electro-Optical Coupler (EOC) performs the conversion from the optical into a digital electric signal of the DAE. The EOC is connected to the DASY5 measurement server.

The DASY5 measurement server, which performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation. A computer operating Windows 2003.

DASY5 software and SEMCAD data evaluation software.

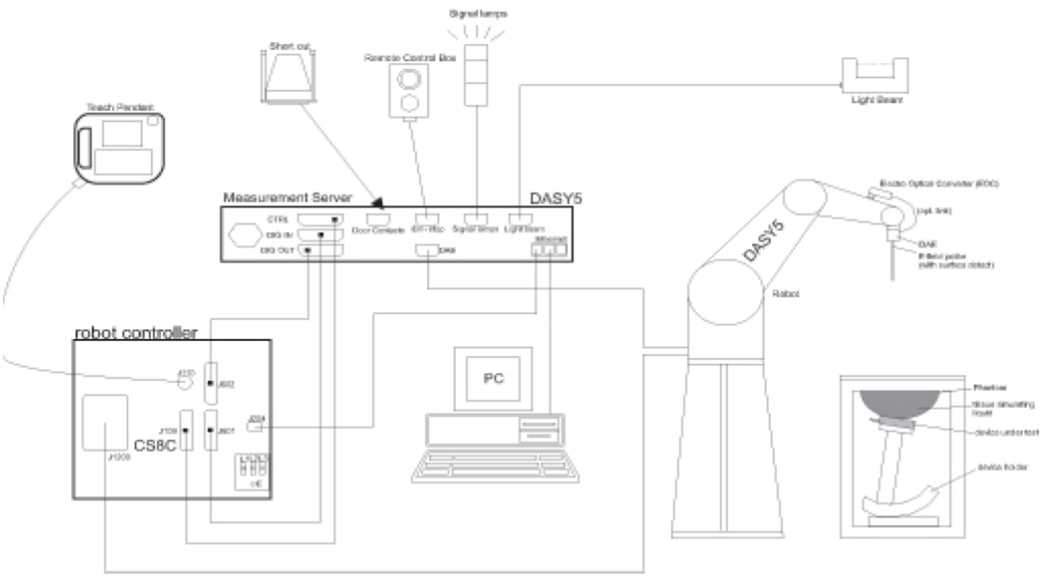
Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.

The generic twin phantom enabling the testing of left-hand and right-hand usage.

The device holder for handheld Mobile Phones.

Tissue simulating liquid mixed according to the given recipes.

System validation dipoles allowing to validate the proper functioning of the system.



6.2. DASY5 E-field Probe System

The SAR measurements were conducted with the dosimetric probe EX3DV4 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation.

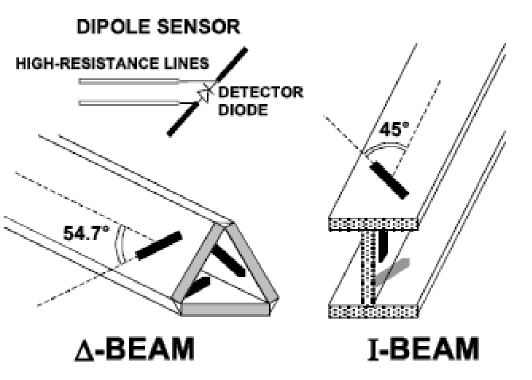
- **Probe Specification**

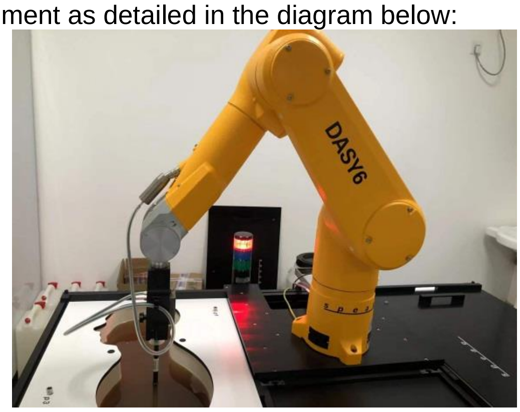
Construction	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available.
Frequency	4 MHz to 10 GHz; Linearity: ± 0.2 dB (30 MHz to 6 GHz)
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
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Distance from probe tip to dipole centers: 1.0 mm
Application	General dosimetry up to 6 GHz Dosimetry in strong gradient fields Compliance tests of Mobile Phones
Compatibility	DASY3, DASY4, DASY52 SAR and higher, EASY4/MRI

- **Isotropic E-Field Probe**

The isotropic E-Field probe has been fully calibrated and assessed for isotropicity, and boundary effect within a controlled environment. Depending on the frequency for which the probe is calibrated the method utilized for calibration will change.

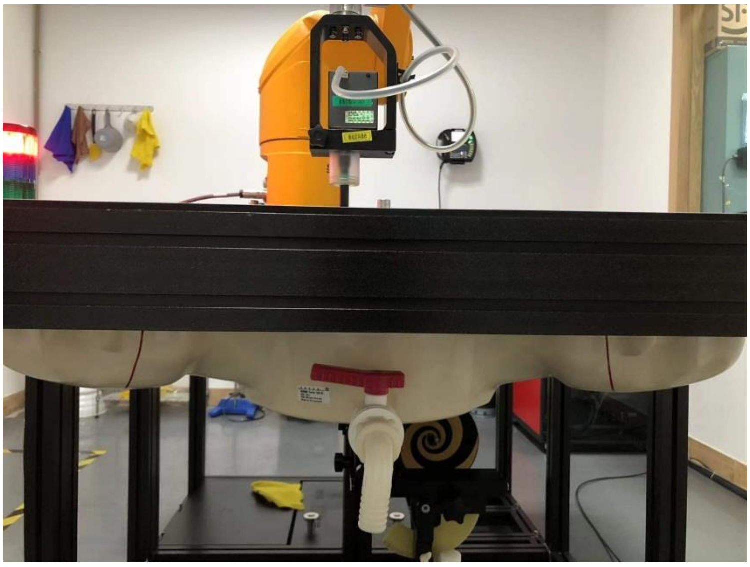
The E-Field probe utilizes a triangular sensor arrangement as detailed in the diagram below:





6.3. Phantoms

The phantom used for all tests i.e. for both system checks and device testing, was the twin-headed "SAM Phantom", manufactured by SPEAG. The SAM twin phantom is a fiberglass shell phantom with 2mm shell thickness (except the ear region, where shell thickness increases to 6mm).
System checking was performed using the flat section, whilst Head SAR tests used the left and right head profile sections. Body SAR testing also used the flat section between the head profiles.



SAM-Twin Phantom

6.4. Device Holder

The device was placed in the device holder (illustrated below) that is supplied by SPEAG as an integral part of the DASY system.
The DASY device holder is designed to cope with the different positions given in the standard. It has two scales for device rotation (with respect to the body axis) and device inclination (with respect to the line between the ear reference points). The rotation centers for both scales is the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.

Device holder supplied by SPEAG

7. SAR Test Procedure

7.1. Scanning Procedure

Step 1: 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. Measure the local SAR at a test point within 8 mm of the phantom inner surface that is closest to the DUT. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

Step 2: Area Scan

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 locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maximal found in the scanned area, within a range of the global maximum. The range (in dB) 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 Resolutions per FCC KDB Publication 865664 D01v04

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

Step 3: Zoom Scan

Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1g and 10g of simulated tissue. The Zoom Scan measures points (refer to table below) within a cube whose 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 g and 10 g and displays these values next to the job's label.

Zoom Scan Resolutions per FCC KDB Publication 865664 D01v04

<table>
<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">$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$ 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>

Step 4: Power drift measurement

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1. The SAR drift shall be kept within ± 5 %.

7.2. Data Storage and Evaluation

Data Storage

The DASY5 software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors),s together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension ".DA4". The 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 incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated.

The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [W/kg], [mW/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

Data Evaluation

The SEMCAD software 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:	Normi, ai0, ai1, ai2
	Conversion factor:	ConvFi
	Diode compression point:	Dcpi
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 DASY5 components. In the direct measuring mode of the multimeter 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:

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

Vi: compensated signal of channel (i = x, y, z)
Ui: input signal of channel (i = x, y, z)
cf: crest factor of exciting field (DASY parameter)
dcpi: diode compression point (DASY parameter)

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

$$\mathrm{E-fieldprobes:} \qquad E_i = \sqrt{\frac{V_i}{Norm_i \cdot ConvF}}$$

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

Vi: compensated signal of channel (i = x, y, z)
Normi: sensor sensitivity of channel (i = x, y, z), [mV/(V/m)2] for E-field Probes
ConvF: sensitivity enhancement in solution
aij: sensor sensitivity factors for H-field probes
f: carrier frequency [GHz]
Ei: electric field strength of channel i in V/m
Hi: magnetic field strength of channel i in A/m

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

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

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

$$SAR = E_{tot}^2 \cdot \frac{\sigma}{\rho \cdot 1'000}$$

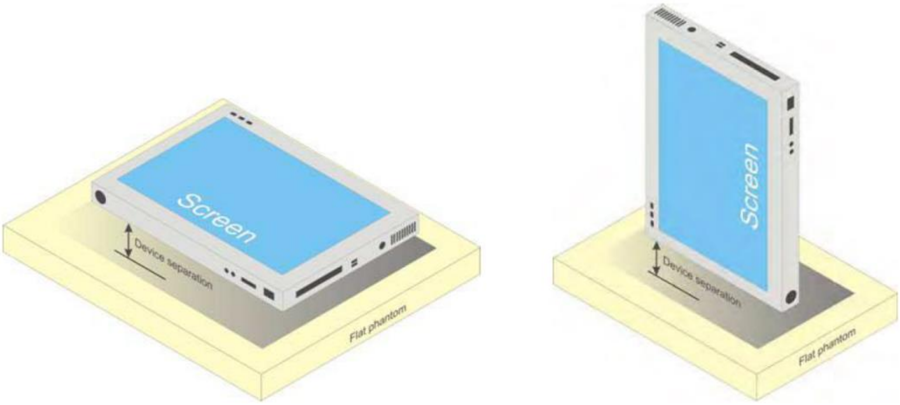
SAR: local specific absorption rate in W/kg
Etot: total field strength in V/m
σ: conductivity in [mho/m] or [Siemens/m]
ρ: equivalent tissue density in g/cm3

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid.

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

8.1. Body Position

Other devices that fall into this category include tablet type portable computers and credit card transaction authorisation terminals, point-of-sale and/or inventory terminals. Where these devices may be torso or limb-supported, the same principles for body-supported devices are applied.



b) Tablet form factor portable computer

9. Dielectric Property Measurements & System Check

9.1. Tissue Dielectric Parameters

The temperature of the tissue-equivalent medium used during measurement must also be within 18℃ to 25℃ and within ± 2℃ of the temperature when the tissue parameters are characterized.
The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements. The parameters should be re-measured after each 3-4 days of use; or earlier if the dielectric parameters can become out of tolerance; for example, when the parameters are marginal at the beginning of the measurement series.
The dielectric constant (ε_r) and conductivity (σ) of typical tissue-equivalent media recipes are expected to be within ± 5% of the required target values; but for SAR measurement systems that have implemented the SAR error compensation algorithms documented in IEEE Std 1528, to automatically compensate the measured SAR results for deviations between the measured and required tissue dielectric parameters, the tolerance for ε_r and σ may be relaxed to ± 10%. This is limited to frequencies ≤ 3 GHz.

Tissue Dielectric Parameters
FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

Tissue dielectric parameters		
Target Frequency (MHz)	ε_r	σ(S/m)
835	41.5	0.90
2450	39.2	1.80
5200	36.0	4.66
5800	35.3	5.27

Measurement Results:

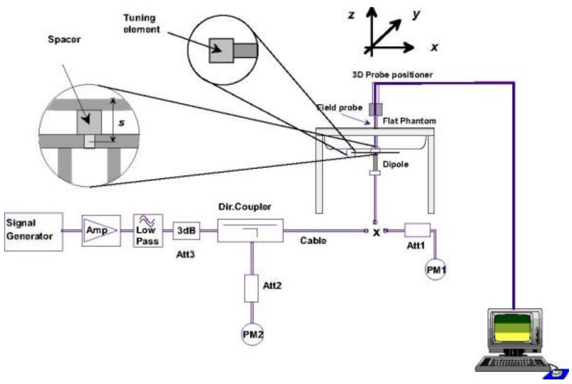
Dielectric performance of tissue simulating liquid									
Frequency (MHz)	ε_r		σ(S/m)		Delta (ε_r)	Delta (σ)	Limit	Temp (℃)	Date
	Target	Measured	Target	Measured					
835	41.50	40.12	0.900	0.894	-3.33%	-0.72%	±5%	22.2	2023/6/8
2450	39.20	37.48	1.800	1.775	-4.39%	-1.39%	±5%	22.2	2023/6/9
5250	35.93	34.58	4.706	4.480	-3.76%	-4.80%	±5%	22.2	2023/6/12
5750	35.36	33.82	5.219	4.995	-4.36%	-4.29%	±5%	22.2	2023/6/12

9.2. System Check

SAR system verification is required to confirm measurement accuracy, according to the tissue dielectric media, probe calibration points and other system operating parameters required for measuring the SAR of a test device. The system verification must be performed for each frequency band and within the valid range of each probe calibration point required for testing the device. The same SAR probe(s) and tissue-equivalent media combinations used with each specific SAR system for system verification must be used for device testing. When multiple probe calibration points are required to cover substantially large transmission bands, independent system verifications are required for each probe calibration point. A system verification must be performed before each series of SAR measurements using the same probe calibration point and tissue-equivalent medium. Additional system verification should be considered according to the conditions of the tissue-equivalent medium and measured tissue dielectric parameters, typically every three to four days when the liquid parameters are re-measured or sooner when marginal liquid parameters are used at the beginning of a series of measurements.

System Performance Check Measurement Conditions:

- The measurements were performed in the flat section of the TWIN SAM or ELI phantom, shell thickness: 2.0±0.2 mm (bottom plate) filled with Body or Head simulating liquid of the following parameters.
- The depth of tissue-equivalent liquid in a phantom must be ≥ 15.0 cm for SAR measurements ≤ 3 GHz and ≥10.0 cm for measurements > 3 GHz.
- The DASY system with an E-Field Probe was used for the measurements.
- The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10 mm (above 1 GHz) and 15 mm (below 1 GHz) from dipole center to the simulating liquid surface.
- The coarse grid with a grid spacing of 15 mm was aligned with the dipole.
  For 5 GHz band - The coarse grid with a grid spacing of 10 mm was aligned with the dipole.
- Special 7x7x7 (below 3 GHz) and/or 8x8x7 (above 3 GHz) fine cube was chosen for the cube.
- The results are normalized to 1 W input power.



System Performance Check Setup

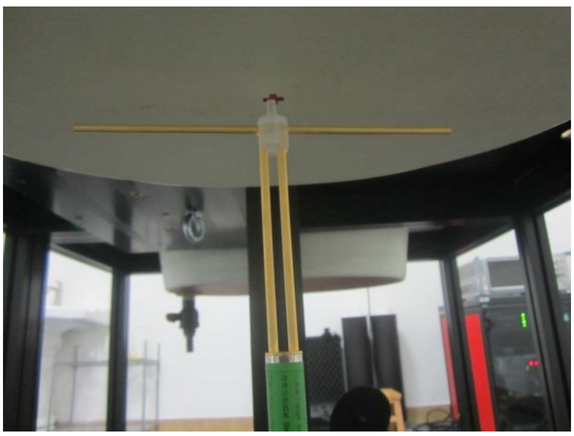


Photo of Dipole Setup

Measurement Results:

System Check Result											
Frequency (MHz)	1g SAR			10g SAR			Delta (1g)	Delta (10g)	Limit	Temp (C°)	Date
	Target 1W	Normalize to 1W	Measured 250mW	Target 1W	Normalize to 1W	Measured 250mW					
835	9.39	9.76	2.44	6.14	6.28	1.57	3.94%	2.28%	±10%	22.4	2023/6/8
2450	52.00	49.20	12.30	23.90	22.76	5.69	-5.38%	-4.77%	±10%	22.4	2023/6/9
Frequency (MHz)	1g SAR			10g SAR			Delta (1g)	Delta (10g)	Limit	Temp (C°)	Date
	Target 1W	Normalize to 1W	Measured 100mW	Target 1W	Normalize to 1W	Measured 100mW					
5250	78.20	79.20	7.92	22.30	22.60	2.26	1.28%	1.35%	±10%	22.4	2023/6/12
5750	79.30	84.90	8.49	22.50	24.10	2.41	7.06%	7.11%	±10%	22.4	2023/6/12

Note:
The 1-g and 10-g SAR measured with a reference dipole, using the required tissue-equivalent medium at the test frequency, must be within ±10% of the manufacturer calibrated dipole SAR target.

Plots of System Performance Check

SystemPerformanceCheck-Head 835MHz

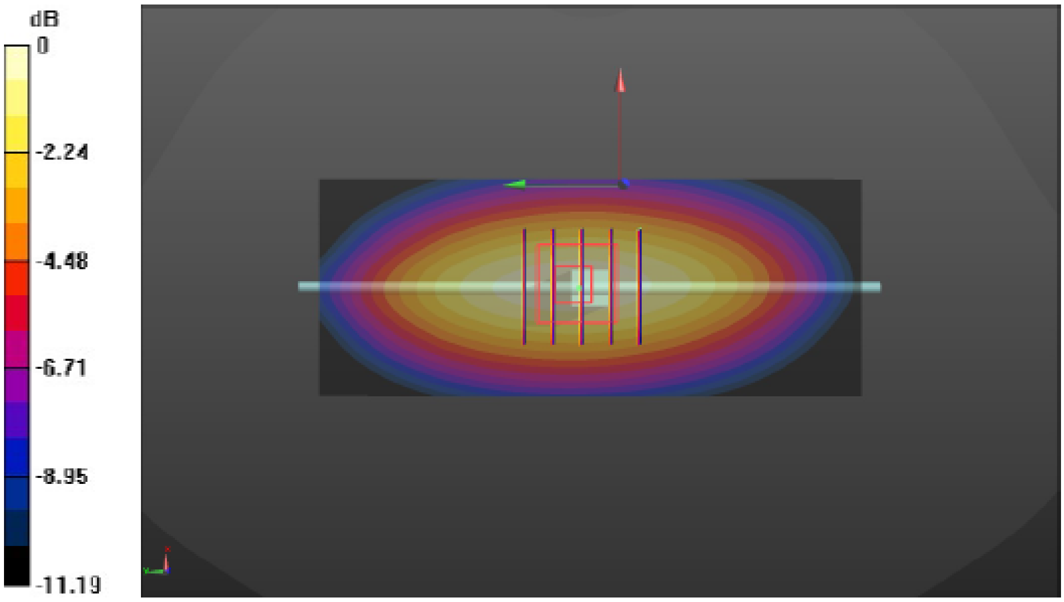
Communication System: UID 0, CW (0); Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.894 S/m; ε_r = 40.123; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature:22.4℃;Liquid Temperature:22.2℃;

DASY Configuration:

- Probe: EX3DV4 - SN7494; ConvF(10.4, 10.4, 10.4); Calibrated: 4/17/2023;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1549; Calibrated: 3/27/2023
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Head/d=15mm, Pin=250mW/Area Scan (41x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 3.40 W/kg

Head/d=15mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 63.28 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 3.97 W/kg
SAR(1 g) = 2.44 W/kg; SAR(10 g) = 1.57 W/kg
Maximum value of SAR (measured) = 3.40 W/kg



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

SystemPerformanceCheck-Head 2450MHz

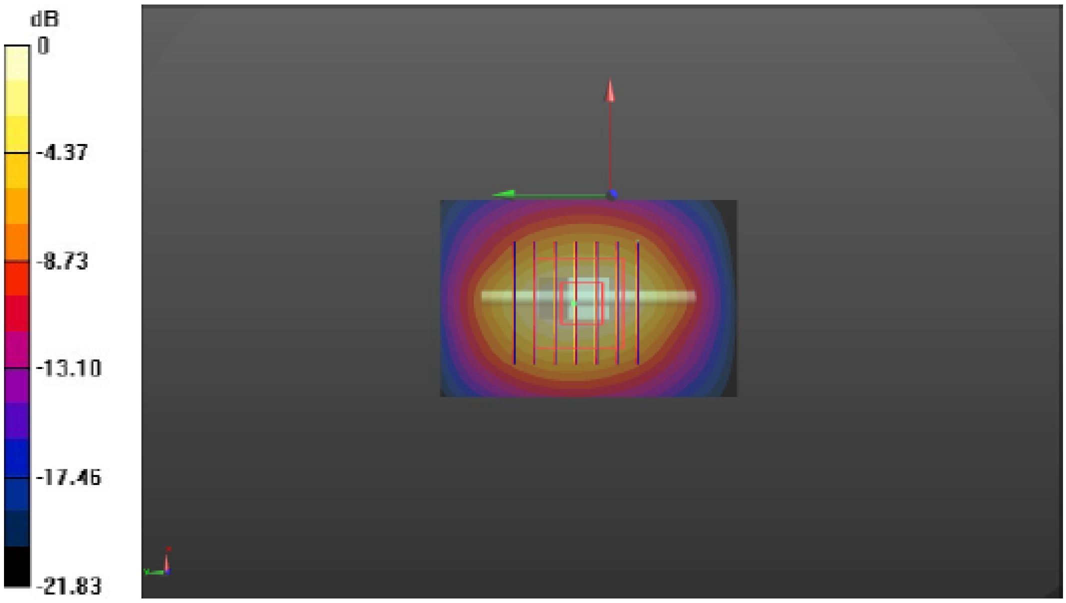
Communication System: UID 0, CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2450 MHz; σ = 1.775 S/m; ε_r = 37.484; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature:22.4℃;Liquid Temperature:22.2℃;

DASY Configuration:

- Probe: EX3DV4 - SN7494; ConvF(8.01, 8.01, 8.01); Calibrated: 4/17/2023;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1549; Calibrated: 3/27/2023
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Head/d=10mm,Pin=250mW/Area Scan (41x61x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 18.0 W/kg

Head/d=10mm,Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 103.3 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 21.7 W/kg
SAR(1 g) = 12.3 W/kg; SAR(10 g) = 5.69 W/kg
Maximum value of SAR (measured) = 17.6 W/kg



0 dB = 17.6 W/kg = 12.46 dBW/kg

SystemPerformanceCheck-Head 5250MHz

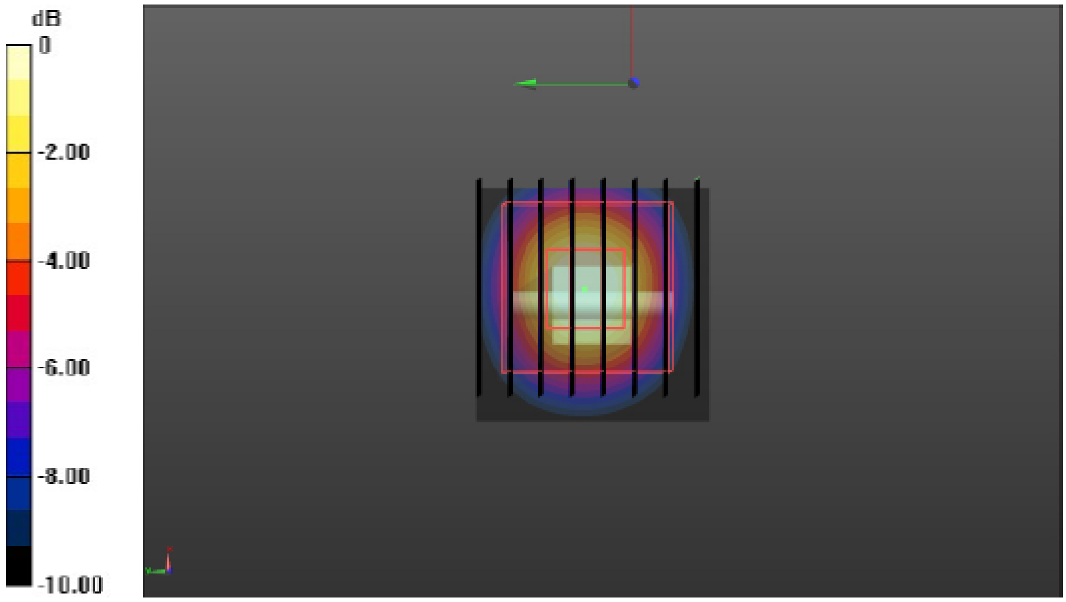
Communication System: UID 0, Generic WIFI (0); Frequency: 5250 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5250 MHz; σ = 4.48 S/m; ε_r = 34.58; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature:22.4℃;Liquid Temperature:22.2℃;

DASY Configuration:

- Probe: EX3DV4 - SN7494; ConvF(5.67, 5.67, 5.67); Calibrated: 4/17/2023;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1549; Calibrated: 3/27/2023
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Head/d=10mm,pin=100mW/Area Scan (31x31x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 21.1 W/kg

Head/d=10mm,pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 71.95 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 33.0 W/kg
SAR(1 g) = 7.92 W/kg; SAR(10 g) = 2.26 W/kg
Maximum value of SAR (measured) = 18.7 W/kg



0 dB = 18.7 W/kg = 12.72 dBW/kg

SystemPerformanceCheck-Head 5750MHz

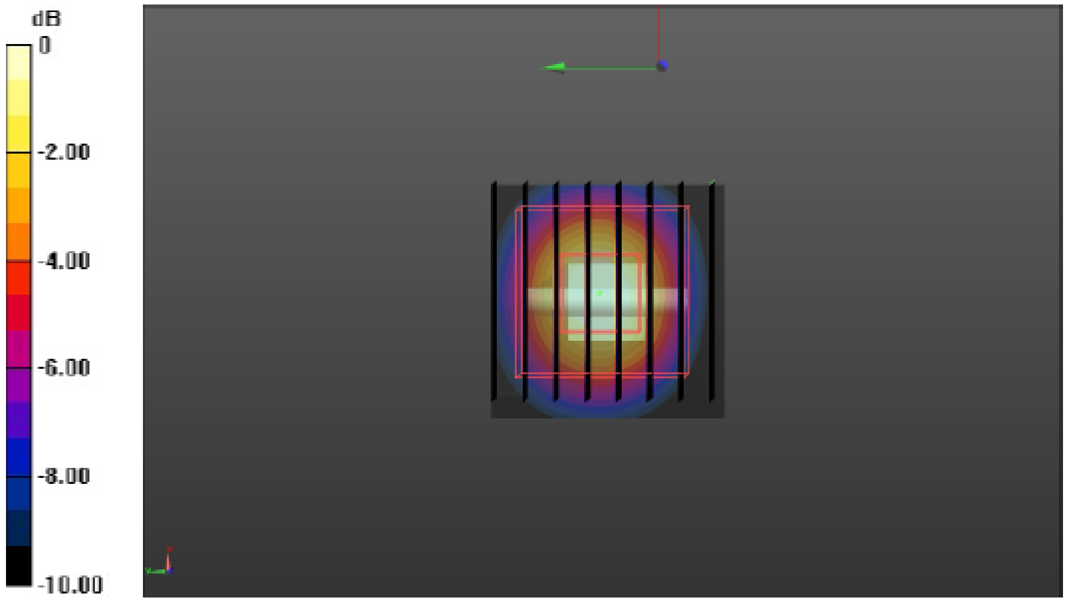
Communication System: UID 0, Generic WIFI (0); Frequency: 5750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5750 MHz; σ = 4.995 S/m; ε_r = 33.818; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature:22.4℃;Liquid Temperature:22.2℃;

DASY Configuration:

- Probe: EX3DV4 - SN7494; ConvF(5.14, 5.14, 5.14); Calibrated: 4/17/2023;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1549; Calibrated: 3/27/2023
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Head/d=10mm Pin=100mW,f=5750Mhz/Area Scan (31x31x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 23.2 W/kg

Head/d=10mm Pin=100mW,f=5750Mhz/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 72.92 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 39.8 W/kg
SAR(1 g) = 8.49 W/kg; SAR(10 g) = 2.41 W/kg
Maximum value of SAR (measured) = 20.7 W/kg



0 dB = 20.7 W/kg = 13.16 dBW/kg

10. SAR Exposure Limits

SAR assessments have been made in line with the requirements of FCC 47 CFR § 2.1093.

Type Exposure	Limit (W/kg)	
	General Population/ Uncontrolled Exposure Environment	Occupational/ Controlled Exposure Environment
Spatial Average SAR (whole body)	0.08	0.4
Spatial Peak SAR (1g cube tissue for head and trunk)	1.6	8.0
Spatial Peak SAR (10g for limb)	4.0	20.0

Note:

1. *Population/Uncontrolled Environments: are defined as locations where there is the exposure of individual who have no knowledge or control of their exposure.*
2. *Occupational/Controlled Environments: are defined as locations where there is exposure that may be incurred by people who are aware of the potential for exposure (i.e. as a result of employment or occupation).*

11. Conducted Power Measurement Results and Tune-up

Please refer to Appendix Report

Note:

GSM

1. *Per KDB 447498 D04, the maximum output power channel is used for SAR testing and further SAR test reduction.*
2. *Per KDB 941225 D01, considering the possibility of e.g. 3rd party VoIP operation for Head and Body-worn SAR test reduction for GSM and GPRS modes is determined by the source-base time-averaged output power including tune-up tolerance. The mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested.*
3. *Per KDB941225 D01, for hotspot SAR test reduction for GPRS modes is determined by the source-based time-averaged output power including tune-up tolerance, For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested.*

WCDMA

1. *The following tests were conducted according to the test requirements outlines in 3GPP TS34.121 specification.*
2. *The procedures in KDB 941225 D01 are applied for 3GPP Rel. 6 HSPA to configure the device in the required sub-test mode to determine SAR test exclusion*

A summary of thest setting are illustrated belowe:

HSDPA Setup Configureation:

a) *The EUT was connected to base station RS CMU200 referred to the setup configuration*
b) *The RF path losses were compensated into the measurements*
c) *A call was established between EUT and base station with following setting:*
   i. *Set Gain Factors (βc and βd) and parameters were set according to each specific sub-test in the following table, C10.1.4, Quoted from the TS 34.121*
   ii. *Set RMC 12.2Kbps + HSDPA mode*
   iii. *Set Cell Power=-86dBm*
   iv. *Set HS-DSCH Configuration Type to FRC (H-set 1, QPSK)*
   v. *Select HSDPA uplink parameters*
   vi. *Set Delta ACK, Delta NACK and Delta CQI=8*
   vii. *Set Ack-Nack repetition Factor to 3*
   viii. *Set CQI Feedback Cycle (K) to 4ms*
   ix. *Set CQI repetition factor to 2*
   x. *Power ctrl mode= all up bits*
d) *The transmitter maximum output power waw 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 Configureation:

a) The EUT was connected to base station RS CMU200 referred to the setup configuration
b) The RF path losses were compensated into the measurements
c) A call was established between EUT and base station with following setting:
i. Call configs = 5.2b, 5.9b, 5.10b, and 5.13.2B with QPSK
ii. Set Gain Factors (βc and βd) 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=-86dBm
iv. Set channel type= 12.2Kbps + HSPA mode
v. Set UE Target power
vi. Set Ctrl mode=Alternating bits
vii. Set and observe the E-TFCI
viii. Confirm that E-TFCI is equal the target E-TFCI of 75 for Sub-test 1, and other subtest's E-TFCI
d) The transmitter maximum output power waw 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 β_{hs} = 30/15 * β_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.

LTE

General:

1. *CMW500 base station simulator was used to setup the connection with EUT; the frequency band, channel,bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUTtransmitting at maximum power and at different configurations which are requested to be reported to FCC, forconducted power measurement and SAR testing.*
2. *Per KDB 941225 D05v02r03, when a properly configured base station simulator is used for the SAR and powermeasurements, spectrum plots for each RB allocation and offset configuration is not required.*
3. *Per KDB 941225 D05v02r03, start with the largest channel bandwidth and measure SAR for QPSK with 1 RBallocation, using the RB offset and required test channel combination with the highest maximum output power for RBoffsets at the upper edge, middle and lower edge of each required test channel.*
4. *Per KDB 941225 D05v02r03, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.*

LTE (TDD) Considerations

1. *According to KDB 941225 D05 SAR for LTE Devices, for Time-Division Duplex (TDD) systems, SAR must be tested using a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by the defined 3GPP LTE TDD configurations.*

2. *SAR was tested with the highest transmission duty factor (63.33%) using Uplink-downlink configuration 0 and Special subframe configuration 7.*

3. *LTE TDD Bands support 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplinkdownlink configurations and Table 4.2-1 for Special subframe configurations.*

Table 4.2-1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS)

Special subframe configuration	Normal cyclic prefix in downlink			Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	$6592 \cdot T_s$	$(1+X) \cdot 2192 \cdot T_s$	$(1+X) \cdot 2560 \cdot T_s$	$7680 \cdot T_s$	$(1+X) \cdot 2192 \cdot T_s$	$(1+X) \cdot 2560 \cdot T_s$
1	$19760 \cdot T_s$			$20480 \cdot T_s$		
2	$21952 \cdot T_s$			$23040 \cdot T_s$		
3	$24144 \cdot T_s$			$25600 \cdot T_s$		
4	$26336 \cdot T_s$			$7680 \cdot T_s$	$(2+X) \cdot 2192 \cdot T_s$	$(2+X) \cdot 2560 \cdot T_s$
5	$6592 \cdot T_s$	$(2+X) \cdot 2192 \cdot T_s$	$(2+X) \cdot 2560 \cdot T_s$	$20480 \cdot T_s$		
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$		
8	$24144 \cdot T_s$			-	-	-
9	$13168 \cdot T_s$			-	-	-
10	$13168 \cdot T_s$	$13152 \cdot T_s$	$12800 \cdot T_s$	-	-	-

Table 4.2-2: Uplink-downlink configurations

Uplink-downlink configuration	Downlink-to-Uplink Switch-point periodicity	Subframe number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U	U	D	S	U	U	D

Calculated Duty Cycle = Extended cyclic prefix in uplink x (Ts) x # of S + # of U

<u>Example for Calculated Duty Cycle for Uplink-Downlink Configuration 0:</u>
Calculated Duty Cycle = 5120 x [1/(15000 x 2048)] x 2 + 6 ms = 63.33%
where
Ts = 1/(15000 x 2048) seconds

This device supports uplink-downlink configurations 0-6. The configuration with highest duty cycle was used-configuration 0 at 63.3% duty cycle.

Wi-Fi

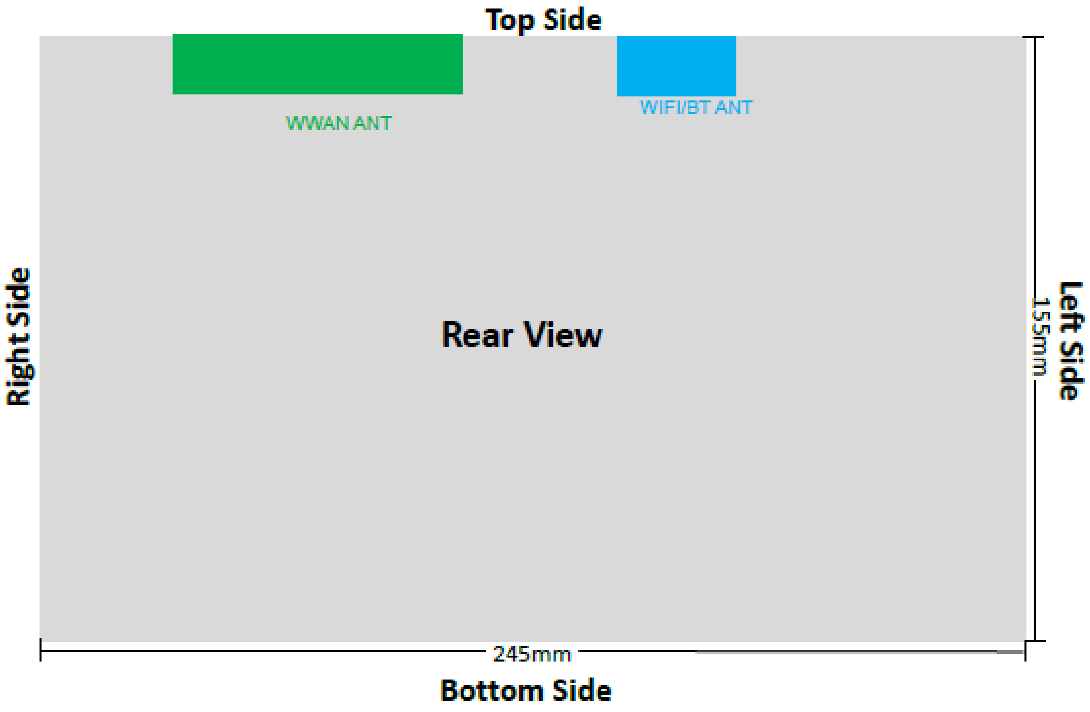
For 2.4GHz Wi-Fi SAR testing, highest average RF output power channel for the lowest data rate for 802.11b were for SAR evaluation.

The maximum output power specified for production units are determined for all applicable 802.11 transmission modes in each standalone and aggregated frequency band. Maximum output power is measured for the highest maximum output power configuration(s) in each frequency band according to the default power measurement procedures.

SAR testing is not required for OFDM mode(s) when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

12. RF Exposure Conditions (Test Configurations)

12.1. Antenna Location



12.2. Standalone SAR test exclusion considerations

KDB 447498 D04:

$$P_{th}\ (\mathrm{mW}) = ERP_{20\ cm}\ (\mathrm{mW}) = \begin{cases} 2040f & 0.3\ \mathrm{GHz} \le f < 1.5\ \mathrm{GHz} \\ 3060 & 1.5\ \mathrm{GHz} \le f \le 6\ \mathrm{GHz} \end{cases} \quad (B.1)$$

$$P_{th}\ (\mathrm{mW}) = \begin{cases} ERP_{20\ cm}(d/20\ \mathrm{cm})^{x} & d \le 20\ \mathrm{cm} \\ ERP_{20\ cm} & 20\ \mathrm{cm} < d \le 40\ \mathrm{cm} \end{cases} \quad (B.2)$$

where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\ cm}\sqrt{f}}\right)$$

a) For test separation distances ≤20cm, the 1-g SAR test exclusion thresholds are determined by the following :

1)2040*Freq*(test separation distance/200)^(-Log(60/(2040*Freq*(Freq^0.5)))) mW, for 0.3GHz to 1.5GHz

3060*(test separation distance/200)^(-Log(60/(3060*(Freq^0.5)))) mW, for 1.5GHz to 6GHz

b) For test separation distances >20cm and ≤40cm, the 1-g SAR test exclusion thresholds are determined by the following :

1)2040*Freq mW,for 0.3GHz to 1.5GHz

2)3060 mW,for 1.5GHz to 6GHz

Band	Burst Average Power (dBm)	Division Factors	Frame-Average Power (dBm)
GPRS850(2Tx slots)	30.50	-6.02	24.48

Tx Interface	Frequency (GHz)	Output Power		separation distances (mm)					Calculated Threshold Value(mW)				
		dBm	mW	Rear	Left	Right	Top	Bottom	Rear	Left	Right	Top	Bottom
GSM 850	0.8366	24.48	280.54	5	140	45	5	145	9.2 Measured	1030.2 Exempt	206.7 Measured	9.2 Measured	1082.7 Exempt
WCDMA Band V	0.8466	23.00	199.53	5	140	45	5	145	9.1 Measured	1039.6 Exempt	206.8 Exempt	9.1 Measured	1092.9 Exempt
LTE Band 5	0.8440	23.50	223.87	5	140	45	5	145	9.1 Measured	1037.2 Exempt	206.7 Measured	9.1 Measured	1090.2 Exempt
WIFI 2.4G	2.4370	16.00	39.81	5	70	155	5	145	2.8 Measured	415.9 Exempt	1884.9 Exempt	2.8 Measured	1660.4 Exempt
WIFI 5G U-NII-1	5.1800	20.00	100.00	5	70	155	5	145	1.5 Measured	350.2 Exempt	1807.8 Exemp	1.5 Measured	1575.3 Exempt
WIFI 5G U-NII-3	5.7850	19.00	79.43	5	70	155	5	145	1.4 Measured	341.5 Exempt	1796.8 Exemp	1.4 Measured	1563.2 Exempt
BT	2.4020	8.00	6.31	5	70	155	5	145	2.8 Measured	417.3 Exempt	1886.4 Exempt	2.8 Measured	1662.1 Exempt

12.3. Required Test Configurations

The table below identifies the standalone test configurations required for this device according to the findings in Section 13:

Test Configurations	Rear	Left	Right	Top	Bottom
GSM 850	Yes	No	Yes	Yes	No
WCDMA Band V	Yes	No	No	Yes	No
LTE B5	Yes	No	Yes	Yes	No
WIFI 2.4G	Yes	No	No	Yes	No
WIFI 5G U-NII-1	Yes	No	No	Yes	No
WIFI 5G U-NII-3	Yes	No	No	Yes	No
Bluetooth	Yes	No	No	Yes	No

13. Measured and Reported SAR Results

Measurement Results:
Please refer to Appendix Report

Measurement data plots:
Please refer to Appendix D

Note:
SAR Test Reduction criteria are as follows:
- *Reported SAR(W/kg) for WWAN = Measured SAR *Tune-up Scaling Factor*
- *Reported SAR(W/kg) for Wi-Fi and Bluetooth = Measured SAR * Tune-up scaling factor * Duty Cycle scaling factor*
- *Duty Cycle scaling factor = 1 / Duty cycle (%)*

KDB 447498 D04 Interim General RF Exposure Guidance v01:
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*

KDB 616217 D04 SAR for laptop and tablets v01r02:
Some 2-in-1 tablets may operate with the display folded on top of the keyboard. Most recent tablets are designed with an interactive display that may not require a physical keyboard. Both configurations are used in similar manners and require SAR evaluation for the back surface and edges of the tablet. For keyboards that can be unfolded like a laptop, the procedures for laptop platform should also be applied. When the tablet keyboard can be detached from the display screen and also contains a wireless transmitter, SAR testing for the keyboard alone may be required. 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). When voice mode is supported on a tablet and it is limited to speaker mode or headset operations only, additional SAR testing for this type of voice use is not required. For other voice mode operations, including phablet configurations and next to the ear use, when it is unclear a KDB inquiry should be submitted to determine SAR test requirements.

Both the back surface and edges of tablets can operate directly next to users; hence, higher SAR is generally expected and the modular approach may only be possible for the lower power transmitters incorporated in tablets. When higher output power transmitters are incorporated in tablets and the SAR of the modular transmitter in the required tablet test configurations is > 1.2 W/kg but ≤1.4 W/kg, where only a few of the SAR results are in this range, a KDB inquiry is required to determine if the test results are sufficiently conservative to ensure compliance without requiring further dedicated host approval requirements. When the SAR is > 1.4 W/kg, approval in a dedicated host is required. While all transmitters may be addressed in a single FCC ID for approval using the dedicated host approach, the mixed approach can generally be applied to incorporate lower power transmitters in tablets.

When the modular approach is used, transmitters and modules must be initially tested for standalone operations in generic host conditions according to the following minimum test separation distance and antenna installation requirements for incorporation in the tablet platform.
a) ≤5 mm between the antenna and user for both back surface and edge exposure conditions
b) the antennas used by the host must have been tested for equipment approval or qualify for SAR test exclusion
c) the antenna polarization, physical orientation, rotation and installation configurations used by the host must have been tested for compliance or qualify for test exclusion

d) when the SAR Test Exclusion Threshold in KDB Publication 447498 D01 applies, a test separation distance of 5 mm is required to determine test exclusion for the tablet platform

The antennas embedded in tablets are typically ≤5mm from the outer housing. The required antenna to user test separation distance is a "not to exceed test" distance required to apply the modular approach. Instead of the typical zero gap tablet edge test requirement between the edge of a tablet and the user, when an antenna has been tested at ≤5 mm according to the modular approach it can be incorporated into tablets with at least twice the tested distance from the outer housing of the tablet edge; otherwise, the tablet edge zero gap test requirement applies. When the dedicated host approach is applied, the back surface and edges of the tablet should be tested for SAR compliance with the tablet touching the phantom. The SAR Test Exclusion Threshold in KDB Publication 447498 D01 can be applied to 616217 D04 SAR for laptop and tablets v01r02 determine SAR test exclusion for adjacent edge configurations.The closest distance from the antenna to an adjacent tablet edge is used to determine if SAR testing is required for the adjacent edges, with the adjacent edge positioned against the phantom and the edge containing the antenna positioned perpendicular to the phantom.
For tablets with a curved or contoured back surface or edge construction, if the antenna location can be positioned against the user during normal use and the additional separation introduced by the contour against a flat phantom is > 5 mm or when the reported SAR is > 1.2 W/kg, a KDB inquiry is required to determine the applicable tablet test setup requirements.20 When proximity or other sensors are incorporated on the back surface or edges of a tablet, near the curved or contoured regions, additional considerations are required besides the sensor triggering and coverage procedures provided in this document. A KDB inquiry is recommended to ensure the proper tablet test setups are used. In both cases the KDB inquiry must clearly describe the device shape and its operational configurations.

KDB 941225 D01 SAR test for 3G SAR Test Reduction Procedure:
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.

GSM Guidance
SAR test reduction for GPRS and EDGE modes is determined by the source-based time-averaged output power specified for production units, including tune-up tolerance. The data mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested. Please refer to section 9. for GSM power verification.
SAR is not required for EDGE (8PSK) mode because the maximum output power and tune-up limit is ≤ 1/4dB higher than GPRS/EDGE (GMSK) or the adjusted SAR of the highest reported SAR of GPRS/EDGE (GMSK) is ≤ 1.2W/kg.

W-CDMA Guidance
SAR for next to the ear head exposure is measured using a 12.2 kbps RMC with TPC bits configured to all "1's". The 3G SAR test reduction procedure is applied to AMR configurations with 12.2 kbps RMC (Head) and other spreading codes and multiple DPDCHn configurations supported by the handset with 12.2 kbps RMC (Body-Worn Accessory) as the primary mode.
Per KDB 941225 D01 RMC12.2Kbps setting is used to evaluate SAR. If the maximum output power and Tune-up tolerance specified for production units in HSDPA/HSUPA is ≦1/4dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio fo specified maximum output power and tune-up tolerance of HSDPA / HSUPA to RMC 12.2Kbps and the adjusted SAR is ≦1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA.

KDB 941225 D05 SAR for LTE Devices:
SAR test reduction is applied using the following criteria:
- *Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB, and 50% RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel.*
- *When the reported SAR is > 0.8 W/kg, testing for other Channels is performed at the highest output power level for 1RB, and 50% RB configuration for that channel.*
- *Testing for 100% RB configuration is performed at the highest output power level for 100% RB configuration across the Low, Mid and High Channel when the highest reported SAR for 1 RB and 50% RB are > 0.8 W/kg. Testing for the remaining required channels is not needed because the reported SAR*

for 100% RB Allocation < 1.45 W/kg.

- *Testing for 16-QAM and 64-QAM modulation is not required because the reported SAR for QPSK is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of QPSK.*
- *Testing for the other channel bandwidths is not required because the reported SAR for the highest channel bandwidth is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of the highest channel bandwidth.*

TDD LTE reqirement:

For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9%) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix 63.3%/62.9% = 1.006 is applied to scale-up the measured SAR result.The Reported TDD LTE SAR = measured SAR (W/kg) Tune-up Scaling Factor* scaling factor for extended cyclic prefix.*

KDB 248227 D01 SAR meas for 802.11:

When 802.11 frame gaps are accounted for in the transmission, a maximum transmission duty factor of 92 - 96% is typically achievable in most test mode configurations. A minimum transmission duty factor of 85% is required to avoid certain hardware and device implementation issues related to wide range SAR scaling. The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

SAR test reduction for 802.11 Wi-Fi transmission mode configurations are considered separately for DSSS and OFDM. An initial test position is determined to reduce the number of tests required for certain exposure configurations with multiple test positions. An initial test configuration is determined for each frequency band and aggregated band according to maximum output power, channel bandwidth, wireless mode configurations and other operating parameters to streamline the measurement requirements. For 2.4 GHz DSSS, either the initial test position or DSSS procedure is applied to reduce the number of SAR tests; these are mutually exclusive. For OFDM, an initial test position is only applicable to next to the ear, UMPC mini-tablet and hotspot mode configurations, which is tested using the initial test configuration to facilitate test reduction. For other exposure conditions with a fixed test position, SAR test reduction is determined using only the initial test configuration.

The multiple test positions require SAR measurements in head, hotspot mode or UMPC mini-tablet configurations may be reduced according to the highest reported SAR determined using the initial test position(s) by applying the DSSS or OFDM SAR measurement procedures in the required wireless mode test configuration(s). The initial test position(s) is measured using the highest measured maximum output power channel in the required wireless mode test configuration(s). When the reported SAR for the initial test position is:

- *≤ 0.4 W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and wireless mode combination within the frequency band or aggregated band. DSSS and OFDM configurations are considered separately according to the required SAR procedures.*
- *> 0.4 W/kg, SAR is repeated using the same wireless mode test configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg or all required test positions are tested.*
  - *For subsequent test positions with equivalent test separation distance or when exposure is dominated by coupling conditions, the position for maximum coupling condition should be tested.*
  - *When it is unclear, all equivalent conditions must be tested.*
- *For all positions/configurations tested using the initial test position and subsequent test positions,when the reported SAR is > 0.8 W/kg, measure the SAR for these positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required test channels are considered.*
  - *The additional power measurements required for this step should be limited to those necessary for identifying subsequent highest output power channels to apply the test reduction.*
- *When the specified maximum output power is the same for both UNII 1 and UNII 2A, begin SAR measurements in UNII 2A with the channel with the highest measured output power. If the reported SAR for UNII 2A is ≤ 1.2 W/kg, SAR is not required for UNII 1; otherwise treat the remaining bands separately and test them independently for SAR.*
- *When the specified maximum output power is different between UNII 1 and UNII 2A, begin SAR with the band that has the higher specified maximum output. If the highest reported SAR for the band with the highest specified power is ≤ 1.2 W/kg, testing for the band with the lower specified output power is not required; otherwise test the remaining bands independently for SAR.*

To determine the initial test position, Area Scans were performed to determine the position with the Maximum Value of SAR (measured). The position that produced the highest Maximum Value of SAR is considered the worst case position; thus used as the initial test position.

14. SAR Measurement Variability

In accordance with published RF Exposure KDB 865664 D01 SAR measurement 100 MHz to 6 GHz. These additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

1) Repeated measurement is not required when the original highest measured SAR is <0.8 or 2 W/kg (1-g or 10-g respectively); steps 2) through 4) do not apply.
2) When the original highest measured SAR is ≥ 0.8 or 2 W/kg (1-g or 10-g respectively), repeat that measurement once.
3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 or 3.6 W/kg (~ 10% from the 1-g or 10-g respective SAR limit).
4) Perform a third repeated measurement only if the original, first, or second repeated measurement is ≥ 1.5 or 3.75 W/kg (1-g or 10-g respectively) and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

Band	Test Position	Frequency		Highest Measured SAR (W/kg)	First Repeated		Second Repeated	
		CH	MHz		Measured SAR(W/kg)	Largest to Smallest SAR Ratio	Measured SAR(W/kg)	Largest to Smallest SAR Ratio
GSM 850	Rear	190	836.6	0.816	0.811	1.006	N/A	N/A
WCDMA Band V	Rear	4233	846.6	0.838	0.834	1.005	N/A	N/A

15. Simultaneous Transmission analysis

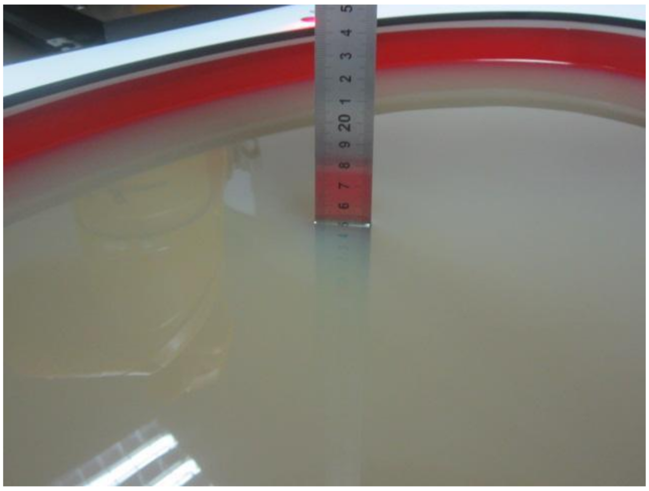
No.	Simultaneous Transmission Configurations	Body	Note
1	GSM(voice) + Bluetooth (data)	Yes	
2	GSM(voice) + WLAN (data)	Yes	
3	WCDMA(voice) + Bluetooth (data)	Yes	
4	WCDMA(voice) + WLAN (data)	Yes	
5	GPRS (data) + Bluetooth (data)	Yes	
6	GPRS (data) + WLAN (data)	Yes	
7	WCDMA (data) + Bluetooth (data)	Yes	
8	WCDMA (data) + WLAN (data)	Yes	
9	LTE + Bluetooth (data)	Yes	
10	LTE + WLAN (data)	Yes	

General note:
1. WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.
2. EUT will choose either GSM or WCDMA LTE according to the network signal condition; therefore, they will not operate simultaneously at any moment.
3. The reported SAR summation is calculated based on the same configuration and test position

Simultaneous Transmission data:

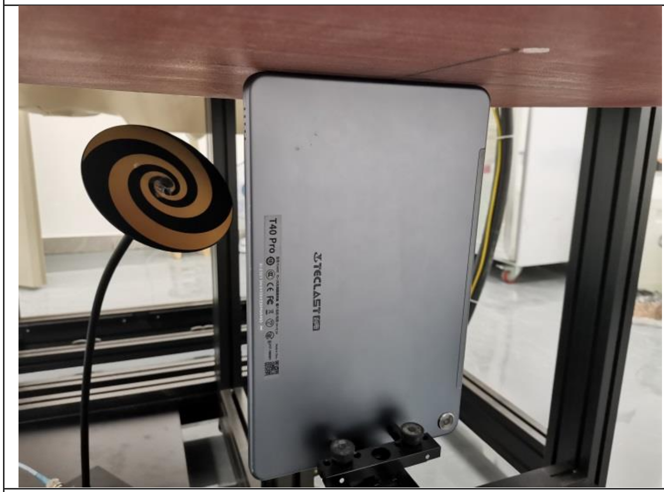
Please refer to Appendix Report

16. Test Setup Photos



Liquid depth in the Body phantom

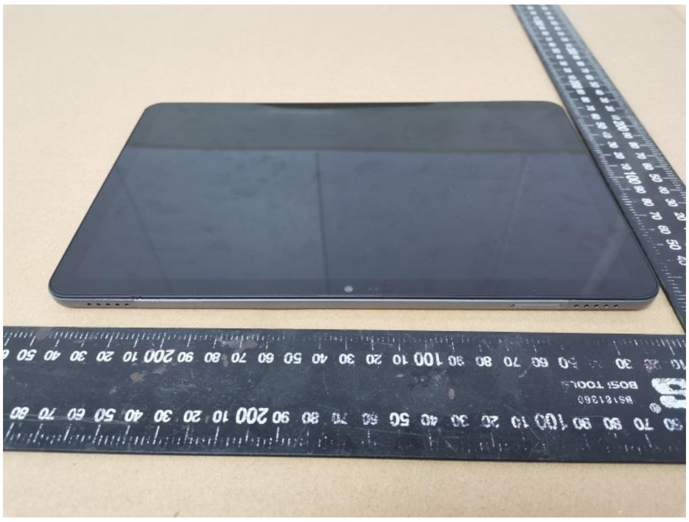
Rear 0mm



Right 0mm

Top 0mm

17. Photos of the EUT



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

Project No.	SHT2304067501EW		
Test sample No.	YPHT23040675001	Model No.	TLA002
Start test date	6/8/2023	Finish date	6/12/2023
Temperature	22.4℃	Humidity	38%
Test Engineer	Weiyang.Xiang	Auditor	Xiaodong Zhao

Appendix clause	Test Item	Result
A	Conducted Power Measurement Results	PASS
B	SAR Measurement Results	PASS
C	Simultaneous Transmission analysis	PASS

Appendix A:Conducted Power Measurement Results-GSM

GSM850		Burst Average Power (dBm)			Tune-up limit (dBm)	Division Factors	Frame-Average Power (dBm)			Tune-up limit (dBm)
		CH128	CH190	CH251			CH128	CH190	CH251	
		824.2MHz	836.6MHz	848.8MHz			824.2MHz	836.6MHz	848.8MHz	
GSM		31.85	32.08	32.41	32.50	-9.03	22.82	23.05	23.38	23.47
GPRS (GMSK)	1Tx slot	31.98	32.08	31.20	32.50	-9.03	22.95	23.05	22.17	23.47
	2Tx slots	29.91	30.04	29.10	30.50	-6.02	23.89	24.02	23.08	24.48
	3Tx slots	28.01	28.14	27.19	28.50	-4.26	23.75	23.88	22.93	24.24
	4Tx slots	25.82	26.15	25.99	26.50	-3.01	22.81	23.14	22.98	23.49
EGPRS (8PSK)	1Tx slot	25.72	25.62	25.52	26.00	-9.03	16.69	16.59	16.49	16.97
	2Tx slots	24.83	24.82	24.68	25.00	-6.02	18.81	18.80	18.66	18.98
	3Tx slots	22.54	22.64	22.41	23.00	-4.26	18.28	18.38	18.15	18.74
	4Tx slots	19.98	20.01	19.81	20.50	-3.01	16.97	17.00	16.80	17.49

Appendix A:Conducted Power Measurement Results-WCDMA

WCDMA Band V		Conducted Power (dBm)			Tune-up limit (dBm)
		CH4132	CH4183	CH4233	
		826.4MHz	836.6MHz	846.6MHz	
AMR 12.2K		22.18	22.32	22.73	23.00
RMC 12.2K		22.21	22.35	22.76	23.00
HSDPA	Subtest-1	21.53	21.88	21.50	22.00
	Subtest-2	21.01	21.57	21.31	22.00
	Subtest-3	20.61	21.11	20.92	21.50
	Subtest-4	20.64	21.15	20.87	21.50
HSUPA	Subtest-1	18.43	20.40	20.00	20.50
	Subtest-2	19.67	20.54	20.19	21.00
	Subtest-3	19.48	20.06	19.67	20.50
	Subtest-4	19.27	20.08	19.73	20.50
	Subtest-5	21.80	22.13	21.86	22.50

LTE-FDD Band 5				Conducted Power (dBm)			Tune-up Limit(dBm)
Band-width(MHz)	Modulation	RB allocation	RB offset	Low	Middle	High	
1.4	QPSK	1	0	22.71	22.78	23.43	24.00
			2	22.83	22.78	23.53	
			5	22.81	22.88	23.55	
		3	0	22.82	22.86	23.38	23.50
			1	22.80	22.84	23.37	
			3	22.86	22.97	23.40	
		6	0	21.85	21.75	22.38	22.50
	16QAM	1	0	22.34	21.80	23.02	23.50
			2	21.98	21.78	22.66	
			5	22.34	21.80	22.71	
		3	0	21.50	21.43	22.13	22.50
			1	21.41	21.42	22.13	
			3	21.59	21.78	22.10	
		6	0	20.92	21.35	21.82	22.00
3	QPSK	1	0	22.84	23.09	23.19	23.50
			8	22.88	22.97	23.26	
			14	22.83	23.03	23.30	
		8	0	21.96	21.96	22.17	22.50
			4	21.93	22.08	22.20	
			7	21.96	22.03	22.19	
		15	0	21.99	21.92	22.17	22.50
	16QAM	1	0	22.01	21.95	22.69	23.00
			8	21.91	21.57	22.74	
			14	21.87	21.67	22.69	
		8	0	21.17	21.30	21.34	21.50
			4	21.13	21.19	21.23	
			7	21.11	21.42	21.40	
		15	0	20.95	21.27	21.32	21.50
5	QPSK	1	0	22.95	23.11	23.18	23.50
			12	22.88	22.95	23.25	
			24	22.98	23.03	23.27	
		12	0	22.03	22.01	22.03	22.50
			6	22.04	22.10	22.06	
			13	21.91	21.92	22.21	
		25	0	21.86	21.95	22.14	22.50
	16QAM	1	0	21.37	22.23	22.09	22.50
			12	21.25	22.05	22.15	
			24	21.34	22.22	22.13	
		12	0	21.00	21.17	21.12	21.50
			6	21.00	21.13	21.13	
			13	20.90	21.48	21.27	
		25	0	20.97	21.36	21.21	21.50
10	QPSK	1	0	22.89	23.06	23.14	23.50
			24	22.87	22.97	23.12	
			49	22.89	23.11	23.27	
		25	0	21.89	22.10	22.05	22.50
			12	21.91	22.04	22.07	
			25	21.97	22.08	22.24	
		50	0	21.96	21.85	21.97	22.00
	16QAM	1	0	21.83	21.64	21.91	22.50
			24	21.71	21.72	21.90	
			49	22.06	21.78	21.98	
		25	0	20.87	21.22	21.24	21.50
			12	20.85	21.22	21.24	
			25	21.18	21.48	21.30	
		50	0	21.00	21.39	21.37	21.50

Appendix A:Conducted Power Measurement Results-WIFI/Bluetooth

WIFI 2.4G					
Mode	Channel	Frequency (MHz)	Peak Power (dBm)	Average Power (dBm)	Tune-up limit (dBm)
802.11b	1	2412	16.38	15.23	15.50
	6	2437	17.02	15.74	16.00
	11	2462	16.98	15.67	16.00
802.11g	1	2412	13.10	12.03	12.50
	6	2437	12.89	11.55	12.00
	11	2462	12.54	11.03	11.50
802.11n (HT20)	1	2412	13.21	12.45	12.50
	6	2437	13.07	11.96	12.00
	11	2462	12.70	11.62	12.00
802.11n (HT40)	3	2422	14.06	12.94	13.00
	6	2437	13.54	12.17	12.50
	9	2452	12.50	11.23	11.50

WIFI 5G U-NII-1					
Bandwidth	Mode	Channel	Frequency (MHz)	Average Power (dBm)	Tune-up limit (dBm)
20	802.11ac	36	5180	17.26	17.50
		44	5220	17.20	17.50
		48	5240	17.15	17.50
	802.11n	36	5180	19.86	20.00
		44	5220	19.85	20.00
		48	5240	19.44	19.50
	802.11a	36	5180	19.69	20.00
		44	5220	19.53	20.00
		48	5240	19.39	19.50
40	802.11ac	38	5190	16.99	17.00
		46	5230	17.06	17.50
	802.11n	38	5190	17.78	18.00
		46	5230	17.95	18.00
80	802.11ac	42	5210	17.22	17.50

WIFI 5G U-NII-3					
Bandwidth	Mode	Channel	Frequency (MHz)	Average Power (dBm)	Tune-up limit (dBm)
20	802.11ac	149	5745	16.04	16.50
		157	5785	16.26	16.50
		165	5825	16.32	16.50
	802.11n	149	5745	18.75	19.00
		157	5785	18.94	19.00
		165	5825	18.92	19.00
	802.11a	149	5745	18.70	19.00
		157	5785	18.98	19.00
		165	5825	18.78	19.00
40	802.11ac	151	5755	16.26	16.50
		159	5795	15.65	16.00
	802.11n	151	5755	16.98	17.00
		159	5795	16.92	17.00
80	802.11ac	155	5775	16.42	16.50

Bluetooth						
Mode		Channel	Frequency (MHz)	Peak Power (dBm)	Average Power (dBm)	Tune-up limit (dBm)
EDR	GFSK	0	2402	8.92	7.56	8.00
		39	2441	7.12	6.04	6.50
		78	2480	7.58	6.34	6.50
	π/4QPSK	0	2402	7.68	6.40	6.50
		39	2441	8.32	7.21	7.50
		78	2480	8.05	6.98	7.00
	8DPSK	0	2402	7.90	6.53	7.00
		39	2441	8.52	7.41	7.50
		78	2480	8.45	7.23	7.50
BLE 1M	GFSK	0	2402	-0.34	-1.52	-1.50
		19	2440	1.01	-0.97	-0.50
		39	2480	-1.92	-2.81	-2.50
BLE 2M	GFSK	0	2402	-0.47	-1.46	-1.00
		19	2440	0.87	-0.79	-0.50
		39	2480	-2.09	-3.75	-3.50

Appendix B:SAR Measurement Results

GSM850										
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune-up limit (dBm)	Tune-up scaling factor	Power Drift(dB)	Measured SAR(1g)	Report SAR(1g)	Plot No.
		CH	MHz					(W/kg)	(W/kg)	
GPRS 2Tx slots	Rear	128	824.2	29.91	30.50	1.146	0.08	0.788	0.903	-
		190	836.6	30.04	30.50	1.112	-0.15	0.816	0.907	1
		251	848.8	29.10	30.50	1.380	-0.11	0.644	0.889	-
	Right	128	824.2	29.91	30.50	1.146	-	-	-	-
		190	836.6	30.04	30.50	1.112	0.02	0.330	0.367	-
		251	848.8	29.10	30.50	1.380	-	-	-	-
	Top	128	824.2	29.91	30.50	1.146	0.13	0.743	0.851	-
		190	836.6	30.04	30.50	1.112	-0.08	0.788	0.876	-
		251	848.8	29.10	30.50	1.380	0.06	0.589	0.813	-

WCDMA Band V										
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune-up limit (dBm)	Tune-up scaling factor	Power Drift(dB)	Measured SAR(1g)	Report SAR(1g)	Plot No.
		CH	MHz					(W/kg)	(W/kg)	
RMC 12.2Kbps	Rear	4132	826.4	22.21	23.00	1.199	0.16	0.718	0.861	-
		4183	836.6	22.35	23.00	1.161	-0.08	0.747	0.868	-
		4233	846.6	22.76	23.00	1.057	-0.18	0.838	0.886	2
	Top	4132	826.4	22.21	23.00	1.199	0.10	0.709	0.850	-
		4183	836.6	22.35	23.00	1.161	-0.02	0.730	0.848	-
		4233	846.6	22.76	23.00	1.057	-0.16	0.832	0.879	-

LTE Band 5										
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune-up limit (dBm)	Tune-up scaling factor	Power Drift(dB)	Measured SAR(1g)	Report SAR(1g)	Plot No.
		CH	MHz					(W/kg)	(W/kg)	
10M QPSK 1RB	Rear	20450	829.0	22.89	23.50	1.151	-	-	-	-
		20525	836.5	23.11	23.50	1.094	-	-	-	-
		20600	844.0	23.27	23.50	1.054	-0.12	0.619	0.653	3
	Right	20450	829.0	22.89	23.50	1.151	-	-	-	-
		20525	836.5	23.11	23.50	1.094	-	-	-	-
		20600	844.0	23.27	23.50	1.054	-0.08	0.221	0.233	-
	Top	20450	829.0	22.89	23.50	1.151	-	-	-	-
		20525	836.5	23.11	23.50	1.094	-	-	-	-
		20600	844.0	23.27	23.50	1.054	0.13	0.607	0.640	-
10M QPSK 25RB	Rear	20450	829.0	21.97	22.50	1.130	-	-	-	-
		20525	836.5	22.08	22.50	1.102	-	-	-	-
		20600	844.0	22.24	22.50	1.062	-0.06	0.469	0.498	-
	Right	20450	829.0	21.97	22.50	1.130	-	-	-	-
		20525	836.5	22.08	22.50	1.102	-	-	-	-
		20600	844.0	22.24	22.50	1.062	0.12	0.137	0.145	-
	Top	20450	829.0	21.97	22.50	1.130	-	-	-	-
		20525	836.5	22.08	22.50	1.102	-	-	-	-
		20600	844.0	22.24	22.50	1.062	-0.10	0.442	0.469	-

WIFI 2.4G												
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune-up limit (dBm)	Tune-up scaling factor	Duty Cycle	Duty Cycle Scaling Factor	Power Drift(dB)	Measured SAR(1g)	Report SAR(1g)	Plot No.
		CH	MHz							(W/kg)	(W/kg)	
802.11b	Rear	1	2412	15.23	15.50	1.064	98.23%	1.018	-	-	-	-
		6	2437	15.74	16.00	1.062	98.23%	1.018	-0.17	0.417	0.451	4
		11	2462	15.67	16.00	1.079	98.23%	1.018	-	-	-	-
	Top	1	2412	15.23	15.50	1.064	98.23%	1.018	-	-	-	-
		6	2437	15.74	16.00	1.062	98.23%	1.018	-0.05	0.413	0.446	-
		11	2462	15.67	16.00	1.079	98.23%	1.018	-	-	-	-

WIFI 5G U-NII-1												
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune-up limit (dBm)	Tune-up scaling factor	Duty Cycle	Duty Cycle Scaling Factor	Power Drift(dB)	Measured SAR(1g)	Report SAR(1g)	Plot No.
		CH	MHz							(W/kg)	(W/kg)	
802.11n (HT20)	Rear	36	5180	19.86	20.00	1.033	81.82%	1.222	0.18	0.236	0.298	5
		44	5220	19.85	20.00	1.035	81.25%	1.231	-	-	-	-
		48	5240	19.44	19.50	1.014	86.03%	1.162	-	-	-	-
	Top	36	5180	19.86	20.00	1.033	81.82%	1.222	0.15	0.227	0.287	-
		44	5220	19.85	20.00	1.035	81.25%	1.231	-	-	-	-
		48	5240	19.44	19.50	1.014	86.03%	1.162	-	-	-	-

WIFI 5G U-NII-3												
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune-up limit (dBm)	Tune-up scaling factor	Duty Cycle	Duty Cycle Scaling Factor	Power Drift(dB)	Measured SAR(1g)	Report SAR(1g)	Plot No.
		CH	MHz							(W/kg)	(W/kg)	
802.11a	Rear	149	5745	18.70	19.00	1.072	86.88%	1.151	-	-	-	-
		157	5785	18.98	19.00	1.005	84.24%	1.187	-0.10	0.470	0.561	6
		165	5825	18.78	19.00	1.052	86.88%	1.151	-	-	-	-
	Top	149	5745	18.70	19.00	1.072	86.88%	1.151	-	-	-	-
		157	5785	18.98	19.00	1.005	84.24%	1.187	0.06	0.466	0.556	-
		165	5825	18.78	19.00	1.052	86.88%	1.151	-	-	-	-

Bluetooth												
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune-up limit (dBm)	Tune-up scaling factor	Duty Cycle	Duty Cycle Scaling Factor	Power Drift(dB)	Measured SAR(1g)	Report SAR(1g)	Plot No.
		CH	MHz							(W/kg)	(W/kg)	
EDR GFSK	Rear	0	2402	7.56	8.00	1.107	77.54%	1.290	-0.17	0.124	0.177	7
		39	2441	6.04	6.50	1.112	77.54%	1.290	-	-	-	-
		78	2480	6.34	6.50	1.038	77.54%	1.290	-	-	-	-
	Top	0	2402	7.56	8.00	1.107	77.54%	1.290	-0.09	0.108	0.154	-
		39	2441	6.04	6.50	1.112	77.54%	1.290	-	-	-	-
		78	2480	6.34	6.50	1.038	77.54%	1.290	-	-	-	-

Appendix C: Simultaneous Transmission analysis

WWAN + WLAN DTS					
WWAN Band		Exposure Position	Max SAR (W/kg)		Summed SAR
			WWAN	WLAN DTS	(W/kg)
GSM	GSM850	Rear	0.907	0.451	1.358
		Right side	0.367	-	0.367
		Top side	0.876	0.446	1.322
WCDMA	Band V	Rear	0.886	0.451	1.337
		Top side	0.879	0.446	1.325
LTE	B5 1RB	Rear	0.653	0.451	1.104
		Right side	0.233	-	0.233
		Top side	0.640	0.446	1.086
	B5 25RB	Rear	0.498	0.451	0.949
		Right side	0.145	-	0.145
		Top side	0.469	0.446	0.915

WWAN + WLAN U-NII					
WWAN Band		Exposure Position	Max SAR (W/kg)		Summed SAR
			WWAN	WLAN U-NII	(W/kg)
GSM	GSM850	Rear	0.907	0.561	1.468
		Right side	0.367	-	0.367
		Top side	0.876	0.556	1.432
WCDMA	Band V	Rear	0.886	0.561	1.447
		Top side	0.879	0.556	1.435
LTE	B5 1RB	Rear	0.653	0.561	1.214
		Right side	0.233	-	0.233
		Top side	0.640	0.556	1.196
	B5 25RB	Rear	0.498	0.561	1.059
		Right side	0.145	-	0.145
		Top side	0.469	0.556	1.025

WWAN + BT					
WWAN Band		Exposure Position	Max SAR (W/kg)		Summed SAR
			WWAN	BT	(W/kg)
GSM	GSM850	Rear	0.907	0.177	1.084
		Right side	0.367	-	0.367
		Top side	0.876	0.154	1.030
WCDMA	Band V	Rear	0.886	0.177	1.063
		Top side	0.879	0.154	1.033
LTE	B5 1RB	Rear	0.653	0.177	0.830
		Right side	0.233	-	0.233
		Top side	0.640	0.154	0.794
	B5 25RB	Rear	0.498	0.177	0.675
		Right side	0.145	-	0.145
		Top side	0.469	0.154	0.623

Test Laboratory: Huatongwei International Inspection Co., Ltd.,SAR Lab Date: 6/8/2023

GSM 850-Body

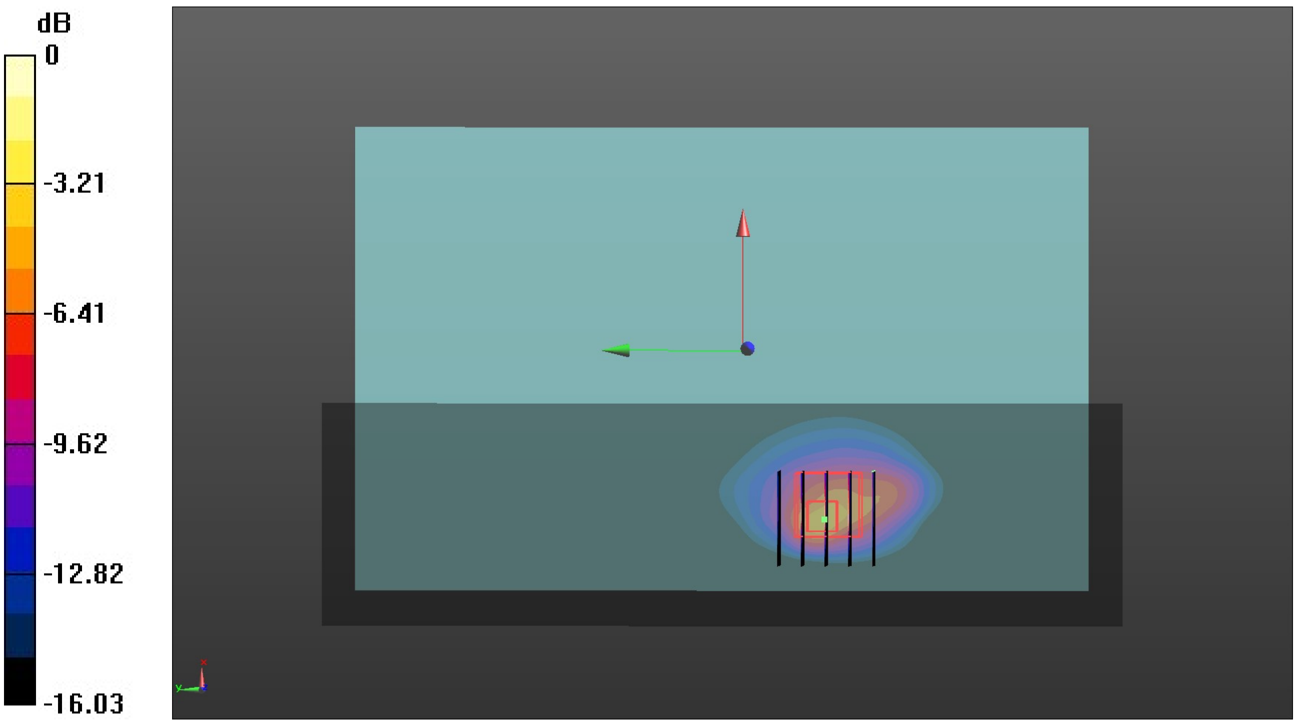
Communication System: UID 0, Generic GPRS(TDMA, GMSK, TN 0-1) (0); Frequency: 836.6 MHz;Duty Cycle: 1:4.10015
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.894 S/m; ε_r = 40.126; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature:22.6℃;Liquid Temperature:22.4℃;

DASY Configuration:

- Probe: EX3DV4 - SN7494; ConvF(10.4, 10.4, 10.4) @ 836.6 MHz; Calibrated: 4/17/2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1549; Calibrated: 3/27/2023
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

Rear/CH 190/Area Scan (51x181x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.872 W/kg

Rear/CH 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.473 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 4.41 W/kg
SAR(1 g) = 0.816 W/kg; SAR(10 g) = 0.294 W/kg
Maximum value of SAR (measured) = 2.38 W/kg



0 dB = 2.38 W/kg = 3.77 dBW/kg

Test Laboratory: Huatongwei International Inspection Co., Ltd.,SAR Lab Date: 6/8/2023

WCDMA Band V-Body

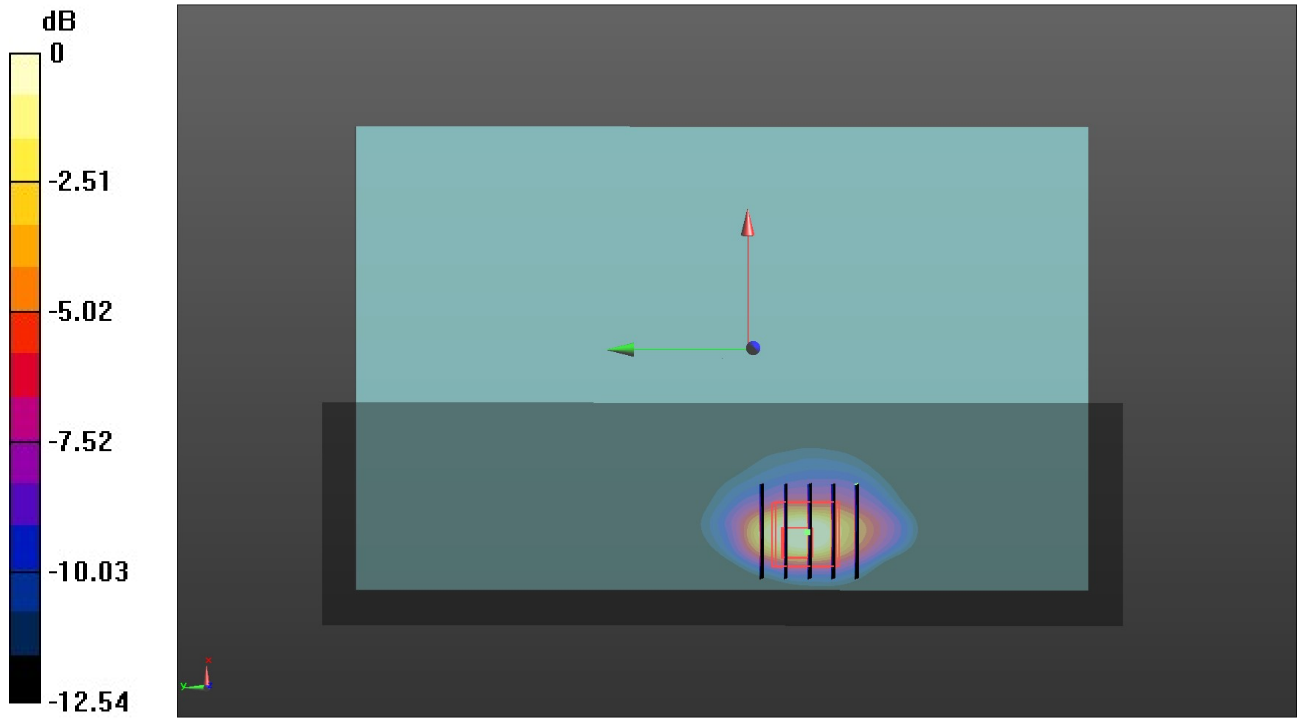
Communication System: UID 0, Generic UMTS (0); Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 846.6 MHz; σ = 0.9 S/m; ε_r = 40.144; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature:22.5°C;Liquid Temperature:22.3°C;

DASY Configuration:

- Probe: EX3DV4 - SN7494; ConvF(10.4, 10.4, 10.4) @ 846.6 MHz; Calibrated: 4/17/2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1549; Calibrated: 3/27/2023
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

Rear/CH 4233/Area Scan (51x181x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.84 W/kg

Rear/CH 4233/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.378 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 4.00 W/kg
SAR(1 g) = 0.838 W/kg; SAR(10 g) = 0.322 W/kg
Maximum value of SAR (measured) = 1.54 W/kg



0 dB = 1.54 W/kg = 1.88 dBW/kg

Test Laboratory: Huatongwei International Inspection Co., Ltd.,SAR Lab Date: 6/8/2023

LTE Band 5-Body

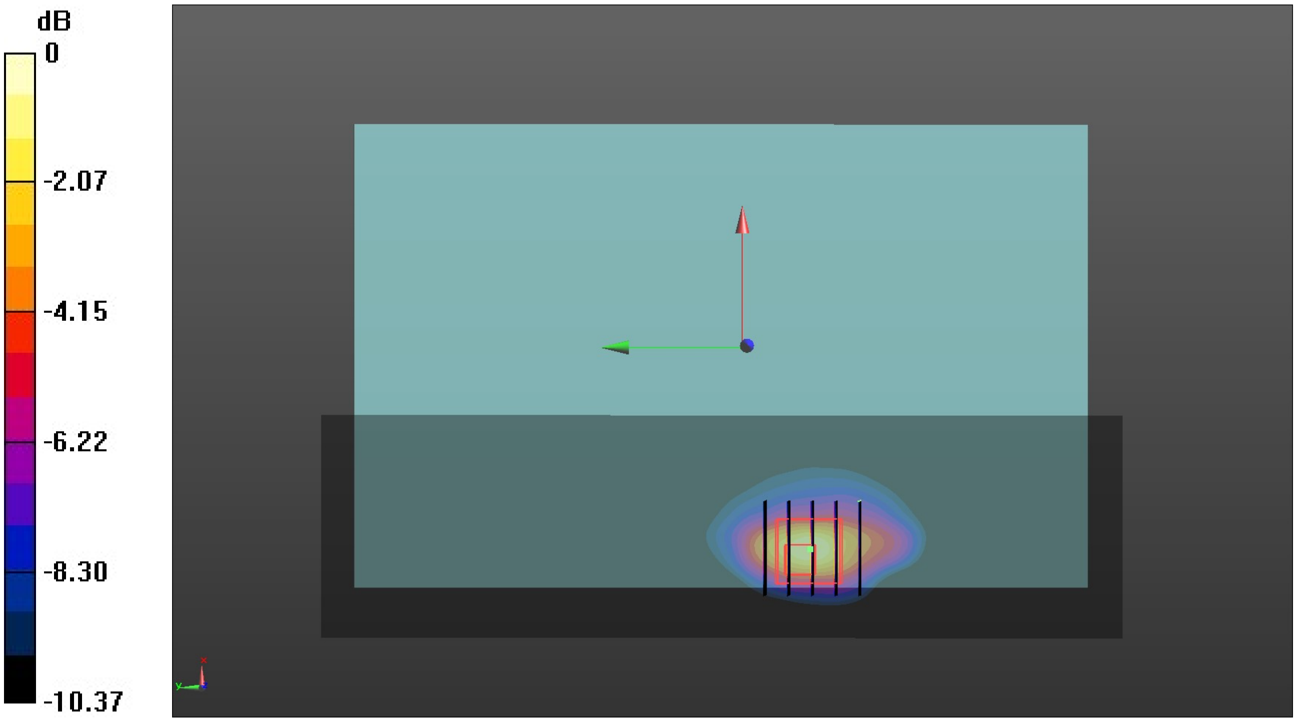
Communication System: UID 0, Generic LTE-FDD (0); Frequency: 844 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 844 MHz; σ = 0.898 S/m; ε_r = 40.139; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature:22.5℃;Liquid Temperature:22.3℃;

DASY Configuration:

- Probe: EX3DV4 - SN7494; ConvF(10.4, 10.4, 10.4) @ 844 MHz; Calibrated: 4/17/2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1549; Calibrated: 3/27/2023
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

Rear/CH 20600/Area Scan (51x181x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.962 W/kg

Rear/CH 20600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.680 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 2.48 W/kg
SAR(1 g) = 0.619 W/kg; SAR(10 g) = 0.265 W/kg
Maximum value of SAR (measured) = 1.12 W/kg



0 dB = 1.12 W/kg = 0.49 dBW/kg

Test Laboratory: Huatongwei International Inspection Co., Ltd.,SAR Lab Date: 6/9/2023

WIFI 2.4G-Body

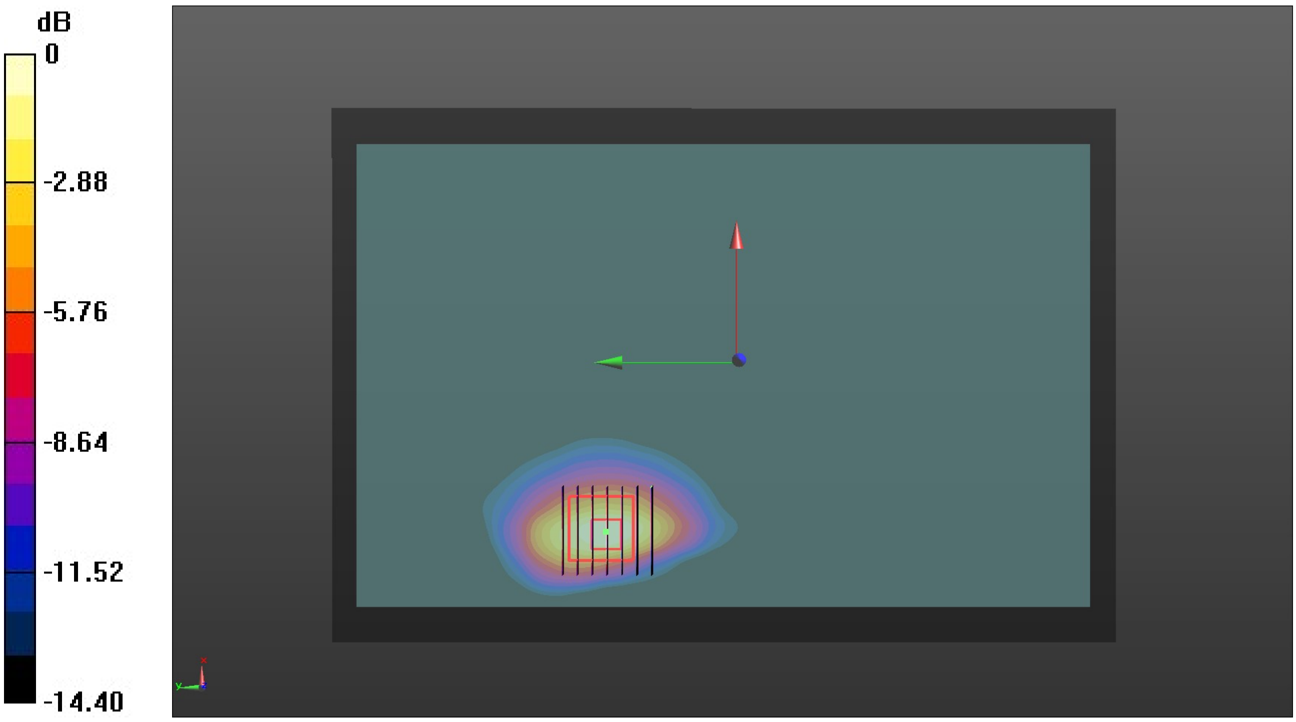
Communication System: UID 0, Generic WIFI (0); Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.727 S/m; ε_r = 37.504; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature:22.7℃;Liquid Temperature:22.5℃;

DASY Configuration:

- Probe: EX3DV4 - SN7494; ConvF(8.01, 8.01, 8.01) @ 2437 MHz; Calibrated: 4/17/2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1549; Calibrated: 3/27/2023
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

Rear/CH 6/Area Scan (151x221x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.860 W/kg

Rear/CH 6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.9860 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 1.25 W/kg
SAR(1 g) = 0.417 W/kg; SAR(10 g) = 0.180 W/kg
Maximum value of SAR (measured) = 0.794 W/kg



0 dB = 0.794 W/kg = -1.00 dBW/kg

Test Laboratory: Huatongwei International Inspection Co., Ltd.,SAR Lab Date: 6/12/2023

WIFI 5G U NII-1-Body

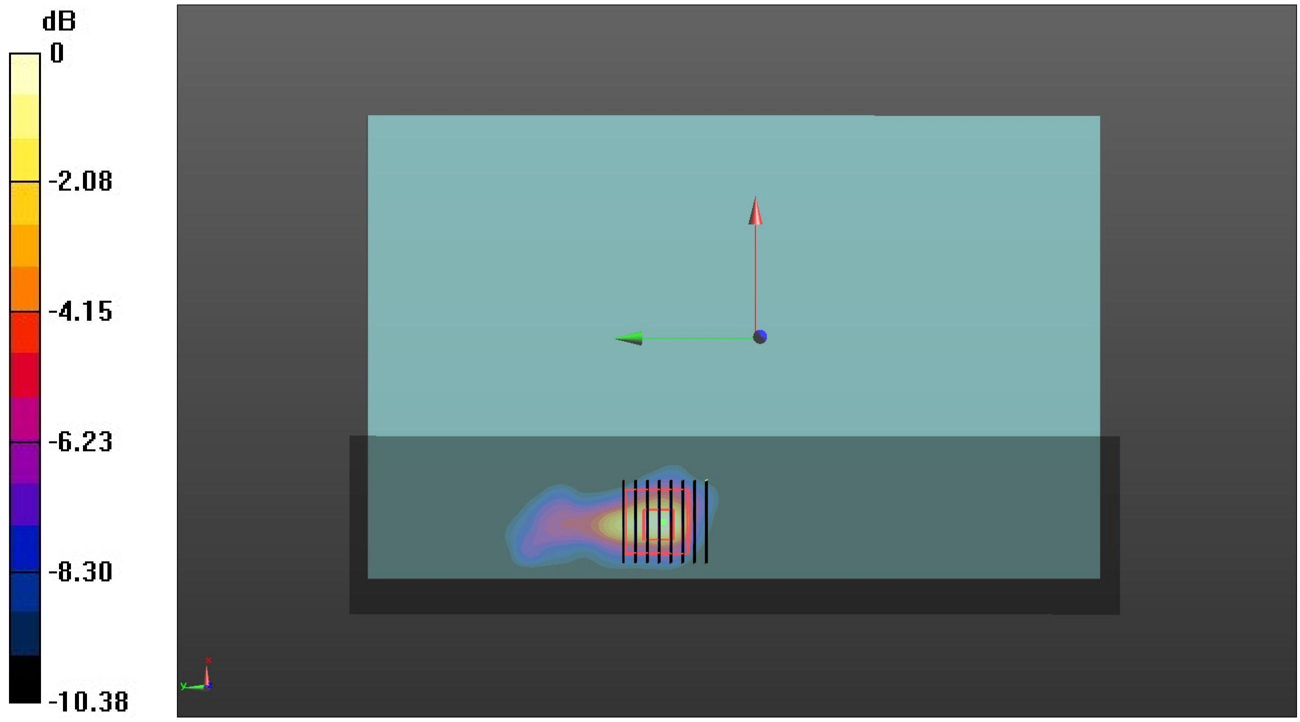
Communication System: UID 0, Generic WIFI (0); Frequency: 5180 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5180 MHz; σ = 4.411 S/m; ε_r = 34.706; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature:22.6°C;Liquid Temperature:22.4°C;

DASY Configuration:

- Probe: EX3DV4 - SN7494; ConvF(5.67, 5.67, 5.67) @ 5180 MHz; Calibrated: 4/17/2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1549; Calibrated: 3/27/2023
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

Rear/CH 36/Area Scan (61x261x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.645 W/kg

Rear/CH 36/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 1.944 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 1.23 W/kg
SAR(1 g) = 0.236 W/kg; SAR(10 g) = 0.097 W/kg
Maximum value of SAR (measured) = 0.665 W/kg



0 dB = 0.665 W/kg = -2.71 dBW/kg

Test Laboratory: Huatongwei International Inspection Co., Ltd.,SAR Lab Date: 6/12/2023

WIFI 5G U NII-3-Body

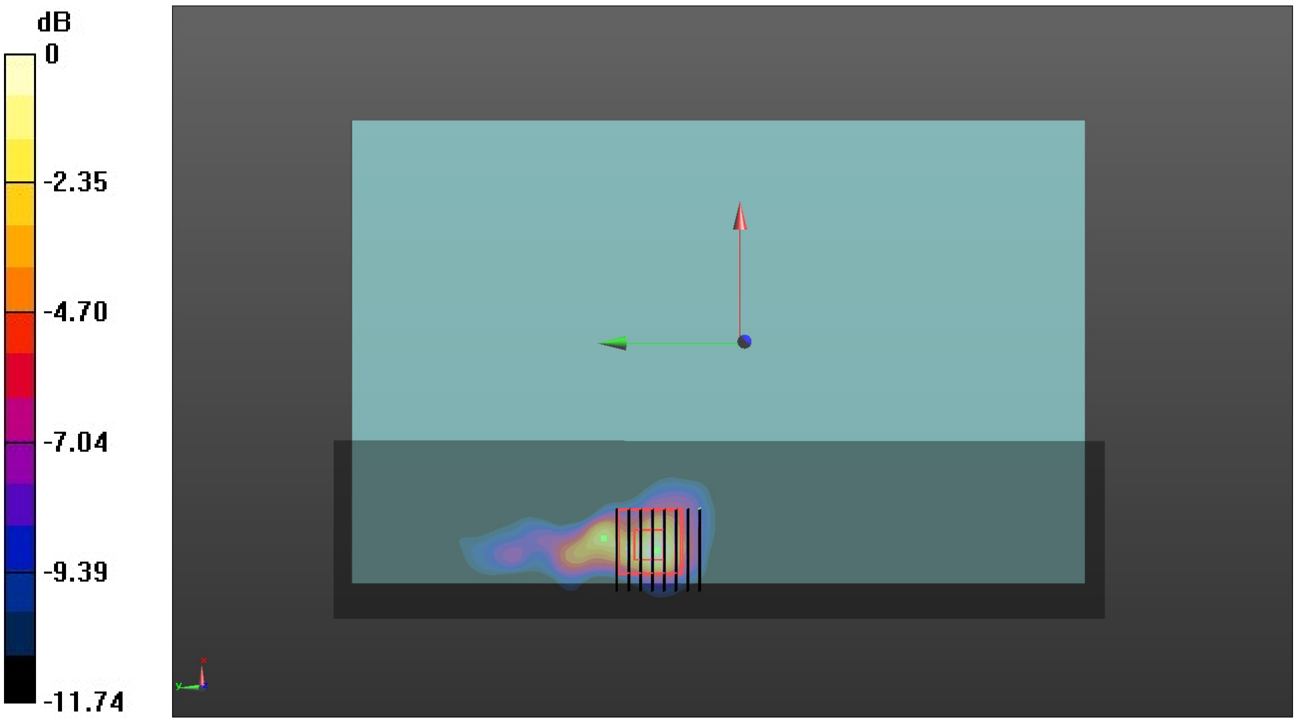
Communication System: UID 0, Generic WIFI (0); Frequency: 5785 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5785 MHz; σ = 5.03 S/m; ε_r = 33.764; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature:22.4°C;Liquid Temperature:22.2°C;

DASY Configuration:

- Probe: EX3DV4 - SN7494; ConvF(5.14, 5.14, 5.14) @ 5785 MHz; Calibrated: 4/17/2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1549; Calibrated: 3/27/2023
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

Rear/CH 157/Area Scan (61x261x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.29 W/kg

Rear/CH 157/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 1.525 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 2.96 W/kg
SAR(1 g) = 0.470 W/kg; SAR(10 g) = 0.150 W/kg
Maximum value of SAR (measured) = 1.29 W/kg



0 dB = 1.29 W/kg = 1.11 dBW/kg

Test Laboratory: Huatongwei International Inspection Co., Ltd.,SAR Lab Date: 6/9/2023

BT-L-Body

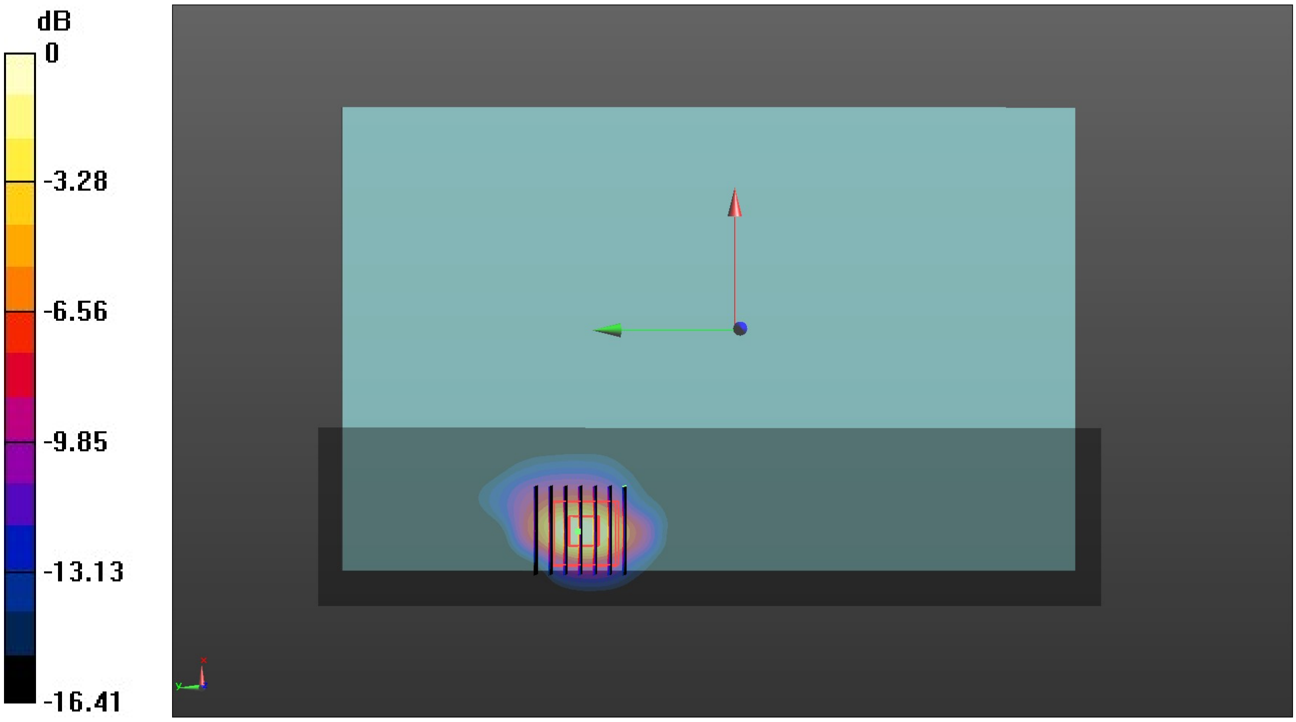
Communication System: UID 0, Generic BT (0); Frequency: 2402 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2402 MHz; σ = 1.678 S/m; ε_r = 37.566; ρ = 1000 kg/m^3
Phantom section: Flat Section
Ambient Temperature:22.5°C;Liquid Temperature:22.3°C;

DASY Configuration:

- Probe: EX3DV4 - SN7494; ConvF(8.01, 8.01, 8.01) @ 2402 MHz; Calibrated: 4/17/2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1549; Calibrated: 3/27/2023
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

Rear/CH 0/Area Scan (51x221x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.409 W/kg

Rear/CH 0/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.893 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 0.520 W/kg
SAR(1 g) = 0.124 W/kg; SAR(10 g) = 0.022 W/kg
Maximum value of SAR (measured) = 0.361 W/kg



0 dB = 0.361 W/kg = -1.80 dBW/kg

1. DAE4 Calibration Certificate

In Collaboration with s p e a g CALIBRATION LABORATORY

Add: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2117
E-mail: emf@caict.ac.cn http://www.caict.ac.cn

中国认可 国际互认 校准 CALIBRATION CNAS L0570

Client : HTW

Certificate No: J23Z60202

CALIBRATION CERTIFICATE

Object	DAE4 - SN: 1549
Calibration Procedure(s)	FF-Z11-002-01 Calibration Procedure for the Data Acquisition Electronics (DAEx)
Calibration date:	March 27, 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
Process Calibrator 753	1971018	14-Jun-22 (CTTL, No.J22X04180)	Jun-23

	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: March 28, 2023

In Collaboration with
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CALIBRATION LABORATORY

CAICT

Add: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191, China
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E-mail: emf@caict.ac.cn http://www.caict.ac.cn

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	406.340 ± 0.15% (k=2)	406.011 ± 0.15% (k=2)	406.173 ± 0.15% (k=2)
Low Range	3.98404 ± 0.7% (k=2)	3.99064 ± 0.7% (k=2)	3.99140 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	18.5° ± 1 °

2. Probe Calibration Certificate

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Client HTW Certificate No: Z23-60186

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN : 7494
Calibration Procedure(s)	FF-Z11-004-02 Calibration Procedures for Dosimetric E-field Probes
Calibration date:	April 17, 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	14-Jun-22(CTTL, No.J22X04181)	Jun-23
Power sensor NRP-Z91	101547	14-Jun-22(CTTL, No.J22X04181)	Jun-23
Power sensor NRP-Z91	101548	14-Jun-22(CTTL, No.J22X04181)	Jun-23
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	20-May-22(SPEAG, No.EX3-3846_May22)	May-23
DAE4	SN 1555	25-Aug-22(SPEAG, No.DAE4-1555_Aug22)	Aug-23
DAE4	SN 549	24-Jan-23(SPEAG, No.DAE4-549_Jan23)	Jan-24
Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
SignalGenerator MG3700A	6201052605	14-Jun-22(CTTL, No.J22X04182)	Jun-23
Network Analyzer E5071C	MY46110673	10-Jan-23(CTTL, No.J23X00104)	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: April 24, 2023