TEST REPORT

Applicant:	Whoop International Trading Ltd.
Address:	Flat-B 8/F chong gming building 72, cheung sha wan road, Kowloon, Hong kong
Equipment Type:	Mobile Data Terminal
Model Name:	WMT-JA1
Brand Name:	whoop
FCC ID:	2AP7L-WMTJA1
Test Standard:	FCC 47 CFR Part 2.1093 (refer to section 3.1)
Maximum SAR:	Hotspot (1 g@10mm): 1.19 W/kg
Sample Arrival Date:	Feb. 02, 2024
Test Date:	Mar. 05, 2024 - Mar. 06, 2024
Date of Issue:	Mar. 21, 2024

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

Tested by: Zhang Jiwei

Checked by: Xu Rui

Approved by: Tolan Tu

(Testing Director)

Revision History

Version	Issue Date	Revisions Content
Rev. 01	Mar. 21, 2024	Initial Issue

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1 GENERAL INFORMATION

1.1 Test Laboratory

Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100

1.2 Test Location

Name	Shenzhen BALUN Technology Co., Ltd.
Location	☑ Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
	☐ 1/F, Building B, Ganghongji High-tech Intelligent Industrial Park, No. 1008, Songbai Road, Yangguang Community, Xili Sub-district, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196.

1.3 Test Environment Condition

Ambient Temperature	18℃ to 25℃
Ambient Relative Humidity	30% to 70%

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Whoop International Trading Ltd.
Address	Flat-B 8/F chong gming building 72, cheung sha wan road, Kowloon, Hong kong

2.2 Manufacturer Information

Manufacturer	Whoop International Trading Ltd.
Address	Flat-B 8/F chong gming building 72, cheung sha wan road, Kowloon, Hong kong

2.3 General Description for Equipment under Test (EUT)

EUT Name	Mobile Data Terminal
Model Name Under Test	WMT-JA1
Series Model Name	N/A
Description of Model Name Differentiation	N/A
Hardware Version	WMT-JA1-H2
Software Version	V3.0
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.4 Ancillary Equipment

Ancillary Equipment 1	Battery	
	Brand Name	whoop
	Model No.	WMT-JA1-B01
	Serial No.	N/A
	Capacity	2200 mAh
	Rated Voltage	3.7 V
	Limit Charge Voltage	4.2 V

2.5 Technical Information

Network and Wireless connectivity	4G Network LTE FDD Band 2/4/5/12/66/71

The requirement for the following technical information of the EUT was tested in this report:

Operating Mode	LTE		
Frequency Range	LTE Band 2	TX: 1850 ~ 1910 MHz	RX: 1930 ~ 1990 MHz
	LTE Band 4	TX: 1710 ~ 1755 MHz	RX: 2110 ~ 2155 MHz
	LTE Band 5	TX: 824 ~ 849 MHz	RX: 869 ~ 894 MHz
	LTE Band 12	TX: 699 ~ 716 MHz	RX: 729 ~ 746 MHz
	LTE Band 66	TX: 1710 ~ 1780 MHz	RX: 2110 ~ 2200 MHz
	LTE Band 71	TX: 663 ~ 698 MHz	RX: 617 ~ 652 MHz
Antenna Type	PIFA Antenna		
Hotspot Function	N/A		
Exposure Category	General Population/Uncontrolled exposure		
Product Type	Portable Device		
EUT Type	☒ Production unit	☐ Identical prototype	

3 SUMMARY OF TEST RESULT

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 2.1093	Radiofrequency radiation exposure evaluation: portable devices
2	ANSI C95.1-1992	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz
3	KDB 447498 D04 v01	447498 D04 Interim General RF Exposure Guidance v01
4	KDB 941225 D05 v02r05	SAR Evaluation Considerations for LTE Devices
5	KDB 941225 D06 v02r01	SAR EVALUATION PROCEDURES FOR PORTABLE DEVICES WITH WIRELESS ROUTER CAPABILITIES
6	KDB 865664 D01 v01r04	SAR Measurement 100 MHz to 6 GHz
7	KDB 865664 D02 v01r02	RF Exposure Reporting

3.2 Device Category and SAR Limit

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.

Table of Exposure Limits:

Body Position	SAR Value (W/Kg)	
	General Population/ Uncontrolled Exposure	Occupational/ ControlledExposure
Whole-Body SAR (averaged over the entire body)	0.08	0.4
Partial-Body SAR (averaged over any 1 gram of tissue)	1.60	8.0
SAR for hands, wrists, feet and ankles (averaged over any 10 grams of tissue)	4.0	20.0

NOTE:

General Population/Uncontrolled Exposure: Locations where there is the exposure of individuals who have no knowledge or control of their exposure. General population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

Occupational/Controlled Exposure: Locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

3.3 Test Result Summary

3.3.1 Highest SAR (1 g Value)

Equipment Class	Band	Maximum Scaled SAR (W/kg)	Maximum Report SAR (W/kg)
		Hotspot (10mm)	Hotspot (10mm)
LTE	Band 2	0.88	**1.19**
	Band 4	**1.19**	
	Band 5	0.59	
	Band 12	1.07	
	Band 66	1.16	
	Band 71	0.95	
Limit (W/kg)		1.60	
Verdict		Pass	

3.4 Test Uncertainty

According to KDB 865664 D01, when the highest measured 1 g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis is not required in SAR reports submitted for equipment approval.

The maximum 1 g SAR for the EUT in this report is 1.19 W/kg, which is lower than 1.5 W/kg, so the extensive SAR measurement uncertainty analysis is not required in this report.

4 MEASUREMENT SYSTEM

4.1 Specific Absorption Rate (SAR) Definition

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.

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

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

SAR is expressed in units of Watts per kilogram (W/kg) SAR measurement can be related to the electrical field in the tissue by

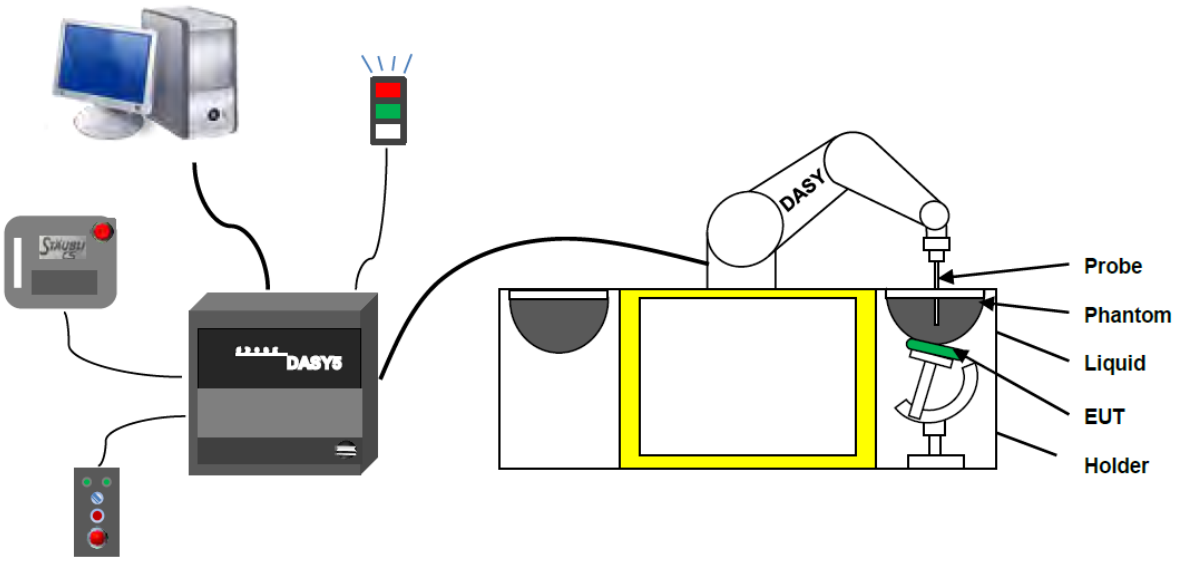
$$\mathbf{SAR} = \frac{\boldsymbol{\sigma}\mathbf{E}^{\mathbf{2}}}{\boldsymbol{\rho}}$$

Where: σ is the conductivity of the tissue,

ρis the mass density of the tissue and E is the RMS electrical field strength.

4.2 DASY SAR System

4.2.1 DASY SAR System Diagram



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

1. A standard high precision 6-axis robot (Stäubli RX family) with controller and software. An arm extension for accommodating the data acquisition electronics (DAE).
2. 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.
3. 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.
4. A unit to operate the optical surface detector which is connected to the EOC.
5. 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.
6. The DASY5 measurement server, which performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation.
7. DASY5 software and SEMCAD data evaluation software.
8. Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.
9. The generic twin phantom enabling the testing of left-hand and right-hand usage.
10. The device holder for handheld mobile phones.
11. Tissue simulating liquid mixed according to the given recipes.
12. System validation dipoles allowing to validate the proper functioning of the system.

4.2.2 Robot

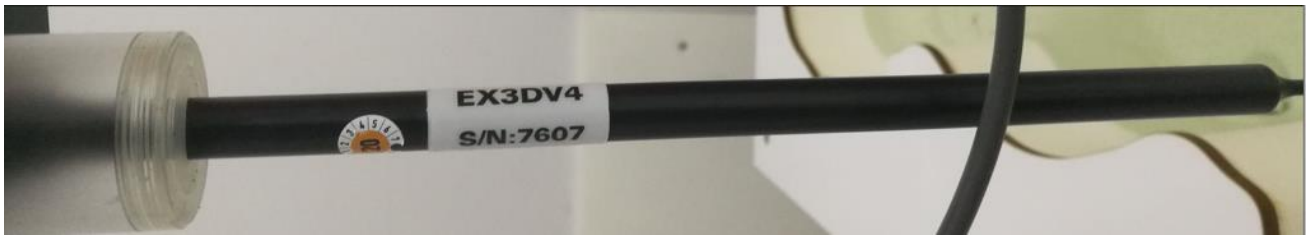
The Dasy SAR system uses the high precision robots. Symmetrical design with triangular core Built-in optical fiber for surface detection system For the 6-axis controller system, Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents). The robot series have many features that are important for our application:

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

4.2.3 E-Field Probe

The probe is specially designed and calibrated for use in liquids with high permittivities for the measurements the Specific Dosimetric E-Field Probe EX3DV4-SN: 7607 with following specifications is used.

Construction	Symmetrical design with triangular core Built-in optical fiber for surface detection systemBuilt-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., glycolether)
Calibration	ISO/IEC 17025 calibration service available
Frequency	10 MHz to 6 GHz; Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.2 dB in HSL (rotation around probe axis) ; ± 0.4 dB in HSL (rotation normal to probe axis)
Dynamic range	5 μW/g to > 100 mW/g; Linearity: ± 0.2 dB
Dimensions	Overall length: 337 mm (Tip: 9 mm) Tip diameter: 2.5 mm (Body: 10 mm) Distance from probe tip to dipole centers: 1.0 mm
Application	General dosimetry up to 3 GHz Compliance tests of mobile phones Fast automatic scanning in arbitrary phantoms (EX3DV4)

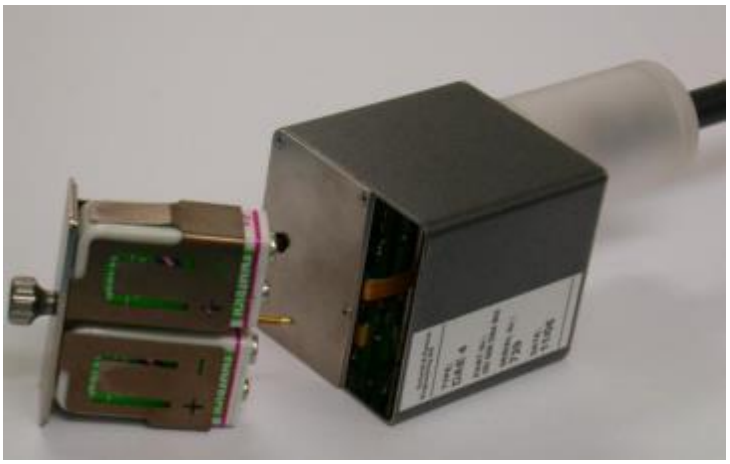


E-Field Probe Calibration Process

Probe calibration is realized, in compliance with CENELEC EN 62209-1/-2 and IEEE 1528 std, with CALISAR, Antennessa proprietary calibration system. The calibration is performed with the EN 62209-1/2 annexe technique using reference guide at the five frequencies.

4.2.4 Data Acquisition Electronics

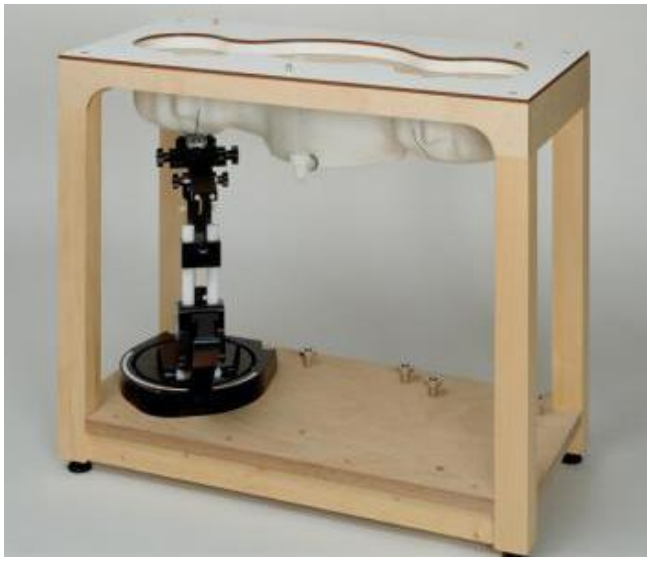
The data acquisition electronics (DAE) consist of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converte and a command decoder with a control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information, as well as an optical uplink for commands and the clock.



- Input Impedance: 200MOhm
- The Inputs: Symmetrical and Floating
- Commom Mode Rejection: Above 80dB

4.2.5 Phantoms

For the measurements the Specific Anthropomorphic Mannequin (SAM) defined by the IEEE SCC-34/SC2 group is used. The phantom is a polyurethane shell integrated in a wooden table. The thickness of the phantom amounts to 2mm +/- 0.2mm. It enables the dosimetric evaluation of left and right phone usage and includes an additional flat phantom part for the simplified performance check. The phantom set-up includes a cover, which prevents the evaporation of the liquid.



- Left hand
- Right hand
- Flat phantom

Photo of Phantom SN1576

Serial Number	Material	Length	Height
SN 1576 SAM	Vinylester, glass fiber reinforced	1000	500

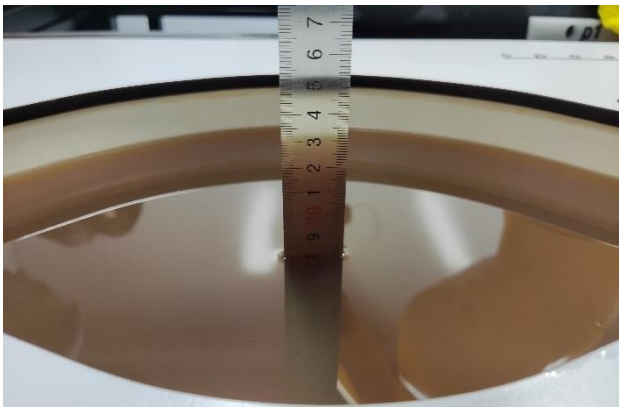
4.2.6 Device Holder

The DASY5 device holder has two scales for device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear openings). The plane between the ear openings and the mouth tip has a rotation angle of 65°. 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. This device holder is used for standard mobile phones or PDA"s only. If necessary an additional support of polystyrene material is used. Larger DUT"s (e.g. notebooks) cannot be tested using this device holder. Instead a support of bigger polystyrene cubes and thin polystyrene plates is used to position the DUT in all relevant positions to find and measure spots with maximum SAR values. Therefore those devices are normally only tested at the flat part of the SAM.

The positioning system allows obtaining cheek and tilting position with a very good accuracy. Incompliance with CENELEC, the tilt angle uncertainty is lower than 1°.

4.2.7 Simulating Liquid

For SAR measurement of the field distribution inside the phantom, the phantom must be filled with homogeneous tissue simulating liquid to a depth of at least 15 cm. 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. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm. The nominal dielectric values of the tissue simulating liquids in the phantom and the tolerance of 5%.

Head Liquid Depth	Body Liquid Depth
	

The following table gives the recipes for tissue simulating liquid.

TSL	Manufacturer / Model	Freq Range (MHz)	Main Ingredients
Head WideBand	SPEAG HBBL600-10000V6	600-10000	Ethanediol, Sodium petroleum sulfonate, Hexylene Glycol / 2-Methyl-pentane-2.4-diol, Alkoxylated alcohol

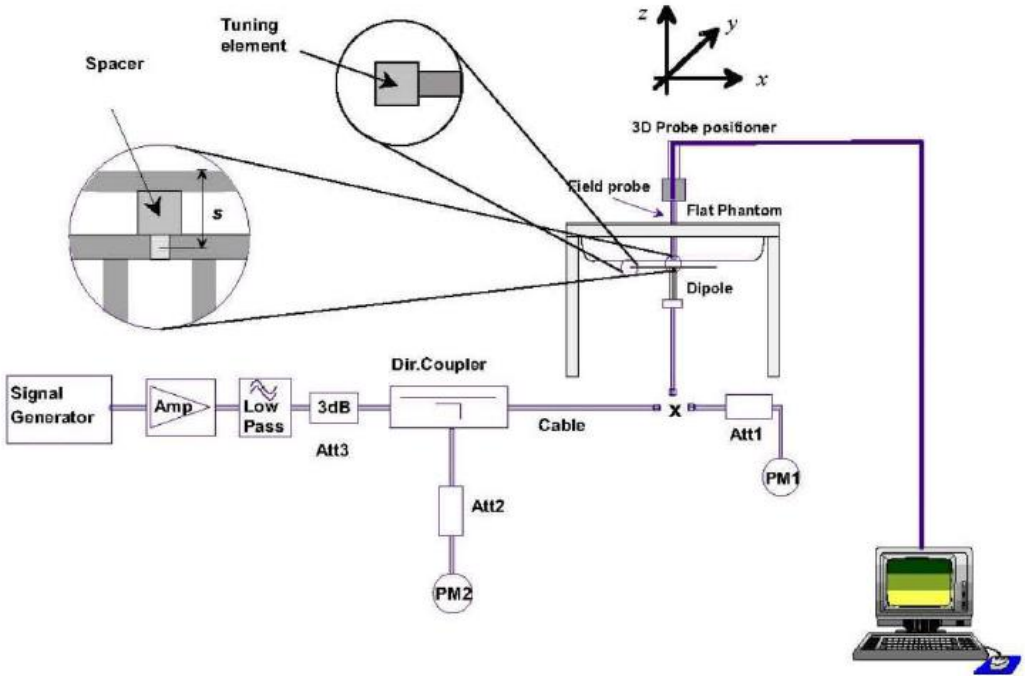
5 SYSTEM VERIFICATION

5.1 Purpose of System 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.

5.2 System Check Setup

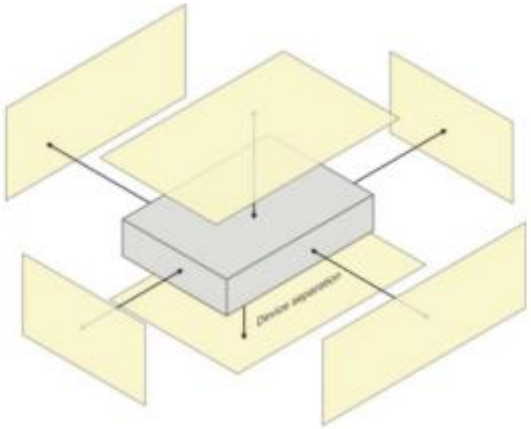
In the simplified setup for system evaluation, the EUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave that comes from a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. 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:



6 TEST POSITION CONFIGURATIONS

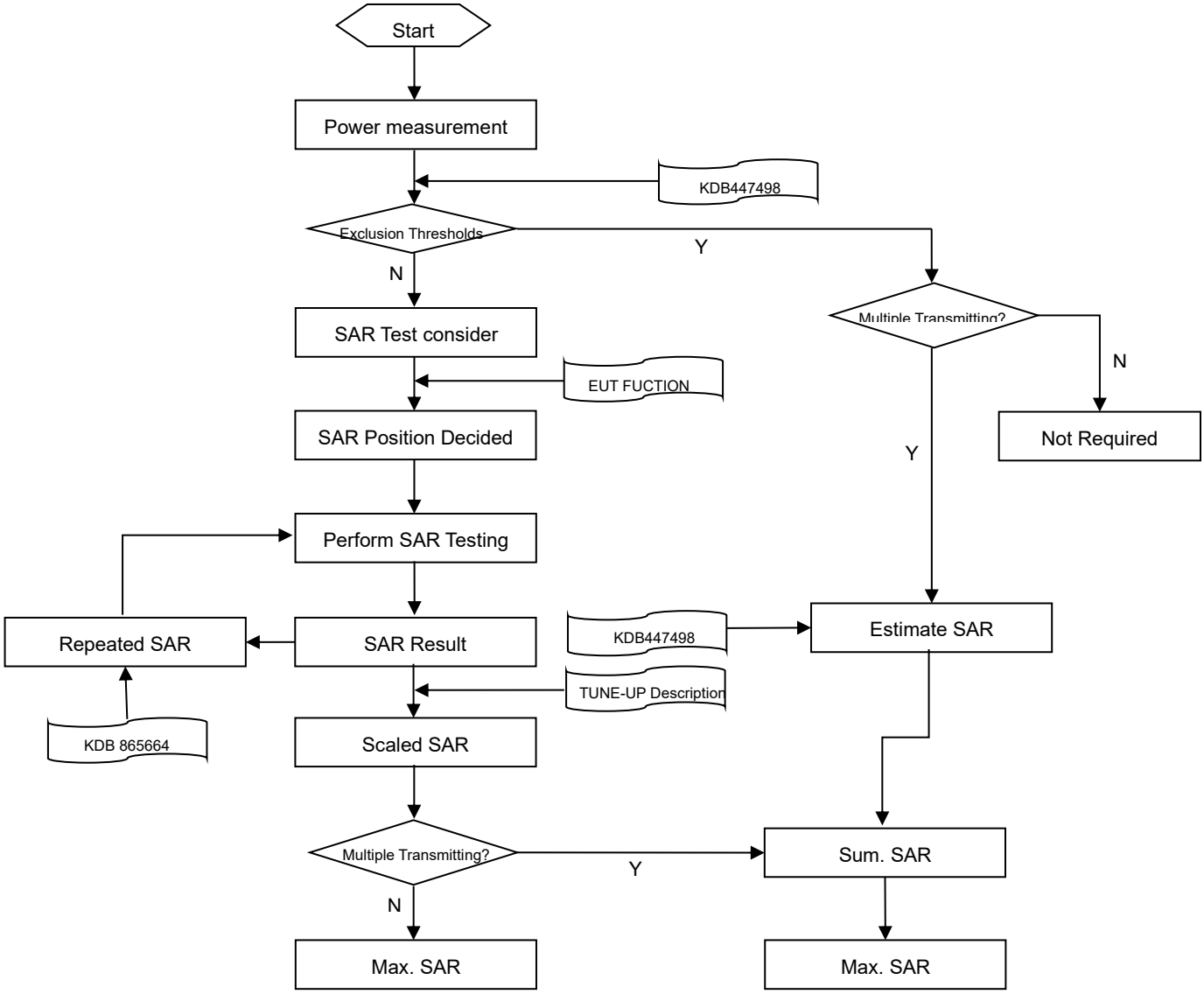
6.1 Hotspot Mode Exposure Position Conditions

For handsets that support hotspot mode operations, with wireless router capabilities and various web browsing functions, the relevant hand and body exposure conditions are tested according to the hotspot SAR procedures in KDB 941225. A test separation distance of 10 mm is required between the phantom and all surfaces and edges with a transmitting antenna located within 25 mm from that surface or edge. When the form factor of a handset is smaller than 9 cm x 5 cm, a test separation distance of 5 mm (instead of 10 mm) is required for testing hotspot mode. When the separation distance required for body-worn accessory testing is larger than or equal to that tested for hotspot mode, in the same wireless mode and for the same surface of the phone, the hotspot mode SAR data may be used to support body-worn accessory SAR compliance for that particular configuration (surface).



7 MEASUREMENT PROCEDURE

7.1 Measurement Process Diagram



7.2 SAR Scan General Requirement

Probe boundary effect error compensation is required for measurements with the probe tip closer than half a probe tip diameter to the phantom surface. Boththe probe tip diameter and sensor offset distance must satisfy measurement protocols; to ensure probe boundary effect errors are minimized and the higher fields closest to the phantom surface can be correctly measured and extrapolated to the phantom surface for computing 1 g SAR. Tolerances of the post-processing algorithms must be verified by the test laboratory for the scan resolutions used in the SAR measurements, according to the reference distribution functions specified in IEEE Std 1528-2013.

<table>
<tr><th colspan="3"></th><th>≤3GHz</th><th>>3GHz</th></tr>
<tr><td colspan="3">Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5±1 mm</td><td>½·δ·ln(2)±0.5 mm</td></tr>
<tr><td colspan="3">Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30°±1°</td><td>20°±1°</td></tr>
<tr><td colspan="3" rowspan="2">Maximum area scan spatial resolution: Δx Area , Δy Area</td><td>≤ 2 GHz: ≤ 15 mm
2 – 3 GHz: ≤ 12 mm</td><td>3–4 GHz: ≤ 12 mm
4 – 6 GHz: ≤ 10 mm</td></tr>
<tr><td colspan="2">When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.</td></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx Zoom , Δy Zoom</td><td>≤ 2 GHz: ≤ 8 mm
2 –3 GHz: ≤ 5 mm*</td><td>3–4 GHz: ≤ 5 mm*
4 – 6 GHz: ≤ 4 mm*</td></tr>
<tr><td rowspan="6">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2" rowspan="3">uniform grid: Δz Zoom (n)</td><td rowspan="3">≤ 5 mm</td><td>3–4 GHz: ≤ 4 mm</td></tr>
<tr><td>4–5 GHz: ≤ 3 mm</td></tr>
<tr><td>5–6 GHz: ≤ 2 mm</td></tr>
<tr><td rowspan="3">graded grid</td><td rowspan="2">Δz Zoom (1): between 1st two points closest to phantom surface</td><td rowspan="2">≤ 4 mm</td><td>3–4 GHz: ≤ 3 mm</td></tr>
<tr><td>4–5 GHz: ≤ 2.5 mm</td></tr>
<tr><td>Δz Zoom (n>1): between subsequent points</td><td colspan="2">5–6 GHz: ≤ 2 mm
≤ 1.5·Δz Zoom (n-1)</td></tr>
<tr><td rowspan="3">Minimum zoom scan volume</td><td colspan="2" rowspan="3">x, y, z</td><td rowspan="3">≥30 mm</td><td>3–4 GHz: ≥ 28 mm</td></tr>
<tr><td>4–5 GHz: ≥ 25 mm</td></tr>
<tr><td>5–6 GHz: ≥ 22 mm</td></tr>
<tr><td colspan="5">Note:
1. δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.
2. * When zoom scan is required and the reported SAR from the area scan based 1 g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.</td></tr>
</table>

7.3 Measurement Procedure

The following steps are used for each test position

a. Establish a call with the maximum output power with a base station simulator. The connection between the mobile and the base station simulator is established via air interface
b. Measurement of the local E-field value at a fixed location. This value serves as a reference value for calculating a possible power drift.
c. Measurement of the SAR distribution with a grid of 8 to 16mm * 8 to16 mm and a constant distance to the inner surface of the phantom. Since the sensors cannot directly measure at the inner phantom surface, the values between the sensors and the inner phantom surface are extrapolated. With these values the area of the maximum SAR is calculated by an interpolation scheme.
d. Around this point, a cube of 30 * 30 * 30 mm or 32 * 32 *32 mm is assessed by measuring 5 or 8 * 5 or 8*4 or 5 mm. With these data, the peak spatial-average SAR value can be calculated.

7.4 Area & Zoom Scan Procedure

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

When the 1 g SAR of the highest peak is within 2 dB of the SAR limit, additional zoom scans are required for other peaks within 2 dB of the highest peak that have not been included in any zoom scan to ensure there is no increase in SAR.

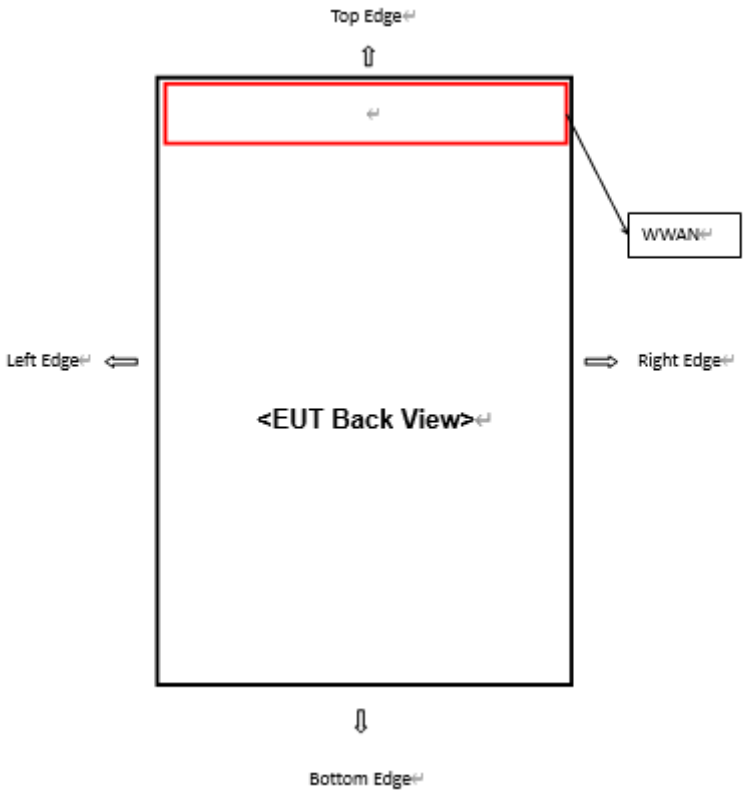
8 CONDUCTED RF OUPUT POWER

8.1 LTE

Please refer the document “BL-SZ2410995-AP .pdf”.

9 TEST EXCLUSION CONSIDERATION

9.1 Antenna Location



Antenna	Front Side(mm)	Back Side(mm)	Left Edge(mm)	Right Edge(mm)	Top Edge(mm)	Bottom Edge(mm)
WWAN	2.5	2.5	4.5	4.5	2.0	106.5

9.2 SAR Test Consideration Table

According with FCC KDB 447498 D04, Appendix B, The SAR-based exemption formula applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold Pth (mW).

This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive). The following table shows the power threshold from 5mm to 50mm.

Power Thresholds (mW)					
Frequency (MHz)	At separation distance of ≤5 mm	At separation distance of 10 mm	At separation distance of 15 mm	At separation distance of 20 mm	At separation distance of 25 mm
300	39 mW	65 mW	88 mW	110 mW	129 mW
450	22 mW	44 mW	67 mW	89 mW	112 mW
835	9 mW	25 mW	44 mW	66 mW	90 mW
1900	3 mW	12 mW	26 mW	44 mW	66 mW
2450	3 mW	10 mW	22 mW	38 mW	59 mW
3600	2 mW	8 mW	18 mW	32 mW	49 mW
5800	1 mW	6 mW	14 mW	25 mW	40 mW
Frequency (MHz)	At separation distance of 30 mm	At separation distance of 35 mm	At separation distance of 40 mm	At separation distance of 45 mm	At separation distance of 50 mm
300	148 mW	166 mW	184 mW	201 mW	217 mW
450	135 mW	158 mW	180 mW	203 mW	226 mW
835	116 mW	145 mW	175 mW	207 mW	240 mW
1900	92 mW	122 mW	157 mW	195 mW	236 mW
2450	83 mW	111 mW	143 mW	179 mW	219 mW
3600	71 mW	96 mW	125 mW	158 mW	195 mW
5800	58 mW	80 mW	106 mW	136 mW	169 mW

9.2.1 SAR Test Consideration

This host is a MIFI, under normal use the RF exposure scenarios are shown in the table below:

RF exposure Position	RF exposure scenarios
Front Side	Hotspot
Back Side	Hotspot
Left Edge	Hotspot
Right Edge	Hotspot
Top Edge	Hotspot
Bottom Edge	Hotspot

Hotspot RF exposure scenarios

Test Position Configurations	Mode	LTE B2	LTE B4	LTE B5	LTE B12	LTE B66	LTE B71
Calculated Frequency(MHz)		1910	1755	849	716	1780	698
Front Side	Distance to User (mm)	2.5					
	Max. Peak Power (dBm)	19.00	20.50	23.00	23.00	20.50	23.00
	Max. Peak Power (mW)	79.43	112.20	199.53	199.53	112.20	199.53
	Exclusion Threshold (mW)	0.94	1.01	3.40	4.68	1.00	4.97
	SAR Test Required	Yes	Yes	Yes	Yes	Yes	Yes
Back Side	Distance to User (mm)	2.5					
	Max. Peak Power (dBm)	19.00	20.50	23.00	23.00	20.50	23.00
	Max. Peak Power (mW)	79.43	112.20	199.53	199.53	112.20	199.53
	Exclusion Threshold (mW)	0.94	1.01	3.40	4.68	1.00	4.97
	SAR Test Required	Yes	Yes	Yes	Yes	Yes	Yes
Left Edge	Distance to User (mm)	4.5					
	Max. Peak Power (dBm)	19.00	20.50	23.00	23.00	20.50	23.00
	Max. Peak Power (mW)	79.43	112.20	199.53	199.53	112.20	199.53
	Exclusion Threshold (mW)	2.77	2.97	7.84	10.09	2.94	10.59
	SAR Test Required	Yes	Yes	Yes	Yes	Yes	Yes
Right Edge	Distance to User (mm)	4.5					
	Max. Peak Power (dBm)	19.00	20.50	23.00	23.00	20.50	23.00
	Max. Peak Power (mW)	79.43	112.20	199.53	199.53	112.20	199.53
	Exclusion Threshold (mW)	2.77	2.97	7.84	10.09	2.94	10.59
	SAR Test Required	Yes	Yes	Yes	Yes	Yes	Yes
Top Edge	Distance to User (mm)	2.0					
	Max. Peak Power (dBm)	19.00	20.50	23.00	23.00	20.50	23.00
	Max. Peak Power (mW)	79.43	112.20	199.53	199.53	112.20	199.53
	Exclusion Threshold (mW)	0.62	0.67	2.48	3.49	0.66	3.73
	SAR Test Required	Yes	Yes	Yes	Yes	Yes	Yes
Bottom Edge	Distance to User (mm)	106.5					
	Max. Peak Power (dBm)	19.00	20.50	23.00	23.00	20.50	23.00

	Max. Peak Power (mW)	79.43	112.20	199.53	199.53	112.20	199.53
	Exclusion Threshold (mW)	955.54	966.73	703.19	635.59	964.85	623.38
	SAR Test Required	Yes	Yes	Yes	Yes	Yes	Yes

Note:

1. Maximum power is the source-based time-average power and represents the maximum RF output power including tune-up tolerance among production units
2. Per KDB 447498 D04, for larger devices, the test separation distance of adjacent edge configuration is determined by the closest separation between the antenna and the user.
3. Per KDB 447498 D04, standalone SAR test exclusion threshold is applied; If the distance of the antenna to the user is < 5mm, 5mm is used to determine SAR exclusion threshold
4. Per KDB 447498 D04, for separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive), the threshold Pth (mW) is given by Following:

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

where

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

   a. f(GHz) is the RF channel transmit frequency in GHz
   b. d is the separation distance (cm), The result is rounded to one decimal place for comparison
   c. ERP_{20cm} are determined by:

$$ERP_{20cm}(mW) = f(x) = \begin{cases} 2040f & 0.3GHz \le f < 1.5GHz \\ 3060 & 1.5GHz \le f \le 6GHz \end{cases}$$

5. Per KDB 248227 D01, choose the highest output power channel to test SAR and determine further SAR exclusion.8. For each frequency band, testing at higher data rates and higher order modulations is not required when the maximum average output power for each of these configurations is less than 1/4dB higher than those measured at the lowest data rate
6. Per KDB 248227 D01 SAR is not required for the following 2.4 GHz OFDM conditions.
   a. When KDB Publication 447498 D04 SAR test exclusion applies to the OFDM configuration.
   b. When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.
7. Per KDB 248227 D01 SAR is not required for the following U-NII-1 and U-NII-2A bands conditions.
   a. When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, each band is tested independently for SAR.
   b. When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration; otherwise, each band is tested independently for SAR.
8. For Limb SAR, SAR test exemption considered by applying a factor of 2.5 to the applicable power level thresholds.

10 TEST RESULT

10.1LTE Band 2 (20MHz Bandwidth)

Antenna	Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	RB Num.	RB Start	Power Drift (dB)	1 g Meas SAR (W/kg)	Meas. Power (dBm)	Max. tune-power (dBm)	Scaling Factor	1g Scaled SAR (W/kg)	Meas. No.
Hotspot														
Main	QPSK	Front Side	10	18900	1900.0	1	Mid	0.17	0.658	18.51	19.00	1.119	0.737	/
		Back Side	10	18900	1900.0	1	Mid	-0.02	0.785	18.51	19.00	1.119	**0.879**	1#
		Left Edge	10	18900	1900.0	1	Mid	-0.04	0.493	18.51	19.00	1.119	0.552	/
		Right Edge	10	18900	1900.0	1	Mid	0.12	0.180	18.51	19.00	1.119	0.201	/
		Top Edge	10	18900	1900.0	1	Mid	-0.18	0.519	18.51	19.00	1.119	0.581	/
		Bottom Edge	10	18900	1900.0	1	Mid	-0.11	0.102	18.51	19.00	1.119	0.114	/
		Back Side	10	18700	1880.0	1	Mid	-0.07	0.738	18.50	19.00	1.122	0.828	/
		Back Side	10	19100	1900.0	1	Mid	0.03	0.748	18.35	19.00	1.161	0.869	/
		Front Side	10	18700	1880.0	50	High	-0.13	0.523	17.30	18.00	1.175	0.614	/
		Back Side	10	18700	1880.0	50	High	0.03	0.637	17.30	18.00	1.175	0.748	/
		Left Edge	10	18700	1880.0	50	High	-0.01	0.400	17.30	18.00	1.175	0.470	/
		Right Edge	10	18700	1880.0	50	High	0.07	0.149	17.30	18.00	1.175	0.175	/
		Top Edge	10	18700	1880.0	50	High	0.09	0.407	17.30	18.00	1.175	0.478	/
		Bottom Edge	10	18700	1880.0	50	High	-0.10	0.080	17.30	18.00	1.175	0.094	/
		Back Side	10	18900	1900.0	100	Low	0.02	0.625	17.33	18.00	1.167	0.729	/
Note: Refer to ANNEX C for the detailed test data for each test configuration.														

10.2 LTE Band 4 (20MHz Bandwidth)

Antenna	Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	RB Num.	RB Start	Power Drift (dB)	1 g Meas SAR (W/kg)	Meas. Power (dBm)	Max. tune-power (dBm)	Scaling Factor	1g Scaled SAR (W/kg)	Meas. No.
Hotspot														
Main	QPSK	Front Side	10	20175	1732.5	1	Mid	0.14	0.920	19.61	20.50	1.227	1.129	/
		Back Side	10	20175	1732.5	1	Mid	-0.12	0.930	19.61	20.50	1.227	1.142	/
		Left Edge	10	20175	1732.5	1	Mid	0.11	0.568	19.61	20.50	1.227	0.697	/
		Right Edge	10	20175	1732.5	1	Mid	0.01	0.087	19.61	20.50	1.227	0.107	/
		Top Edge	10	20175	1732.5	1	Mid	0.19	0.681	19.61	20.50	1.227	0.836	/
		Bottom Edge	10	20175	1732.5	1	Mid	-0.01	0.339	19.61	20.50	1.227	0.416	/
		Front Side	10	20050	1720	1	High	0.05	0.958	19.65	20.50	1.216	1.165	/
		Front Side	10	20300	1745	1	Mid	-0.08	0.916	19.51	20.50	1.256	1.151	/
		Back Side	10	20050	1720	1	High	0.09	0.974	19.65	20.50	1.216	**1.185**	2#
		Back Side	10	20300	1745	1	Mid	0.02	0.938	19.51	20.50	1.256	1.178	/
		Top Edge	10	20050	1720	1	High	0.10	0.708	19.65	20.50	1.216	0.861	/
		Top Edge	10	20300	1745	1	Mid	-0.09	0.691	19.51	20.50	1.256	0.868	/
		Front Side	10	20050	1720	50	Mid	0.03	0.735	18.36	19.50	1.300	0.956	/
		Back Side	10	20050	1720	50	Mid	0.09	0.755	18.36	19.50	1.300	0.982	/
		Left Edge	10	20050	1720	50	Mid	0.07	0.434	18.36	19.50	1.300	0.564	/
		Right Edge	10	20050	1720	50	Mid	-0.01	0.080	18.36	19.50	1.300	0.104	/
		Top Edge	10	20050	1720	50	Mid	0.06	0.554	18.36	19.50	1.300	0.720	/
		Bottom Edge	10	20050	1720	50	Mid	-0.04	0.279	18.36	19.50	1.300	0.363	/
		Front Side	10	20175	1732.5	50	High	0.03	0.745	18.34	19.50	1.306	0.973	/
		Front Side	10	20300	1745	50	Mid	0.01	0.712	18.34	19.50	1.306	0.930	/
		Back Side	10	20175	1732.5	50	High	0.11	0.751	18.34	19.50	1.306	0.981	/
		Back Side	10	20300	1745	50	Mid	0.01	0.736	18.34	19.50	1.306	0.961	/
		Front Side	10	20050	1720	100	Low	0.06	0.705	18.31	19.50	1.315	0.927	/
		Back Side	10	20050	1720	100	Low	-0.04	0.718	18.31	19.50	1.315	0.944	/
Note: Refer to ANNEX C for the detailed test data for each test configuration.														

10.3 LTE Band 5 (10MHz Bandwidth)

Antenna	Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	RB Num.	RB Start	Power Drift (dB)	1 g Meas SAR (W/kg)	Meas. Power (dBm)	Max tune-power (dBm)	Scaling Factor	1g Scaled SAR (W/kg)	Meas. No.
Hotspot														
Main	QPSK	Front Side	10	20525	836.5	1	High	-0.16	0.394	21.93	23.00	1.279	0.504	/
		Back Side	10	20525	836.5	1	High	-0.15	0.344	21.93	23.00	1.279	0.440	/
		Left Edge	10	20525	836.5	1	High	0.01	0.157	21.93	23.00	1.279	0.201	/
		Right Edge	10	20525	836.5	1	High	-0.05	0.202	21.93	23.00	1.279	0.258	/
		Top Edge	10	20525	836.5	1	High	-0.01	0.117	21.93	23.00	1.279	0.150	/
		Bottom Edge	10	20525	836.5	1	High	-0.01	0.047	21.93	23.00	1.279	0.060	/
		Front Side	10	20450	829.0	1	Low	0.07	0.457	21.89	23.00	1.291	**0.590**	3#
		Front Side	10	20600	844.0	1	Low	-0.03	0.389	21.89	23.00	1.291	0.502	/
		Front Side	10	20450	829.0	25	Mid	0.08	0.307	20.99	22.00	1.262	0.387	/
		Back Side	10	20450	829.0	25	Mid	-0.07	0.292	20.99	22.00	1.262	0.368	/
		Left Edge	10	20450	829.0	25	Mid	0.11	0.135	20.99	22.00	1.262	0.170	/
		Right Edge	10	20450	829.0	25	Mid	-0.07	0.178	20.99	22.00	1.262	0.225	/
		Top Edge	10	20450	829.0	25	Mid	0.05	0.078	20.99	22.00	1.262	0.098	/
		Bottom Edge	10	20450	829.0	25	Mid	-0.11	0.025	20.99	22.00	1.262	0.032	/
Note: Refer to ANNEX C for the detailed test data for each test configuration.														

10.4LTE Band 12 (10MHz Bandwidth)

Antenna	Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	RB Num.	RB Start	Power Drift (dB)	1 g Meas SAR (W/kg)	Meas. Power (dBm)	Max. tune-power (dBm)	Scaling Factor	1g Scaled SAR (W/kg)	Meas. No.
Hotspot														
Main	QPSK	Front Side	10	23095	707.5	1	High	0.14	0.905	22.74	23.00	1.062	0.961	/
		Back Side	10	23095	707.5	1	High	-0.19	0.723	22.74	23.00	1.062	0.768	/
		Left Edge	10	23095	707.5	1	High	-0.12	0.452	22.74	23.00	1.062	0.480	/
		Right Edge	10	23095	707.5	1	High	-0.04	0.430	22.74	23.00	1.062	0.457	/
		Top Edge	10	23095	707.5	1	High	-0.05	0.096	22.74	23.00	1.062	0.102	/
		Bottom Edge	10	23095	707.5	1	High	0.10	0.071	22.74	23.00	1.062	0.075	/
		Front Side	10	23060	704.0	1	Mid	-0.09	0.946	22.47	23.00	1.130	**1.069**	4#
		Front Side	10	23130	711.0	1	High	-0.09	0.862	22.72	23.00	1.067	0.919	/
		Front Side	10	23130	711.0	25	High	-0.13	0.704	21.61	22.00	1.094	0.770	/
		Back Side	10	23130	711.0	25	High	0.10	0.559	21.61	22.00	1.094	0.612	/
		Left Edge	10	23130	711.0	25	High	0.02	0.347	21.61	22.00	1.094	0.380	/
		Right Edge	10	23130	711.0	25	High	-0.05	0.352	21.61	22.00	1.094	0.385	/
		Top Edge	10	23130	711.0	25	High	0.03	0.092	21.61	22.00	1.094	0.101	/
		Bottom Edge	10	23130	711.0	25	High	-0.04	0.071	21.61	22.00	1.094	0.078	/
		Front Side	10	23130	711.0	50	Low	0.06	0.701	21.46	22.00	1.132	0.794	/
Note: Refer to ANNEX C for the detailed test data for each test configuration.														

10.5 LTE Band 66 (20MHz Bandwidth)

Antenna	Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	RB Num.	RB Start	Power Drift (dB)	1 g Meas SAR (W/kg)	Meas. Power (dBm)	Max. tune-power (dBm)	Scaling Factor	1g Scaled SAR (W/kg)	Meas. No.
Hotspot														
Main	QPSK	Front Side	10	132322	1745	1	Mid	-0.14	0.888	19.93	20.50	1.140	1.013	/
		Back Side	10	132322	1745	1	Mid	-0.18	0.928	19.93	20.50	1.140	1.058	/
		Left Edge	10	132322	1745	1	Mid	0.04	0.598	19.93	20.50	1.140	0.682	/
		Right Edge	10	132322	1745	1	Mid	-0.05	0.087	19.93	20.50	1.140	0.099	/
		Top Edge	10	132322	1745	1	Mid	-0.01	0.775	19.93	20.50	1.140	0.884	/
		Bottom Edge	10	132322	1745	1	Mid	-0.01	0.383	19.93	20.50	1.140	0.437	/
		Front Side	10	132072	1720	1	High	0.04	0.901	19.68	20.50	1.208	1.088	/
		Front Side	10	132572	1770	1	Mid	-0.08	0.823	19.26	20.50	1.330	1.095	/
		Back Side	10	132072	1720	1	High	0.01	0.957	19.68	20.50	1.208	**1.156**	5#
		Back Side	10	132572	1770	1	Mid	0.04	0.864	19.26	20.50	1.330	1.150	/
		Top Edge	10	132072	1720	1	High	0.12	0.790	19.68	20.50	1.208	0.954	/
		Top Edge	10	132572	1770	1	Mid	0.05	0.718	19.26	20.50	1.330	0.955	/
		Front Side	10	132322	1745	50	Low	-0.07	0.707	18.55	19.50	1.245	0.880	/
		Back Side	10	132322	1745	50	Low	-0.07	0.729	18.55	19.50	1.245	0.907	/
		Left Edge	10	132322	1745	50	Low	0.05	0.456	18.55	19.50	1.245	0.567	/
		Right Edge	10	132322	1745	50	Low	-0.03	0.087	18.55	19.50	1.245	0.108	/
		Top Edge	10	132322	1745	50	Low	0.10	0.616	18.55	19.50	1.245	0.767	/
		Bottom Edge	10	132322	1745	50	Low	0.12	0.295	18.55	19.50	1.245	0.367	/
		Front Side	10	132072	1720	50	Low	-0.09	0.714	18.52	19.50	1.253	0.895	/
		Front Side	10	132572	1770	50	High	0.09	0.657	18.00	19.50	1.413	0.928	/
		Back Side	10	132072	1720	50	Low	-0.03	0.771	18.52	19.50	1.253	0.966	/
		Back Side	10	132572	1770	50	High	0.10	0.685	18.00	19.50	1.413	0.968	/
		Front Side	10	132072	1720	100	Low	-0.07	0.703	18.66	19.50	1.213	0.853	/
		Back Side	10	132572	1770	100	Low	-0.04	0.710	18.66	19.50	1.213	0.862	/
Note: Refer to ANNEX C for the detailed test data for each test configuration.														

10.6 LTE Band 71 (20MHz Bandwidth)

Antenna	Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	RB Num.	RB Start	Power Drift (dB)	1 g Meas SAR (W/kg)	Meas. Power (dBm)	Max. tune-power (dBm)	Scaling Factor	1g Scaled SAR (W/kg)	Meas. No.
Hotspot														
Main	QPSK	Front Side	10	133297	680.5	1	Mid	0.04	0.665	21.94	23.00	1.276	0.849	/
		Back Side	10	133297	680.5	1	Mid	0.06	0.669	21.94	23.00	1.276	0.854	/
		Left Edge	10	133297	680.5	1	Mid	0.19	0.579	21.94	23.00	1.276	0.739	/
		Right Edge	10	133297	680.5	1	Mid	-0.17	0.086	21.94	23.00	1.276	0.110	/
		Top Edge	10	133297	680.5	1	Mid	0.03	0.599	21.94	23.00	1.276	0.765	/
		Bottom Edge	10	133297	680.5	1	Mid	0.09	0.307	21.94	23.00	1.276	0.392	/
		Front Side	10	133222	663.0	1	High	0.04	0.706	21.83	23.00	1.309	0.924	/
		Front Side	10	133372	688.0	1	Mid	-0.08	0.710	21.92	23.00	1.282	0.910	/
		Back Side	10	133222	663.0	1	High	0.13	0.721	21.83	23.00	1.309	0.944	/
		Back Side	10	133372	688.0	1	Mid	0.05	0.742	21.92	23.00	1.282	**0.951**	6#
		Front Side	10	133297	680.5	50	High	-0.03	0.541	20.78	22.00	1.324	0.716	/
		Back Side	10	133297	680.5	50	High	0.02	0.548	20.78	22.00	1.324	0.726	/
		Left Edge	10	133297	680.5	50	High	0.11	0.455	20.78	22.00	1.324	0.603	/
		Right Edge	10	133297	680.5	50	High	0.10	0.054	20.78	22.00	1.324	0.072	/
		Top Edge	10	133297	680.5	50	High	0.12	0.467	20.78	22.00	1.324	0.618	/
		Bottom Edge	10	133297	680.5	50	High	0.06	0.241	20.78	22.00	1.324	0.319	/
		Back Side	10	133372	688.0	100	Low	-0.03	0.541	20.65	22.00	1.365	0.738	/

Note: Refer to ANNEX C for the detailed test data for each test configuration.

11 SAR Measurement Variability

According to KDB 865664 D01, SAR measurement variability was assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. Alternatively, if the highest measured SAR for both head and body tissue-equivalent media are ≤ 1.45 W/kg and the ratio of these highest SAR values, i.e., largest divided by smallest value, is ≤ 1.10, the highest SAR configuration for either head or body tissue-equivalent medium may be used to perform the repeated measurement. 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.

SAR repeated measurement procedure:

1. When the highest measured SAR is < 0.80 W/kg, repeated measurement is not required.
2. When the highest measured SAR is >= 0.80 W/kg, repeat that measurement once.
3. 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 W/kg, perform a second repeated measurement.
4. If the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20, and the original, first or second repeated measurement is >= 1.5 W/kg, perform a third repeated measurement.

Frequency Band (MHz)	Wireless Band	RF Exposure Conditions	Test Position	Highest Measured SAR (W/kg)	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)	Largest to Smallest SAR Radio
1720	LTE Band4	Hotspot	Front Side	0.958	Yes	0.935	1.02
1720	LTE Band4	Hotspot	Back Side	0.974	Yes	0.972	1.00
704	LTE Band12	Hotspot	Front Side	0.946	Yes	0.898	1.05
1720	LTE Band66	Hotspot	Front Side	0.901	Yes	0.885	1.02
1720	LTE Band66	Hotspot	Back Side	0.957	Yes	0.918	1.04

12 TEST EQUIPMENTS LIST

Description	Manufacturer	Model	Serial No./Version	Cal. Date	Cal. Due
PC	Dell	N/A	N/A	N/A	N/A
Test Software	Speag	DASY5	52.8.8.1222	N/A	N/A
750MHz Validation Dipole	Speag	D750V3	SN: 1208	2021/07/05	2024/07/05
835MHz Validation Dipole	Speag	D835V2	SN: 4d187	2021/05/17	2024/05/17
1750MHz Validation Dipole	Speag	D1750V2	SN: 1130	2021/05/17	2024/05/17
1900MHz Validation Dipole	Speag	D1900V2	SN: 5d193	2021/05/20	2024/05/20
E-Field Probe	Speag	EX3DV4	SN: 7607	2023/07/04	2024/07/04
Data Acquisition Electronicsr	Speag	DAE4	SN: 878	2023/03/23	2024/03/23
Signal Generator	R&S	SMB100A	177746	2023/05/10	2024/05/10
Power Meter	R&S	NRVD-B2	835843/014	2023/09/05	2024/09/05
Power Sensor	R&S	NRV-Z4	100381	2023/09/05	2024/09/05
Power Sensor	R&S	NRV-Z2	100211	2023/09/05	2024/09/05
Wireless Communication Test Set	Anritsu	MT8820C	6201144551	2023/06/29	2024/06/29
Network Analyzer	Agilent	E5071C	MY46103472	2023/11/14	2024/11/14
Thermometer	Elitech	RC-4	EF5238001629	2023/10/09	2024/10/09
Thermometer	Elitech	RC-4HC	EF7239002655	2023/11/17	2024/11/17
Power Amplifier	SATIMO	6552B	22374	N/A	N/A
Dielectric Probe Kit	Speag	DAK3.5	SN: 1312	N/A	N/A
Phantom	Speag	SAM	SN: 1576	N/A	N/A
Attenuator	COM-MW	ZA-S1-31	1305003187	N/A	N/A
Directional coupler	AA-MCS	AAMCS-UDC	000272	N/A	N/A

Note: For dipole antennas, BALUN has adopted 3 years as calibration intervals, and on annual basis, every measurement dipole has been evaluated and is in compliance with the following criteria:

1. There is no physical damage on the dipole;
2. System validation with specific dipole is within 10% of calibrated value;
3. Return-loss in within 20% of calibrated measurement.
4. Impedance (real or imaginary parts) in within 5 Ohms of calibrated measurement.

ANNEX A SIMULATING LIQUID VERIFICATION RESULT

The dielectric parameters of the liquids were verified prior to the SAR evaluation using a DAK3.5 Dielectric Probe Kit.

Date	Liquid Type	Fre. (MHz)	Temp. (℃)	Meas. Conductivity (σ) (S/m)	Meas. Permittivity (ε)	Target Conductivity (σ) (S/m)	Target Permittivity (ε)	Conductivity Tolerance (%)	Permittivity Tolerance (%)
2024.03.05	Head	750	21.6	0.93	41.20	0.89	41.94	4.61	-1.76
2024.03.05	Head	835	21.6	0.91	42.13	0.90	41.50	0.78	1.51
2024.03.06	Head	1750	21.2	1.40	39.98	1.37	40.08	2.26	-0.25
2024.03.06	Head	1900	21.2	1.42	39.21	1.40	40.00	1.43	-1.98
Note: The tolerance limit of Conductivity and Permittivity is± 5%.									

ANNEX B SYSTEM CHECK RESULT

Comparing to the original SAR value provided by SPEAG, the validation data should be within itsspecification of 10 %(for 1 g).

Date	Liquid Type	Freq. (MHz)	Power (mW)	Measured SAR (W/kg)	Normalized SAR (W/kg)	Dipole SAR (W/kg)	Tolerance (%)
2024.03.05	Head	750	100	0.818	8.18	8.29	-1.33
2024.03.05	Head	835	100	0.956	9.56	9.76	-2.05
2024.03.06	Head	1750	100	3.610	36.10	36.70	-1.63
2024.03.06	Head	1900	100	4.170	41.70	40.30	3.47
Note: The tolerance limit of System validation ±10%.							

System Performance Check Data (750MHz)

Date: 2024.03.05

Communication System Band: D750 (750.0 MHz); Frequency: 750 MHz;Duty Cycle: 1:1

Medium parameters used (extrapolated): f = 750 MHz; σ = 0.931 S/m; ε_r = 41.201; ρ = 1000 kg/m^3

Phantom section: Flat Section

Ambient Temperature:22.5℃ Liquid Temperature:21.6℃

DASY5 Configuration:

- Probe: EX3DV4 - SN7607; ConvF(10.31, 10.57, 10.43); Calibrated: 2023.07.04;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn878; Calibrated: 2023.03.23
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1576
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

CW 750/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.811 W/kg

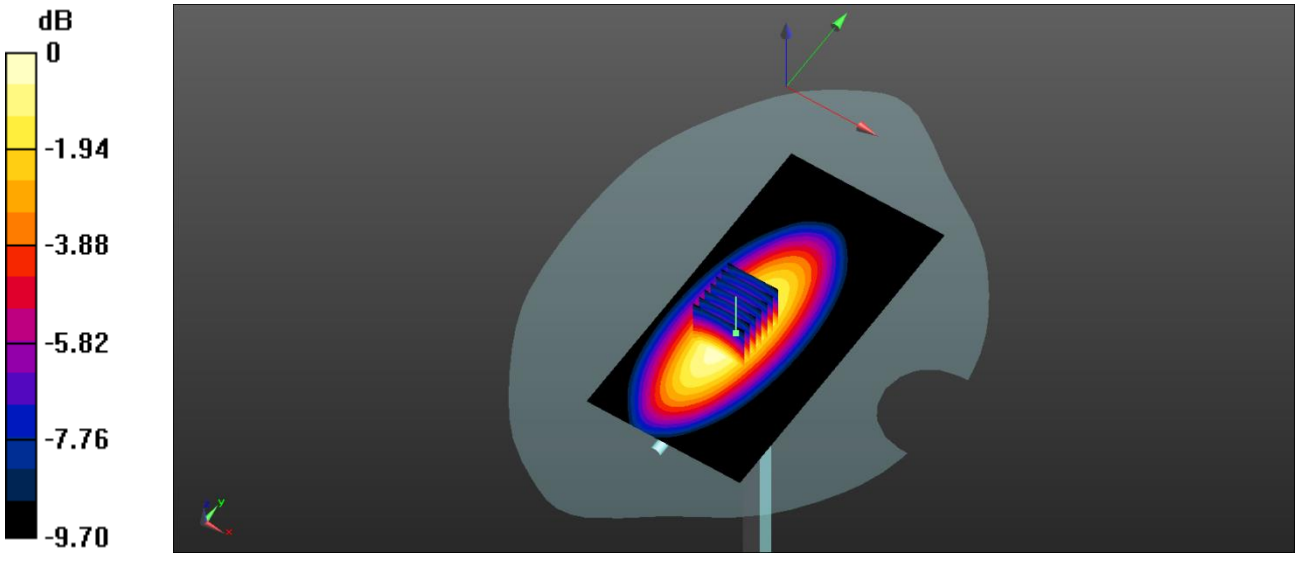
CW 750/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 28.27 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 1.14 W/kg

SAR(1 g) = 0.818 W/kg; SAR(10 g) = 0.545 W/kg

Maximum value of SAR (measured) = 0.837 W/kg



0 dB = 0.837 W/kg

System Performance Check Data (835MHz)

Date: 2024.03.05

Communication System Band: D835 (835.0 MHz); Frequency: 835 MHz;Duty Cycle: 1:1

Medium parameters used: f = 835 MHz; σ = 0.902 S/m; ε_r = 41.668; ρ = 1000 kg/m^3

Phantom section: Flat Section

Ambient Temperature:22.5℃ Liquid Temperature:21.6℃

DASY5 Configuration:

- Probe: EX3DV4 - SN7607; ConvF(9.96, 10.1, 10.15); Calibrated: 2023.07.04;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn878; Calibrated: 2023.03.23
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1576
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

CW 835/Area Scan (61x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.18 W/kg

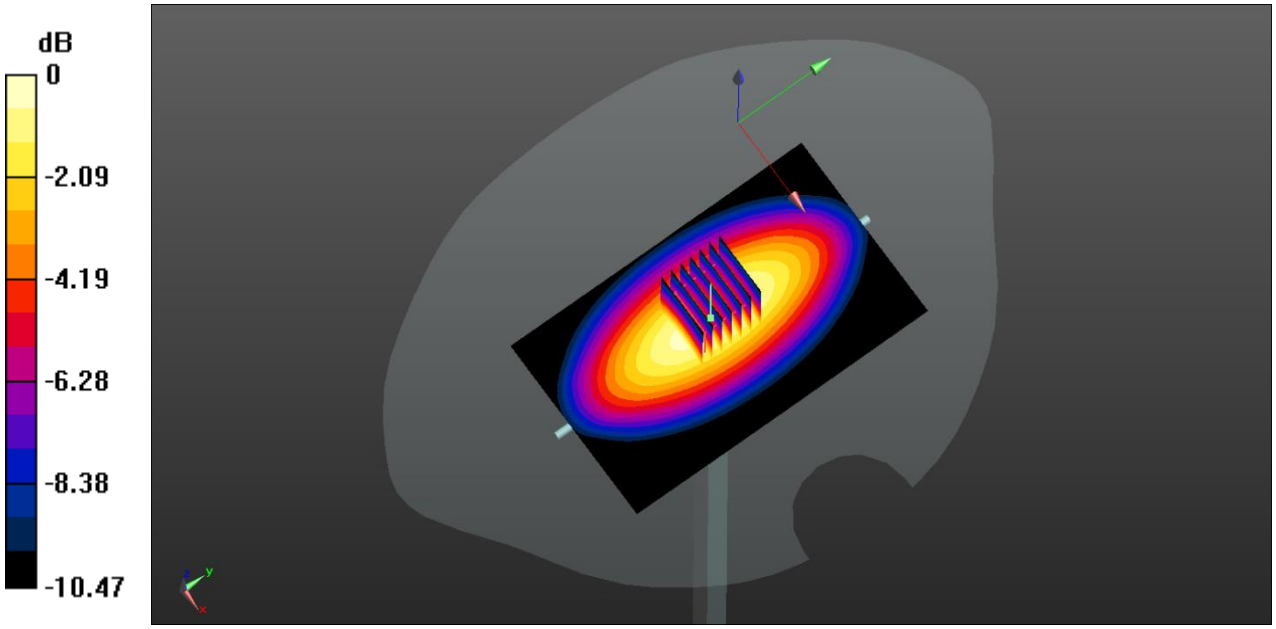
CW 835/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 33.31 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 1.47 W/kg

SAR(1 g) = 0.956 W/kg; SAR(10 g) = 0.634 W/kg

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



0 dB = 1.08 W/kg

System Performance Check Data (1750MHz)

Date: 2024.03.06

Communication System Band: D1750 (1750.0 MHz); Frequency: 1750 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1750 MHz; σ = 1.401 S/m; ε_r = 39.98; ρ = 1000 kg/m^3

Phantom section: Flat Section

Ambient Temperature:22.4℃ Liquid Temperature:21.2℃

DASY5 Configuration:

- Probe: EX3DV4 - SN7607; ConvF(8.52, 8.91, 8.76); Calibrated: 2023.07.04;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn878; Calibrated: 2023.03.23
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1576
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

CW 1750/Area Scan (101x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 4.28 W/kg

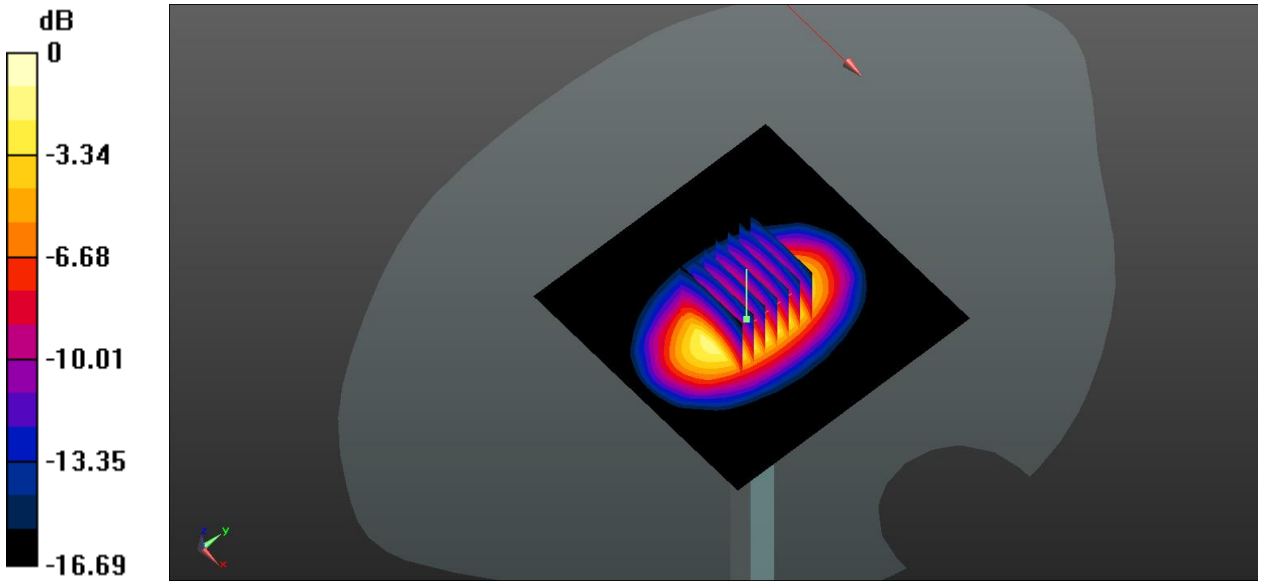
CW 1750/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.77 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 7.08 W/kg

SAR(1 g) = 3.61 W/kg; SAR(10 g) = 1.93 W/kg

Maximum value of SAR (measured) = 4.32 W/kg



0 dB = 4.32 W/kg

System Performance Check Data (1900MHz)

Date: 2024.03.06

Communication System Band: D1900 (1900.0 MHz); Frequency: 1900 MHz;Duty Cycle: 1:1

Medium parameters used: f = 1900 MHz; σ = 1.42 S/m; ε_r = 39.208; ρ = 1000 kg/m^3

Phantom section: Flat Section

Ambient Temperature:22.4℃ Liquid Temperature:21.2℃

DASY5 Configuration:

- Probe: EX3DV4 - SN7607; ConvF(7.98, 8.26, 8.14); Calibrated: 2023.07.04;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn878; Calibrated: 2023.03.23
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1576
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

CW 1900/Area Scan (101x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 4.67 W/kg

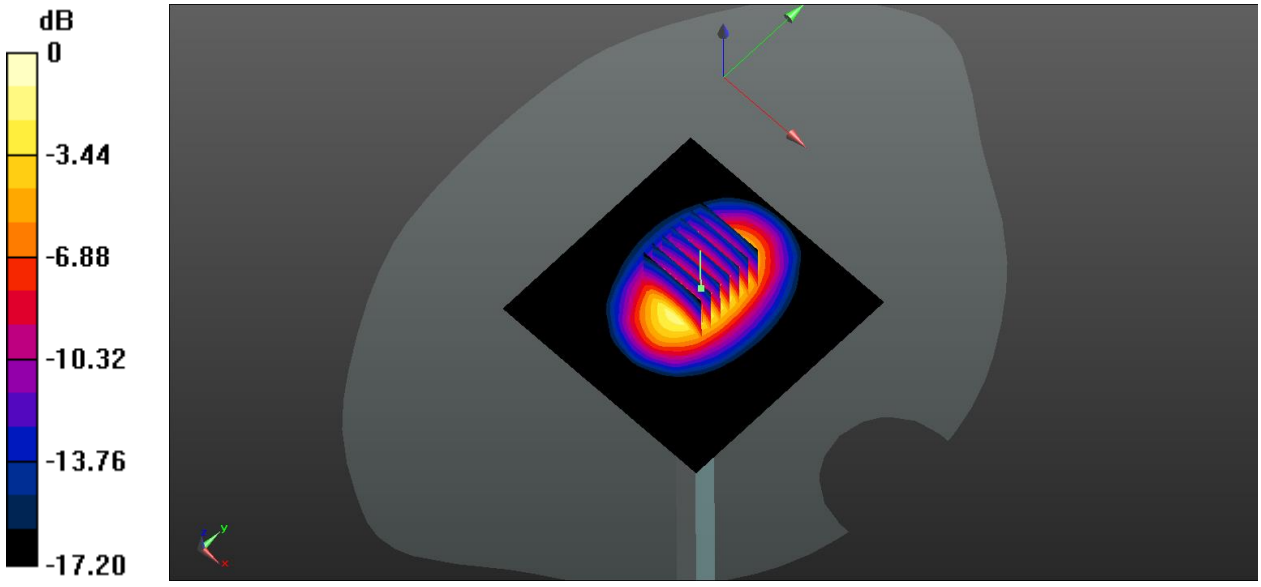
CW 1900/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.24 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 7.54 W/kg

SAR(1 g) = 4.17 W/kg; SAR(10 g) = 2.04 W/kg

Maximum value of SAR (measured) = 4.68W/kg



0 dB = 4.68 W/kg

ANNEX C TEST DATA

Meas.1 Body Plane with Back Side 10mm on Middle Channel in LTE Band2 mode

Date: 2024.03.06

Communication System Band: BAND 2; Frequency: 1880 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1880 MHz; σ = 1.396 S/m; ε_r = 39.676; ρ = 1000 kg/m^3

Phantom section: Flat Section

Ambient Temperature:22.4℃ Liquid Temperature:21.2℃

DASY5 Configuration:

- Probe: EX3DV4 - SN7607; ConvF(7.98, 8.26, 8.14); Calibrated: 2023.07.04;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn878; Calibrated: 2023.03.23
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1576
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch18900/Area Scan (81x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.895 W/kg

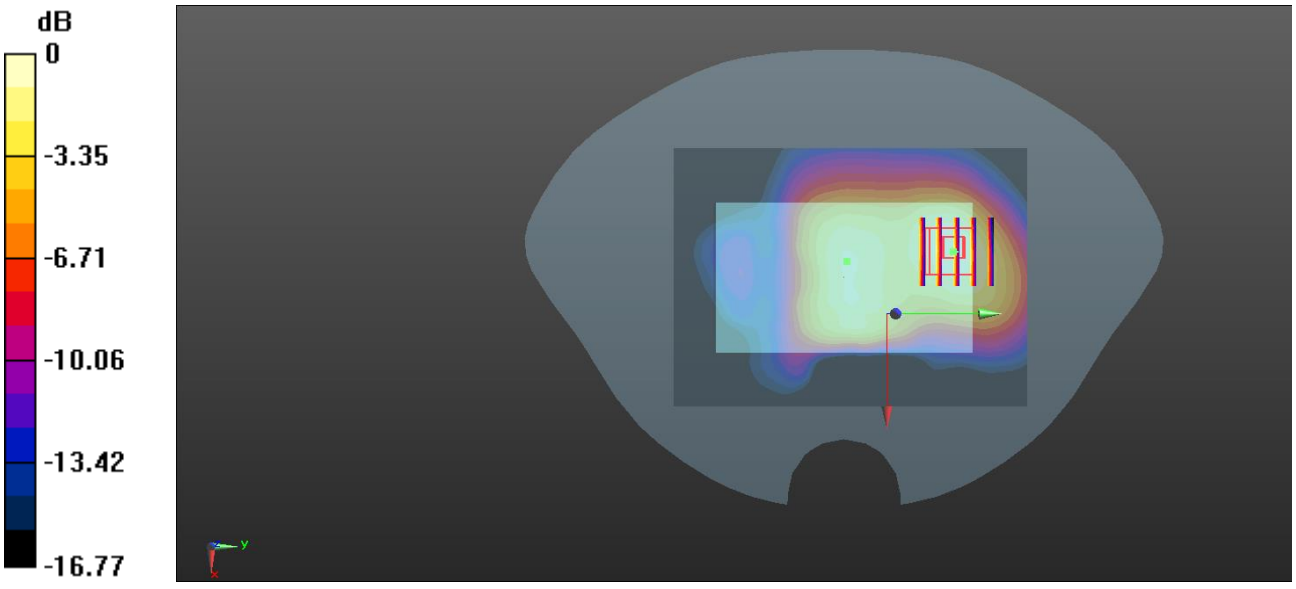
Ch18900/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 22.18 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 1.33 W/kg

SAR(1 g) = 0.785 W/kg; SAR(10 g) = 0.462 W/kg

Maximum value of SAR (measured) = 0.853 W/kg



0 dB = 0.853 W/kg

Meas.2 Body Plane with Back Side 10mm on Low Channel in LTE Band4 mode

Date: 2024.03.06

Communication System Band: BAND 4; Frequency: 1720 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1720 MHz; σ = 1.342 S/m; ε_r = 41.392; ρ = 1000 kg/m^3

Phantom section: Flat Section

Ambient Temperature:22.4℃ Liquid Temperature:21.2℃

DASY5 Configuration:

- Probe: EX3DV4 - SN7607; ConvF(8.52, 8.91, 8.76); Calibrated: 2023.07.04;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn878; Calibrated: 2023.03.23
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1576
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch20050/Area Scan (81x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.10 W/kg

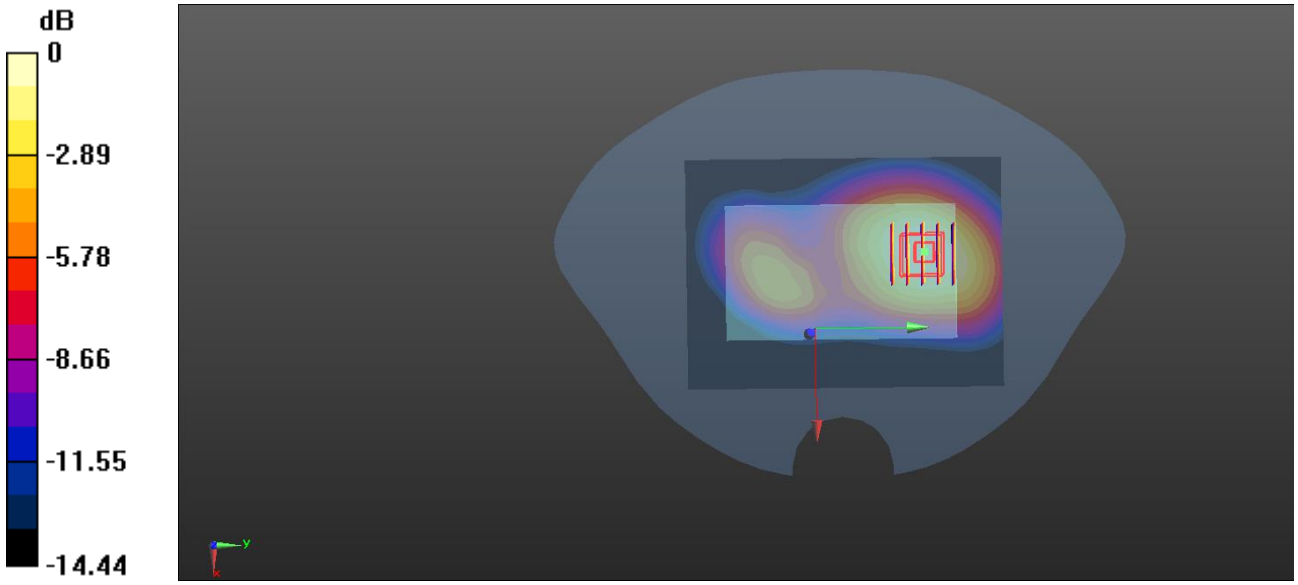
Ch20050/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.00 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 1.43 W/kg

SAR(1 g) = 0.974 W/kg; SAR(10 g) = 0.631 W/kg

Maximum value of SAR (measured) = 1.06 W/kg



0 dB = 1.06 W/kg

Meas.3 Body Plane with Front Side 10mm on Low Channel in LTE Band5 mode

Date: 2024.03.05

Communication System Band: BAND 5; Frequency: 829 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 829 MHz; σ = 0.868 S/m; ε_r = 42.492; ρ = 1000 kg/m^3

Phantom section: Flat Section

Ambient Temperature:22.5℃ Liquid Temperature:21.6℃

DASY5 Configuration:

- Probe: EX3DV4 - SN7607; ConvF(9.96, 10.1, 10.15); Calibrated: 2023.07.04;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn878; Calibrated: 2023.03.23
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1576
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch20450/Area Scan (81x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.576 W/kg

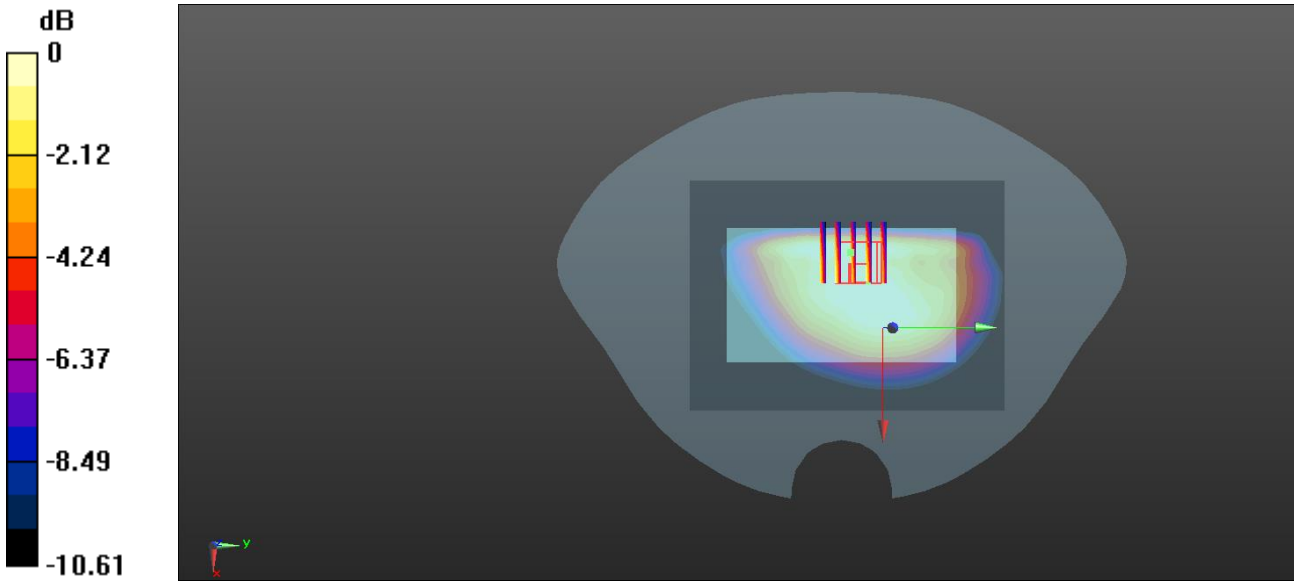
Ch20450/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 23.51 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 0.611 W/kg

SAR(1 g) = 0.457 W/kg; SAR(10 g) = 0.314 W/kg

Maximum value of SAR (measured) = 0.516 W/kg



0 dB = 0.516 W/kg

Meas.4 Body Plane with Front Side 10mm on Low Channel in LTE Band12 mode

Date: 2024.03.05

Communication System Band: BAND 12; Frequency: 704 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 704 MHz; σ = 0.903 S/m; ε_r = 42.079; ρ = 1000 kg/m^3

Phantom section: Flat Section

Ambient Temperature:22.5℃ Liquid Temperature:21.6℃

DASY5 Configuration:

- Probe: EX3DV4 - SN7607; ConvF(10.31, 10.57, 10.43); Calibrated: 2023.07.04;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn878; Calibrated: 2023.03.23
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1576
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch23060/Area Scan (81x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.02 W/kg

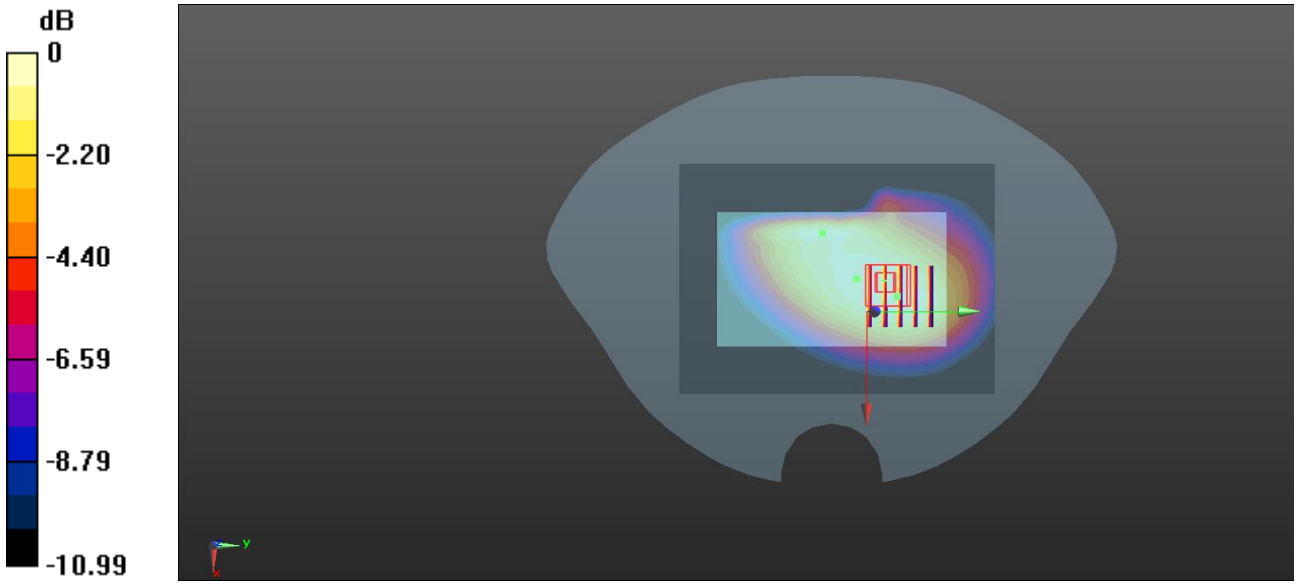
Ch23060/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 31.15 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 1.29 W/kg

SAR(1 g) = 0.946 W/kg; SAR(10 g) = 0.673 W/kg

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



0 dB = 1.01 W/kg

Meas.5 Body Plane with Back Side 10mm on Low Channel in LTE Band66 mode

Date: 2024.03.06

Communication System Band: BAND 66; Frequency: 1720 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1720 MHz; σ = 1.342 S/m; ε_r = 41.392; ρ = 1000 kg/m^3

Phantom section: Flat Section

Ambient Temperature:22.4℃ Liquid Temperature:21.2℃

DASY5 Configuration:

- Probe: EX3DV4 - SN7607; ConvF(8.52, 8.91, 8.76); Calibrated: 2023.07.04;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn878; Calibrated: 2023.03.23
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1576
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch132072/Area Scan (81x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

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

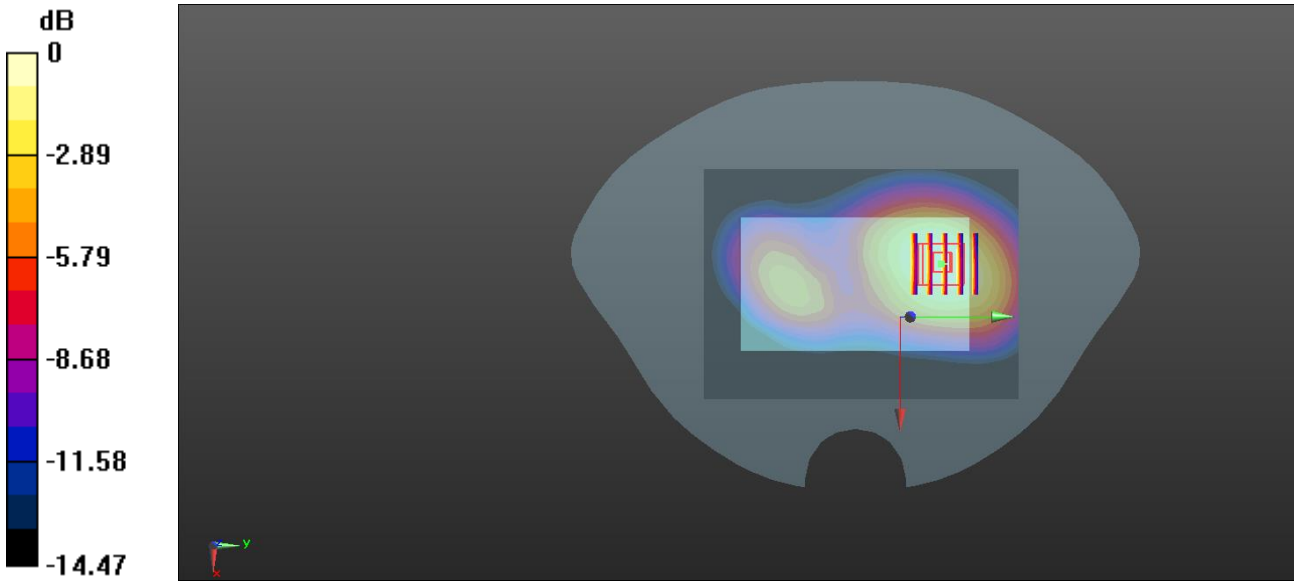
Ch132072/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 10.90 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 1.40 W/kg

SAR(1 g) = 0.957 W/kg; SAR(10 g) = 0.616 W/kg

Maximum value of SAR (measured) = 1.03 W/kg



0 dB = 1.03 W/kg

Meas.6 Body Plane with Back Side 10mm on High Channel in LTE Band71 mode

Date: 2024.03.05

Communication System Band: BAND 71; Frequency: 688 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 688 MHz; σ = 0.894 S/m; ε_r = 42.744; ρ = 1000 kg/m^3

Phantom section: Flat Section

Ambient Temperature:22.5℃ Liquid Temperature:21.6℃

DASY5 Configuration:

- Probe: EX3DV4 - SN7607; ConvF(10.31, 10.57, 10.43); Calibrated: 2023.07.04;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn878; Calibrated: 2023.03.23
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1576
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch133372/Area Scan (81x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.895 W/kg

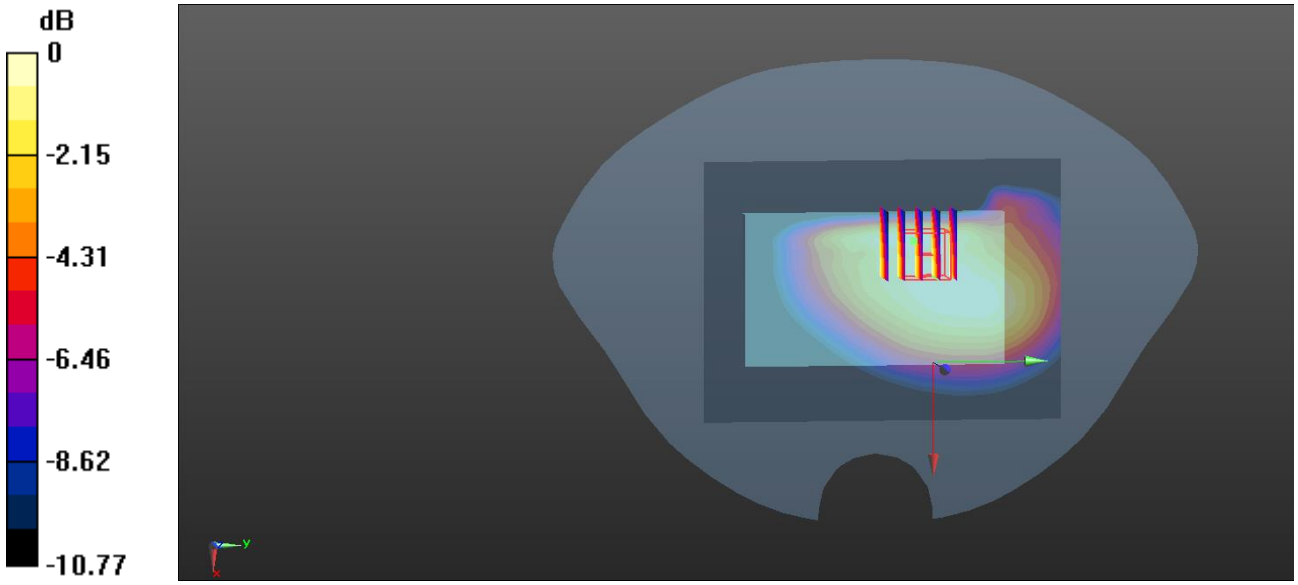
Ch133372/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 25.12 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 1.03 W/kg

SAR(1 g) = 0.742 W/kg; SAR(10 g) = 0.502 W/kg

Maximum value of SAR (measured) = 0.843 W/kg



0 dB = 0.843 W/kg

ANNEX D EUT EXTERNAL PHOTOS

Please refer the document “BL-SZ2410995-AW.pdf”.

ANNEX E SAR TEST SETUP PHOTOS

Please refer the document “BL-SZ2410995-AS.pdf”.

ANNEX F CALIBRATION REPORT

Please refer the document “BL-SZ2410995-AC.pdf”.

ANNEX G TUNE-UP PROCEDURE

Please refer the document “BL-SZ2410995-AT.pdf”.

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