

TEST REPORT

Applicant: NCXX Inc.
Address: 5-4-30, Minami-aoyama Minato-ku Tokyo, 1070062
Japan
Equipment Type: LTE USB Modem
Model Name: UX302NC-R(S)
Brand Name: NCXX Inc.
FCC ID: SLKUX302NC-RS
Test Standard: FCC 47 CFR Part 2.1093
(refer section 3.1)
Maximum SAR: Body (1 g): 1.19 W/kg
Sample Arrival Date: Feb. 13, 2025
Test Date: Feb. 16, 2025 - Feb. 17, 2025
Date of Issue: Mar. 27, 2025

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

Tested by: Guo Guangwei**Checked by:** Xu Rui**Approved by:** Tolan Tu
(Testing Director)

Revision History

Version	Issue Date	Revisions Content
<u>Rev. 01</u>	<u>Mar. 27, 2025</u>	<u>Initial Issue</u>

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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°C to 25°C
Ambient Relative Humidity	30% to 70%

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	NCXX Inc.
Address	5-4-30, Minami-aoyama Minato-ku Tokyo, 1070062 Japan

2.2 Factory Information

Manufacturer	NCXX Inc.
Address	5-4-30, Minami-aoyama Minato-ku Tokyo, 1070062 Japan

2.3 General Description for Equipment under Test (EUT)

EUT Name	LTE USB Modem
Model Name Under Test	UX302NC-R(S)
Series Model Name	N/A
Description of Model name differentiation	N/A
Hardware Version	Main Borad: LWDM130A2-1 Sub Borad: LWDU129A3-1
Software Version	LWDMJ12.1.0_M130
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.4 Ancillary Equipment

Note: Not application.

2.5 Technical Information

Network and Wireless connectivity	2G Network GPRS/EDGE 850/1900 MHz 3G Network WCDMA/HSDPA/HSUPA Band 5 4G Network LTE FDD Band 5/18/19/26
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The requirement for the following technical information of the EUT was tested in this report:

Operating Mode	GSM; WCDMA; LTE		
Frequency Range	GSM 850	TX: 824 ~ 849 MHz	RX: 869 ~ 894 MHz
	GSM 1900	TX: 1850 ~ 1910 MHz	RX: 1930 ~ 1990 MHz
	WCDMA Band 5	TX: 824 ~ 849 MHz	RX: 869 ~ 894 MHz
	LTE Band 5	TX: 824 ~ 849 MHz	RX: 869 ~ 894 MHz
	LTE Band 18	TX: 815 ~ 830 MHz	RX: 860 ~ 875 MHz
	LTE Band 19	TX: 830 ~ 845 MHz	RX: 875 ~ 890 MHz
	LTE Band 26	TX: 814 ~ 849 MHz	RX: 859 ~ 894 MHz
Antenna Type	WWAN	Fixed Internal 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/IEEE 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 447498 D02 v02r01	SAR MEASUREMENT PROCEDURES FOR USB DONGLE TRANSMITTERS
5	KDB 941225 D01 v03r01	3G SAR MEASUREMENT PROCEDURES
6	KDB 941225 D05 v02r05	SAR EVALUATION CONSIDERATIONS FOR LTE DEVICES
7	KDB 865664 D01 v01r04	SAR Measurement 100 MHz to 6 GHz
8	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/ Controlled Exposure
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

Frequency Band		Maximum Scaled SAR (W/kg) 1 g	Maximum Report SAR (W/kg) 1 g
		Body (Separation 5 mm)	Body (Separation 5 mm)
GSM	GSM 850	0.63	1.19
	GSM 1900	1.07	
WCDMA	Band 5	1.16	
LTE	Band 5	0.92	
	Band 18	0.97	
	Band 19	1.03	
	Band 26	1.19	
Limits (W/kg)		1.60	1.60
Test 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 1.192 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:

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

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

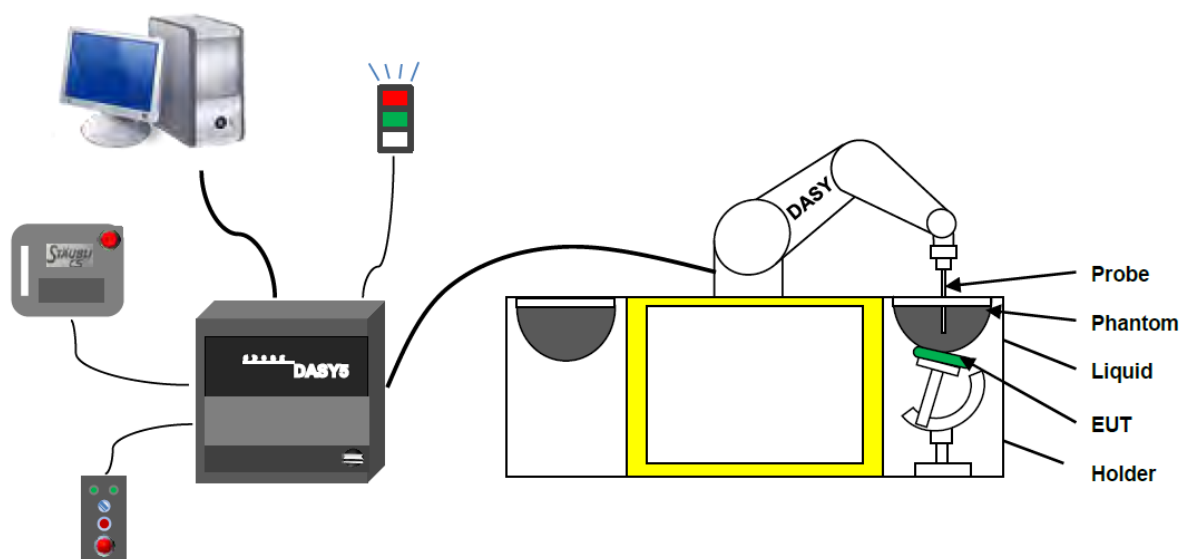
$$SAR = \frac{\sigma E^2}{\rho}$$

Where: σ is the conductivity of the tissue,

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

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: 7510 with following specifications is used.

Construction	Symmetrical design with triangular core Built-in optical fiber for surface detection system Built-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 μ W/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

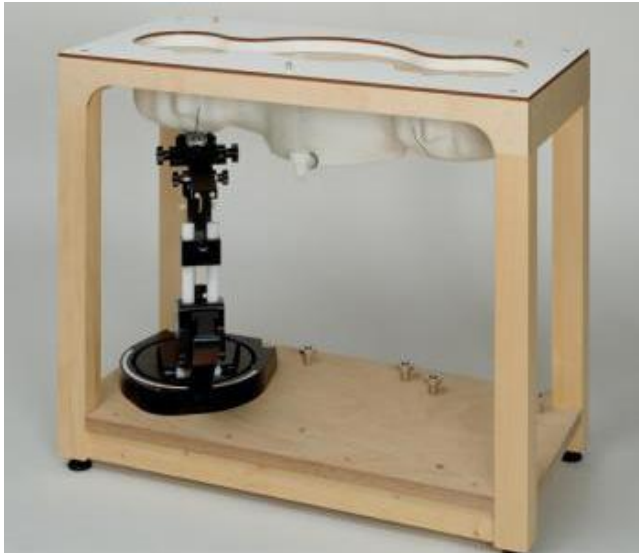
The data acquisition electronics (DAE) consist of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder with a control logic unit. Transmission to the measurement server is accomplished through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



- Input Impedance: 200M Ω m
- The Inputs: Symmetrical and Floating
- Common 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 SN 1576



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° .

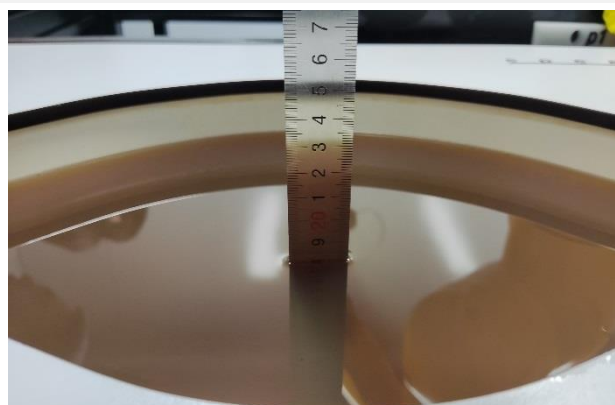
4.2.7 Simulating Liquid

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	Ethenediol, Sodium petroleum sulfonate, Hexylene Glycol / 2-Methyl-pentane-2.4-diol, Alkoxylated alcohol

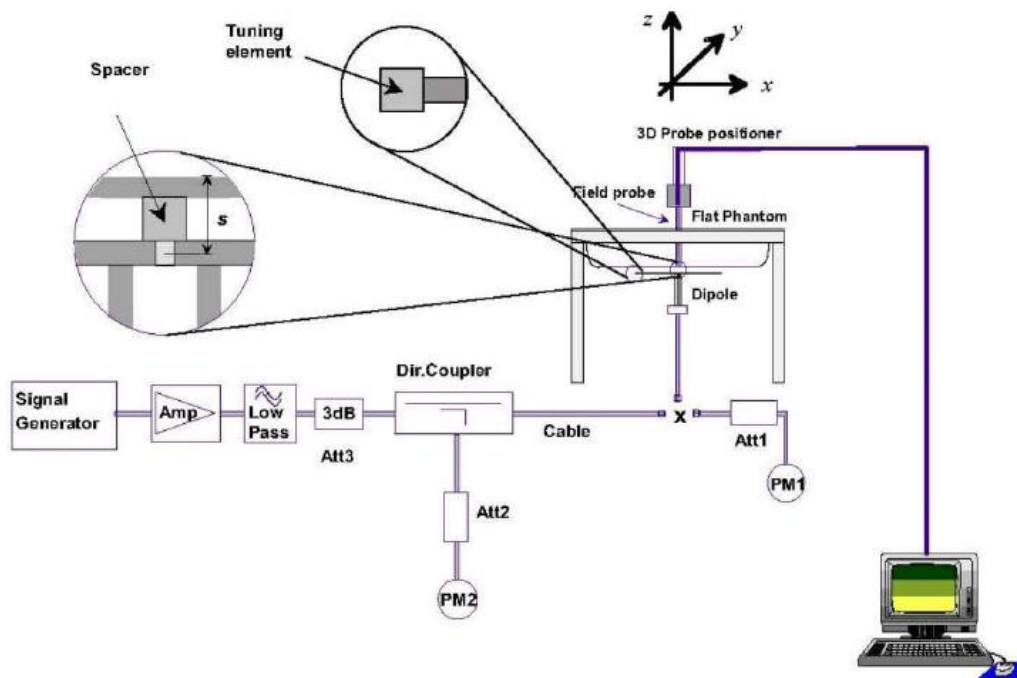
5 SYSTEM VERIFICATION

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:



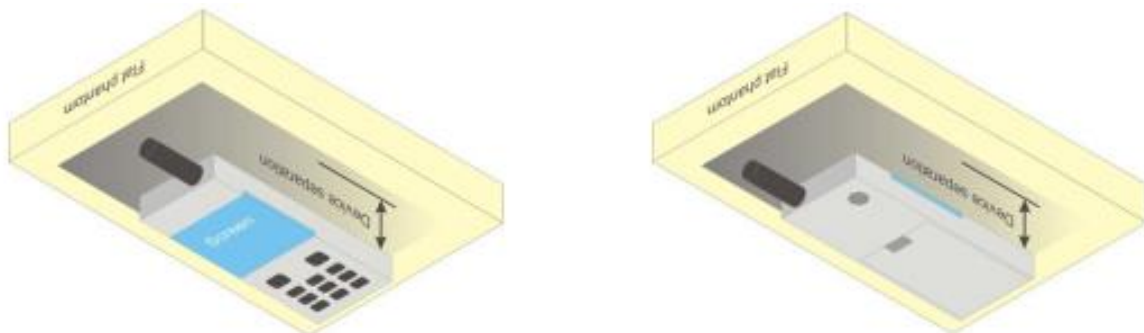
6 TEST POSITION CONFIGURATIONS

6.1 Body-worn Position Conditions

Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in KDB 447498 are used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode. When the reported SAR for a body-worn accessory.

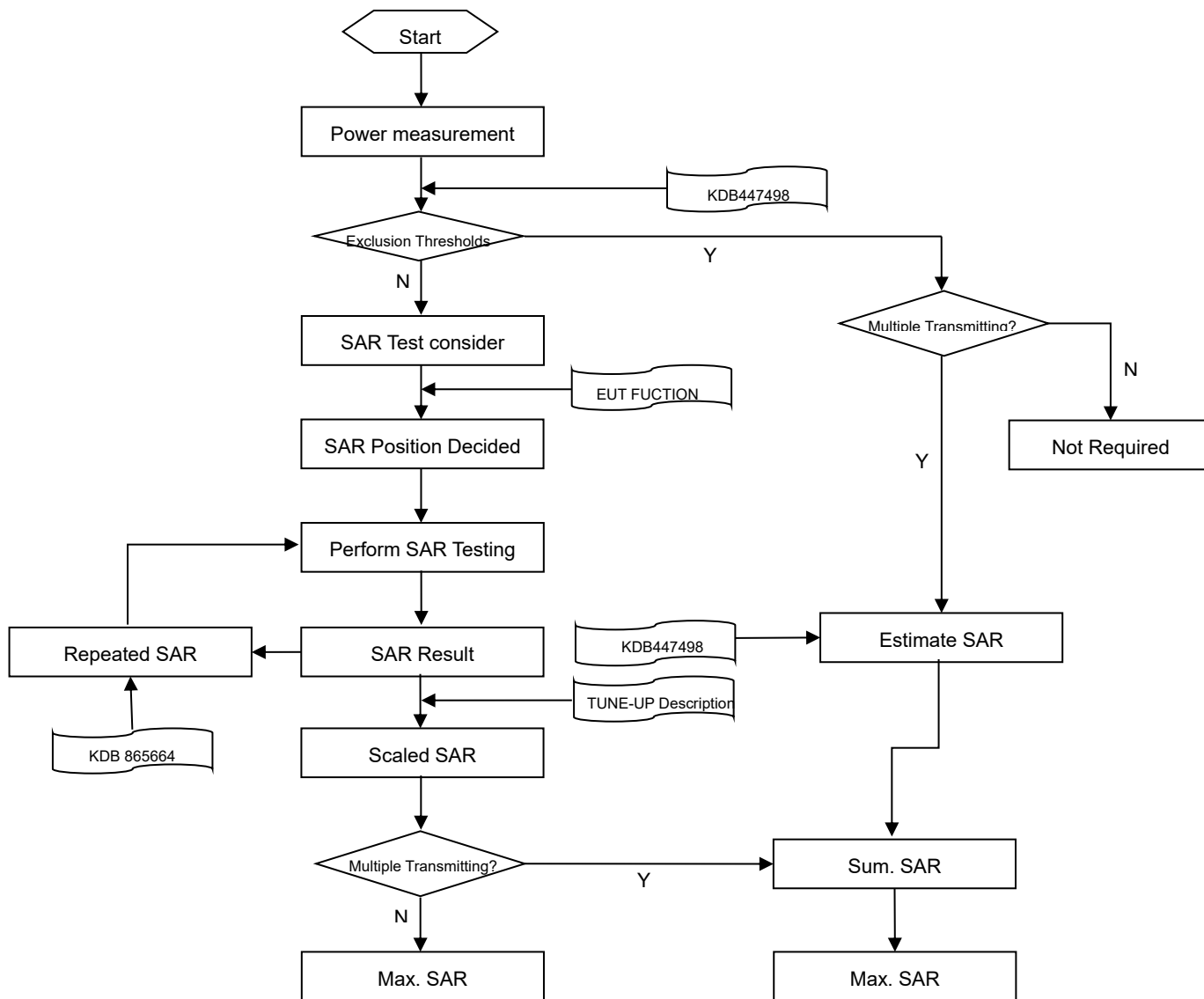
Body-worn accessories that do not contain metallic or conductive components may be tested according to worst-case exposure configurations, typically according to the smallest test separation distance required for the group of body-worn accessories with similar operating and exposure characteristics. All body-worn accessories containing metallic components are tested in conjunction with the host device.

Body-worn accessory SAR compliance is based on a single minimum test separation distance for all wireless and operating modes applicable to each body-worn accessory used by the host, and according to the relevant voice and/or data mode transmissions and operations. If a body-worn accessory supports voice only operations in its normal and expected use conditions, testing of data mode for body-worn compliance is not required. A conservative minimum test separation distance for supporting off-the-shelf body-worn accessories that may be acquired by users of consumer handsets is used to test for body-worn accessory SAR compliance. This distance is determined by the handset manufacturer, according to the requirements of Supplement C 01-01. Devices that are designed to operate on the body of users using lanyards and straps, or without requiring additional body-worn accessories, will be tested using a conservative minimum test separation distance ≤ 5 mm to support compliance.



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. Both the 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.

			≤3GHz	>3GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5±1 mm	½·δ·ln(2)±0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location			30°±1°	20°±1°
Maximum area scan spatial resolution: Δx Area , Δy Area			≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3–4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
			When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan spatial resolution: Δx Zoom , Δy Zoom			≤ 2 GHz: ≤ 8 mm 2 –3 GHz: ≤ 5 mm*	3–4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: Δz Zoom (n)		≤ 5 mm	3–4 GHz: ≤ 4 mm
				4–5 GHz: ≤ 3 mm
				5–6 GHz: ≤ 2 mm
	graded grid	Δz Zoom (1): between 1st two points closest to phantom surface	≤ 4 mm	3–4 GHz: ≤ 3 mm
				4–5 GHz: ≤ 2.5 mm
		Δz Zoom (n>1): between subsequent points	≤ 1.5·Δz Zoom (n-1)	
Minimum zoom scan volume	x, y, z		≥30 mm	3–4 GHz: ≥ 28 mm
				4–5 GHz: ≥ 25 mm
				5–6 GHz: ≥ 22 mm

Note:

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.

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 to 16 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.

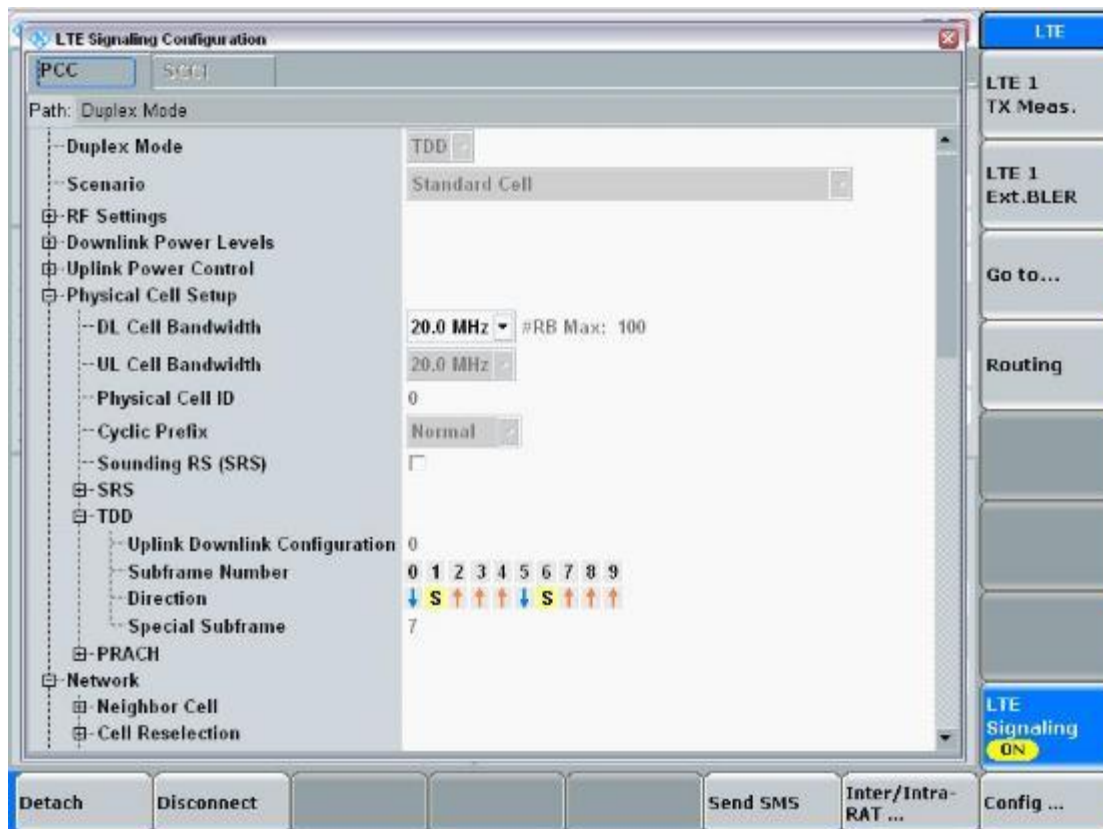
7.4 Area & Zoom Scan Procedure

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.

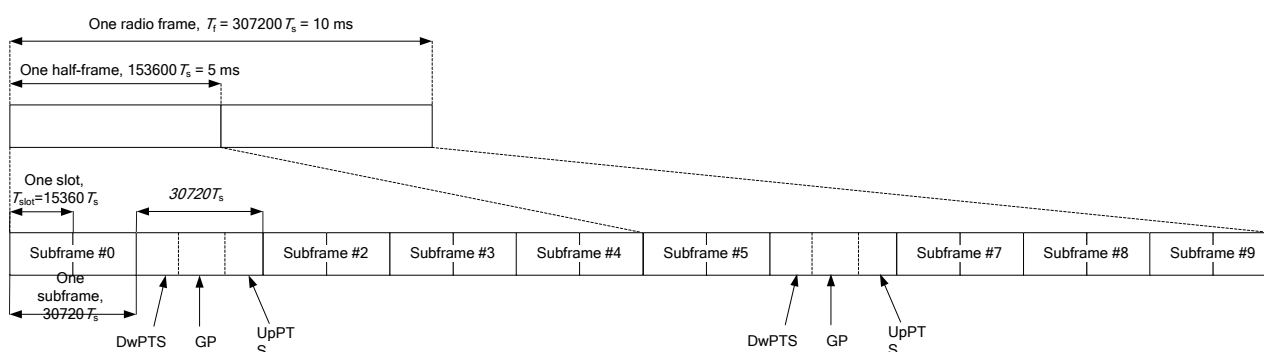
When the 1 g SAR of the highest peak is within 2 dB of the SAR limit, additional zoom scans are required for other peaks within 2 dB of the highest peak that have not been included in any zoom scan to ensure there is no increase in SAR.

7.5 LTE (TDD) Considerations

During TDD-LTE SAR testing, the EUT was commanded to transmit on maximum output power and maximum transmitting bandwidth. The uplink and downlink slot configuration as below in one radio frame.



According to 3GPP Per 3GPP TS 36.211. Each radio frame of length ($T_f = 307200 \cdot T_s = 10\text{ms}$) of two half-frames of length ($153600 \cdot T_s = 5\text{ms}$). Each half-frame consists of five sub-frames of length ($30720 \cdot T_s = 1\text{ms}$)



And the special sub-frame with the three fields DwPTS, GP and UpPTS.

The length of DwPTS and UpPTS is given by below table subject to the total length of DwPTS, GP and UpPTS being equal to $30720 \cdot T_s = 1\text{ms}$.

Configuration of special sub-frame (lengths of DwPTS/GP/UpPTS)

Special sub-frame 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	$6592 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$	$7680 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$
1	$19760 \cdot T_s$			$20480 \cdot T_s$		
2	$21592 \cdot T_s$			$23040 \cdot T_s$		
3	$24144 \cdot T_s$			$25600 \cdot T_s$		
4	$26336 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$7680 \cdot T_s$	$2560 \cdot T_s$	$5120 \cdot T_s$
5	$6592 \cdot T_s$			$20480 \cdot T_s$		
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21592 \cdot T_s$			$12800 \cdot T_s$	-	-
8	$24144 \cdot T_s$			-		
9	$13168 \cdot T_s$			-	-	-

For special sub-frame uplink time we used the largest cyclic prefix for duty cycle calculate;

Maximum uplink time of one special sub-frame=(largest cyclic prefix)/(one sub-frame of length)* time of one sub-frame= $5120 \cdot T_s / 30720 \cdot T_s \cdot 1\text{ms} = 0.167\text{ms}$

One radio frame with 6 uplink sub-frames and two special sub-frame,

there for the maximum Uplink time in one radio frame is: **$6 \cdot 1\text{ ms} + 2 \cdot 0.167\text{ ms} = 6.334\text{ms}$**

So, the duty cycle for TDD-LTE is: **$6.334\text{ms} / 10\text{ms} = 1: 1.58$**

8 CONDUCTED RF OUPUT POWER

8.1 GSM

Please refer the document "BL-SZ2520135-AP.pdf".

8.2 WCDMA

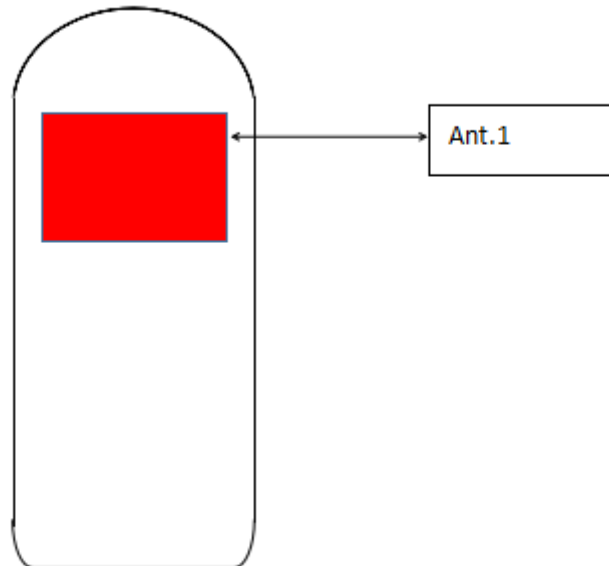
Please refer the document "BL-SZ2520135-AP.pdf".

8.3 LTE

Please refer the document "BL-SZ2520135-AP.pdf".

9 TEST EXCLUSION CONSIDERATION

9.1 Antenna location sketch



Antenna	Support Bands
Ant.1	GSM850/1900 WCDMA B5 LTE B5/18/19/26

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 P_{th} (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 notebook computer, under normal use the RF exposure scenarios are shown in the table below:

Band	Mode	Max. Peak Power		Test Position Configurations					
		dBm	mW	Vertical-Front	Vertical-Back	Horizontal-Up	Horizontal-Down	Top Edge	Bottom Edge
GSM 850	Distance to User			<5mm	<5mm	<5mm	<5mm	<5mm	50mm
	Data	29.00	794.33	Yes	Yes	Yes	Yes	Yes	Yes
GSM 1900	Distance to User			<5mm	<5mm	<5mm	<5mm	<5mm	50mm
	Data	27.00	501.19	Yes	Yes	Yes	Yes	Yes	Yes
WCDMA Band 5	Distance to User			<5mm	<5mm	<5mm	<5mm	<5mm	50mm
	RMC	23.50	223.87	Yes	Yes	Yes	Yes	Yes	Yes
LTE Band 5	Distance to User			<5mm	<5mm	<5mm	<5mm	<5mm	50mm
	QPSK	23.00	199.53	Yes	Yes	Yes	Yes	Yes	Yes
LTE Band 18	Distance to User			<5mm	<5mm	<5mm	<5mm	<5mm	50mm
	QPSK	23.00	199.53	Yes	Yes	Yes	Yes	Yes	Yes
LTE Band 19	Distance to User			<5mm	<5mm	<5mm	<5mm	<5mm	50mm
	QPSK	23.00	199.53	Yes	Yes	Yes	Yes	Yes	Yes
LTE Band 26	Distance to User			<5mm	<5mm	<5mm	<5mm	<5mm	50mm
	QPSK	23.00	199.53	Yes	Yes	Yes	Yes	Yes	Yes

Note:

- Maximum power is the source-based time-average power and represents the maximum RF output power including tune-up tolerance among production units
- 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.
- 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
- 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 P_{th} (mW) is given by Following:

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

where

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

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

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

10 TEST RESULT

10.1 GSM 850 SAR

Antenna	Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (dB)	1g Meas SAR (W/kg)	Meas. Power (dBm)	Max. tune- power (dBm)	Scaling Factor	1g Scaled SAR (W/kg)	Meas. No.
Body												
Ant.1	DATA 2slots	Horizontal-Up	5	190	836.6	0.11	0.600	28.79	29.00	1.050	0.630	1#
		Horizontal-Down	5	190	836.6	0.01	0.469	28.79	29.00	1.050	0.492	/
		Vertical-Front	5	190	836.6	0.02	0.277	28.79	29.00	1.050	0.291	/
		Vertical-Back	5	190	836.6	0.19	0.286	28.79	29.00	1.050	0.300	/
		Top Edge	5	190	836.6	0.11	0.150	28.79	29.00	1.050	0.158	/
		Bottom Edge	5	190	836.6	-0.07	0.161	28.79	29.00	1.050	0.169	/
Note: Refer to ANNEX C for the detailed test data for each test configuration.												

10.2 GSM 1900 SAR

Antenna	Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (dB)	1g Meas SAR (W/kg)	Meas. Power (dBm)	Max. tune- power (dBm)	Scaling Factor	1g Scaled SAR (W/kg)	Meas. No.
Body												
Ant.1	DATA 2slots	Horizontal-Up	5	661	1880.0	0.05	0.874	26.45	27.00	1.135	0.992	/
		Horizontal-Down	5	661	1880.0	0.09	0.662	26.45	27.00	1.135	0.751	/
		Vertical-Front	5	661	1880.0	0.10	0.556	26.45	27.00	1.135	0.631	/
		Vertical-Back	5	661	1880.0	-0.17	0.462	26.45	27.00	1.135	0.524	/
		Top Edge	5	661	1880.0	0.15	0.113	26.45	27.00	1.135	0.128	/
		Bottom Edge	5	661	1880.0	0.05	0.095	26.45	27.00	1.135	0.108	/
		Horizontal-Up	5	512	1850.2	0.14	0.822	26.20	27.00	1.202	0.988	/
		Horizontal-Up	5	810	1909.8	-0.13	0.931	26.38	27.00	1.153	1.073	2#
Note: Refer to ANNEX C for the detailed test data for each test configuration.												

10.3WCDMA Band 5

Antenna	Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (dB)	1g Meas SAR (W/kg)	Meas. Power (dBm)	Max. tune- power (dBm)	Scaling Factor	1g Scaled SAR (W/kg)	Meas. No.
Body												
Ant.1	RMC	Horizontal-Up	5	4182	836.4	0.06	1.040	23.35	23.50	1.035	1.076	/
		Horizontal-Down	5	4182	836.4	-0.01	0.936	23.35	23.50	1.035	0.969	/
		Vertical-Front	5	4182	836.4	-0.16	0.538	23.35	23.50	1.035	0.557	/
		Vertical-Back	5	4182	836.4	-0.07	0.470	23.35	23.50	1.035	0.486	/
		Top Edge	5	4182	836.4	-0.05	0.234	23.35	23.50	1.035	0.242	/
		Bottom Edge	5	4182	836.4	0.14	0.255	23.35	23.50	1.035	0.264	/
		Horizontal-Up	5	4132	826.4	0.02	1.090	23.22	23.50	1.067	1.163	3#
		Horizontal-Up	5	4233	846.6	-0.09	1.040	23.14	23.50	1.086	1.129	/
Note: Refer to ANNEX C for the detailed test data for each test configuration.												

10.4LTE Band 5 (10MHz Bandwidth)

Antenn a	Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	RB Num.	RB Start	Power Drift (dB)	1g Meas SAR (W/kg)	Meas. Power (dBm)	Max. tune- power (dBm)	Scaling Factor	1g Scaled SAR (W/kg)	Meas. No.
Body														
Ant.1	QPSK	Horizontal-Up	5	20525	836.5	1	Mid	-0.18	0.788	22.58	23.00	1.102	0.868	/
		Horizontal-Down	5	20525	836.5	1	Mid	-0.14	0.634	22.58	23.00	1.102	0.699	/
		Vertical-Front	5	20525	836.5	1	Mid	-0.07	0.351	22.58	23.00	1.102	0.387	/
		Vertical-Back	5	20525	836.5	1	Mid	0.14	0.334	22.58	23.00	1.102	0.368	/
		Top Edge	5	20525	836.5	1	Mid	0.06	0.214	22.58	23.00	1.102	0.236	/
		Bottom Edge	5	20525	836.5	1	Mid	-0.08	0.171	22.58	23.00	1.102	0.188	/
		Horizontal-Up	5	20525	836.5	25	Mid	0.16	0.741	21.65	22.00	1.084	0.803	/
		Horizontal-Down	5	20525	836.5	25	Mid	-0.06	0.679	21.65	22.00	1.084	0.736	/
		Vertical-Front	5	20525	836.5	25	Mid	-0.10	0.315	21.65	22.00	1.084	0.341	/
		Vertical-Back	5	20525	836.5	25	Mid	-0.13	0.361	21.65	22.00	1.084	0.391	/
		Top Edge	5	20525	836.5	25	Mid	0.03	0.165	21.65	22.00	1.084	0.179	/
		Bottom Edge	5	20525	836.5	25	Mid	0.16	0.157	21.65	22.00	1.084	0.170	/
		Horizontal-Up	5	20450	829.0	1	Mid	0.02	0.702	22.40	23.00	1.148	0.806	/
		Horizontal-Up	5	20600	844.0	1	High	-0.02	0.816	22.50	23.00	1.122	0.916	4#
		Horizontal-Up	5	20450	829.0	25	Low	0.03	0.634	21.44	22.00	1.138	0.721	/
		Horizontal-Up	5	20600	844.0	25	Low	-0.03	0.716	21.63	22.00	1.089	0.780	/
		Horizontal-Up	5	20525	836.5	50	Low	0.13	0.710	21.65	22.00	1.084	0.770	/
Note: Refer to ANNEX C for the detailed test data for each test configuration.														

10.5LTE Band 18 (15MHz Bandwidth)

Antenn a	Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	RB Num.	RB Start	Power Drift (dB)	1g Meas SAR (W/kg)	Meas. Power (dBm)	Max. tune- power (dBm)	Scaling Factor	1g Scaled SAR (W/kg)	Meas. No.
Body														
Ant.1	QPSK	Horizontal-Up	5	23925	822.5	1	Mid	-0.05	0.893	22.63	23.00	1.089	0.972	5#
		Horizontal-Down	5	23925	822.5	1	Mid	0.04	0.793	22.63	23.00	1.089	0.864	/
		Vertical-Front	5	23925	822.5	1	Mid	0.02	0.389	22.63	23.00	1.089	0.424	/
		Vertical-Back	5	23925	822.5	1	Mid	-0.11	0.401	22.63	23.00	1.089	0.437	/
		Top Edge	5	23925	822.5	1	Mid	-0.06	0.166	22.63	23.00	1.089	0.181	/
		Bottom Edge	5	23925	822.5	1	Mid	0.04	0.210	22.63	23.00	1.089	0.229	/
		Horizontal-Up	5	23925	822.5	36	Mid	0.10	0.826	21.65	22.00	1.084	0.895	/
		Horizontal-Down	5	23925	822.5	36	Mid	0.11	0.823	21.65	22.00	1.084	0.892	/
		Vertical-Front	5	23925	822.5	36	Mid	0.12	0.386	21.65	22.00	1.084	0.418	/
		Vertical-Back	5	23925	822.5	36	Mid	-0.19	0.365	21.65	22.00	1.084	0.396	/
		Top Edge	5	23925	822.5	36	Mid	0.11	0.016	21.65	22.00	1.084	0.017	/
		Bottom Edge	5	23925	822.5	36	Mid	-0.12	0.214	21.65	22.00	1.084	0.232	/
Note: Refer to ANNEX C for the detailed test data for each test configuration.														

10.6LTE Band 19 (15MHz Bandwidth)

Antenn a	Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	RB Num.	RB Start	Power Drift (dB)	1g Meas SAR (W/kg)	Meas. Power (dBm)	Max. tune- power (dBm)	Scaling Factor	1g Scaled SAR (W/kg)	Meas. No.
Body														
Ant.1	QPSK	Horizontal-Up	5	24075	837.5	1	Mid	-0.02	0.934	22.57	23.00	1.104	1.031	6#
		Horizontal-Down	5	24075	837.5	1	Mid	0.17	0.876	22.57	23.00	1.104	0.967	/
		Vertical-Front	5	24075	837.5	1	Mid	-0.10	0.443	22.57	23.00	1.104	0.489	/
		Vertical-Back	5	24075	837.5	1	Mid	0.00	0.397	22.57	23.00	1.104	0.438	/
		Top Edge	5	24075	837.5	1	Mid	-0.17	0.171	22.57	23.00	1.104	0.189	/
		Bottom Edge	5	24075	837.5	1	Mid	0.08	0.168	22.57	23.00	1.104	0.185	/
		Horizontal-Up	5	24075	837.5	36	Mid	-0.12	0.828	21.63	22.00	1.089	0.902	/
		Horizontal-Down	5	24075	837.5	36	Mid	-0.08	0.698	21.63	22.00	1.089	0.760	/
		Vertical-Front	5	24075	837.5	36	Mid	0.12	0.398	21.63	22.00	1.089	0.433	/
		Vertical-Back	5	24075	837.5	36	Mid	-0.08	0.423	21.63	22.00	1.089	0.461	/
		Top Edge	5	24075	837.5	36	Mid	0.14	0.193	21.63	22.00	1.089	0.210	/
		Bottom Edge	5	24075	837.5	36	Mid	-0.11	0.164	21.63	22.00	1.089	0.179	/
Note: Refer to ANNEX C for the detailed test data for each test configuration.														

10.7LTE Band 26 (15MHz Bandwidth)

Antenn a	Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	RB Num.	RB Start	Power Drift (dB)	1g Meas SAR (W/kg)	Meas. Power (dBm)	Max. tune- power (dBm)	Scaling Factor	1g Scaled SAR (W/kg)	Meas. No.
Body														
Ant.1	QPSK	Horizontal-Up	5	26865	831.5	1	Mid	0.10	0.783	22.31	23.00	1.172	0.918	/
		Horizontal-Down	5	26865	831.5	1	Mid	-0.05	0.611	22.31	23.00	1.172	0.716	/
		Vertical-Front	5	26865	831.5	1	Mid	0.17	0.333	22.31	23.00	1.172	0.390	/
		Vertical-Back	5	26865	831.5	1	Mid	0.08	0.328	22.31	23.00	1.172	0.384	/
		Top Edge	5	26865	831.5	1	Mid	-0.03	0.182	22.31	23.00	1.172	0.213	/
		Bottom Edge	5	26865	831.5	1	Mid	0.17	0.142	22.31	23.00	1.172	0.166	/
		Horizontal-Up	5	26865	831.5	36	Mid	-0.06	0.736	21.58	22.00	1.102	0.811	/
		Horizontal-Down	5	26865	831.5	36	Mid	0.04	0.507	21.58	22.00	1.102	0.559	/
		Vertical-Front	5	26865	831.5	36	Mid	-0.03	0.348	21.58	22.00	1.102	0.383	/
		Vertical-Back	5	26865	831.5	36	Mid	0.05	0.381	21.58	22.00	1.102	0.420	/
		Top Edge	5	26865	831.5	36	Mid	0.13	0.153	21.58	22.00	1.102	0.169	/
		Bottom Edge	5	26865	831.5	36	Mid	-0.17	0.118	21.58	22.00	1.102	0.130	/
		Horizontal-Up	5	26765	821.5	1	High	-0.06	0.815	22.29	23.00	1.178	0.960	/
		Horizontal-Up	5	26965	841.5	1	Low	0.11	1.010	22.28	23.00	1.180	1.192	7#
		Horizontal-Up	5	26765	821.5	36	High	0.08	0.848	21.32	22.00	1.169	0.991	/
		Horizontal-Up	5	26965	841.5	36	Low	-0.02	0.938	21.53	22.00	1.114	1.045	/
		Horizontal-Up	5	26865	831.5	72	Low	0.17	0.922	21.53	22.00	1.114	1.027	/
		Horizontal-Up	5	26765	821.5	72	Low	0.11	0.855	21.53	22.00	1.114	0.952	/
		Horizontal-Up	5	26965	841.5	72	Low	0.16	0.834	21.53	22.00	1.114	0.929	/
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	Antenna	RF Exposure Conditions	Test Position	Highest Measured SAR (W/kg)	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)	Largest to Smallest SAR Ratio
1880.0	GSM 1900	Ant.1	Body	Horizontal-Up	0.874	Yes	0.848	1.03
1850.2	GSM 1900	Ant.1	Body	Horizontal-Up	0.822	Yes	0.801	1.03
1909.8	GSM 1900	Ant.1	Body	Horizontal-Up	0.931	Yes	0.906	1.03
836.4	WCDMA Band 5	Ant.1	Body	Horizontal-Up	1.040	Yes	0.993	1.05
836.4	WCDMA Band 5	Ant.1	Body	Horizontal-Down	0.936	Yes	0.907	1.03
826.4	WCDMA Band 5	Ant.1	Body	Horizontal-Up	1.090	Yes	1.050	1.04
846.6	WCDMA Band 5	Ant.1	Body	Horizontal-Up	1.040	Yes	1.010	1.03
844.0	LTE Band 5	Ant.1	Body	Horizontal-Up	0.816	Yes	0.796	1.03
822.5	LTE Band 18	Ant.1	Body	Horizontal-Up	0.893	Yes	0.873	1.02
822.5	LTE Band 18	Ant.1	Body	Horizontal-Up	0.826	Yes	0.802	1.03
822.5	LTE Band 18	Ant.1	Body	Horizontal-Down	0.823	Yes	0.808	1.02
837.5	LTE Band 19	Ant.1	Body	Horizontal-Up	0.934	Yes	0.911	1.03
837.5	LTE Band 19	Ant.1	Body	Horizontal-Down	0.876	Yes	0.848	1.03
837.5	LTE Band 19	Ant.1	Body	Horizontal-Up	0.828	Yes	0.801	1.03
821.5	LTE Band 26	Ant.1	Body	Horizontal-Up	0.815	Yes	0.798	1.02
841.5	LTE Band 26	Ant.1	Body	Horizontal-Up	1.010	Yes	0.988	1.02
821.5	LTE Band 26	Ant.1	Body	Horizontal-Up	0.848	Yes	0.814	1.04
841.5	LTE Band 26	Ant.1	Body	Horizontal-Up	0.938	Yes	0.917	1.02
831.5	LTE Band 26	Ant.1	Body	Horizontal-Up	0.922	Yes	0.903	1.02
821.5	LTE Band 26	Ant.1	Body	Horizontal-Up	0.855	Yes	0.838	1.02
841.5	LTE Band 26	Ant.1	Body	Horizontal-Up	0.834	Yes	0.811	1.03

Note: The ratio of largest to smallest SAR for the original and first repeated measurements is < 1.20, the second repeated measurement is not required.

12 SIMULTANEOUS TRANSMISSION

Note: This product has only one antenna for WWAN, so simultaneous transmission evaluation is not required in this report.

13 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
835MHz Validation Dipole	Speag	D835V2	SN: 4d187	2024/05/08	2027/05/07
1950MHz Validation Dipole	Speag	D1950V3	SN: 1240	2024/08/22	2027/08/21
Data Acquisition Electronics	Speag	DAE4	SN: 1711	2024/03/18	2025/03/17
E-Field Probe	Speag	EX3DV4	SN: 7510	2024/06/25	2025/06/24
Signal Generator	R&S	SMB100A	177746	2024/04/24	2025/04/23
Power Meter	R&S	NRVD-B2	835843/014	2024/08/08	2025/08/07
Power Sensor	R&S	NRV-Z4	100381	2024/08/08	2025/08/07
Power Sensor	R&S	NRV-Z2	100211	2024/08/08	2025/08/07
Wireless Communication Test Set	Anritsu	MT8820C	6201144551	2024/05/14	2025/05/13
Network Analyzer	Agilent	E5071C	MY46103472	2024/09/11	2025/09/10
Thermometer	Elitech	RC-4HC	EF7216002985	2024/10/31	2025/10/30
Thermometer	Elitech	RC-4HC	EF720B004811	2024/10/31	2025/10/30
Power Amplifier	Mini-Circuits	ZVA-183W-S+	932502132	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.

Head Liquid

Date	Liquid Type	Fre. (MHz)	Temp. (°C)	Meas. Conductivity (σ) (S/m)	Meas. Permittivity (ϵ)	Target Conductivity (σ) (S/m)	Target Permittivity (ϵ)	Conductivity Tolerance (%)	Permittivity Tolerance (%)
2025.02.16	Head	835	21.5	0.88	41.80	0.90	41.50	-2.22	0.72
2025.02.17	Head	835	21.4	0.89	41.41	0.90	41.50	-1.11	-0.22
2025.02.17	Head	1950	21.4	1.43	38.85	1.40	40.00	2.14	-2.88
Note: The tolerance limit of Conductivity and Permittivity is $\pm 5\%$.									

ANNEX B SYSTEM CHECK RESULT

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

Head liquid 1g

Date	Liquid Type	Freq. (MHz)	Power (mW)	Measured SAR (W/kg)	Normalized SAR (W/kg)	Dipole SAR (W/kg)	Tolerance (%)
2025.02.16	Head	835	100	0.931	9.31	9.74	-4.41
2025.02.17	Head	835	100	1.010	10.10	9.74	3.70
2025.02.17	Head	1950	100	4.240	42.40	41.70	1.68
Note: The tolerance limit of System validation $\pm 10\%$.							

System Performance Check Data (835MHz)

Date: 2025.02.16

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

Medium parameters used (interpolated): $f = 835$ MHz; $\sigma = 0.884$ S/m; $\epsilon_r = 41.795$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.6°C Liquid Temperature: 21.5°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(9.99, 9.99, 9.99); Calibrated: 2024.06.25;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1711; Calibrated: 2024.03.18
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1576
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

CW835/Area Scan (61x121x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm

Maximum value of SAR (interpolated) = 0.989 W/kg

CW835/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 35.20 V/m; Power Drift = -0.16 dB

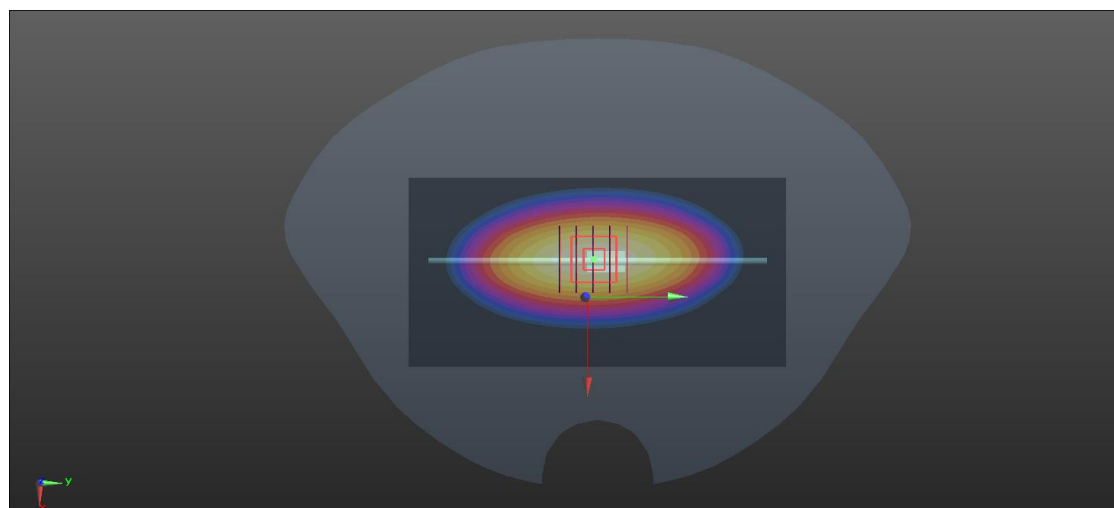
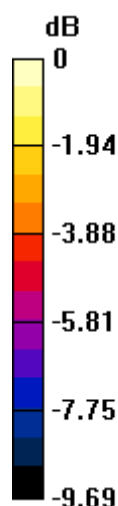
Peak SAR (extrapolated) = 1.35 W/kg

SAR(1 g) = 0.931 W/kg; SAR(10 g) = 0.624 W/kg

Smallest distance from peaks to all points 3 dB below = 20.5 mm

Ratio of SAR at M2 to SAR at M1 = 69.5%

Maximum value of SAR (measured) = 1.00 W/kg



0 dB = 1.00 W/kg

System Performance Check Data (835MHz)

Date: 2025.02.17

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

Medium parameters used (interpolated): $f = 835$ MHz; $\sigma = 0.89$ S/m; $\epsilon_r = 41.413$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.4°C Liquid Temperature: 21.4°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(9.99, 9.99, 9.99); Calibrated: 2024.06.25;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1711; Calibrated: 2024.03.18
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1576
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

CW835/Area Scan (61x121x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm

Maximum value of SAR (interpolated) = 1.09 W/kg

CW835/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 35.36 V/m; Power Drift = -0.12 dB

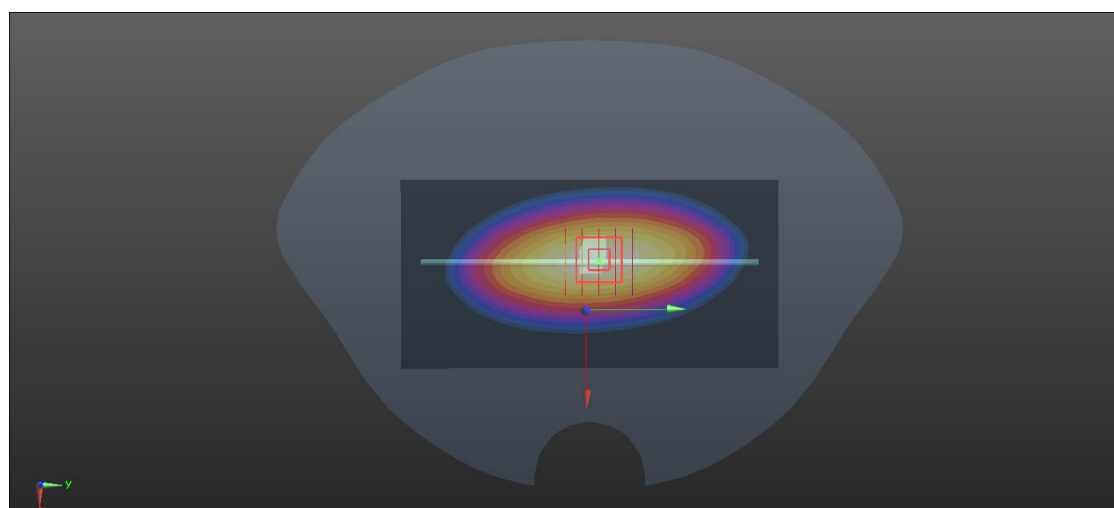
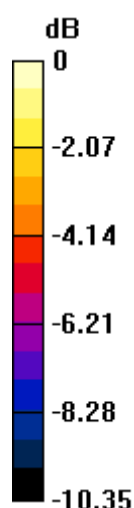
Peak SAR (extrapolated) = 1.49 W/kg

SAR(1 g) = 1.01 W/kg; SAR(10 g) = 0.665 W/kg

Smallest distance from peaks to all points 3 dB below = 16.3 mm

Ratio of SAR at M2 to SAR at M1 = 68%

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



0 dB = 1.10 W/kg

System Performance Check Data (1950MHz)

Date: 2025.02.17

Communication System Band: D1950 (1950.0 MHz); Frequency: 1950 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1950$ MHz; $\sigma = 1.43$ S/m; $\epsilon_r = 38.852$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.4°C Liquid Temperature: 21.4°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(8.33, 8.33, 8.33); Calibrated: 2024.06.25;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1711; Calibrated: 2024.03.18
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1576
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

CW1950/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 5.37 W/kg

CW1950/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 61.74 V/m; Power Drift = -0.06 dB

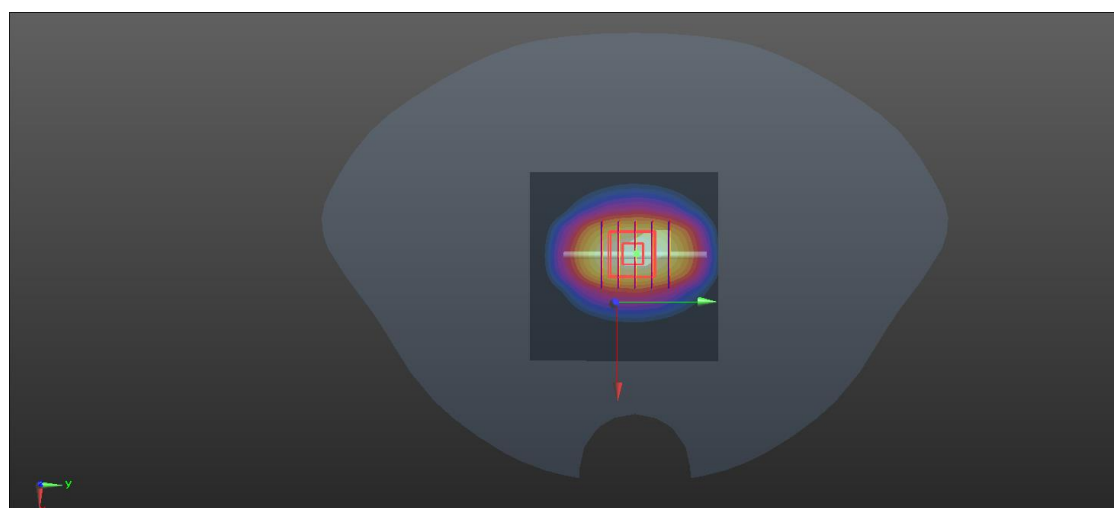
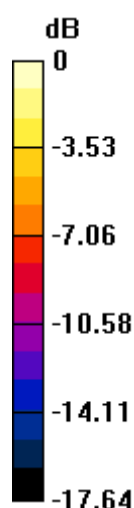
Peak SAR (extrapolated) = 7.81 W/kg

SAR(1 g) = 4.24 W/kg; SAR(10 g) = 2.2 W/kg

Smallest distance from peaks to all points 3 dB below = 11.2 mm

Ratio of SAR at M2 to SAR at M1 = 55.8%

Maximum value of SAR (measured) = 4.75 W/kg



0 dB = 4.75 W/kg

ANNEX C TEST DATA

Meas.1 Body Plane with Horizontal-up 5mm on Middle Channel in GPRS850 2Slots mode With Antenna 1

Date: 2025.02.16

Communication System Band: GPRS850; Frequency: 836.6 MHz; Duty Cycle: 1:4.1

Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.907$ S/m; $\epsilon_r = 40.736$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.6°C Liquid Temperature: 21.5°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(9.99, 9.99, 9.99); Calibrated: 2024.06.25;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1711; Calibrated: 2024.03.18
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1576
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch190/Area Scan (51x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.666 W/kg

Ch190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 25.72 V/m; Power Drift = 0.11 dB

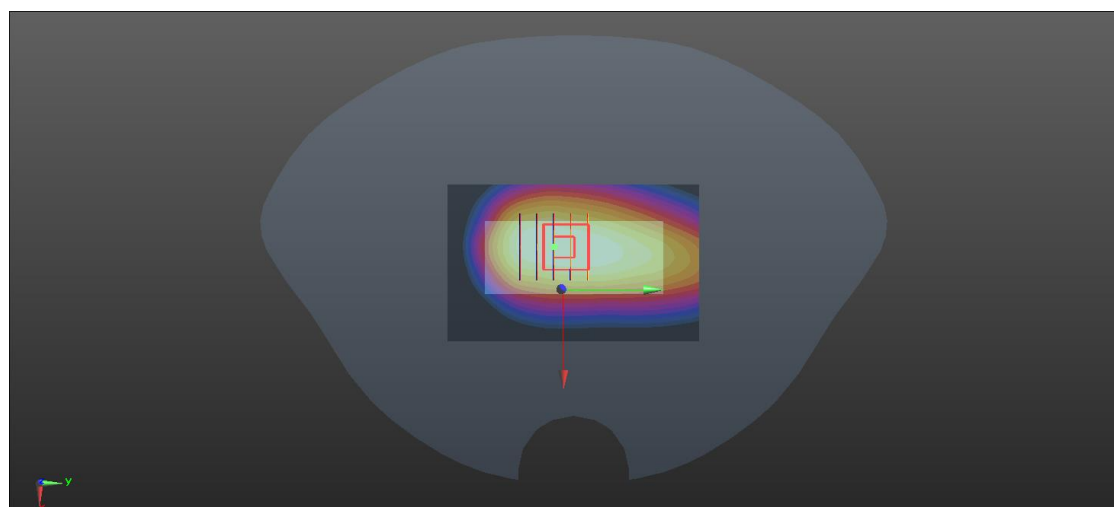
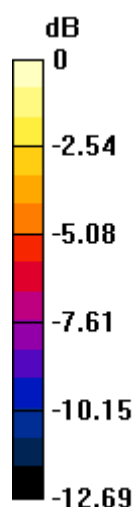
Peak SAR (extrapolated) = 0.860 W/kg

SAR(1 g) = 0.600 W/kg; SAR(10 g) = 0.402 W/kg

Smallest distance from peaks to all points 3 dB below = 18.7 mm

Ratio of SAR at M2 to SAR at M1 = 69.2%

Maximum value of SAR (measured) = 0.643 W/kg



0 dB = 0.643 W/kg

Meas.2 Body Plane with Horizontal-up 5mm on High Channel in GPRS1900 2Slots mode With Antenna 1

Date: 2025.02.17

Communication System Band: GPRS1900; Frequency: 1909.8 MHz; Duty Cycle: 1:4.1

Medium parameters used (interpolated): $f = 1909.8$ MHz; $\sigma = 1.424$ S/m; $\epsilon_r = 39.26$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.4°C Liquid Temperature: 21.4°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(8.33, 8.33, 8.33); Calibrated: 2024.06.25;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1711; Calibrated: 2024.03.18
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1576
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch810/Area Scan (51x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.11 W/kg

Ch810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 21.57 V/m; Power Drift = -0.13 dB

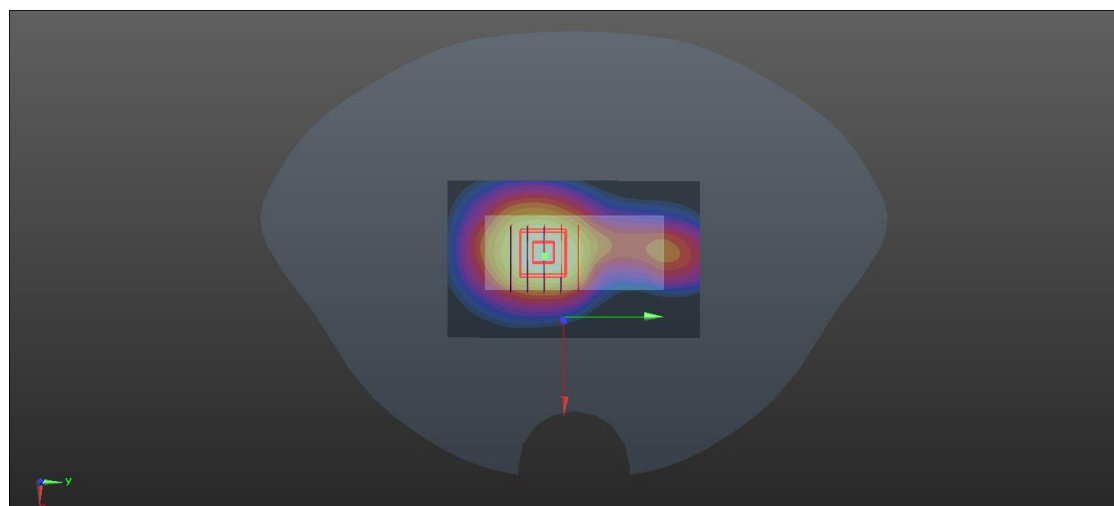
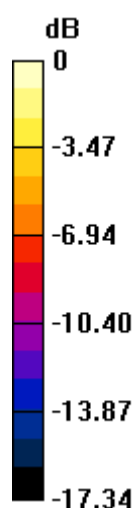
Peak SAR (extrapolated) = 1.55 W/kg

SAR(1 g) = 0.931 W/kg; SAR(10 g) = 0.523 W/kg

Smallest distance from peaks to all points 3 dB below = 14.3 mm

Ratio of SAR at M2 to SAR at M1 = 62.6%

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



0 dB = 1.01 W/kg

Meas.3 Body Plane with Horizontal-up 5mm on Low Channel in WCDMA Band5 mode With Antenna 1

Date: 2025.02.16

Communication System Band: Band 5; Frequency: 826.4 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 826.4$ MHz; $\sigma = 0.883$ S/m; $\epsilon_r = 42.658$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.6°C Liquid Temperature: 21.5°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(9.99, 9.99, 9.99); Calibrated: 2024.06.25;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1711; Calibrated: 2024.03.18
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1576
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch4132/Area Scan (51x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.19 W/kg

Ch4132/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 35.20 V/m; Power Drift = 0.02 dB

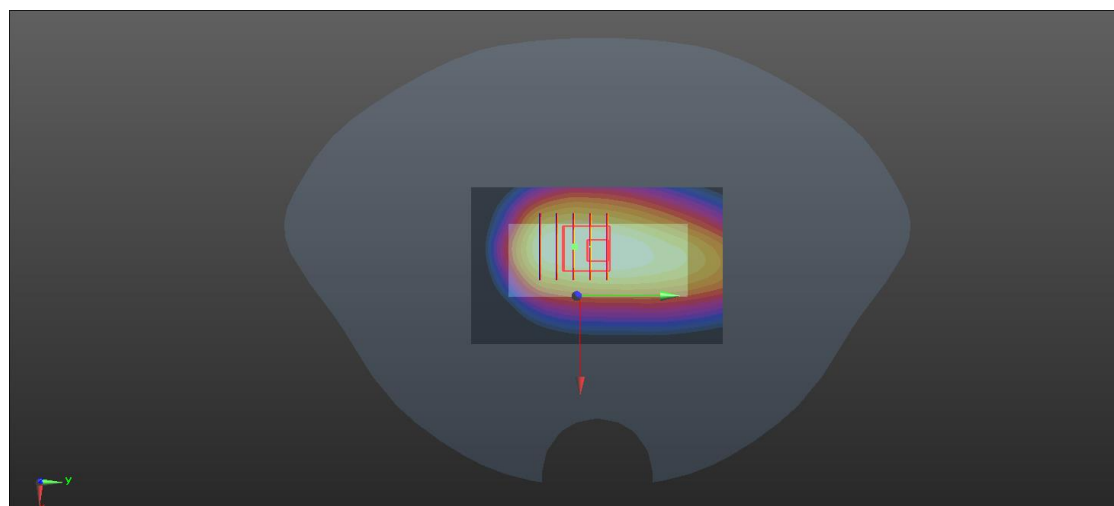
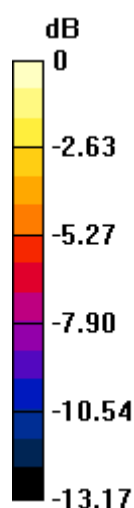
Peak SAR (extrapolated) = 1.56 W/kg

SAR(1 g) = 1.09 W/kg; SAR(10 g) = 0.725 W/kg

Smallest distance from peaks to all points 3 dB below = 17.6 mm

Ratio of SAR at M2 to SAR at M1 = 70.3%

Maximum value of SAR (measured) = 1.16 W/kg



0 dB = 1.16 W/kg

Meas.4 Body Plane with Horizontal-up 5mm on High Channel in LTE Band5 mode With Antenna 1

Date: 2025.02.17

Communication System Band: Band 5; Frequency: 844 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 844$ MHz; $\sigma = 0.928$ S/m; $\epsilon_r = 40.077$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.4°C Liquid Temperature: 21.4°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(9.99, 9.99, 9.99); Calibrated: 2024.06.25;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1711; Calibrated: 2024.03.18
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1576
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch20600/Area Scan (51x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.921 W/kg

Ch20600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 31.16 V/m; Power Drift = -0.02 dB

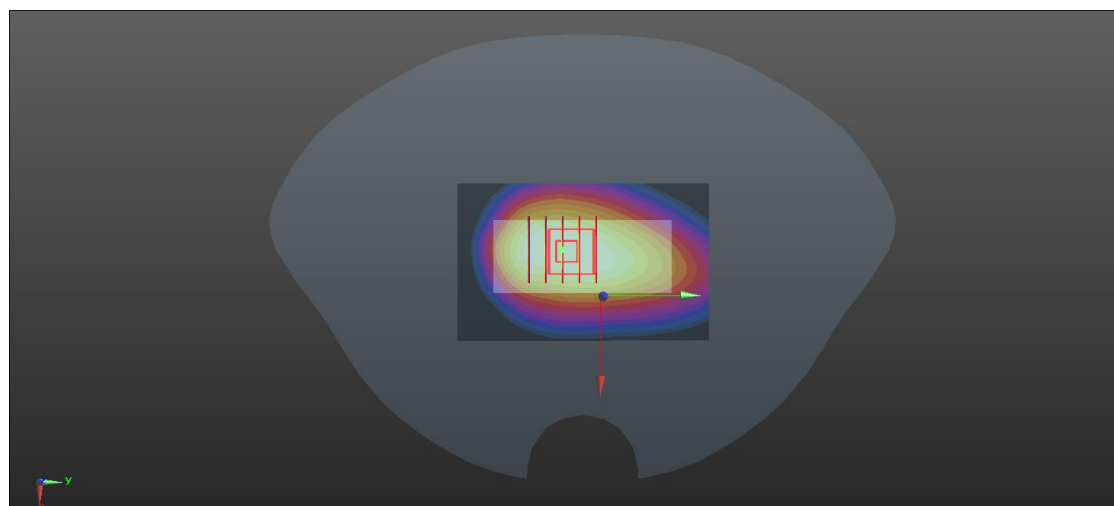
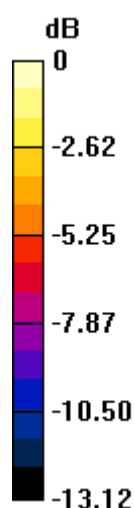
Peak SAR (extrapolated) = 1.17 W/kg

SAR(1 g) = 0.816 W/kg; SAR(10 g) = 0.543 W/kg

Smallest distance from peaks to all points 3 dB below = 18.7 mm

Ratio of SAR at M2 to SAR at M1 = 69.4%

Maximum value of SAR (measured) = 0.875 W/kg



0 dB = 0.875 W/kg

Meas.5 Body Plane with Horizontal-up 5mm on Middle Channel in LTE Band18 mode With Antenna 1

Date: 2025.02.16

Communication System Band: Band 18; Frequency: 822.5 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 822.5$ MHz; $\sigma = 0.868$ S/m; $\epsilon_r = 42.82$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.6°C Liquid Temperature: 21.5°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(9.99, 9.99, 9.99); Calibrated: 2024.06.25;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1711; Calibrated: 2024.03.18
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1576
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch23925/Area Scan (51x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.980 W/kg

Ch23925/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 33.79 V/m; Power Drift = -0.05 dB

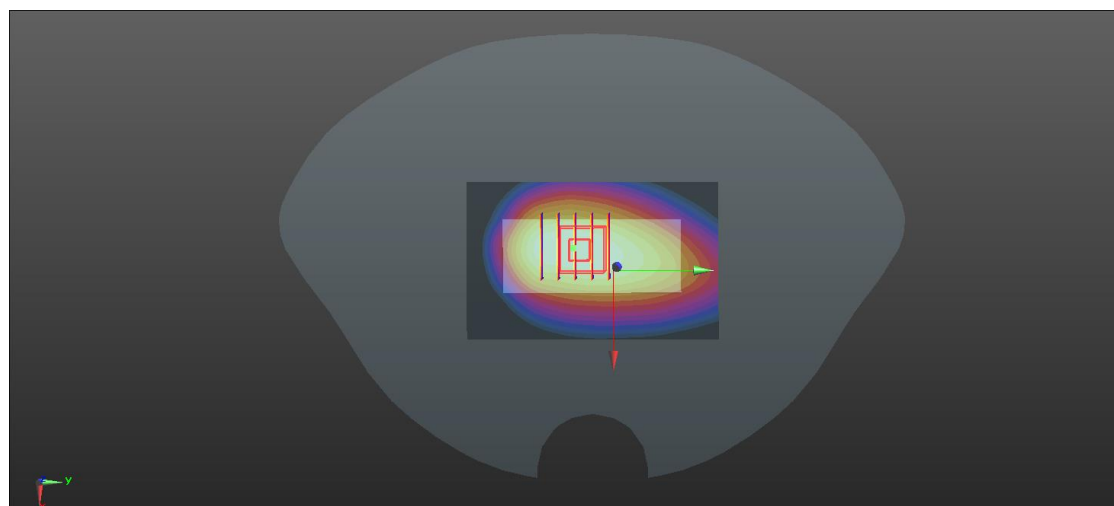
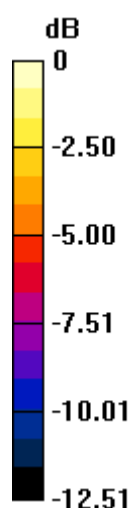
Peak SAR (extrapolated) = 1.27 W/kg

SAR(1 g) = 0.893 W/kg; SAR(10 g) = 0.595 W/kg

Smallest distance from peaks to all points 3 dB below = 17.9 mm

Ratio of SAR at M2 to SAR at M1 = 70%

Maximum value of SAR (measured) = 0.959 W/kg



0 dB = 0.959 W/kg

Meas.6 Body Plane with Horizontal-up 5mm on Middle Channel in LTE Band19 mode With Antenna 1

Date: 2025.02.16

Communication System Band: Band 19; Frequency: 837.5 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 837.5$ MHz; $\sigma = 0.913$ S/m; $\epsilon_r = 40.689$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.6°C Liquid Temperature: 21.5°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(9.99, 9.99, 9.99); Calibrated: 2024.06.25;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1711; Calibrated: 2024.03.18
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1576
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch24075/Area Scan (51x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.07 W/kg

Ch24075/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 34.05 V/m; Power Drift = -0.02 dB

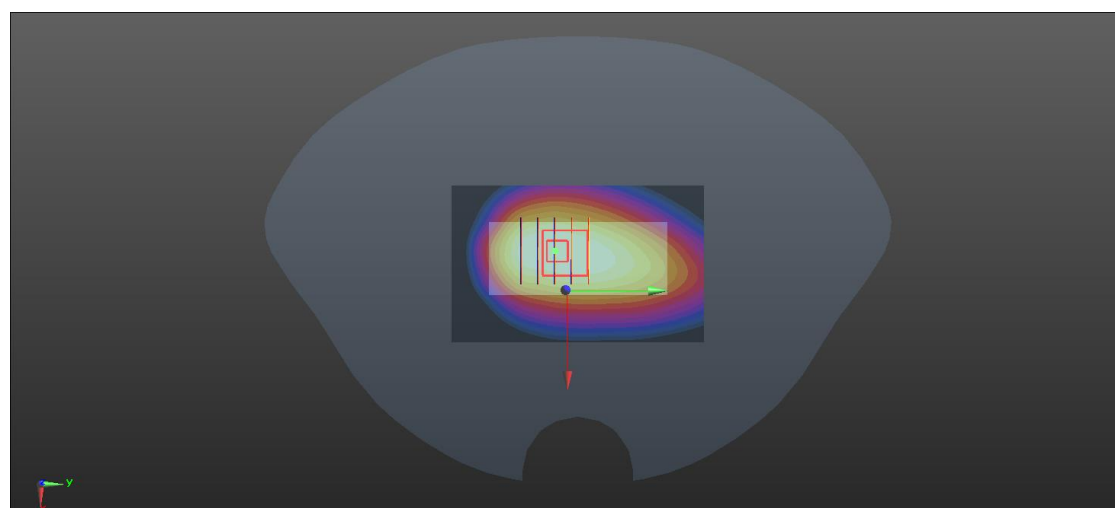
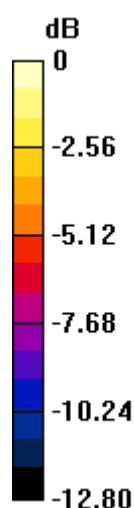
Peak SAR (extrapolated) = 1.40 W/kg

SAR(1 g) = 0.934 W/kg; SAR(10 g) = 0.622 W/kg

Smallest distance from peaks to all points 3 dB below = 17.2 mm

Ratio of SAR at M2 to SAR at M1 = 69.6%

Maximum value of SAR (measured) = 1.00 W/kg



0 dB = 1.00 W/kg

Meas.7 Body Plane with Horizontal-up 5mm on High Channel in LTE B26 mode With Antenna 1

Date: 2025.02.17

Communication System Band: Band 26; Frequency: 841.5 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 841.5$ MHz; $\sigma = 0.914$ S/m; $\epsilon_r = 40.598$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.4°C Liquid Temperature: 21.4°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(9.99, 9.99, 9.99); Calibrated: 2024.06.25;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1711; Calibrated: 2024.03.18
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1576
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch26965/Area Scan (51x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

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

Ch26965/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 33.92 V/m; Power Drift = 0.11 dB

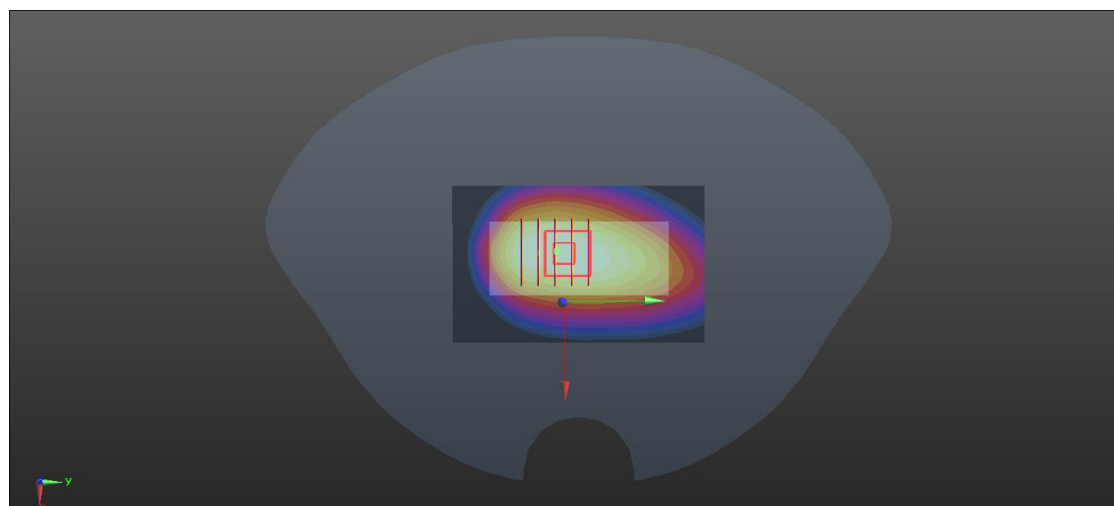
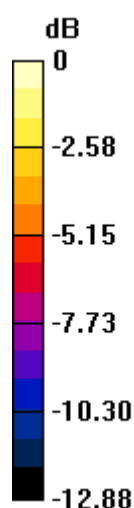
Peak SAR (extrapolated) = 1.44 W/kg

SAR(1 g) = 1.01 W/kg; SAR(10 g) = 0.681 W/kg

Smallest distance from peaks to all points 3 dB below = 19.3 mm

Ratio of SAR at M2 to SAR at M1 = 69.9%

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



0 dB = 1.08 W/kg

ANNEX D EUT EXTERNAL PHOTOS

Please refer the document “BL-SZ2520135-AW.pdf”.

ANNEX E SAR TEST SETUP PHOTOS

Please refer the document “BL-SZ2520135-AS.pdf”.

ANNEX F CALIBRATION REPORT

Please refer the document “BL-SZ2520135-AC.pdf”.

ANNEX G TUNE-UP PROCEDURE

Please refer the document “BL-SZ2520135-AT.pdf”.

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