

TEST REPORT

Applicant: Shenzhen Jimi IoT Co., Ltd.
Address: 3-4/F, Block A, Building #7, Shenzhen International Innovation Valley, Dashi 1st Road, Nanshan District, Shenzhen, Guangdong, China
Equipment Type: Portable GNSS Tracker
Model Name: P6401 (refer to section 2.3)
Brand Name: Jimi IoT
FCC ID: 2AMLF-P6401
Test Standard: FCC 47 CFR Part 2.1093 (refer to section 3.1)
Maximum SAR: Body (1 g@0mm): 0.95 W/kg
Sample Arrival Date: Feb. 20, 2025
Test Date: Mar. 12, 2025- Mar. 24, 2025
Date of Issue: Apr. 01, 2025

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

**Tested by:** Xiong Lining**Checked by:** Xu Rui**Approved by:** Tolan Tu
(Testing Director)

Revision History

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

TABLE OF CONTENTS

1 GENERAL INFORMATION..... 5

1.1 Test Laboratory 5

1.2 Test Location 5

1.3 Test Environment Condition..... 5

2 PRODUCT INFORMATION 6

2.1 Applicant Information 6

2.2 Manufacturer Information..... 6

2.3 General Description for Equipment under Test (EUT)..... 6

2.4 Ancillary Equipment..... 6

2.5 Technical Information 7

3 SUMMARY OF TEST RESULT 8

3.1 Test Standards 8

3.2 Device Category and SAR Limit 9

3.3 Test Result Summary 10

3.4 Test Uncertainty 11

4 MEASUREMENT SYSTEM 12

4.1 Specific Absorption Rate (SAR) Definition 12

4.2 DASY SAR System 13

5 SYSTEM VERIFICATION 20

5.1 Purpose of System Check 20

5.2 System Check Setup 20

6 TEST POSITION CONFIGURATIONS 21

6.1 Body-worn Position Conditions 21

7 MEASUREMENT PROCEDURE 22

7.1	Measurement Process Diagram	22
7.2	SAR Scan General Requirement	23
7.3	Measurement Procedure	24
7.4	Area & Zoom Scan Procedure	24
7.5	LTE (TDD) Considerations.....	25
8	CONDUCTED RF OUPUT POWER	27
8.1	GSM.....	27
8.2	LTE.....	27
8.3	Bluetooth	28
9	TEST EXCLUSION CONSIDERATION	29
10	TEST RESULT	30
10.1	GSM 850	30
10.2	GSM 1900	30
10.3	LTE Band 2 (20MHz Bandwidth)	31
10.4	LTE Band 4 (20MHz Bandwidth)	32
10.5	LTE Band 5 (10MHz Bandwidth)	33
10.6	LTE Band 7 (20MHz Bandwidth)	34
10.7	LTE Band 66 (20MHz Bandwidth).....	35
10.9	Bluetooth	36
11	SAR Measurement Variability	37
12	SIMULTANEOUS TRANSMISSION.....	38
12.1	Simultaneous Transmission Mode Consider	38
12.2	Sum SAR of Simultaneous Transmission	39
13	TEST EQUIPMENTS LIST	41
ANNEX A	SIMULATING LIQUID VERIFICATION RESULT	42
ANNEX B	SYSTEM CHECK RESULT	43
ANNEX C	TEST DATA.....	54
ANNEX D	EUT EXTERNAL PHOTOS.....	62
ANNEX E	SAR TEST SETUP PHOTOS	62
ANNEX F	CALIBRATION REPORT	62

ANNEX G TUNE-UP PROCEDURE 62

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	Shenzhen Jimi IoT Co., Ltd.
Address	3-4/F, Block A, Building #7, Shenzhen International Innovation Valley, Dashi 1st Road, Nanshan District, Shenzhen, Guangdong, China

2.2 Manufacturer Information

Manufacturer	Shenzhen Jimi IoT Co., Ltd.
Address	3-4/F, Block A, Building #7, Shenzhen International Innovation Valley, Dashi 1st Road, Nanshan District, Shenzhen, Guangdong, China

2.3 General Description for Equipment under Test (EUT)

EUT Name	Portable GNSS Tracker
Model Name Under Test	P6401
Series Model Name	PL601, PL601LA, PL601L, PDV Gen2
Description of Model name differentiation	All models are same with electrical parameters and internal circuit structure, but only differ in model name. (this information provided by the applicant)
Hardware Version	P6401-MB-V1.1
Software Version	P6401_P6401_WEBI_LA_V1.1.1
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.4 Ancillary Equipment

Ancillary Equipment 1	Battery	
	Brand Name	N/A
	Model No.	SP0601
	Serial No.	N/A
	Capacity	650 mAh
	Rated Voltage	3.8 V
	Limit Charge Voltage	4.35 V

2.5 Technical Information

Network and Wireless connectivity	2G Network GSM/GPRS/EDGE 850/1900 4G Network LTE FDD Band 2/4/5/7/66 BLE: 1M GPS, BDS
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The requirement for the following technical information of the EUT was tested in this report:

Operating Mode	GSM, LTE, Bluetooth		
Frequency Range	GSM 850	TX: 824 ~ 849 MHz	RX: 869 ~ 894 MHz
	GSM 1900	TX: 1850 ~ 1910 MHz	RX: 1930 ~ 1990 MHz
	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 7	TX: 2500 ~ 2570 MHz	RX: 2620 ~ 2690 MHz
	LTE Band 66	TX: 1710 ~ 1780 MHz	RX: 2110 ~ 2180 MHz
	Bluetooth	2402 ~ 2480 MHz	
Antenna Type	WWAN: PIFA Antenna Bluetooth: PIFA Antenna		
DTM	N/A		
Hotspot Function	Not Support		
Power Reduction	Not Support		
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 941225 D05 v02r05	SAR Evaluation Considerations for LTE Devices
5	KDB 865664 D01 v01r04	SAR Measurement 100 MHz to 6 GHz
6	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 Values

Equipment Class	Band	Maximum Scaled SAR (W/kg)	Maximum Report SAR (W/kg)
		Body (0mm)	Body (0mm)
		1g SAR	1g SAR
PCE	GSM 850	0.79	0.95
	GSM 1900	0.19	
	LTE Band 2	0.37	
	LTE Band 4	0.50	
	LTE Band 5	0.75	
	LTE Band 7	0.95	
	LTE Band 66	0.49	
DSS	Bluetooth	0.08	
Limit (W/kg)		1.6	1.6
Verdict		PASS	

3.3.2 Highest Simultaneous Transmission SAR Values

Equipment Class	Maximum Scaled SAR (W/kg)
	Body-worn 1g (0mm)
PCE	0.97
DSS	0.97
Limit (W/Kg)	1.60
Verdict	Pass
Note: The highest simultaneous SAR please refer section 12.1.	

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 0.95 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:

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

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

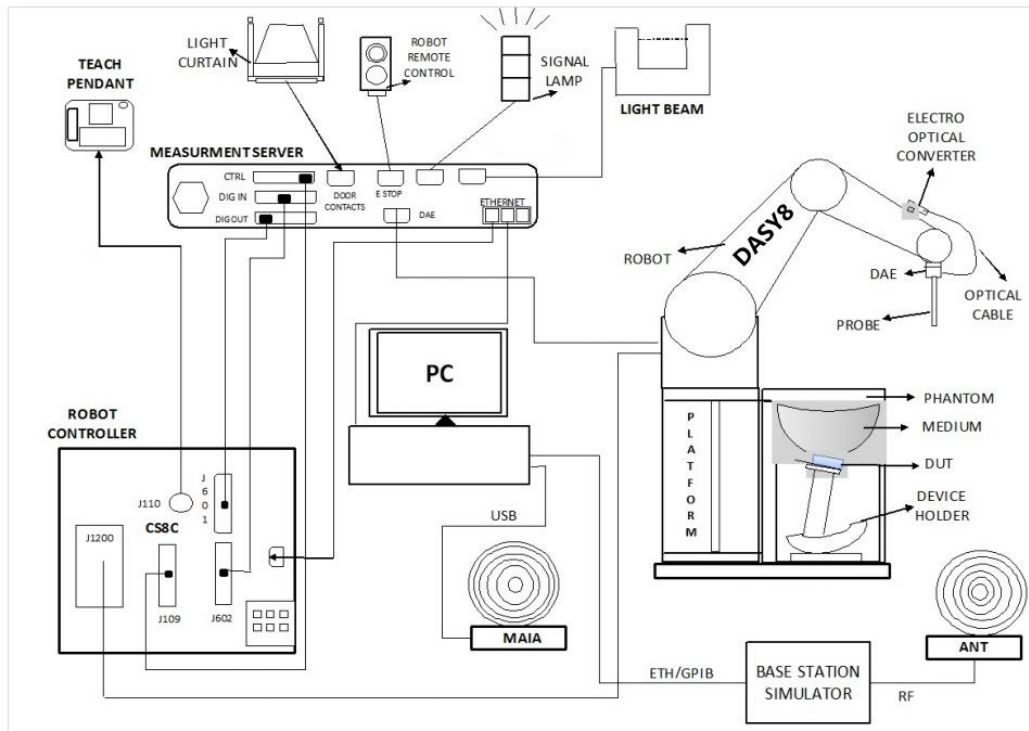
$$\text{SAR} = \frac{\sigma E^2}{\rho}$$

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 DASY 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 DASY 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 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., glycoether)
Calibration	ISO/IEC 17025 calibration service available
Frequency	4 MHz to 10 GHz; Linearity: ± 0.2 dB
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 IEC/IEEE 62209-1528 and IEEE 1528 std, with CALISAR, Antennessa proprietary calibration system. The calibration is performed with the IEC/IEEE 62209-1528 annexe technique using reference guide at the five frequencies.

4.2.4 Data Acquisition Electronics

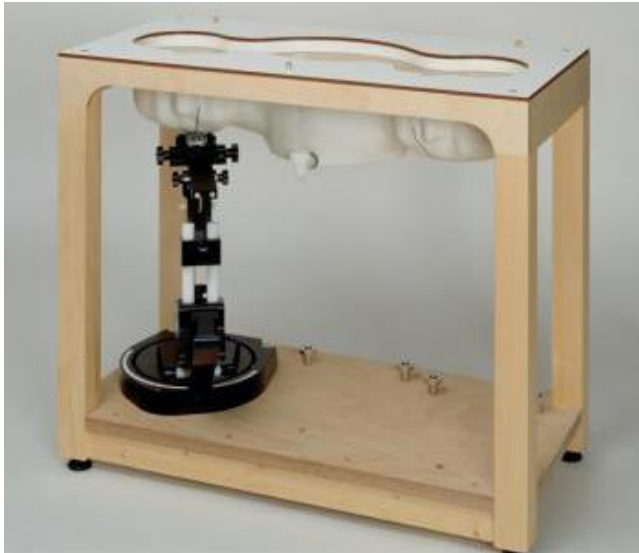
The data acquisition electronics (DAE) consist of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converte and a command decoder with a control logic unit. Transmission to the measurement server is accomplished through an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



- Input Impedance: 200M Ω m
- 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 head
- Right head
- Flat phantom

Photo of Phantom SN1859



Serial Number	Material	Length	Height
SN 1859 SAM	Vinylester, glass fiber reinforced	1000	500

4.2.6 Device Holder

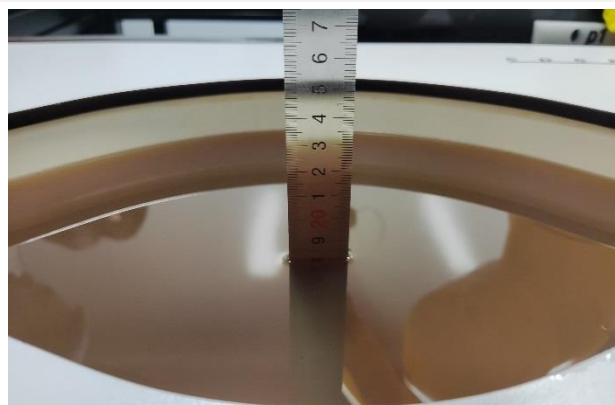
The DASY device holder has two scales for device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear openings). The plane between the ear openings and the mouth tip has a rotation angle of 65° . The bottom plate contains three pair of bolts for 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

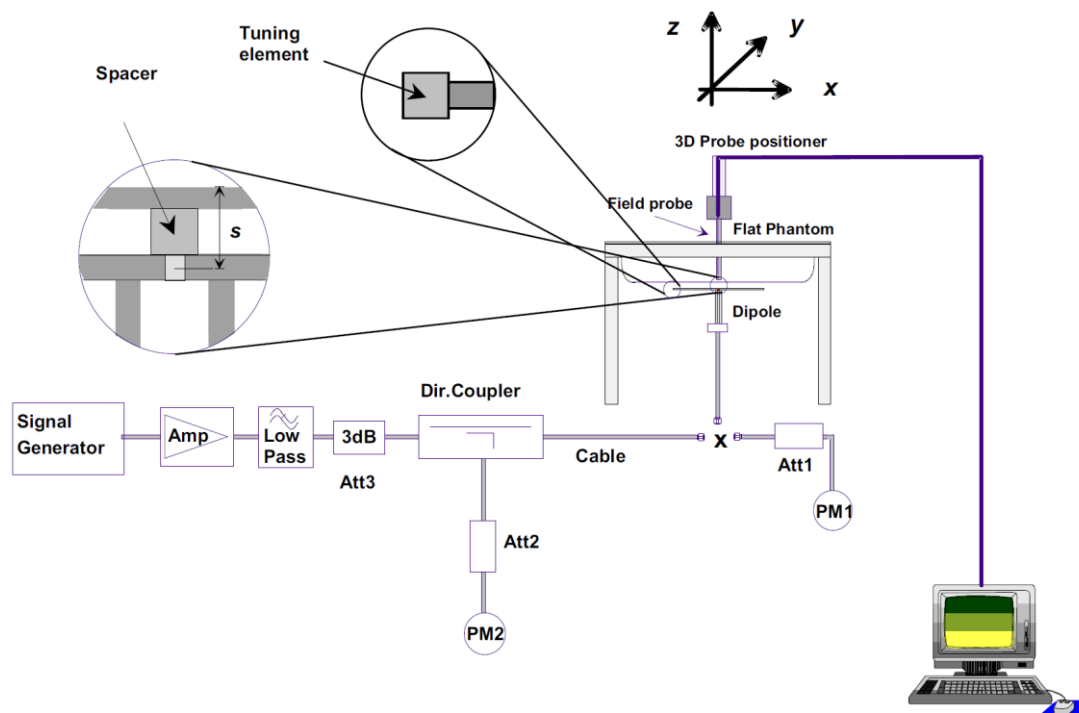
5 SYSTEM VERIFICATION

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

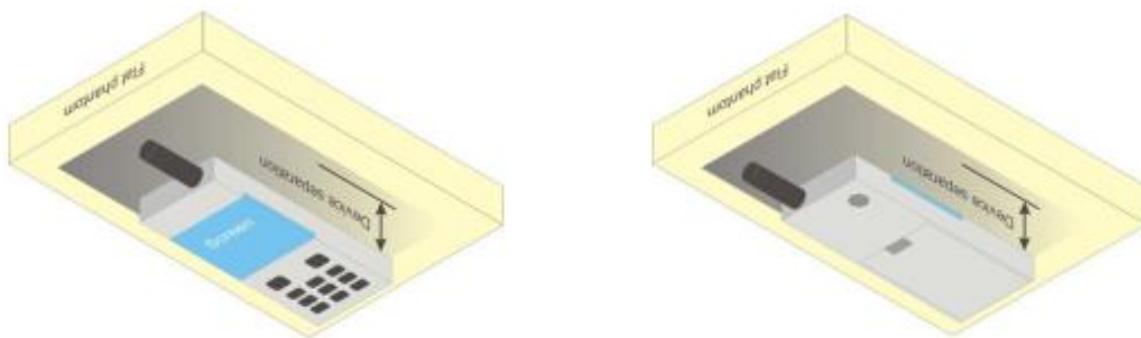
According to KDB 648474 D04 Handset, handsets are tested for SAR compliance in head, body-worn accessory and other use configurations described in the following subsections.

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.

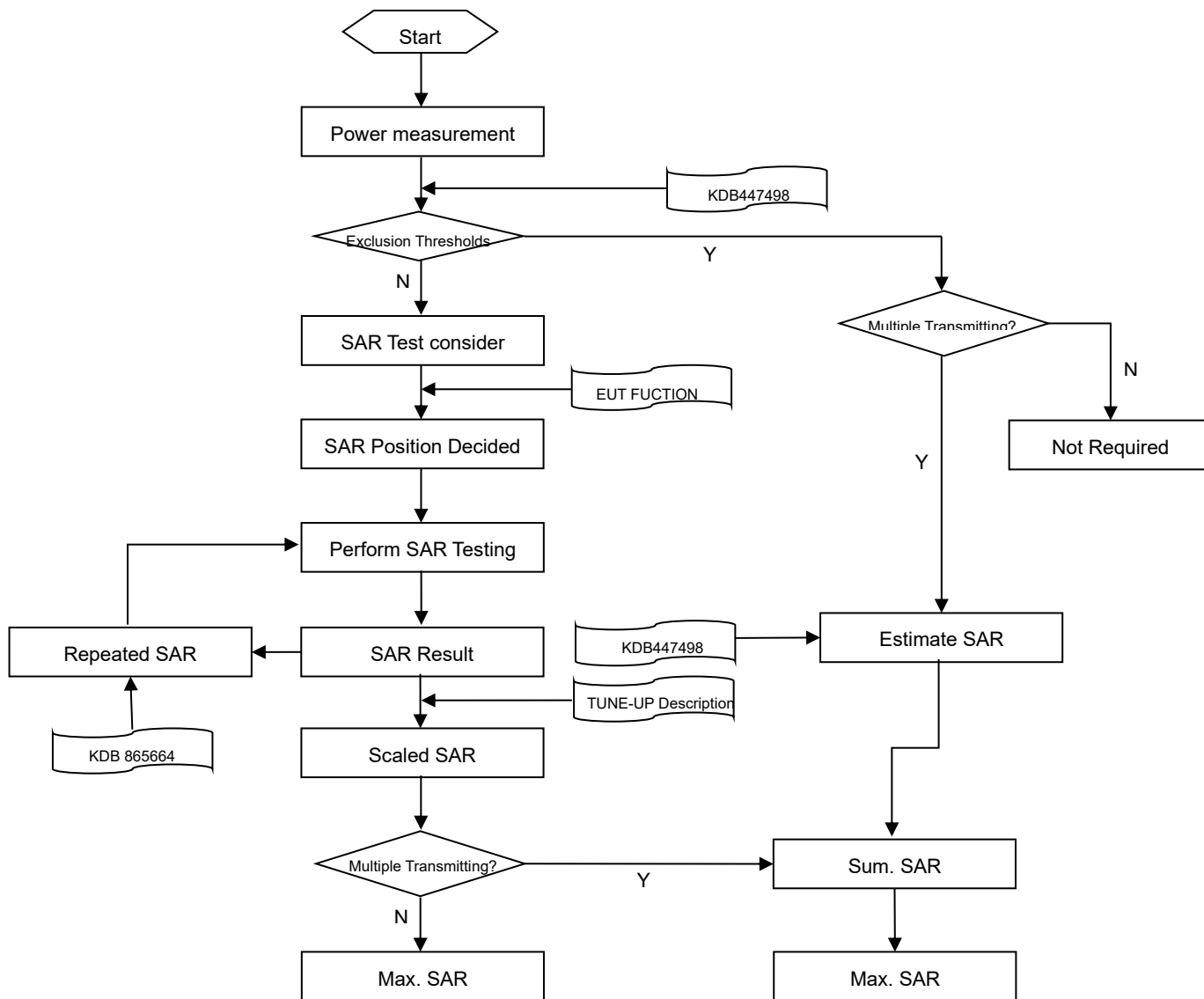
Body-worn accessories that do not contain metallic or conductive components may be tested according to worst-case exposure configurations, typically according to the smallest test separation distance required for the group of body-worn accessories with similar operating and exposure characteristics. 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	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ 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.

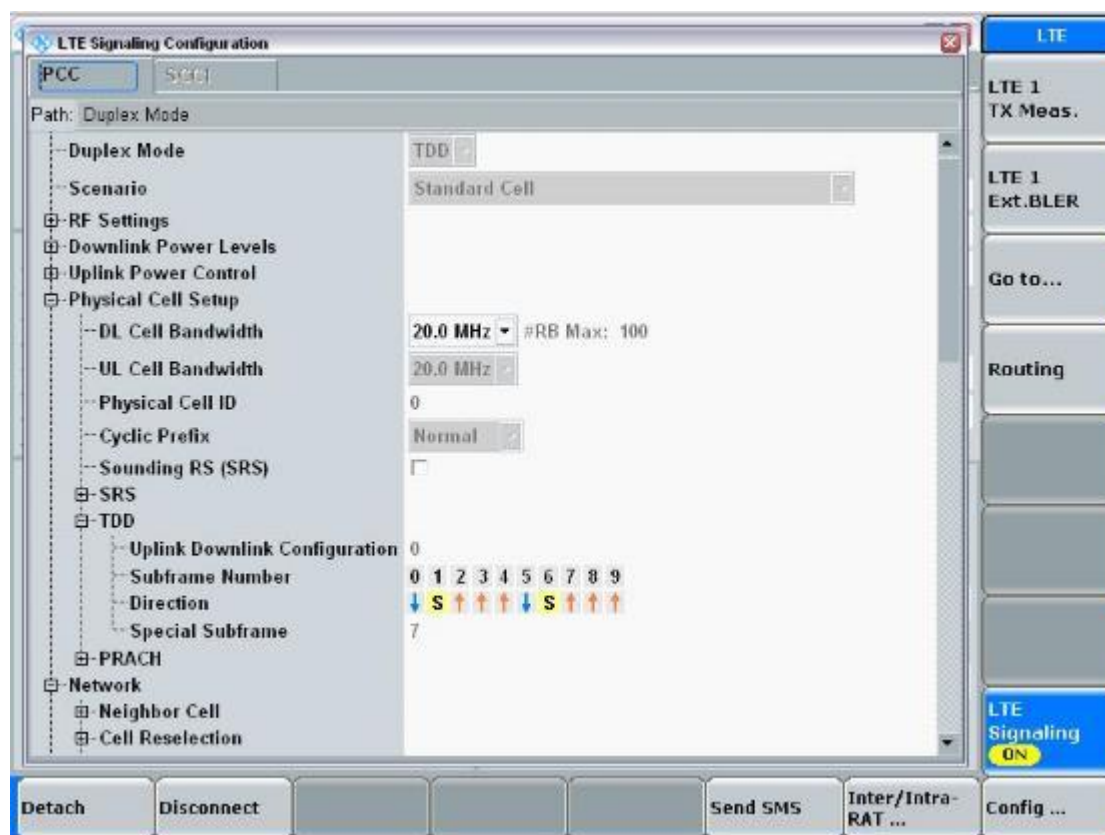
7.4 Area & Zoom Scan Procedure

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.

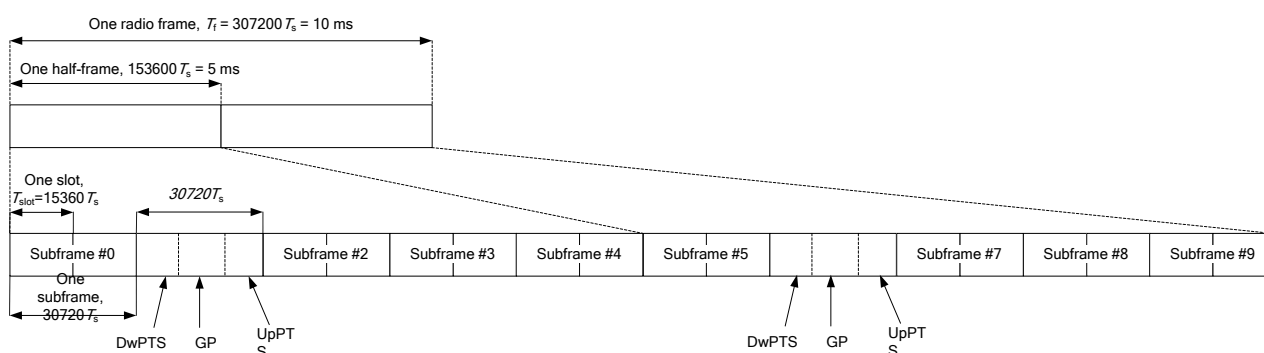
When the 1 g SAR of the highest peak is within 2 dB of the SAR limit, additional zoom scans are required for other peaks within 2 dB of the highest peak that have not been included in any zoom scan to ensure there is no increase in SAR.

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-SZ2520955-AP.pdf”.

8.2 LTE

Please refer the document “BL-SZ2520955-AP.pdf”.

8.3 Bluetooth

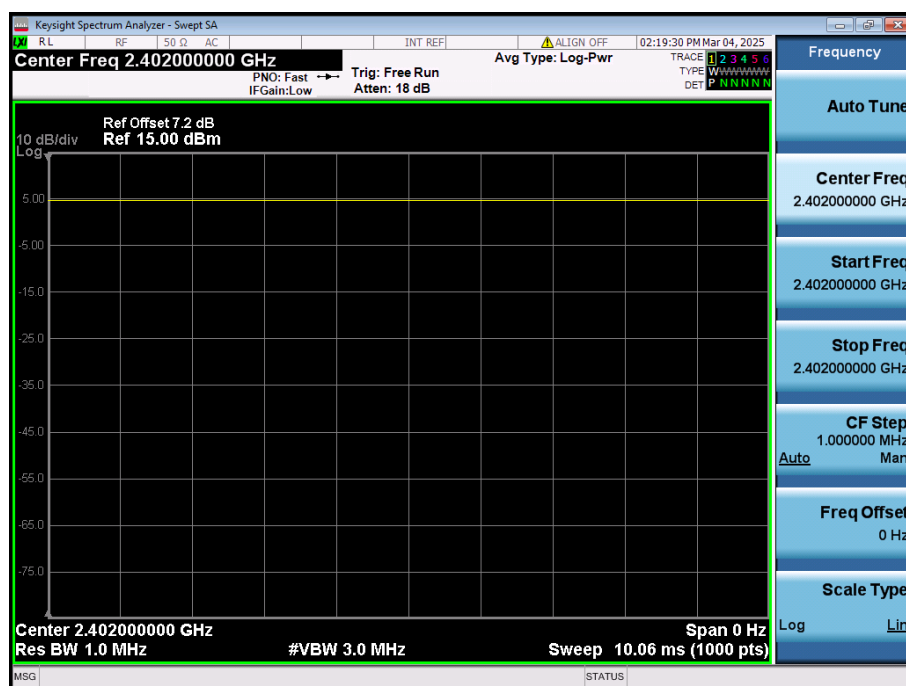
Mode	GFSK		
Mode	BLE-1Mbps		
Channel	0	19	39
Frequency (MHz)	2402	2441	2480
EIRP (dBm)	4.83	6.28	3.31
Tune-Up Limit (dBm)	6.00	7.00	5.00
SAR Test Require	NO	Yes	NO

Note 1: Since bluetooth BR mode is the maximum output power mode, SAR measurements were performed with test software using DH5 modulation, and SAR measurement is not required for the EDR and LE. When the secondary mode is $\leq \frac{1}{4}$ dB higher than the primary mode.

Note: The Bluetooth duty cycle is 100 % as following figure, according to 2016 Oct. TCB workshop for Bluetooth SAR scaling need further consideration and the maximum duty cycle is 100%, therefore the actual duty cycle will be scaled up to 100% for Bluetooth reported SAR calculation.

Duty Cycle

GFSK



9 TEST EXCLUSION CONSIDERATION

For antenna location and support bands please refer the document “BL-SZ2520955-AI EUT internal photo.pdf”.

10 TEST RESULT

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

10.1GSM 850

Antenna	Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift(dB)	1 g Meas SAR(Wkg)	Meas. Power (dBm)	Max. tune power(dBm)	Scaling Factor	1g Scaled SAR (W/kg)	Meas. No.
Body												
Ant.0	DATA 2Slots	Front Side	0	128	824.2	-0.04	0.545	30.56	31.00	1.107	0.603	/
		Back Side	0	128	824.2	-0.01	0.239	30.56	31.00	1.107	0.265	/
		Left Edge	0	128	824.2	0.00	0.716	30.56	31.00	1.107	0.793	1#
		Right Edge	0	128	824.2	0.08	0.054	30.56	31.00	1.107	0.060	/
		Top Edge	0	128	824.2	0.13	0.096	30.56	31.00	1.107	0.106	/
		Bottom Edge	0	128	824.2	0.13	0.154	30.56	31.00	1.107	0.170	/

10.2GSM 1900

Antenna	Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift(dB)	1 g Meas SAR(Wkg)	Meas. Power (dBm)	Max. tune power(dBm)	Scaling Factor	1g Scaled SAR (W/kg)	Meas. No.
Body												
Ant.0	DATA 2Slots	Front Side	0	661	1880	-0.13	0.158	27.30	28.00	1.175	0.186	2#
		Back Side	0	661	1880	-0.07	0.117	27.30	28.00	1.175	0.137	/
		Left Edge	0	661	1880	-0.03	0.092	27.30	28.00	1.175	0.108	/
		Right Edge	0	661	1880	-0.01	0.010	27.30	28.00	1.175	0.012	/
		Top Edge	0	661	1880	0.07	0.057	27.30	28.00	1.175	0.067	/
		Bottom Edge	0	661	1880	0.09	0.084	27.30	28.00	1.175	0.099	/

10.3LTE Band 2 (20MHz Bandwidth)

Antenna	Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	RB Num.	RB Start	Power Drift(dB)	1 g Meas SAR(Wkg)	Meas. Power (dBm)	Max. tune power(dBm)	Scaling Factor	1g Scaled SAR (W/kg)	Meas. No.
Body														
Ant.0	QPSK	Front Side	0	18700	1860	1	MID	-0.14	0.325	21.48	22.00	1.127	0.366	3#
		Back Side	0	18700	1860	1	MID	0.02	0.259	21.48	22.00	1.127	0.292	/
		Left Edge	0	18700	1860	1	MID	-0.11	0.145	21.48	22.00	1.127	0.163	/
		Right Edge	0	18700	1860	1	MID	-0.04	0.027	21.48	22.00	1.127	0.030	/
		Top Edge	0	18700	1860	1	MID	0.13	0.082	21.48	22.00	1.127	0.092	/
		Bottom Edge	0	18700	1860	1	MID	0.01	0.172	21.48	22.00	1.127	0.194	/
		Front Side	0	18700	1860	50	MID	0.05	0.293	20.32	21.00	1.169	0.343	/
		Back Side	0	18700	1860	50	MID	-0.04	0.205	20.32	21.00	1.169	0.240	/
		Left Edge	0	18700	1860	50	MID	-0.02	0.115	20.32	21.00	1.169	0.134	/
		Right Edge	0	18700	1860	50	MID	0.04	0.022	20.32	21.00	1.169	0.026	/
		Top Edge	0	18700	1860	50	MID	0.08	0.065	20.32	21.00	1.169	0.076	/
		Bottom Edge	0	18700	1860	50	MID	-0.11	0.136	20.32	21.00	1.169	0.159	/

10.4LTE Band 4 (20MHz Bandwidth)

Antenna	Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	RB Num.	RB Start	Power Drift(dB)	1 g Meas SAR(Wkg)	Meas. Power (dBm)	Max. tune power(dBm)	Scaling Factor	1g Scaled SAR (W/kg)	Meas. No.
Body														
Ant.0	QPSK	Front Side	0	20175	1732.5	1	MID	0.04	0.434	21.90	22.50	1.148	0.498	4#
		Back Side	0	20175	1732.5	1	MID	0.15	0.360	21.90	22.50	1.148	0.413	/
		Left Edge	0	20175	1732.5	1	MID	-0.07	0.200	21.90	22.50	1.148	0.230	/
		Right Edge	0	20175	1732.5	1	MID	0.05	0.025	21.90	22.50	1.148	0.029	/
		Top Edge	0	20175	1732.5	1	MID	0.13	0.089	21.90	22.50	1.148	0.102	/
		Bottom Edge	0	20175	1732.5	1	MID	-0.14	0.251	21.90	22.50	1.148	0.288	/
		Front Side	0	20175	1732.5	50	MID	-0.15	0.337	20.88	21.50	1.153	0.389	/
		Back Side	0	20175	1732.5	50	MID	-0.05	0.286	20.88	21.50	1.153	0.330	/
		Left Edge	0	20175	1732.5	50	MID	0.01	0.160	20.88	21.50	1.153	0.184	/
		Right Edge	0	20175	1732.5	50	MID	-0.13	0.020	20.88	21.50	1.153	0.023	/
		Top Edge	0	20175	1732.5	50	MID	0.07	0.070	20.88	21.50	1.153	0.081	/
		Bottom Edge	0	20175	1732.5	50	MID	-0.11	0.200	20.88	21.50	1.153	0.231	/

10.5LTE Band 5 (10MHz Bandwidth)

Antenna	Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	RB Num.	RB Start	Power Drift(dB)	1 g Meas SAR(Wkg)	Meas. Power (dBm)	Max. tune power(dBm)	Scaling Factor	1g Scaled SAR (W/kg)	Meas. No.
Body														
Ant.0	QPSK	Front Side	0	20450	829	1	MID	0.00	0.629	21.75	22.50	1.189	0.748	5#
		Back Side	0	20450	829	1	MID	0.14	0.247	21.75	22.50	1.189	0.294	/
		Left Edge	0	20450	829	1	MID	0.04	0.383	21.75	22.50	1.189	0.455	/
		Right Edge	0	20450	829	1	MID	-0.03	0.034	21.75	22.50	1.189	0.040	/
		Top Edge	0	20450	829	1	MID	0.08	0.159	21.75	22.50	1.189	0.189	/
		Bottom Edge	0	20450	829	1	MID	-0.09	0.182	21.75	22.50	1.189	0.216	/
		Front Side	0	20450	829	25	MID	0.00	0.410	20.68	21.50	1.208	0.495	/
		Back Side	0	20450	829	25	MID	-0.10	0.197	20.68	21.50	1.208	0.238	/
		Left Edge	0	20450	829	25	MID	-0.06	0.305	20.68	21.50	1.208	0.368	/
		Right Edge	0	20450	829	25	MID	-0.15	0.026	20.68	21.50	1.208	0.031	/
		Top Edge	0	20450	829	25	MID	0.14	0.128	20.68	21.50	1.208	0.155	/
		Bottom Edge	0	20450	829	25	MID	-0.01	0.146	20.68	21.50	1.208	0.176	/

10.6LTE Band 7 (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.
Body														
Ant.0	QPSK	Front Side	0	21100	2535	1	MID	-0.15	0.484	20.54	21.00	1.112	0.538	/
		Back Side	0	21100	2535	1	MID	-0.08	0.405	20.54	21.00	1.112	0.450	/
		Left Edge	0	21100	2535	1	MID	-0.09	0.856	20.54	21.00	1.112	0.952	6#
		Right Edge	0	21100	2535	1	MID	-0.08	0.021	20.54	21.00	1.112	0.023	/
		Top Edge	0	21100	2535	1	MID	0.13	0.026	20.54	21.00	1.112	0.029	/
		Bottom Edge	0	21100	2535	1	MID	-0.10	0.398	20.54	21.00	1.112	0.443	/
		Front Side	0	21100	2535	50	MID	0.04	0.388	19.31	20.00	1.172	0.455	/
		Back Side	0	21100	2535	50	MID	-0.11	0.324	19.31	20.00	1.172	0.380	/
		Left Edge	0	21100	2535	50	MID	0.11	0.676	19.31	20.00	1.172	0.792	/
		Right Edge	0	21100	2535	50	MID	-0.03	0.018	19.31	20.00	1.172	0.021	/
		Top Edge	0	21100	2535	50	MID	0.08	0.022	19.31	20.00	1.172	0.026	/
		Bottom Edge	0	21100	2535	50	MID	-0.04	0.313	19.31	20.00	1.172	0.367	/
		Left Edge	0	20850	2510	1	MID	-0.07	0.695	20.40	21.00	1.148	0.798	/
		Left Edge	0	21350	2560	1	MID	0.03	0.759	20.23	21.00	1.194	0.906	/
		Left Edge	0	20850	2510	50	MID	-0.12	0.660	19.27	20.00	1.183	0.781	/
		Left Edge	0	21350	2560	50	MID	-0.07	0.655	18.96	20.00	1.271	0.833	/
		Left Edge	0	21350	2560	100	LOW	0.15	0.684	19.51	20.00	1.119	0.765	/

10.7LTE Band 66 (20MHz Bandwidth)

Antenna	Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	RB Num.	RB Start	Power Drift(dB)	1 g Meas SAR(Wkg)	Meas. Power (dBm)	Max. tune power(dBm)	Scaling Factor	1g Scaled SAR (W/kg)	Meas. No.
Body														
Ant.0	QPSK	Front Side	0	132322	1745	1	MID	0.02	0.425	21.39	22.00	1.151	0.489	7#
		Back Side	0	132322	1745	1	MID	-0.13	0.257	21.39	22.00	1.151	0.296	/
		Left Edge	0	132322	1745	1	MID	-0.11	0.131	21.39	22.00	1.151	0.151	/
		Right Edge	0	132322	1745	1	MID	-0.14	0.019	21.39	22.00	1.151	0.022	/
		Top Edge	0	132322	1745	1	MID	0.11	0.064	21.39	22.00	1.151	0.074	/
		Bottom Edge	0	132322	1745	1	MID	0.11	0.192	21.39	22.00	1.151	0.221	/
		Front Side	0	132322	1745	50	MID	-0.09	0.246	20.53	21.00	1.114	0.274	/
		Back Side	0	132322	1745	50	MID	-0.05	0.203	20.53	21.00	1.114	0.226	/
		Left Edge	0	132322	1745	50	MID	-0.01	0.104	20.53	21.00	1.114	0.116	/
		Right Edge	0	132322	1745	50	MID	0.11	0.015	20.53	21.00	1.114	0.017	/
		Top Edge	0	132322	1745	50	MID	0.07	0.051	20.53	21.00	1.114	0.057	/
		Bottom Edge	0	132322	1745	50	MID	-0.04	0.152	20.53	21.00	1.114	0.169	/

10.9Bluetooth

Antenna	Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift(dB)	1 g Meas SAR(Wkg)	Meas. Power (dBm)	Max. tune power(dBm)	Scaling Factor	Duty cycle (%)	Duty cycle Factor	1g Scaled SAR (W/kg)	Meas. No.
Body														
Ant.1	BLE	Front Side	0	19	2440	-0.06	0.070	6.28	7.000	1.180	100.000	1.000	0.083	8#
		Back Side	0	19	2440	0.05	0.026	6.28	7.000	1.180	100.000	1.000	0.031	/
		Left Edge	0	19	2440	0.02	0.012	6.28	7.000	1.180	100.000	1.000	0.014	/
		Right Edge	0	19	2440	-0.01	0.014	6.28	7.000	1.180	100.000	1.000	0.017	/
		Top Edge	0	19	2440	0.07	0.042	6.28	7.000	1.180	100.000	1.000	0.050	/
		Bottom Edge	0	19	2440	-0.13	0.007	6.28	7.000	1.180	100.000	1.000	0.008	/

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)	Repeated ^{1st} Measured SAR (W/kg)	Largest to Smallest SAR Radio
2535	LTE band 7	Body	Left Edge	0.856	Yes	0.835	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

Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneous transmitting antenna. When the sum of SAR 1g of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit (SAR 1g 1.6 W/kg), the simultaneous transmission SAR is not required. When the sum of SAR 1g is greater than the SAR limit (SAR 1g 1.6 W/kg), SAR test exclusion is determined by the SAR to Peak Location Ratio (SPLSR).

12.1 Simultaneous Transmission Mode Consider

No.	Simultaneous Tx Combination	Body-worn
1	WWAN + BT	Yes
Note: 1. The maximum SAR summation is calculated based on the same configuration and test position.		

12.2 Sum SAR of Simultaneous Transmission

12.2.1 Body Simultaneous Transmission SAR Evaluation for WWAN and Bluetooth

Band	Antenna	Position	Stand alone SAR		SUM SAR
			1	2	
			WWAN	Bluetooth	1+2
GSM850	Ant.0	Front Side 0mm	0.603	0.083	0.686
		Back Side 0mm	0.265	0.031	0.296
		Left Edge 0mm	0.793	0.014	0.807
		Right Edge 0mm	0.060	0.017	0.077
		Top Edge 0mm	0.106	0.050	0.156
		Bottom Edge 0mm	0.170	0.008	0.178
GSM1900	Ant.0	Front Side 0mm	0.186	0.083	0.269
		Back Side 0mm	0.137	0.031	0.168
		Left Edge 0mm	0.108	0.014	0.122
		Right Edge 0mm	0.012	0.017	0.029
		Top Edge 0mm	0.067	0.050	0.117
		Bottom Edge 0mm	0.099	0.008	0.107
LTE B2	Ant.0	Front Side 0mm	0.366	0.083	0.449
		Back Side 0mm	0.292	0.031	0.323
		Left Edge 0mm	0.163	0.014	0.177
		Right Edge 0mm	0.030	0.017	0.047
		Top Edge 0mm	0.092	0.050	0.142
		Bottom Edge 0mm	0.194	0.008	0.202
LTE B4	Ant.0	Front Side 0mm	0.498	0.083	0.581
		Back Side 0mm	0.413	0.031	0.444
		Left Edge 0mm	0.230	0.014	0.244
		Right Edge 0mm	0.029	0.017	0.046
		Top Edge 0mm	0.102	0.050	0.152
		Bottom Edge 0mm	0.288	0.008	0.296
LTE B5	Ant.0	Front Side 0mm	0.748	0.083	0.831
		Back Side 0mm	0.294	0.031	0.325
		Left Edge 0mm	0.455	0.014	0.469
		Right Edge 0mm	0.040	0.017	0.057
		Top Edge 0mm	0.189	0.050	0.239
		Bottom Edge 0mm	0.216	0.008	0.224
LTE B7	Ant.0	Front Side 0mm	0.538	0.083	0.621
		Back Side 0mm	0.450	0.031	0.481
		Left Edge 0mm	0.952	0.014	0.966
		Right Edge 0mm	0.023	0.017	0.040
		Top Edge 0mm	0.029	0.050	0.079
		Bottom Edge 0mm	0.443	0.008	0.451
LTE B66	Ant.0	Front Side 0mm	0.489	0.083	0.572

		Back Side 0mm	0.296	0.031	0.327
		Left Edge 0mm	0.151	0.014	0.165
		Right Edge 0mm	0.022	0.017	0.039
		Top Edge 0mm	0.074	0.050	0.124
		Bottom Edge 0mm	0.221	0.008	0.229

Note:

1: The highest Summed 1g SAR is 0.966 W/Kg < 1.6 W/kg, so Simultaneous Transmission SAR test is not required.

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
1750MHz Validation Dipole	Speag	D1750V2	SN: 1130	2024/05/08	2027/05/07
1950MHz Validation Dipole	Speag	D1950V3	SN: 1240	2024/08/22	2027/08/21
2450MHz Validation Dipole	Speag	D2450V2	SN: 952	2024/05/07	2027/05/06
2600MHz Validation Dipole	Speag	D2600V2	SN: 1095	2024/05/08	2027/05/07
Data Acquisition Electronics	Speag	DAE4	SN: 1710	2025/01/20	2026/01/19
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: 1859	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 DAK 3.5 Dielectric Probe Kit.

Body 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 (%)
2025.03.24	Body	835	21.4	0.88	42.30	0.90	41.50	-2.22	1.93
2025.03.12	Body	1750	21.2	1.36	40.32	1.37	40.08	-0.73	0.60
2025.03.13	Body	1950	21.3	1.42	39.22	1.40	40.00	1.43	-1.95
2025.03.14	Body	2450	21.1	1.75	38.47	1.80	39.20	-2.78	-1.86
2025.03.15	Body	2600	21.6	1.95	38.93	1.96	39.01	-0.51	-0.21
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).

Body liquid 1g

Date	Liquid Type	Freq. (MHz)	Power (mW)	Measured SAR (W/kg)	Normalized SAR (W/kg)	Dipole SAR (W/kg)	Tolerance (%)
2025.03.24	Body	835	100	0.98	9.76	9.74	0.21
2025.03.12	Body	1750	100	3.67	36.70	37.00	-0.81
2025.03.13	Body	1950	100	4.13	41.30	41.70	-0.96
2025.03.14	Body	2450	100	5.33	53.30	52.60	1.33
2025.03.15	Body	2600	100	5.66	56.60	55.90	1.25

Note: The tolerance limit of System validation $\pm 10\%$.

System Performance Check Data (835MHz)

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivit y [S/m]	TSL Permittivity	Ambient Temperatur e [°C]	Liquid Temperatur e [°C]
Flat, HSL		CD835	CW, 0--	835.0, 50	9.99	0.880	42.3	22.3	21.4

Hardware Setup

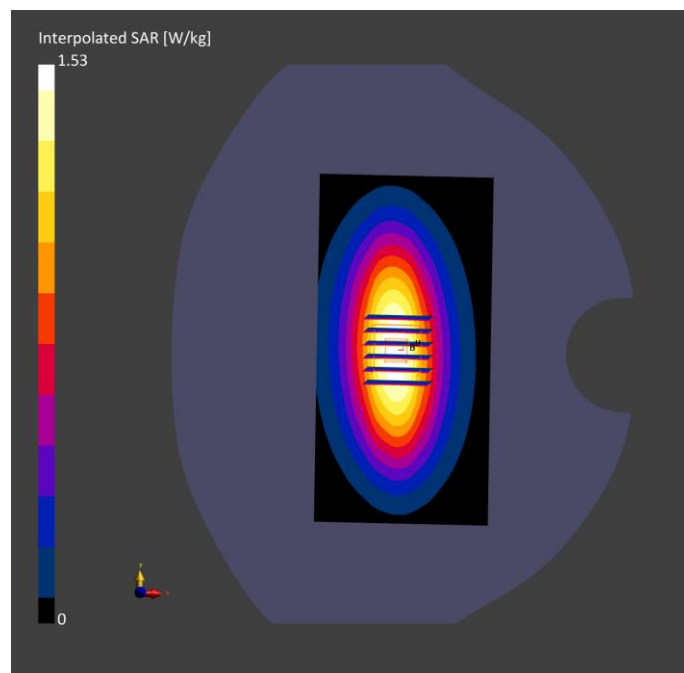
Phantom	TSL, Measured Date		Probe, Calibration Date		DAE, Calibration Date	
Twin-SAM V5.0 (30deg probe tilt) - 1859	HBBL-600-10000	2025-03-24	EX3DV4 - SN7510,	2024-06-25	DAE4 Sn1710,	2025-01-20

Scan Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	80.0 x 160.0	30.0 x 30.0 x 30.0
Grid Steps [mm]	10.0 x 10.0	6.0 x 6.0 x 1.5
Sensor Surface [mm]	3.0	1.4
Graded Grid	Yes	Yes
Grading Ratio	1.5	1.5
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2025-03-24	2025-03-24
psSAR1g [W/kg]	0.944	0.976
psSAR10g [W/kg]	0.613	0.633
Power Drift [dB]	0.02	0.02
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		81.7
Dist 3dB Peak [mm]		12.1



System Performance Check Data (1750MHz)

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivit y [S/m]	TSL Permittivity	Ambient Temperatur e [°C]	Liquid Temperatur e [°C]
Flat, HSL		D1750	CW, 0--	1750.0, 50	8.67	1.36	40.3	22.5	21.2

Hardware Setup

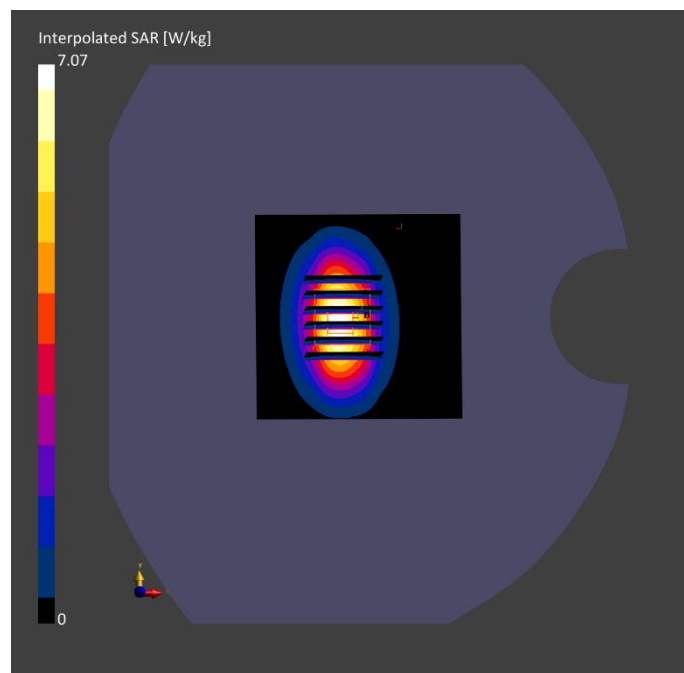
Phantom	TSL, Measured Date		Probe, Calibration Date		DAE, Calibration Date
Twin-SAM V5.0 (30deg probe tilt) - 1859	HBBL-600-10000	2025-03-12	EX3DV4 - SN7510,	2024-06-25	DAE4 Sn1710, 2025-01-20

Scan Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	80.0 x 80.0	30.0 x 30.0 x 30.0
Grid Steps [mm]	10.0 x 10.0	6.0 x 6.0 x 1.5
Sensor Surface [mm]	3.0	1.4
Graded Grid	Yes	Yes
Grading Ratio	1.5	1.5
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2025-03-12	2025-03-12
psSAR1g [W/kg]	3.24	3.67
psSAR10g [W/kg]	1.82	1.95
Power Drift [dB]	0.02	0.05
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		82.2
Dist 3dB Peak [mm]		9.4



System Performance Check Data (1950MHz)

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivit y [S/m]	TSL Permittivity	Ambient Temperatur e [°C]	Liquid Temperatur e [°C]
Flat, HSL		D1950	CW, 0--	1950.0, 50	8.33	1.42	39.2	22.4	21.3

Hardware Setup

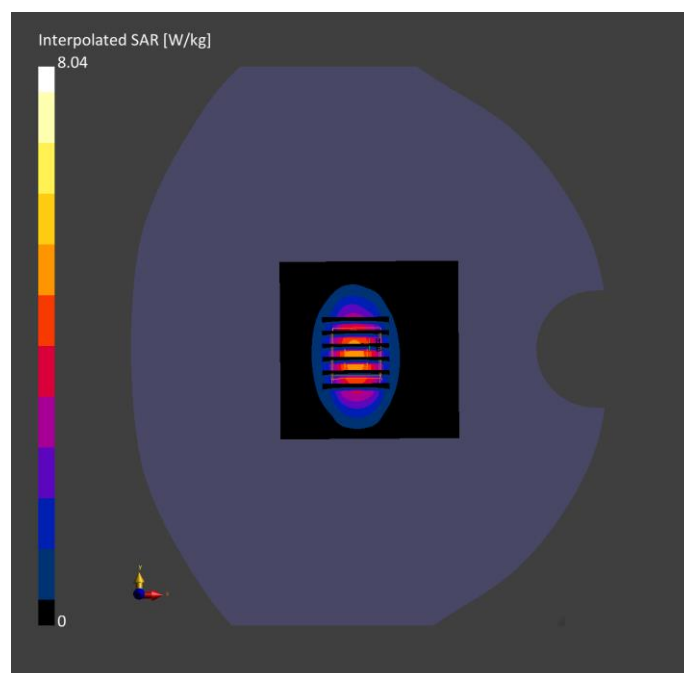
Phantom	TSL, Measured Date		Probe, Calibration Date		DAE, Calibration Date
Twin-SAM V5.0 (30deg probe tilt) - 1859	HBBL-600-10000	2025-03-13	EX3DV4 - SN7510,	2024-06-25	DAE4 Sn1710, 2025-01-20

Scan Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	80.0 x 80.0	30.0 x 30.0 x 30.0
Grid Steps [mm]	10.0 x 10.0	6.0 x 6.0 x 1.5
Sensor Surface [mm]	3.0	1.4
Graded Grid	Yes	Yes
Grading Ratio	1.5	1.5
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2025-03-13	2025-03-13
psSAR1g [W/kg]	3.93	4.13
psSAR10g [W/kg]	1.93	2.16
Power Drift [dB]	0.01	0.04
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		81.3
Dist 3dB Peak [mm]		9.1



System Performance Check Data (2450MHz)

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivit y [S/m]	TSL Permittivity	Ambient Temperatur e [°C]	Liquid Temperatur e [°C]
Flat, HSL		D2450	CW, 0--	2450.0, 50	7.75	1.75	38.5	22.6	21.1

Hardware Setup

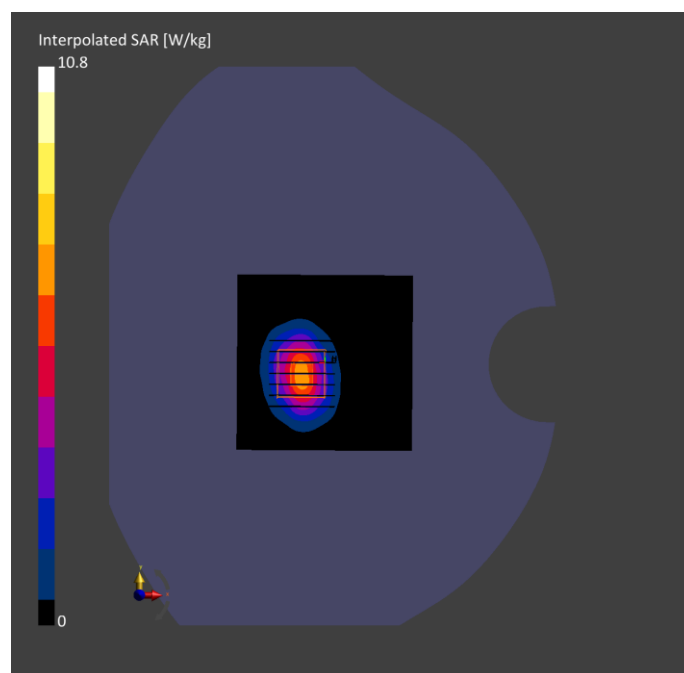
Phantom	TSL, Measured Date		Probe, Calibration Date		DAE, Calibration Date
Twin-SAM V5.0 (30deg probe tilt) - 1859	HBBL-600-10000	2025-03-14	EX3DV4 - SN7510,	2024-06-25	DAE4 Sn1710, 2025-01-20

Scan Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	80.0 x 80.0	30.0 x 30.0 x 30.0
Grid Steps [mm]	10.0 x 10.0	5.0 x 5.0 x 1.5
Sensor Surface [mm]	3.0	1.4
Graded Grid	Yes	Yes
Grading Ratio	1.5	1.5
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2025-03-14	2025-03-14
psSAR1g [W/kg]	5.12	5.33
psSAR10g [W/kg]	2.23	2.45
Power Drift [dB]	0.03	-0.03
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		81.4
Dist 3dB Peak [mm]		9.4



System Performance Check Data (2600MHz)

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity	Ambient Temperature [°C]	Liquid Temperature [°C]
Flat, HSL		CD2600 V3	CW, 0--	2600.0, 50	7.59	1.95	38.9	22.3	21.6

Hardware Setup

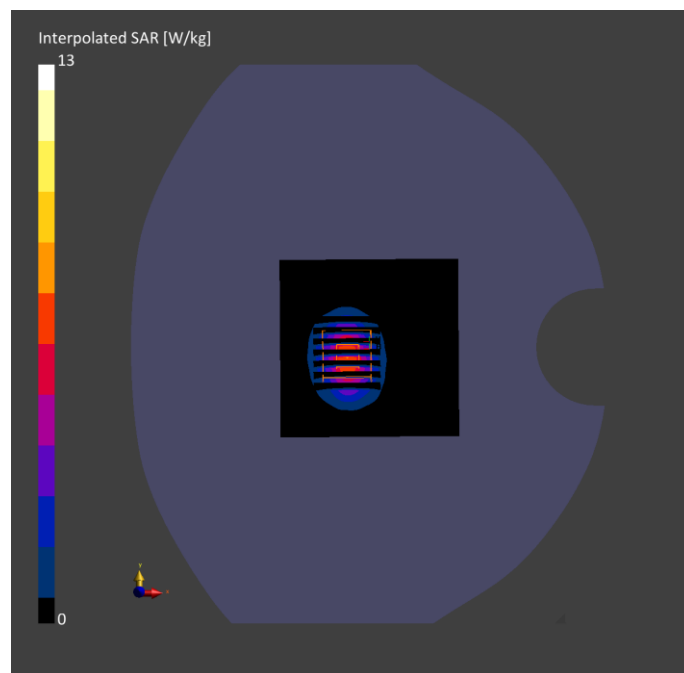
Phantom	TSL, Measured Date		Probe, Calibration Date		DAE, Calibration Date	
Twin-SAM V5.0 (30deg probe tilt) - 1859	HBBL-600-10000	2025-03-15	EX3DV4 - SN7510, 2024-06-25		DAE4 Sn1710, 2025-01-20	

Scan Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	80.0 x 80.0	30.0 x 30.0 x 30.0
Grid Steps [mm]	10.0 x 10.0	5.0 x 5.0 x 1.5
Sensor Surface [mm]	3.0	1.4
Graded Grid	Yes	Yes
Grading Ratio	1.5	1.5
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2025-03-15	2025-03-15
psSAR1g [W/kg]	5.39	5.66
psSAR10g [W/kg]	2.41	2.39
Power Drift [dB]	0.04	0.04
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		79.3
Dist 3dB Peak [mm]		8.6



ANNEX C TEST DATA

Meas.1 Body Plane with Left Edge 0mm on High Channel in GPRS850 2Slots mode with Antenna 0
Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivit y [S/m]	TSL Permittivity	Ambient Temperatur e [°C]	Liquid Temperatur e [°C]
Flat, HSL	EDGE LEFT, 0.00	GSM 850	GSM, 10028-DAC	824.2, 128	8.85	0.877	42.7	22.3	21.4

Hardware Setup

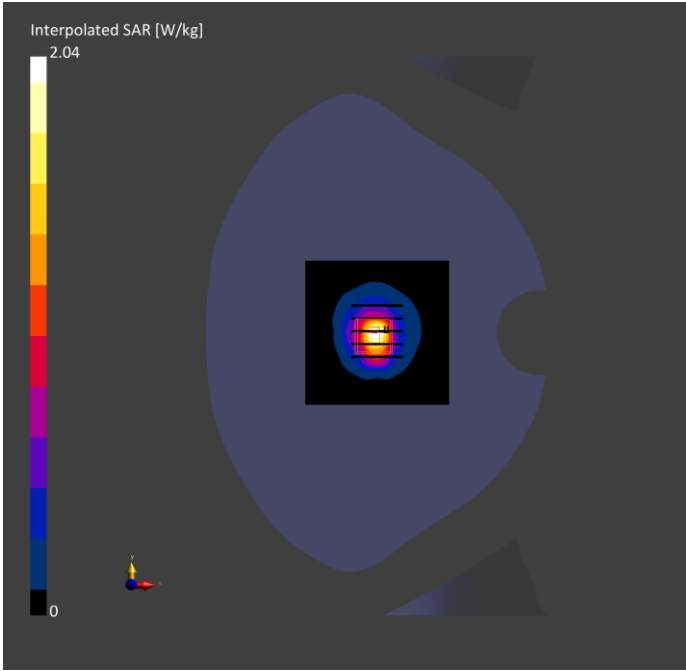
Phantom	TSL, Measured Date		Probe, Calibration Date		DAE, Calibration Date	
Twin-SAM V8.0 (30deg probe tilt) - 1859	HBBL-600-10000	2025-03-24	EX3DV4 - SN7510,	2024-06-25	DAE4 Sn1710,	2024-01-03

Scan Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	90.0 x 90.0	32.0 x 32.0 x 30.0
Grid Steps [mm]	15.0 x 15.0	8.0 x 8.0 x 5.0
Sensor Surface [mm]	3.0	1.4
Graded Grid	Yes	Yes
Grading Ratio	1.5	1.5
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2025-03-24	2025-03-24
psSAR1g [W/kg]	0.629	0.716
psSAR10g [W/kg]	0.336	0.283
Power Drift [dB]	0.18	0.00
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		22.9
Dist 3dB Peak [mm]		6.6



Meas.2 Body Plane with Front Side 0mm on Middle Channel in GPRS1900 2Slots mode with Antenna 0
Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivit y [S/m]	TSL Permittivity	Ambient Temperatur e [°C]	Liquid Temperatur e [°C]
Flat, HSL	FRONT, 0.00	PCS 1900	GSM, 10028-DAC	1880.0, 661	8.33	1.39	40.2	22.4	21.3

Hardware Setup

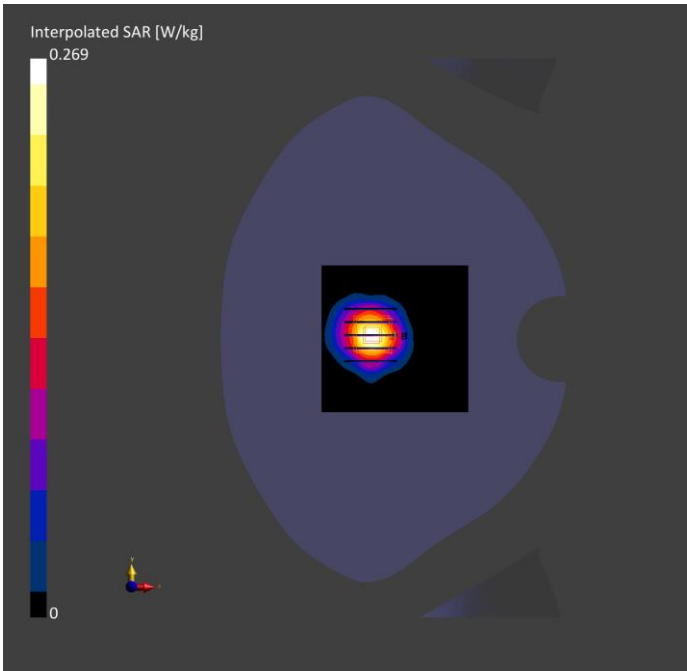
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
Twin-SAM V8.0 (30deg probe tilt) - 1859	HBBL-600-10000 2025-03-13	EX3DV4 - SN7510, 2024-06-25	DAE4 Sn1710, 2024-01-03

Scan Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	90.0 x 90.0	32.0 x 32.0 x 30.0
Grid Steps [mm]	15.0 x 15.0	8.0 x 8.0 x 5.0
Sensor Surface [mm]	3.0	1.4
Graded Grid	Yes	Yes
Grading Ratio	1.5	1.5
MAIA	Y	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2025-03-13	2025-03-13
psSAR1g [W/kg]	0.167	0.158
psSAR10g [W/kg]	0.088	0.088
Power Drift [dB]	0.02	-0.13
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		61.6
Dist 3dB Peak [mm]		9.7



Meas.3 Body Plane with Front Side 0mm on Low Channel in LTE Band2 mode with Antenna 0

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity	Ambient Temperature [°C]	Liquid Temperature [°C]
Flat, HSL	FRONT, 0.00	Band 2	LTE-FDD, 10169-CAF	1860.0, 18700	8.33	1.38	40.4	22.4	21.3

Hardware Setup

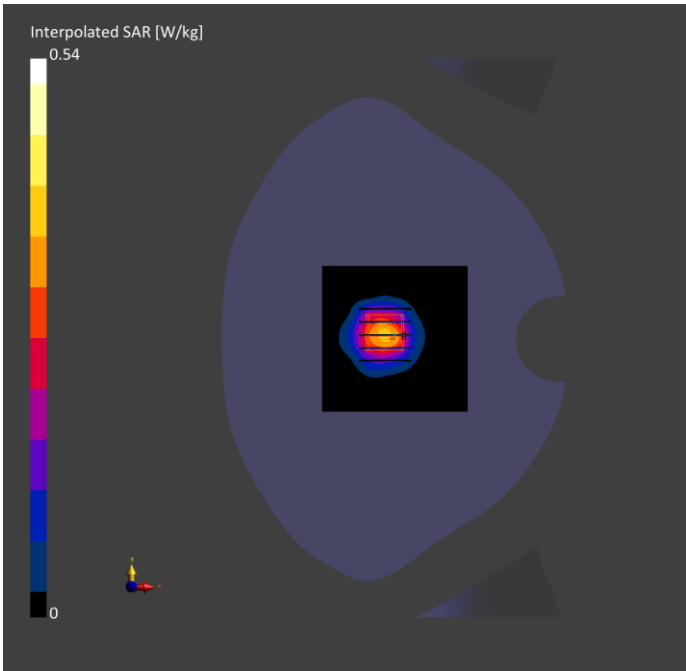
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
Twin-SAM V8.0 (30deg probe tilt) - 1859	HBBL-600-10000 2025-03-13	EX3DV4 - SN7510, 2024-06-25	DAE4 Sn1710, 2024-01-03

Scan Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	90.0 x 90.0	32.0 x 32.0 x 30.0
Grid Steps [mm]	15.0 x 15.0	8.0 x 8.0 x 5.0
Sensor Surface [mm]	3.0	1.4
Graded Grid	Yes	Yes
Grading Ratio	1.5	1.5
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2025-03-13	2025-03-13
psSAR1g [W/kg]	0.318	0.325
psSAR10g [W/kg]	0.174	0.179
Power Drift [dB]	0.01	-0.14
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		63.7
Dist 3dB Peak [mm]		10.1



Meas.4 Body Plane with Front Side 0mm on Low Channel in LTE Band4 mode with Antenna 0

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivit y [S/m]	TSL Permittivity	Ambient Temperatur e [°C]	Liquid Temperatur e [°C]
Flat, HSL	FRONT, 0.00	Band 4	LTE-FDD, 10169-CAF	1732.5, 20175	8.67	1.35	40.7	22.5	21.2

Hardware Setup

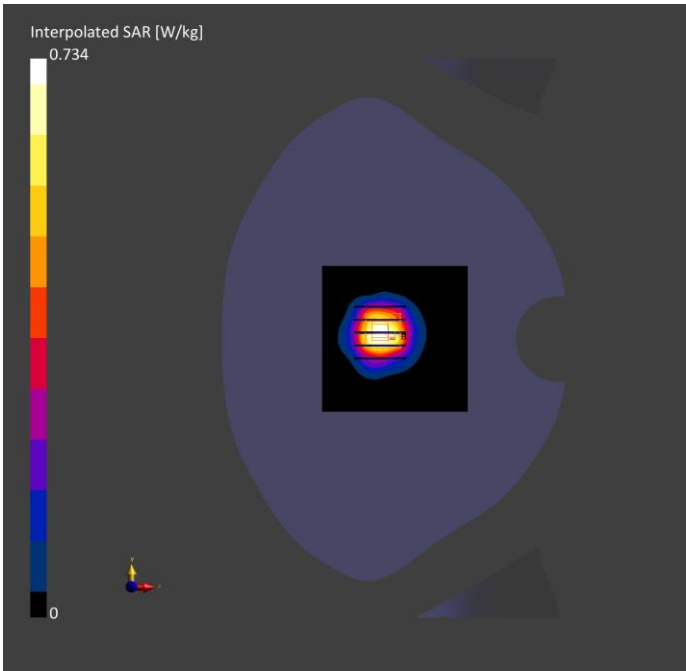
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
Twin-SAM V8.0 (30deg probe tilt) - 1859	HBBL-600-10000 2025-03-12	EX3DV4 - SN7510, 2024-06-25	DAE4 Sn1710, 2024-01-03

Scan Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	90.0 x 90.0	32.0 x 32.0 x 30.0
Grid Steps [mm]	15.0 x 15.0	8.0 x 8.0 x 5.0
Sensor Surface [mm]	3.0	1.4
Graded Grid	Yes	Yes
Grading Ratio	1.5	1.5
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2025-03-12	2025-03-12
psSAR1g [W/kg]	0.403	0.434
psSAR10g [W/kg]	0.223	0.236
Power Drift [dB]	0.07	0.04
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		60.0
Dist 3dB Peak [mm]		10.7



Meas.5 Body Plane with Front Side 0mm on Low Channel in LTE Band5 mode with Antenna 0

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivit y [S/m]	TSL Permittivity	Ambient Temperatur e [°C]	Liquid Temperatur e [°C]
Flat, HSL	FRONT, 0.00	Band 5	LTE-FDD, 10175-CAH	829.0, 20450	9.99	0.878	42.4	22.3	21.4

Hardware Setup

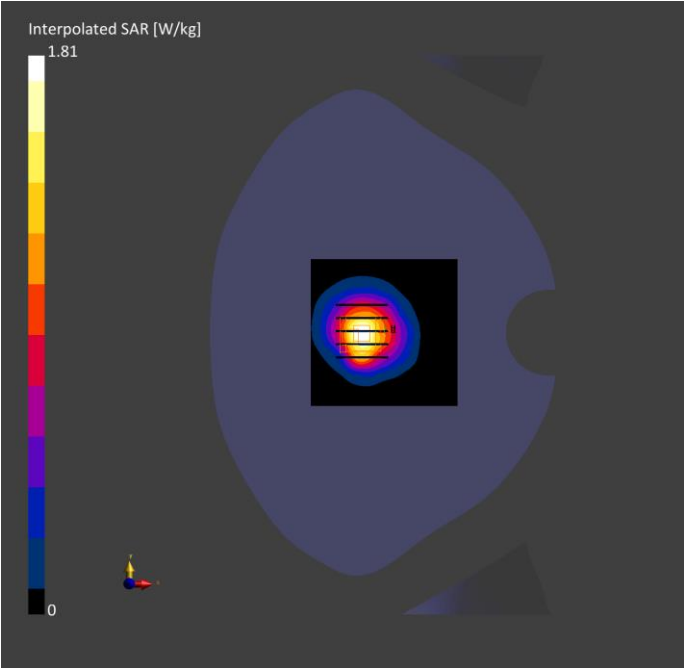
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
Twin-SAM V8.0 (30deg probe tilt) - 1859	HBBL-600-10000 2025-03-24	EX3DV4 - SN7510, 2024-06-25	DAE4 Sn1710, 2024-01-03

Scan Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	90.0 x 90.0	32.0 x 32.0 x 30.0
Grid Steps [mm]	15.0 x 15.0	8.0 x 8.0 x 5.0
Sensor Surface [mm]	3.0	1.4
Graded Grid	Yes	Yes
Grading Ratio	1.5	1.5
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2025-03-24	2025-03-24
psSAR1g [W/kg]	0.401	0.629
psSAR10g [W/kg]	0.243	0.266
Power Drift [dB]	0.04	0.00
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		23.8
Dist 3dB Peak [mm]		5.1



Meas.6 Body Plane with Left Edge 0mm on Middle Channel in LTE Band7 mode with Antenna 0

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivit y [S/m]	TSL Permittivity	Ambient Temperatur e [°C]	Liquid Temperatur e [°C]
Flat, HSL	EDGE LEFT, 0.00	Band 7	LTE-FDD, 10169-CAF	2535.0, 21100	7.75	1.88	39.2	22.3	21.6

Hardware Setup

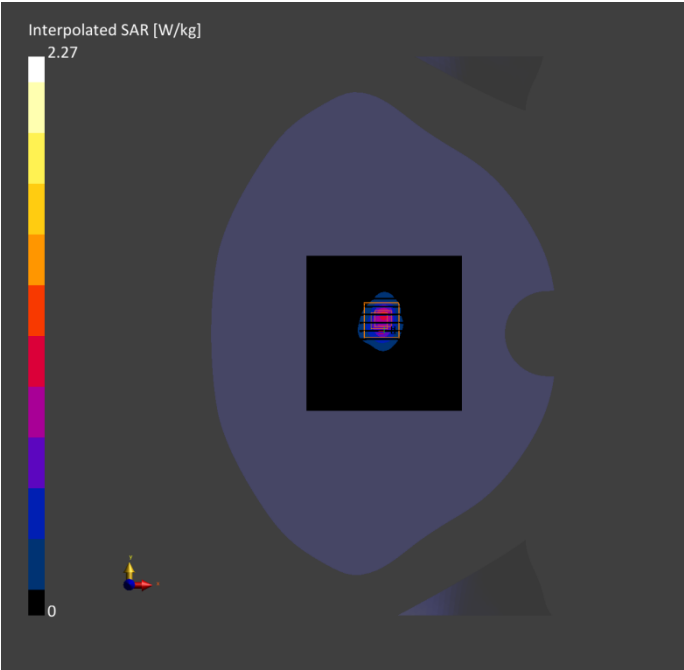
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
Twin-SAM V8.0 (30deg probe tilt) - 1859	HBBL-600-10000 2025-03-15	EX3DV4 - SN7510, 2024-06-25	DAE4 Sn1710, 2024-01-03

Scan Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	96.0 x 96.0	30.0 x 30.0 x 30.0
Grid Steps [mm]	12.0 x 12.0	5.0 x 5.0 x 5.0
Sensor Surface [mm]	3.0	1.4
Graded Grid	Yes	Yes
Grading Ratio	1.5	1.5
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2025-03-15	2025-03-15
psSAR1g [W/kg]	0.711	0.856
psSAR10g [W/kg]	0.287	0.303
Power Drift [dB]	0.03	-0.09
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		34.2
Dist 3dB Peak [mm]		5.0



Meas.7 Body Plane with Front Side 0mm on High Channel in LTE Band66 mode with Antenna 0

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivit y [S/m]	TSL Permittivity	Ambient Temperatur e [°C]	Liquid Temperatur e [°C]
Flat, HSL	FRONT, 0.00	Band 66	LTE-FDD, 10169-CAF	1745.0, 132322	8.67	1.36	40.5	22.5	21.2

Hardware Setup

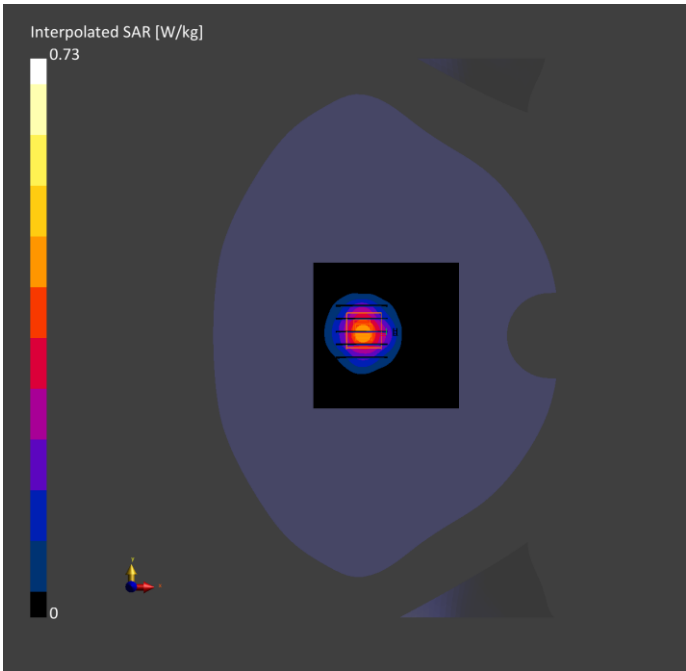
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
Twin-SAM V8.0 (30deg probe tilt) - 1859	HBBL-600-10000 2025-03-12	EX3DV4 - SN7510, 2024-06-25	DAE4 Sn1710, 2024-01-03

Scan Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	90.0 x 90.0	32.0 x 32.0 x 30.0
Grid Steps [mm]	15.0 x 15.0	8.0 x 8.0 x 5.0
Sensor Surface [mm]	3.0	1.4
Graded Grid	Yes	Yes
Grading Ratio	1.5	1.5
MAIA	N/A	N/A
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2025-03-12	2025-03-12
psSAR1g [W/kg]	0.386	0.425
psSAR10g [W/kg]	0.203	0.231
Power Drift [dB]	0.11	0.02
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		60.9
Dist 3dB Peak [mm]		10.1



Meas.8 Body Plane with Front Side 0mm on 19 Channel in Bluetooth mode with Antenna 1

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivit y [S/m]	TSL Permittivity	Ambient Temperatur e [°C]	Liquid Temperatur e [°C]
Flat, HSL	FRONT, 0.00	ISM 2.4 GHz Band	Bluetooth, 10670-AAA	2440.0, 19	7.75	1.74	38.6	22.6	21.1

Hardware Setup

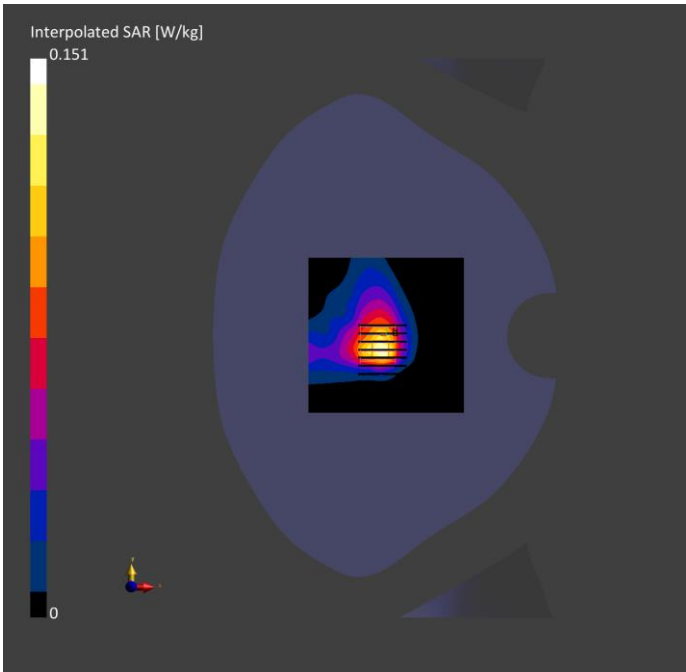
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date
Twin-SAM V5.0 (30deg probe tilt) - 1859	HBBL-600-10000 2025-03-14	EX3DV4 - SN7510, 2024-06-25	DAE4 Sn1710, 2025-01-20

Scan Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	96.0 x 96.0	30.0 x 30.0 x 30.0
Grid Steps [mm]	12.0 x 12.0	5.0 x 5.0 x 5.0
Sensor Surface [mm]	3.0	1.4
Graded Grid	Yes	Yes
Grading Ratio	1.5	1.5
MAIA	Y	Y
Surface Detection	VMS + 6p	VMS + 6p
Scan Method	Measured	Measured

Measurement Results

	Area Scan	Zoom Scan
Date	2025-03-14	2025-03-14
psSAR1g [W/kg]	0.072	0.070
psSAR10g [W/kg]	0.036	0.032
Power Drift [dB]	0.15	-0.06
Power Scaling	Disabled	Disabled
Scaling Factor [dB]		
TSL Correction	No correction	No correction
M2/M1 [%]		39.0
Dist 3dB Peak [mm]		9.0



ANNEX D EUT EXTERNAL PHOTOS

Please refer the document “BL-SZ2520955-AW.pdf”.

ANNEX E SAR TEST SETUP PHOTOS

Please refer the document “BL-SZ2520955-AS.pdf”.

ANNEX F CALIBRATION REPORT

Please refer the document “BL-SZ2520955-AC.pdf”.

ANNEX G TUNE-UP PROCEDURE

Please refer the document “BL-SZ2520955-AT.pdf”.

Statement

1. The laboratory guarantees the scientificity, accuracy and impartiality of the test, and is responsible for all the information in the report, except the information provided by the customer. The customer is responsible for the impact of the information provided on the validity of the results.
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--END OF REPORT--