

TEST REPORT

Applicant: SEUIC Technologies Co., Ltd.
Address: NO.15 Xinghuo Road, Nanjing New & High Technology Industry Development Zone, 210061, Nanjing City, Jiangsu Province, China
Equipment Type: Rugged Tablet PC
Model Name: AUTOID Pad Air(Win)
Brand Name: Seuic
FCC ID: 2AC68-PADAIRWIN
Test Standard: FCC 47 CFR Part 2.1093 (refer section 3.1)
Maximum SAR: Body 2.4GHz(1 g@0mm): 1.18 W/kg
Body 5GHz(1 g@0mm): 1.19 W/kg
Sample Arrival Date: Nov. 07, 2022
Test Date: Nov. 21, 2022 - Nov. 24, 2022
Date of Issue: Jan. 10, 2023

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

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Revision History		
Version	Issue Date	Revisions Content
<u>Rev. 01</u>	<u>Jan. 10, 2023</u>	<u>Initial Issue</u>

TABLE OF CONTENTS

1	GENERAL INFORMATION	4
1.1	Test Laboratory	4
1.2	Test Location	4
1.3	Test Environment Condition	4
2	PRODUCT INFORMATION	5
2.1	Applicant Information	5
2.2	Manufacturer Information	5
2.3	Factory Information	5
2.4	General Description for Equipment under Test (EUT)	5
2.5	Ancillary Equipment	5
2.6	Technical Information	6
3	SUMMARY OF TEST RESULT	7
3.1	Test Standards	7
3.2	Device Category and SAR Limit	8
3.3	Test Result Summary	9
3.4	Test Uncertainty	10
4	MEASUREMENT SYSTEM	11
4.1	Specific Absorption Rate (SAR) Definition	11
4.2	DASY SAR System	12
5	SYSTEM VERIFICATION	20
5.1	Purpose of System Check	20
5.2	System Check Setup	20
6	TEST POSITION CONFIGURATIONS	21
6.1	Tablet Exposure Condition	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
8	CONDUCTED RF OUPUT POWER	25
8.1	WIFI	25
8.2	Bluetooth (Main Antenna)	34
9	TEST EXCLUSION CONSIDERATION	35
9.1	Tablet Mode antenna location sketch	35
9.2	SAR Test Consideration Table	36
10	TEST RESULT	41
10.1	Bluetooth	41
10.2	WIFI 2.4GHz	41
10.3	WIFI 5GHz	42
11	SAR Measurement Variability	43
12	SIMULTANEOUS TRANSMISSION	44
12.1	Simultaneous Transmission Mode Considerations	44
12.2	NFC SAR Test Instructions	45
12.3	Sum SAR of Simultaneous Transmission	48
13	TEST EQUIPMENTS LIST	50
ANNEX A	SIMULATING LIQUID VERIFICATION RESULT	51
ANNEX B	SYSTEM CHECK RESULT	52
ANNEX C	TEST DATA	57
ANNEX D	EUT EXTERNAL PHOTOS	70
ANNEX E	SAR TEST SETUP PHOTOS	70
ANNEX F	CALIBRATION REPORT	70
ANNEX G	Tune-up Procedure	70

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	<input checked="" type="checkbox"/> Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
	<input type="checkbox"/> 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	SEUIC Technologies Co., Ltd.
Address	NO.15 Xinghuo Road, Nanjing New & High Technology Industry Development Zone, 210061, Nanjing City, Jiangsu Province, China

2.2 Manufacturer Information

Manufacturer	SEUIC Technologies Co., Ltd.
Address	NO.15 Xinghuo Road, Nanjing New & High Technology Industry Development Zone, 210061, Nanjing City, Jiangsu Province, China

2.3 Factory Information

Factory	SEUIC Technologies Co., Ltd.
Address	3rd Floor, No.4 Building, Zhicheng Industrial Park, Zhida Road, Nanjing Jiangbei New Area, Nanjing City, China

2.4 General Description for Equipment under Test (EUT)

EUT Name	Rugged Tablet PC
Model Name Under Test	AUTOID Pad Air(Win)
Series Model Name	N/A
Description of Model Name Differentiation	N/A
Hardware Version	N/A
Software Version	N/A
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.5 Ancillary Equipment

Ancillary Equipment 1	Battery	
	Brand Name	N/A
	Model No.	D530
	Serial No.	N/A
	Capacity	4920 mAh
	Rated Voltage	7.7 V
	Limit Charge Voltage	8.8 V
	Manufacturer	Shenzhen 3sun Electronics Co., Ltd.

2.6 Technical Information

Network and Wireless connectivity	Bluetooth (BR+EDR+BLE) WIFI 802.11a, 802.11b, 802.11g, 802.11n and 802.11ac U-NII-1/2A/2C/3, NFC
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The requirement for the following technical information of the EUT was tested in this report:

Operating Mode	2.4G WLAN, 5G WLAN, Bluetooth, NFC	
Frequency Range	802.11b/g/n(HT20)	2412 MHz ~ 2462 MHz
	802.11a/ n(HT20/HT40) /ac(VHT20/VHT40/VHT80)	5150 MHz ~ 5250 MHz
		5250 MHz ~ 5350 MHz
		5470 MHz ~ 5725 MHz
	Bluetooth	2402 MHz ~ 2480 MHz
	NFC	13.56 MHz
Antenna Type	WLAN: PIFA Antenna Bluetooth: PIFA Antenna NFC: Coil Antenna	
Hotspot Function	N/A	
Exposure Category	General Population/Uncontrolled exposure	
EUT Stage	Portable Device	
Product	Type	
	<input checked="" type="checkbox"/> Production unit	<input type="checkbox"/> Identical prototype

3 SUMMARY OF TEST RESULT

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 2.1093	Radiofrequency radiation exposure evaluation: portable devices
2	ANSI C95.1-1992	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz
3	FCC KDB 447498 D04 v01	447498 D04 Interim General RF Exposure Guidance v01
4	FCC KDB 865664 D01 v01r04	SAR Measurement 100 MHz to 6 GHz
5	FCC KDB 865664 D02 v01r02	RF Exposure Reporting
6	KDB 248227 D01 v02r02	SAR Guidance for IEEE 802.11 (Wi-Fi) Transmitters
7	KDB 616217 D04v01r02	SAR for laptop and tablets

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 (1 g Value)

Frequency Band		Maximum Scaled SAR (W/kg)	Maximum Report SAR (W/kg)
		Body (0mm)	Body (0mm)
WIFI	2.4 G Aux. Antenna	1.15	1.19
	2.4 G Main Antenna	1.18	
	2.4 G MIMO Antenna	0.56	
	5.3G WLAN Aux. Antenna	1.19	
	5.3G WLAN Main Antenna	1.10	
	5.3G WLAN MIMO Antenna	0.67	
	5.6G WLAN Aux. Antenna	1.09	
	5.6G WLAN Main Antenna	1.04	
	5.6G WLAN MIMO Antenna	0.45	
	5.8G WLAN Aux. Antenna	0.95	
	5.8G WLAN Main Antenna	0.76	
	5.8G WLAN MIMO Antenna	0.43	
Bluetooth	DH5 Main Antenna	0.09	
Limit (W/kg)		1.60	
Verdict		Pass	

3.3.2 Highest Simultaneous Transmission SAR Values (1 g Value)

Note: The simultaneous transmission SAR detail please refer to section 12.

3.4 Test Uncertainty

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

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

4 MEASUREMENT SYSTEM

4.1 Specific Absorption Rate (SAR) Definition

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

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

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

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

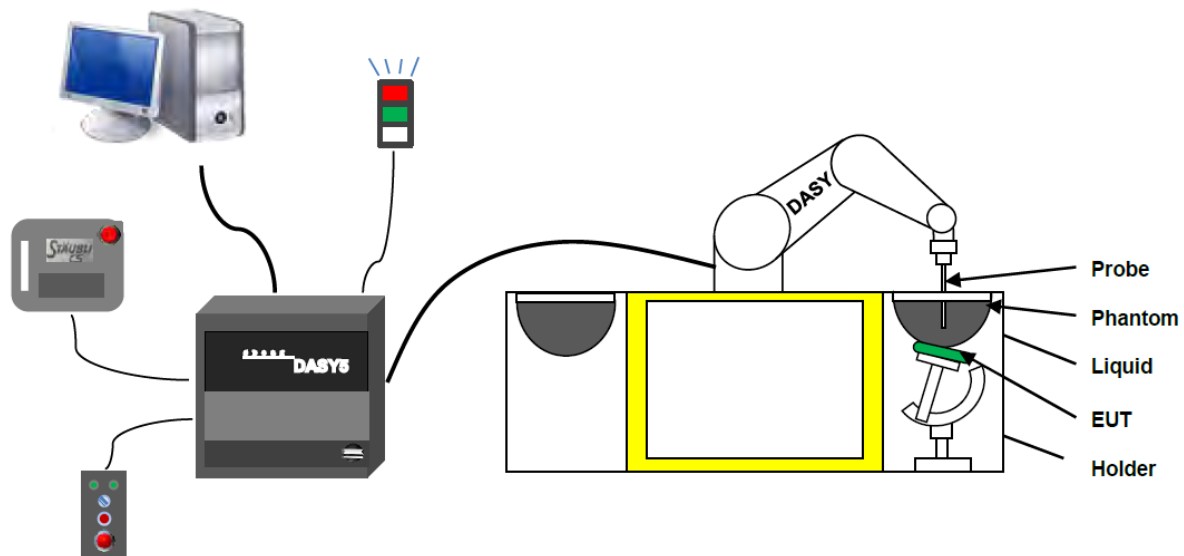
$$SAR = \frac{\sigma E^2}{\rho}$$

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 DASYS measurement server.
6. The DASYS measurement server, which performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation.
7. DASYS 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., glycoether)
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, Antennassa proprietary calibration system. The calibration is performed with the EN 62209-1/2 annexe technique using reference guide at the five frequencies.

4.2.4 Data Acquisition Electronics

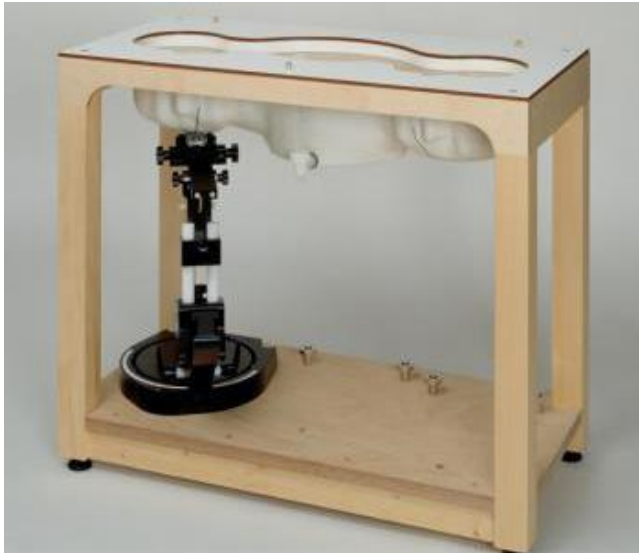
The data acquisition electronics (DAE) consist of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converte and a command decoder with a control logic unit. Transmission to the measurement server is accomplished through an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



- Input Impedance: 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 hand
- Right hand
- Flat phantom

Photo of Phantom SN1857



Serial Number	Material	Length	Height
SN 1857 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° .

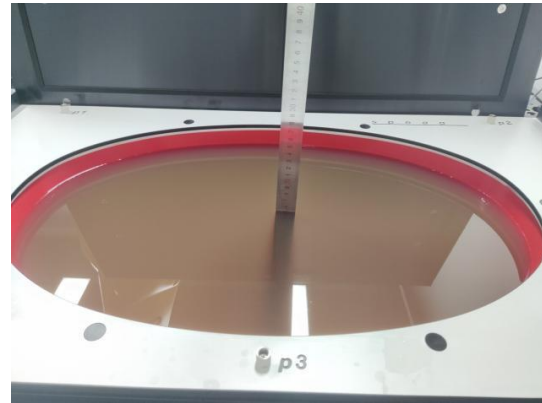
4.2.7 Simulating Liquid

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 and the theoretical Conductivity/Permittivity.

Head (Reference IEEE1528)								
Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity σ (S/m)	Permittivity ϵ
750	41.1	57.0	0.2	1.4	0.2	0	0.89	41.9
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
900	40.3	57.9	0.2	1.4	0.2	0	0.97	41.5
1800, 1900, 2000	55.2	0	0	0.3	0	44.5	1.4	40.0
2450	55.0	0	0	0.1	0	44.9	1.80	39.2
2600	54.9	0	0	0.1	0	45.0	1.96	39.0
Frequency (MHz)	Water (%)	Hexyl Carbitol (%)			Triton X-100 (%)		Conductivity σ (S/m)	Permittivity ϵ
5200	62.52	17.24			17.24		4.66	36.0
5800	62.52	17.24			17.24		5.27	35.3
Body (From instrument manufacturer)								
Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity σ (S/m)	Permittivity ϵ
750	51.7	47.2	0	0.9	0.1	0	0.96	55.5
835	50.8	48.2	0	0.9	0.1	0	0.97	55.2
900	50.8	48.2	0	0.9	0.1	0	1.05	55.0
1800, 1900, 2000	70.2	0	0	0.4	0	29.4	1.52	53.3
2450	68.6	0	0	0.1	0	31.3	1.95	52.7
2600	68.2	0	0	0.1	0	31.7	2.16	52.5
Frequency(MHz)	Water	DGBE			Salt		Conductivity	Permittivity

		(%)	(%)	σ (S/m)	ϵ
5200	78.60	21.40	/	5.54	47.86
5800	78.50	21.40	0.1	6.0	48.20

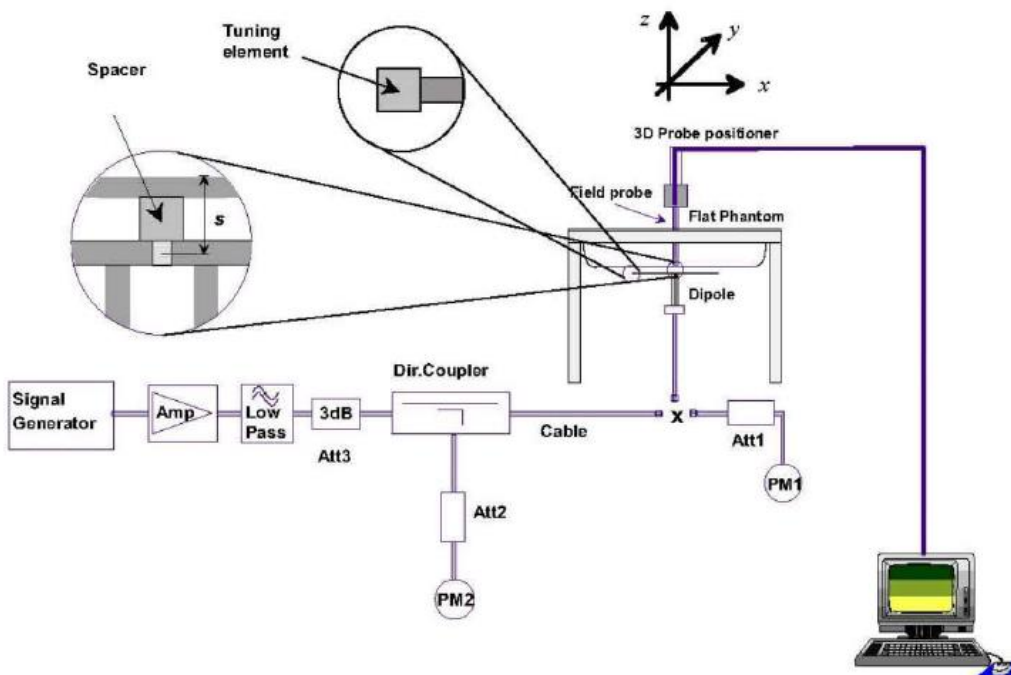
5 SYSTEM VERIFICATION

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 Tablet Exposure Condition

This DUT was tested in four different positions. They are back side, left edge and top edge in these positions, the surface of DUT is touching with phantom 0mm.

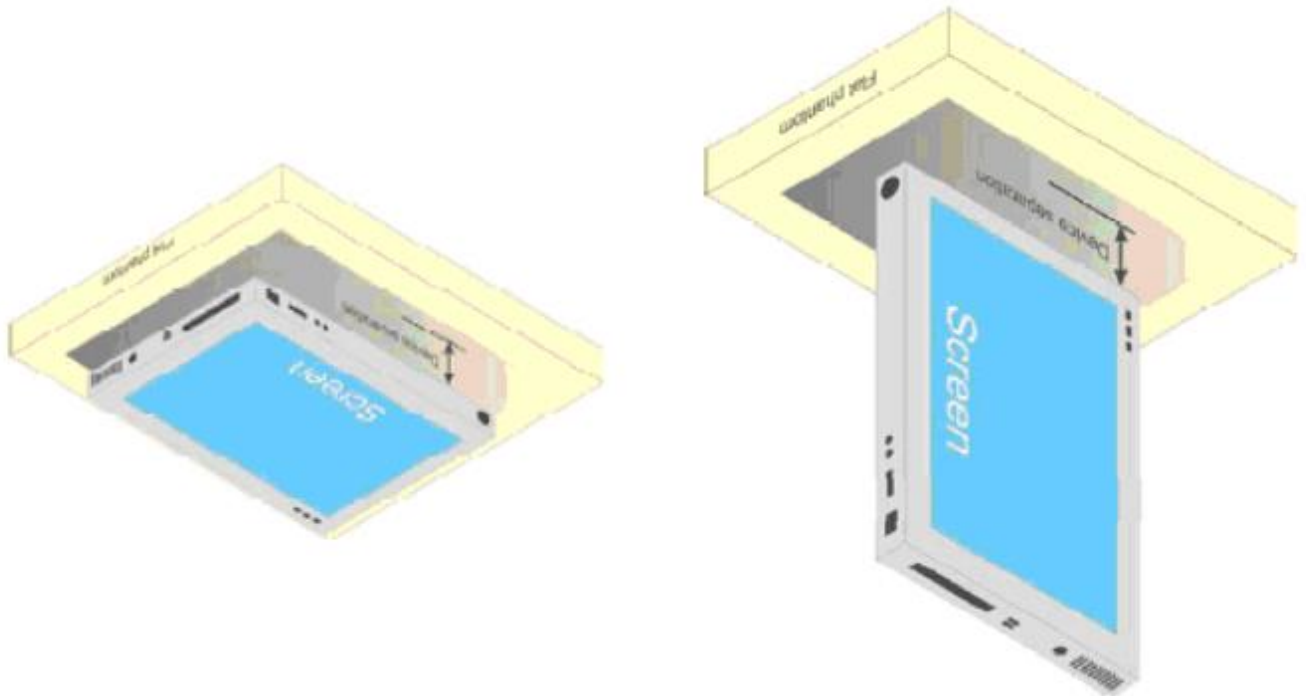
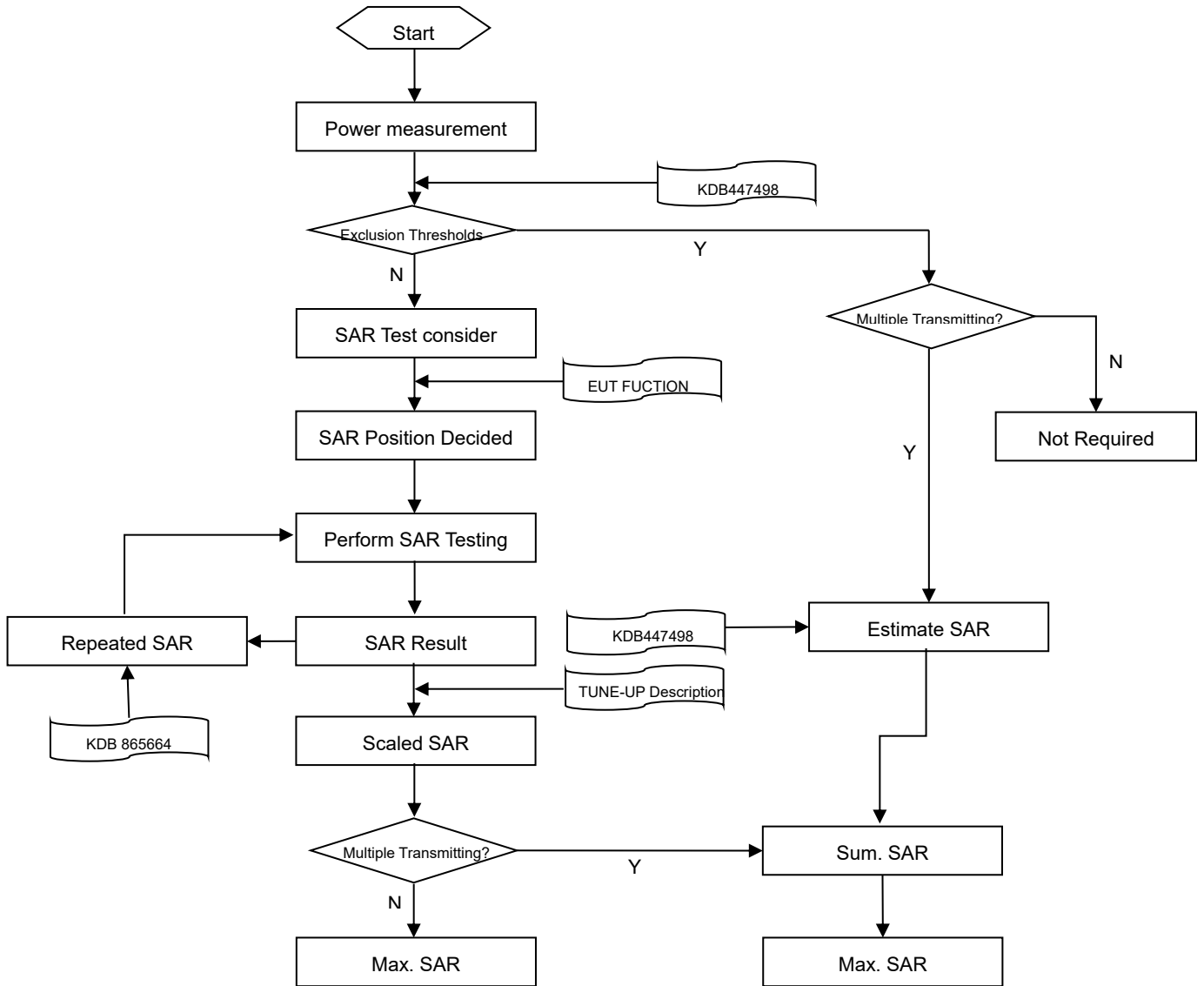


Fig Illustration for Lap-touching Position

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 Δz Zoom (n>1): between subsequent points	≤ 4 mm
4–5 GHz: ≤ 2.5 mm			
		5–6 GHz: ≤ 2 mm	
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.

8 CONDUCTED RF OUTPUT POWER

8.1 WIFI

8.1.1 2.4G WIFI (Main Antenna)

Band (GHz)	Mode	Channel	Freq. (MHz)	Conducted Power (dBm)	Tune-up Power Limit (dBm)	SAR Test Require.
2.4 (2.4~2.4835)	802.11b	1	2412	14.44	16.00	NO
		2	2417	15.49	16.50	YES
		6	2437	15.44	16.50	YES
		11	2462	15.35	16.50	YES
	802.11g	1	2412	13.35	15.00	NO
		2	2417	14.58	15.50	NO
		6	2437	14.38	15.50	NO
		10	2457	14.60	15.50	NO
		11	2462	13.44	15.00	NO
	802.11n(HT20)	1	2412	12.25	14.00	NO
		2	2417	14.51	15.50	NO
		6	2437	14.19	15.50	NO
		10	2457	14.56	15.50	NO
		11	2462	13.26	15.00	NO

Note: When multiple channel bandwidth configurations in a frequency band have the same maximum tune-up output power, the test configuration is determined by applying the following steps sequentially.

- 1) The largest channel bandwidth configuration is selected between the multiple configurations in a frequency band with the same maximum tune-up output power.
- 2) When multiple transmission modes (802.11b/g/n) have the same maximum tune-up output power, largest channel bandwidth, lowest order modulation and lowest data rate, the lowest order 802.11 mode is selected; i.e., 802.11b is chosen over 802.11g, and 802.11g chosen over 802.11n.
- 3) According KDB 247228, when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, OFDM SAR test is not required.
Adjusted SAR = $1.181 * (35.48\text{mW}/44.67\text{mW}) = 0.938$ W/Kg, so 2.4G OFDM SAR test is not required.

8.1.2 2.4G WIFI (Aux. Antenna)

Band (GHz)	Mode	Channel	Freq. (MHz)	Conducted Power (dBm)	Tune-up Power Limit (dBm)	SAR Test Require.
2.4 (2.4~2.4835)	802.11b	1	2412	15.14	15.50	YES
		6	2437	15.27	15.50	YES
		10	2457	15.09	15.50	YES
		11	2462	8.90	10.50	NO
	802.11g	1	2412	11.55	13.00	NO
		2	2417	14.56	15.50	NO
		6	2437	14.87	15.50	NO
		10	2457	14.56	15.50	NO
		11	2462	4.67	6.00	NO
	802.11n(HT20)	1	2412	10.81	12.50	NO
		2	2417	14.28	15.50	NO
		6	2437	14.53	15.50	NO
		10	2457	14.30	15.50	NO
		11	2462	3.41	5.00	NO

Note: When multiple channel bandwidth configurations in a frequency band have the same maximum tune-up output power, the test configuration is determined by applying the following steps sequentially.

1) The largest channel bandwidth configuration is selected between the multiple configurations in a frequency band with the same maximum tune-up output power.

2) When multiple transmission modes (802.11b/g/n) have the same maximum tune-up output power, largest channel bandwidth, lowest order modulation and lowest data rate, the lowest order 802.11 mode is selected; i.e., 802.11b is chosen over 802.11g, and 802.11g chosen over 802.11n.

3) According KDB 247228, when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, OFDM SAR test is not required.

Adjusted SAR = $1.145 * (35.48\text{mW}/35.48\text{mW}) = 1.145$ W/Kg, so 2.4G OFDM SAR test is not required.

8.1.3 2.4G WIFI (MIMO)

Band (GHz)	Mode	Channel	Freq. (MHz)	Conducted Power (dBm)	Tune-up Power Limit (dBm)	SAR Test Require.
2.4 (2.4~2.4835)	802.11b	1	2412	15.13	15.50	NO
		6	2437	15.36	15.50	YES
		10	2457	15.23	15.50	NO
		11	2462	12.42	14.00	NO
	802.11g	1	2412	13.88	15.50	NO
		2	2417	/	/	NO
		6	2437	14.69	15.50	NO
		10	2457	14.35	15.50	NO
		11	2462	7.54	9.50	NO
	802.11n(HT20)	1	2412	13.04	15.00	NO
		2	2417	14.26	15.50	NO
		6	2437	14.49	15.50	NO
		10	2457	14.30	15.50	NO
		11	2462	6.52	8.50	NO

Note: When multiple channel bandwidth configurations in a frequency band have the same maximum tune-up output power, the test configuration is determined by applying the following steps sequentially.

1) The largest channel bandwidth configuration is selected between the multiple configurations in a frequency band with the same maximum tune-up output power.

2) When multiple transmission modes (802.11b/g/n) have the same maximum tune-up output power, largest channel bandwidth, lowest order modulation and lowest data rate, the lowest order 802.11 mode is selected; i.e., 802.11b is chosen over 802.11g, and 802.11g chosen over 802.11n.

3) According KDB 247228, when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, OFDM SAR test is not required.

Adjusted SAR = $0.557 * (35.48\text{mW}/35.48\text{mW}) = 0.557$ W/Kg, so 2.4G OFDM SAR test is not required.

8.1.4 5G WIFI (Main Antenna)

Band (GHz)	Mode	Channel	Freq. (MHz)	Conducted Power (dBm)	Tune-up Power Limit (dBm)	SAR Test Require.
5.2 (5.15~5.25)	802.11a	36	5180	13.13	15.00	NO
		44	5220	14.57	15.50	NO
		48	5240	14.92	15.50	NO
	802.11n(HT20)	36	5180	12.56	14.50	NO
		44	5220	14.39	15.50	NO
		48	5240	14.76	15.50	NO
	802.11n(HT40)	38	5190	9.22	11.00	NO
		46	5230	12.47	13.50	NO
	802.11ac(VHT20)	36	5180	12.35	14.00	NO
		44	5220	14.58	15.50	NO
		48	5240	14.69	15.50	NO
	802.11ac(VHT40)	38	5190	9.25	11.00	NO
46		5230	14.36	15.50	NO	
802.11ac(VHT80)	42	5210	6.75	8.50	NO	
5.3 (5.25~5.35)	802.11a	52	5260	14.63	15.50	NO
		60	5300	14.87	15.50	NO
		64	5320	14.57	15.50	NO
	802.11n(HT20)	52	5260	14.50	15.50	NO
		60	5300	14.58	15.50	NO
		64	5320	14.28	15.50	NO
	802.11n(HT40)	54	5270	12.55	13.50	NO
		62	5310	11.15	13.00	NO
	802.11ac(VHT20)	52	5260	14.52	15.50	NO
		60	5300	14.46	15.50	NO
		64	5320	14.30	15.50	NO
	802.11ac(VHT40)	54	5270	14.84	15.50	YES
62		5310	11.12	13.00	YES	
802.11ac(VHT80)	58	5290	8.14	10.00	NO	
5.6 (5.47~5.725)	802.11a	100	5500	13.80	15.50	NO
		116	5580	14.10	15.50	NO
		140	5700	13.54	15.50	NO
	802.11n(HT20)	100	5500	13.70	15.50	NO
		116	5580	13.90	15.50	NO
		140	5700	14.72	15.50	NO
	802.11n(HT40)	102	5510	10.77	12.50	NO
		118	5590	11.74	13.50	NO
		134	5670	12.04	13.50	NO
	802.11ac(VHT20)	100	5500	12.56	14.50	NO
116		5580	12.66	14.50	NO	

		140	5700	13.40	15.00	NO
	802.11ac(VHT40)	102	5510	10.80	12.50	YES
		118	5590	14.00	15.50	YES
		134	5670	13.97	15.50	YES
		802.11ac(VHT80)	106	5530	6.77	8.50
	122		5610	13.49	15.00	NO
	138		5690	13.30	15.00	NO
5.8 (5.725~5.850)	802.11a	149	5745	15.15	15.50	NO
		157	5785	14.87	15.50	NO
		165	5825	14.07	15.50	NO
	802.11n(HT20)	149	5745	15.03	15.50	NO
		157	5785	14.78	15.50	NO
		165	5825	13.94	15.50	NO
	802.11n(HT40)	151	5755	13.17	13.50	NO
		159	5795	13.00	13.50	NO
	802.11ac(VHT20)	149	5745	15.17	15.50	NO
		157	5785	14.83	15.50	NO
		165	5825	13.99	15.50	NO
	802.11ac(VHT40)	151	5755	14.94	15.50	NO
		159	5795	14.58	15.50	NO
	802.11ac(VHT80)	155	5775	15.14	15.50	YES

Note: When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, each band is tested independently for SAR.

8.1.5 5G WIFI (Aux. Antenna)

Band (GHz)	Mode	Channel	Freq. (MHz)	Conducted Power (dBm)	Tune-up Power Limit (dBm)	SAR Test Require.
5.2 (5.15~5.25)	802.11a	36	5180	9.85	10.00	NO
		44	5220	9.82	10.00	NO
		48	5240	9.91	10.00	NO
	802.11n(HT20)	36	5180	9.80	10.00	NO
		44	5220	9.75	10.00	NO
		48	5240	9.78	10.00	NO
	802.11n(HT40)	38	5190	9.54	10.00	NO
		46	5230	9.57	10.00	NO
	802.11ac(VHT20)	36	5180	9.72	10.00	NO
		44	5220	9.70	10.00	NO
		48	5240	9.80	10.00	NO
	802.11ac(VHT40)	38	5190	9.57	10.00	NO
46		5230	9.57	10.00	NO	
802.11ac(VHT80)	42	5210	5.61	7.50	NO	
5.3 (5.25~5.35)	802.11a	52	5260	9.75	10.00	NO
		60	5300	9.74	10.00	NO
		64	5320	9.75	10.00	NO
	802.11n(HT20)	52	5260	9.85	10.00	NO
		60	5300	9.58	10.00	NO
		64	5320	9.64	10.00	NO
	802.11n(HT40)	54	5270	9.58	10.00	NO
		62	5310	9.51	10.00	NO
	802.11ac(VHT20)	52	5260	9.87	10.00	NO
		60	5300	9.61	10.00	NO
		64	5320	9.65	10.00	NO
	802.11ac(VHT40)	54	5270	9.28	10.00	NO
62		5310	9.60	10.00	NO	
802.11ac(VHT80)	58	5290	9.73	10.00	YES	
5.6 (5.47~5.725)	802.11a	100	5500	8.83	9.00	NO
		116	5580	8.83	9.00	NO
		140	5700	8.60	9.00	NO
	802.11n(HT20)	100	5500	8.75	9.00	NO
		116	5580	8.73	9.00	NO
		140	5700	8.50	9.00	NO
	802.11n(HT40)	102	5510	8.89	9.00	NO
		118	5590	8.74	9.00	NO
		134	5670	8.49	9.00	NO
	802.11ac(VHT20)	100	5500	8.77	9.00	NO
116		5580	8.78	9.00	NO	

	802.11ac(VHT40)	140	5700	8.53	9.00	NO	
		102	5510	8.57	9.00	NO	
		118	5590	8.71	9.00	NO	
		134	5670	8.50	9.00	NO	
	802.11ac(VHT80)	106	5530	8.65	9.00	YES	
		122	5610	8.53	9.00	YES	
		138	5690	8.58	9.00	YES	
	5.8 (5.725~5.850)	802.11a	149	5745	12.16	12.50	NO
			157	5785	12.41	12.50	NO
165			5825	12.23	12.50	NO	
802.11n(HT20)		149	5745	12.31	12.50	NO	
		157	5785	12.15	12.50	NO	
		165	5825	12.40	12.50	NO	
802.11n(HT40)		151	5755	12.14	12.50	NO	
		159	5795	12.27	12.50	NO	
802.11ac(VHT20)		149	5745	12.35	12.50	NO	
		157	5785	12.13	12.50	NO	
		165	5825	12.35	12.50	NO	
802.11ac(VHT40)		151	5755	12.16	12.50	NO	
		159	5795	12.33	12.50	NO	
802.11ac(VHT80)		155	5775	12.01	12.50	YES	
<p>Note: When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, each band is tested independently for SAR.</p>							

8.1.6 5G WIFI (MIMO)

Band (GHz)	Mode	Channel	Freq. (MHz)	Conducted Power (dBm)	Tune-up Power Limit (dBm)	SAR Test Require.
5.2 (5.15~5.25)	802.11a	36	5180	9.81	10.00	NO
		44	5220	9.80	10.00	NO
		48	5240	9.76	10.00	NO
	802.11n(HT20)	36	5180	9.82	10.00	NO
		44	5220	9.92	10.00	NO
		48	5240	9.61	10.00	NO
	802.11n(HT40)	38	5190	9.56	10.00	NO
		46	5230	9.53	10.00	NO
	802.11ac(VHT20)	36	5180	9.81	10.00	NO
		44	5220	9.82	10.00	NO
		48	5240	9.81	10.00	NO
	802.11ac(VHT40)	38	5190	9.76	10.00	NO
46		5230	9.72	10.00	NO	
802.11ac(VHT80)	42	5210	8.67	10.00	NO	
5.3 (5.25~5.35)	802.11a	52	5260	9.76	10.00	NO
		60	5300	9.90	10.00	NO
		64	5320	9.94	10.00	NO
	802.11n(HT20)	52	5260	9.67	10.00	NO
		60	5300	9.81	10.00	NO
		64	5320	9.79	10.00	NO
	802.11n(HT40)	54	5270	9.63	10.00	NO
		62	5310	9.69	10.00	NO
	802.11ac(VHT20)	52	5260	9.87	10.00	NO
		60	5300	9.77	10.00	NO
		64	5320	9.88	10.00	NO
	802.11ac(VHT40)	54	5270	9.56	10.00	NO
62		5310	9.74	10.00	NO	
802.11ac(VHT80)	58	5290	9.56	10.00	YES	
5.6 (5.47~5.725)	802.11a	100	5500	8.89	9.00	NO
		116	5580	8.47	9.00	NO
		140	5700	8.60	9.00	NO
	802.11n(HT20)	100	5500	8.34	9.00	NO
		116	5580	8.53	9.00	NO
		140	5700	8.71	9.00	NO
	802.11n(HT40)	102	5510	8.45	9.00	NO
		118	5590	8.41	9.00	NO
		134	5670	8.74	9.00	NO
	802.11ac(VHT20)	100	5500	8.66	9.00	NO
116		5580	8.64	9.00	NO	

		140	5700	8.80	9.00	NO
	802.11ac(VHT40)	102	5510	8.49	9.00	NO
		118	5590	8.54	9.00	NO
		134	5670	8.59	9.00	NO
	802.11ac(VHT80)	106	5530	8.67	9.00	NO
		122	5610	8.77	9.00	YES
		138	5690	8.52	9.00	NO
5.8 (5.725~5.850)	802.11a	149	5745	12.30	12.50	NO
		157	5785	12.26	12.50	NO
		165	5825	12.39	12.50	NO
	802.11n(HT20)	149	5745	12.23	12.50	NO
		157	5785	12.33	12.50	NO
		165	5825	12.23	12.50	NO
	802.11n(HT40)	151	5755	12.26	12.50	NO
		159	5795	12.33	12.50	NO
	802.11ac(VHT20)	149	5745	12.32	12.50	NO
		157	5785	12.41	12.50	NO
		165	5825	12.31	12.50	NO
	802.11ac(VHT40)	151	5755	12.20	12.50	NO
		159	5795	12.24	12.50	NO
	802.11ac(VHT80)	155	5775	12.05	12.50	YES
	<p>Note: When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, each band is tested independently for SAR.</p>					

8.2 Bluetooth (Main Antenna)

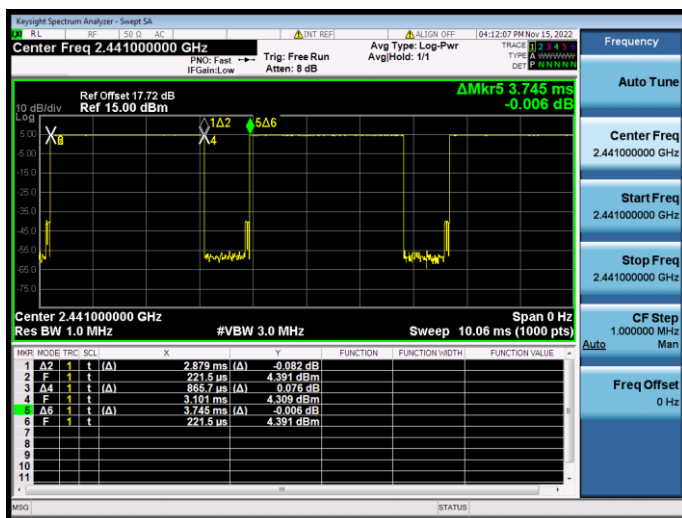
Mode	GFSK			π/4-DQPSK		
Channel	0	39	78	0	39	78
Frequency (MHz)	2402	2441	2480	2402	2441	2480
Conducted Power (dBm)	4.22	4.36	3.37	-1.66	-1.39	-2.43
Tune-Up Limit (dBm)	5.00			-1.00		
SAR Test Require	YES			NO		
Mode	8-DPSK			BLE		
Channel	0	39	78	0	19	39
Frequency (MHz)	2402	2441	2480	2402	2440	2480
Conducted Power (dBm)	-1.70	-1.42	-2.45	2.06	2.70	2.12
Tune-Up Limit (dBm)	-1.00			4.00		
SAR Test Require	NO			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 ≤ ¼ dB higher than the primary mode.

Note: The Bluetooth duty cycle is 76.88 % 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.

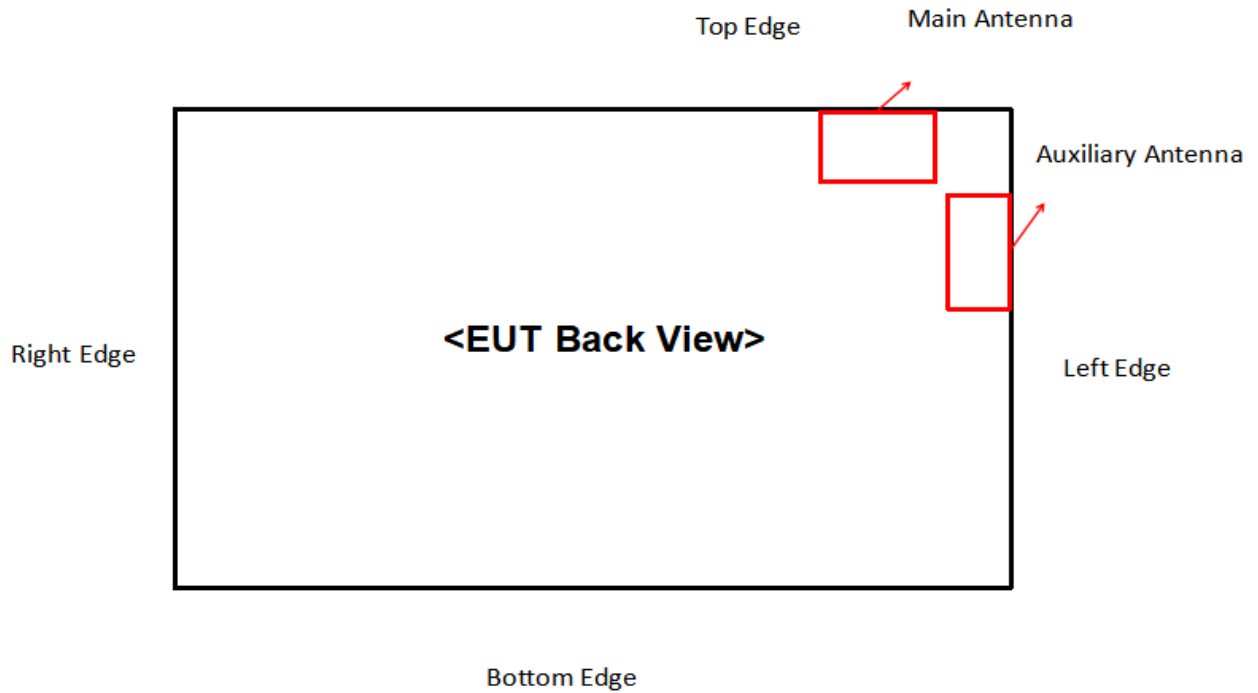
Duty Cycle

GFSK



9 TEST EXCLUSION CONSIDERATION

9.1 Tablet Mode antenna location sketch



Antenna	Front Side(mm)	Back Side(mm)	Left Edge(mm)	Right Edge(mm)	Top Edge(mm)	Bottom Edge(mm)
Auxiliary	<5	<5	<5	241	18.1	134
Main	<5	<5	60	164	<5	157

Note: According to KDB 616217 D04 Tablet host platform test requirements, SAR evaluation for the front surface of tablet display screens are generally not necessary.

9.2 SAR Test Consideration Table

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

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

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

9.2.1 Table mode SAR Test Consideration

Main Antenna						
Test Position Configurations	Mode	Bluetooth	WLAN 2.4GHz	WLAN 5.3GHz	WLAN 5.6GHz	WLAN 5.8GHz
Calculated Frequency(MHz)		2480	2462	5320	5700	5825
Back Side	Distance to User (mm)	<5				
	Max. Peak Power (dBm)	5.00	16.50	15.50	15.50	15.50
	Max. Peak Power (mW)	3.16	44.67	35.48	35.48	35.48
	Exclusion Threshold (mW)	0.00	0.00	0.00	0.00	0.00
	SAR Test Required	YES	YES	YES	YES	YES
Left Edge	Distance to User (mm)	60				
	Max. Peak Power (dBm)	5.00	16.50	15.50	15.50	15.50
	Max. Peak Power (mW)	3.16	44.67	35.48	35.48	35.48
	Exclusion Threshold (mW)	308.85	309.44	252.98	248.34	247.05
	SAR Test Required	NO	NO	NO	NO	NO
Right Edge	Distance to User (mm)	164				
	Max. Peak Power (dBm)	5.00	16.50	15.50	15.50	15.50
	Max. Peak Power (mW)	3.16	44.67	35.48	35.48	35.48
	Exclusion Threshold (mW)	2096.79	2097.45	2028.95	2022.77	2021.03
	SAR Test Required	NO	NO	NO	NO	NO
Top Edge	Distance to User (mm)	<5				
	Max. Peak Power (dBm)	5.00	16.50	15.50	15.50	15.50
	Max. Peak Power (mW)	3.16	44.67	35.48	35.48	35.48
	Exclusion Threshold (mW)	0.00	0.00	0.00	0.00	0.00
	SAR Test Required	YES	YES	YES	YES	YES
Bottom Side	Distance to User (mm)	157				
	Max. Peak Power (dBm)	5.00	16.50	15.50	15.50	15.50
	Max. Peak Power (mW)	3.16	44.67	35.48	35.48	35.48
	Exclusion Threshold (mW)	1929.61	1930.35	1853.73	1846.85	1844.91
	SAR Test Required	NO	NO	NO	NO	NO

Auxiliary Antenna					
Test Position Configurations	Mode	WLAN 2.4GHz	WLAN 5.3GHz	WLAN 5.6GHz	WLAN 5.8GHz
Calculated Frequency(MHz)		2462	5320	5700	5825
Back Side	Distance to User (mm)	<5			
	Max. Peak Power (dBm)	15.50	10.00	9.00	12.50
	Max. Peak Power (mW)	35.48	10.00	7.94	17.78
	Exclusion Threshold (mW)	0.00	0.00	0.00	0.00
	SAR Test Required	YES	YES	YES	YES
Left Edge	Distance to User (mm)	<5			
	Max. Peak Power (dBm)	15.50	10.00	9.00	12.50
	Max. Peak Power (mW)	35.48	10.00	7.94	17.78
	Exclusion Threshold (mW)	0.00	0.00	0.00	0.00
	SAR Test Required	YES	YES	YES	YES
Right Edge	Distance to User (mm)	241			
	Max. Peak Power (dBm)	15.50	10.00	9.00	12.50
	Max. Peak Power (mW)	35.48	10.00	7.94	17.78
	Exclusion Threshold (mW)	4363.72	4502.02	4514.61	4518.58
	SAR Test Required	NO	NO	NO	NO
Top Edge	Distance to User (mm)	18.1			
	Max. Peak Power (dBm)	15.50	10.00	9.00	12.50
	Max. Peak Power (mW)	35.48	10.00	7.94	17.78
	Exclusion Threshold (mW)	31.62	21.16	20.41	20.18
	SAR Test Required	YES	YES	YES	YES
Bottom Side	Distance to User (mm)	134			
	Max. Peak Power (dBm)	15.50	10.00	9.00	12.50
	Max. Peak Power (mW)	35.48	10.00	7.94	17.78
	Exclusion Threshold (mW)	1427.92	1335.38	1327.39	1324.89
	SAR Test Required	NO	NO	NO	NO

MIMO					
Test Position Configurations	Mode	WLAN 2.4GHz	WLAN 5.3GHz	WLAN 5.6GHz	WLAN 5.8GHz
Calculated Frequency(MHz)		2462	5320	5700	5825
Back Side	Distance to User (mm)	<5			
	Max. Peak Power (dBm)	15.50	10.00	9.00	12.50
	Max. Peak Power (mW)	35.48	10.00	7.94	17.78
	Exclusion Threshold (mW)	0.00	0.00	0.00	0.00
	SAR Test Required	YES	YES	YES	YES
Left Edge	Distance to User (mm)	<5			
	Max. Peak Power (dBm)	15.50	10.00	9.00	12.50
	Max. Peak Power (mW)	35.48	10.00	7.94	17.78
	Exclusion Threshold (mW)	0.00	0.00	0.00	0.00
	SAR Test Required	YES	YES	YES	YES
Right Edge	Distance to User (mm)	164			
	Max. Peak Power (dBm)	15.50	10.00	9.00	12.50
	Max. Peak Power (mW)	35.48	10.00	7.94	17.78
	Exclusion Threshold (mW)	2097.45	2028.95	2022.77	2021.03
	SAR Test Required	NO	NO	NO	NO
Top Edge	Distance to User (mm)	<5			
	Max. Peak Power (dBm)	15.50	10.00	9.00	12.50
	Max. Peak Power (mW)	35.48	10.00	7.94	17.78
	Exclusion Threshold (mW)	0.00	0.00	0.00	0.00
	SAR Test Required	YES	YES	YES	YES
Bottom Side	Distance to User (mm)	134			
	Max. Peak Power (dBm)	15.50	10.00	9.00	12.50
	Max. Peak Power (mW)	35.48	10.00	7.94	17.78
	Exclusion Threshold (mW)	1427.92	1335.38	1327.39	1324.89
	SAR Test Required	NO	NO	NO	NO

Note:

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

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

where

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

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

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

5. Per KDB 248227 D01, choose the highest output power channel to test SAR and determine further SAR exclusion.8. For each frequency band, testing at higher data rates and higher order modulations is not required when the maximum average output power for each of these configurations is less than 1/4dB higher than those measured at the lowest data rate
6. Per KDB 248227 D01 SAR is not required for the following 2.4 GHz OFDM conditions.
 - a. When KDB Publication 447498 D04 SAR test exclusion applies to the OFDM configuration.
 - b. When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.
7. Per KDB 248227 D01 SAR is not required for the following U-NII-1 and U-NII-2A bands conditions.
 - a. When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, each band is tested independently for SAR.
 - b. When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration; otherwise, each band is tested independently for SAR.
8. NFC test results are derived from project reports BL-SZ22B0401-402.

10 TEST RESULT

10.1 Bluetooth

Mode	Antenna	State	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (dB)	1g Meas SAR (W/kg)	Meas. Power (dBm)	Max. tune-up power (dBm)	Scaling Factor	Duty cycle (%)	Duty Factor	1g Scaled SAR (W/kg)	Meas. No.
Body															
DH5	Main	Tablet	Back Side	0	39	2441	0.09	0.058	4.36	5.00	1.159	76.88	1.301	0.087	#1
			Left Edge	0	39	2441	-0.07	0.036	4.36	5.00	1.159	76.88	1.301	0.054	/
			Top Edge	0	39	2441	-0.16	0.012	4.36	5.00	1.159	76.88	1.301	0.018	/
Note: Refer to ANNEX C for the detailed test data for each test configuration.															

10.2 WIFI 2.4GHz

Mode	Antenna	State	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (dB)	1g Meas SAR (W/kg)	Meas. Power (dBm)	Max. tune-up power (dBm)	Scaling Factor	Duty cycle (%)	Duty Factor	1g Scaled SAR (W/kg)	Meas. No.
Body															
802.11 b	Main	Tablet	Back Side	0	2	2417	0.05	0.922	15.49	16.50	1.262	98.56	1.015	1.181	#2
			Back Side	0	6	2437	-0.10	0.813	15.44	16.50	1.276	98.56	1.015	1.053	/
			Back Side	0	11	2462	0.14	0.882	15.35	16.50	1.303	98.56	1.015	1.167	/
			Top Edge	0	2	2417	0.09	0.455	15.49	16.50	1.262	98.56	1.015	0.583	/
802.11 b	Aux.	Tablet	Back Side	0	6	2437	-0.06	1.070	15.27	15.50	1.054	98.56	1.015	1.145	#3
			Back Side	0	1	2437	-0.16	0.786	15.14	15.50	1.086	98.56	1.015	0.867	/
			Back Side	0	10	2457	-0.02	0.980	15.09	15.50	1.099	98.56	1.015	1.093	/
			Left Edge	0	6	2437	0.02	0.745	15.27	15.50	1.054	98.56	1.015	0.797	/
			Top Edge	0	6	2437	0.18	0.375	15.27	15.50	1.054	98.56	1.015	0.401	/
802.11 b	MIMO	Tablet	Back Side	0	6	2437	0.03	0.531	15.36	15.50	1.033	98.56	1.015	0.557	#4
			Left Edge	0	6	2437	-0.17	0.421	15.36	15.50	1.033	98.56	1.015	0.441	/
			Top Edge	0	6	2437	-0.02	0.234	15.36	15.50	1.033	98.56	1.015	0.245	/
Note: Refer to ANNEX C for the detailed test data for each test configuration.															

10.3 WIFI 5GHz

Mode	Antenna	State	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (dB)	1g Meas SAR (W/kg)	Meas. Power (dBm)	Max. tune-up power (dBm)	Scaling Factor	Duty cycle (%)	Duty Factor	1g Scaled SAR (W/kg)	Meas. No.
Body-5.3G															
802.11 ac (VHT40)	Main	Tablet	Back Side	0	54	5270	0.02	0.919	14.84	15.50	1.165	97.16	1.029	1.102	#5
			Back Side	0	62	5310	-0.04	0.401	11.12	13.00	1.542	97.16	1.029	0.636	/
			Top Edge	0	54	5270	0.08	0.371	14.84	15.50	1.165	97.16	1.029	0.445	/
802.11 ac (VHT80)	Aux.	Tablet	Back Side	0	58	5290	-0.11	0.564	9.73	10.00	1.064	94.13	1.062	0.637	/
			Left Edge	0	58	5290	0.16	1.050	9.73	10.00	1.064	94.13	1.062	1.187	#6
			Top Edge	0	58	5290	-0.03	0.225	9.73	10.00	1.064	94.13	1.062	0.254	/
802.11 ac (VHT80)	MIMO	Tablet	Back Side	0	58	5290	0.04	0.302	9.56	10.00	1.107	94.13	1.062	0.355	/
			Left Edge	0	58	5290	0.01	0.566	9.56	10.00	1.107	94.13	1.062	0.665	#7
			Top Edge	0	58	5290	0.03	0.120	9.56	10.00	1.107	94.13	1.062	0.141	/
Body-5.6G															
802.11 ac (VHT40)	Main	Tablet	Back Side	0	118	5590	0.04	0.713	14.00	15.50	1.413	97.16	1.029	1.036	#8
			Back Side	0	102	5510	-0.05	0.495	10.80	12.50	1.479	97.16	1.029	0.753	/
			Back Side	0	134	5670	-0.01	0.705	13.97	15.50	1.422	97.16	1.029	1.032	/
			Top Edge	0	118	5590	0.04	0.304	14.00	15.50	1.413	97.16	1.029	0.442	/
802.11 ac (VHT80)	Aux.	Tablet	Back Side	0	106	5530	-0.10	0.512	8.65	9.00	1.084	94.13	1.062	0.589	/
			Left Edge	0	106	5530	-0.19	0.945	8.65	9.00	1.084	94.13	1.062	1.088	#9
			Left Edge	0	122	5610	-0.04	0.706	8.53	9.00	1.114	94.13	1.062	0.835	/
			Left Edge	0	138	5690	-0.06	0.651	8.58	9.00	1.102	94.13	1.062	0.762	/
			Top Edge	0	106	5530	-0.10	0.239	8.65	9.00	1.084	94.13	1.062	0.275	/
802.11 ac (VHT80)	MIMO	Tablet	Back Side	0	122	5610	0.16	0.219	8.77	9.00	1.054	94.13	1.062	0.245	/
			Left Edge	0	122	5610	0.03	0.398	8.77	9.00	1.054	94.13	1.062	0.446	#10
			Top Edge	0	122	5610	0.18	0.101	8.77	9.00	1.054	94.13	1.062	0.113	/
Body-5.8G															
802.11 ac (VHT80)	Main	Tablet	Back Side	0	155	5775	-0.06	0.658	15.14	15.50	1.087	94.13	1.062	0.760	#11
			Top Edge	0	155	5775	-0.15	0.360	15.14	15.50	1.087	94.13	1.062	0.416	/
802.11 ac (VHT80)	Aux.	Tablet	Back Side	0	155	5775	-0.12	0.694	12.01	12.50	1.119	94.13	1.062	0.825	/
			Left Edge	0	155	5775	0.03	0.800	12.01	12.50	1.119	94.13	1.062	0.951	#12
			Top Edge	0	155	5775	0.16	0.216	12.01	12.50	1.119	94.13	1.062	0.257	/
802.11 ac (VHT80)	MIMO	Tablet	Back Side	0	155	5775	-0.03	0.316	12.05	12.50	1.109	94.13	1.062	0.372	/
			Left Edge	0	155	5775	-0.02	0.365	12.05	12.50	1.109	94.13	1.062	0.430	#13
			Top Edge	0	155	5775	-0.14	0.098	12.05	12.50	1.109	94.13	1.062	0.115	/
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	Test Position	Highest Measured SAR (W/kg)	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)	Largest to Smallest SAR Ratio
2450	WLAN 2.4G	Main	Back Side	0.922	Yes	0.901	1.02
2450	WLAN 2.4G	Auxiliary	Back Side	1.070	Yes	1.030	1.04
5300	WLAN 5.3G	Main	Back Side	0.919	Yes	0.905	1.02
5300	WLAN 5.3G	Auxiliary	Left Side	1.050	Yes	0.980	1.07
5600	WLAN 5.6G	Auxiliary	Left Side	0.945	Yes	0.931	1.02
5800	WLAN 5.8G	Auxiliary	Left Side	0.800	Yes	0.796	1.01

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).

According KDB 447498 D04, simultaneous transmission:

- a) $SPLSR = (SAR1 + SAR2)^{1.5} / R_i$ (min. separation distance, mm), and the peak separation distance is determined from the square root of $[(x1-x2)^2 + (y1-y2)^2 + (z1-z2)^2]$, where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
SAR1 is the highest reported or estimated SAR for the first of a pair of simultaneous transmitting antennas, in a specific test operating mode and exposure condition.
SAR2 is the highest reported or estimated SAR for the second of a pair of simultaneous transmitting antennas, in a specific test operating mode and exposure condition as the first.
- b) If $SPLSR \leq 0.04$, simultaneously transmission SAR measurement is not necessary.
- c) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.

12.1 Simultaneous Transmission Mode Considerations

NO.	Mode	Body
1	2.4 G WLAN (Auxiliary Antenna)	+ 2.4 G WLAN (Main Antenna)
2	2.4 G WLAN (Auxiliary Antenna)	+ Bluetooth (Main Antenna)
3	5 G WLAN (Auxiliary Antenna)	+ 5 G WLAN (Main Antenna)
4	5 G WLAN (Auxiliary Antenna)	+ Bluetooth (Main Antenna)
5	5 G WLAN (Auxiliary Antenna)	+ 5 G WLAN (Main Antenna) + Bluetooth (Main Antenna)

Note:

- The EUT supports the Main antenna with TX/RX diversity function for WLAN and Bluetooth, the Auxiliary antenna with TX/RX diversity function for WLAN.
- WLAN 2.4GHz and Bluetooth will not be transmitting from the Main antenna at same time.
- 2.4G WLAN can't transmit simultaneously with 5G WLAN.
- NFC can be transmitted simultaneously with any of the above combinations, the NFC SAR determination is described following sections section .

12.2 NFC SAR Test Instructions

1.1 According to the 2022.04 TCBC Workshop meeting, the power threshold is $\leq 100\text{MHz}$, refer to P6s.

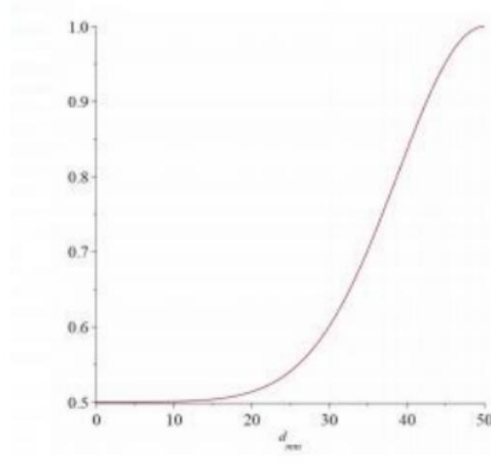
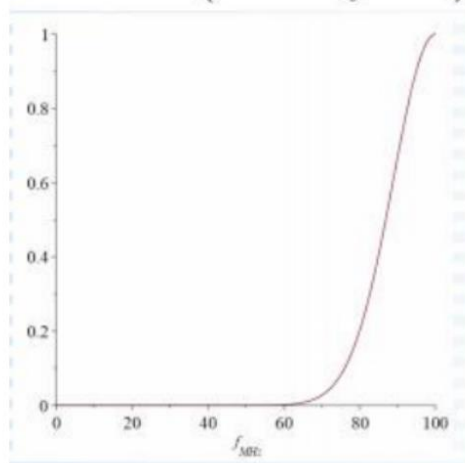
$$P_{7X}(d_{mm}, f_{MHz}) := \begin{cases} P_{6S}(d_{mm}, f_{MHz}) & f_{MHz} \leq 100 \\ P_{6to7}(d_{mm}, f_{MHz}) & 100 < f_{MHz} \leq 300 \\ P_7(d_{mm}, f_{MHz}) & 300 < f_{MHz} \end{cases}$$

1.2 For portable products, when using a distance of $\leq 50\text{mm}$, such as mobile phone NFC, P6s is calculated with the following formula calculate.

$$S_f(f_{MHz}) \cdot P_{431a}(d_{mm}, f_{MHz}) + (1 - S_f(f_{MHz})) \cdot S_d(d_{mm}) \cdot P_{431b1}(50., 100.) \cdot \left(1 + \log_{10}\left(\frac{100.}{f_{MHz}}\right)\right) \quad d_{mm} \leq 50 \text{ and } f_{MHz} \leq 100$$

1.3 The smoothing functions Sf and Sd in P6s calculate the limits based on KDB 447498 V06 and are calculated as follows.

$$S_f(f_{MHz}) := \exp\left(-10 \frac{(f_{MHz} - f_{max})^2}{\Delta f^2}\right) \quad S_d(d_{mm}) := 0.5 + 0.5 \cdot \exp\left(-10 \frac{(d_{mm} - d_{max})^2}{\Delta d^2}\right)$$



d≤50mm				
f Max(MHz)	100		d Max(mm)	50
f MHz	13.56		d(mm)	5
Δf(MHz)	100		Δd	50
Sf(fMHz)	0.000568861		Sd (dmm)	0.50015177
P6s(mW)	443.1257378			
Note: SAR testing is required when the distance is 5mm and the power is greater than 443.13mW.				

2. According to the ANSI C63.10 clause 11.12.2.2:

The value of maximum peak output power is according to the method described in ANSI C63.10 clause 11.12.2.2 General procedure for conducted measurements in restricted bands:

- a) Measure the conducted output power (in dBm) using the detector specified (see guidance regarding measurement procedures for determining quasi-peak, peak, and average conducted output power, respectively).
- b) Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the ERP level (see guidance on determining the applicable antenna gain)
- c) Add the appropriate maximum ground reflection factor to the EIRP level (6 dB for frequencies ≤ 30 MHz, 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive and 0 dB for frequencies > 1000 MHz).
- d) For devices with multiple antenna-ports, measure the power of each individual chain and sum the ERP of all chains in linear terms (e.g., Watts, mW).
- e) Convert the resultant ERP level to an equivalent electric field strength using the following relationship:

$$E = \sqrt{EIRP - 20 \log D + 104.8}$$

where:

E = electric field strength in dBμV/m,

ERP = equivalent isotropic radiated power in dBm

D = specified measurement distance in meters.

Mode	f(MHz)	Max. E-Field strength (dBuV/m)	D(m)	Ground reflection factor (dB)	EIRP (dBm)
NFC (13.56MHz)	13.56	52.32	3	6	-36.94

Note:

- 1. Add the appropriate maximum ground reflection factor to the EIRP level (6 dB for frequencies ≤ 30 MHz).
- 2. $EIRP = 52.32 + 20 \cdot \log(3) - 104.8 + 6 = -36.94$ (dBm)

According to the FCC KDB 447498 D04

Estimated SAR: SAR_{est} = 1.6 · P_{ant} / P_{th} [W/kg]

Estimated SAR	1.6 · P _{ant} / P _{th} [W/kg]		
P _{meas.} (dBm)	-36.94	P _{meas.} (mW)	0.0002
P _{th.} (mW)	443.13		
NFC Estimated 1g SAR [W/kg]	<0.001		

Results:

1. The NFC power is -31.54dBm, the power threshold is P_s=443.13mW, Therefore, the NFC SAR test is excluded.

2. NFC multi-transmit requires the use of the TER formula:

$$TER = \sum_{k=1}^{N_s} \left(\frac{SAR_k}{SAR_{lim}} \right) + \sum_{k=1}^{N_f} \left(\frac{MPE_{field, k}}{MPE_{field, lim}} \right)^2 + \sum_{k=1}^{N_{PD}} \left(\frac{MPE_{PD, k}}{MPE_{PD, lim}} \right)$$

The maximum SAR value for WLAN and BT is 1.241 [W/kg], Therefore, the worst TER = (1.241+0.001)/1.6 = 0.776 < 1, the NFC SAR transmit simultaneously Pass.

12.3 Sum SAR of Simultaneous Transmission

12.3.1 Highest Bluetooth and WLAN Sum Body SAR of Simultaneous Transmission

Test Mode	Position	Mode	Max. 1g SAR	1g Sum SAR	SPLSR	SPLSR
			(W/kg)	(W/kg)	(Yes/No)	Num.
Body (Separation 0 mm)						
Table	Back Side	2.4 G WLAN Antenna MIMO	0.557	/	No	/
		2.4 G WLAN Antenna Auxiliary	1.145	1.232	No	/
		Bluetooth	0.087			
		5.3 G WLAN Antenna MIMO	0.355	/	No	/
		5.3 G WLAN Antenna Auxiliary	0.637	0.724	No	/
		Bluetooth	0.087			
		5.3 G WLAN Antenna Main	1.102	1.189	No	/
		Bluetooth	0.087			
		5.3 G WLAN Antenna MIMO	0.355	0.442	No	/
		Bluetooth	0.087			
		5.6 G WLAN Antenna MIMO	0.245	/	No	/
		5.6 G WLAN Antenna Auxiliary	0.589	0.676	No	/
		Bluetooth	0.087			
		5.6 G WLAN Antenna Main	1.036	1.123	No	/
		Bluetooth	0.087			
		5.6 G WLAN Antenna MIMO	0.245	0.332	No	/
		Bluetooth	0.087			
		5.8 G WLAN Antenna MIMO	0.372	/	No	/
	5.8 G WLAN Antenna Auxiliary	0.825	0.912	No	/	
	Bluetooth	0.087				
	5.8 G WLAN Antenna Main	0.760	0.847	No	/	
	Bluetooth	0.087				
	5.8 G WLAN Antenna MIMO	0.372	0.459	No	/	
	Bluetooth	0.087				
	Left Edge	2.4 G WLAN Antenna MIMO	0.441	/	No	/
		2.4 G WLAN Antenna Auxiliary	0.797	0.851	No	/
		Bluetooth	0.054			
		5.3 G WLAN Antenna MIMO	0.665	/	No	/
5.3 G WLAN Antenna Auxiliary		1.187	1.241	No	/	
Bluetooth		0.054				
5.3 G WLAN Antenna Main		/	0.054	No	/	
Bluetooth		0.054				
5.3 G WLAN Antenna MIMO		0.665	0.719	No	/	
Bluetooth		0.054				
5.6 G WLAN Antenna MIMO	0.446	/	No	/		
5.6 G WLAN Antenna Auxiliary	1.088	1.142	No	/		

		Bluetooth	0.054			
		5.6 G WLAN Antenna Main	/	0.054	No	/
		Bluetooth	0.054			
		5.6 G WLAN Antenna MIMO	0.446	0.500	No	/
		Bluetooth	0.054			
		5.8 G WLAN Antenna MIMO	0.430	/	No	/
		5.8 G WLAN Antenna Auxiliary	0.951	1.005	No	/
		Bluetooth	0.054			
		5.8 G WLAN Antenna Main	/	0.054	No	/
		Bluetooth	0.054			
		5.8 G WLAN Antenna MIMO	0.430	0.484	No	/
		Bluetooth	0.054			
	Top Side	2.4 G WLAN Antenna MIMO	0.245	/	No	/
		2.4 G WLAN Antenna Auxiliary	0.401	0.419	No	/
		Bluetooth	0.018			
		5.3 G WLAN Antenna MIMO	0.141	/	No	/
		5.3 G WLAN Antenna Auxiliary	0.254	0.272	No	/
		Bluetooth	0.018			
		5.3 G WLAN Antenna Main	0.445	0.463	No	/
		Bluetooth	0.018			
		5.3 G WLAN Antenna MIMO	0.141	0.159	No	/
		Bluetooth	0.018			
		5.6 G WLAN Antenna MIMO	0.113	/	No	/
		5.6 G WLAN Antenna Auxiliary	0.275	0.293	No	/
		Bluetooth	0.018			
		5.6 G WLAN Antenna Main	0.442	0.460	No	/
		Bluetooth	0.018			
		5.6 G WLAN Antenna MIMO	0.113	0.131	No	/
		Bluetooth	0.018			
		5.8 G WLAN Antenna MIMO	0.115	/	No	/
		5.8 G WLAN Antenna Auxiliary	0.257	0.275	No	/
		Bluetooth	0.018			
5.8 G WLAN Antenna Main	0.416	0.434	No	/		
Bluetooth	0.018					
5.8 G WLAN Antenna MIMO	0.115	0.133	No	/		
Bluetooth	0.018					

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
2450MHz Validation Dipole	Speag	D2450V2	SN: 952	2021/05/19	2024/05/18
5GHz Validation Dipole	Speag	D5GHzV2	SN: 1200	2021/05/18	2024/05/17
E-Field Probe	Speag	EX3DV4	SN: 7510	2021/12/29	2022/12/28
Data Acquisition Electronicsr	Speag	DAE4	SN: 1710	2022/02/01	2023/01/31
Signal Generator	R&S	SMB100A	177746	2022/05/19	2023/05/18
Power Meter	R&S	NRVD-B2	7250BJ-0112/2011	2022/09/06	2023/09/05
Power Sensor	R&S	NRV-Z4	100381	2022/09/06	2023/09/05
Power Sensor	R&S	NRV-Z2	100211	2022/09/06	2023/09/05
Network Analyzer	Agilent	E5071C	MY46103472	2021/12/29	2022/12/28
Thermometer	Elitech	RC-4HC	EF720B004807	2021/12/01	2022/11/30
Thermometer	Elitech	RC-4HC	EF720B004820	2021/12/01	2022/11/30
Power Amplifier	SATIMO	6552B	22374	N/A	N/A
Dielectric Probe Kit	Speag	DAK3.5	SN: 1312	N/A	N/A
Phantom	Speag	SAM	SN: 1857	N/A	N/A
Attenuator	COM-MW	ZA-S1-31	1305003187	N/A	N/A
Directional coupler	AA-MCS	AAMCS-UDC	000272	N/A	N/A

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

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

ANNEX A SIMULATING LIQUID VERIFICATION RESULT

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

Date	Liquid Type	Fre. (MHz)	Temp. (°C)	Meas. Conductivity (σ) (S/m)	Meas. Permittivity (ϵ)	Target Conductivity (σ) (S/m)	Target Permittivity (ϵ)	Conductivity Tolerance (%)	Permittivity Tolerance (%)
2022/11/21	Head	2450	21.9	1.79	39.98	1.80	39.20	-0.56	1.99
2022/11/22	Head	5250	21.3	4.68	35.28	4.71	35.93	-0.64	-1.81
2022/11/23	Head	5600	21.3	5.16	34.69	5.07	35.53	1.78	-2.36
2022/11/24	Head	5750	21.8	5.25	36.00	5.22	35.36	0.57	1.81

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 (%)
2022/11/21	Head	2450	100	2.38	23.80	53.00	-1.32
2022/11/22	Head	5250	100	2.15	21.50	77.80	-1.54
2022/11/23	Head	5600	100	2.38	23.80	81.20	2.34
2022/11/24	Head	5750	100	2.24	22.40	77.20	2.20

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

System Performance Check Data (2450MHz)

Date: 2022.11.21

Communication System Band: D2450 (2450.0 MHz); Frequency: 2450 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.791$ S/m; $\epsilon_r = 39.98$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.2°C Liquid Temperature: 21.9°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(7.63, 7.63, 7.63); Calibrated: 2021.12.29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1710; Calibrated: 2022.02.01
- Phantom: SAM (20deg probe tilt) with CRP v5.0 Right 1857; Type: QD000P40CD; Serial: TP1857
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

CW 2450 100mw/Area Scan (101x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 5.34 W/kg

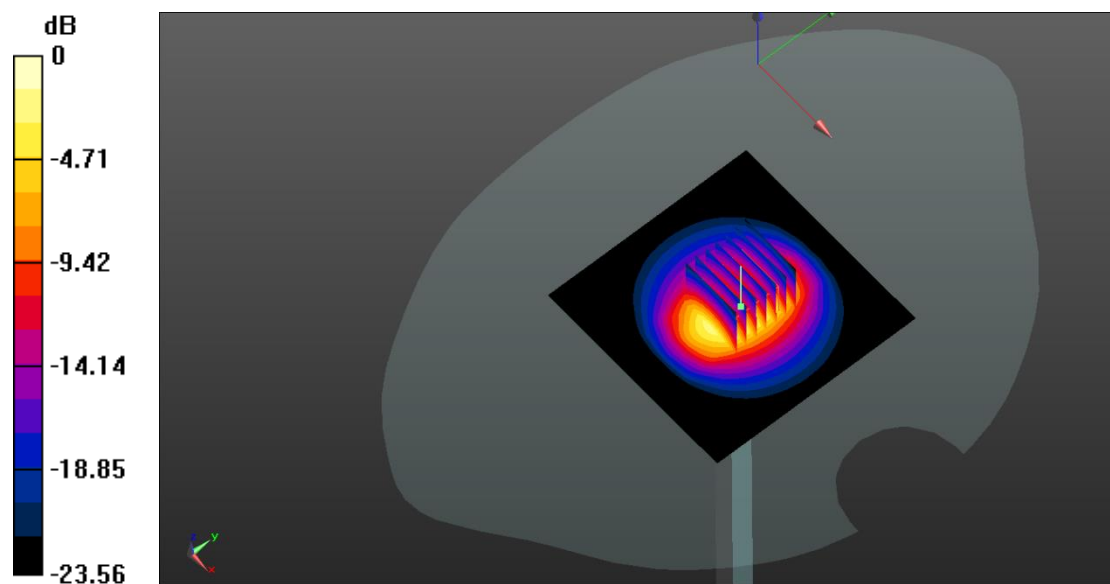
CW 2450 100mw/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 56.28 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 11.1 W/kg

SAR(1 g) = 5.23 W/kg; SAR(10 g) = 2.38 W/kg

Maximum value of SAR (measured) = 5.25 W/kg



0 dB = 5.25 W/kg

System Performance Check Data (5250MHz)

Date: 2022.11.22

Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5250 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5250$ MHz; $\sigma = 4.682$ S/m; $\epsilon_r = 35.283$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.5°C Liquid Temperature: 21.3°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(5.42, 5.42, 5.42); Calibrated: 2021.12.29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1710; Calibrated: 2022.02.01
- Phantom: SAM (20deg probe tilt) with CRP v5.0 Right 1857; Type: QD000P40CD; Serial: TP1857
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

CW5250 Head100mw/Area Scan (101x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 7.64 W/kg

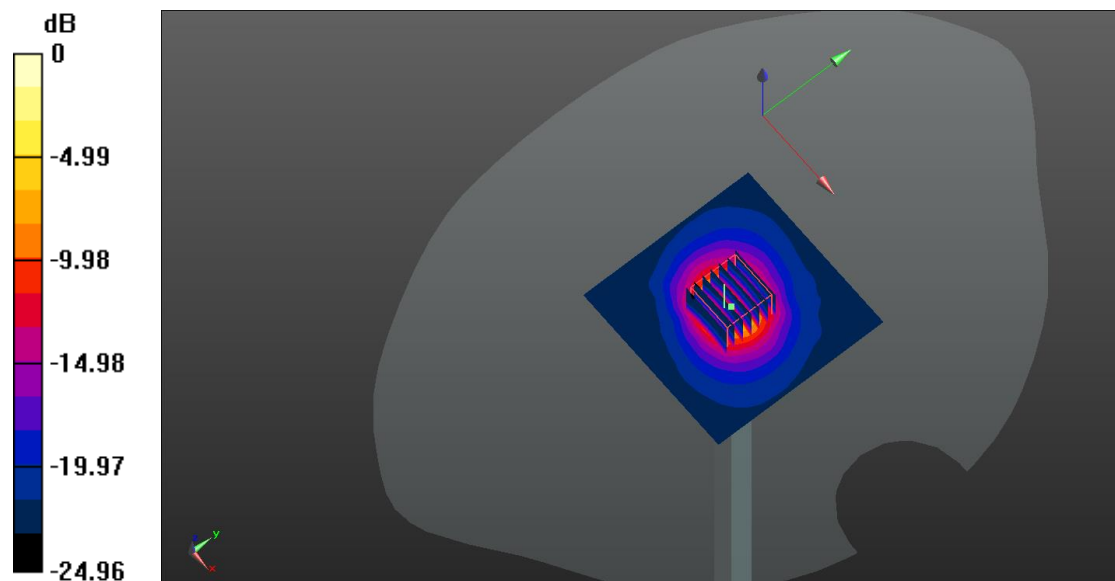
CW5250 Head 100mw/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 29.51 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 33.2 W/kg

SAR(1 g) = 7.66 W/kg; SAR(10 g) = 2.15 W/kg

Maximum value of SAR (measured) = 16.5 W/kg



0 dB = 16.5 W/kg

System Performance Check Data (5600MHz)

Date: 2022.11.23

Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5600 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5600$ MHz; $\sigma = 5.157$ S/m; $\epsilon_r = 34.688$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.1°C Liquid Temperature: 21.3°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(4.81, 4.81, 4.81); Calibrated: 2021.12.29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1710; Calibrated: 2022.02.01
- Phantom: SAM (20deg probe tilt) with CRP v5.0 Right 1857; Type: QD000P40CD; Serial: TP1857
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

CW 5600 100mW/Area Scan (81x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 8.53 W/kg

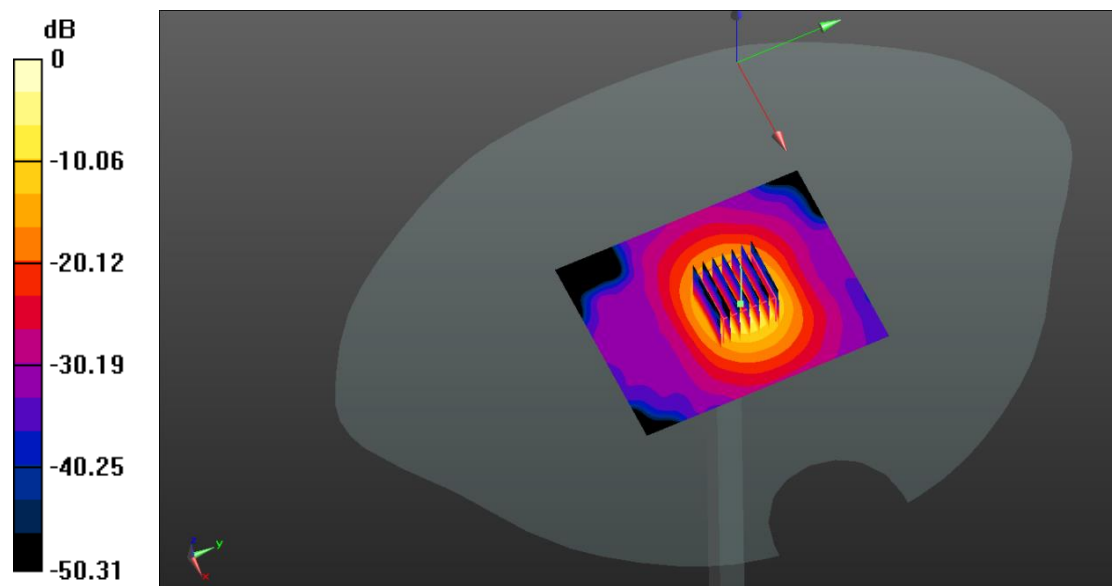
CW 5600 100mW/Zoom Scan (7x7x21)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 32.18 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 38.2 W/kg

SAR(1 g) = 8.31 W/kg; SAR(10 g) = 2.38 W/kg

Maximum value of SAR (measured) = 16.8 W/kg



0 dB = 16.8 W/kg

System Performance Check Data (5750MHz)

Date: 2022.11.24

Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5750 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5750$ MHz; $\sigma = 5.25$ S/m; $\epsilon_r = 35.996$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.1°C Liquid Temperature: 21.8°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(4.9, 4.9, 4.9); Calibrated: 2021.12.29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1710; Calibrated: 2022.02.01
- Phantom: SAM (20deg probe tilt) with CRP v5.0 Right 1857; Type: QD000P40CD; Serial: TP1857
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

CW 5750 100mW/Area Scan (81x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 15.3 W/kg

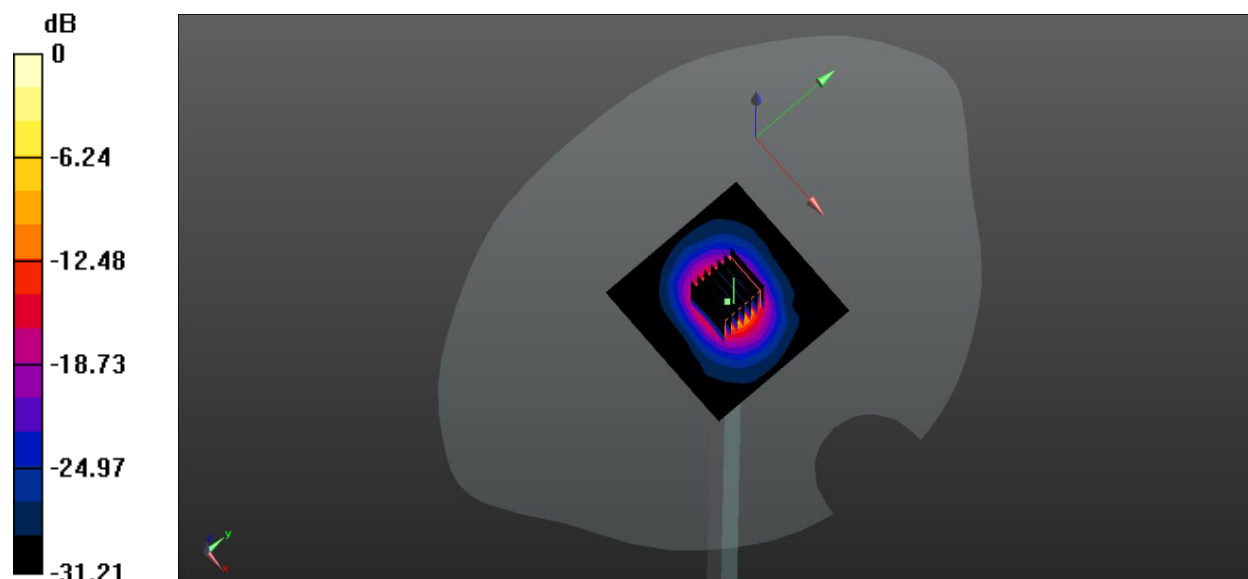
CW 5750 100mW/Zoom Scan (7x7x15)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 42.88 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 37.5 W/kg

SAR(1 g) = 7.89 W/kg; SAR(10 g) = 2.24 W/kg

Maximum value of SAR (measured) = 14.3 W/kg



0 dB = 14.3 W/kg

ANNEX C TEST DATA

Meas.1 Body Plane with Back Side 0mm on 39 Channel in Bluetooth mode with Antenna Main

Date: 2022.11.21

Communication System Band: Bluetooth; Frequency: 2441 MHz; Duty Cycle: 1:1.301

Medium parameters used (interpolated): $f = 2441$ MHz; $\sigma = 1.781$ S/m; $\epsilon_r = 40.1$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.2°C Liquid Temperature: 21.9°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(7.63, 7.63, 7.63); Calibrated: 2021.12.29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1710; Calibrated: 2022.02.01
- Phantom: SAM (20deg probe tilt) with CRP v5.0 Right 1857; Type: QD000P40CD; Serial: TP1857
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch39/Area Scan (81x91x1): Interpolated grid: $dx=1.200$ mm, $dy=1.200$ mm

Maximum value of SAR (interpolated) = 0.0892 W/kg

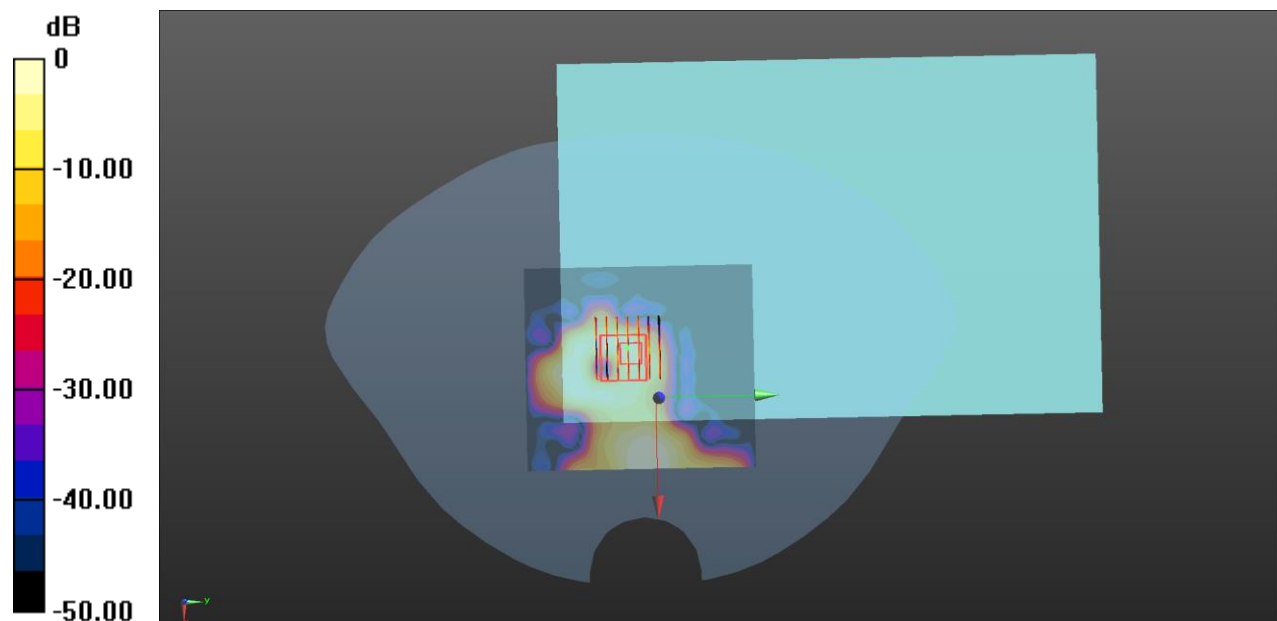
Ch39/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 5.954 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 0.194 W/kg

SAR(1 g) = 0.058 W/kg; SAR(10 g) = 0.018 W/kg

Maximum value of SAR (measured) = 0.0758 W/kg



0 dB = 0.0758 W/kg

Meas.2 Body Plane with Back Side 0mm on 2 Channel in IEEE802.11b mode with Antenna Main

Date: 2022.11.21

Communication System Band: 2.4G; Frequency: 2417 MHz; Duty Cycle: 1:1.015

Medium parameters used (interpolated): $f = 2417$ MHz; $\sigma = 1.749$ S/m; $\epsilon_r = 40.341$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.2°C Liquid Temperature: 21.9°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(7.63, 7.63, 7.63); Calibrated: 2021.12.29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1710; Calibrated: 2022.02.01
- Phantom: SAM (20deg probe tilt) with CRP v5.0 Right 1857; Type: QD000P40CD; Serial: TP1857
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch2/Area Scan (81x91x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

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

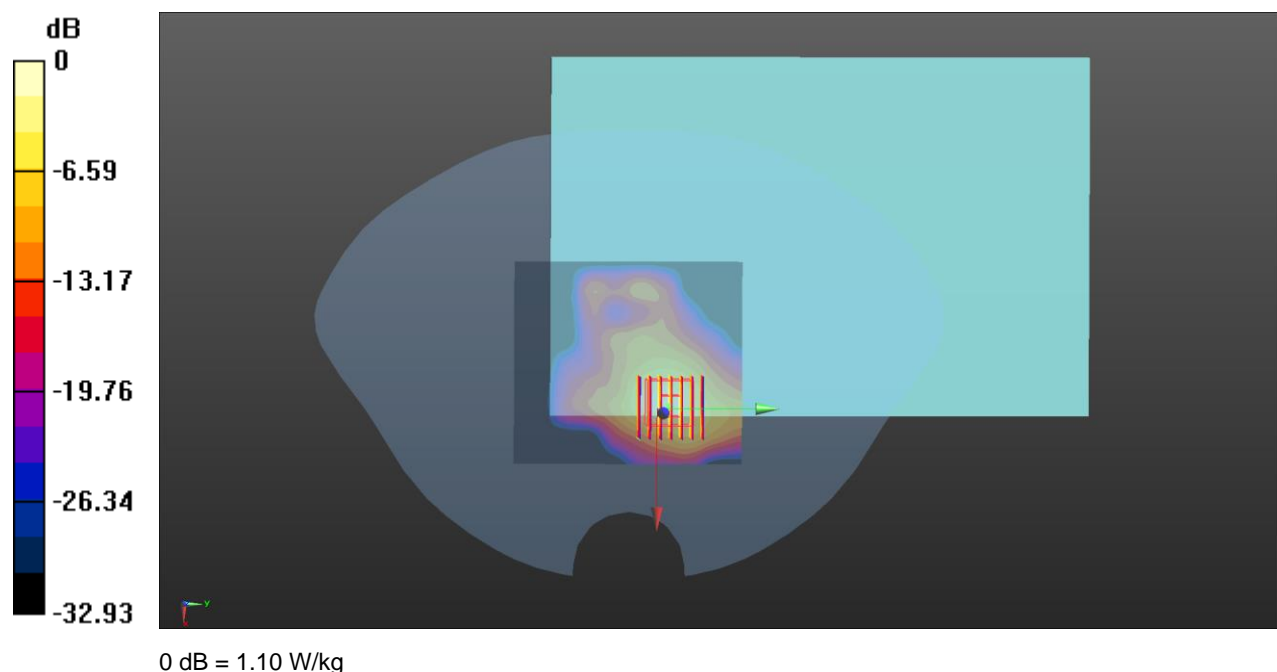
Ch2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.228 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 2.21 W/kg

SAR(1 g) = 0.922 W/kg; SAR(10 g) = 0.379 W/kg

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



Meas.3 Body Plane with Back Side 0mm on 6 Channel in IEEE802.11b mode with Antenna Auxiliary

Date: 2022.11.21

Communication System Band: 2.4G; Frequency: 2437 MHz; Duty Cycle: 1:1.015

Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 1.774$ S/m; $\epsilon_r = 40.18$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.2°C Liquid Temperature: 21.9°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(7.63, 7.63, 7.63); Calibrated: 2021.12.29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1710; Calibrated: 2022.02.01
- Phantom: SAM (20deg probe tilt) with CRP v5.0 Right 1857; Type: QD000P40CD; Serial: TP1857
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch6/Area Scan (81x91x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 1.34 W/kg

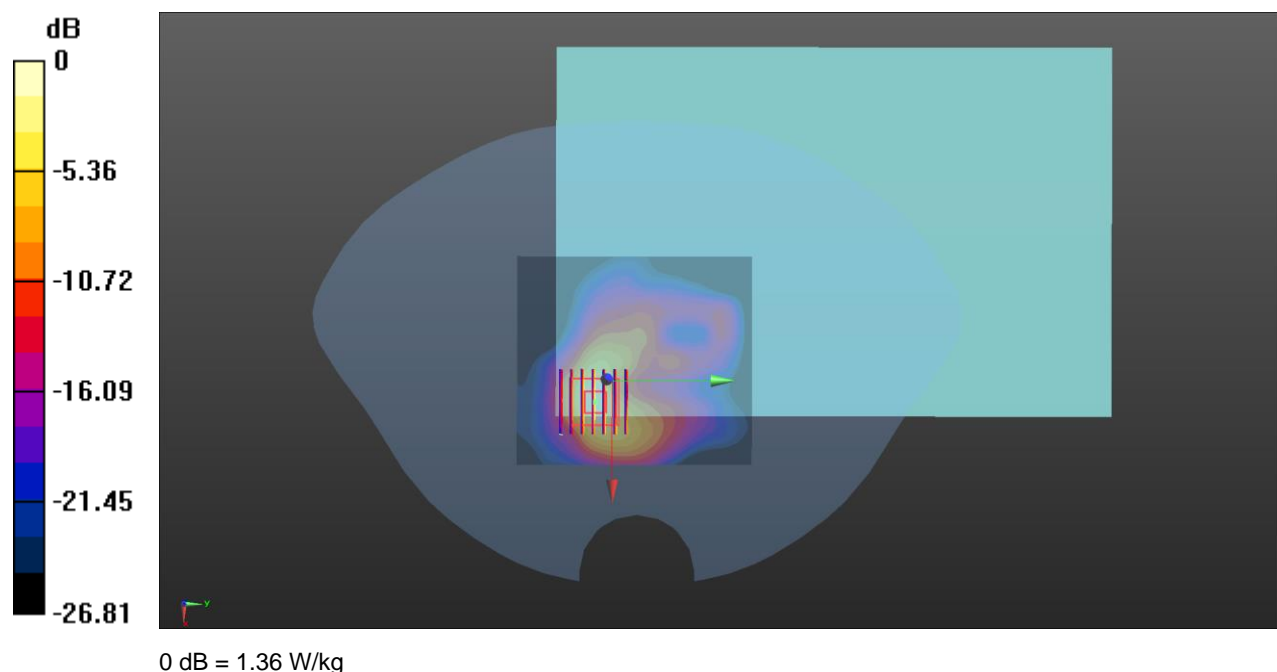
Ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.188 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 2.94 W/kg

SAR(1 g) = 1.07 W/kg; SAR(10 g) = 0.407 W/kg

Maximum value of SAR (measured) = 1.36 W/kg



Meas.4 Body Plane with Back Side 0mm on 6 Channel in IEEE802.11b mode with Antenna MIMO

Date: 2022.11.21

Communication System Band: 2.4G; Frequency: 2437 MHz; Duty Cycle: 1:1.015

Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 1.774$ S/m; $\epsilon_r = 40.18$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.2°C Liquid Temperature: 21.9°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(7.63, 7.63, 7.63); Calibrated: 2021.12.29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1710; Calibrated: 2022.02.01
- Phantom: SAM (20deg probe tilt) with CRP v5.0 Right 1857; Type: QD000P40CD; Serial: TP1857
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch6/Area Scan (81x111x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 0.609 W/kg

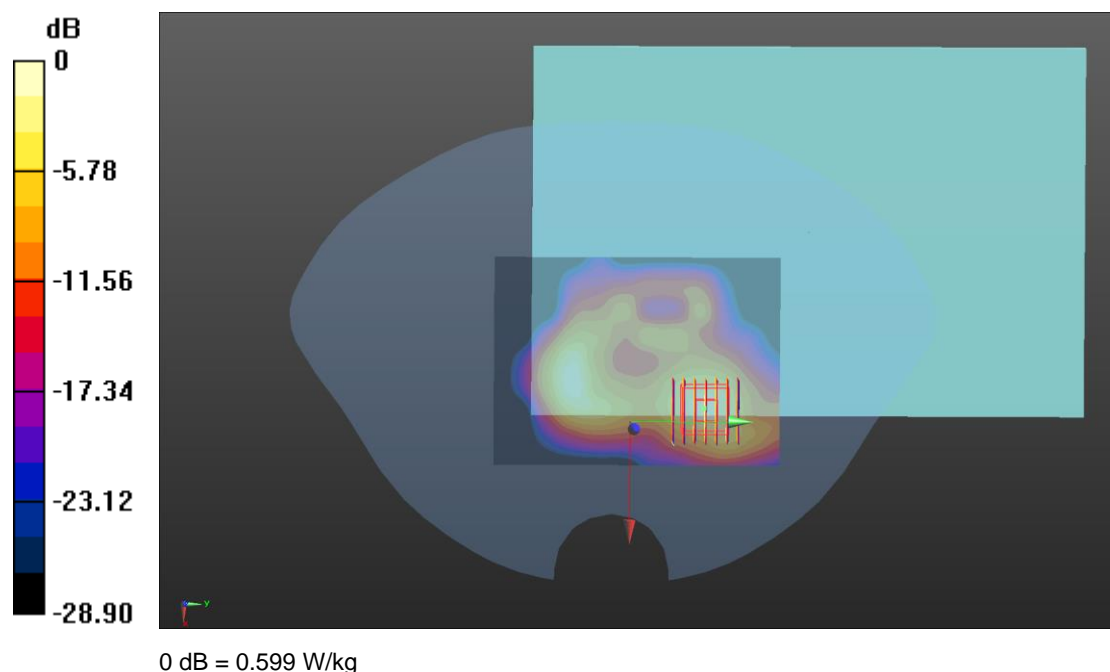
Ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.469 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 1.35 W/kg

SAR(1 g) = 0.531 W/kg; SAR(10 g) = 0.220 W/kg

Maximum value of SAR (measured) = 0.599 W/kg



Meas.5 Body Plane with Back Side 0mm on 54 Channel in IEEE802.11ac40 mode with Antenna Main

Date: 2022.11.22

Communication System Band: 5.3G; Frequency: 5270 MHz; Duty Cycle: 1:1.029

Medium parameters used (interpolated): $f = 5270$ MHz; $\sigma = 4.713$ S/m; $\epsilon_r = 35.224$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.5°C Liquid Temperature: 21.3°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(5.42, 5.42, 5.42); Calibrated: 2021.12.29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1710; Calibrated: 2022.02.01
- Phantom: SAM (20deg probe tilt) with CRP v5.0 Right 1857; Type: QD000P40CD; Serial: TP1857
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch54/Area Scan (101x141x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.82 W/kg

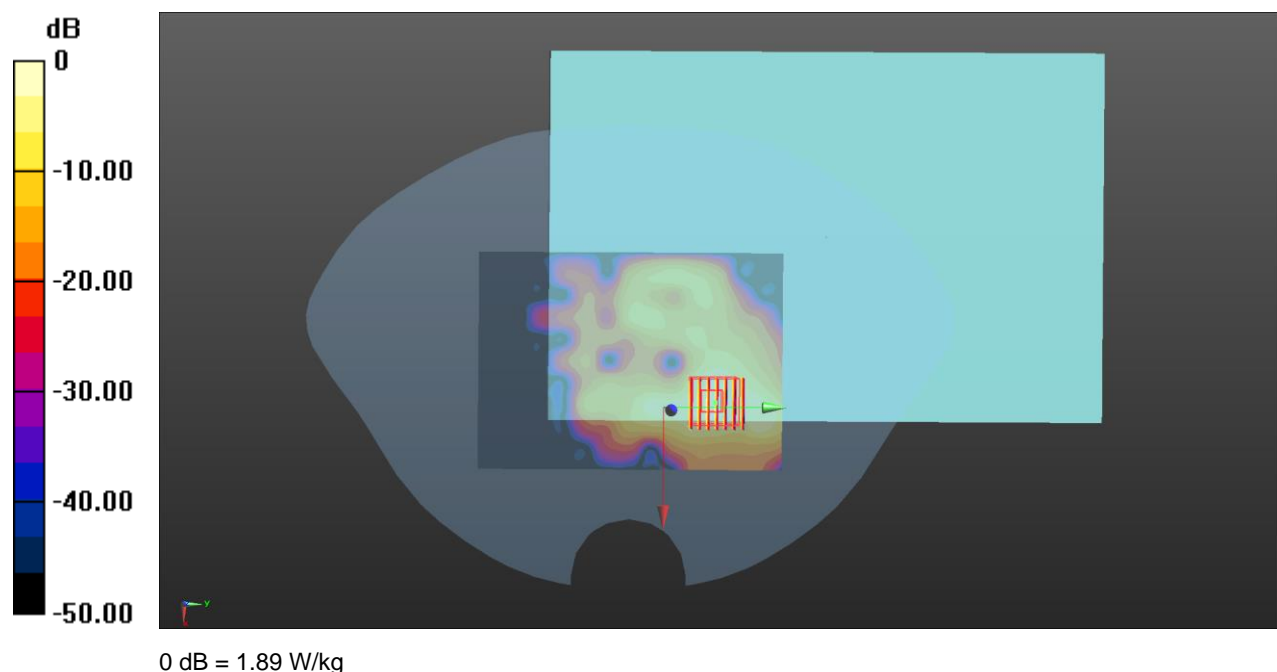
Ch54/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 0 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 4.22 W/kg

SAR(1 g) = 0.919 W/kg; SAR(10 g) = 0.258 W/kg

Maximum value of SAR (measured) = 1.89 W/kg



Meas.6 Body Plane with Left Edge 0mm on 58 Channel in IEEE802.11ac80 mode with Antenna Auxiliary

Date: 2022.11.22

Communication System Band: 5.3G; Frequency: 5290 MHz; Duty Cycle: 1:1.062

Medium parameters used (interpolated): $f = 5290$ MHz; $\sigma = 4.747$ S/m; $\epsilon_r = 35.177$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.5°C Liquid Temperature: 21.3°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(5.42, 5.42, 5.42); Calibrated: 2021.12.29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1710; Calibrated: 2022.02.01
- Phantom: SAM (20deg probe tilt) with CRP v5.0 Right 1857; Type: QD000P40CD; Serial: TP1857
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch58/Area Scan (101x151x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.88 W/kg

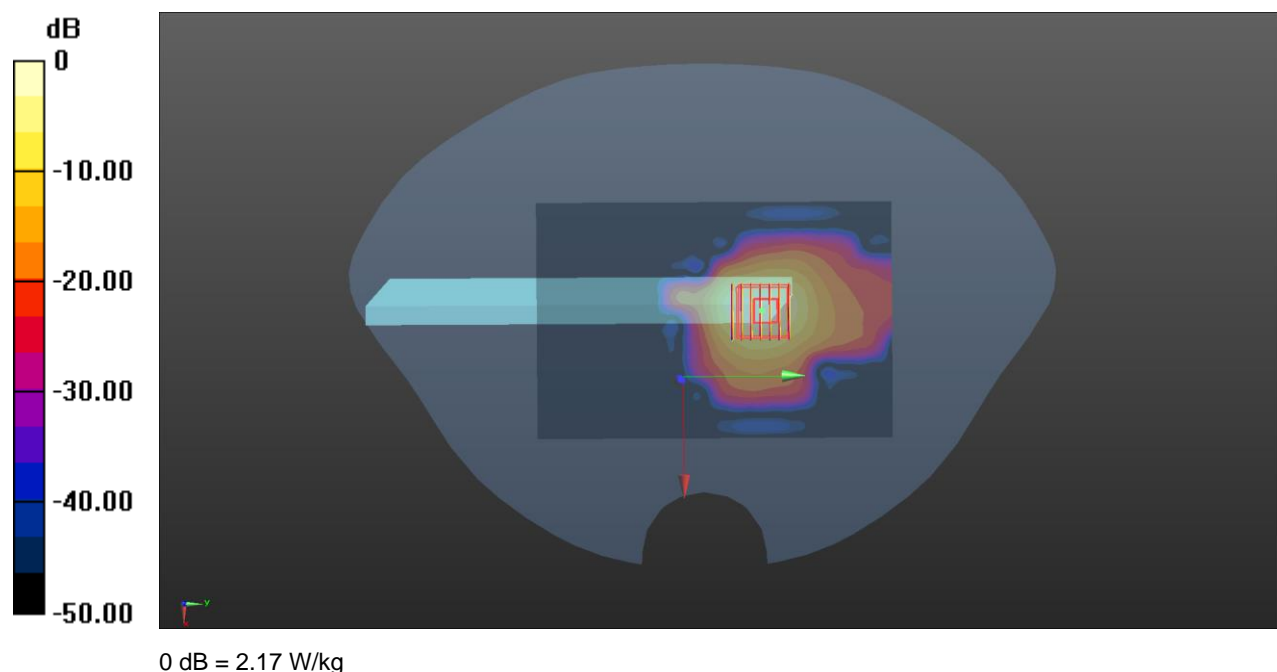
Ch58/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 1.500 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 4.31 W/kg

SAR(1 g) = 1.05 W/kg; SAR(10 g) = 0.321 W/kg

Maximum value of SAR (measured) = 2.17 W/kg



Meas.7 Body Plane with Left Edge 0mm on 58 Channel in IEEE802.11ac80 mode with Antenna MIMO

Date: 2022.11.22

Communication System Band: 5.3G; Frequency: 5290 MHz; Duty Cycle: 1:1.062

Medium parameters used (interpolated): $f = 5290$ MHz; $\sigma = 4.747$ S/m; $\epsilon_r = 35.177$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.5°C Liquid Temperature: 21.3°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(5.42, 5.42, 5.42); Calibrated: 2021.12.29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1710; Calibrated: 2022.02.01
- Phantom: SAM (20deg probe tilt) with CRP v5.0 Right 1857; Type: QD000P40CD; Serial: TP1857
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch58/Area Scan (101x151x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

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

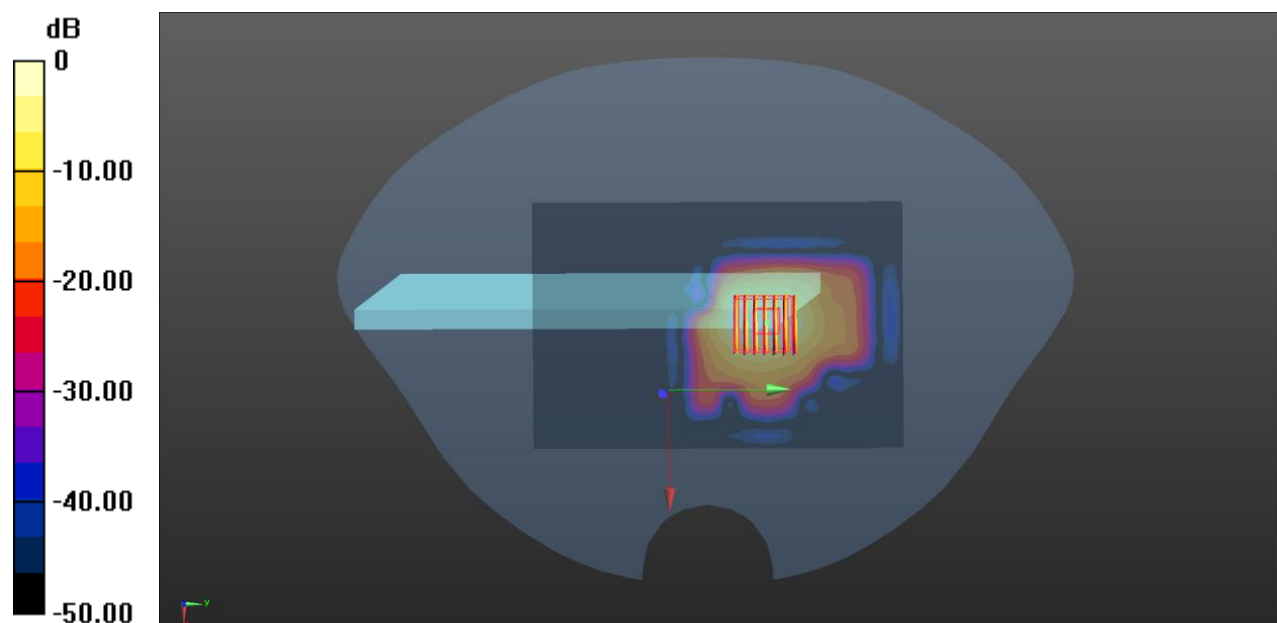
Ch58/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 1.307 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 2.24 W/kg

SAR(1 g) = 0.566 W/kg; SAR(10 g) = 0.174 W/kg

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



0 dB = 1.16 W/kg

Meas.8 Body Plane with Back Side 0mm on 118 Channel in IEEE802.11ac40 mode with Antenna Main

Date: 2022.11.23

Communication System Band: 5.6G; Frequency: 5590 MHz; Duty Cycle: 1:1.029

Medium parameters used (interpolated): $f = 5590$ MHz; $\sigma = 5.138$ S/m; $\epsilon_r = 35.575$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.1°C Liquid Temperature: 21.3°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(4.81, 4.81, 4.81); Calibrated: 2021.12.29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1710; Calibrated: 2022.02.01
- Phantom: SAM (20deg probe tilt) with CRP v5.0 Right 1857; Type: QD000P40CD; Serial: TP1857
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch118/Area Scan (101x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.69 W/kg

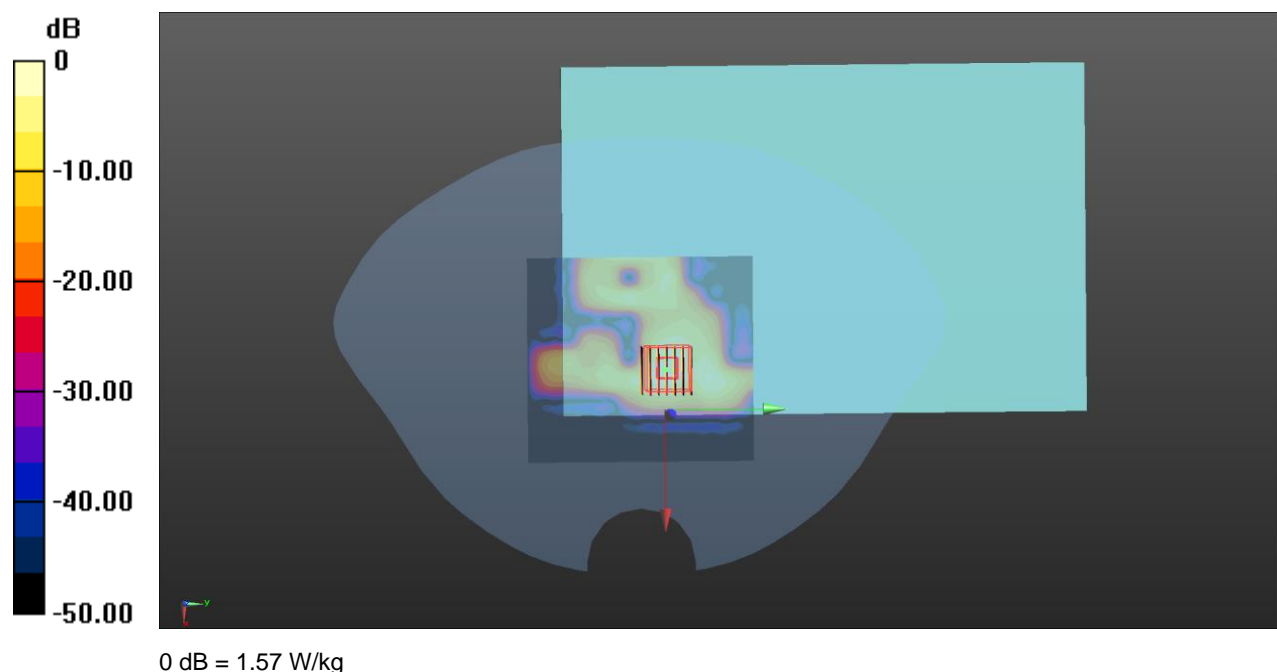
Ch118/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 2.686 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 3.61 W/kg

SAR(1 g) = 0.713 W/kg; SAR(10 g) = 0.192 W/kg

Maximum value of SAR (measured) = 1.57 W/kg



Meas.9 Body Plane with Left Edge 0mm on 106 Channel in IEEE802.11ac80 mode with Antenna Auxiliary

Date: 2022.11.23

Communication System Band: 5.6G; Frequency: 5530 MHz; Duty Cycle: 1:1.062

Medium parameters used (interpolated): $f = 5530$ MHz; $\sigma = 5.064$ S/m; $\epsilon_r = 35.832$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.1°C Liquid Temperature: 21.3°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(4.81, 4.81, 4.81); Calibrated: 2021.12.29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1710; Calibrated: 2022.02.01
- Phantom: SAM (20deg probe tilt) with CRP v5.0 Right 1857; Type: QD000P40CD; Serial: TP1857
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch106/Area Scan (101x151x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.67 W/kg

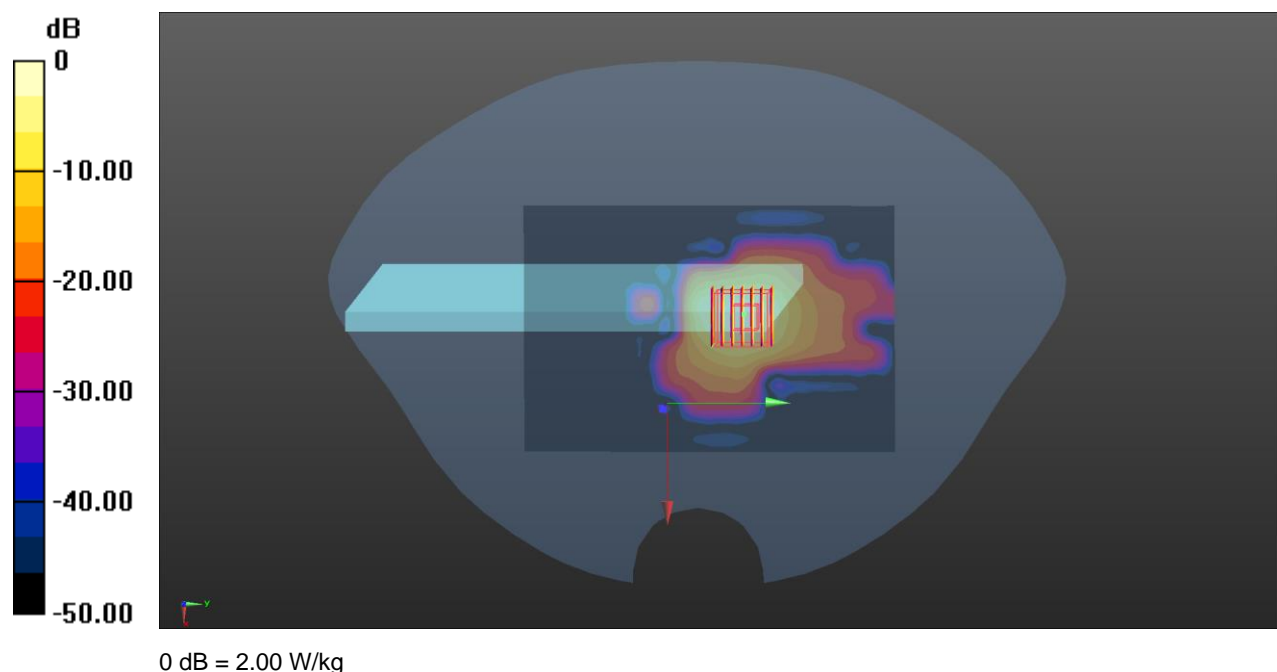
Ch106/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 6.075 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 4.32 W/kg

SAR(1 g) = 0.945 W/kg; SAR(10 g) = 0.278 W/kg

Maximum value of SAR (measured) = 2.00 W/kg



Meas.10 Body Plane with Left Edge 0mm on 106 Channel in IEEE802.11ac80 mode with Antenna MIMO

Date: 2022.11.23

Communication System Band: 5.6G; Frequency: 5530 MHz; Duty Cycle: 1:1.062

Medium parameters used (interpolated): $f = 5530$ MHz; $\sigma = 5.064$ S/m; $\epsilon_r = 35.832$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.1°C Liquid Temperature: 21.3°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(4.81, 4.81, 4.81); Calibrated: 2021.12.29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1710; Calibrated: 2022.02.01
- Phantom: SAM (20deg probe tilt) with CRP v5.0 Right 1857; Type: QD000P40CD; Serial: TP1857
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch106/Area Scan (101x151x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.795 W/kg

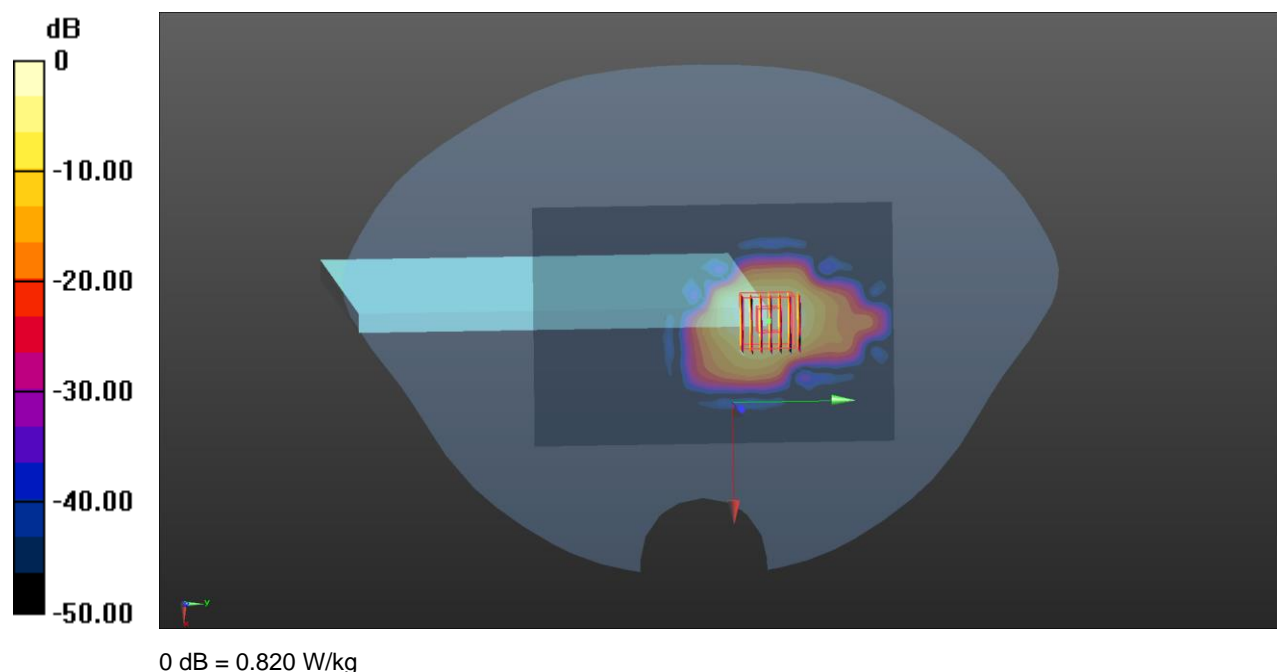
Ch106/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 0.4980 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 1.67 W/kg

SAR(1 g) = 0.398 W/kg; SAR(10 g) = 0.118 W/kg

Maximum value of SAR (measured) = 0.820 W/kg



Meas.11 Body Plane with Back Side 0mm on 155 Channel in IEEE802.11ac80 mode with Antenna Main

Date: 2022.11.24

Communication System Band: 5.8G; Frequency: 5775 MHz; Duty Cycle: 1:1.062

Medium parameters used (interpolated): $f = 5775$ MHz; $\sigma = 5.286$ S/m; $\epsilon_r = 35.852$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.1°C Liquid Temperature: 21.8°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(4.9, 4.9, 4.9); Calibrated: 2021.12.29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1710; Calibrated: 2022.02.01
- Phantom: SAM (20deg probe tilt) with CRP v5.0 Right 1857; Type: QD000P40CD; Serial: TP1857
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch155/Area Scan (101x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.84 W/kg

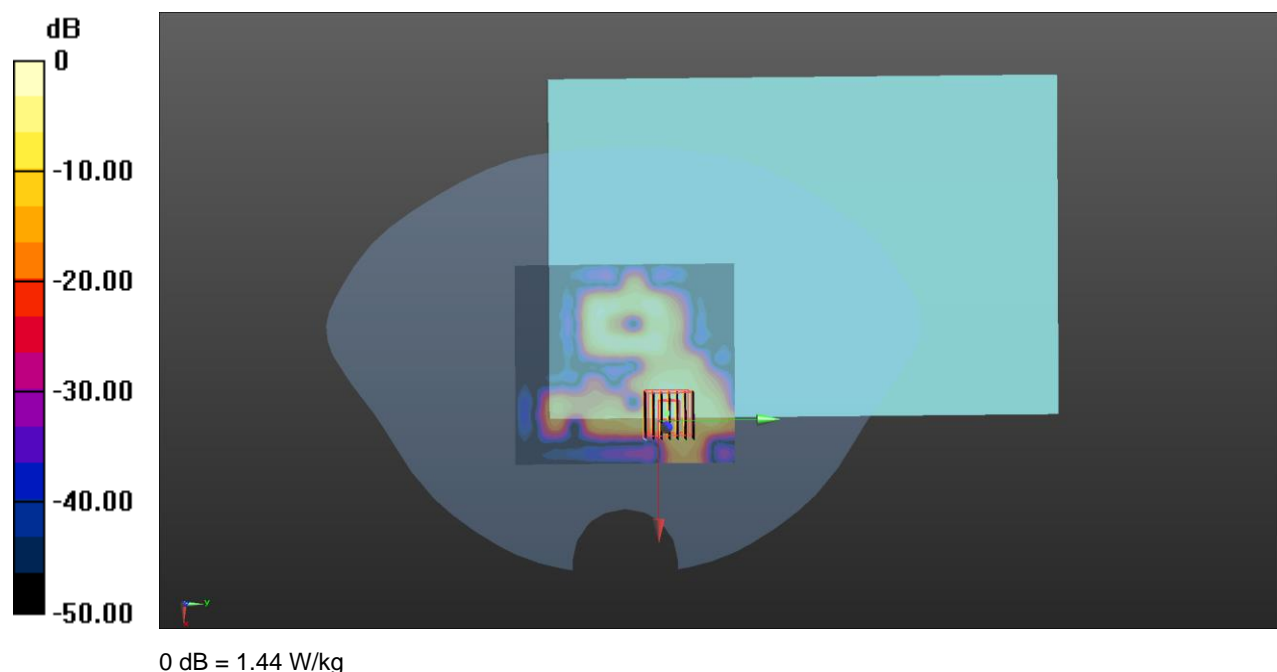
Ch155/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 2.438 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 3.49 W/kg

SAR(1 g) = 0.658 W/kg; SAR(10 g) = 0.164 W/kg

Maximum value of SAR (measured) = 1.44 W/kg



Meas.12 Body Plane with Left Edge 0mm on 155 Channel in IEEE802.11ac80 mode with Antenna Auxiliary

Date: 2022.11.24

Communication System Band: 5.8G; Frequency: 5775 MHz; Duty Cycle: 1:1.062

Medium parameters used (interpolated): $f = 5775$ MHz; $\sigma = 5.286$ S/m; $\epsilon_r = 35.852$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature:22.1°C Liquid Temperature:21.8°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(4.9, 4.9, 4.9); Calibrated: 2021.12.29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1710; Calibrated: 2022.02.01
- Phantom: SAM (20deg probe tilt) with CRP v5.0 Right 1857; Type: QD000P40CD; Serial: TP1857
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch155/Area Scan (101x151x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.43 W/kg

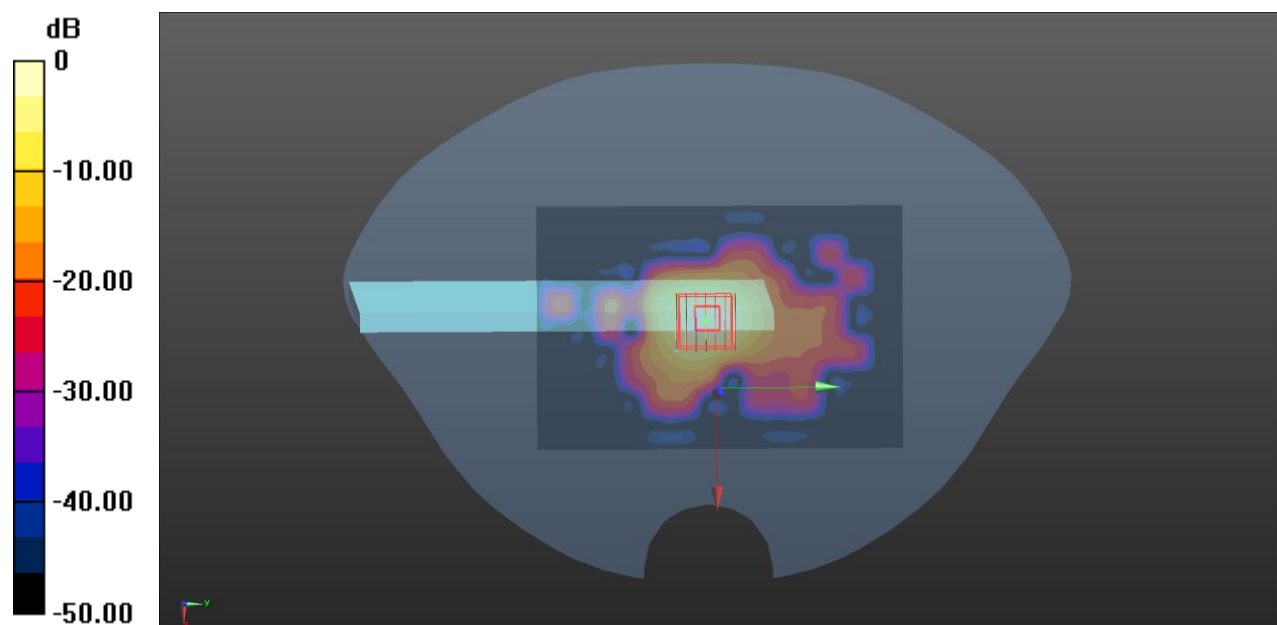
Ch155/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 12.97 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 3.46 W/kg

SAR(1 g) = 0.800 W/kg; SAR(10 g) = 0.238 W/kg

Maximum value of SAR (measured) = 1.69 W/kg



0 dB = 1.69 W/kg

Meas.13 Body Plane with Left Edge 0mm on 155 Channel in IEEE802.11ac80 mode with Antenna MIMO

Date: 2022.11.24

Communication System Band: 5.8G; Frequency: 5775 MHz; Duty Cycle: 1:1.062

Medium parameters used (interpolated): $f = 5775$ MHz; $\sigma = 5.286$ S/m; $\epsilon_r = 35.852$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature: 22.1°C Liquid Temperature: 21.8°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7510; ConvF(4.9, 4.9, 4.9); Calibrated: 2021.12.29;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1710; Calibrated: 2022.02.01
- Phantom: SAM (20deg probe tilt) with CRP v5.0 Right 1857; Type: QD000P40CD; Serial: TP1857
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch155/Area Scan (101x151x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.787 W/kg

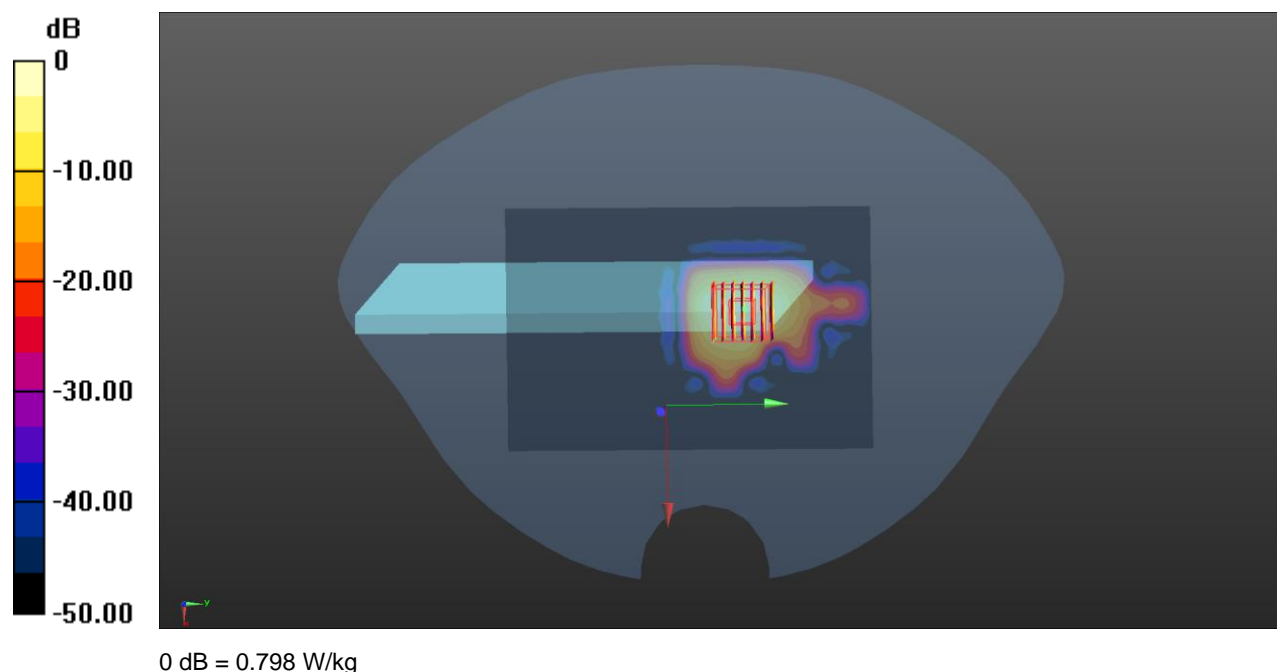
Ch155/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 3.325 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 1.78 W/kg

SAR(1 g) = 0.365 W/kg; SAR(10 g) = 0.104 W/kg

Maximum value of SAR (measured) = 0.798 W/kg



ANNEX D EUT EXTERNAL PHOTOS

Please refer the document “BL-SZ22B0401-AW.pdf”.

ANNEX E SAR TEST SETUP PHOTOS

Please refer the document “BL-SZ22B0401-AS.pdf”.

ANNEX F CALIBRATION REPORT

Please refer the document “CALIBRATION REPORT.pdf”.

ANNEX G Tune-up Procedure

Please refer the document “BL-SZ22B0401 Tune-up Procedure.pdf”.

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