FCC SAR Test Report

Report No.	:	**W7L-240507W001SA02**
Applicant	:	**Xiaomi Communications Co., Ltd.**
Address	:	**#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085**
Manufacturer	:	**Xiaomi Communications Co., Ltd.**
Address	:	**#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085**
Product	:	**Tablet Computer**
FCC ID	:	**2AFZZRP89G**
Brand	:	**Redmi**
Model No.	:	**24075RP89G**
Standards	:	**FCC 47 CFR Part 2 (2.1093) / IEEE C95.1:1992 / IEEE 1528:2013** **KDB 865664 D01 v01r04 / KDB 865664 D02 v01r02 / KDB 248227 D01 v02r02** **KDB 447498 D01 v06 / KDB 616217 D04 v01r02**
Date of Testing	:	**May. 20, 2024 ~ May. 21, 2024**
FCC Designation No.	:	**CN1171** **FCC Site Registration No. : 525120**

CERTIFICATION: The above equipment have been tested by **BV 7LAYERS COMMUNICATIONS TECHNOLOGY (SHENZHEN) CO. LTD.**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's SAR characteristics under the conditions specified in this report. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product certification, approval, or endorsement by A2LA or any government agencies.

Prepared By : Jerry Chen / Engineer

Approved By : Luke Lu / Manager

Table of Contents

Release Control Record

Report No.	Reason for Change	Date Issued
W7L-240507W001SA02	Initial release	May. 30, 2024

1. Summary of Maximum SAR Value

Equipment Class	Mode	Highest Reported Head SAR_{1g} (W/kg)	Highest Reported Body SAR_{1g} (0 cm Gap) (W/kg)
DTS	2.4G WLAN	0.98	1.08
NII	5G WLAN	1.01	0.88
DSS	Bluetooth	0.16	0.70
Highest Simultaneous Transmission SAR		Head (W/kg)	Body (W/kg)
NII + DSS		1.17	1.59

Note:

1. The SAR limit **(Head & Body: SAR_{1g} 1.6 W/kg)** for general population / uncontrolled exposure is specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992.

2. Description of Equipment Under Test

EUT Type	Tablet Computer
FCC ID	2AFZZRP89G
Brand Name	Redmi
Model Name	24075RP89G
Serial Number	272062a27d82
HW Version	13510N85
SW Version	Xiaomi HyperOS 1.0
Tx Frequency Bands (Unit: MHz)	WLAN : 2412 ~ 2462, 5180 ~ 5240, 5260 ~ 5320, 5500 ~ 5720, 5745 ~ 5825 Bluetooth : 2402 ~ 2480
Uplink Modulations	802.11b : DSSS 802.11a/g/n/ac : OFDM Bluetooth : GFSK, π/4-DQPSK, 8-DPSK
Maximum Tune-up Conducted Power (Unit: dBm)	Please refer to section 4.5.1 of this report.
Antenna Type	PIFA Antenna
EUT Stage	Identical Prototype

Note:

1. The above EUT information is declared by the manufacturer and for more detailed features description please refer to the manufacturer's specifications or User's Manual.
2. For WLAN Antenna, when the audio is actively routed through the earpiece receiver on head exposure condition, power reduction will be implemented immediately.
3. For WLAN Antenna, when the SAR sensor is detected close to the body state, power reduction will be activated to limit the maximum power. Proximity sensor triggering distances please refer to section 4.1 in this report.

3. SAR Measurement System

3.1 Definition of Specific Absorption Rate (SAR)

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:

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

SAR is expressed in units of Watts per kilogram (W/kg)

SAR measurement can be related to the electrical field in the tissue by

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

Where: σ is the conductivity of the tissue, ρ is the mass density of the tissue and E is the RMS electrical field strength.

3.2 SPEAG DASY System

DASY system consists of high precision robot, probe alignment sensor, phantom, robot controller, controlled measurement server and near-field probe. The robot includes six axes that can move to the precision position of the DASY5 software defined. The DASY software can define the area that is detected by the probe. The robot is connected to controlled box. Controlled measurement server is connected to the controlled robot box. The DAE includes amplifier, signal multiplexing, AD converter, offset measurement and surface detection. It is connected to the Electro-optical coupler (ECO). The ECO performs the conversion form the optical into digital electric signal of the DAE and transfers data to the PC.

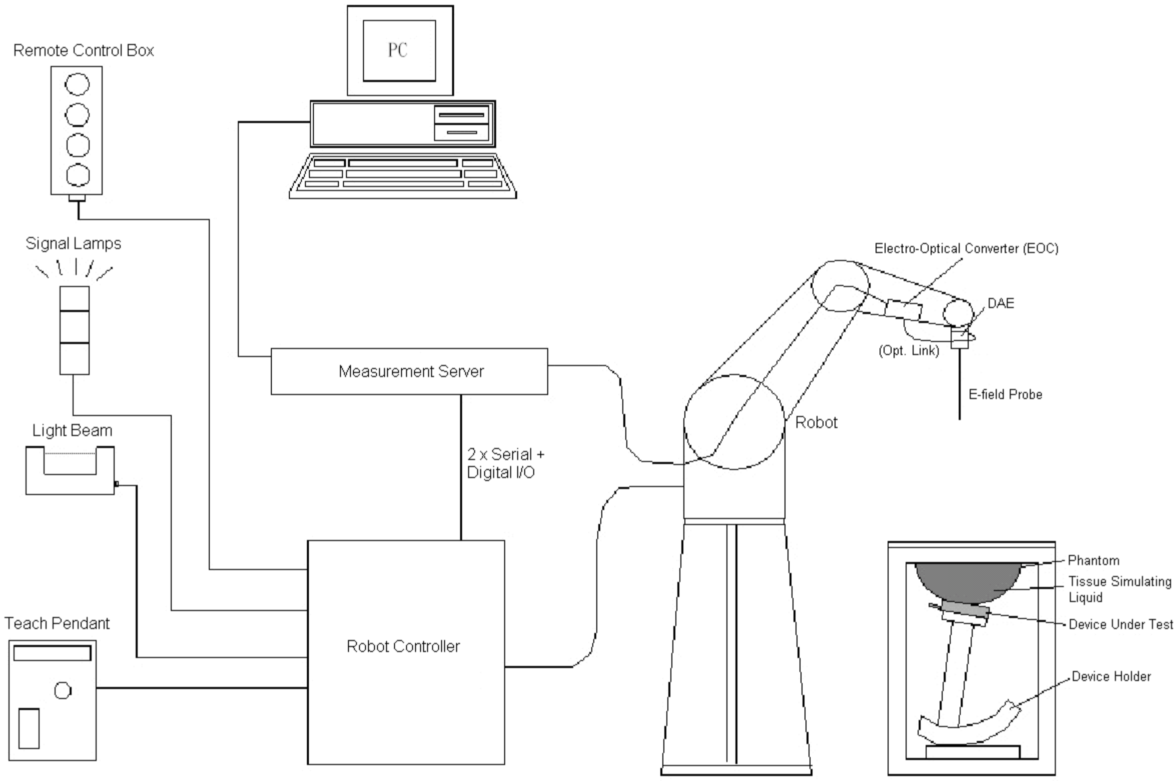


Fig-3.1 DASY System Setup

3.2.1 Robot

The DASY system uses the high precision robots from Stäubli SA (France). For the 6-axis controller system, the robot controller version (DASY5: CS8c) from Stäubli is used. The Stäubli robot series have many features that are important for our application:

- High precision (repeatability ±0.035 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)

Fig-3.2 DASY5

3.2.2 Probes

The SAR measurement is conducted with the dosimetric probe. The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency.

Model	EX3DV4
Construction	Symmetrical design with triangular core. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE).
Frequency	10 MHz to 6 GHz Linearity: ± 0.2 dB
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 μW/g to 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μW/g)
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm

Model	ES3DV3
Construction	Symmetrical design with triangular core. Interleaved sensors. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE).
Frequency	10 MHz to 4 GHz Linearity: ± 0.2 dB
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.3 dB in tissue material (rotation normal to probe axis)
Dynamic Range	5 μW/g to 100 mW/g Linearity: ± 0.2 dB
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 3.9 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.0 mm

3.2.3 Data Acquisition Electronics (DAE)

Model	DAE3, DAE4
Construction	Signal amplifier, multiplexer, A/D converter and control logic. Serial optical link for communication with DASY embedded system (fully remote controlled). Two step probe touch detector for mechanical surface detection and emergency robot stop.
Measurement Range	-100 to +300 mV (16 bit resolution and two range settings: 4mV, 400mV)
Input Offset Voltage	< 5μV (with auto zero)
Input Bias Current	< 50 fA
Dimensions	60 x 60 x 68 mm

3.2.4 Phantoms

Model	Twin SAM
Construction	The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 and IEC 62209-1. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot.
Material	Vinylester, glass fiber reinforced (VE-GF)
Shell Thickness	2 ± 0.2 mm (6 ± 0.2 mm at ear point)
Dimensions	Length: 1000 mm Width: 500 mm Height: adjustable feet
Filling Volume	approx. 25 liters

Model	ELI
Construction	Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles.
Material	Vinylester, glass fiber reinforced (VE-GF)
Shell Thickness	2.0 ± 0.2 mm (bottom plate)
Dimensions	Major axis: 600 mm Minor axis: 400 mm
Filling Volume	approx. 30 liters

3.2.5 Device Holder

Model	Mounting Device	
Construction	In combination with the Twin SAM Phantom or ELI4, the Mounting Device enables the rotation of the mounted transmitter device in spherical coordinates. Rotation point is the ear opening point. Transmitter devices can be easily and accurately positioned according to IEC, IEEE, FCC or other specifications. The device holder can be locked for positioning at different phantom sections (left head, right head, flat).	
Material	POM	

Model	Laptop Extensions Kit	
Construction	Simple but effective and easy-to-use extension for Mounting Device that facilitates the testing of larger devices according to IEC 62209-2 (e.g., laptops, cameras, etc.). It is lightweight and fits easily on the upper part of the Mounting Device in place of the phone positioner.	
Material	POM, Acrylic glass, Foam	

3.2.6 System Validation Dipoles

Model	D-Serial	
Construction	Symmetrical dipole with l/4 balun. Enables measurement of feed point impedance with NWA. Matched for use near flat phantoms filled with tissue simulating solutions.	
Frequency	750 MHz to 5800 MHz	
Return Loss	> 20 dB	
Power Capability	> 100 W (f < 1GHz), > 40 W (f > 1GHz)	

3.2.7 Tissue Simulating Liquids

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% are listed in Table-3.1.

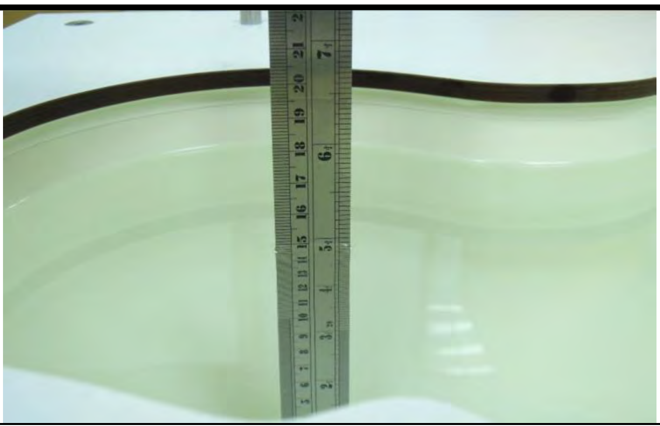


Photo of Liquid Height for Head Position

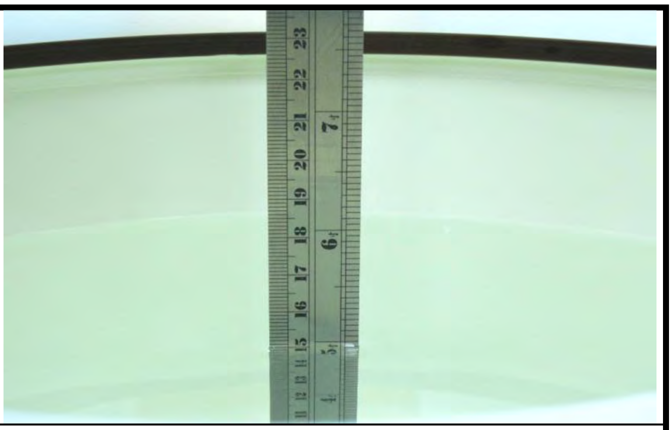


Photo of Liquid Height for Body Position

The dielectric properties of the head tissue simulating liquids are defined in IEEE 1528, and KDB 865664 D01 Appendix A. The dielectric properties of the tissue simulating liquids were verified prior to the SAR evaluation using a dielectric assessment kit and a network analyzer.

Table-3.1 Targets of Tissue Simulating Liquid

Frequency (MHz)	Target Permittivity	Range of ±5%	Target Conductivity	Range of ±5%
750	41.9	39.8 ~ 44.0	0.89	0.85 ~ 0.93
835	41.5	39.4 ~ 43.6	0.90	0.86 ~ 0.95
900	41.5	39.4 ~ 43.6	0.97	0.92 ~ 1.02
1450	40.5	38.5 ~ 42.5	1.20	1.14 ~ 1.26
1640	40.3	38.3 ~ 42.3	1.29	1.23 ~ 1.35
1750	40.1	38.1 ~ 42.1	1.37	1.30 ~ 1.44
1800	40.0	38.0 ~ 42.0	1.40	1.33 ~ 1.47
1900	40.0	38.0 ~ 42.0	1.40	1.33 ~ 1.47
2000	40.0	38.0 ~ 42.0	1.40	1.33 ~ 1.47
2300	39.5	37.5 ~ 41.5	1.67	1.59 ~ 1.75
2450	39.2	37.2 ~ 41.2	1.80	1.71 ~ 1.89
2600	39.0	37.1 ~ 41.0	1.96	1.86 ~ 2.06
3500	37.9	36.0 ~ 39.8	2.91	2.76 ~ 3.06
5200	36.0	34.2 ~ 37.8	4.66	4.43 ~ 4.89
5300	35.9	34.1 ~ 37.7	4.76	4.52 ~ 5.00
5500	35.6	33.8 ~ 37.4	4.96	4.71 ~ 5.21
5600	35.5	33.7 ~ 37.3	5.07	4.82 ~ 5.32
5800	35.3	33.5 ~ 37.1	5.27	5.01 ~ 5.53

The following table gives the recipes for tissue simulating liquids.

Table-3.2 Recipes of Tissue Simulating Liquid

Tissue Type	Bactericide	DGBE	HEC	NaCl	Sucrose	Triton X-100	Water	Diethylene Glycol Mono-hexylether
H750	0.2	-	0.2	1.5	56.0	-	42.1	-
H835	0.2	-	0.2	1.5	57.0	-	41.1	-
H900	0.2	-	0.2	1.4	58.0	-	40.2	-
H1450	-	43.3	-	0.6	-	-	56.1	-
H1640	-	45.8	-	0.5	-	-	53.7	-
H1750	-	47.0	-	0.4	-	-	52.6	-
H1800	-	44.5	-	0.3	-	-	55.2	-
H1900	-	44.5	-	0.2	-	-	55.3	-
H2000	-	44.5	-	0.1	-	-	55.4	-
H2300	-	44.9	-	0.1	-	-	55.0	-
H2450	-	45.0	-	0.1	-	-	54.9	-
H2600	-	45.1	-	0.1	-	-	54.8	-
H3500	-	8.0	-	0.2	-	20.0	71.8	-
H5G	-	-	-	-	-	17.2	65.5	17.3

3.3 SAR System Verification

The system check verifies that the system operates within its specifications. It is performed daily or before every SAR measurement. The system check uses normal SAR measurements in the flat section of the phantom with a matched dipole at a specified distance. The system verification setup is shown as below.

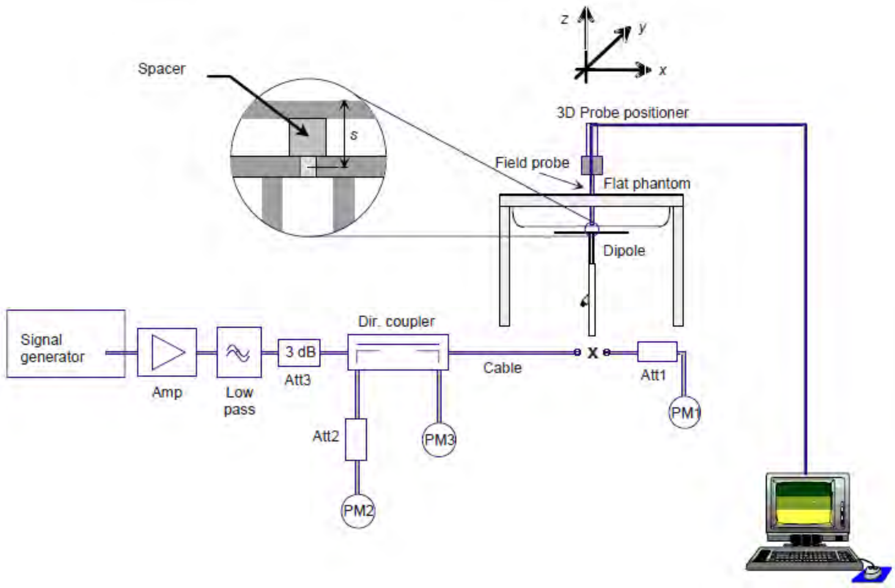


Fig-3.3 System Verification Setup

The validation dipole is placed beneath the flat phantom with the specific spacer in place. The distance spacer is touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The spectrum analyzer measures the forward power at the location of the system check dipole connector. The signal generator is adjusted for the desired forward power (250 mW is used for 700 MHz to 3 GHz, 100 mW is used for 3.5 GHz to 6 GHz) at the dipole connector and the power meter is read at that level. After connecting the cable to the dipole, the signal generator is readjusted for the same reading at power meter.

After system check testing, the SAR result will be normalized to 1W forward input power and compared with the reference SAR value derived from validation dipole certificate report. The deviation of system check should be within 10 %.

3.4 SAR Measurement Procedure

According to the SAR test standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

(a) Power reference measurement
(b) Area scan
(c) Zoom scan
(d) Power drift measurement

The SAR measurement procedures for each of test conditions are as follows:

(a) Make EUT to transmit maximum output power
(b) Measure conducted output power through RF cable
(c) Place the EUT in the specific position of phantom
(d) Perform SAR testing steps on the DASY system
(e) Record the SAR value

3.4.1 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. According to KDB 865664 D01, the resolution for Area and Zoom scan is specified in the table below.

Items	<= 2 GHz	2-3 GHz	3-4 GHz	4-5 GHz	5-6 GHz
Area Scan (Δx, Δy)	<= 15 mm	<= 12 mm	<= 12 mm	<= 10 mm	<= 10 mm
Zoom Scan (Δx, Δy)	<= 8 mm	<= 5 mm	<= 5 mm	<= 4 mm	<= 4 mm
Zoom Scan (Δz)	<= 5 mm	<= 5 mm	<= 4 mm	<= 3 mm	<= 2 mm
Zoom Scan Volume	>= 30 mm	>= 30 mm	>= 28 mm	>= 25 mm	>= 22 mm

Note:

When zoom scan is required and report SAR is <= 1.4 W/kg, the zoom scan resolution of Δx / Δy (2-3GHz: <= 8 mm, 3-4GHz: <= 7 mm, 4-6GHz: <= 5 mm) may be applied.

3.4.2 Power Drift Monitoring

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In DASY measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of EUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in dB. If the power drift more than 5%, the SAR will be retested.

3.4.3 Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the test standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The DASY software includes all numerical procedures necessary to evaluate the spatial peak SAR value.

The base for the evaluation is a "cube" measurement. The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.

The entire evaluation of the spatial peak values is performed within the post-processing engine (SEMCAD). The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

(a) Extraction of the measured data (grid and values) from the Zoom Scan
(b) Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
(c) Generation of a high-resolution mesh within the measured volume
(d) Interpolation of all measured values form the measurement grid to the high-resolution grid
(e) Extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
(f) Calculation of the averaged SAR within masses of 1g and 10g

3.4.4 SAR Averaged Methods

In DASY, the interpolation and extrapolation are both based on the modified Quadratic Shepard's method. The interpolation scheme combines a least-square fitted function method and a weighted average method which are the two basic types of computational interpolation and approximation.

Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1 g and 10 g cubes, the extrapolation distance should not be larger than 5 mm.

4. SAR Measurement Evaluation

4.1 EUT Configuration and Setting

<Considerations Related to WLAN for Setup and Testing>

In general, various vendor specific external test software and chipset based internal test modes are typically used for SAR measurement. These chipset based test mode utilities are generally hardware and manufacturer dependent, and often include substantial flexibility to reconfigure or reprogram a device. A Wi-Fi device must be configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools for SAR measurement. The test frequencies established using test mode must correspond to the actual channel frequencies. When 802.11 frame gaps are accounted for in the transmission, a maximum transmission duty factor of 92 - 96% is typically achievable in most test mode configurations. A minimum transmission duty factor of 85% is required to avoid certain hardware and device implementation issues related to wide range SAR scaling. In addition, a periodic transmission duty factor is required for current generation SAR systems to measure SAR correctly. The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

According to KDB 248227 D01, this device has installed WLAN engineering testing software which can provide continuous transmitting RF signal. During WLAN SAR testing, this device was operated to transmit continuously at the maximum transmission duty with specified transmission mode, operating frequency, lowest data rate, and maximum output power.

Initial Test Configuration

An initial test configuration is determined for OFDM transmission modes in 2.4 GHz and 5 GHz bands according to the channel bandwidth, modulation and data rate combination(s) with the highest maximum output power specified for production units in each standalone and aggregated frequency band. When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band.

Subsequent Test Configuration

SAR measurement requirements for the remaining 802.11 transmission mode configurations that have not been tested in the initial test configuration are determined separately for each standalone and aggregated frequency band, in each exposure condition, according to the maximum output power specified for production units. Additional power measurements may be required to determine if SAR measurements are required for subsequent highest output power channels in a subsequent test configuration. When the highest reported SAR for the initial test configuration according to the initial test position or fixed exposure position requirements, is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for that subsequent test configuration.

SAR Test Configuration and Channel Selection

When multiple channel bandwidth configurations in a frequency band have the same specified maximum output power, the initial test configuration is using largest channel bandwidth, lowest order modulation, lowest data rate, and lowest order 802.11 mode (i.e., 802.11a is chosen over 802.11n then 802.11ac or 802.11g is chosen over

802.11n). After an initial test configuration is determined, if multiple test channels have the same measured maximum output power, the channel chosen for SAR measurement is determined according to the following.
1) The channel closest to mid-band frequency is selected for SAR measurement.
2) For channels with equal separation from mid-band frequency; for example, high and low channels or two mid-band channels, the higher frequency (number) channel is selected for SAR measurement.

Test Reduction for U-NII-1 (5.2 GHz) and U-NII-2A (5.3 GHz) Bands

For devices that operate in both U-NII bands using the same transmitter and antenna(s), SAR test reduction is determined according to the following.
1) 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).
2) 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.

<Considerations Related to Bluetooth for Setup and Testing>

This device has installed Bluetooth engineering testing software which can provide continuous transmitting RF signal. During Bluetooth SAR testing, this device was operated to transmit continuously at the maximum transmission duty with specified transmission mode, operating frequency, lowest data rate, and maximum output power.

<Considerations Related to Proximity Sensor>

The device supports WLAN and Bluetooth capabilities. It is designed with a capacitive proximity sensor which can trigger/not trigger power reduction for WLAN on Front Face, Rear Face, Right Side and Top Side of EUT for SAR compliance. Others RF capability (Bluetooth) have no power reduction. The power levels for all wireless technologies and the power reduction please refer to Appendix D of this report.

Proximity Sensor Triggering Distances (KDB 616217 D04 §6.2)

The proximity sensor triggering distance was determined per KDB 616217 for Rear face and applicable edge. Summary for power verification per distance was tabulated in the below table.

WLAN Antenna

Output Power Verification in dBm for EUT Rear Face (moving toward phantom)											
Distance (mm)	11	12	13	14	15	16	17	18	19	20	21
WLAN2.4G Ch1 (802.11b)	12.75	12.75	12.75	12.75	12.75	12.75	19.30	19.30	19.30	19.30	19.30
WLAN5.2G Ch48 (802.11a)	10.05	10.05	10.05	10.05	10.05	10.05	17.02	17.02	17.02	17.02	17.02
WLAN5.3G Ch60 (802.11a)	10.21	10.21	10.21	10.21	10.21	10.21	17.17	17.17	17.17	17.17	17.17
WLAN5.6G Ch116 (802.11a)	8.25	8.25	8.25	8.25	8.25	8.25	16.74	16.74	16.74	16.74	16.74
WLAN5.8G Ch157 (802.11a)	7.85	7.85	7.85	7.85	7.85	7.85	16.34	16.34	16.34	16.34	16.34
Output Power Verification in dBm for EUT Rear Face (moving away phantom)											
Distance (mm)	11	12	13	14	15	16	17	18	19	20	21
WLAN2.4G Ch1 (802.11b)	12.75	12.75	12.75	12.75	12.75	12.75	19.30	19.30	19.30	19.30	19.30
WLAN5.2G Ch48 (802.11a)	10.05	10.05	10.05	10.05	10.05	10.05	17.02	17.02	17.02	17.02	17.02
WLAN5.3G Ch60 (802.11a)	10.21	10.21	10.21	10.21	10.21	10.21	17.17	17.17	17.17	17.17	17.17
WLAN5.6G Ch116 (802.11a)	8.25	8.25	8.25	8.25	8.25	8.25	16.74	16.74	16.74	16.74	16.74
WLAN5.8G Ch157 (802.11a)	7.85	7.85	7.85	7.85	7.85	7.85	16.34	16.34	16.34	16.34	16.34

Output Power Verification in dBm for EUT Top Side (moving toward phantom)											
Distance (mm)	11	12	13	14	15	16	17	18	19	20	21
WLAN2.4G Ch1 (802.11b)	12.75	12.75	12.75	12.75	12.75	12.75	19.30	19.30	19.30	19.30	19.30
WLAN5.2G Ch48 (802.11a)	10.05	10.05	10.05	10.05	10.05	10.05	17.02	17.02	17.02	17.02	17.02
WLAN5.3G Ch60 (802.11a)	10.21	10.21	10.21	10.21	10.21	10.21	17.17	17.17	17.17	17.17	17.17
WLAN5.6G Ch116 (802.11a)	8.25	8.25	8.25	8.25	8.25	8.25	16.74	16.74	16.74	16.74	16.74
WLAN5.8G Ch157 (802.11a)	7.85	7.85	7.85	7.85	7.85	7.85	16.34	16.34	16.34	16.34	16.34
Output Power Verification in dBm for EUT Top Side (moving away phantom)											
Distance (mm)	11	12	13	14	15	16	17	18	19	20	21
WLAN2.4G Ch1 (802.11b)	12.75	12.75	12.75	12.75	12.75	12.75	19.30	19.30	19.30	19.30	19.30
WLAN5.2G Ch48 (802.11a)	10.05	10.05	10.05	10.05	10.05	10.05	17.02	17.02	17.02	17.02	17.02
WLAN5.3G Ch60 (802.11a)	10.21	10.21	10.21	10.21	10.21	10.21	17.17	17.17	17.17	17.17	17.17
WLAN5.6G Ch116 (802.11a)	8.25	8.25	8.25	8.25	8.25	8.25	16.74	16.74	16.74	16.74	16.74
WLAN5.8G Ch157 (802.11a)	7.85	7.85	7.85	7.85	7.85	7.85	16.34	16.34	16.34	16.34	16.34

Output Power Verification in dBm for EUT Right Side (moving toward phantom)											
Distance (mm)	6	7	8	9	10	11	12	13	14	15	16
WLAN2.4G Ch7 (802.11b)	12.75	12.75	12.75	12.75	12.75	12.75	19.30	19.30	19.30	19.30	19.30
WLAN5.3G Ch52 (802.11a)	10.05	10.05	10.05	10.05	10.05	10.05	17.02	17.02	17.02	17.02	17.02
WLAN5.3G Ch52 (802.11a)	10.21	10.21	10.21	10.21	10.21	10.21	17.17	17.17	17.17	17.17	17.17
WLAN5.3G Ch52 (802.11a)	8.25	8.25	8.25	8.25	8.25	8.25	16.74	16.74	16.74	16.74	16.74
WLAN5.6G Ch116 (802.11a)	7.85	7.85	7.85	7.85	7.85	7.85	16.34	16.34	16.34	16.34	16.34

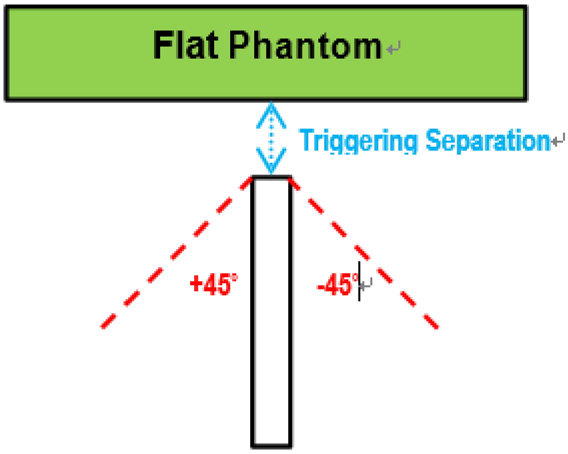
Output Power Verification in dBm for EUT Right Side (moving away phantom)											
Distance (mm)	6	7	8	9	10	11	12	13	14	15	16
WLAN2.4G Ch7 (802.11b)	12.75	12.75	12.75	12.75	12.75	12.75	19.30	19.30	19.30	19.30	19.30
WLAN5.3G Ch52 (802.11a)	10.05	10.05	10.05	10.05	10.05	10.05	17.02	17.02	17.02	17.02	17.02
WLAN5.3G Ch52 (802.11a)	10.21	10.21	10.21	10.21	10.21	10.21	17.17	17.17	17.17	17.17	17.17
WLAN5.3G Ch52 (802.11a)	8.25	8.25	8.25	8.25	8.25	8.25	16.74	16.74	16.74	16.74	16.74
WLAN5.6G Ch116 (802.11a)	7.85	7.85	7.85	7.85	7.85	7.85	16.34	16.34	16.34	16.34	16.34

Proximity Sensor Coverage (KDB 616217 D04 §6.3)

Since the proximity sensor is collocated with antenna in one component, the procedure for proximity sensor coverage is not required.

Proximity Sensor Tilt Angle Influences(KDB 616217 D04 §6.4)

The proximity sensor tilt angle influence was determined per KDB 616217 for applicable edge. Summary for proximity sensor tilt angle influence is shown in below.



Orientation	Separation Distance (mm)	Tilt Angle										
		-45°	-40°	-30°	-20°	-10°	0°	10°	20°	30°	40°	45°
Top Side	16	On	On	On	On	On	On	On	On	On	On	On
Right Side	11	On	On	On	On	On	On	On	On	On	On	On

Summary for Proximity Sensor Triggering Test

The detailed trigger distance is as follows:

WLAN Antenna proximity sensor trigger distance (mm)			
Position	Rear Face	Right Side	Top Side
Minimum	16	11	16

Test distance used for SAR test:

SAR test distance (mm)		
Rear Face	Right Side	Top Side
15	10	15

4.2 EUT Testing Position

4.2.1 Head Exposure Conditions

Head exposure is limited to next to the ear voice mode operations. Head SAR compliance is tested according to the test positions defined in IEEE 1528:2013 using the SAM phantom illustrated as below.

1. Define two imaginary lines on the handset

(a) The vertical centerline passes through two points on the front side of the handset - the midpoint of the width w_t of the handset at the level of the acoustic output, and the midpoint of the width w_b of the bottom of the handset.

(b) The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output. The horizontal line is also tangential to the face of the handset at point A.

(c) The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front face of the handset, especially for clamshell handsets, handsets with flip covers, and other irregularly shaped handsets.

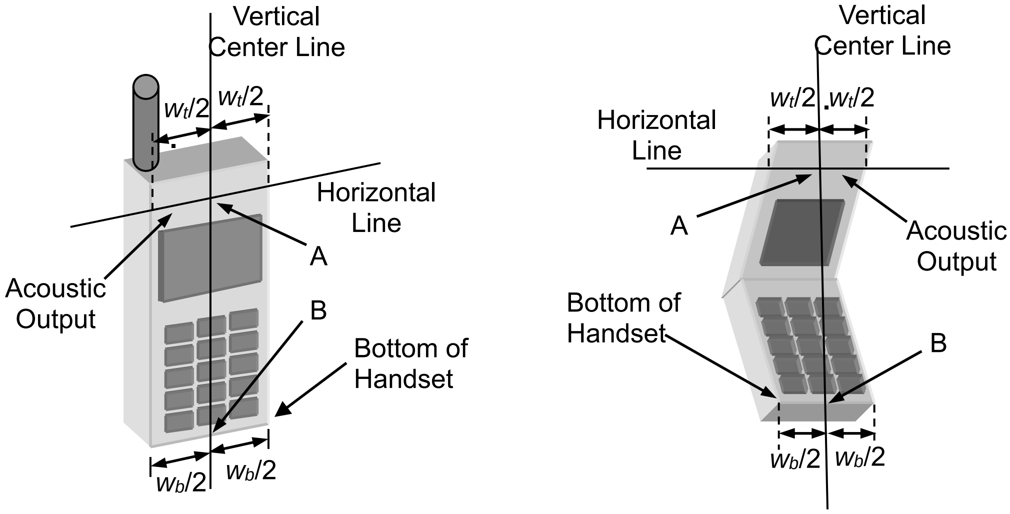


Fig-4.1 Illustration for Handset Vertical and Horizontal Reference Lines

2. Cheek Position

(a) To position the device with the vertical center line of the body of the device and the horizontal line crossing the center piece in a plane parallel to the sagittal plane of the phantom. While maintaining the device in this plane, align the vertical center line with the reference plane containing the three ear and mouth reference point (M: Mouth, RE: Right Ear, and LE: Left Ear) and align the center of the ear piece with the line RE-LE.

(b) To move the device towards the phantom with the ear piece aligned with the line LE-RE until the phone touched the ear. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the phone until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost (see Fig-4.2).

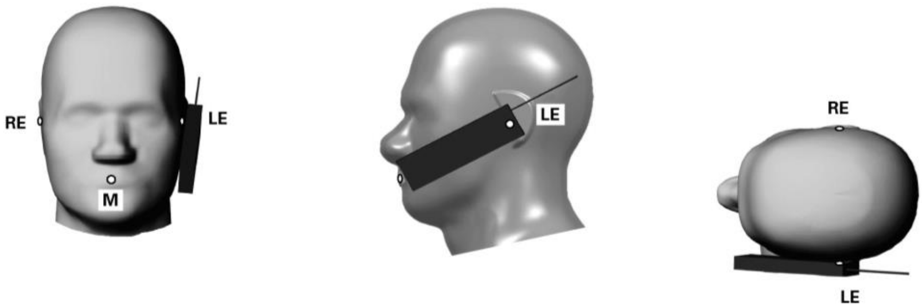


Fig-4.2 Illustration for Cheek Position

3. Tilted Position

(a) To position the device in the “cheek” position described above.

(b) While maintaining the device the reference plane described above and pivoting against the ear, moves it outward away from the mouth by an angle of 15 degrees or until contact with the ear is lost (see Fig-4.3).

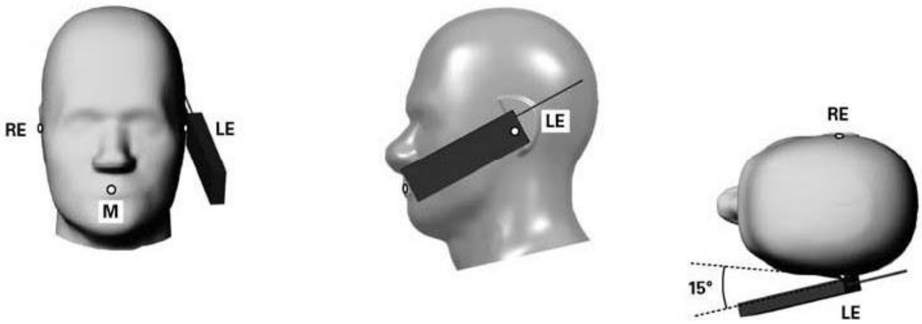


Fig-4.3 Illustration for Tilted Position

4.2.2 Body Exposure Conditions

For full-size tablet, according to KDB 616217 D04, SAR evaluation is required for back surface and edges of the devices. The back surface and edges of the tablet are tested with the tablet touching the phantom. Exposures from antennas through the front surface of the display section of a tablet are generally limited to the user's hands. Exposures to hands for typical consumer transmitters used in tablets are not expected to exceed the extremity SAR limit; therefore, SAR evaluation for the front surface of tablet display screens are generally not necessary. When voice mode is supported on a tablet and it is limited to speaker mode or headset operations only, additional SAR testing for this type of voice use is not required.

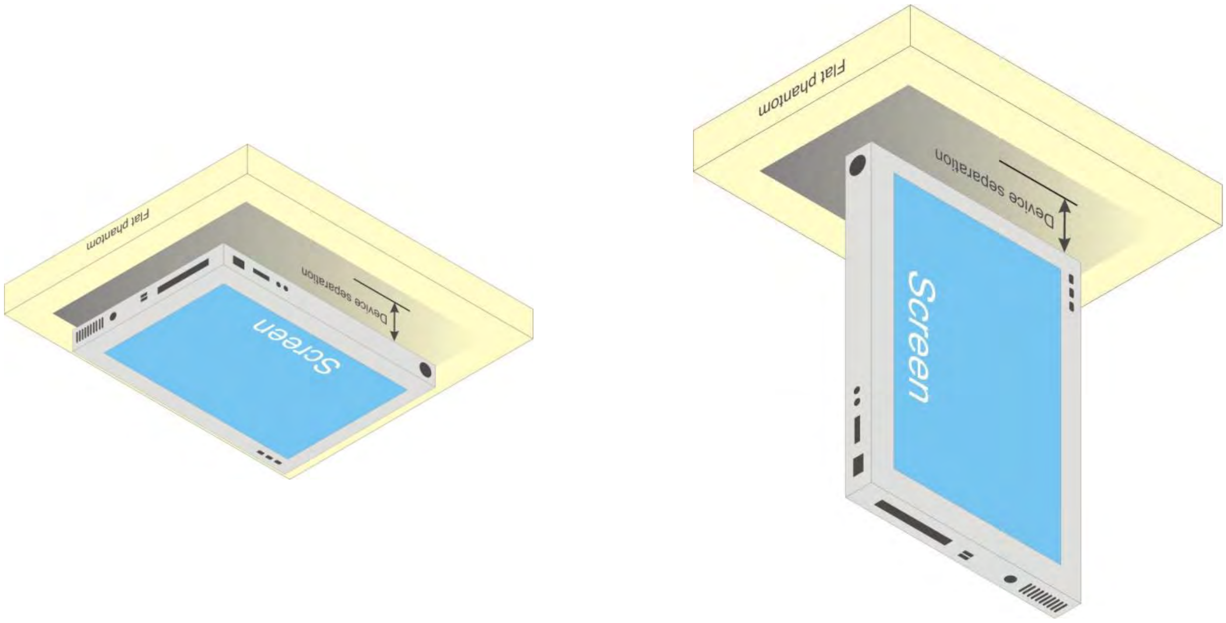


Fig-4.4 Illustration for Tablet Setup

4.2.3 SAR Test Exclusion Evaluations

According to KDB 447498 D01, the SAR test exclusion condition is based on source-based time-averaged maximum conducted output power, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions. The SAR exclusion threshold is determined by the following formula.

1. For the test separation distance <= 50 mm

$$\frac{\textbf{Max. Tune up Power}_{(mW)}}{\textbf{Min. Test Separation Distance}_{(mm)}} \times \sqrt{f_{(GHz)}} \leq \textbf{3.0 for SAR-1g}, \leq \textbf{7.5 for SAR-10g}$$

When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

2. For the test separation distance > 50 mm, and the frequency at 100 MHz to 1500 MHz

$$\left[(\text{Threshold at 50 mm in Step 1}) + (\text{Test Separation Distance} - 50\ \text{mm}) \times \left(\frac{f_{(MHz)}}{150}\right)\right]_{(mW)}$$

3. For the test separation distance > 50 mm, and the frequency at > 1500 MHz to 6 GHz

$$[(\text{Threshold at 50 mm in Step 1}) + (\text{Test Separation Distance} - 50\ \text{mm}) \times 10]_{(mW)}$$

Exposure Position	Wireless Interface	BT	2.4GHz WLAN	5GHz WLAN
	Calculated Frequency	2480MHz	2462MHz	5825MHz
	Maximum power (dBm)	12	20	18
	Maximum rated power(mW)	16.0	100.0	63.0
Rear Face	Separation distance(mm)	0.0	0.0	0.0
	exclusion threshold	5.0	31.4	30.4
	Testing required?	**Yes**	**Yes**	**Yes**
Left Side	Separation distance(mm)	85.0	85.0	85.0
	exclusion threshold	445.0	446.0	412.0
	Testing required?	**No**	**No**	**No**
Right Side	Separation distance(mm)	0.0	0.0	0.0
	exclusion threshold	5.0	31.4	30.4
	Testing required?	**Yes**	**Yes**	**Yes**
Top Side	Separation distance(mm)	0.0	0.0	0.0
	exclusion threshold	5.0	31.4	30.4
	Testing required?	**Yes**	**Yes**	**Yes**
Bottom Side	Separation distance(mm)	202.0	202.0	202.0
	exclusion threshold	1615.0	1616.0	1582.0
	Testing required?	**No**	**No**	**No**

Note:

1. When separation distance <= 50 mm and the calculated result shown in above table is <= 3.0 for SAR-1g exposure condition, or <= 7.5 for SAR-10g exposure condition, the SAR testing exclusion is applied.
2. When separation distance > 50 mm and the device output power is less than the calculated result (power threshold, mW) shown in above table, the SAR testing exclusion is applied.

4.3 Tissue Verification

The measuring results for tissue simulating liquid are shown as below.

Tissue Type	Frequency (MHz)	Liquid Temp. (℃)	Measured Conductivity (σ)	Measured Permittivity (ε_r)	Target Conductivity (σ)	Target Permittivity (ε_r)	Conductivity Deviation (%)	Permittivity Deviation (%)	Test Date
Head	2450	22.6	1.854	37.997	1.80	39.20	3.00	-3.07	May. 20, 2024
Head	5250	22.3	4.684	35.341	4.71	35.90	-0.55	-1.56	May. 20, 2024
Head	5600	22.5	5.032	34.839	5.07	35.50	-0.75	-1.86	May. 21, 2024
Head	5800	22.6	5.240	34.551	5.27	35.30	-0.57	-2.12	May. 21, 2024

Note:

1. The dielectric properties of the tissue simulating liquid must be measured within 24 hours before the SAR testing and within ±5% of the target values. Liquid temperature during the SAR testing must be within ±2 ℃
2. Since the maximum deviation of dielectric properties of the tissue simulating liquid is within 5%, SAR correction is evaluated in the measurement uncertainty shown on section 6 of this report.

4.4 System Verification

The measuring results for system check are shown as below.

Test Date	Frequency (MHz)	1W Target SAR-1g (W/kg)	Measured SAR-1g (W/kg)	Normalized to 1W SAR-1g (W/kg)	Deviation (%)	Dipole S/N	Probe S/N	DAE S/N
May. 20, 2024	2450	53.60	14.20	56.80	5.97	893	3873	1389
May. 20, 2024	5250	76.90	7.48	74.80	-2.73	1133	3873	1389
May. 21, 2024	5600	81.20	8.54	85.40	5.17	1133	3873	1389
May. 21, 2024	5800	78.00	8.41	84.10	7.82	1133	3873	1389

Note:

Compared to the reference SAR value provided by SPEAG, the validation data should be within its specification of 10 %. The result indicates the system check can meet the variation criterion and the plots can be referred to Appendix A of this report.

4.5 Conducted Power Results

4.5.1 Maximum Conducted Power

The maximum conducted average power (Unit: dBm) including tune-up tolerance please refer to Appendix D.

4.5.2 Measured Conducted Power Result

The measured conducted power result (Unit: dBm) please refer to Appendix D.

4.6 SAR Testing Results

4.6.1 SAR Test Reduction Considerations

<KDB 447498 D01, General RF Exposure Guidance>

Testing of other required channels within the operating mode of a frequency band is not required when the reported SAR for the mid-band or highest output power channel is:

(1) ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz

(2) ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz

(3) ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz

<KDB 248227 D01, SAR Guidance for Wi-Fi Transmitters>

(1) For handsets operating next to ear, hotspot mode or mini-tablet configurations, the initial test position procedures were applied. The test position with the highest extrapolated peak SAR will be used as the initial test position. When the reported SAR of initial test position is <= 0.4 W/kg, SAR testing for remaining test positions is not required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is <= 0.8 W/kg or all test positions are measured.

(2) For WLAN 2.4 GHz, the highest measured maximum output power channel for DSSS was selected for SAR measurement. When the reported SAR is <= 0.8 W/kg, no further SAR testing is required. Otherwise, SAR is evaluated at the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel. For OFDM modes (802.11g/n), SAR is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and it is <= 1.2 W/kg.

(3) For WLAN 5 GHz, the initial test configuration was selected according to the transmission mode with the highest maximum output power. When the reported SAR of initial test configuration is > 0.8 W/kg, SAR is required for the subsequent highest measured output power channel until the reported SAR result is <= 1.2 W/kg or all required channels are measured. For other transmission modes, SAR is not required when the highest reported SAR for initial test configuration is adjusted by the ratio of subsequent test configuration to initial test configuration specified maximum output power and it is <= 1.2 W/kg.

(4) For WLAN MIMO mode, the power-based standalone SAR test exclusion or the sum of SAR provision in KDB 447498 to determine simultaneous transmission SAR test exclusion should be applied. Otherwise, SAR for MIMO mode will be measured with all applicable antennas transmitting simultaneously at the specified maximum output power of MIMO operation.

4.6.2 SAR Results for Head Exposure Condition

Plot No.	Band	Mode	Test Position	Ch.	Power Reduction	Duty Cycle %	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Duty Cycle Scaling Factor	Tune-up Scaling Factor	Scaled SAR-1g (W/kg)
	WLAN2.4G	802.11b	Right Cheek	1	Receiver on	99.57	19.50	18.78	-0.17	0.269	1.004	1.180	0.32
	WLAN2.4G	802.11b	Right Tilted	1	Receiver on	99.57	19.50	18.78	-0.03	0.164	1.004	1.180	0.19
	WLAN2.4G	802.11b	Left Cheek	1	Receiver on	99.57	19.50	18.78	0.01	0.739	1.004	1.180	0.88
	WLAN2.4G	802.11b	Left Tilted	1	Receiver on	99.57	19.50	18.78	-0.04	0.496	1.004	1.180	0.59
P01	WLAN2.4G	802.11b	Left Cheek	11	Receiver on	99.57	19.50	18.64	-0.04	0.797	1.004	1.219	**0.98**
	WLAN5G	802.11a	Right Cheek	60	N/A	96.88	18.00	17.17	-0.06	0.172	1.032	1.211	0.21
	WLAN5G	802.11a	Right Tilted	60	N/A	96.88	18.00	17.17	-0.03	0.189	1.032	1.211	0.24
P02	WLAN5G	802.11a	Left Cheek	60	N/A	96.88	18.00	17.17	0.00	0.525	1.032	1.211	**0.66**
	WLAN5G	802.11a	Left Tilted	60	N/A	96.88	18.00	17.17	0.13	0.509	1.032	1.211	0.64
	WLAN5G	802.11a	Right Cheek	116	N/A	96.88	18.00	16.74	0.05	0.173	1.032	1.337	0.24
	WLAN5G	802.11a	Right Tilted	116	N/A	96.88	18.00	16.74	-0.06	0.186	1.032	1.337	0.26
P03	WLAN5G	802.11a	Left Cheek	116	N/A	96.88	18.00	16.74	0.00	0.733	1.032	1.337	**1.01**
	WLAN5G	802.11a	Left Tilted	116	N/A	96.88	18.00	16.74	0.16	0.565	1.032	1.337	0.78
	WLAN5G	802.11a	Left Cheek	124	N/A	96.88	18.00	16.70	-0.14	0.712	1.032	1.349	0.99
	WLAN5G	802.11a	Right Cheek	157	N/A	96.88	18.00	16.34	-0.05	0.126	1.032	1.466	0.19
	WLAN5G	802.11a	Right Tilted	157	N/A	96.88	18.00	16.34	-0.09	0.143	1.032	1.466	0.22
P04	WLAN5G	802.11a	Left Cheek	157	N/A	96.88	18.00	16.34	0.06	0.533	1.032	1.466	**0.81**
	WLAN5G	802.11a	Left Tilted	157	N/A	96.88	18.00	16.34	-0.08	0.489	1.032	1.466	0.74
	WLAN5G	802.11a	Left Cheek	165	N/A	96.88	18.00	16.34	0.19	0.512	1.032	1.466	0.77
	BT	GFSK	Right Cheek	39	N/A	76.91	12.00	10.67	-0.12	0.029	1.300	1.358	0.05
	BT	GFSK	Right Tilted	39	N/A	76.91	12.00	10.67	-0.11	0.019	1.300	1.358	0.03
P05	BT	GFSK	Left Cheek	39	N/A	76.91	12.00	10.67	0.01	0.092	1.300	1.358	**0.16**
	BT	GFSK	Left Tilted	39	N/A	76.91	12.00	10.67	-0.14	0.070	1.300	1.358	0.12

4.6.1 SAR Results for Body Exposure Condition (Separation Distance is 0 cm Gap)

Plot No.	Band	Mode	Test Position	Separation Distance (cm)	Ch.	Power Reduction	Duty Cycle %	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Duty Cycle Scaling Factor	Tune-up Scaling Factor	Scaled SAR-1g (W/kg)
P06	WLAN2.4G	802.11b	Rear Face	0	1	Sensor on	99.57	13.50	12.75	-0.05	0.905	1.004	1.189	**1.08**
	WLAN2.4G	802.11b	Right Side	0	1	Sensor on	99.57	13.50	12.75	0.16	0.493	1.004	1.189	0.59
	WLAN2.4G	802.11b	Top Side	0	1	Sensor on	99.57	13.50	12.75	0.10	0.177	1.004	1.189	0.21
	WLAN2.4G	802.11b	Rear Face	0	11	Sensor on	99.57	13.50	12.59	-0.15	0.861	1.004	1.233	1.07
	WLAN2.4G	802.11b	Rear Face	1.5	1	N/A	99.57	20.00	19.30	-0.01	0.253	1.004	1.175	0.30
	WLAN2.4G	802.11b	Right Side	1	1	N/A	99.57	20.00	19.30	0.09	0.303	1.004	1.175	0.36
	WLAN2.4G	802.11b	Top Side	1.5	1	N/A	99.57	20.00	19.30	-0.02	0.098	1.004	1.175	0.12
P07	WLAN5G	802.11a	Rear Face	0	60	Sensor on	96.88	11.00	10.21	0.00	0.714	1.032	1.199	**0.88**
	WLAN5G	802.11a	Right Side	0	60	Sensor on	96.88	11.00	10.21	0.17	0.135	1.032	1.199	0.17
	WLAN5G	802.11a	Top Side	0	60	Sensor on	96.88	11.00	10.21	-0.17	0.336	1.032	1.199	0.42
	WLAN5G	802.11a	Rear Face	0	52	Sensor on	96.88	11.00	10.13	0.01	0.654	1.032	1.222	0.82
	WLAN5G	802.11a	Rear Face	1.5	60	N/A	96.88	18.00	17.17	-0.15	0.317	1.032	1.211	0.40
	WLAN5G	802.11a	Right Side	1	60	N/A	96.88	18.00	17.17	0.04	0.277	1.032	1.211	0.35
	WLAN5G	802.11a	Top Side	1.5	60	N/A	96.88	18.00	17.17	-0.06	0.204	1.032	1.211	0.25
P08	WLAN5G	802.11a	Rear Face	0	116	Sensor on	96.88	9.50	8.25	0.00	0.620	1.032	1.334	**0.85**
	WLAN5G	802.11a	Right Side	0	116	Sensor on	96.88	9.50	8.25	0.07	0.158	1.032	1.334	0.22
	WLAN5G	802.11a	Top Side	0	116	Sensor on	96.88	9.50	8.25	-0.08	0.180	1.032	1.334	0.25
	WLAN5G	802.11a	Rear Face	0	100	Sensor on	96.88	9.50	8.21	0.12	0.583	1.032	1.346	0.81
	WLAN5G	802.11a	Rear Face	1.5	116	N/A	96.88	18.00	16.74	-0.09	0.426	1.032	1.337	0.59
	WLAN5G	802.11a	Right Side	1	116	N/A	96.88	18.00	16.74	-0.04	0.284	1.032	1.337	0.39
	WLAN5G	802.11a	Top Side	1.5	116	N/A	96.88	18.00	16.74	0.14	0.220	1.032	1.337	0.30
P09	WLAN5G	802.11a	Rear Face	0	157	Sensor on	96.88	9.50	7.85	0.00	0.548	1.032	1.462	**0.83**
	WLAN5G	802.11a	Right Side	0	157	Sensor on	96.88	9.50	7.85	0.16	0.211	1.032	1.462	0.32
	WLAN5G	802.11a	Top Side	0	157	Sensor on	96.88	9.50	7.85	-0.03	0.297	1.032	1.462	0.45
	WLAN5G	802.11a	Rear Face	0	165	Sensor on	96.88	9.50	7.83	-0.04	0.508	1.032	1.469	0.77
	WLAN5G	802.11a	Rear Face	1.5	157	N/A	96.88	18.00	16.34	-0.10	0.322	1.032	1.466	0.49
	WLAN5G	802.11a	Right Side	1	157	N/A	96.88	18.00	16.34	0.12	0.307	1.032	1.466	0.46
	WLAN5G	802.11a	Top Side	1.5	157	N/A	96.88	18.00	16.34	0.03	0.248	1.032	1.466	0.38
P10	BT	GFSK	Rear Face	0	39	N/A	76.91	12.00	10.67	-0.04	0.398	1.300	1.358	**0.70**
	BT	GFSK	Right Side	0	39	N/A	76.91	12.00	10.67	0.14	0.200	1.300	1.358	0.35

Plot No.	Band	Mode	Test Position	Separation Distance (cm)	Ch.	Power Reduction	Duty Cycle %	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Duty Cycle Scaling Factor	Tune-up Scaling Factor	Scaled SAR-1g (W/kg)
	BT	GFSK	Top Side	0	39	N/A	76.91	12.00	10.67	0.12	0.132	1.300	1.358	0.23

Note:
1. SAR testing for WLAN / BT was performed on the maximum power mode.

4.6.2 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.

Band	Test Position	Ch.	Original Measured SAR-1g (W/kg)	1st Repeated SAR-1g (W/kg)	L/S Ratio	2nd Repeated SAR-1g (W/kg)	L/S Ratio	3rd Repeated SAR-1g (W/kg)	L/S Ratio
WLAN2.4G	Rear Face	1	0.905	0.899	1.007	N/A	N/A	N/A	N/A

4.6.3 Simultaneous Multi-band Transmission Evaluation

<Simultaneous Transmission Possibilities>

The simultaneous transmission possibilities for this device are listed as below.

Simultaneous TX Combination	Capable Transmit Configurations	Head	Body
1	WLAN5G + BT	Yes	Yes

<SAR Summation Analysis>

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 SPLSR.

Head exposure condition:

Exposure Position	1	2	3	2+3 Summed 1g SAR (W/kg)
	2.4GHz WLAN	5GHz WLAN	Bluetooth	
	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	
Right Cheek	0.319	0.239	0.051	**0.29**
Right Tilted	0.194	0.257	0.034	**0.29**
Left Cheek	0.976	1.011	0.163	**1.17**
Left Tilted	0.588	0.779	0.124	**0.90**

Body exposure condition:

Exposure Position	1	2	3	2+3 Summed 1g SAR (W/kg)
	2.4GHz WLAN	5GHz WLAN	Bluetooth	
	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	
Rear face	0.854	0.884	0.703	**1.59**
Right side	0.465	0.464	0.353	**0.82**
Top side	0.280	0.448	0.233	**0.68**

Summary:

The SAR summation of maximum SAR of BT and WLAN for each position is under the SAR limitation (**1.6 W/kg for Head and body**). Therefore, the simultaneous transmission condition is compliance with the SAR criterion.

Test Engineer： Jerry Chen and Rikou Lu

5. Calibration of Test Equipment

Equipment	Manufacturer	Model	SN	Cal. Data	Due Data
System Validation Dipole	SPEAG	D2600V2	1110	Sep. 16, 2021	Sep. 15, 2024
System Validation Dipole	SPEAG	D5GHzV2	1133	Sep. 14, 2021	Sep. 13, 2024
Dosimetric E-Field Probe	SPEAG	EX3DV4	3873	Aug. 22, 2023	Aug. 21, 2024
Data Acquisition Electronics	SPEAG	DAE4	1389	Nov. 03, 2023	Nov. 02, 2024
Dielectric Probe Kit	SPEAG	DAK-3.5	1076	Aug. 17, 2023	Aug. 16, 2024
ENA Series Network Analyzer	Agilent	E5071C	MY46214638	Apr. 28, 2024	Apr. 27, 2025
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510355	Jan. 31, 2024	Jan. 30, 2025
MXG Analog Signal Generator	KEYSIGHT	N5183A	MY50143024	Jan. 31, 2024	Jan. 30, 2025
Power Meter	Agilent	N1914A	MY52180044	Jan. 30, 2024	Jan. 29, 2025
Power Sensor	Agilent	E9304A H18	MY52050011	Jan. 30, 2024	Jan. 29, 2025
Power Meter	ANRITSU	ML2495A	1506002	Jan. 30, 2024	Jan. 29, 2025
Power Sensor	ANRITSU	MA2411B	1339353	Jan. 30, 2024	Jan. 29, 2025
Temp. & Humi. Recorder	HUATO	A2000TH	HE20107712	Apr. 29, 2024	Apr. 28, 2025
Electronic Thermometer	YONGFA	YF-160A	120100323	Apr. 29, 2024	Apr. 28, 2025
Coupler	Woken	0110A056020-10	COM27RW1A3	May. 20, 2024	May. 19, 2025

Note:

1. Referring to KDB 865664 D01 v01r04, the dipole calibration interval can be extended to 3 years with justification. The dipole are also not physically damaged, or repaired during the interval. The dipole justification can be found in appendix C.
   The return loss is ＜ -20dB, within 20% of prior calibration, the impedance is with 5ohm of prior calibration.

6. Measurement Uncertainty

DASY5 Uncertainty Budget								
Error Description	**Uncertainty Value (±%)**	**Probability**	**Divisor**	**(Ci) 1g**	**(Ci) 10g**	**Standard Uncertainty (1g) (±%)**	**Standard Uncertainty (10g) (±%)**	**(Vi) Veff**
Measurement System								
Probe Calibration	6.0	N	1	1	1	6.0	6.0	∞
Axial Isotropy	4.7	R	1.732	0.7	0.7	1.9	1.9	∞
Hemispherical Isotropy	9.6	R	1.732	0.7	0.7	3.9	3.9	∞
Boundary Effects	1.0	R	1.732	1	1	0.6	0.6	∞
Linearity	4.7	R	1.732	1	1	2.7	2.7	∞
System Detection Limits	1.0	R	1.732	1	1	0.6	0.6	∞
Modulation Response	3.2	R	1.732	1	1	1.8	1.8	∞
Readout Electronics	0.3	N	1	1	1	0.3	0.3	∞
Response Time	0.0	R	1.732	1	1	0.0	0.0	∞
Integration Time	2.6	R	1.732	1	1	1.5	1.5	∞
RF Ambient Noise	3.0	R	1.732	1	1	1.7	1.7	∞
RF Ambient Reflections	3.0	R	1.732	1	1	1.7	1.7	∞
Probe Positioner	0.4	R	1.732	1	1	0.2	0.2	∞
Probe Positioning	2.9	R	1.732	1	1	1.7	1.7	∞
Max. SAR Eval.	2.0	R	1.732	1	1	1.2	1.2	∞
Test Sample Related								
Device Positioning	3.0	N	1	1	1	3.0	3.0	35
Device Holder	3.6	N	1	1	1	3.6	3.6	12
Power Drift	5.0	R	1.732	1	1	2.9	2.9	∞
Power Scaling	0.0	R	1.732	1	1	0.0	0.0	∞
Phantom and Setup								
Phantom Uncertainty	6.1	R	1.732	1	1	3.5	3.5	∞
SAR correction	0.0	R	1.732	1	0.84	0.0	0.0	∞
Liquid Conductivity Repeatability	0.2	N	1	0.78	0.71	0.1	0.1	5
Liquid Conductivity (target)	5.0	R	1.732	0.78	0.71	2.3	2.0	∞
Liquid Conductivity (mea.)	2.5	R	1.732	0.78	0.71	1.1	1.0	∞
Temp. unc. - Conductivity	3.4	R	1.732	0.78	0.71	1.5	1.4	∞
Liquid Permittivity Repeatability	0.15	N	1	0.23	0.26	0.0	0.0	5
Liquid Permittivity (target)	5.0	R	1.732	0.23	0.26	0.7	0.8	∞
Liquid Permittivity (mea.)	2.5	R	1.732	0.23	0.26	0.3	0.4	∞
Temp. unc. - Permittivity	0.83	R	1.732	0.23	0.26	0.1	0.1	∞
Combined Std. Uncertainty						11.4%	11.4%	1013
Coverage Factor for 95 %						K=2	K=2	
Expanded STD Uncertainty						22.9%	22.7%	

Uncertainty budget for frequency range 30 MHz to 3 GHz

DASY5 Uncertainty Budget								
Error Description	**Uncertainty Value (±%)**	**Probability**	**Divisor**	**(Ci) 1g**	**(Ci) 10g**	**Standard Uncertainty (1g) (±%)**	**Standard Uncertainty (10g) (±%)**	**(Vi) Veff**
Measurement System								
Probe Calibration	6.55	N	1	1	1	6.5	6.5	∞
Axial Isotropy	4.7	R	1.732	0.7	0.7	1.9	1.9	∞
Hemispherical Isotropy	9.6	R	1.732	0.7	0.7	3.9	3.9	∞
Boundary Effects	2.0	R	1.732	1	1	1.2	1.2	∞
Linearity	4.7	R	1.732	1	1	2.7	2.7	∞
System Detection Limits	1.0	R	1.732	1	1	0.6	0.6	∞
Modulation Response	3.2	R	1.732	1	1	1.8	1.8	∞
Readout Electronics	0.3	N	1	1	1	0.3	0.3	∞
Response Time	0.0	R	1.732	1	1	0.0	0.0	∞
Integration Time	2.6	R	1.732	1	1	1.5	1.5	∞
RF Ambient Noise	3.0	R	1.732	1	1	1.7	1.7	∞
RF Ambient Reflections	3.0	R	1.732	1	1	1.7	1.7	∞
Probe Positioner	0.4	R	1.732	1	1	0.2	0.2	∞
Probe Positioning	6.7	R	1.732	1	1	3.9	3.9	∞
Max. SAR Eval.	4.0	R	1.732	1	1	2.3	2.3	∞
Test Sample Related								
Device Positioning	3.0	N	1	1	1	3.0	3.0	35
Device Holder	3.6	N	1	1	1	3.6	3.6	12
Power Drift	5.0	R	1.732	1	1	2.9	2.9	∞
Power Scaling	0.0	R	1.732	1	1	0.0	0.0	∞
Phantom and Setup								
Phantom Uncertainty	6.6	R	1.732	1	1	3.8	3.8	∞
SAR correction	0.0	R	1.732	1	0.84	0.0	0.0	∞
Liquid Conductivity Repeatability	0.2	N	1	0.78	0.71	0.1	0.1	5
Liquid Conductivity (target)	5.0	R	1.732	0.78	0.71	2.3	2.0	∞
Liquid Conductivity (mea.)	2.5	R	1.732	0.78	0.71	1.1	1.0	∞
Temp. unc. - Conductivity	3.4	R	1.732	0.78	0.71	1.5	1.4	∞
Liquid Permittivity Repeatability	0.15	N	1	0.23	0.26	0.0	0.0	5
Liquid Permittivity (target)	5.0	R	1.732	0.23	0.26	0.7	0.8	∞
Liquid Permittivity (mea.)	2.5	R	1.732	0.23	0.26	0.3	0.4	∞
Temp. unc. - Permittivity	0.83	R	1.732	0.23	0.26	0.1	0.1	∞
Combined Std. Uncertainty						12.5%	12.5%	1458
Coverage Factor for 95 %						K=2	K=2	
Expanded STD Uncertainty						25.0%	24.9%	

Uncertainty budget for frequency range 3 GHz to 6 GHz

7. Information on the Testing Laboratories

We, BV 7LAYERS COMMUNICATIONS TECHNOLOGY (SHENZHEN) CO. LTD., were founded in 2015 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Add: No. Room B37, Warehouse A5, No.3 Chiwan 4th Road, Zhaoshang Street, Nanshan district, Shenzhen, P.R.C
Tel: 86-755-8869-6566
Fax: 86-755-8869-6577

Email: customerservice.sw@cn.bureauveritas.com
Web Site: www.bureauveritas.com

The road map of all our labs can be found in our web site also.

---END---

Appendix A. SAR Plots of System Verification

The plots for system verification with largest deviation for each SAR system combination are shown as follows.

Test Laboratory: BV 7LAYERS SAR/HAC Testing Lab Date: 2024/05/20

System Check_HSL2450_20240520

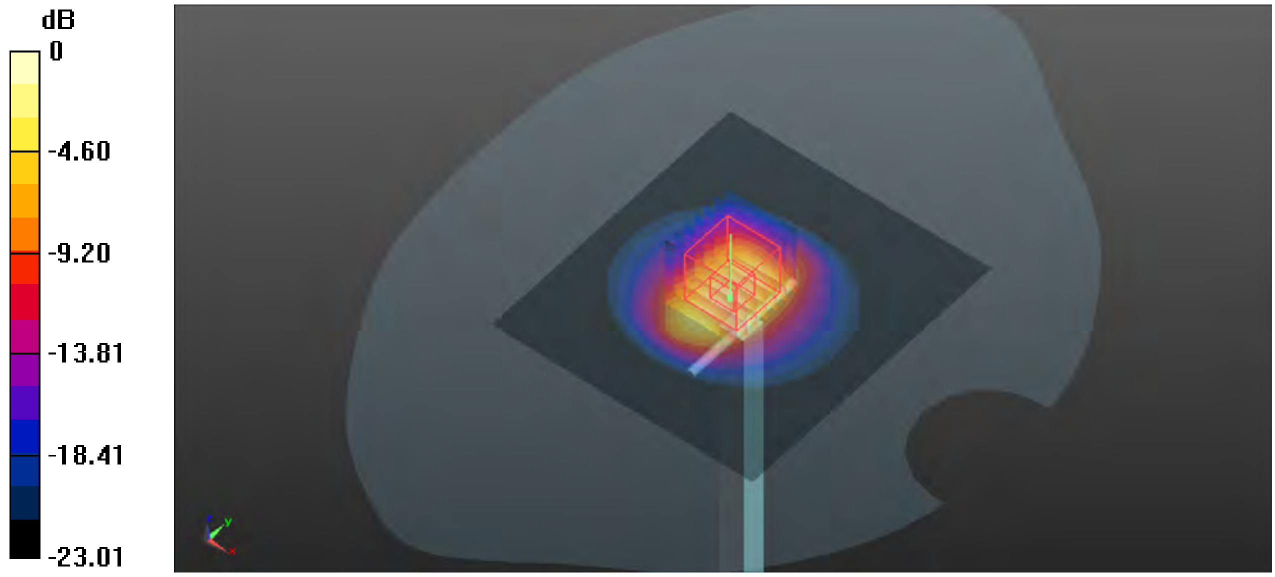
DUT: Dipole:2450 MHz;Type:D2450V2

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: HSL2450_0520 Medium parameters used: f = 2450 MHz; σ = 1.854 S/m; ε_r = 37.997; ρ = 1000 kg/m^3
Ambient Temperature：23.4℃; Liquid Temperature：22.6℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(7.62, 7.65, 7.52) @ 2450 MHz; Calibrated: 2023/08/22
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2023/11/03
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD; Serial: TP:1781
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Pin=250mW/Area Scan (91x101x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 24.8 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 111.22 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 30.9 W/kg
SAR(1 g) = 14.2 W/kg; SAR(10 g) = 6.33 W/kg
Smallest distance from peaks to all points 3 dB below = 9 mm
Ratio of SAR at M2 to SAR at M1 = 47.6%
Maximum value of SAR (measured) = 24.7 W/kg



0 dB = 24.7 W/kg

Test Laboratory: BV 7LAYERS SAR/HAC Testing Lab Date: 2024/05/20

System Check_HSL5250_20240520

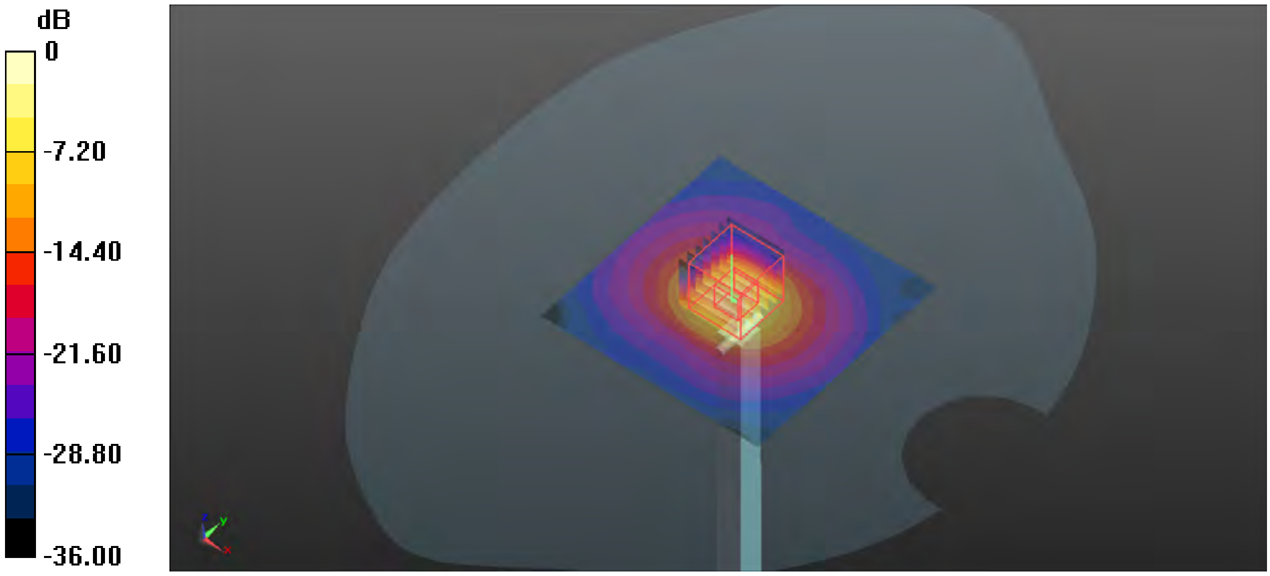
DUT: Dipole 5GHzV2;Type:D5GHzV2

Communication System: CW; Frequency: 5250 MHz;Duty Cycle: 1:1
Medium: HSL5G_0520 Medium parameters used: f = 5250 MHz; σ = 4.684 S/m; ε_r = 35.341; ρ = 1000 kg/m^3
Ambient Temperature：23.4℃; Liquid Temperature：22.3℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(5.05, 4.95, 5.04) @ 5250 MHz; Calibrated: 2023/08/22
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2023/11/03
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD; Serial: TP:1781
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 16.3 W/kg

Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 61.95 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 35.1 W/kg
SAR(1 g) = 7.48 W/kg; SAR(10 g) = 2.23 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 54.4%
Maximum value of SAR (measured) = 17.8 W/kg



0 dB = 17.8 W/kg

Test Laboratory: BV 7LAYERS SAR/HAC Testing Lab   Date: 2024/05/21

System Check_HSL5600_20240521

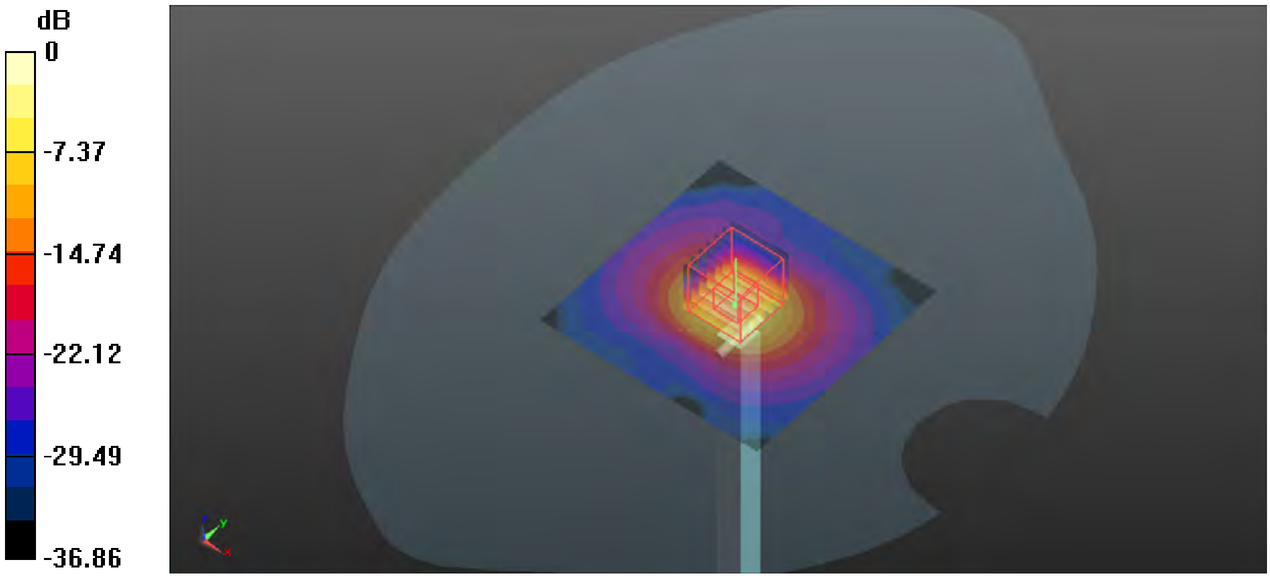
DUT: Dipole 5GHzV2;Type:D5GHzV2

Communication System: CW; Frequency: 5600 MHz;Duty Cycle: 1:1
Medium: HSL5G_0521 Medium parameters used: f = 5600 MHz; σ = 5.032 S/m; ε_r = 34.839; ρ = 1000 kg/m^3
Ambient Temperature：23.5℃; Liquid Temperature：22.5℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(4.65, 4.62, 4.65) @ 5600 MHz; Calibrated: 2023/08/22
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2023/11/03
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD; Serial: TP:1781
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 20.5 W/kg

Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 69.41 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 36.4 W/kg
SAR(1 g) = 8.54 W/kg; SAR(10 g) = 2.42 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 52.1%
Maximum value of SAR (measured) = 22.2 W/kg



0 dB = 22.2 W/kg

Test Laboratory: BV 7LAYERS SAR/HAC Testing Lab   Date: 2024/05/21

System Check_HSL5800_20240521

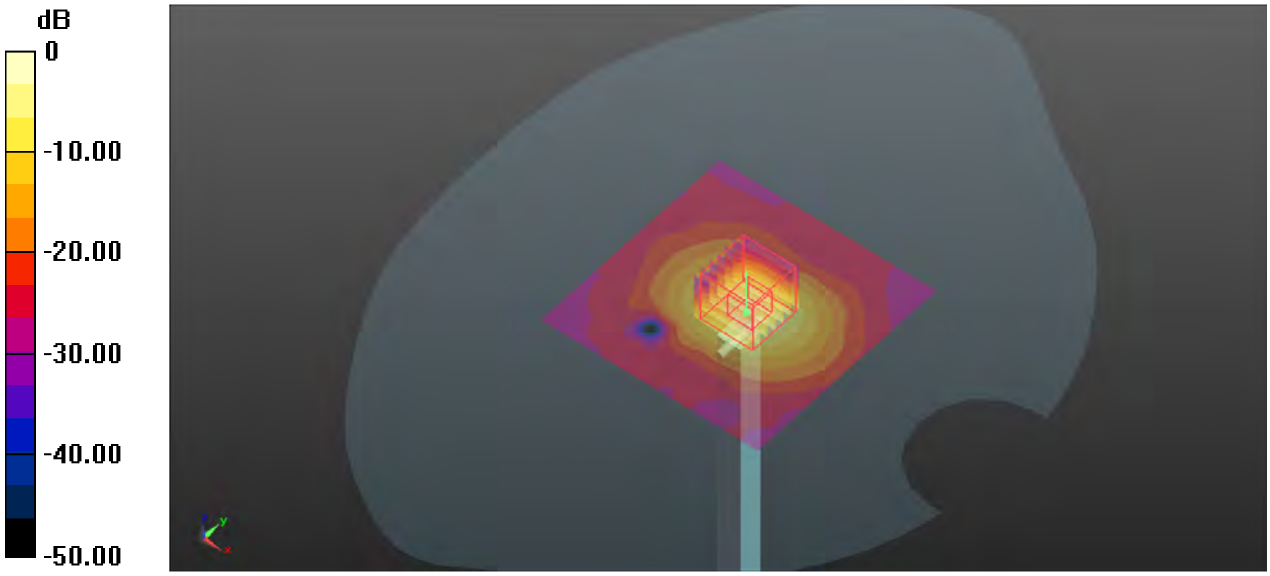
DUT: Dipole 5GHzV2;Type:D5GHzV2

Communication System: CW; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: HSL5G_0521 Medium parameters used: f = 5800 MHz; σ = 5.24 S/m; ε_r = 34.551; ρ = 1000 kg/m^3
Ambient Temperature：23.3℃; Liquid Temperature：22.6℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(4.59, 4.56, 4.63) @ 5800 MHz; Calibrated: 2023/08/22
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2023/11/03
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD; Serial: TP:1781
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 12.4 W/kg

Pin=100mW/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 54.34 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 29.1 W/kg
SAR(1 g) = 8.41 W/kg; SAR(10 g) = 2.35 W/kg
Smallest distance from peaks to all points 3 dB below = 7.9 mm
Ratio of SAR at M2 to SAR at M1 = 52.9%
Maximum value of SAR (measured) = 13.7 W/kg



0 dB = 13.7 W/kg

Appendix B. SAR Plots of SAR Measurement

The SAR plots for highest measured SAR in each exposure configuration, wireless mode and frequency band combination are shown as follows.

Test Laboratory: BV 7LAYERS SAR/HAC Testing Lab Date: 2024/05/20

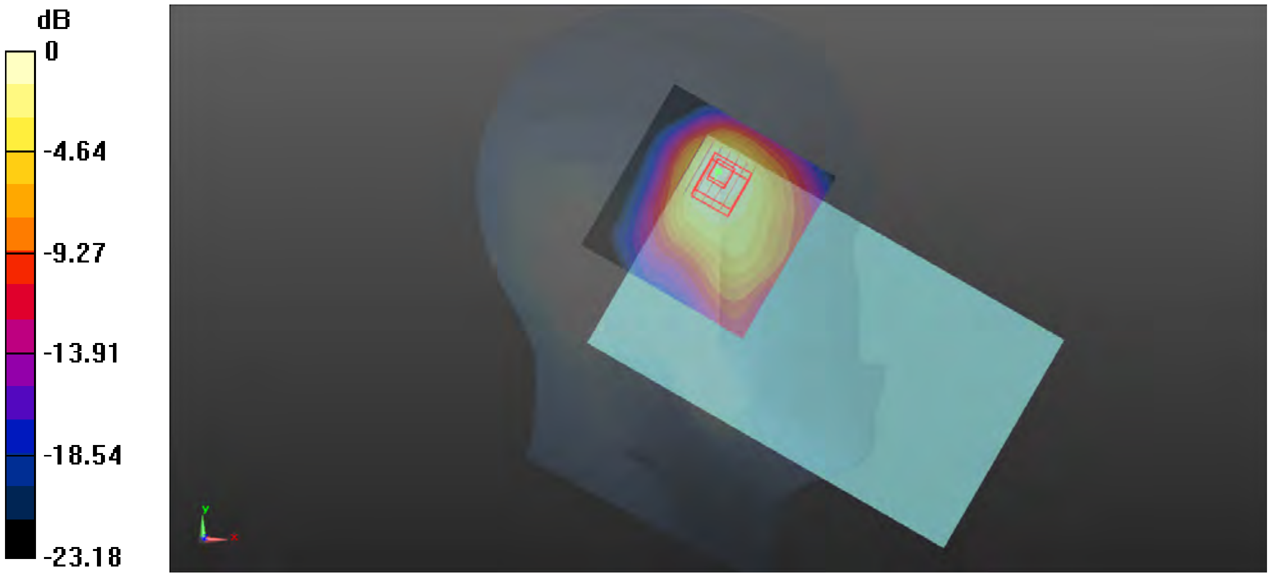
P01 WLAN2.4G_802.11b_Left Cheek_Ch11

Communication System: 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1.004
Medium: HSL2450_0520 Medium parameters used: f = 2462 MHz; σ = 1.868 S/m; ε_r = 37.944; ρ = 1000 kg/m^3
Ambient Temperature：23.4℃; Liquid Temperature：22.6℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(7.62, 7.65, 7.52) @ 2462 MHz; Calibrated: 2023/08/22
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2023/11/03
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD; Serial: TP:1781
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

- Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.24 W/kg

- Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.365 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.46 W/kg
SAR(1 g) = 0.797 W/kg; SAR(10 g) = 0.429 W/kg
Smallest distance from peaks to all points 3 dB below = 12 mm
Ratio of SAR at M2 to SAR at M1 = 53.2%
Maximum value of SAR (measured) = 1.14 W/kg



0 dB = 1.14 W/kg

Test Laboratory: BV 7LAYERS SAR/HAC Testing Lab   Date: 2024/05/20

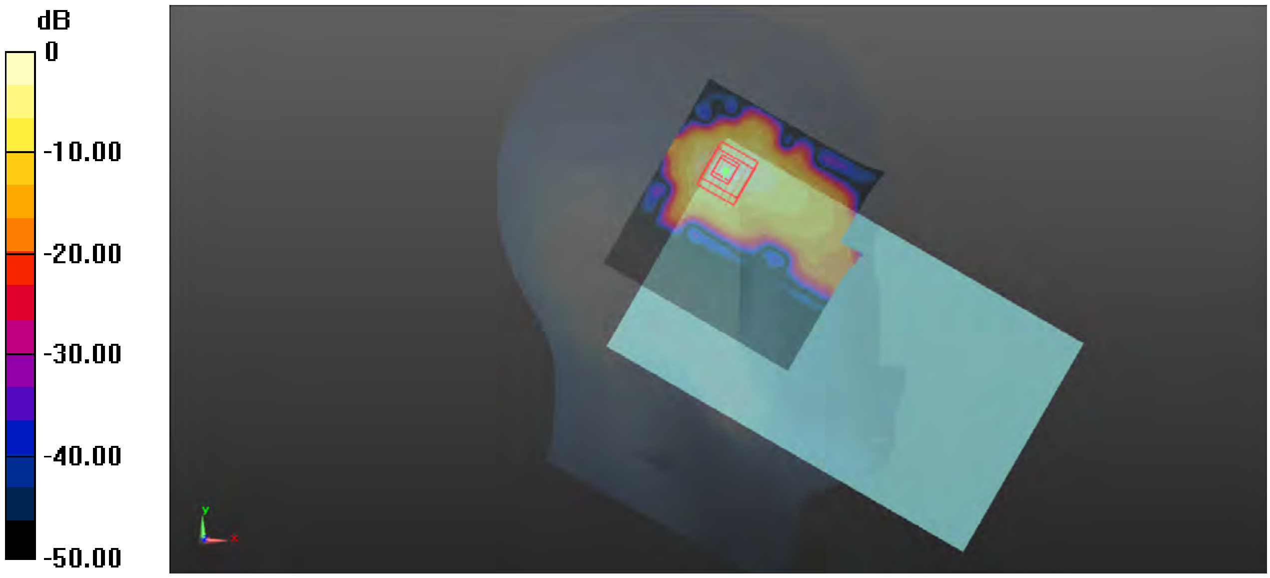
P02 WLAN5G_802.11a_Left Cheek_Ch60

Communication System: 802.11a; Frequency: 5300 MHz;Duty Cycle: 1:1.032
Medium: HSL5G_0520 Medium parameters used: f = 5300 MHz; σ = 4.735 S/m; ε_r = 35.259; ρ = 1000 kg/m^3
Ambient Temperature：23.4℃; Liquid Temperature：22.3℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(5.05, 4.95, 5.04) @ 5300 MHz; Calibrated: 2023/08/22
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2023/11/03
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD; Serial: TP:1781
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

- Area Scan (111x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.989 W/kg

- Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0.4230 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 2.17 W/kg
SAR(1 g) = 0.525 W/kg; SAR(10 g) = 0.160 W/kg
Smallest distance from peaks to all points 3 dB below = 5.8 mm
Ratio of SAR at M2 to SAR at M1 = 53.7%
Maximum value of SAR (measured) = 1.07 W/kg



0 dB = 1.07 W/kg

Test Laboratory: BV 7LAYERS SAR/HAC Testing Lab Date: 2024/05/21

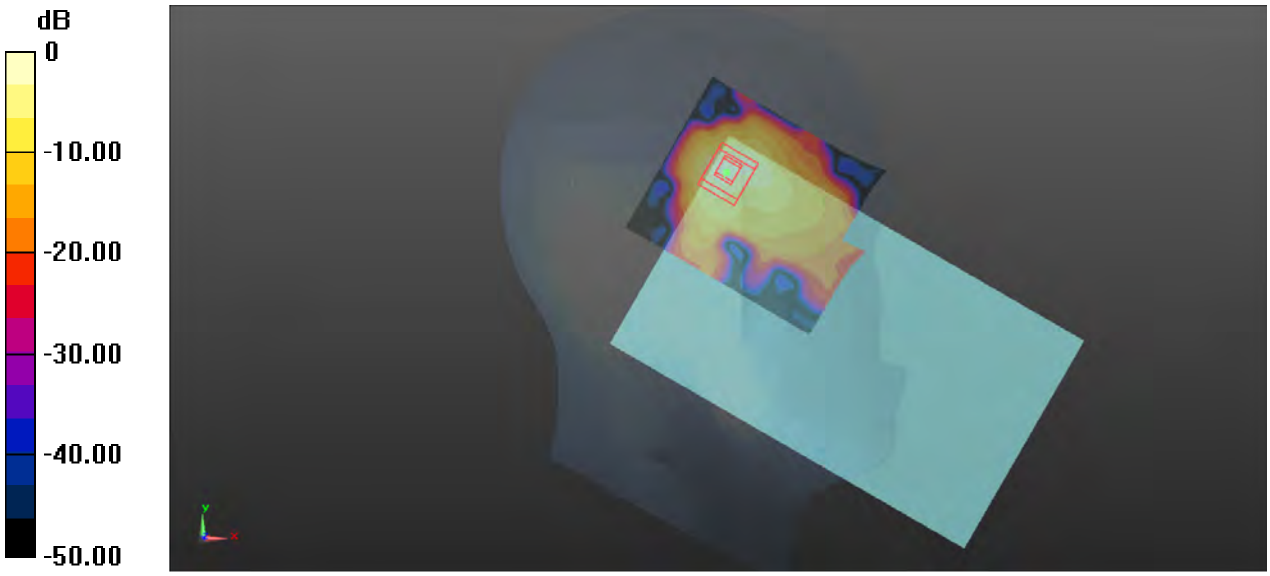
P03 WLAN5G_802.11a_Left Cheek_Ch116

Communication System: 802.11a; Frequency: 5580 MHz;Duty Cycle: 1:1.032
Medium: HSL5G_0521 Medium parameters used: f = 5580 MHz; σ = 5.012 S/m; ε_r = 34.863; ρ = 1000 kg/m^3
Ambient Temperature：23.5℃; Liquid Temperature：22.5℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(4.65, 4.62, 4.65) @ 5580 MHz; Calibrated: 2023/08/22
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2023/11/03
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD; Serial: TP:1781
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

- Area Scan (91x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.35 W/kg

- Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0.9560 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 3.31 W/kg
SAR(1 g) = 0.733 W/kg; SAR(10 g) = 0.215 W/kg
Smallest distance from peaks to all points 3 dB below = 5.7 mm
Ratio of SAR at M2 to SAR at M1 = 52%
Maximum value of SAR (measured) = 1.52 W/kg



0 dB = 1.52 W/kg

Test Laboratory: BV 7LAYERS SAR/HAC Testing Lab Date: 2024/05/21

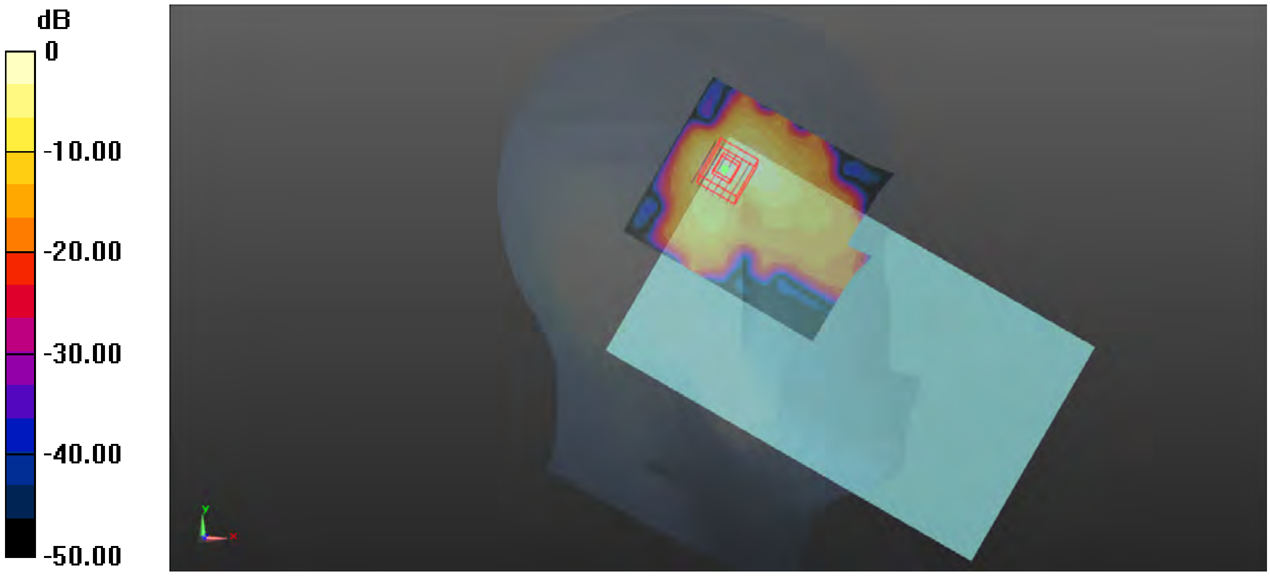
P04 WLAN5G_802.11a_Left Cheek_Ch157

Communication System: 802.11a; Frequency: 5785 MHz;Duty Cycle: 1:1.032
Medium: HSL5G_0521 Medium parameters used: f = 5785 MHz; σ = 5.22 S/m; ε_r = 34.574; ρ = 1000 kg/m^3
Ambient Temperature：23.3℃; Liquid Temperature：22.6℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(4.59, 4.56, 4.63) @ 5785 MHz; Calibrated: 2023/08/22
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2023/11/03
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD; Serial: TP:1781
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

- Area Scan (91x111x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.991 W/kg

- Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 1.248 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 2.44 W/kg
SAR(1 g) = 0.533 W/kg; SAR(10 g) = 0.153 W/kg
Smallest distance from peaks to all points 3 dB below = 5.7 mm
Ratio of SAR at M2 to SAR at M1 = 51.6%
Maximum value of SAR (measured) = 1.15 W/kg



0 dB = 1.15 W/kg

Test Laboratory: BV 7LAYERS SAR/HAC Testing Lab Date: 2024/05/20

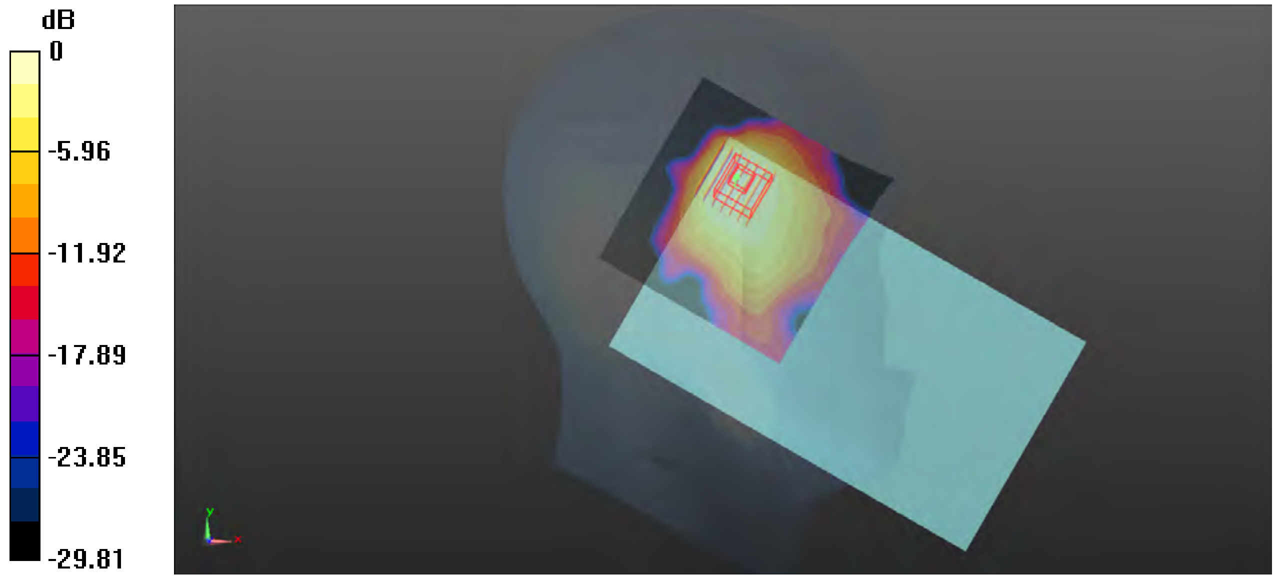
P05 BT_GFSK_Left Cheek_Ch0

Communication System: BT; Frequency: 2402 MHz;Duty Cycle: 1:1.3
Medium: HSL2450_0520 Medium parameters used: f = 2402 MHz; σ = 1.8 S/m; ε_r = 38.211; ρ = 1000 kg/m^3
Ambient Temperature：23.4℃; Liquid Temperature：22.6℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(7.62, 7.65, 7.52) @ 2402 MHz; Calibrated: 2023/08/22
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2023/11/03
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD; Serial: TP:1781
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

- Area Scan (91x91x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.141 W/kg

- Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.577 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.170 W/kg
SAR(1 g) = 0.092 W/kg; SAR(10 g) = 0.049 W/kg
Smallest distance from peaks to all points 3 dB below = 11.2 mm
Ratio of SAR at M2 to SAR at M1 = 52.6%
Maximum value of SAR (measured) = 0.131 W/kg



0 dB = 0.131 W/kg

Test Laboratory: BV 7LAYERS SAR/HAC Testing Lab Date: 2024/05/20

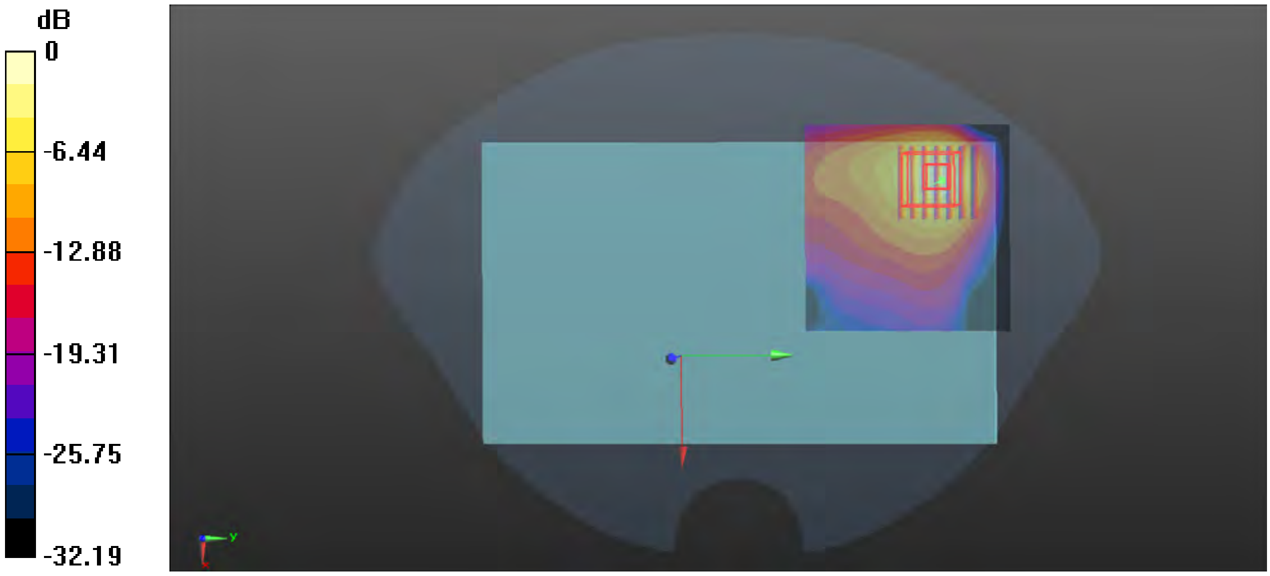
P06 WLAN2.4G_802.11b_Rear Face_0cm_Ch1

Communication System: 802.11b; Frequency: 2412 MHz;Duty Cycle: 1:1.004
Medium: HSL2450_0520 Medium parameters used: f = 2412 MHz; σ = 1.811 S/m; ε_r = 38.168; ρ = 1000 kg/m^3
Ambient Temperature：23.4℃; Liquid Temperature：22.6℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(7.62, 7.65, 7.52) @ 2412 MHz; Calibrated: 2023/08/22
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2023/11/03
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD; Serial: TP:1781
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

- Area Scan (71x71x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.59 W/kg

- Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.099 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 2.36 W/kg
SAR(1 g) = 0.905 W/kg; SAR(10 g) = 0.370 W/kg
Smallest distance from peaks to all points 3 dB below = 7.8 mm
Ratio of SAR at M2 to SAR at M1 = 37.7%
Maximum value of SAR (measured) = 1.55 W/kg



0 dB = 1.55 W/kg

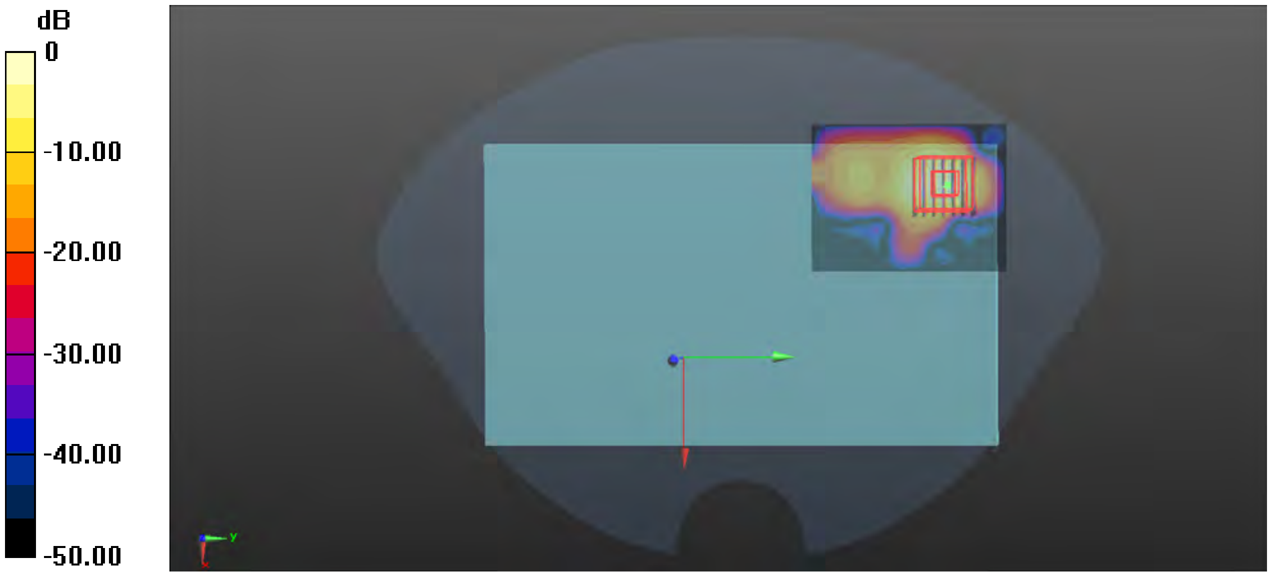
P07 WLAN5G_802.11a_Rear Face_0cm_Ch60

Communication System: 802.11a; Frequency: 5300 MHz;Duty Cycle: 1:1.032
Medium: HSL5G_0520 Medium parameters used: f = 5300 MHz; $\sigma = 4.735$ S/m; $\varepsilon_r = 35.259$; $\rho = 1000$ kg/m^3
Ambient Temperature：23.4℃; Liquid Temperature：22.3℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(5.05, 4.95, 5.04) @ 5300 MHz; Calibrated: 2023/08/22
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2023/11/03
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD; Serial: TP:1781
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

- Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 2.20 W/kg

- Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 3.77 W/kg
SAR(1 g) = 0.714 W/kg; SAR(10 g) = 0.196 W/kg
Smallest distance from peaks to all points 3 dB below = 5.4 mm
Ratio of SAR at M2 to SAR at M1 = 49.6%
Maximum value of SAR (measured) = 1.71 W/kg



0 dB = 1.71 W/kg

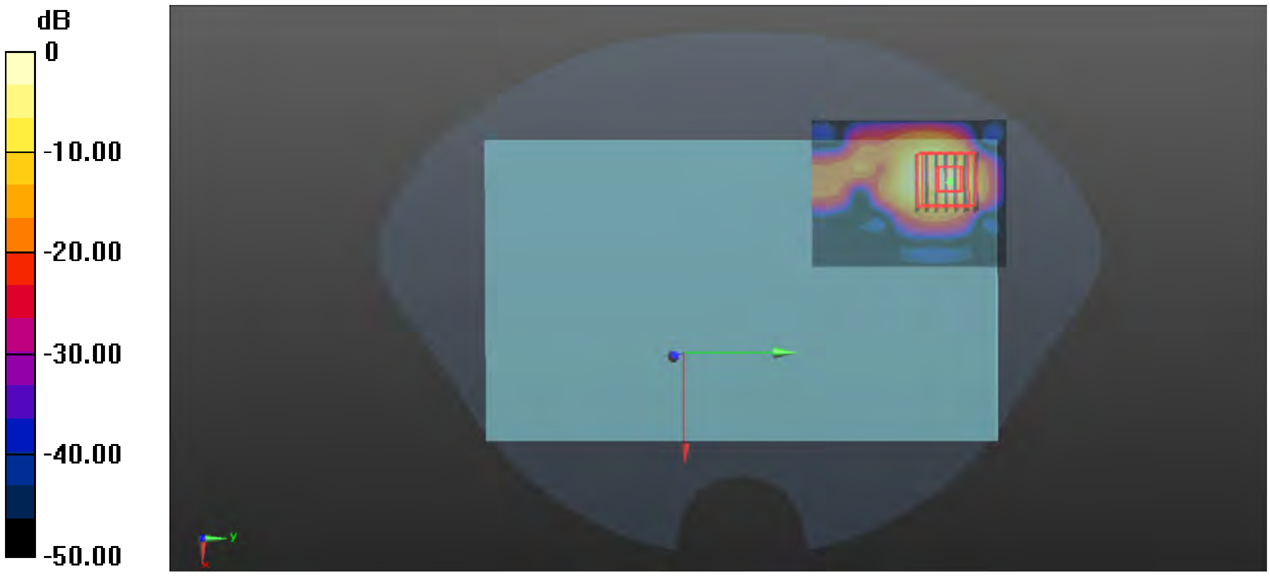
P08 WLAN5G_802.11a_Rear Face_0cm_Ch116

Communication System: 802.11a; Frequency: 5580 MHz;Duty Cycle: 1:1.032
Medium: HSL5G_0521 Medium parameters used: f = 5580 MHz; σ = 5.012 S/m; ε_r = 34.863; ρ = 1000 kg/m^3
Ambient Temperature：23.5℃; Liquid Temperature：22.5℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(4.65, 4.62, 4.65) @ 5580 MHz; Calibrated: 2023/08/22
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2023/11/03
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD; Serial: TP:1781
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

- Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.83 W/kg

- Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 4.76 W/kg
SAR(1 g) = 0.620 W/kg; SAR(10 g) = 0.178 W/kg
Smallest distance from peaks to all points 3 dB below = 4.7 mm
Ratio of SAR at M2 to SAR at M1 = 48.2%
Maximum value of SAR (measured) = 1.97 W/kg



0 dB = 1.97 W/kg

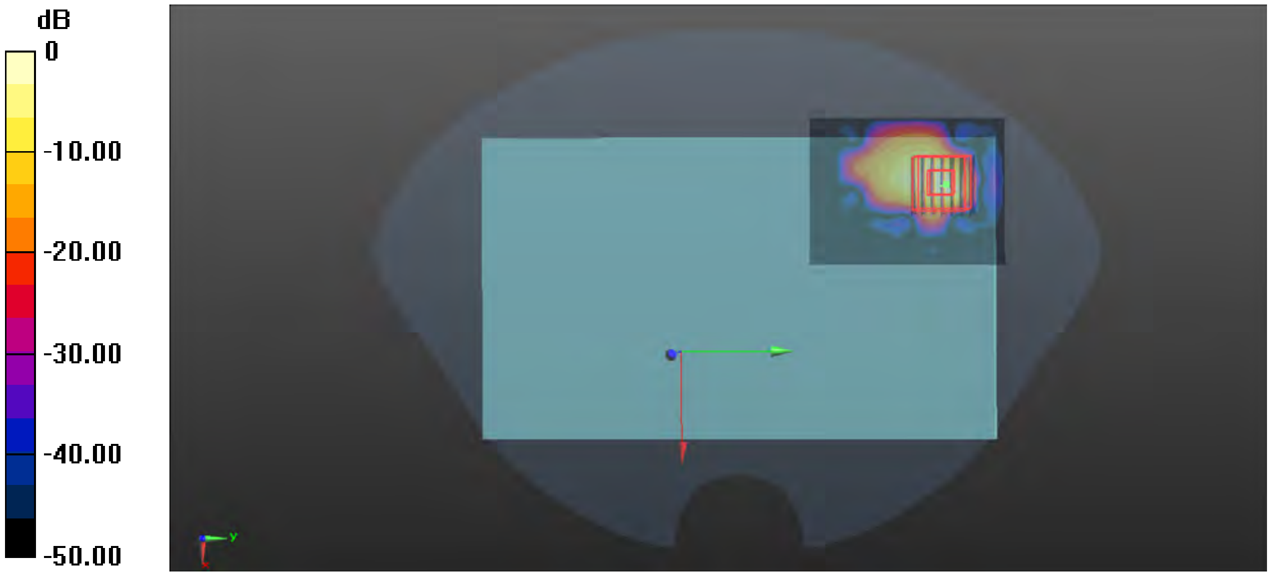
P09 WLAN5G_802.11a_Rear Face_0cm_Ch157

Communication System: 802.11a; Frequency: 5785 MHz;Duty Cycle: 1:1.032
Medium: HSL5G_0521 Medium parameters used: f = 5785 MHz; σ = 5.22 S/m; ε_r = 34.574; ρ = 1000 kg/m^3
Ambient Temperature：23.3℃; Liquid Temperature：22.6℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(4.59, 4.56, 4.63) @ 5785 MHz; Calibrated: 2023/08/22
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2023/11/03
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD; Serial: TP:1781
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

- Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.63 W/kg

- Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 3.30 W/kg
SAR(1 g) = 0.548 W/kg; SAR(10 g) = 0.116 W/kg
Smallest distance from peaks to all points 3 dB below = 4.3 mm
Ratio of SAR at M2 to SAR at M1 = 47.9%
Maximum value of SAR (measured) = 1.40 W/kg



0 dB = 1.40 W/kg

Test Laboratory: BV 7LAYERS SAR/HAC Testing Lab Date: 2024/05/20

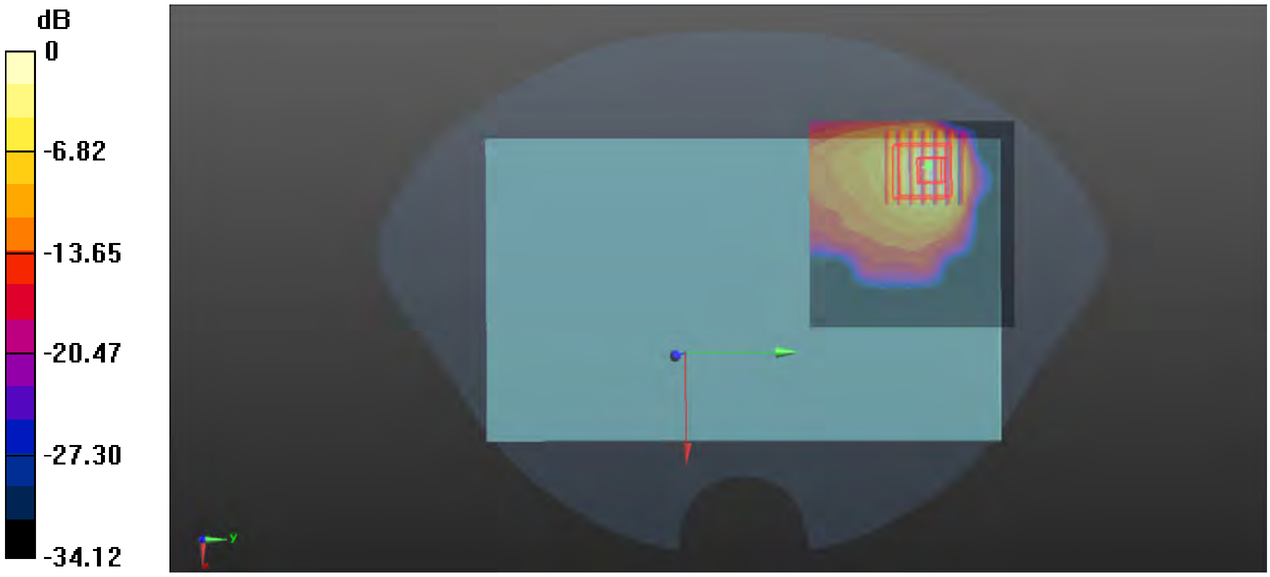
P10 BT_GFSK_Rear Face_0cm_Ch0

Communication System: BT; Frequency: 2402 MHz;Duty Cycle: 1:1.3
Medium: HSL2450_0520 Medium parameters used: f = 2402 MHz; σ = 1.8 S/m; ε_r = 38.211; ρ = 1000 kg/m^3
Ambient Temperature：23.4℃; Liquid Temperature：22.6℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(7.62, 7.65, 7.52) @ 2402 MHz; Calibrated: 2023/08/22
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2023/11/03
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD; Serial: TP:1781
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

- Area Scan (71x71x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.695 W/kg

- Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.6620 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.09 W/kg
SAR(1 g) = 0.419 W/kg; SAR(10 g) = 0.168 W/kg
Smallest distance from peaks to all points 3 dB below = 7.1 mm
Ratio of SAR at M2 to SAR at M1 = 44.2%
Maximum value of SAR (measured) = 0.663 W/kg



0 dB = 0.663 W/kg

Appendix C. Calibration Certificate for Probe and Dipole

The SPEAG calibration certificates are shown as follows.

In Collaboration with
s p e a g
CALIBRATION LABORATORY
Add: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191, Chi
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

中国认可
国际互认
校准
CALIBRATION
CNAS L0570

Client **B.V.ADT** **Certificate No: Z21-60338**

CALIBRATION CERTIFICATE

Object: D2450V2 - SN: 893

Calibration Procedure(s): FF-Z11-003-01
Calibration Procedures for dipole validation kits

Calibration date: September 18, 2021

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22±3)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	106277	23-Sep-20 (CTTL, No.J20X08336)	Sep-21
Power sensor NRP8S	104291	23-Sep-20 (CTTL, No.J20X08336)	Sep-21
Reference Probe EX3DV4	SN 7517	03-Feb-21(CTTL-SPEAG,No.Z21-60001)	Feb-22
DAE4	SN 1556	15-Jan-21(SPEAG,No.DAE4-1556_Jan21)	Jan-22
Secondary Standards	**ID #**	**Cal Date (Calibrated by, Certificate No.)**	**Scheduled Calibration**
Signal Generator E4438C	MY49071430	01-Feb-21 (CTTL, No.J21X00593)	Jan-22
NetworkAnalyzer E5071C	MY46110673	14-Jan-21 (CTTL, No.J21X00232)	Jan-22

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: September 26, 2021

In Collaboration with
speag
CALIBRATION LABORATORY
Add: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORMx,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016
c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010
d) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor k=2, which for a normal distribution Corresponds to a coverage probability of approximately 95%.

In Collaboration with
s p e a g
CALIBRATION LABORATORY
Add: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.9 ± 6 %	1.79 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.4 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**53.6 W/kg ± 18.8 % (*k*=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	6.10 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.4 W/kg ± 18.7 % (*k*=2)**

In Collaboration with
speag
CALIBRATION LABORATORY
Add: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	55.0Ω+ 6.26jΩ
Return Loss	- 22.4dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.069 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG

In Collaboration with
s p e a g
CALIBRATION LABORATORY

Add: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

DASY5 Validation Report for Head TSL Date: 09.18.2021

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 893

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium parameters used: f = 2450 MHz; σ = 1.79 S/m; ε_r = 38.85; ρ = 1000 kg/m^3

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7517; ConvF(7.34, 7.34, 7.34) @ 2450 MHz; Calibrated: 2021-02-03
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 2021-01-15
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

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

Reference Value = 108.0 V/m; Power Drift = -0.01 dB

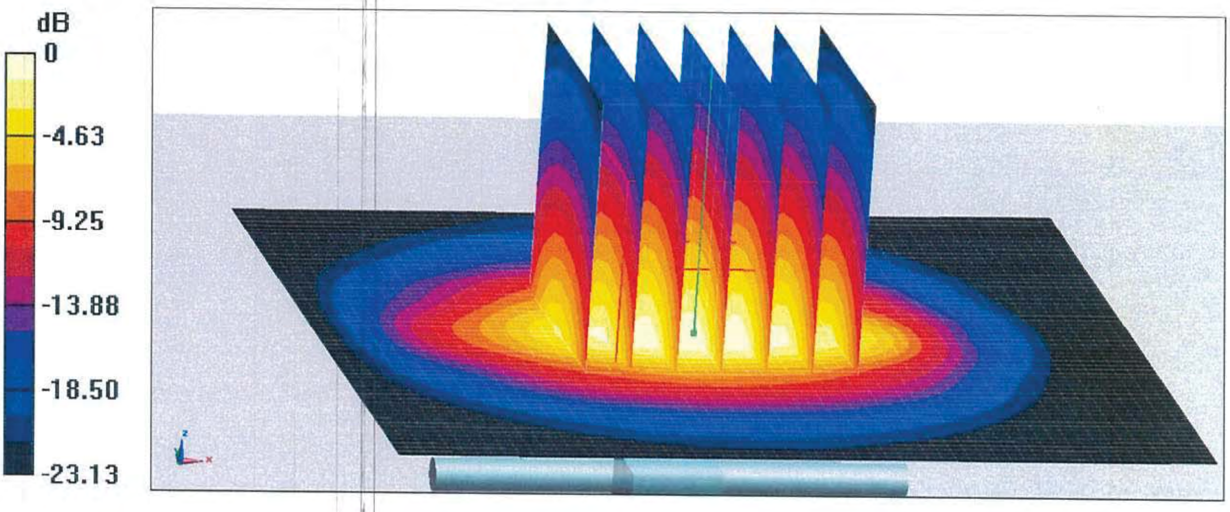
Peak SAR (extrapolated) = 28.3 W/kg

SAR(1 g) = 13.4 W/kg; SAR(10 g) = 6.1 W/kg

Smallest distance from peaks to all points 3 dB below = 9 mm

Ratio of SAR at M2 to SAR at M1 = 46.9%

Maximum value of SAR (measured) = 22.7 W/kg

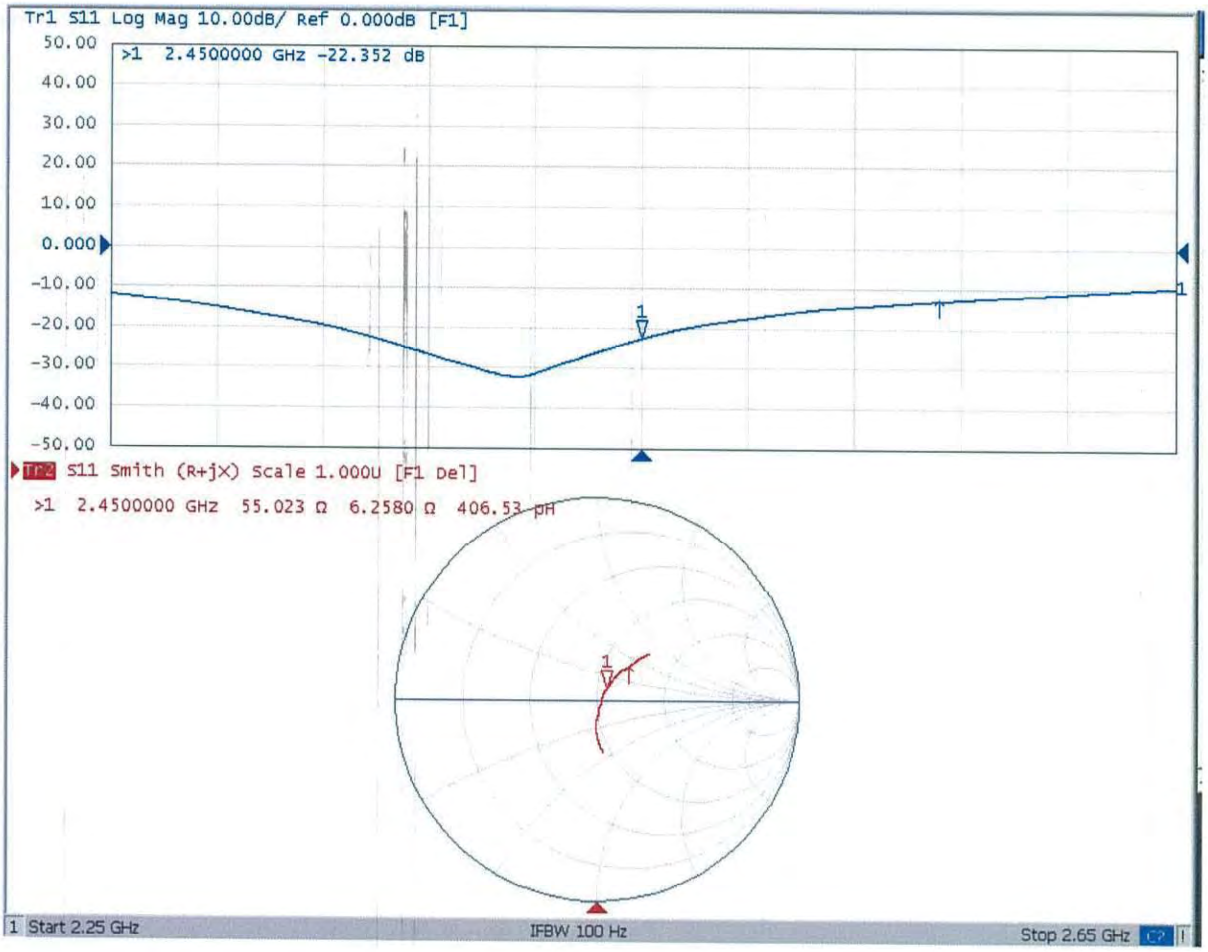


0 dB = 22.7 W/kg = 13.56 dBW/kg

In Collaboration with
s p e a g
CALIBRATION LABORATORY

Add: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Impedance Measurement Plot for Head TSL



D2450V2 - SN: 893 Extended Dipole Calibrations

Referring to KDB 865664 D01, if dipoles are verified in return loss (＜-20dB, within 20% of prior calibration), and in impedance (within 5 ohm of prior calibration), the annual calibration is not necessary and the calibration interval can be extended.

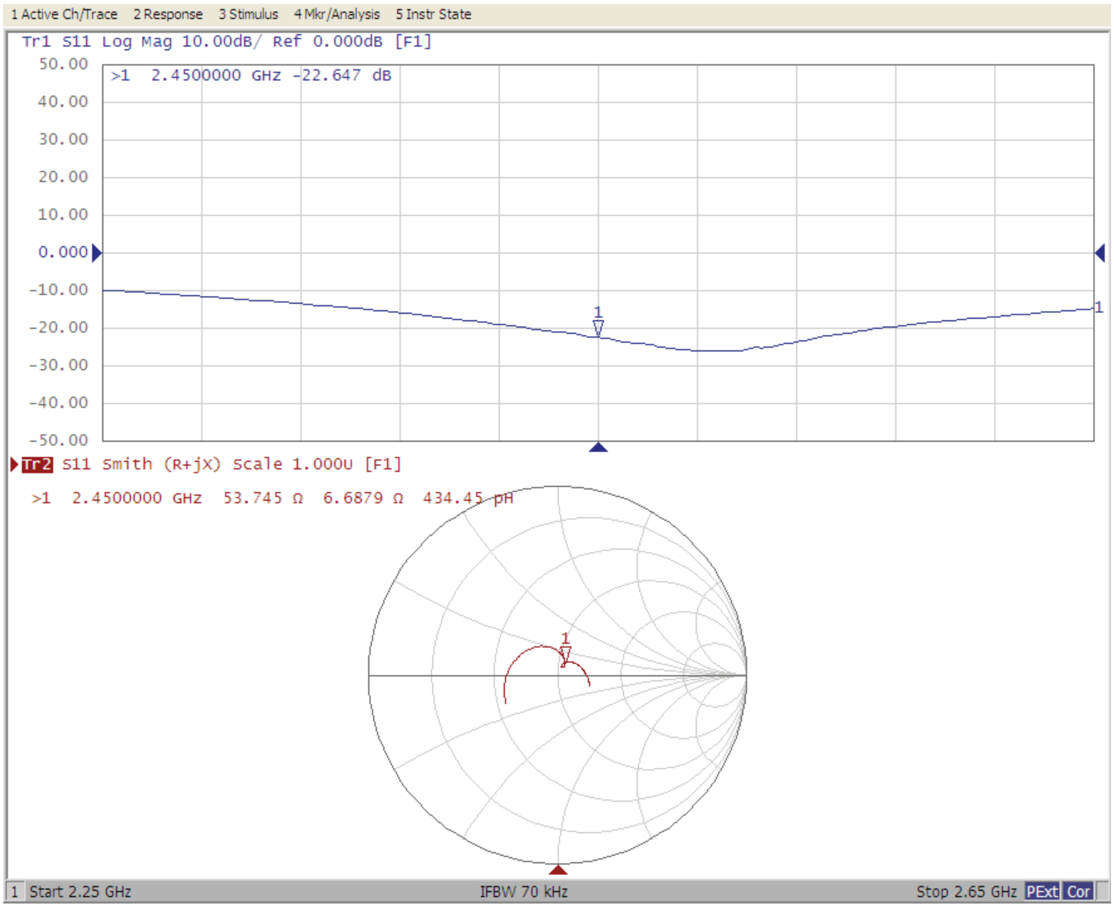
D2450V2 - SN: 893						
2450 Head						
Date of Measurement	Return-loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
2021.09.18	-22.6		55.0		6.3	
2022.09.18	-22.6	0.0	53.7	-1.3	6.7	0.4
2023.09.18	-21.3	5.8	54.2	-0.8	8.0	1.7

<Justification of the extended calibration>

The return loss is ＜-20dB, within 20% of prior calibration, and the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

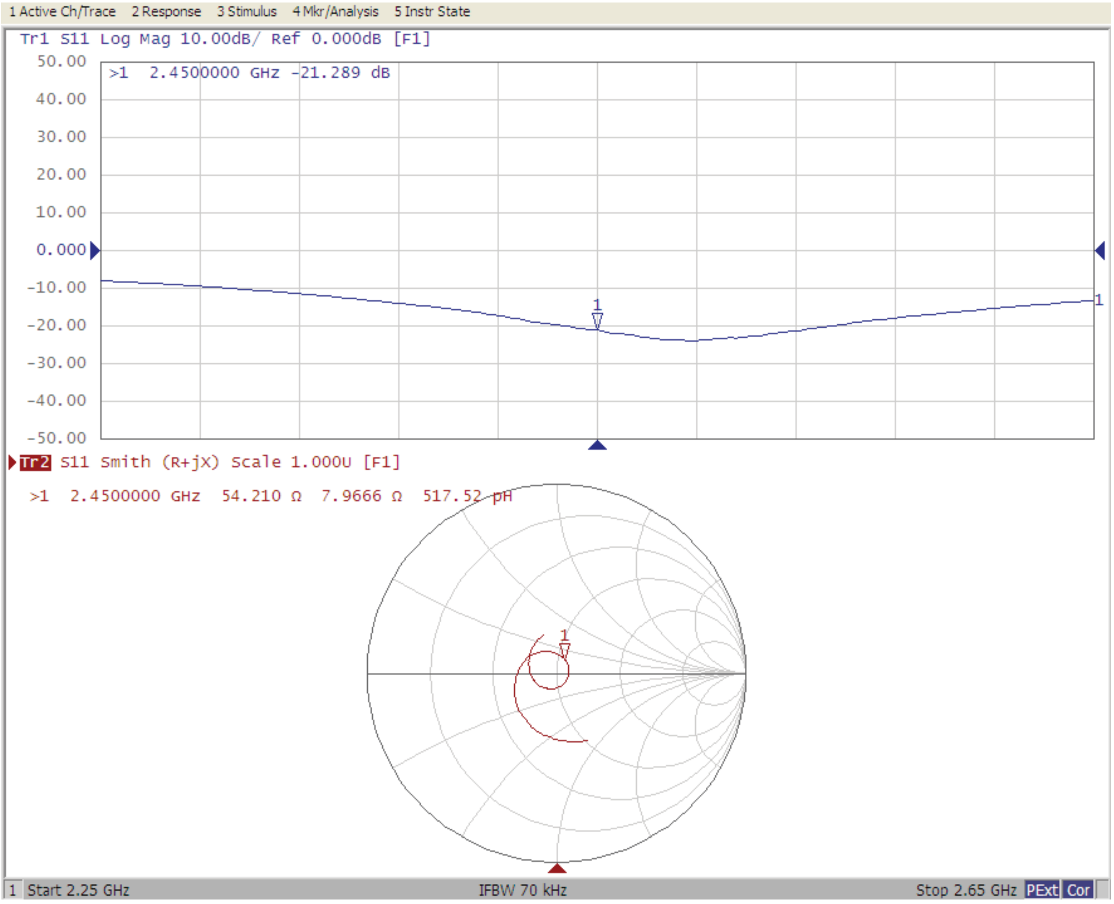
<Dipole Verification Data>

Head 2450MHz _2022.09.18



<Dipole Verification Data>

Head 2450MHz _2023.09.18



In Collaboration with
s p e a g
CALIBRATION LABORATORY
Add: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191, Chi
Tel: +86-10-62304633-2512 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

中国认可
国际互认
校准
CALIBRATION
CNAS L0570

Client B.V.ADT **Certificate No: Z21-60340**

CALIBRATION CERTIFICATE

Object	D5GHzV2 - SN: 1133
Calibration Procedure(s)	FF-Z11-003-01 Calibration Procedures for dipole validation kits
Calibration date:	September 14, 2021

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22±3)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	106277	23-Sep-20 (CTTL, No.J20X08336)	Sep-21
Power sensor NRP8S	104291	23-Sep-20 (CTTL, No.J20X08336)	Sep-21
ReferenceProbe EX3DV4	SN 7517	03-Feb-21(CTTL-SPEAG,No.Z21-60001)	Feb-22
DAE4	SN 1556	15-Jan-21(SPEAG,No.DAE4-1556_Jan21)	Jan-22
Secondary Standards	**ID #**	**Cal Date (Calibrated by, Certificate No.)**	**Scheduled Calibration**
Signal Generator E4438C	MY49071430	01-Feb-21 (CTTL, No.J21X00593)	Jan-22
NetworkAnalyzerE5071C	MY46110673	14-Jan-21 (CTTL, No.J21X00232)	Jan-22

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: September 20, 2021