中认信通
CHINA CERTIFICATION ICT CO., LTD (DONGGUAN)

ACCREDITED
TESTING LABORATORY
CERTIFICATE # 6356.01

SAR TEST REPORT

Applicant: **Autel Robotics Co., Ltd.**

Address: 9th Floor, Bldg.B1, Zhiyuan, 1001 Xueyuan Rd., Xili, Nanshan, Shenzhen, China

FCC ID: **2AGNTEF9240958A**

Product Name: **Autel Smart Controller V3**

Model Number: **EF9-3**

Standard(s): **47 CFR Part 2(2.1093)**

The above equipment has been tested and found compliant with the requirement of the relative standards by China Certification ICT Co., Ltd (Dongguan)

Report Number: **CR22060045-20A**

Date Of Issue: **2022-07-20**

Reviewed By: **Sun Zhong**

Sun Zhong

Title: Manager

Test Laboratory: China Certification ICT Co., Ltd (Dongguan)
No. 113, Pingkang Road, Dalang Town, Dongguan, Guangdong, China
Tel: +86-769-82016888

SAR TEST RESULTS SUMMARY

Operation Frequency Bands	Highest Reported 1g SAR(W/kg)		Highest Reported 10g SAR(W/kg)	
	Body-Supported (Gap 10mm)	Limits (W/kg)	Handheld (Gap 0mm)	Limits (W/kg)
SRD 2.4G	1.21	**1.6**	**1.64**	**4.0**
SRD 900MHz	0.26		0.20	
SRD 5.8G	**1.40**		0.95	
Wi-Fi 2.4G	1.08		1.53	
Wi-Fi 5.8G	0.93		1.17	
Bluetooth	0.13		0.20	
Maximum Simultaneous Transmission SAR				
Items	**Body-Supported (Gap 10mm)**	**Limits (W/kg)**	**Handheld (Gap 0mm)**	**Limits (W/kg)**
Sum SAR(W/kg)	**1.79**	**1.6**	**2.31**	**4.0**
SPLSR	**0.039**	**0.04**	N/A	**0.10**
EUT Received Date:	2022/06/11			
Test Date:	2022/07/04-2022/07/07			
Test Result:	Pass			

Test Facility

The Test site used by China Certification ICT Co., Ltd (Dongguan) to collect test data is located on the No. 113, Pingkang Road, Dalang Town, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 442868, the FCC Designation No. : CN1314.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0123.

Declarations

China Certification ICT Co., Ltd (Dongguan) is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with a triangle symbol "▲". Customer model name, addresses, names, trademarks etc. are not considered data.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

Device Type:	Portable
Exposure Category:	Population / Uncontrolled
Antenna Type(s):	External Antenna for SRD 2.4GHz/900MHz/5.8GHz
	Internal Antenna for WLAN and Bluetooth
Body-Worn Accessories:	None
Operation modes:	SRD 2.4G, SRD 900MHz, SRD 5.8G, WLAN 2.4G/5.8G and Bluetooth
Frequency Band:	SRD 2.4G_1.4M: 2403.5-2475.5MHz SRD 2.4G_20M: 2412.5-2462.5MHz SRD 900MHz_1.4M: 904-926MHz SRD 900MHz_20M: 914-916MHz SRD 5.8G_1.4M: 5728-5847MHz SRD 5.8G_20M: 5738-5839MHz WLAN 2.4G: 2412-2462MHz WLAN 5.8G: 5725-5850MHz Bluetooth : 2402 MHz-2480 MHz
Conducted RF Power:	SRD 2.4G: 25.43 dBm SRD 900MHz: 24.58 dBm SRD 5.8G: 23.86 dBm WLAN 2.4G: 20.37 dBm WLAN 5.8G: 16.81 dBm Bluetooth(BDR/EDR): 10.73 dBm BLE: 4.32 dBm
Rated Input Voltage:	DC 11.55 V from Rechargeable Battery
Serial Number:	CR22060045-SA-S1
Normal Operation:	Handheld and Body Supported

1.2 Test Specification, Methods and Procedures

The tests documented in this report were performed in accordance with FCC 47 CFR § 2.1093, IEEE 1528-2013, the following FCC Published RF exposure KDB procedures:

KDB 447498 D04 Interim General RF Exposure Guidance v01
KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
KDB 865664 D02 RF Exposure Reporting v01r02
KDB 248227 D01 802 11 Wi-Fi SAR v02r02
KDB 616217 D04 SAR for laptop and tablets v01r02

TCB Workshop April 2019: RF Exposure Procedures

1.3 SAR Limts

FCC Limit

EXPOSURE LIMITS	SAR (W/kg)	
	(General Population / Uncontrolled Exposure Environment)	(Occupational / Controlled Exposure Environment)
Spatial Average (averaged over the whole body)	0.08	0.4
Spatial Peak (averaged over any 1 g of tissue)	**1.60**	8.0
Spatial Peak (hands/wrists/feet/ankles averaged over 10 g)	**4.0**	20.0

Population/Uncontrolled Environments are defined as locations where there is the exposure of individual who have no knowledge or control of their exposure.

Occupational/Controlled Environments are defined as locations where there is exposure that may be incurred by people who are aware of the potential for exposure (i.e. as a result of employment or occupation).

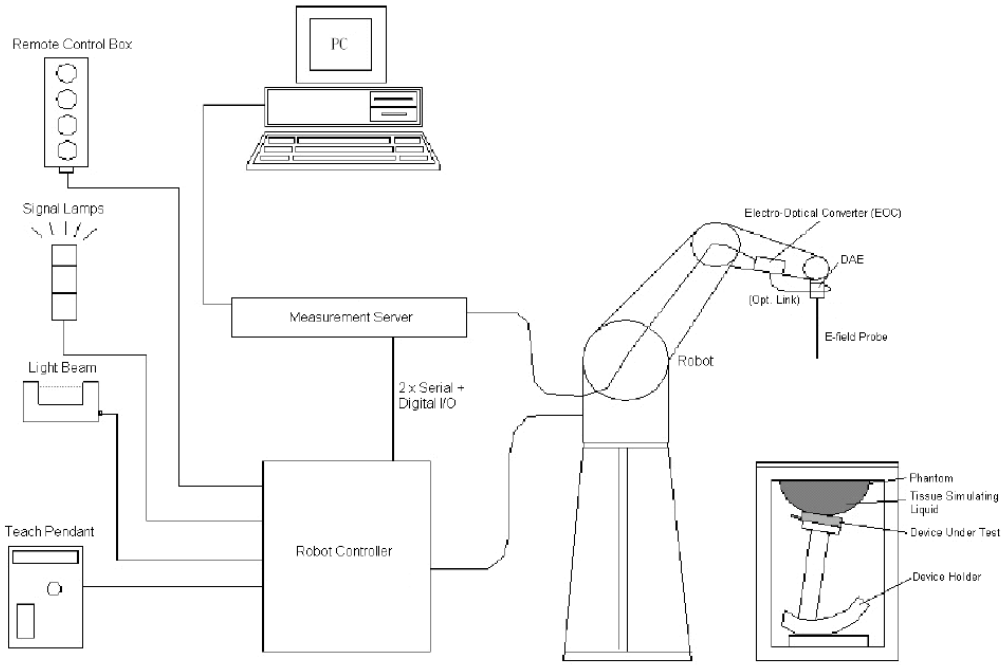
General Population/Uncontrolled environments Spatial Peak limit 4.0W/kg for 10g Extremity SAR and 1.6W/kg for 1g Body SAR applied to the EUT.

2. SAR MEASUREMENT SYSTEM

These measurements were performed with the automated near-field scanning system DASY5 from Schmid & Partner Engineering AG (SPEAG) which is the Fifth generation of the system shown in the figure hereinafter:

DASY5 System Description

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



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal application, 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.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running Win7 professional operating system and the DASY52 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

DASY5 Measurement Server

The DASY5 measurement server is based on a PC/104 CPU board with a 400MHz Intel ULV Celeron, 128MB chip-disk and 128MB RAM. The necessary circuits for communication with the DAE4 (or DAE3) electronics box, as well as the 16 bit AD-converter system for optical detection and digital I/O interface are contained on the DASY5 I/O board, which is directly connected to the PC/104 bus of the CPU board.

The measurement server performs all real-time data evaluation of field measurements and surface detection, controls robot movements and handles safety operation. The PC operating system cannot interfere with these time critical processes. All connections are supervised by a watchdog, and disconnection of any of the cables to the measurement server will automatically disarm the robot and disable all program-controlled robot movements. Furthermore, the measurement server is equipped with an expansion port which is reserved for future applications. Please note that this expansion port does not have a standardized point out, and therefore only devices provided by SPEAG can be connected. Devices from any other supplier could seriously damage the measurement server.

Data Acquisition Electronics

The data acquisition electronics (DAE4) consist of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder with a control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information, as well as an optical uplink for commands and the clock.

The mechanical probe mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection.

The input impedance of both the DAE4 as well as of the DAE3 box is 200MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

EX3DV4 E-Field Probes

Frequency	10 MHz to > 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in TSL (rotation around probe axis) ± 0.5 dB in TSL (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
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields); the only probe that enables compliance testing for frequencies up to 6 GHz with precision of better 30%.
Compatibility	DASY3, DASY4, DASY52 SAR and higher, EASY4/MRI

Calibration Frequency Points for EX3DV4 E-Field Probes SN: 7329 Calibrated: 2021/12/31

Calibration Frequency Point(MHz)	Frequency Range(MHz)		Conversion Factor		
	From	To	X	Y	Z
750 Head	650	850	10.06	10.06	10.06
900 Head	850	1000	9.68	9.68	9.68
1450 Head	1350	1550	8.64	8.64	8.64
1750 Head	1650	1850	8.23	8.23	8.23
1900 Head	1850	2000	8.00	8.00	8.00
2100 Head	2000	2200	7.90	7.90	7.90
2300 Head	2200	2400	7.73	7.73	7.73
2450 Head	2400	2550	7.42	7.42	7.42
2600 Head	2550	2700	7.15	7.15	7.15
5200 Head	5090	5250	5.49	5.49	5.49
5300 Head	5250	5410	5.20	5.20	5.20
5600 Head	5490	5700	4.77	4.77	4.77
5800 Head	5700	5910	4.75	4.75	4.75

SAM Twin Phantom

The SAM twin phantom is a fiberglass shell phantom with 2mm shell thickness (except the ear region, where shell thickness increases to 6 mm). The phantom has three measurement areas:
_ Left Head
_ Right Head
_ Flat phantom

The phantom table for the DASY systems based on the robots have the size of 100 x 50 x 85 cm (L x W x H).
For easy dislocation these tables have fork lift cut outs at the bottom.
The bottom plate contains three pairs of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. Only one device holder is necessary if two phantoms are used (e.g., for different liquids)

A white cover is provided to cover the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. Free space scans of devices on top of this phantom cover are possible. Three reference marks are provided on the phantom counter. These reference marks are used to teach the absolute phantom position relative to the robot.

Robots

The DASY5 system uses the high precision industrial robot. The robot offers the same features important for our application:

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

The above mentioned robots are controlled by the Staubli CS8c robot controllers. All information regarding the use and maintenance of the robot arm and the robot controller is contained on the CDs delivered along with the robot. Paper manuals are available upon request direct from Staubli.

SAR Scan Pricedures

Step 1: Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. The minimum distance of probe sensors to surface is 1.4 mm. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

Step 2: Area Scans

Area scans are defined prior to the measurement process being executed with a user defined variable spacing between each measurement point (integral) allowing low uncertainty measurements to be conducted. Scans defined for FCC applications utilize a 15mm 2 step integral, with 1.5mm interpolation used to locate the peak SAR area used for zoom scan assessments.

Where the system identifies multiple SAR peaks (which are within 25% of peak value) the system will provide the user with the option of assessing each peak location individually for zoom scan averaging.

Area Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 mm ± 1 mm	½·δ·ln(2) mm ± 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.	

Step 3: Zoom Scan (Cube Scan Averaging)

The averaging zoom scan volume utilized in the DASY5 software is in the shape of a cube and the side dimension of a 1 g or 10 g mass is dependent on the density of the liquid representing the simulated tissue. A density of 1000 kg/m^3 is used to represent the head and body tissue density and not the phantom liquid density, in order to be consistent with the definition of the liquid dielectric properties, i.e. the side length of the 1g cube is 10mm,with the side length of the 10g cube is 21.5mm.

Zoom Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

			≤ 3 GHz	> 3 GHz
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: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$ 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: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see IEEE Std 1528-2013 for details.

* When zoom scan is required and the *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB Publication 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

Step 4: Power Drift Measurement

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

When the cube intersects with the surface of the phantom, it is oriented so that 3 vertices touch the surface of the shell or the center of a face is tangent to the surface. The face of the cube closest to the surface is modified in order to conform to the tangent surface.

The zoom scan integer steps can be user defined so as to reduce uncertainty, but normal practice for typical test applications (including FCC) utilize a physical step of 7 x7 x 7 (5mmx5mmx5mm) providing a volume of 30 mm in the X & Y & Z axis.

Tissue Dielectric Parameters for Head and Body Phantoms

The head tissue dielectric parameters recommended by the IEC 62209-1:2016

Recommended Tissue Dielectric Parameters for Head liquid

Table A.3 – Dielectric properties of the head tissue-equivalent liquid

Frequency MHz	Relative permittivity ε_r	Conductivity (σ) S/m
300	45,3	0,87
450	43,5	0,87
750	*41,9*	*0,89*
835	41,5	0,90
900	41,5	0,97
1 450	40,5	1,20
1 500	*40,4*	*1,23*
1 640	*40,2*	*1,31*
1 750	*40,1*	*1,37*
1 800	40,0	1,40
1 900	40,0	1,40
2 000	40,0	1,40
2 100	*39,8*	*1,49*
2 300	*39,5*	*1,67*
2 450	39,2	1,80
2 600	*39,0*	*1,96*
3 000	38,5	2,40
3 500	*37,9*	*2,91*
4 000	*37,4*	*3,43*
4 500	*36,8*	*3,94*
5 000	*36,2*	*4,45*
5 200	*36,0*	*4,66*
5 400	*35,8*	*4,86*
5 600	*35,5*	*5,07*
5 800	*35,3*	*5,27*
6 000	*35,1*	*5,48*

NOTE For convenience, permittivity and conductivity values at those frequencies which are not part of the original data provided by Drossos et al. [33] or the extension to 5 800 MHz are provided (i.e. the values shown *in italics*). These values were linearly interpolated between the values in this table that are immediately above and below these values, except the values at 6 000 MHz that were linearly extrapolated from the values at 3 000 MHz and 5 800 MHz.

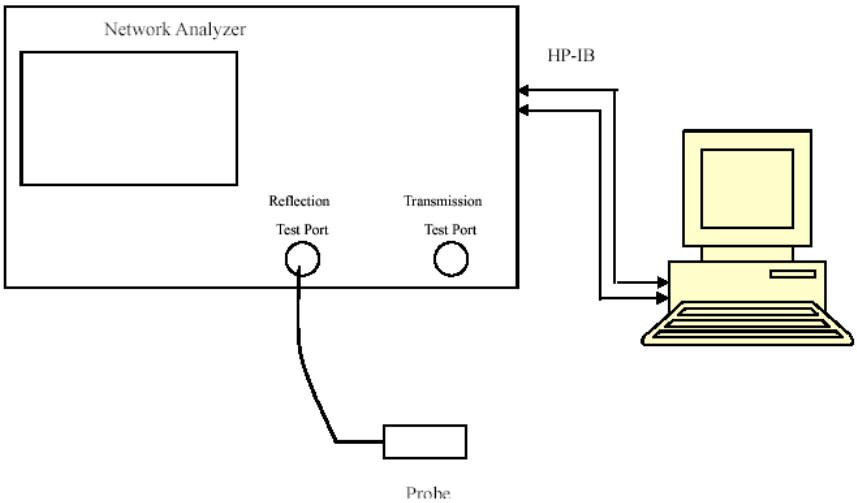
3. EQUIPMENT LIST AND CALIBRATION

3.1 Equipments List & Calibration Information

Equipment	Model	S/N	Calibration Date	Calibration Due Date
DASY5 Test Software	DASY52.10	N/A	NCR	NCR
DASY5 Measurement Server	DASY5 4.5.12	1567	NCR	NCR
Data Acquisition Electronics	DAE4	1354	2021/9/1	2022/8/31
E-Field Probe	EX3DV4	7329	2021/12/31	2022/12/30
Mounting Device	MD4HHTV5	BJPCTC0152	NCR	NCR
Twin SAM	Twin SAM V5.0	1412	NCR	NCR
Dipole, 900 MHz	D900V2	1d183	2021/8/27	2024/8/26
Dipole, 2450 MHz	D2450V2	971	2021/6/28	2024/6/27
Dipole,5GHz	D5GHzV2	1246	2019/11/19	2022/11/18
Simulated Tissue 900 MHz	TS-900	2103090001	Each Time	/
Simulated Tissue 2450 MHz	TS-2450	2109245001	Each Time	/
Simulated Tissue 5800 MHz	TS-5800	2101580001	Each Time	/
Network Analyzer	8753B	2828A00170	2021/10/26	2022/10/25
Dielectric assessment kit	1253	SM DAK 040 CA	NCR	NCR
MXG Vector Signal Generator	N5182B	MY51350144	2021/7/22	2022/7/21
Power Meter	EPM-441A/8484A	GB37481494	2021/7/22	2022/7/21
Power Amplifier	ZVA-183-S+	5969001149	NCR	NCR
Directional Coupler	441493	520Z	NCR	NCR
Attenuator	20dB, 100W	LN749	NCR	NCR
Attenuator	6dB, 150W	2754	NCR	NCR

4. SAR MEASUREMENT SYSTEM VERIFICATION

4.1 Liquid Verification



Liquid Verification Setup Block Diagram

Liquid Verification Results

Frequency (MHz)	Liquid Type	Liquid Parameter		Target Value		Delta (%)		Tolerance (%)
		ε_r	σ (S/m)	ε_r	σ (S/m)	$\Delta\varepsilon_r$	Δσ (S/m)	
900	Simulated Tissue 900 MHz	41.665	0.953	41.5	0.97	0.4	-1.75	±10
904	Simulated Tissue 900 MHz	41.641	0.964	41.49	0.97	0.36	-0.62	±10
914	Simulated Tissue 900 MHz	41.442	0.975	41.47	0.98	-0.07	-0.51	±10
915	Simulated Tissue 900 MHz	41.408	0.981	41.47	0.98	-0.15	0.1	±10
916	Simulated Tissue 900 MHz	41.378	0.989	41.47	0.98	-0.22	0.92	±10
926	Simulated Tissue 900 MHz	41.336	0.996	41.45	0.98	-0.28	1.63	±10

**Liquid Verification above was performed on 2022/07/04.*

Frequency (MHz)	Liquid Type	Liquid Parameter		Target Value		Delta (%)		Tolerance (%)
		ε_r	σ (S/m)	ε_r	σ (S/m)	$\Delta\varepsilon_r$	Δσ (S/m)	
2403.5	Simulated Tissue 2450 MHz	39.363	1.742	39.29	1.76	0.19	-1.02	±10
2412	Simulated Tissue 2450 MHz	39.341	1.751	39.28	1.77	0.16	-1.07	±10
2412.5	Simulated Tissue 2450 MHz	39.328	1.764	39.28	1.77	0.12	-0.34	±10
2436.5	Simulated Tissue 2450 MHz	39.315	1.773	39.23	1.79	0.22	-0.95	±10
2437	Simulated Tissue 2450 MHz	39.306	1.781	39.23	1.79	0.19	-0.5	±10
2439.5	Simulated Tissue 2450 MHz	39.291	1.787	39.22	1.79	0.18	-0.17	±10
2450	Simulated Tissue 2450 MHz	39.249	1.803	39.2	1.8	0.12	0.17	±10
2462	Simulated Tissue 2450 MHz	39.215	1.815	39.18	1.81	0.09	0.28	±10
2462.5	Simulated Tissue 2450 MHz	39.193	1.819	39.18	1.81	0.03	0.5	±10
2475.5	Simulated Tissue 2450 MHz	39.105	1.824	39.17	1.83	-0.17	-0.33	±10

**Liquid Verification above was performed on 2022/07/05.*

Frequency (MHz)	Liquid Type	Liquid Parameter		Target Value		Delta (%)		Tolerance (%)
		ε_r	σ (S/m)	ε_r	σ (S/m)	$\Delta\varepsilon_r$	Δσ (S/m)	
2402	Simulated Tissue 2450 MHz	39.375	1.734	39.3	1.76	0.19	-1.48	±10
2441	Simulated Tissue 2450 MHz	39.267	1.791	39.22	1.79	0.12	0.06	±10
2450	Simulated Tissue 2450 MHz	39.211	1.807	39.2	1.8	0.03	0.39	±10
2473	Simulated Tissue 2450 MHz	39.134	1.822	39.17	1.82	-0.09	0.11	±10
2480	Simulated Tissue 2450 MHz	39.079	1.832	39.16	1.83	-0.21	0.11	±10

**Liquid Verification above was performed on 2022/07/06.*

Frequency (MHz)	Liquid Type	Liquid Parameter		Target Value		Delta (%)		Tolerance (%)
		ε_r	σ (S/m)	ε_r	σ (S/m)	$\Delta\varepsilon_r$	Δσ (S/m)	
5728	Simulated Tissue 5800 MHz	35.454	5.192	35.37	5.2	0.24	-0.15	±10
5738	Simulated Tissue 5800 MHz	35.409	5.214	35.36	5.21	0.14	0.08	±10
5788	Simulated Tissue 5800 MHz	35.336	5.245	35.31	5.26	0.07	-0.29	±10
5789	Simulated Tissue 5800 MHz	35.295	5.257	35.31	5.26	-0.04	-0.06	±10
5800	Simulated Tissue 5800 MHz	35.266	5.281	35.3	5.27	-0.1	0.21	±10
5839	Simulated Tissue 5800 MHz	35.248	5.323	35.26	5.31	-0.03	0.24	±10
5847	Simulated Tissue 5800 MHz	35.239	5.342	35.25	5.32	-0.03	0.41	±10

**Liquid Verification above was performed on 2022/07/06.*

Frequency (MHz)	Liquid Type	Liquid Parameter		Target Value		Delta (%)		Tolerance (%)
		ε_r	σ (S/m)	ε_r	σ (S/m)	$\Delta\varepsilon_r$	Δσ (S/m)	
5745	Simulated Tissue 5800 MHz	35.361	5.221	35.36	5.22	0	0.02	±10
5785	Simulated Tissue 5800 MHz	35.347	5.234	35.32	5.26	0.08	-0.49	±10
5800	Simulated Tissue 5800 MHz	35.282	5.276	35.3	5.27	-0.05	0.11	±10
5825	Simulated Tissue 5800 MHz	35.257	5.307	35.28	5.3	-0.07	0.13	±10

**Liquid Verification above was performed on 2022/07/07.*

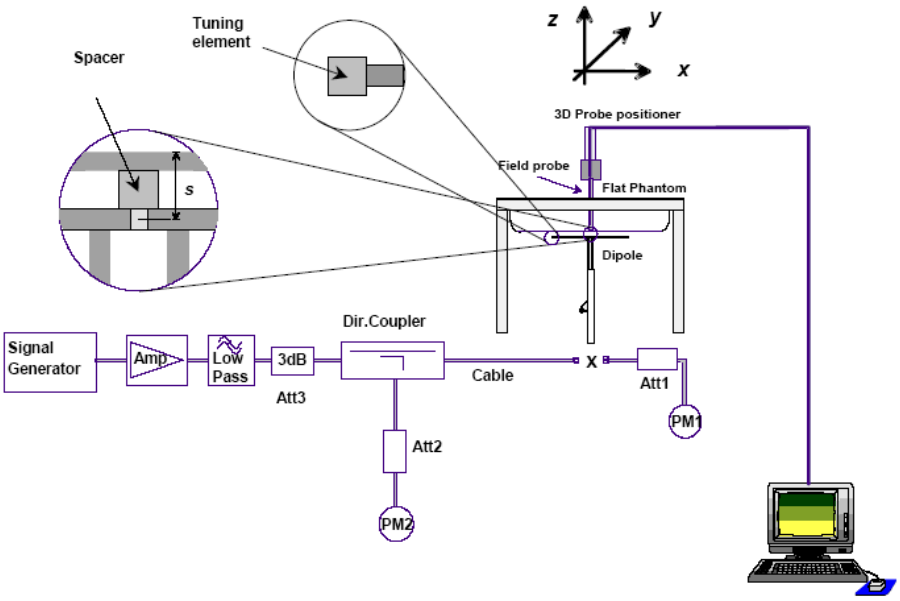
4.2 System Accuracy Verification

Prior to the assessment, the system validation kit was used to test whether the system was operating within its specifications of ±10%. The validation results are tabulated below. And also the corresponding SAR plot is attached as well in the SAR plots files.

The spacing distances in the **System Verification Setup Block Diagram** is given by the following:

a) s = 15 mm ± 0,2 mm for 300 MHz ≤ f ≤ 1 000 MHz;
b) s = 10 mm ± 0,2 mm for 1 000 MHz < f ≤ 3 000 MHz;
c) s = 10 mm ± 0,2 mm for 3 000 MHz < f ≤ 6 000 MHz.

System Verification Setup Block Diagram



System Accuracy Check Results

Date	Frequency Band	Liquid Type	Input Power (mW)	Measured SAR (W/kg)		Normalized to 1W (W/kg)	Target Value (W/kg)	Delta (%)	Tolerance (%)
2022/7/4	900 MHz	Simulated Tissue 900 MHz	100	1g	1.03	10.3	10.9	-5.5	±10
				10g	0.679	6.79	6.96	-2.44	±10
2022/7/5	2450 MHz	Simulated Tissue 2450 MHz	100	1g	5.26	52.6	53.5	-1.68	±10
				10g	2.39	23.9	24.2	-1.24	±10
2022/7/6	2450 MHz	Simulated Tissue 2450 MHz	100	1g	5.11	51.1	53.5	-4.49	±10
				10g	2.29	22.9	24.2	-5.37	±10
2022/7/6	5800 MHz	Simulated Tissue 5800 MHz	100	1g	7.92	79.2	77.9	1.67	±10
				10g	2.28	22.8	22	3.64	±10
2022/7/7	5800 MHz	Simulated Tissue 5800 MHz	100	1g	7.61	76.1	77.9	-2.31	±10
				10g	2.14	21.4	22	-2.73	±10

*The SAR values above are normalized to 1 Watt forward power.

4.3 SAR SYSTEM VALIDATION DATA

System Performance 900 MHz

DUT: D900V2; Type: 900 MHz; Serial: 1d183

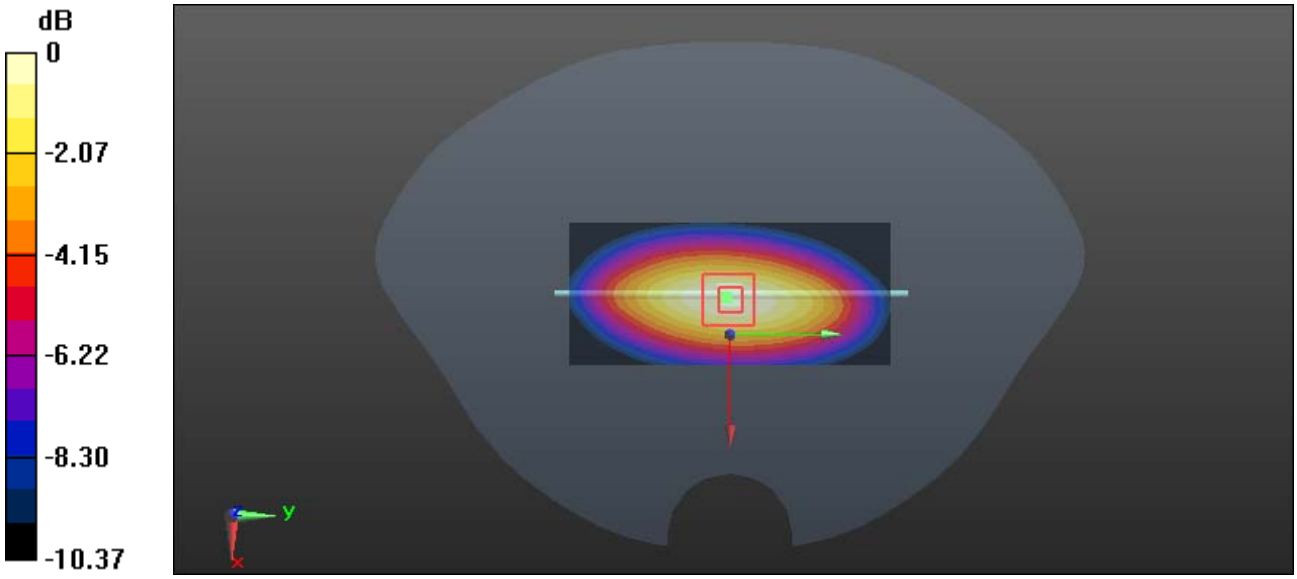
Communication System: CW; Frequency: 900 MHz; Duty Cycle: 1:1
Medium parameters used: f = 900 MHz; σ = 0.953 S/m; ε_r = 41.665; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(9.68, 9.68, 9.68) @ 900 MHz; Calibrated: 2021/12/31
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2021/9/1
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (41x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.35 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 32.78 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 1.52 W/kg
SAR(1 g) = 1.03 W/kg; SAR(10 g) = 0.679 W/kg
Maximum value of SAR (measured) = 1.34 W/kg



0 dB = 1.34 W/kg = 1.27 dBW/kg

System Performance 2450MHz was performed on 2022/07/05

DUT: D2450V2; Type: 2450 MHz; Serial: 971

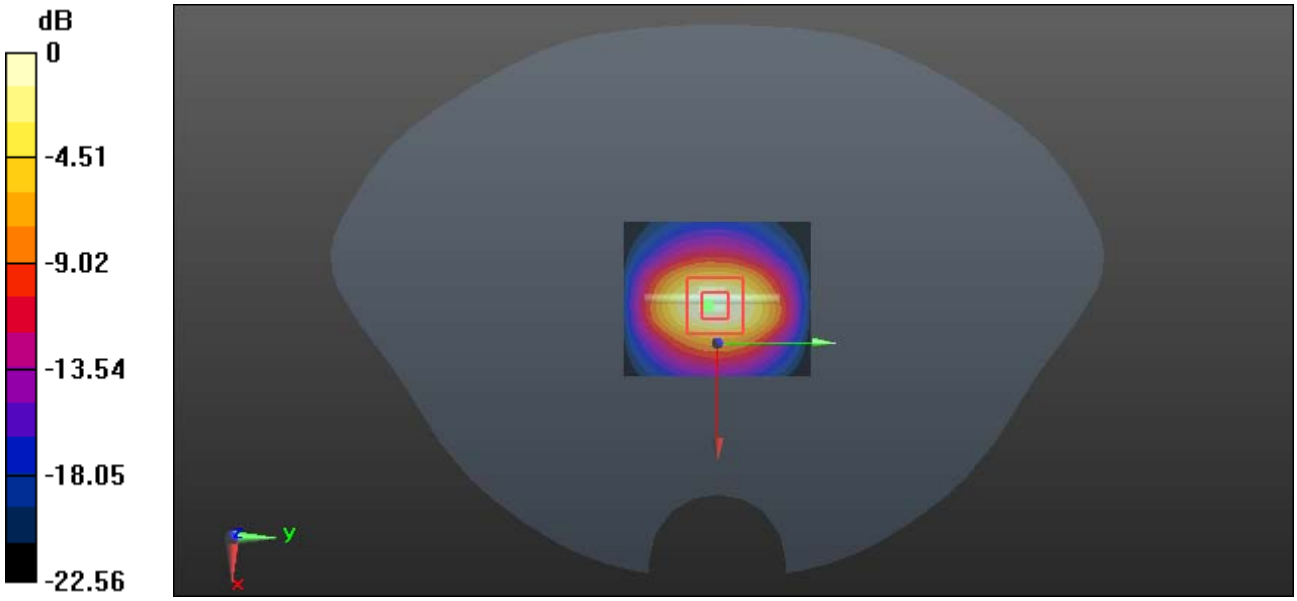
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.803 S/m; ε_r = 39.249; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(7.42, 7.42, 7.42) @ 2450 MHz; Calibrated: 2021/12/31
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2021/9/1
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (51x51x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 8.58 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 56.80 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 10.7 W/kg
SAR(1 g) = 5.26 W/kg; SAR(10 g) = 2.39 W/kg
Maximum value of SAR (measured) = 8.15 W/kg



0 dB = 8.15 W/kg = 9.11 dBW/kg

System Performance 2450MHz was performed on 2022/07/06

DUT: D2450V2; Type: 2450 MHz; Serial: 971

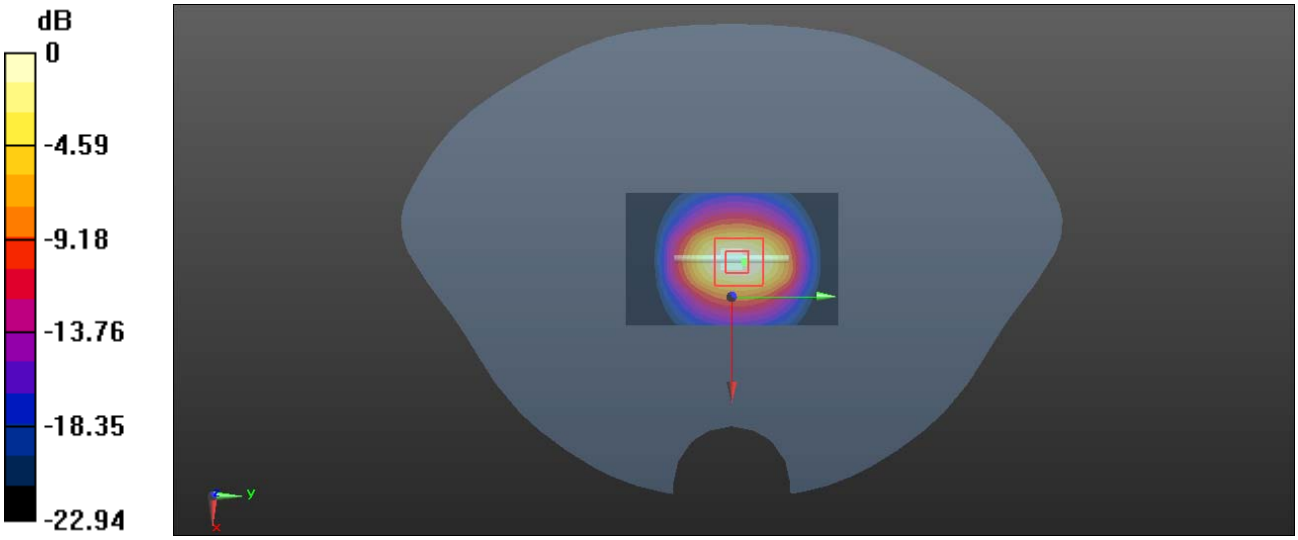
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.807 S/m; ε_r = 39.211; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(7.42, 7.42, 7.42) @ 2450 MHz; Calibrated: 2021/12/31
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2021/9/1
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (51x51x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 8.30 W/kg

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 55.75 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 9.57 W/kg
SAR(1 g) = 5.11 W/kg; SAR(10 g) = 2.29 W/kg
Maximum value of SAR (measured) = 7.67 W/kg



0 dB = 7.67 W/kg = 8.85 dBW/kg

System Performance 5800 MHz was performed on 2022/07/06

DUT: Dipole D5GHzV2; Type: 5800 MHz; Serial: SN:1246

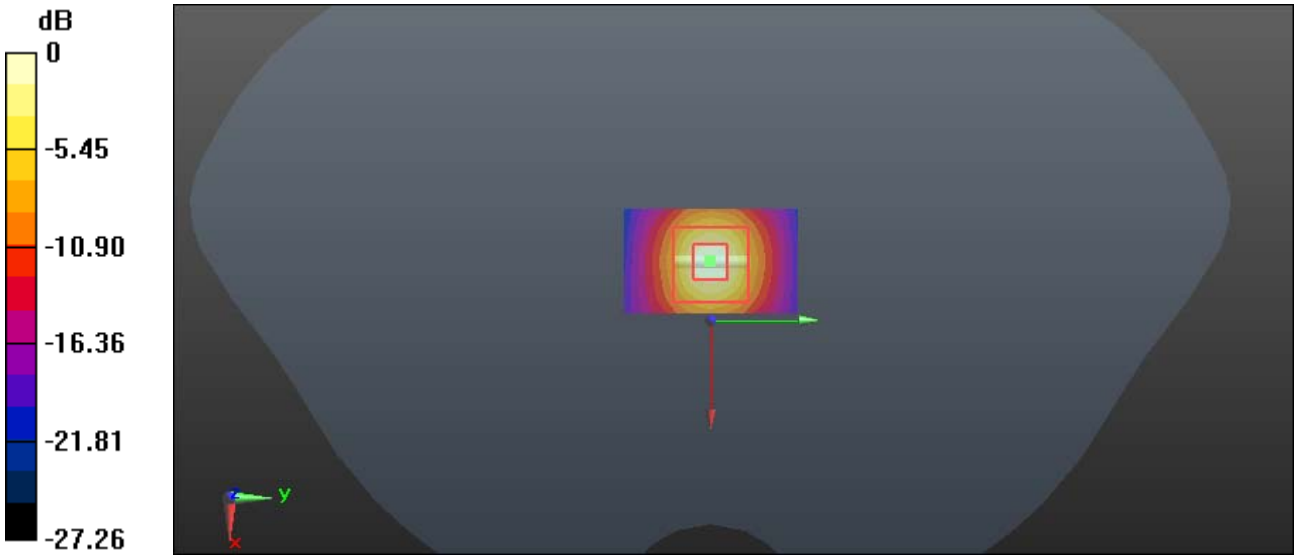
Communication System: CW; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5800 MHz; σ = 5.281 S/m; ε_r = 35.266; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(4.75, 4.75, 4.75) @ 5800 MHz; Calibrated: 2021/12/31
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2021/9/1
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (41x51x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 19.2 W/kg

Zoom Scan (7x7x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 42.17 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 28.5 W/kg
SAR(1 g) = 7.92 W/kg; SAR(10 g) = 2.28 W/kg
Maximum value of SAR (measured) = 18.6 W/kg



0 dB = 18.6 W/kg = 12.70 dBW/kg

System Performance 5800 MHz was performed on 2022/07/07

DUT: Dipole D5GHzV2; Type: 5800 MHz; Serial: SN:1246

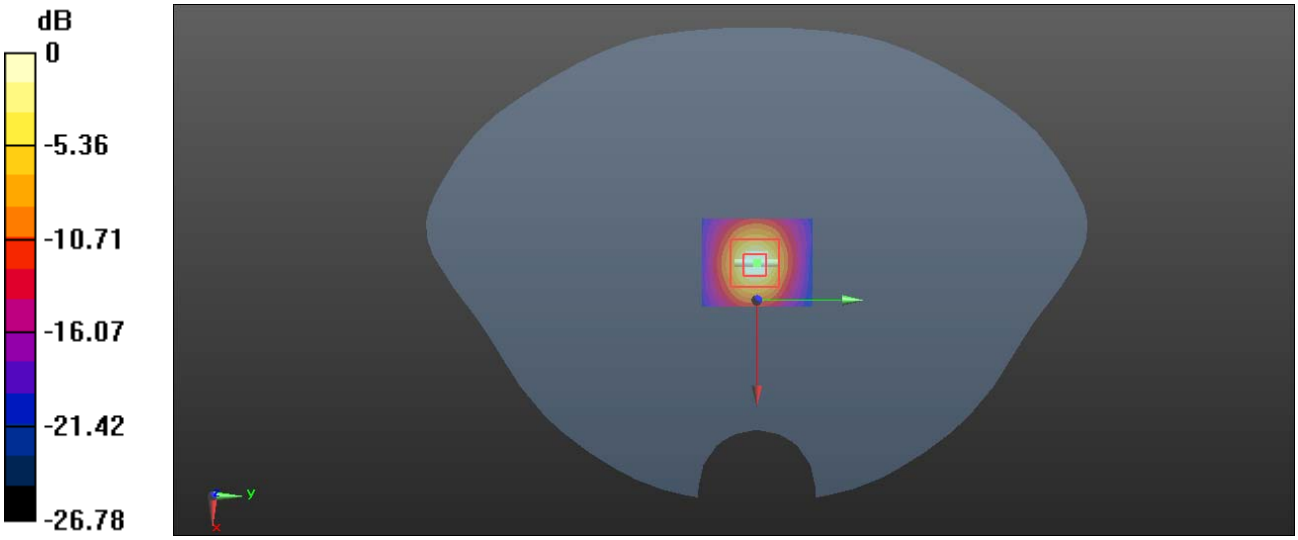
Communication System: CW; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5800 MHz; σ = 5.276 S/m; ε_r = 35.282; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(4.75, 4.75, 4.75) @ 5800 MHz; Calibrated: 2021/12/31
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2021/9/1
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (41x51x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 22.4 W/kg

Zoom Scan (7x7x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 40.46 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 33.4 W/kg
SAR(1 g) = 7.61 W/kg; SAR(10 g) = 2.14 W/kg
Maximum value of SAR (measured) = 19.7 W/kg



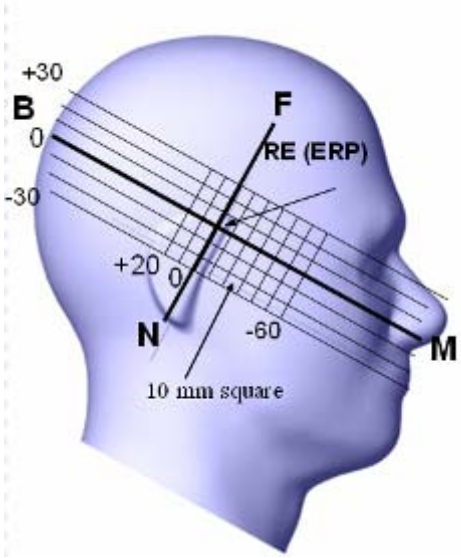
0 dB = 19.7 W/kg = 12.94 dBW/kg

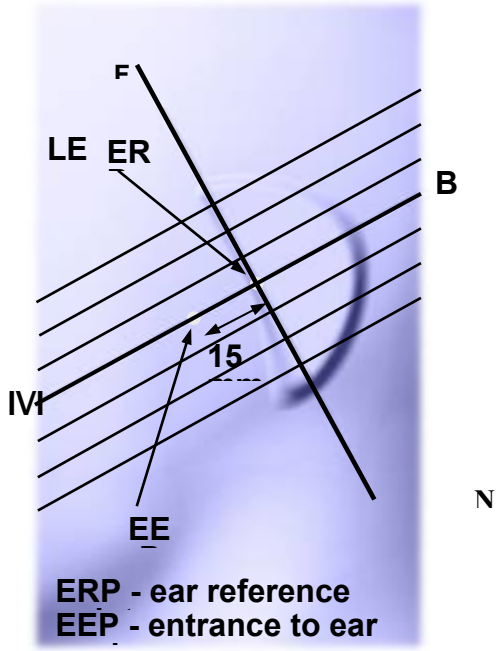
5. EUT TEST STRATEGY AND METHODOLOGY

5.1 Test Positions for Device Operating Next to a Person's Ear

This category includes most wireless handsets with fixed, retractable or internal antennas located toward the top half of the device, with or without a foldout, sliding or similar keypad cover. The handset should have its earpiece located within the upper ¼ of the device, either along the centerline or off-centered, as perceived by its users. This type of handset should be positioned in a normal operating position with the "test device reference point" located along the "vertical centerline" on the front of the device aligned to the "ear reference point". The "test device reference point" should be located at the same level as the center of the earpiece region. The "vertical centerline" should bisect the front surface of the handset at its top and bottom edges. A "ear reference point" is located on the outer surface of the head phantom on each ear spacer. It is located 1.5 cm above the center of the ear canal entrance in the "phantom reference plane" defined by the three lines joining the center of each "ear reference point" (left and right) and the tip of the mouth.

A handset should be initially positioned with the earpiece region pressed against the ear spacer of a head phantom. For the SCC-34/SC-2 head phantom, the device should be positioned parallel to the "N-F" line defined along the base of the ear spacer that contains the "ear reference point". For interim head phantoms, the device should be positioned parallel to the cheek for maximum RF energy coupling. The "test device reference point" is aligned to the "ear reference point" on the head phantom and the "vertical centerline" is aligned to the "phantom reference plane". This is called the "initial ear position". While maintaining these three alignments, the body of the handset is gradually adjusted to each of the following positions for evaluating SAR:





5.2 Cheek/Touch Position

The device is brought toward the mouth of the head phantom by pivoting against the "ear reference point" or along the "N-F" line for the SCC-34/SC-2 head phantom.

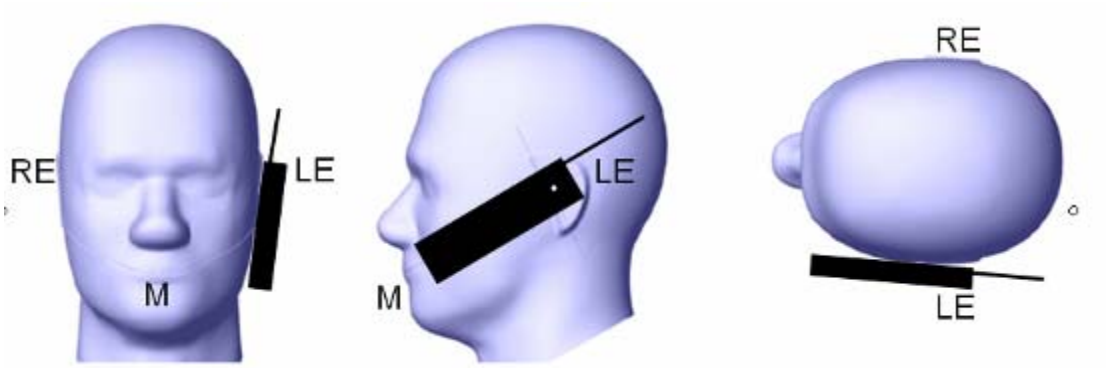
This test position is established:

When any point on the display, keypad or mouthpiece portions of the handset is in contact with the phantom.

(or) When any portion of a foldout, sliding or similar keypad cover opened to its intended self-adjusting normal use position is in contact with the cheek or mouth of the phantom.

For existing head phantoms – when the handset loses contact with the phantom at the pivoting point, rotation should continue until the device touches the cheek of the phantom or breaks its last contact from the ear spacer.

Cheek /Touch Position



5.3 Ear/Tilt Position

With the handset aligned in the "Cheek/Touch Position":

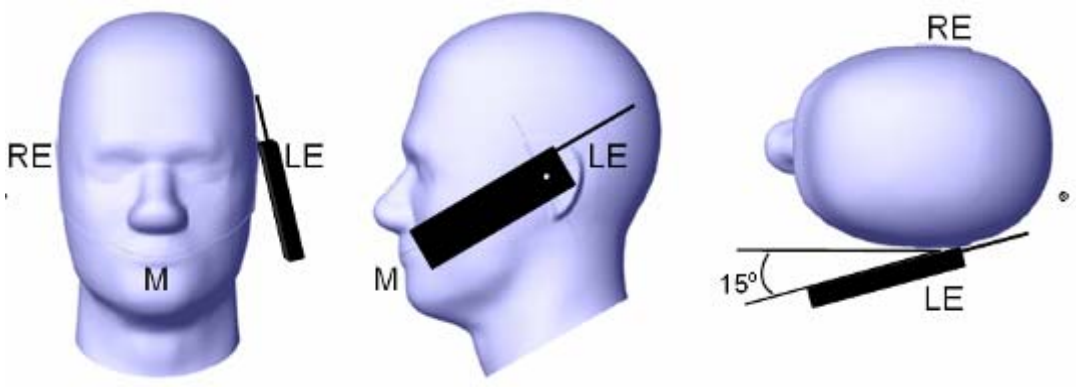
1) If the earpiece of the handset is not in full contact with the phantom's ear spacer (in the "Cheek/Touch position") and the peak SAR location for the "Cheek/Touch" position is located at the ear spacer region or corresponds to the earpiece region of the handset, the device should be returned to the "initial ear position" by rotating it away from the mouth until the earpiece is in full contact with the ear spacer.

2) (otherwise) The handset should be moved (translated) away from the cheek perpendicular to the line passes through both "ear reference points" (note: one of these ear reference points may not physically exist on a split head model) for approximate 2-3 cm. While it is in this position, the device handset is tilted away from the mouth with respect to the "test device reference point" until the inside angle between the vertical centerline on the front surface of the phone and the horizontal line passing through the ear reference point is by 15 80°. After the tilt, it is then moved (translated) back toward the head perpendicular to the line passes through both "ear reference points" until the device touches the phantom or the ear spacer. If the antenna touches the head first, the positioning process should be repeated with a tilt angle less than 15° so that the device and its antenna would touch the phantom simultaneously. This test position may require a device holder or positioner to achieve the translation and tilting with acceptable positioning repeatability.

If a device is also designed to transmit with its keypad cover closed for operating in the head position, such positions should also be considered in the SAR evaluation. The device should be tested on the left and

right side of the head phantom in the “Cheek/Touch” and “Ear/Tilt” positions. When applicable, each configuration should be tested with the antenna in its fully extended and fully retracted positions. These test configurations should be tested at the high, middle and low frequency channels of each operating mode; for example, AMPS, CDMA, and TDMA. If the SAR measured at the middle channel for each test configuration (left, right, Cheek/Touch, Tilt/Ear, extended and retracted) is at least 2.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s). If the transmission band of the test device is less than 10 MHz, testing at the high and low frequency channels is optional.

Ear /Tilt 15° Position



5.4 Test positions for body-worn and other configurations

Body-worn operating configurations should be tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in normal use configurations. Devices with a headset output should be tested with a headset connected to the device. When multiple accessories that do not contain metallic components are supplied with the device, the device may be tested with only the accessory that dictates the closest spacing to the body. When multiple accessories that contain metallic components are supplied with the device, the device must be tested with each accessory that contains a unique metallic component. If multiple accessories share an identical metallic component (e.g., the same metallic belt-clip used with different holsters with no other metallic components), only the accessory that dictates the closest spacing to the body must be tested.

Body-worn accessories may not always be supplied or available as options for some devices that are intended to be authorized for body-worn use. A separation distance of 1.5 cm between the back of the device and a flat phantom is recommended for testing body-worn SAR compliance under such circumstances. Other separation distances may be used, but they should not exceed 2.5 cm. In these cases, the device may use body-worn accessories that provide a separation distance greater than that tested for the device provided however that the accessory contains no metallic components.

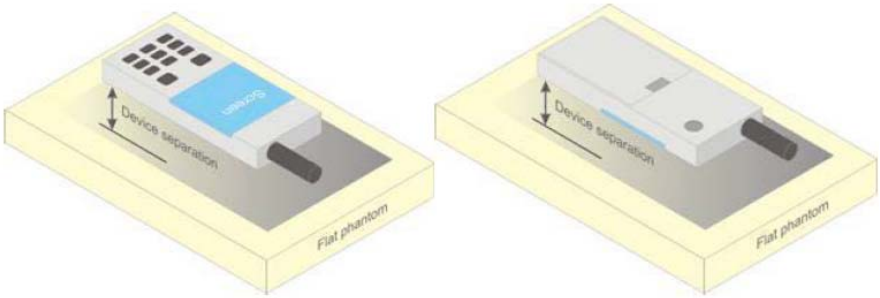


Figure 5 – Test positions for body-worn devices

5.5 Test Distance for SAR Evaluation

For Handheld mode(10g Extremity SAR) the EUT(Equipment Under Test) is set directly against the phantom, the test distance is 0mm;
For Close to Body mode(1g Body SAR) the EUT is set 10mm away from the phantom, the test distance is 10mm.

5.6 SAR Evaluation Procedure

The evaluation was performed with the following procedure:

Step 1: Measurement of the SAR value at a fixed location above the ear point or central position was used as a reference value for assessing the power drop. The SAR at this point is measured at the start of the test and then again at the end of the testing.

Step 2: The SAR distribution at the exposed side of the head was measured at a distance of 4 mm from the inner surface of the shell. The area covered the entire dimension of the head or radiating structures of the EUT, the horizontal grid spacing was 15 mm x 15 mm, and the SAR distribution was determined by integrated grid of 1.5mm x 1.5mm. Based on these data, the area of the maximum absorption was determined by spline interpolation. The first Area Scan covers the entire dimension of the EUT to ensure that the hotspot was correctly identified.

Step 3: Around this point, a volume of 30 mm x 30 mm x 30 mm was assessed by measuring 7x 7 x 7 points. On the basis of this data set, the spatial peak SAR value was evaluated under the following procedure:

1) The data at the surface were extrapolated, since the center of the dipoles is 1.2 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.3 mm. The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip.

2) The maximum interpolated value was searched with a straightforward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1 g or 10 g) were computed by the 3D-Spline interpolation algorithm. The 3D-Spline is composed of three one dimensional splines with the “Not a knot"-condition (in x, y and z-directions). The volume was integrated with the trapezoidal-algorithm. One thousand points (10 x 10 x 10) were interpolated to calculate the averages.

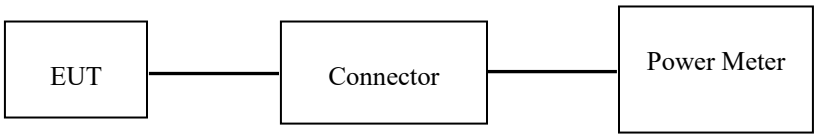
All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

Step 4: Re-measurement of the SAR value at the same location as in Step 1. If the value changed by more than 5%, the evaluation was repeated.

6. CONDUCTED OUTPUT POWER MEASUREMENT

6.1 Test Procedure

The RF output of the transmitter was connected to the input of the Power Meter through Connector.



SRD/WLAN

6.2 Maximum Target Output Power

Band	Mode	Maximum Target Output Power (dBm)	
		Chain 0	Chain 1
SRD 2.4GHz	1.4 M	25.5	/
	20 M	25.2	/
SRD 900MHz	1.4 M	24.7	/
	20 M	23.6	/
SRD 5.8GHz	1.4 M	23.9	/
	20 M	23.2	/
WLAN 2.4G	802.11b	16.2	19
	802.11g	19.3	20.4
	802.11n20	18	14.4
	802.11n40	18.8	15.8
WLAN 5.8G	802.11a	16.9	14.3
	802.11n20	16.8	14.3
	802.11n40	16.7	14.3
	802.11ac80	15.2	14
Bluetooth BDR/EDR		10.8	/
BLE		4.5	/

6.3 Test Results:

SRD 2.4G:

Mode	Frequency (MHz)	Duty Cycle	Max Average Conducted Output Power (dBm)
1.4 MHz	2403.5	100%	25.35
	2439.5		25.43
	2475.5		24.31
20 MHz	2412.5	100%	25.12
	2436.5		25.06
	2462.5		24.94

SRD 900MHz:

Mode	Frequency (MHz)	Duty Cycle	Max Average Conducted Output Power (dBm)
1.4 MHz	904	100%	24.58
	915		24.19
	926		24.34
20 MHz	914	100%	23.47
	915		23.22
	916		23.26

SRD 5.8G:

Mode	Frequency (MHz)	Duty Cycle	Max Average Conducted Output Power (dBm)
1.4 MHz	5728	100%	23.86
	5788		23.77
	5847		23.62
20 MHz	5738	100%	23.15
	5789		23.04
	5839		22.93

WLAN 2.4G:

Mode	Frequency (MHz)	Data Rate	Duty Cycle	RF Output Power (dBm)		
				Chain 0	Chain 1	Total
802.11 b	2412	1Mbps	100%	15.63	18.94	/
	2437			15.91	18.79	/
	2462			16.07	18.88	/
802.11 g	2412	6Mbps	95.69%	19.04	20.37	/
	2437			19.09	20.29	/
	2462			19.22	20.21	/
802.11 n20	2412	MCS0	98.71%	17.36	14.26	19.09
	2437			17.29	14.19	18.96
	2462			17.91	14.22	19.47
802.11 n40	2422	MCS0	92.11%	18.68	15.31	20.32
	2437			18.34	15.27	20.05
	2452			18.57	15.72	20.34

WLAN 5G:

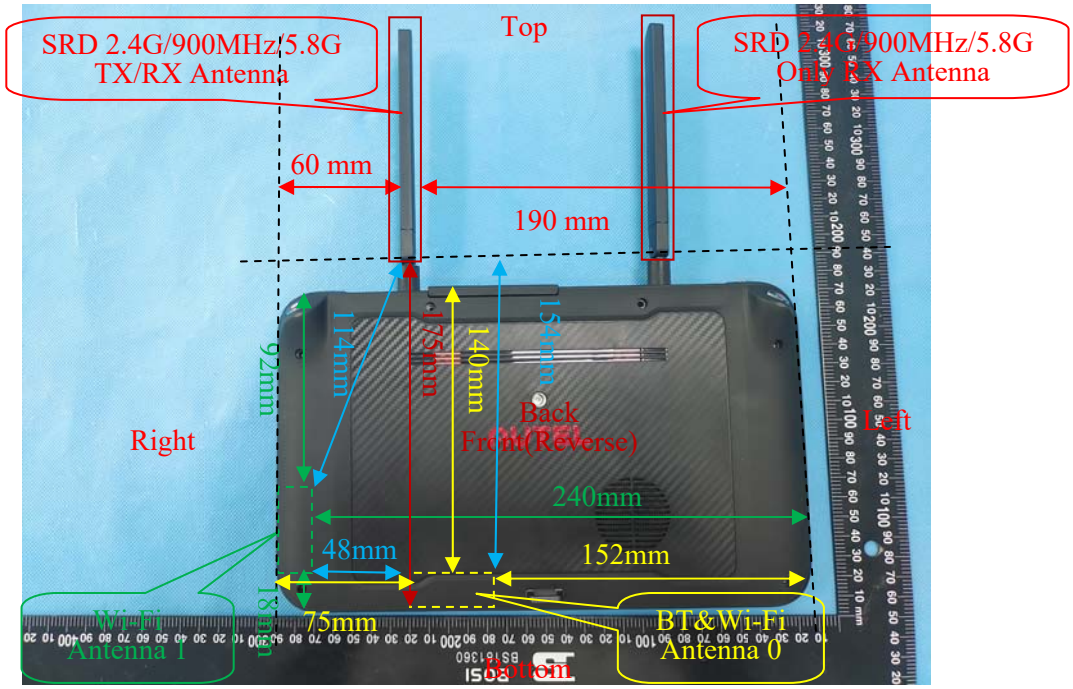
Band	Mode	Frequency (MHz)	Data Rate	Duty Cycle	Max Average Conducted Output Power (dBm)		
					Chain 0	Chain 1	Total
5.8G	802.11a	5745	6Mbps	89.38%	16.77	14.19	/
		5785			16.81	14.14	/
		5825			16.39	14.07	/
	802.11n20	5745	MCS0	91.51%	16.37	14.16	18.41
		5785			16.74	14.13	18.65
		5825			15.88	14.09	18.12
	802.11n40	5755	MCS0	71.67%	16.54	14.11	18.49
		5795			16.57	14.17	18.54
	802.11ac80	5775	MCS0	19.33%	15.11	13.92	17.57

Bluetooth:

Mode	Channel frequency (MHz)	RF Output Power (dBm)
BDR(GFSK)	2402	9.22
	2441	9.59
	2473	10.73
	2480	9.45
EDR(π/4-DQPSK)	2402	8.57
	2441	8.81
	2473	9.51
	2480	9.08
EDR(8DPSK)	2402	8.85
	2441	9.48
	2473	9.89
	2480	9.31
BLE_1M	2402	2.78
	2440	3.2
	2480	4.19
BLE_2M	2402	2.79
	2440	3.26
	2480	4.32

7. Standalone SAR test exclusion considerations

Antennas Location:



7.1 Antenna Distance To Edge

Antenna Distance To Edge(mm)						
Mode	**Back**	**Front**	**Left**	**Right**	**Top**	**Bottom**
SRD 2.4G/900MHz/5.8G	15	<5	190	60	<5	175
WLAN (2.4G/5.8G) Antenna 0	<5	<5	152	75	140	<5
WLAN (2.4G/5.8G) Antenna 1	<5	<5	240	<5	92	18
Bluetooth	<5	<5	152	75	140	<5

7.2 Standalone SAR test exclusion considerations

Mode	Frequency (MHz)	Distance (cm)	SAR-Based Exemption Threshold		Conducted output power including Tune-up Tolerance (dBm)	Antenna Gain (dBi)	ERP (dBm)	SAR Test Exclusion
			(mW)	(dBm)				
SRD 2.4G	2475.5	10	10.19	10.08	25.5	1.7	25.05	NO
SRD 900MHz	926	10	19.31	12.86	24.7	2.7	25.25	NO
SRD 5.8G	5847	10	5.82	7.65	23.9	3.2	18.55	NO
Wi-Fi 2.4G	2462	10	10.22	10.09	20.4	2.7	20.95	NO
Wi-Fi 5.8G	5825	10	5.84	7.66	16.9	3.7	18.45	NO
Bluetooth	2480	10	10.17	10.07	10.8	2.7	11.35	NO

Note: *The bluetooth based peak power for calculation.*

NOTE:
According to 447498 D04 Interim General RF Exposure Guidance v01, clause 2.1.3 1- SAR-Based Exemption:

The SAR-based exemption formula of §1.1307(b)(3)(i)(B), repeated here as Formula (B.2), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold P_{th} (mW).

This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by Formula (B.2).

$$P_{th}\ (\text{mW}) = \begin{cases} ERP_{20\ \text{cm}}(d/20\ \text{cm})^x & d \le 20\ \text{cm} \\ ERP_{20\ \text{cm}} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases} \qquad \text{(B.2)}$$

where

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

and f is in GHz, d is the separation distance (cm), and $ERP_{20\text{cm}}$ is per Formula (B.1).

$$ERP_{20\ \text{cm}}\ (\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases} \qquad \text{(B.1)}$$

7.4 Standalone SAR test exclusion considerations:

Mode	Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Test Exclusion Distance (mm)
SRD 2.4G	2475.5	25.5	354.81	64.6
SRD 900MHz	926	24.7	295.12	57.2
SRD 5.8G	5847	23.9	245.47	59.9
Wi-Fi 2.4G	2462	20.4	109.65	34.8
Wi-Fi 5.8G	5825	16.9	48.98	27.7
Bluetooth	2480	10.8	12.02	11

7.5 SAR test exclusion for the EUT edge considerations Result

Mode	Back Edge	Front Edge	Left Edge	Right Edge	Top Edge	Bottom Edge
Bluetooth	**Required**	**Required**	Exclusion	Exclusion	Exclusion	**Required**
SRD 2.4GHz	**Required**	**Required**	Exclusion	**Required**	**Required**	Exclusion
SRD 900MHz	**Required**	**Required**	Exclusion	Exclusion	**Required**	Exclusion
SRD 5.8GHz	**Required**	**Required**	Exclusion	Exclusion	**Required**	Exclusion
WLAN 2.4G Chain0	**Required**	**Required**	Exclusion	Exclusion	Exclusion	**Required**
WLAN 2.4G Chain1	**Required**	**Required**	Exclusion	**Required**	Exclusion	**Required**
WLAN 5.8G Chain0	**Required**	**Required**	Exclusion	Exclusion	Exclusion	**Required**
WLAN 5.8G Chain1	**Required**	**Required**	Exclusion	**Required**	Exclusion	**Required**

Note:
Required:The distance is less than **Test Exclusion Distance**, the SAR test is required.
Exclusion: The distance is large than **Test Exclusion Distance**, SAR test is not required.

8. SAR MEASUREMENT RESULTS

This page summarizes the results of the performed dosimetric evaluation.

8.1 SAR Test Data

Environmental Conditions

Temperature:	22.5-23.8 ℃	22.5-23.9 ℃	22.5-23.6 ℃	22.5-23.2 ℃
Relative Humidity:	445 %	46 %	48 %	45 %
ATM Pressure:	101.1 kPa	100.8 kPa	100.6 kPa	100.2 kPa
Test Date:	2022/07/04	2022/07/05	2022/07/06	2022/07/07

Testing was performed by Karl Gong, Ken Zong, Way Li.

SRD 2.4G:

EUT Position	Bandwidth (MHz)	Frequency (MHz)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	10 g SAR (W/kg), Limit=4.0W/kg				
					Scaled Factor	Meas. SAR	Scaled SAR	Corrected SAR	Plot
Handheld Back (0mm)	1.4M	2403.5	/	/	/	/	/	/	/
		2439.5	25.43	25.5	1.016	1.21	1.229	1.23	1#
		2475.5	/	/	/	/	/	/	/
Handheld Back Fold (0mm)	1.4M	2403.5	/	/	/	/	/	/	/
		2439.5	25.43	25.5	1.016	0.013	0.013	0.01	2#
		2475.5	/	/	/	/	/	/	/
Handheld Front (0mm)	1.4M	2403.5	/	/	/	/	/	/	/
		2439.5	25.43	25.5	1.016	0.054	0.055	0.06	3#
		2475.5	/	/	/	/	/	/	/
Handheld Right (0mm)	1.4M	2403.5	/	/	/	/	/	/	/
		2439.5	25.43	25.5	1.016	<0.01	0.01	0.01	/
		2475.5	/	/	/	/	/	/	/
Handheld Top (0mm)	1.4M	2403.5	25.35	25.5	1.035	1.58	1.635	1.64	4#
		2439.5	25.43	25.5	1.016	1.39	1.412	1.41	5#
		2475.5	24.31	25.5	1.315	1.22	1.604	1.6	6#
	20M	2436.5	25.06	25.2	1.033	1.3	1.343	1.34	7#

EUT Position	Bandwidth (MHz)	Frequency (MHz)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1 g SAR (W/kg), Limit=1.6W/kg				
					Scaled Factor	Meas. SAR	Scaled SAR	Corrected SAR	Plot
Close to Body Back (10mm)	1.4M	2403.5	/	/	/	/	/	/	/
		2439.5	25.43	25.5	1.016	0.774	0.786	0.79	8#
		2475.5	/	/	/	/	/	/	/
Close to Body Back Fold (10mm)	1.4M	2403.5	/	/	/	/	/	/	/
		2439.5	25.43	25.5	1.016	0.017	0.017	0.02	9#
		2475.5	/	/	/	/	/	/	/
Close to Body Front (10mm)	1.4M	2403.5	/	/	/	/	/	/	/
		2439.5	25.43	25.5	1.016	0.048	0.049	0.05	10#
		2475.5	/	/	/	/	/	/	/
Close to Body Right (10mm)	1.4M	2403.5	/	/	/	/	/	/	/
		2439.5	25.43	25.5	1.016	<0.01	0.01	0.01	/
		2475.5	/	/	/	/	/	/	/
Close to Body Top (10mm)	1.4M	2403.5	25.35	25.5	1.035	1.11	1.149	1.15	11#
		2439.5	25.43	25.5	1.016	1.19	1.209	1.21	12#
		2475.5	24.31	25.5	1.315	0.867	1.14	1.14	13#
	20M	2412.5	25.12	25.2	1.019	1.14	1.162	1.16	14#
		2436.5	25.06	25.2	1.033	1.16	1.198	1.2	15#
		2462.5	24.94	25.2	1.062	0.79	0.839	0.84	16#

The data was performed on 2022/07/05.

SRD 900MHz:

EUT Position	Bandwidth (MHz)	Frequency (MHz)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	10 g SAR (W/kg), Limit=4.0W/kg				
					Scaled Factor	Meas. SAR	Scaled SAR	Corrected SAR	Plot
Handheld Back (0mm)	1.4M	904	/	/	/	/	/	/	/
		915	24.19	24.7	1.125	0.174	0.196	0.2	17#
		926	/	/	/	/	/	/	/
Handheld Back Fold (0mm)	1.4M	904	/	/	/	/	/	/	/
		915	24.19	24.7	1.125	<0.01	0.01	0.01	/
		926	/	/	/	/	/	/	/
Handheld Front (0mm)	1.4M	904	24.58	24.7	1.028	0.18	0.185	0.19	18#
		915	24.19	24.7	1.125	0.181	0.204	0.2	19#
		926	24.34	24.7	1.086	0.181	0.197	0.2	20#
	20M	915	23.22	23.6	1.091	0.164	0.179	0.18	21#
Handheld Top (0mm)	1.4M	904	/	/	/	/	/	/	/
		915	24.19	24.7	1.125	0.162	0.182	0.18	22#
		926	/	/	/	/	/	/	/

EUT Position	Bandwidth (MHz)	Frequency (MHz)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1 g SAR (W/kg), Limit=1.6W/kg				
					Scaled Factor	Meas. SAR	Scaled SAR	Corrected SAR	Plot
Close to Body Back (10mm)	1.4M	904	/	/	/	/	/	/	/
		915	24.19	24.7	1.125	0.183	0.206	0.21	23#
		926	/	/	/	/	/	/	/
Close to Body Back Fold (10mm)	1.4M	904	/	/	/		/	/	/
		915	24.19	24.7	1.125	<0.01	0.01	0.01	/
		926	/	/	/		/	/	/
Close to Body Front (10mm)	1.4M	904	24.58	24.7	1.028	0.248	0.255	0.26	24#
		915	24.19	24.7	1.125	0.217	0.244	0.24	25#
		926	24.34	24.7	1.086	0.228	0.248	0.25	26#
	20M	915	23.22	23.6	1.091	0.206	0.225	0.23	27#
Close to Body Top (10mm)	1.4M	904	/	/	/	/	/	/	/
		915	24.19	24.7	1.125	0.168	0.189	0.19	28#
		926	/	/	/	/	/	/	/

SRD 5.8G:

EUT Position	Bandwidth (MHz)	Frequency (MHz)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	10 g SAR (W/kg), Limit=4.0W/kg				
					Scaled Factor	Meas. SAR	Scaled SAR	Corrected SAR	Plot
Handheld Back (0mm)	1.4M	5728	/	/	/	/	/	/	/
		5788	23.77	23.9	1.03	0.736	0.758	0.76	29#
		5847	/	/	/	/	/	/	/
Handheld Back Fold (0mm)	1.4M	5728	/	/	/	/	/	/	/
		5788	23.77	23.9	1.03	0.139	0.143	0.14	30#
		5847	/	/	/	/	/	/	/
Handheld Front (0mm)	1.4M	5728	/	/	/	/	/	/	/
		5788	23.77	23.9	1.03	0.124	0.128	0.13	31#
		5847	/	/	/	/	/	/	/
Handheld Top (0mm)	1.4M	5728	23.86	23.9	1.009	0.927	0.935	0.94	32#
		5788	23.77	23.9	1.03	0.918	0.946	0.95	33#
		5847	23.62	23.9	1.067	0.672	0.717	0.72	34#
	20M	5789	23.04	23.2	1.038	0.845	0.877	0.88	35#

The data was performed on 2022/07/06.

EUT Position	Bandwidth (MHz)	Frequency (MHz)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1 g SAR (W/kg), Limit=1.6W/kg				
					Scaled Factor	Meas. SAR	Scaled SAR	Corrected SAR	Plot
Close to Body Back (10mm)	1.4M	5728	23.86	23.9	1.009	1.06	1.07	1.07	36#
		5788	23.77	23.9	1.03	1.13	1.164	1.16	37#
		5847	23.62	23.9	1.067	0.861	0.919	0.92	38#
Close to Body Back Fold (10mm)	1.4M	5728	/	/	/	/	/	/	/
		5788	23.77	23.9	1.03	0.237	0.244	0.24	39#
		5847	/	/	/	/	/	/	/
Close to Body Front (10mm)	1.4M	5728	/	/	/	/	/	/	/
		5788	23.77	23.9	1.03	0.213	0.219	0.22	40#
		5847	/	/	/	/	/	/	/
Close to Body Top (10mm)	1.4M	5728	23.86	23.9	1.009	1.17	1.181	1.18	41#
		5788	23.77	23.9	1.03	1.25	1.288	1.29	42#
		5847	23.62	23.9	1.067	1.31	1.398	1.4	43#
	20 M	5738	23.15	23.2	1.012	1.13	1.144	1.14	44#
		5789	23.04	23.2	1.038	1.12	1.163	1.16	45#
		5839	22.93	23.2	1.064	1.11	1.181	1.18	46#

The data was performed on 2022/07/06.

Note:

1. When the SAR value is less than half of the limit, testing for other channels are optional.
2. When SAR or MPE is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance.
3. For modes that peak SAR is too low to evaluate, a SAR value 0.01W/kg is considered as their Scaled SAR.
4. The highest output power bandwidth 1.4MHz was selected as primary mode, for the worst case of the primary mode other bandwidth, bandwidth 20MHz were selected to test.
5. According to IEC 62209-2:2010 ,If the correction ΔSAR has a positive sign, the measured SAR results shall not be corrected.

WLAN 2.4G Antenna 0:

EUT Position	Test Mode	Frequency (MHz)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	10 g SAR (W/kg), Limit=4.0W/kg					
					Scaled Factor	Duty Cycle	Meas. SAR	Scaled SAR	Corrected SAR	Plot
Handheld Back (0mm)	802.11g	2412	/	/	/	/	/	/	/	/
	802.11g	2437	19.09	19.3	1.05	1.045	0.069	0.075	0.08	47#
	802.11g	2462	/	/	/	/	/	/	/	/
Handheld Front (0mm)	802.11g	2412	19.04	19.3	1.062	1.045	0.46	0.511	0.51	48#
	802.11g	2437	19.09	19.3	1.05	1.045	0.482	0.529	0.53	49#
	802.11g	2462	19.22	19.3	1.019	1.045	0.557	0.594	0.59	50#
Handheld Bottom (0mm)	802.11g	2412	/	/	/	/	/	/	/	/
	802.11g	2437	19.09	19.3	1.05	1.045	0.375	0.412	0.41	51#
	802.11g	2462	/	/	/	/	/	/	/	/

EUT Position	Test Mode	Frequency (MHz)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1 g SAR (W/kg), Limit=1.6W/kg					
					Scaled Factor	Duty Cycle	Meas. SAR	Scaled SAR	Corrected SAR	Plot
Close to Body Back (10mm)	802.11g	2412	/	/	/	/	/	/	/	/
	802.11g	2437	19.09	19.3	1.05	1.045	0.05	0.055	0.06	52#
	802.11g	2462	/	/	/	/	/	/	/	/
Close to Body Front (10mm)	802.11g	2412	19.04	19.3	1.062	1.045	0.333	0.37	0.37	53#
	802.11g	2437	19.09	19.3	1.05	1.045	0.237	0.26	0.26	54#
	802.11g	2462	19.22	19.3	1.019	1.045	0.413	0.44	0.44	55#
Close to Body Bottom (10mm)	802.11g	2412	/	/	/	/	/	/	/	/
	802.11g	2437	19.09	19.3	1.05	1.045	0.382	0.419	0.42	56#
	802.11g	2462	/	/	/	/	/	/	/	/

The data was performed on 2022/07/05.

WLAN 2.4G Antenna 1:

EUT Position	Test Mode	Frequency (MHz)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	10 g SAR (W/kg), Limit=4.0W/kg					
					Scaled Factor	Duty Cycle	Meas. SAR	Scaled SAR	Corrected SAR	Plot
Handheld Back (0mm)	802.11g	2412	/	/	/	/	/	/	/	/
	802.11g	2437	20.29	20.4	1.026	1.045	0.228	0.245	0.25	57#
	802.11g	2462	/	/	/	/	/	/	/	/
Handheld Front (0mm)	802.11g	2412	20.37	20.4	1.007	1.045	1.44	1.515	1.52	58#
	802.11g	2437	20.29	20.4	1.026	1.045	1.24	1.329	1.33	59#
	802.11g	2462	20.21	20.4	1.045	1.045	1.4	1.529	1.53	60#
Handheld Right (0mm)	802.11g	2412	/	/	/	/	/	/	/	/
	802.11g	2437	20.29	20.4	1.026	1.045	0.721	0.773	0.77	61#
	802.11g	2462	/	/	/	/	/	/	/	/
Handheld Bottom (0mm)	802.11g	2412	/	/	/	/	/	/	/	/
	802.11g	2437	20.29	20.4	1.026	1.045	0.05	0.053	0.05	62#
	802.11g	2462	/	/	/	/	/	/	/	/

EUT Position	Test Mode	Frequency (MHz)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1 g SAR (W/kg), Limit=1.6W/kg					
					Scaled Factor	Duty Cycle	Meas. SAR	Scaled SAR	Corrected SAR	Plot
Close to Body Back (10mm)	802.11g	2412	/	/	/	/	/	/	/	/
	802.11g	2437	20.29	20.4	1.026	1.045	0.17	0.182	0.18	63#
	802.11g	2462	/	/	/	/	/	/	/	/
Close to Body Front (10mm)	802.11g	2412	20.37	20.4	1.007	1.045	0.916	0.963	0.96	64#
	802.11g	2437	20.29	20.4	1.026	1.045	0.964	1.034	1.03	65#
	802.11g	2462	20.21	20.4	1.045	1.045	0.989	1.081	1.08	66#
Close to Body Right (10mm)	802.11g	2412	/	/	/	/	/	/	/	/
	802.11g	2437	20.29	20.4	1.026	1.045	0.618	0.663	0.66	67#
	802.11g	2462	/	/	/	/	/	/	/	/
Close to Body Bottom (10mm)	802.11g	2412	/	/	/	/	/	/	/	/
	802.11g	2437	20.29	20.4	1.026	1.045	0.048	0.051	0.05	68#
	802.11g	2462	/	/	/	/	/	/	/	/

The data was performed on 2022/07/05.

Note:

1. When the SAR value is less than half of the limit, testing for other channels are optional.
2. When SAR or MPE is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance.
3. For modes that peak SAR is too low to evaluate, a SAR value 0.01W/kg is considered as their Scaled SAR.
4. For 802.11g mode power is the largest mode of 802.11b/g/n, 802.11 g mode is selected to test
5. According to IEC 62209-2:2010 ,If the correction ΔSAR has a positive sign, the measured SAR results shall not be corrected.

WLAN 5.8G Antenna 0:

EUT Position	Test Mode	Frequency (MHz)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	10 g SAR (W/kg), Limit=4.0W/kg				
					Scaled Factor	Meas. SAR	Scaled SAR	Corrected SAR	Plot
Handheld Back (0mm)	802.11a	5745	/	/	/	/	/	/	/
	802.11a	5785	16.81	16.9	1.021	0.223	0.228	0.23	69#
	802.11a	5825	/	/	/	/	/	/	/
Handheld Front (0mm)	802.11a	5745	16.77	16.9	1.03	1.11	1.143	1.14	70#
	802.11a	5785	16.81	16.9	1.021	1.11	1.133	1.13	71#
	802.11a	5825	16.39	16.9	1.125	1.04	1.17	1.17	72#
Handheld Bottom (0mm)	802.11a	5745	/	/	/	/	/	/	/
	802.11a	5785	16.81	16.9	1.021	1.07	1.092	1.09	73#
	802.11a	5825	/	/	/	/	/	/	/

The data was performed on 2022/07/07.

EUT Position	Test Mode	Frequency (MHz)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1 g SAR (W/kg), Limit=1.6W/kg				
					Scaled Factor	Meas. SAR	Scaled SAR	Corrected SAR	Plot
Close to Body Back (10mm)	802.11a	5745	/	/	/	/	/	/	/
	802.11a	5785	16.81	16.9	1.021	0.143	0.146	0.15	74#
	802.11a	5825	/	/	/	/	/	/	/
Close to Body Front (10mm)	802.11a	5745	16.77	16.9	1.03	0.743	0.765	0.77	75#
	802.11a	5785	16.81	16.9	1.021	0.761	0.777	0.78	76#
	802.11a	5825	16.39	16.9	1.125	0.828	0.932	0.93	77#
Close to Body Bottom (10mm)	802.11a	5745	/	/	/	/	/	/	/
	802.11a	5785	16.81	16.9	1.021	0.602	0.615	0.62	78#
	802.11a	5825	/	/	/	/	/	/	/

The data was performed on 2022/07/07.

WLAN 5.8G Antenna 1:

EUT Position	Test Mode	Frequency (MHz)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	10 g SAR (W/kg), Limit=4.0W/kg				
					Scaled Factor	Meas. SAR	Scaled SAR	Corrected SAR	Plot
Handheld Back (0mm)	802.11a	5745	/	/	/	/	/	/	/
	802.11a	5785	14.14	14.3	1.038	0.189	0.196	0.2	79#
	802.11a	5825	/	/	/	/	/	/	/
Handheld Front (0mm)	802.11a	5745	14.19	14.3	1.026	0.577	0.592	0.59	80#
	802.11a	5785	14.14	14.3	1.038	0.592	0.614	0.61	81#
	802.11a	5825	14.07	14.3	1.054	0.713	0.752	0.75	82#
Handheld Right (0mm)	802.11a	5745	/	/	/	/	/	/	/
	802.11a	5785	14.14	14.3	1.038	0.528	0.548	0.55	83#
	802.11a	5825	/	/	/	/	/	/	/
Handheld Bottom (0mm)	802.11a	5745	/	/	/	/	/	/	/
	802.11a	5785	14.14	14.3	1.038	0.055	0.057	0.06	84#
	802.11a	5825	/	/	/	/	/	/	/

The data was performed on 2022/07/07.

EUT Position	Test Mode	Frequency (MHz)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1 g SAR (W/kg), Limit=1.6W/kg				
					Scaled Factor	Meas. SAR	Scaled SAR	Corrected SAR	Plot
Close to Body Back (10mm)	802.11a	5745	/	/	/	/	/	/	/
	802.11a	5785	14.14	14.3	1.038	0.17	0.176	0.18	85#
	802.11a	5825	/	/	/	/	/	/	/
Close to Body Front (10mm)	802.11a	5745	14.19	14.3	1.026	0.554	0.568	0.57	86#
	802.11a	5785	14.14	14.3	1.038	0.541	0.562	0.56	87#
	802.11a	5825	14.07	14.3	1.054	0.569	0.6	0.6	88#
Close to Body Right (10mm)	802.11a	5745	/	/	/	/	/	/	/
	802.11a	5785	14.14	14.3	1.038	0.416	0.432	0.43	89#
	802.11a	5825	/	/	/	/	/	/	/
Close to Body Bottom (10mm)	802.11a	5745	/	/	/	/	/	/	/
	802.11a	5785	14.14	14.3	1.038	0.055	0.057	0.06	90#
	802.11a	5825	/	/	/	/	/	/	/

The data was performed on 2022/07/07.

Note:

1. When the SAR value is less than half of the limit, testing for other channels are optional.
2. When SAR or MPE is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance.
3. For modes that peak SAR is too low to evaluate, a SAR value 0.01W/kg is considered as their Scaled SAR.
4. For 802.11a mode power is the largest mode of 802.11a/n/ac, 802.11 a mode is selected to test
5. According to IEC 62209-2:2010 ,If the correction ΔSAR has a positive sign, the measured SAR results shall not be corrected.

Bluetooth:

EUT Position	Test Mode	Frequency (MHz)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	10 g SAR (W/kg), Limit=4.0W/kg				
					Scaled Factor	Meas. SAR	Scaled SAR	Corrected SAR	Plot
Handheld Back (0mm)	GFSK	2402	/	/	/	/	/	/	/
	GFSK	2441	9.59	10.8	1.321	0.011	0.015	0.02	91#
	GFSK	2473	/	/	/	/	/	/	/
	GFSK	2480	/	/	/	/	/	/	/
Handheld Front (0mm)	GFSK	2402	/	/	/	/	/	/	/
	GFSK	2441	9.59	10.8	1.321	0.104	0.137	0.14	92#
	GFSK	2473	/	/	/	/	/	/	/
	GFSK	2480	/	/	/	/	/	/	/
Handheld Bottom (0mm)	GFSK	2402	9.22	10.8	1.439	0.084	0.121	0.12	93#
	GFSK	2441	9.59	10.8	1.321	0.118	0.156	0.16	94#
	GFSK	2473	10.73	10.8	1.016	0.194	0.197	0.2	95#
	GFSK	2480	9.45	10.8	1.365	0.113	0.154	0.15	96#

The data was performed on 2022/07/04.

EUT Position	Test Mode	Frequency (MHz)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1 g SAR (W/kg), Limit=1.6W/kg				
					Scaled Factor	Meas. SAR	Scaled SAR	Corrected SAR	Plot
Close to Body Back (10mm)	GFSK	2402	/	/	/	/	/	/	/
	GFSK	2441	9.59	10.8	1.321	<0.01	0.01	0.01	/
	GFSK	2473	/	/	/	/	/	/	/
	GFSK	2480	/	/	/	/	/	/	/
Close to Body Front (10mm)	GFSK	2402	/	/	/	/	/	/	/
	GFSK	2441	9.59	10.8	1.321	0.049	0.065	0.07	97#
	GFSK	2473	/	/	/	/	/	/	/
	GFSK	2480	/	/	/	/	/	/	/
Close to Body Bottom (10mm)	GFSK	2402	9.22	10.8	1.439	0.037	0.053	0.05	98#
	GFSK	2441	9.59	10.8	1.321	0.06	0.079	0.08	99#
	GFSK	2473	10.73	10.8	1.016	0.123	0.125	0.13	100#
	GFSK	2480	9.45	10.8	1.365	0.061	0.083	0.08	101#

The data was performed on 2022/07/04.

7.8.2 SAR correction formula

From Douglas et al. ([28], [29]), a linear relationship was found between the percentage change in SAR (denoted ΔSAR) and the percentage change in the permittivity and conductivity from the target values in Table 2 (denoted $\Delta\varepsilon_r$ and $\Delta\sigma$, respectively). This linear relationship agrees with the results of Kuster and Balzano [30] and Bit-Babik et al. [31]. The relationship is given by:

$$\Delta SAR = c_\varepsilon \Delta\varepsilon_r + c_\sigma \Delta\sigma \tag{8}$$

where

c_ε = $\partial(\Delta SAR)/\partial(\Delta\varepsilon)$ is the coefficient representing the sensitivity of SAR to permittivity where SAR is normalized to output power;

c_σ = $\partial(\Delta SAR)/\partial(\Delta\sigma)$ is the coefficient representing the sensitivity of SAR to conductivity, where SAR is normalized to output power.

The values of c_ε and c_σ have a simple relationship with frequency that can be described using polynomial equations. For dipole antennas at frequencies from 4 MHz to 6 GHz, the 1 g averaged SAR c_ε and c_σ are given by

$$c_\varepsilon = -7{,}854\times10^{-4} f^3 + 9{,}402\times10^{-3} f^2 - 2{,}742\times10^{-2} f - 0{,}202\,6 \tag{9}$$

$$c_\sigma = 9{,}804\times10^{-3} f^3 - 8{,}661\times10^{-2} f^2 + 2{,}981\times10^{-2} f + 0{,}782\,9 \tag{10}$$

where f is the frequency in GHz. Above 6 GHz, the sensitivity is non-varying with frequency due to the small penetration depth; the values of c_ε = −0,198 and c_σ = 0 shall be used.

For frequencies from 4 MHz to 6 GHz, the 10 g averaged SAR c_ε and c_σ are given by:

$$c_\varepsilon = 3{,}456\times10^{-3} f^3 - 3{,}531\times10^{-2} f^2 + 7{,}675\times10^{-2} f - 0{,}186\,0 \tag{11}$$

$$c_\sigma = 4{,}479\times10^{-3} f^3 - 1{,}586\times10^{-2} f^2 - 0{,}197\,2 f + 0{,}771\,7 \tag{12}$$

Corrected SAR Evaluation Table

Frequency (MHz)	Liquid Type	C ε	△ ε r	C δ	△ δ	△SAR (%)
900	1g Head	-0.220	0.4	0.747	-1.75	-1.39
904	1g Head	-0.220	0.36	0.746	-0.62	-0.54
914	1g Head	-0.220	-0.07	0.745	-0.51	-0.36
915	1g Head	-0.220	-0.15	0.745	0.1	0.11
916	1g Head	-0.220	-0.22	0.745	0.92	0.73
926	1g Head	-0.221	-0.28	0.744	1.63	1.27
900	10g Head	-0.143	0.4	0.585	-1.75	-1.08
904	10g Head	-0.143	0.36	0.584	-0.62	-0.41
914	10g Head	-0.143	-0.07	0.582	-0.51	-0.29
915	10g Head	-0.143	-0.15	0.581	0.1	0.08
916	10g Head	-0.143	-0.22	0.581	0.92	0.57
926	10g Head	-0.142	-0.28	0.579	1.63	0.98

Frequency (MHz)	Liquid Type	C ε	△ ε r	C δ	△ δ	△SAR (%)
2403.5	1g Head	-0.225	0.19	0.490	-1.02	-0.54
2412	1g Head	-0.225	0.16	0.489	-1.07	-0.56
2412.5	1g Head	-0.225	0.12	0.488	-0.34	-0.19
2436.5	1g Head	-0.225	0.22	0.483	-0.95	-0.51
2437	1g Head	-0.225	0.19	0.483	-0.5	-0.28
2439.5	1g Head	-0.225	0.18	0.483	-0.17	-0.12
2450	1g Head	-0.225	0.12	0.480	0.17	0.05
2462	1g Head	-0.225	0.09	0.478	0.28	0.11
2462.5	1g Head	-0.225	0.03	0.478	0.5	0.23
2475.5	1g Head	-0.225	-0.17	0.475	-0.33	-0.12
2403.5	10g Head	-0.158	0.19	0.268	-1.02	-0.30
2412	10g Head	-0.158	0.16	0.267	-1.07	-0.31
2412.5	10g Head	-0.158	0.12	0.267	-0.34	-0.11
2436.5	10g Head	-0.159	0.22	0.262	-0.95	-0.28
2437	10g Head	-0.159	0.19	0.262	-0.5	-0.16
2439.5	10g Head	-0.159	0.18	0.261	-0.17	-0.07
2450	10g Head	-0.159	0.12	0.259	0.17	0.02
2462	10g Head	-0.159	0.09	0.257	0.28	0.06
2462.5	10g Head	-0.160	0.03	0.257	0.5	0.12
2475.5	10g Head	-0.160	-0.17	0.254	-0.33	-0.06

Frequency (MHz)	Liquid Type	C ε	△ ε r	C δ	△ δ	△SAR (%)
2402	1g Head	-0.225	0.19	0.491	-1.48	-0.77
2441	1g Head	-0.225	0.12	0.482	0.06	0.00
2450	1g Head	-0.225	0.03	0.480	0.39	0.18
2473	1g Head	-0.225	-0.09	0.475	0.11	0.07
2480	1g Head	-0.225	-0.21	0.474	0.11	0.10
2402	10g Head	-0.157	0.19	0.269	-1.48	-0.43
2441	10g Head	-0.159	0.12	0.261	0.06	0.00
2450	10g Head	-0.159	0.03	0.259	0.39	0.10
2473	10g Head	-0.160	-0.09	0.255	0.11	0.04
2480	10g Head	-0.160	-0.21	0.253	0.11	0.06

Frequency (MHz)	Liquid Type	C ε	△ ε r	C δ	△ δ	△SAR (%)
5728	1g Head	-0.199	0.24	-0.046	-0.15	-0.04
5738	1g Head	-0.199	0.14	-0.045	0.08	-0.03
5788	1g Head	-0.199	0.07	-0.045	-0.29	0.00
5789	1g Head	-0.199	-0.04	-0.045	-0.06	0.01
5800	1g Head	-0.199	-0.1	-0.045	0.21	0.01
5839	1g Head	-0.199	-0.03	-0.044	0.24	0.00
5847	1g Head	-0.198	-0.03	-0.044	0.41	-0.01
5728	10g Head	-0.255	0.24	-0.036	-0.15	-0.06
5738	10g Head	-0.255	0.14	-0.036	0.08	-0.04
5788	10g Head	-0.255	0.07	-0.033	-0.29	-0.01
5789	10g Head	-0.255	-0.04	-0.032	-0.06	0.01
5800	10g Head	-0.254	-0.1	-0.032	0.21	0.02
5839	10g Head	-0.254	-0.03	-0.029	0.24	0.00
5847	10g Head	-0.254	-0.03	-0.028	0.41	0.00

Frequency (MHz)	Liquid Type	C ε	△ ε r	C δ	△ δ	△SAR (%)
5745	1g Head	-0.199	0	-0.045	0.02	0.00
5785	1g Head	-0.199	0.08	-0.045	-0.49	0.01
5800	1g Head	-0.199	-0.05	-0.045	0.11	0.00
5825	1g Head	-0.199	-0.07	-0.044	0.13	0.01
5745	10g Head	-0.255	0	-0.035	0.02	0.00
5785	10g Head	-0.255	0.08	-0.033	-0.49	0.00
5800	10g Head	-0.254	-0.05	-0.032	0.11	0.01
5825	10g Head	-0.254	-0.07	-0.030	0.13	0.01

$$\Delta SAR = c_\varepsilon \, \Delta\varepsilon_r + c_\sigma \, \Delta\sigma$$

where

f is the frequency in GHz.

Corrected SAR = Measured SAR * ((100 + (ΔSAR x -1)) /100)

9. SAR MEASUREMENT VARIABILITY

In accordance with published RF Exposure KDB procedure 865664 D01 SAR measurement 100 MHz to 6 GHz v01. 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

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
3) Perform a second repeated measurement only 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 (~ 10% from the 1-g SAR limit).
4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

Note: The same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.

The Highest Measured SAR Configuration in Each Frequency Band

Handheld

SAR probe calibration point	Frequency Band	Freq.(MHz)	EUT Position	Meas. SAR (W/kg)		Largest to Smallest SAR Ratio
				Original	Repeated	
/	/	/	/	/	/	/

Body

SAR probe calibration point	Frequency Band	Freq.(MHz)	EUT Position	Meas. SAR (W/kg)		Largest to Smallest SAR Ratio
				Original	Repeated	
2450MHz (2400-2550MHz)	SRD 2.4G_1.4M	2439.5	Close to Body Top	1.19	1.14	1.04
5800MHz (5700-5910MHz)	SRD 5.8G_1.4M	5847	Close to Body Top	1.31	1.25	1.05

Note:

1. Second Repeated Measurement is not required since the ratio of the largest to smallest SAR for the original and first repeated measurement is not > 1.20.
2. The measured SAR results **do not** have to be scaled to the maximum tune-up tolerance to determine if repeated measurements are required.
3. SAR measurement variability must be assessed for each frequency band, which is determined by the **SAR probe calibration point and tissue-equivalent medium** used for the device measurements.

10. SAR SIMULTANEOUS TRANSMISSION DESCRIPTION

Simultaneous Transmission:

Description of Simultaneous Transmit Capabilities	
Transmitter Combination	**Simultaneous?**
Wi-Fi 2.4G Chain 0+ Wi-Fi 2.4G Chain 1	√
Wi-Fi 5.8G Chain 0+ Wi-Fi 5.8G Chain 1	√
SRD （2.4G/900MHz/5.8G）+ Bluetooth	√
SRD （2.4G/900MHz/5.8G）+ Wi-Fi 2.4G Chain 0+ Wi-Fi 2.4G Chain 1	√
SRD （2.4G/900MHz/5.8G）+ Wi-Fi 5.8G Chain 0+ Wi-Fi 5.8G Chain 1	√
SRD （2.4G/900MHz/5.8G）+ Wi-Fi （2.4G/5.8G）Chain 1+ Bluetooth	√
Wi-Fi（2.4G/5.8G）Chain 0+ Bluetooth	×

Simultaneous SAR test exclusion considerations:

Worst case:

10g Extremity SAR:

Mode(SAR1+SAR2+SAR3)	Position	Reported SAR(W/kg)			ΣSAR < 4.0 W/kg
		SAR1	SAR2	SAR3	
SRD 2.4G + Wi-Fi 2.4G Chain 0+ Wi-Fi 2.4G Chain 1	Handheld Back	1.23	0.08	0.25	1.56
	Handheld Back Fold	0.01	0	0	0.01
	Handheld Front	0.06	0.59	1.52	2.17
	Handheld Top	1.64	0	0	1.64
	Handheld Right	0	0.01	0.77	0.78
	Handheld Bottom	0	0.41	0.05	0.46
SRD 2.4G + Wi-Fi 5.8G Chain 0+ Wi-Fi 5.8G Chain 1	Handheld Back	1.23	0.23	0.2	1.66
	Handheld Back Fold	0.01	0	0	0.01
	Handheld Front	0.06	1.17	0.75	1.98
	Handheld Top	1.64	0	0	1.64
	Handheld Right	0	0.05	0.55	0.6
	Handheld Bottom	0	1.09	0.06	1.15
SRD 2.4G + Wi-Fi 2.4G Chain 1+ Bluetooth	Handheld Back	1.23	0.08	0.02	1.33
	Handheld Back Fold	0.01	0	0	0.01
	Handheld Front	0.06	0.59	0.14	0.79
	Handheld Top	1.64	0	0	1.64
	Handheld Right	0	0.01	0	0.01
	Handheld Bottom	0	0.41	0.2	0.61
SRD 2.4G + Wi-Fi 5.8G Chain 1+ Bluetooth	Handheld Back	1.23	0.23	0.02	1.48
	Handheld Back Fold	0.01	0	0	0.01
	Handheld Front	0.06	1.17	0.14	1.37
	Handheld Top	1.64	0	0	1.64
	Handheld Right	0	0.05	0	0.05
	Handheld Bottom	0	1.09	0.2	1.29

Mode(SAR1+SAR2+SAR3)	Position	Reported SAR(W/kg)			ΣSAR < 4.0 W/kg
		SAR1	SAR2	SAR3	
SRD 900MHz + Wi-Fi 2.4G Chain 0+ Wi-Fi 2.4G Chain 1	Handheld Back	0.2	0.08	0.25	0.53
	Handheld Back Fold	0.01	0	0	0.01
	Handheld Front	0.2	0.59	1.52	**2.31**
	Handheld Top	0.18	0	0	0.18
	Handheld Right	0	0.01	0.77	0.78
	Handheld Bottom	0	0.41	0.05	0.46
SRD 900MHz + Wi-Fi 5.8G Chain 0+ Wi-Fi 5.8G Chain 1	Handheld Back	0.2	0.23	0.2	0.63
	Handheld Back Fold	0.01	0	0	0.01
	Handheld Front	0.2	1.17	0.75	2.12
	Handheld Top	0.18	0	0	0.18
	Handheld Right	0	0.05	0.55	0.6
	Handheld Bottom	0	1.09	0.06	1.15
SRD 900MHz + Wi-Fi 2.4G Chain 1+ Bluetooth	Handheld Back	0.2	0.08	0.02	0.3
	Handheld Back Fold	0.01	0	0	0.01
	Handheld Front	0.2	0.59	0.14	0.93
	Handheld Top	0.18	0	0	0.18
	Handheld Right	0	0.01	0	0.01
	Handheld Bottom	0	0.41	0.2	0.61
SRD 900MHz + Wi-Fi 5.8G Chain 1+ Bluetooth	Handheld Back	0.2	0.23	0.02	0.45
	Handheld Back Fold	0.01		0	0.01
	Handheld Front	0.2	1.17	0.14	1.51
	Handheld Top	0.18	0	0	0.18
	Handheld Right	0	0.05	0	0.05
	Handheld Bottom	0	1.09	0.2	1.29
SRD 5.8G + Wi-Fi 2.4G Chain 0+ Wi-Fi 2.4G Chain 1	Handheld Back	0.76	0.08	0.25	1.09
	Handheld Back Fold	0.14	0	0	0.14
	Handheld Front	0.13	0.59	1.52	2.24
	Handheld Top	0.95	0	0	0.95
	Handheld Right	0	0.01	0.77	0.78
	Handheld Bottom	0	0.41	0.05	0.46
SRD 5.8G + Wi-Fi 5.8G Chain 0+ Wi-Fi 5.8G Chain 1	Handheld Back	0.76	0.23	0.2	1.19
	Handheld Back Fold	0.14	0	0	0.14
	Handheld Front	0.13	1.17	0.75	2.05
	Handheld Top	0.95	0	0	0.95
	Handheld Right	0	0.05	0.55	0.6
	Handheld Bottom	0	1.09	0.06	1.15

Mode(SAR1+SAR2+SAR3)	Position	Reported SAR(W/kg)			ΣSAR < 4.0 W/kg
		SAR1	SAR2	SAR3	
SRD 5.8G + Wi-Fi 2.4G Chain 1+ Bluetooth	Handheld Back	0.76	0.08	0.02	0.86
	Handheld Back Fold	0.14	0	0	0.14
	Handheld Front	0.13	0.59	0.14	0.86
	Handheld Top	0.95	0	0	0.95
	Handheld Right	0	0.01	0	0.01
	Handheld Bottom	0	0.41	0.2	0.61
SRD 5.8G + Wi-Fi 5.8G Chain 1+ Bluetooth	Handheld Back	0.76	0.23	0.02	1.01
	Handheld Back Fold	0.14	0	0	0.14
	Handheld Front	0.13	1.17	0.14	1.44
	Handheld Top	0.95	0	0	0.95
	Handheld Right	0	0.05	0	0.05
	Handheld Bottom	0	1.09	0.2	1.29

Conclusion:

Sum of SAR: **ΣSAR < 4.0 W/kg**, simultaneous transmission SAR with Volume Scans is **not required**.

Worst case:

1g Body SAR:

Mode(SAR1+SAR2+SAR3)	Position	Reported SAR(W/kg)			ΣSAR < 1.6 W/kg
		SAR1	SAR2	SAR3	
SRD 2.4G + Wi-Fi 2.4G Chain 0+ Wi-Fi 2.4G Chain 1	Body Back	0.79	0.06	0.18	1.03
	Body Back Fold	0.02	0	0	0.02
	Body Front	0.05	0.44	1.08	1.57
	Body Top	1.21	0	0	1.21
	Body Right	0	0.02	0.66	0.68
	Body Bottom	0	0.42	0.05	0.47
SRD 2.4G + Wi-Fi 5.8G Chain 0+ Wi-Fi 5.8G Chain 1	Body Back	0.79	0.15	0.18	1.12
	Body Back Fold	0.02	0	0	0.02
	Body Front	0.05	0.93	0.6	1.58
	Body Top	1.21	0	0	1.21
	Body Right	0	0.04	0.43	0.47
	Body Bottom	0	0.62	0.06	0.68
SRD 2.4G + Wi-Fi 2.4G Chain 1+ Bluetooth	Body Back	0.79	0.06	0.01	0.86
	Body Back Fold	0.02	0	0	0.02
	Body Front	0.05	0.44	0.07	0.56
	Body Top	1.21	0	0	1.21
	Body Right	0	0.02	0	0.02
	Body Bottom	0	0.42	0.13	0.55
SRD 2.4G + Wi-Fi 5.8G Chain 1+ Bluetooth	Body Back	0.79	0.15	0.01	0.95
	Body Back Fold	0.02	0	0	0.02
	Body Front	0.05	0.93	0.07	1.05
	Body Top	1.21	0	0	1.21
	Body Right	0	0.04	0	0.04
	Body Bottom	0	0.62	0.13	0.75
SRD 900MHz + Wi-Fi 2.4G Chain 0+ Wi-Fi 2.4G Chain 1	Body Back	0.21	0.06	0.18	0.45
	Body Back Fold	0.01	0	0	0.01
	Body Front	0.26	0.44	1.08	**1.78**
	Body Top	0.19	0	0	0.19
	Body Right	0	0.02	0.66	0.68
	Body Bottom	0	0.42	0.05	0.47
SRD 900MHz + Wi-Fi 5.8G Chain 0+ Wi-Fi 5.8G Chain 1	Body Back	0.21	0.15	0.18	0.54
	Body Back Fold	0.01	0	0	0.01
	Body Front	0.26	0.93	0.6	**1.79**
	Body Top	0.19	0	0	0.19
	Body Right	0	0.04	0.43	0.47
	Body Bottom	0	0.62	0.06	0.68

Mode(SAR1+SAR2+SAR3)	Position	Reported SAR(W/kg)			ΣSAR < 4.0 W/kg
		SAR1	SAR2	SAR3	
SRD 900MHz + Wi-Fi 2.4G Chain 1+ Bluetooth	Body Back	0.21	0.06	0.01	0.28
	Body Back Fold	0.01	0	0	0.01
	Body Front	0.26	0.44	0.07	0.77
	Body Top	0.19	0	0	0.19
	Body Right	0	0.02	0	0.02
	Body Bottom	0	0.42	0.13	0.55
SRD 900MHz + Wi-Fi 5.8G Chain 1+ Bluetooth	Body Back	0.21	0.15	0.01	0.37
	Body Back Fold	0.01	0	0	0.01
	Body Front	0.26	0.93	0.07	1.26
	Body Top	0.19	0	0	0.19
	Body Right	0	0.04	0	0.04
	Body Bottom	0	0.62	0.13	0.75
SRD 5.8G + Wi-Fi 2.4G Chain 0+ Wi-Fi 2.4G Chain 1	Body Back	1.16	0.06	0.18	1.4
	Body Back Fold	0.24	0	0	0.24
	Body Front	0.22	0.44	1.08	**1.74**
	Body Top	1.4	0	0	1.4
	Body Right	0	0.02	0.66	0.68
	Body Bottom	0	0.42	0.05	0.47
SRD 5.8G + Wi-Fi 5.8G Chain 0+ Wi-Fi 5.8G Chain 1	Body Back	1.16	0.15	0.18	1.49
	Body Back Fold	0.24	0	0	0.24
	Body Front	0.22	0.93	0.6	**1.75**
	Body Top	1.4	0	0	1.4
	Body Right	0	0.04	0.43	0.47
	Body Bottom	0	0.62	0.06	0.68
SRD 5.8G + Wi-Fi 2.4G Chain 1+ Bluetooth	Body Back	1.16	0.06	0.01	1.23
	Body Back Fold	0.24	0	0	0.24
	Body Front	0.22	0.44	0.07	0.73
	Body Top	1.4	0	0	1.4
	Body Right	0	0.02	0	0.02
	Body Bottom	0	0.42	0.13	0.55
SRD 5.8G + Wi-Fi 5.8G Chain 1+ Bluetooth	Body Back	1.16	0.15	0.01	1.32
	Body Back Fold	0.24	0	0	0.24
	Body Front	0.22	0.93	0.07	1.22
	Body Top	1.4	0	0	1.4
	Body Right	0	0.04	0	0.04
	Body Bottom	0	0.62	0.13	0.75

Distances :
SRD (2.4G/900MHz5.8G) ,Wi-Fi 2.4G/5.8G Chain 0:154mm
SRD (2.4G/900MHz5.8G), Wi-Fi 2.4G/5.8G Chain 1:114mm
Wi-Fi 2.4G/5.8G Chain 0, Wi-Fi 2.4G/5.8G Chain 1:48mm

SRD 900MHz + Wi-Fi 2.4G Chain 0+ Wi-Fi 2.4G Chain 1: Sum SAR=1.78W/kg>1.6 W/kg,

SPLSR(SRD 900MHz + Wi-Fi 2.4G Chain 0)=0.004<0.04

SPLSR(SRD 900MHz + Wi-Fi 2.4G Chain 1)=0.014<0.04
SPLSR(Wi-Fi 2.4G Chain 0 + Wi-Fi 2.4G Chain 1)=0.039<0.04

SRD 900MHz + Wi-Fi 5.8G Chain 0+ Wi-Fi 5.8G Chain 1: Sum SAR=1.79W/kg>1.6 W/kg
SPLSR(SRD 900MHz + Wi-Fi 5.8G Chain 0)=0.008<0.04
SPLSR(SRD 900MHz + Wi-Fi 5.8G Chain 1)=0.007<0.04
SPLSR(Wi-Fi 5.8G Chain 0 + Wi-Fi 5.8G Chain 1)=0.039<0.04

SRD 5.8G + Wi-Fi 2.4G Chain 0+ Wi-Fi 2.4G Chain 1: Sum SAR=1.74W/kg>1.6 W/kg
SPLSR(SRD 5.8G + Wi-Fi 2.4G Chain 0)=0.003<0.04
SPLSR(SRD 5.8G + Wi-Fi 2.4G Chain 1)=0.013<0.04
SPLSR(Wi-Fi 2.4G Chain 0 + Wi-Fi 2.4G Chain 1)=0.039<0.04

SRD 5.8G + Wi-Fi 5.8G Chain 0+ Wi-Fi 5.8G Chain 1 Body Front: Sum SAR=1.75W/kg>1.6 W/kg
SPLSR(SRD 5.8G + Wi-Fi 5.8G Chain 0)=0.008<0.04
SPLSR(SRD 5.8G + Wi-Fi 5.8G Chain 1)=0.007<0.04
SPLSR(Wi-Fi 5.8G Chain 0 + Wi-Fi 5.8G Chain 1)=0.039<0.04

Conclusion:
Sum of SAR: **ΣSAR ≤ 1.6 W/kg** therefore simultaneous transmission SAR with Volume Scans is **not required**.

11. SAR PLOTS

Please Refer to the Attachment.

APPENDIX A MEASUREMENT UNCERTAINTY

The uncertainty budget has been determined for the measurement system and is given in the following Table.

Measurement uncertainty evaluation for IEEE1528-2013 SAR test

Source of uncertainty	Tolerance/ uncertainty ± %	Probability distribution	Divisor	ci (1 g)	ci (10 g)	Standard uncertainty ± %, (1 g)	Standard uncertainty ± %, (10 g)
Measurement system							
Probe calibration	6.55	N	1	1	1	6.3	6.3
Axial Isotropy	4.7	R	√3	1	1	2.7	2.7
Hemispherical Isotropy	9.6	R	√3	0	0	0.0	0.0
Boundary effect	1.0	R	√3	1	1	0.6	0.6
Linearity	4.7	R	√3	1	1	2.7	2.7
Detection limits	1.0	R	√3	1	1	0.6	0.6
Readout electronics	0.3	N	1	1	1	0.3	0.3
Response time	0.0	R	√3	1	1	0.0	0.0
Integration time	0.0	R	√3	1	1	0.0	0.0
RF ambient conditions – noise	1.0	R	√3	1	1	0.6	0.6
RF ambient conditions– reflections	1.0	R	√3	1	1	0.6	0.6
Probe positioner mech. Restrictions	0.8	R	√3	1	1	0.5	0.5
Probe positioning with respect to phantom shell	6.7	R	√3	1	1	3.9	3.9
Post-processing	2.0	R	√3	1	1	1.2	1.2
Test sample related							
Test sample positioning	2.8	N	1	1	1	2.8	2.8
Device holder uncertainty	6.3	N	1	1	1	6.3	6.3
Drift of output power	5.0	R	√3	1	1	2.9	2.9
Phantom and set-up							
Phantom uncertainty (shape and thickness tolerances)	4.0	R	√3	1	1	2.3	2.3
Liquid conductivity target)	5.0	R	√3	0.64	0.43	1.8	1.2
Liquid conductivity meas.)	2.5	N	1	0.64	0.43	1.6	1.1
Liquid permittivity target)	5.0	R	√3	0.6	0.49	1.7	1.4
Liquid permittivity meas.)	2.5	N	1	0.6	0.49	1.5	1.2
Combined standard uncertainty		RSS				12.2	12.0
Expanded uncertainty 95 % confidence interval)						24.1	23.7

Measurement uncertainty evaluation for IEC62209-1 SAR test

Source of uncertainty	Tolerance/ uncertainty ± %	Probability distribution	Divisor	ci (1 g)	ci (10 g)	Standard uncertainty ± %, (1 g)	Standard uncertainty ± %, (10 g)
Measurement system							
Probe calibration	6.55	N	1	1	1	6.3	6.3
Axial Isotropy	4.7	R	√3	1	1	2.7	2.7
Hemispherical Isotropy	9.6	R	√3	0	0	0.0	0.0
Boundary effect	1.0	R	√3	1	1	0.6	0.6
Linearity	4.7	R	√3	1	1	2.7	2.7
Detection limits	1.0	R	√3	1	1	0.6	0.6
Readout electronics	0.3	N	1	1	1	0.3	0.3
Response time	0.0	R	√3	1	1	0.0	0.0
Integration time	0.0	R	√3	1	1	0.0	0.0
RF ambient conditions – noise	1.0	R	√3	1	1	0.6	0.6
Probe positioning with respect to phantom shell	6.7	R	√3	1	1	3.9	3.9
Probe positioner mech. Restrictions	0.8	R	√3	1	1	0.5	0.5
RF ambient conditions– reflections	1.0	R	√3	1	1	0.6	0.6
Post-processing	2.0	R	√3	1	1	1.2	1.2
Test sample related							
Test sample positioning	2.8	N	1	1	1	2.8	2.8
Device holder uncertainty	6.3	N	1	1	1	6.3	6.3
Drift of output power	5.0	R	√3	1	1	2.9	2.9
Phantom and set-up							
Phantom uncertainty (shape and thickness tolerances)	4.0	R	√3	1	1	2.3	2.3
Liquid conductivity target)	5.0	R	√3	0.64	0.43	1.8	1.2
Liquid conductivity meas.)	2.5	N	1	0.64	0.43	1.6	1.1
Liquid permittivity target)	5.0	R	√3	0.6	0.49	1.7	1.4
Liquid permittivity meas.)	2.5	N	1	0.6	0.49	1.5	1.2
Combined standard uncertainty		RSS				12.2	12.0
Expanded uncertainty 95 % confidence interval)						24.0	23.6

APPENDIX B EUT TEST POSITION PHOTOS

Please Refer to the Attachment.

APPENDIX C CALIBRATION CERTIFICATES

Please Refer to the Attachment.

******* END OF REPORT *******