

TEST REPORT

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Report Number : SZNS211027-55317E-SA
FCC ID: 2AQJT-EZC5201BS
IC 24421-EZC5201BS

Test Standard (s)

FCC 47 CFR part 2.1093; RSS-102 Issue 5 Amendment 1 (February 2, 2021)

Sample Description

Product Type: WiFi Dongle
Model No.: EZC-5201BS
Multiple Model(s) No.: EZC-5200BS(Please refer to DOS for Model difference)
Trade Mark: EZCast, BenQ
Date Received: 2021/10/27
Date of Test: 2022/01/14~2022/01/15
Report Date: 2022/01/16

Test Result:

Pass*

* In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

Approved By:

Lance Li

Lance Li

EMC Engineer

Candy Li

EMC Engineer

Note: This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "*".

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Attestation of Test Results			
EUT Information	HVIN	EZC-5201BS	
	EUT Description	WiFi Dongle	
	Tested Model	EZC-5201BS	
	Multiple Model(s) No.:	EZC-5200BS (Please refer to DOS for Model difference)	
	Trade Mark	EZCast, BenQ	
	FCC ID:	2AQJT-EZC5201BS	
	IC	24421-EZC5201BS	
	Serial Number	SZNS211027-55317E-SA -S1	
	Test Date	2022/01/14 to 2022/01/15	
MODE		Max. SAR Level(s) Reported(W/kg)	Limit (W/kg)
WIFI 2.4G	1g Body SAR	0.39	1.6
WIFI 5G	1g Body SAR	0.73	
Simultaneous	1g Body SAR	0.84	
Applicable Standards	FCC 47 CFR part 2.1093 Radiofrequency radiation exposure evaluation: portable devices		
	RSS-102 Issue 5 Amendment 1 (February 2, 2021) Radio Frequency (RF) Exposure Compliance of Radio communication Apparatus (All Frequency Bands).		
	Safety Code 6 Health Canada’s Radiofrequency Exposure Guidelines Limits of Human Exposure to Radiofrequency Electromagnetic Energy in the Frequency Range from 3 kHz to 300 GHz		
	RF Exposure Procedures: TCB Workshop April 2019		
	IEC/IEEE 62209-1528:2020 Measurement procedure for the assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Part 1: Devices used next to the ear (Frequency range of 300 MHz to 6 GHz)		
	KDB procedures KDB 447498 D01 General RF Exposure Guidance v06 KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04 KDB 865664 D02 RF Exposure Reporting v01r02 KDB 447498 D02 SAR Procedures for Dongle Xmtr v02r01.		
Note: This wireless device has been shown to be capable of compliance for localized specific absorption rate (SAR) for General Population/Uncontrolled Exposure limits specified in Safety Code 6 Health Canada’s Radiofrequency Exposure Guidelines and has been tested in accordance with the measurement procedures specified in IEC/IEEE 62209-1528:2020 and RF exposure KDB procedures.			
The results and statements contained in this report pertain only to the device(s) evaluated.			

Note:

1. The USB cable used for test does not affect the radiation characteristics and transmitting power of the transmitter.
2. The USB cable used for the test was less than 12 inches.

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	SZNS211027-55317E-SA	Original Report	2022-01-16

EUT DESCRIPTION

This report has been prepared on behalf of *Actions Microelectronics Co., Ltd.* and their product *WiFi Dongle*, Model: *EZC-5201BS*, FCC ID: *2AQJT-EZC5201BS, IC: 24421-EZC5201BS* or the EUT (Equipment under Test) as referred to in the rest of this report.

Technical Specification

Device Type:	Portable
Exposure Category:	Population / Uncontrolled
Antenna Type(s):	Internal Antenna
Proximity sensor for SAR reduction:	None
Operation Mode :	Wi-Fi and Bluetooth
Frequency Band:	WLAN (2.4G): 2412~2472 MHz WLAN (5.2G): 5150-5250MHz WLAN (5.3G): 5250-5350MHz FCC: WLAN (5.6G): 5470-5725MHz IC: WLAN (5.6G): 5470-5600MHz & 5650-5725MHz WLAN (5.8G): 5725-5850MHz Bluetooth : 2402 MHz-2480 MHz
Conducted RF Power:	WLAN (2.4G): 14.78 dBm WLAN (5.2G): 14.54 dBm WLAN (5.3G): 15.10 dBm WLAN (5.6G): 9.82 dBm WLAN (5.8G): 14.61 dBm Bluetooth(BDR/EDR): 3.51 dBm BLE: 3.33 dBm

Note:

1. Canada does not support this frequency range (5600-5650MHz).

REFERENCE, STANDARDS, AND GUIDELINES

FCC:

The Report and Order requires routine SAR evaluation prior to equipment authorization of portable transmitter devices, including portable telephones. For consumer products, the applicable limit is 1.6 mW/g as recommended by the ANSI/IEEE standard C95.1-1992 [6] for an uncontrolled environment (Paragraph 65). According to the Supplement C of OET Bulletin 65 "Evaluating Compliance with FCC Guide-lines for Human Exposure to Radio frequency Electromagnetic Fields", released on Jun 29, 2001 by the FCC, the device should be evaluated at maximum output power (radiated from the antenna) under "worst-case" conditions for normal or intended use, incorporating normal antenna operating positions, device peak performance frequencies and positions for maximum RF energy coupling.

This report describes the methodology and results of experiments performed on wireless data terminal. The objective was to determine if there is RF radiation and if radiation is found, what is the extent of radiation with respect to safety limits. SAR (Specific Absorption Rate) is the measure of RF exposure determined by the amount of RF energy absorbed by human body (or its parts) – to determine how the RF energy couples to the body or head which is a primary health concern for body worn devices. The limit below which the exposure to RF is considered safe by regulatory bodies in North America is 1.6 mW/g average over 1 gram of tissue mass.

CE:

The order requires routine SAR evaluation prior to equipment authorization of portable transmitter devices, including portable telephones. For consumer products, the applicable limit is 2 mW/g as recommended by EN62209-1 for an uncontrolled environment. According to the Standard, the device should be evaluated at maximum output power (radiated from the antenna) under "worst-case" conditions for normal or intended use, incorporating normal antenna operating positions, device peak performance frequencies and positions for maximum RF energy coupling.

This report describes the methodology and results of experiments performed on wireless data terminal. The objective was to determine if there is RF radiation and if radiation is found, what is the extent of radiation with respect to safety limits. SAR (Specific Absorption Rate) is the measure of RF exposure determined by the amount of RF energy absorbed by human body (or its parts) – to determine how the RF energy couples to the body or head which is a primary health concern for body worn devices. The limit below which the exposure to RF is considered safe by regulatory bodies in Europe is 2 mW/g average over 10 gram of tissue mass.

The test configurations were laid out on a specially designed test fixture to ensure the reproducibility of measurements. Each configuration was scanned for SAR. Analysis of each scan was carried out to characterize the above effects in the device.

SAR Limits**FCC Limit(1g Tissue)**

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

CE Limit(10g Tissue)

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 10 g of tissue)	2.0	10
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 1.6W/kg (FCC) & 2 W/kg (CE) applied to the EUT.

FACILITIES

The test site used by Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 708358, the FCC Designation No.: CN1189. Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 4297.01 .

Listed by Innovation, Science and Economic Development Canada (ISED), the Registration Number is 5077A.

The test site has been registered with ISED Canada under ISED Canada Registration Number CN0016.

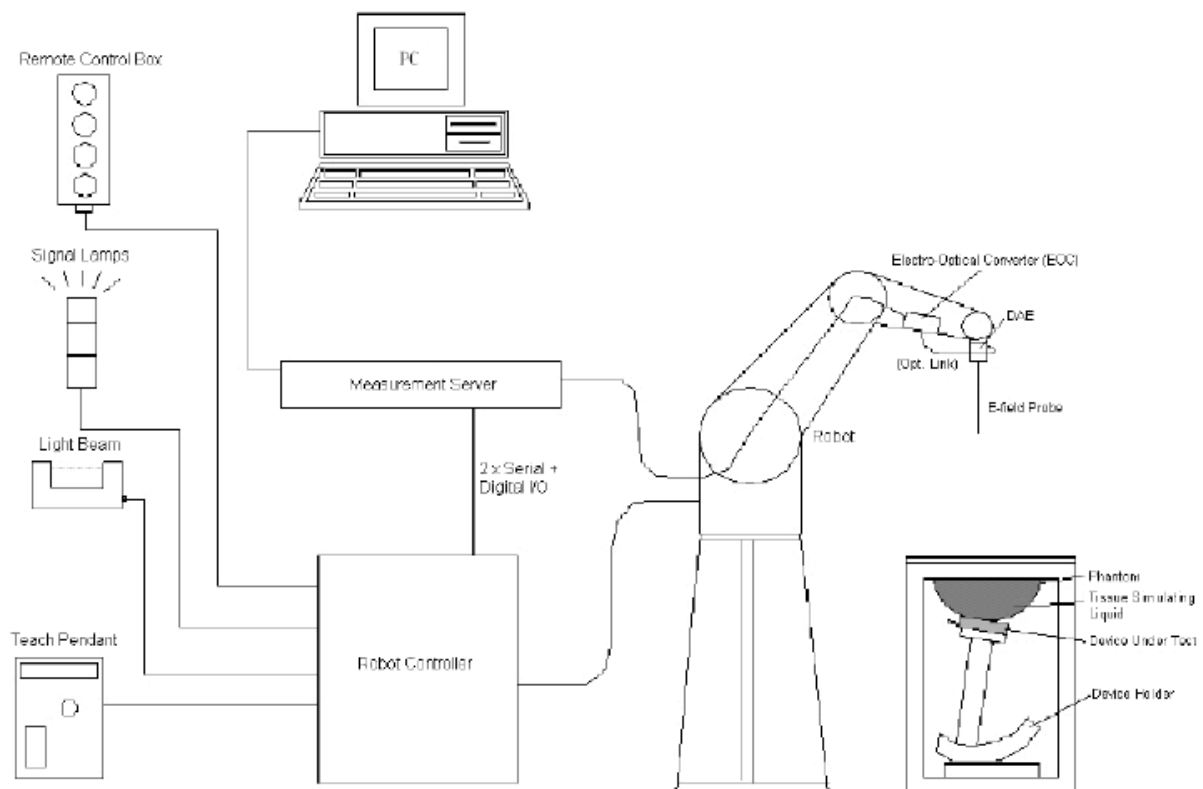
DESCRIPTION OF TEST SYSTEM

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 (Staubli TX=RX family) 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 400 MHz Intel ULV Celeron, 128 MB chip-disk and 128 MB 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 evaluations of field measurements and surface detection, controls robot movements, and handles safety operations. 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 pinout, and therefore only devices provided by SPEAG can be connected. Connection of 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 200M Ω ; 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 μ W/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μ W/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

SAM Twin Phantom

The SAM Twin Phantom (shown in front of DASY5) is a fiberglass shell phantom with shell thickness 2 mm, except in the ear region where the thickness is increased to 6 mm..

When the phantom is mounted inside allocated slot of the DASY5 platform, phantom reference points can be taught directly in the DASY5 V5.2 software. When the DASY5 platform is used to mount the

Phantom, some of the phantom teaching points cannot be reached by the robot in DASY5 V5.2. A special tool called P1a-P2aX-Former is provided to transform two of the three points, P1 and P2, to reachable locations. To use these new teaching points, a revised phantom configuration file is required.

In addition to our standard broadband liquids, the phantom can be used with the following tissue simulating liquids:

Sugar-water-based liquids can be left permanently in the phantom.

Always cover the liquid when the system is not in use to prevent changes in liquid parameters due to water evaporation.

DGBE-based liquids should be used with care. As DGBE is a softener for most plastics, the liquid should be taken out of the phantom, and the phantom should be dried when the system is not in use (desirable at least once a week).

Do not use other organic solvents without previously testing the solvent resistivity of the phantom. Approximately 25 liters of liquid is required to fill the SAM Twin phantom.



Calibration Frequency Points for EX3DV4 E-Field Probes SN: 3619 Calibrated: 2021/08/25

Calibration Frequency Point(MHz)	Conversion Factor		
	X	Y	Z
450 Head	8.89	8.89	8.89
600 Head	8.96	8.96	8.96
750 Head	8.63	8.63	8.63
835 Head	8.50	8.50	8.50
900 Head	8.28	8.28	8.28
1750 Head	7.33	7.33	7.33
1900 Head	7.07	7.07	7.07
2450 Head	6.69	6.69	6.69
2600 Head	6.53	6.53	6.53
5250 Head	4.37	4.37	4.37
5600 Head	4.03	4.03	4.03
5800 Head	3.93	3.93	3.93

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.

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.

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 $7 \times 7 \times 7$ (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 62209-1528-2020

Recommended Tissue Dielectric Parameters for Head

Table 2 – Dielectric properties of the tissue-equivalent medium

Frequency MHz	Real part of the complex relative permittivity, ε_r'	Conductivity, σ S/m	Penetration depth (E-field), δ mm
4	55,0	0,75	293,0
13	55,0	0,75	165,5
30	55,0	0,75	112,8
150	52,3	0,76	62,0
300	45,3	0,87	46,1
450	43,5	0,87	43,0
750	41,9	0,89	39,8
835	41,5	0,90	39,0
900	41,5	0,97	36,2
1 450	40,5	1,20	28,6
1 800	40,0	1,40	24,3
1 900	40,0	1,40	24,3
1 950	40,0	1,40	24,3
2 000	40,0	1,40	24,3
2 100	39,8	1,49	22,8
2 450	39,2	1,80	18,7
2 600	39,0	1,96	17,2
3 000	38,5	2,40	14,0
3 500	37,9	2,91	11,4
4 000	37,4	3,43	10,0
4 500	36,8	3,94	9,7

Frequency MHz	Real part of the complex relative permittivity, ε_r'	Conductivity, σ S/m	Penetration depth (E-field), δ mm
5 000	36,2	4,45	1,5
5 200	36,0	4,66	8,4
5 400	35,8	4,86	8,1
5 600	35,5	5,07	7,5
5 800	35,3	5,27	7,3
6 000	35,1	5,48	7,0
6 500	34,5	6,07	6,7
7 000	33,9	6,65	6,4
7 500	33,3	7,24	6,1
8 000	32,7	7,84	5,9
8 500	32,1	8,46	5,3
9 000	31,6	9,08	4,8
9 500	31,0	9,71	4,4
10 000	30,4	10,40	4,0

NOTE For convenience, permittivity and conductivity values are linearly interpolated for frequencies that are not a part of the original data from Drossos et al. [2]. They are shown in italics in Table 2. The italicized values are linearly interpolated (below 5800 MHz) or extrapolated (above 5800 MHz) from the non-italicized values that are immediately above and below these values.

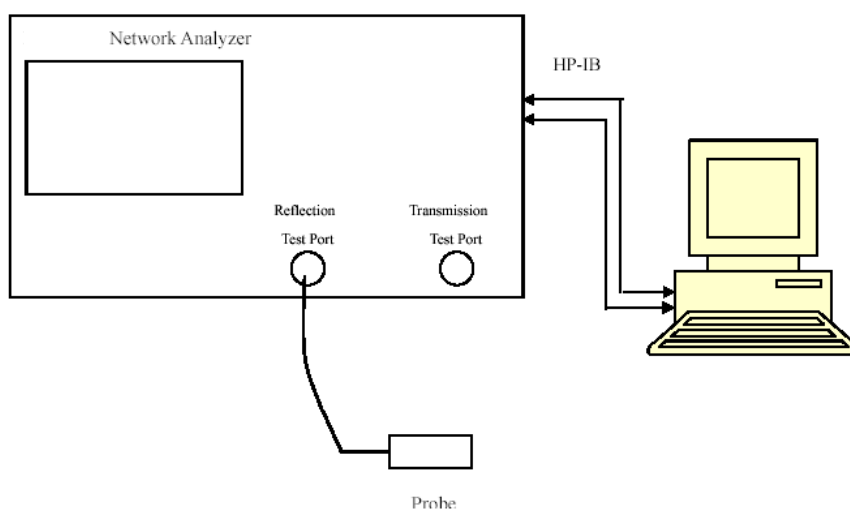
EQUIPMENT LIST AND CALIBRATION

Equipments List & Calibration Information

Equipment	Model	S/N	Calibration Date	Calibration Due Date
DASY5 Test Software	DASY52 52.10.4	N/A	NCR	NCR
DASY5 Measurement Server	DASY5 6.0.31	N/A	NCR	NCR
Data Acquisition Electronics	DAE4	1562	2021/01/19	2022/01/18
E-Field Probe	EX3DV4	3619	2021/08/25	2022/08/24
Mounting Device	MD4HHTV5	SD 000 H01 KA	NCR	NCR
SAM Twin Phantom	SAM-Twin V5.0	1744	NCR	NCR
Dipole,2450MHz	D2450V2	751	2020/10/13	2023/10/12
Dipole,5GHz	D5GHZV2	1301	2020/01/10	2023/01/09
Simulated Tissue Liquid Head(500-9500MHz)	HBBL600-10000V6	180622-2	Each Time	/
Network Analyzer	8753D	3410A08288	2021/7/07	2022/7/06
Dielectric Assessment Kit	DAK-3.5	1248	NCR	NCR
Signal Generator	SMB100A	108362	2021/12/24	2022/12/23
USB wideband power sensor	U2021XA	MY52350001	2021/7/31	2022/7/30
Power Amplifier	CBA 1G-070	T44328	2021/12/24	2022/12/23
Linear Power Amplifier	AS0860-40/45	1060913	2021/12/24	2022/12/23
Directional Coupler	4223-20	3.113.277	2021/12/24	2022/12/23
6dB Attenuator	8493B 6dB Attenuator	2708A 04769	2021/12/24	2022/12/23

SAR MEASUREMENT SYSTEM VERIFICATION

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)	$\Delta\epsilon_r$	$\Delta\sigma$	
2412	Simulated Tissue Liquid Head	38.513	1.792	39.28	1.77	-1.95	1.24	± 5
2442	Simulated Tissue Liquid Head	38.496	1.817	39.22	1.79	-1.85	1.51	± 5
2450	Simulated Tissue Liquid Head	38.468	1.821	39.20	1.80	-1.87	1.17	± 5
2472	Simulated Tissue Liquid Head	38.319	1.836	39.17	1.82	-2.17	0.88	± 5

*Liquid Verification above was performed on 2022/01/14.

Frequency (MHz)	Liquid Type	Liquid Parameter		Target Value		Delta (%)		Tolerance (%)
		ϵ_r	σ (S/m)	ϵ_r	σ (S/m)	$\Delta\epsilon_r$	$\Delta\sigma$	
5180	Simulated Tissue Liquid Head	34.988	4.672	36.02	4.64	-2.87	0.69	± 5
5200	Simulated Tissue Liquid Head	35.155	4.694	36.00	4.66	-2.35	0.73	± 5
5240	Simulated Tissue Liquid Head	34.669	4.738	35.96	4.70	-3.59	0.81	± 5
5250	Simulated Tissue Liquid Head	35.010	4.751	35.95	4.71	-2.61	0.87	± 5
5260	Simulated Tissue Liquid Head	35.181	4.764	35.94	4.72	-2.11	0.93	± 5
5280	Simulated Tissue Liquid Head	34.771	4.783	35.92	4.74	-3.20	0.91	± 5
5320	Simulated Tissue Liquid Head	34.881	4.818	35.88	4.78	-2.78	0.79	± 5
5500	Simulated Tissue Liquid Head	34.554	5.028	35.65	4.97	-3.07	1.17	± 5
5580	Simulated Tissue Liquid Head	34.697	5.092	35.53	5.05	-2.34	0.83	± 5
5600	Simulated Tissue Liquid Head	34.457	5.136	35.50	5.07	-2.94	1.30	± 5
5700	Simulated Tissue Liquid Head	34.604	5.228	35.40	5.17	-2.25	1.12	± 5

*Liquid Verification was performed on 2022/01/15.

Frequency (MHz)	Liquid Type	Liquid Parameter		Target Value		Delta (%)		Tolerance (%)
		ϵ_r	σ (S/m)	ϵ_r	σ (S/m)	$\Delta\epsilon_r$	$\Delta\sigma$	
5745	Simulated Tissue Liquid Head	34.495	5.272	35.36	5.22	-2.45	1.00	± 5
5785	Simulated Tissue Liquid Head	34.963	5.321	35.32	5.26	-1.01	1.16	± 5
5800	Simulated Tissue Liquid Head	35.102	5.346	35.30	5.27	-0.56	1.44	± 5
5825	Simulated Tissue Liquid Head	34.811	5.359	35.28	5.30	-1.33	1.11	± 5

*Liquid Verification was performed on 2022/01/14.

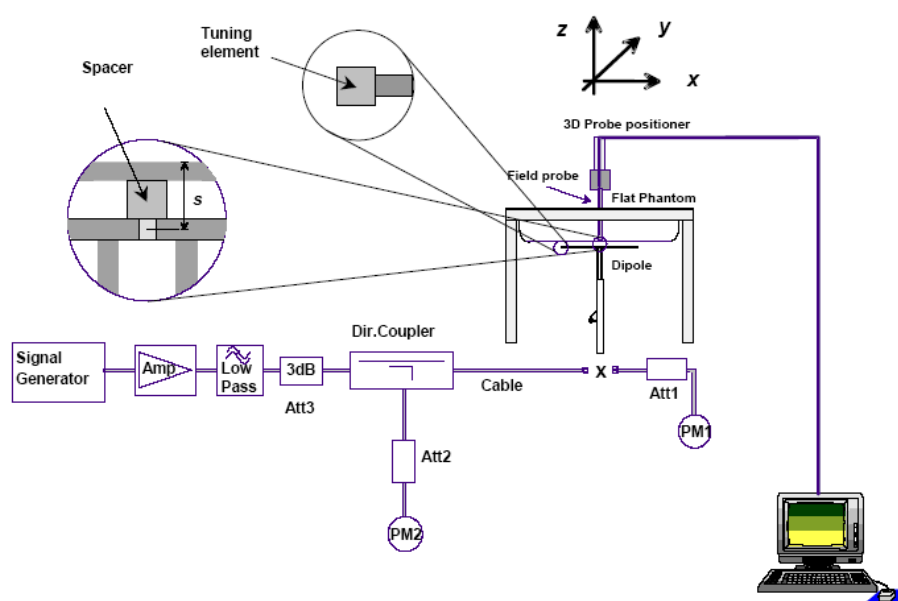
System Accuracy Verification

Prior to the assessment, the system validation kit was used to test whether the system was operating within its specifications of $\pm 10\%$. 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:

- $s = 15 \text{ mm} \pm 0,2 \text{ mm}$ for $300 \text{ MHz} \leq f \leq 1\,000 \text{ MHz}$;
- $s = 10 \text{ mm} \pm 0,2 \text{ mm}$ for $1\,000 \text{ MHz} < f \leq 3\,000 \text{ MHz}$;
- $s = 10 \text{ mm} \pm 0,2 \text{ mm}$ for $3\,000 \text{ MHz} < f \leq 6\,000 \text{ MHz}$.

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 (%)
2022/01/14	2450 MHz	Head	100	1g	5.67	56.7	53.0	6.981	± 10
2022/01/15	5250 MHz	Head	100	1g	7.69	76.9	80.7	-4.709	± 10
2022/01/15	5600 MHz	Head	100	1g	8.07	80.7	85.1	-5.170	± 10
2022/01/14	5800 MHz	Head	100	1g	7.72	77.2	80.2	-3.741	± 10

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

SAR SYSTEM VALIDATION DATA

DUT: D2450V2; Type: 2450MHz; Serial: 751

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

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.821$ S/m; $\epsilon_r = 38.468$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 – SN3619; ConvF(6.69, 6.69, 6.69) @ 2450 MHz;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1562; Calibrated: 2021/1/19
- Phantom: Head model; Type: QD000P40CC; Serial: TP:1744
- Measurement SW: DASY52, Version 52.10 (4)

System Performance Check at 2450MHz/d=10mm, Pin=100mw/Area Scan (101x131x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 7.17 W/kg

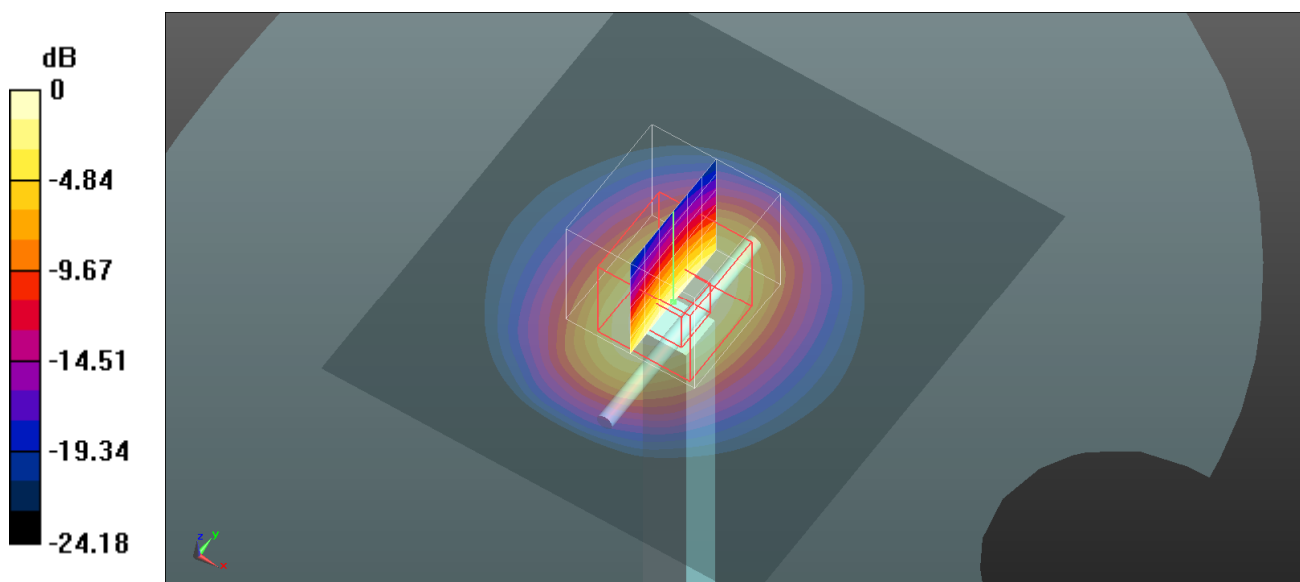
System Performance Check at 2450MHz/d=10mm, Pin=100mw/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 58.26 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 11.2 W/kg

SAR(1 g) = 5.67 W/kg; SAR(10 g) = 2.54 W/kg

Maximum value of SAR (measured) = 7.68 W/kg



0 dB = 7.68 W/kg = 8.85 dBW/kg

System Performance 5250 MHz Head**DUT: Dipole 5GHz Type: D5GHZV2; Serial: 1301**

Communication System: UID 0, CW (0); Frequency: 5250 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5250$ MHz; $\sigma = 4.751$ S/m; $\epsilon_r = 35.01$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 – SN3619; ConvF(4.37, 4.37, 4.37) @ 5250 MHz;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1562; Calibrated: 2021/1/19
- Phantom: Head model; Type: QD000P40CC; Serial: TP:1744
- Measurement SW: DASY52, Version 52.10 (4)

Head 5250MHz Pin=100mW/Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 15.9 W/kg

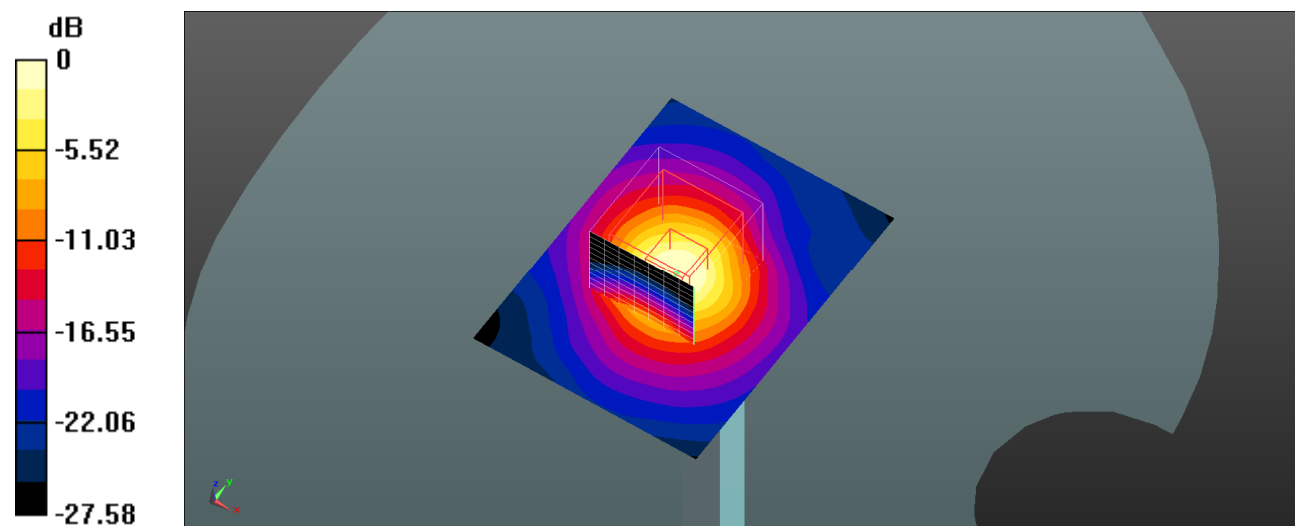
Head 5250MHz Pin=100mW/Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 70.82 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 28.9 W/kg

SAR(1 g) = 7.69 W/kg; SAR(10 g) = 2.15 W/kg

Maximum value of SAR (measured) = 15.1 W/kg



0 dB = 15.1 W/kg = 11.79 dBW/kg

System Performance 5600 MHz Head**DUT: Dipole 5GHz Type: D5GHZV2; Serial: 1301**

Communication System: UID 0, CW (0); Frequency: 5600 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5600$ MHz; $\sigma = 5.136$ S/m; $\epsilon_r = 34.457$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 – SN3619; ConvF(4.03, 4.03, 4.03) @ 5600 MHz;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1562; Calibrated: 2021/1/19
- Phantom: Head model; Type: QD000P40CC; Serial: TP:1744
- Measurement SW: DASY52, Version 52.10 (4)

Head 5600MHz Pin=100mW/Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 18.2 W/kg

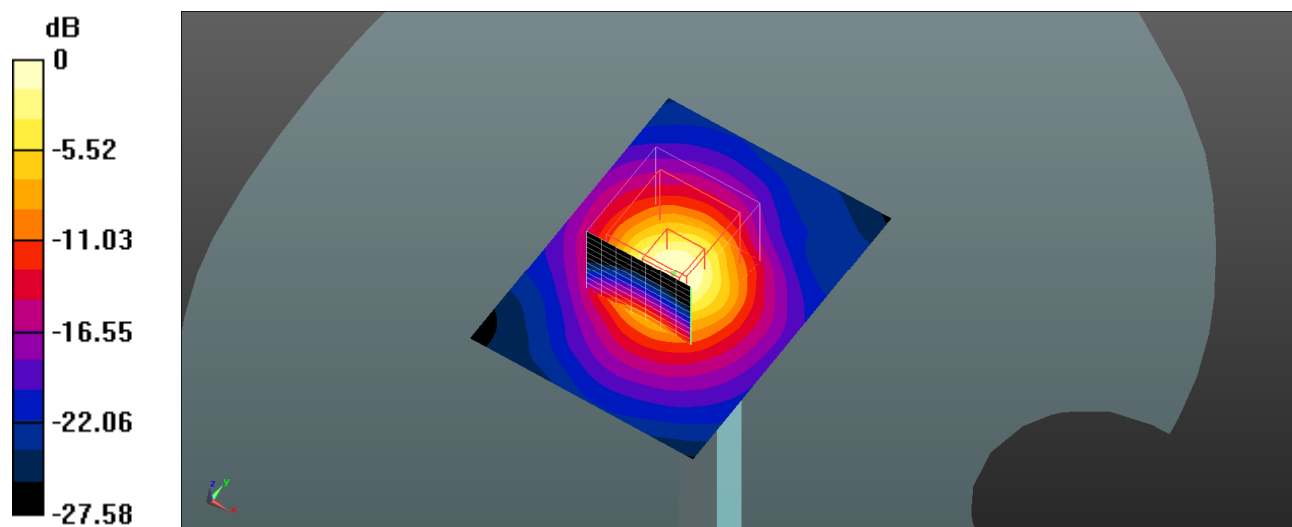
Head 5600MHz Pin=100mW/Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 78.05 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 31.6 W/kg

SAR(1 g) = 8.07 W/kg; SAR(10 g) = 2.23 W/kg

Maximum value of SAR (measured) = 17.5 W/kg



0 dB = 17.5 W/kg = 12.43 dBW/kg

System Performance 5800 MHz Head**DUT: Dipole 5GHz Type: D5GHZV2; Serial: 1301**

Communication System: UID 0, CW (0); Frequency: 5800 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5800$ MHz; $\sigma = 5.346$ S/m; $\epsilon_r = 35.102$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 – SN3619; ConvF(3.93, 3.93, 3.93) @ 5800 MHz;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1562; Calibrated: 2021/1/19
- Phantom: Head model; Type: QD000P40CC; Serial: TP:1744
- Measurement SW: DASY52, Version 52.10 (4)

Head 5800MHz Pin=100mW/Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

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

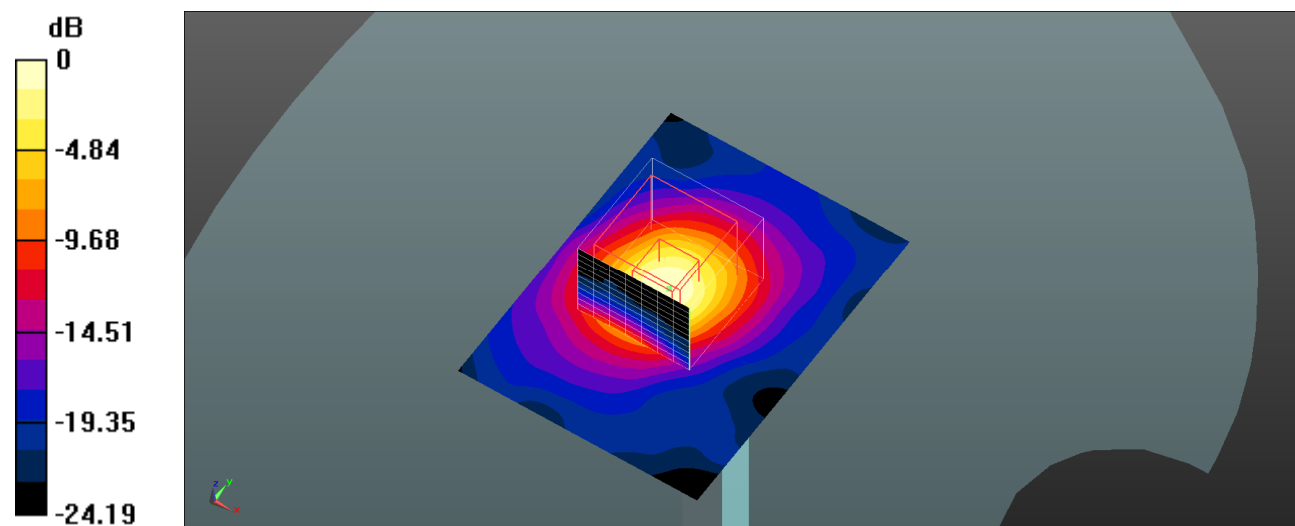
Head 5800MHz Pin=100mW/Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 74.28 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 29.6 W/kg

SAR(1 g) = 7.72 W/kg; SAR(10 g) = 2.19 W/kg

Maximum value of SAR (measured) = 15.9 W/kg



0 dB = 15.9 W/kg = 12.01 dBW/kg

EUT TEST STRATEGY AND METHODOLOGY

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.

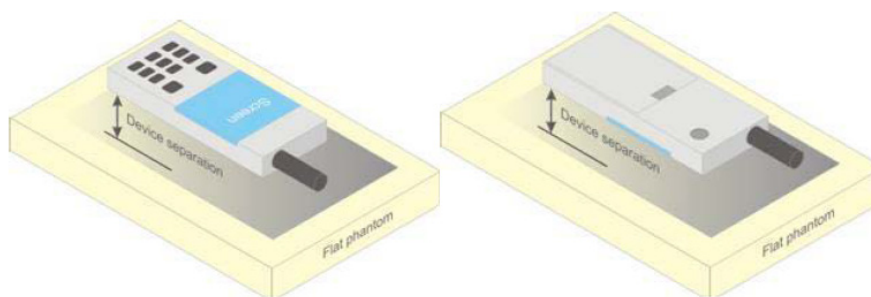


Figure 5 – Test positions for body-worn devices

Test Distance for SAR Evaluation

For this case the EUT(Equipment Under Test) is set 5mm away from the phantom, the test distance is 5mm.

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.

CONDUCTED OUTPUT POWER MEASUREMENT

Maximum Target Output Power

Max Target Power(dBm)			
Mode/Band	Channel		
	Low	Middle	High
WLAN 2.4G	15.0	15.0	15.0
WLAN 5.2G	15.0	15.0	15.0
WLAN 5.3G	15.5	15.5	15.5
WLAN 5.6G	10.0	10.0	10.0
WLAN 5.8G	15.0	15.0	15.0
Bluetooth BDR/EDR	4.0	4.0	4.0
Bluetooth BLE	4.0	4.0	4.0

Provision Applicable

The measured peak output power should be greater and within 5% than EMI measurement.

Test Results:**Bluetooth:**

Mode	Channel frequency (MHz)	RF Output Power (dBm)
BDR(GFSK)	2402	2.32
	2441	0.73
	2480	0.14
EDR($\pi/4$ -DQPSK)	2402	3.04
	2441	1.40
	2480	0.09
EDR(8DPSK)	2402	3.51
	2441	1.97
	2480	0.63
BLE_1M	2402	3.33
	2440	2.28
	2480	0.80

Wi-Fi 2.4G:

Mode	Channel frequency (MHz)	Data Rate	Conducted Average Output
802.11b	2412	1Mbps	12.29
	2442		13.32
	2472		12.64
802.11g	2412	6Mbps	14.58
	2442		14.78
	2472		13.87
802.11n HT20	2412	MCS0	13.84
	2442		13.85
	2472		14.24
802.11n HT40	2422	MCS0	12.62
	2442		13.76
	2462		12.95

Wi-Fi 5.2G:

Mode	Channel frequency (MHz)	Data Rate	Conducted Average Output
802.11a	5180	6Mbps	12.14
	5200		12.54
	5240		13.15
802.11n20	5180	MCS0	11.30
	5200		11.66
	5240		11.74
802.11n40	5190	MCS0	7.55
	5230		7.90
802.11ac20	5180	MCS0	14.12
	5200		14.54
	5240		14.44
802.11ac40	5190	MCS0	7.07
	5230		9.90
802.11ac80	5210	MCS0	9.46

Wi-Fi 5.3G:

Mode	Channel frequency (MHz)	Data Rate	Conducted Average Output
802.11a	5260	6Mbps	14.70
	5280		14.63
	5320		15.10
802.11n20	5260	MCS0	12.63
	5280		11.83
	5320		12.96
802.11n40	5270	MCS0	13.11
	5310		8.47
802.11ac20	5260	MCS0	14.07
	5280		14.70
	5320		12.73
802.11ac40	5270	MCS0	14.61
	5310		6.79
802.11ac80	5290	MCS0	7.52

Wi-Fi 5.6G:

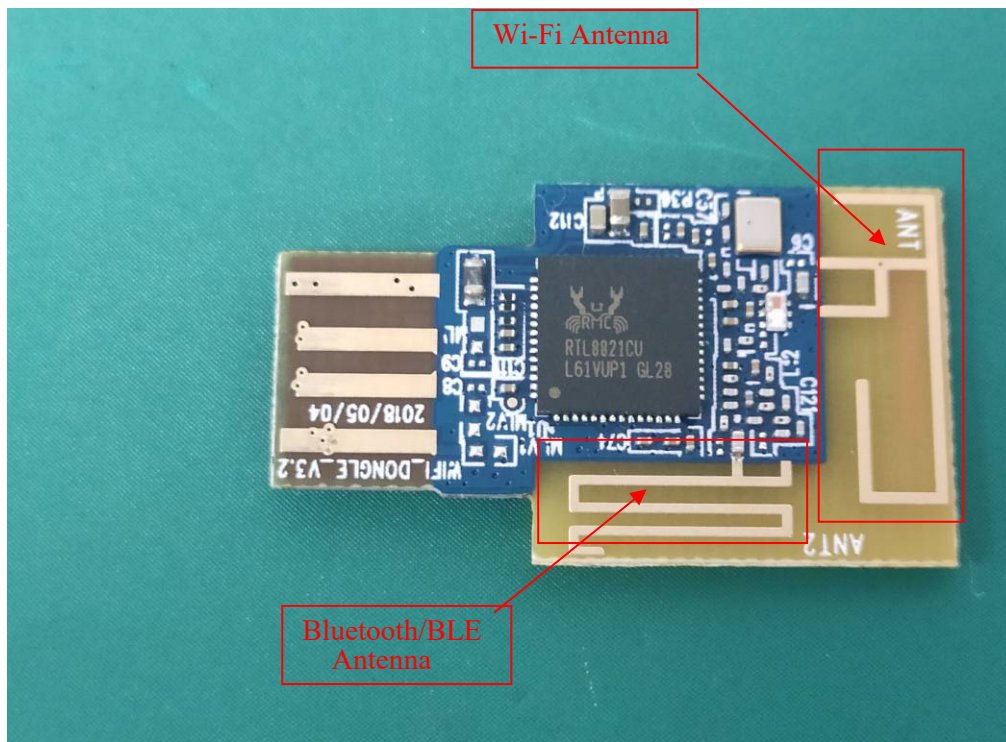
Mode	Channel frequency (MHz)	Data Rate	Conducted Average Output
802.11a	5500	6Mbps	6.50
	5580		8.34
	5700		9.82
802.11n20	5500	MCS0	6.57
	5580		9.18
	5700		9.71
802.11n40	5510	MCS0	8.13
	5550		7.94
	5670		9.42
802.11ac20	5500	MCS0	6.51
	5580		8.26
	5700		9.66
802.11ac40	5510	MCS0	6.30
	5550		7.56
	5670		9.42
802.11ac80	5530	MCS0	8.49
	5610		9.12

Wi-Fi 5.8G:

Mode	Channel frequency (MHz)	Data Rate	Conducted Average Output
802.11a	5745	6Mbps	13.34
	5785		13.23
	5825		12.91
802.11n20	5745	MCS0	14.46
	5785		13.37
	5825		12.86
802.11n40	5755	MCS0	14.34
	5795		14.31
802.11ac20	5745	MCS0	14.61
	5785		14.31
	5825		13.81
802.11ac40	5755	MCS0	14.22
	5795		14.29
802.11ac80	5775	MCS0	13.88

Standalone SAR test exclusion considerations

Antennas Location:



Standalone SAR test exclusion for the EUT Edge considerations
[RSS-102 Issue 5 Amendment 1 (February 2, 2021)]

Output power level shall be the higher of the maximum conducted or equivalent isotropically radiated power (e.i.r.p.) source-based, time-averaged output power. For controlled use devices where the 8 W/kg for 1 gram of tissue applies, the exemption limits for routine evaluation in Table 1 are multiplied by a factor of 5. For limb-worn devices where the 10 gram value applies, the exemption limits for routine evaluation in Table 1 are multiplied by a factor of 2.5. If the operating frequency of the device is between two frequencies located in Table 1, linear interpolation shall be applied for the applicable separation distance. For test separation distance less than 5 mm, the exemption limits for a separation distance of 5 mm can be applied to determine if a routine evaluation is required.

Table 1: SAR evaluation – Exemption limits for routine evaluation based on frequency and separation distance^{4,5}

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of ≤5 mm	At separation distance of 10 mm	At separation distance of 15 mm	At separation distance of 20 mm	At separation distance of 25 mm
≤300	71 mW	101 mW	132 mW	162 mW	193 mW
450	52 mW	70 mW	88 mW	106 mW	123 mW
835	17 mW	30 mW	42 mW	55 mW	67 mW
1900	7 mW	10 mW	18 mW	34 mW	60 mW
2450	4 mW	7 mW	15 mW	30 mW	52 mW
3500	2 mW	6 mW	16 mW	32 mW	55 mW
5800	1 mW	6 mW	15 mW	27 mW	41 mW

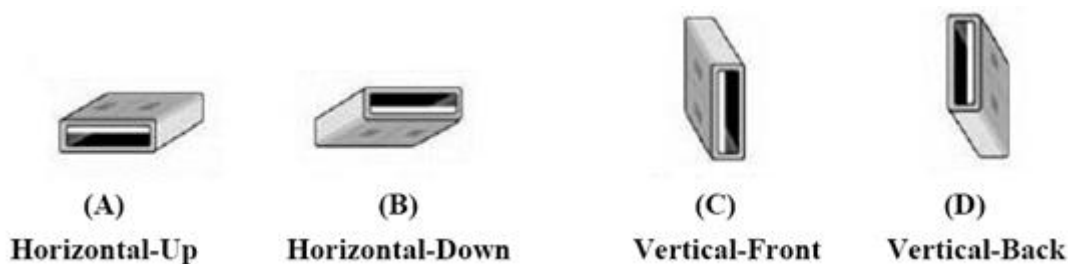
Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of 30 mm	At separation distance of 35 mm	At separation distance of 40 mm	At separation distance of 45 mm	At separation distance of ≥50 mm
≤300	223 mW	254 mW	284 mW	315 mW	345 mW
450	141 mW	159 mW	177 mW	195 mW	213 mW
835	80 mW	92 mW	105 mW	117 mW	130 mW
1900	99 mW	153 mW	225 mW	316 mW	431 mW
2450	83 mW	123 mW	173 mW	235 mW	309 mW
3500	86 mW	124 mW	170 mW	225 mW	290 mW
5800	56 mW	71 mW	85 mW	97 mW	106 mW

Standalone SAR test exclusion for the EUT Edge considerations (RSS-102 issue 5)

Model	Frequency (MHz)	Peak P _{avg} (dBm)	EIRP (dBm)	EIRP (mW)	Exemption Limits (mW)
Bluetooth	2480	4.0	3.8	2.40	4
WLAN 2.4G	2472	15.0	14.2	26.30	4
WLAN 5.2G	5240	15.0	17.0	50.12	1
WLAN 5.3G	5350	15.5	17.5	56.23	1
WLAN 5.6G	5700	10.0	12.0	15.85	1
WLAN 5.8G	5825	15.0	17.0	50.12	1

Note:

1. Antenna Gain: Bluetooth: -0.2dBi; 2.4G Wi-Fi: -0.8dBi; 5G Wi-Fi: 2.0dBi



Test exclusion result				
Model	Horizontal-UP	Horizontal-Down	Vertical-Front	Vertical-Back
Bluetooth	Exclusion	Exclusion	Exclusion	Exclusion
WLAN 2.4G	Required	Required	Required	Required
WLAN 5.2G	Required	Required	Required	Required
WLAN 5.3G	Required	Required	Required	Required
WLAN 5.6G	Required	Required	Required	Required
WLAN 5.8G	Required	Required	Required	Required

Note 1:

Required: test is required.

Exclusion: test is not required.

Note 2:

Because the standard of IC is more strict than that of FCC required, So we use the standard of IC to evaluate.

Corrected SAR Evaluation

IEC/IEEE 62209-1528:2020

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 $\Delta \epsilon_r$ 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:

$$\Delta SAR = c_\epsilon \Delta \epsilon_r + c_\sigma \Delta \sigma \quad (8)$$

where

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

$c_\sigma = \partial(\Delta SAR)/\partial(\Delta \sigma)$ 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

$$c_\epsilon = -7,854 \times 10^{-4} f^3 + 9,402 \times 10^{-3} f^2 - 2,742 \times 10^{-2} f - 0,2026 \quad (9)$$

$$c_\sigma = 9,804 \times 10^{-3} f^3 - 8,661 \times 10^{-2} f^2 + 2,981 \times 10^{-2} f + 0,7829 \quad (10)$$

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 $c_\epsilon = -0,198$ and $c_\sigma = 0$ shall be used.

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

$$c_\epsilon = 3,456 \times 10^{-3} f^3 - 3,531 \times 10^{-2} f^2 + 7,675 \times 10^{-2} f - 0,1860 \quad (11)$$

$$c_\sigma = 4,479 \times 10^{-3} f^3 - 1,586 \times 10^{-2} f^2 - 0,1972 f + 0,7717 \quad (12)$$

Calibrate Date	Liquid Type	Frequency (MHz)	C_{ε}	$\Delta\varepsilon_r$	C_{δ}	Δ_{δ}	ΔSAR_{10g}
2022/01/14	Head	2412	-0.225	-1.95	0.489	1.24	1.045
		2442	-0.225	-1.85	0.482	1.51	1.144
		2450	-0.225	-1.87	0.480	1.17	0.982
		2472	-0.225	-2.17	0.475	0.88	0.906
2022/01/15	Head	5180	-0.202	-2.87	-0.024	0.69	0.563
		5200	-0.201	-2.35	-0.026	0.73	0.453
		5240	-0.201	-3.59	-0.028	0.81	0.699
		5250	-0.201	-2.61	-0.029	0.87	0.499
		5260	-0.201	-2.11	-0.030	0.93	0.396
		5280	-0.201	-3.2	-0.031	0.91	0.615
		5320	-0.201	-2.78	-0.034	0.79	0.532
		5500	-0.200	-3.07	-0.042	1.17	0.565
		5580	-0.199	-2.34	-0.044	0.83	0.429
		5600	-0.199	-2.94	-0.045	1.3	0.527
		5700	-0.199	-2.25	-0.046	1.12	0.396
2022/01/14	Head	5745	-0.199	-2.45	-0.045	1	0.443
		5785	-0.199	-1.01	-0.045	1.16	0.149
		5800	-0.199	-0.56	-0.045	1.44	0.047
		5825	-0.199	-1.33	-0.044	1.11	0.216

Note:

1. According to **Notice 2012-DRS0529**, if the correction ΔSAR has a negative sign, **the measured SAR result should be corrected**, and has a positive sign, the measured SAR result shall not be corrected.
2. **Scaled SAR = Correct SAR*(1- $\Delta\text{SAR}\%$)**

SAR MEASUREMENT RESULTS

This page summarizes the results of the performed dosimetric evaluation.

SAR Test Data

Environmental Conditions

Temperature:	21.3-22.1 °C	22.6-23.4 °C
Relative Humidity:	40-46 %	46-55%
ATM Pressure:	101.3 kPa	101.3 kPa
Test Date:	2022/01/14	2022/01/15

Testing was performed by Seven Liang, Jacky Yang and Kelly Wang.

WLAN 2.4G:

Test Mode	EUT Position	Frequency (MHz)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/Kg), Limited=1.6 W/kg				
					Scaled Factor	Meas.	Scaled SAR	Correct SAR	Plot
802.11g	Horizontal-UP (5mm)	2412	/	/	/	/	/	/	
		2442	14.78	15.0	1.052	0.233	0.25	0.25	1#
		2472	/	/	/	/	/	/	/
	Horizontal-Down (5mm)	2412	14.58	15.0	1.102	0.190	0.21	0.21	2#
		2442	14.78	15.0	1.052	0.374	0.39	0.39	3#
		2472	13.87	15.0	1.297	0.171	0.22	0.22	4#
	Vertical-Front (5mm)	2412	/	/	/	/	/	/	/
		2442	14.78	15.0	1.052	0.132	0.14	0.14	5#
		2472	/	/	/	/	/	/	/
	Vertical-Back (5mm)	2412	/	/	/	/	/	/	/
		2442	14.78	15.0	1.052	0.111	0.12	0.12	6#
		2472	/	/	/	/	/	/	/

Note:

- When the highest *reported* SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, OFDM SAR is not required.
- 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.
- According to **Notice 2012-DRS0529**, if the correction Δ SAR has a negative sign, **the measured SAR result should be corrected**, and has a positive sign, the measured SAR result shall not be corrected.

WLAN 5G:

Test Mode	EUT Position	Frequency (MHz)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/Kg), Limited=1.6 W/kg				
					Scaled Factor	Meas.	Scaled SAR	Correct SAR	Plot
802.11ac20	Horizontal-UP (5mm)	5180	14.12	15.0	1.225	0.246	0.30	0.30	7#
		5200	14.54	15.0	1.112	0.334	0.37	0.37	8#
		5240	14.44	15.0	1.138	0.242	0.28	0.28	9#
	Horizontal-Down (5mm)	5180	/	/	/	/	/	/	/
		5200	14.54	15.0	1.112	0.116	0.13	0.13	10#
		5240	/	/	/	/	/	/	/
	Vertical-Front (5mm)	5180	/	/	/	/	/	/	/
		5200	14.54	15.0	1.112	0.119	0.13	0.13	11#
		5240	/	/	/	/	/	/	/
	Vertical-Back (5mm)	5180	/	/	/	/	/	/	/
		5200	14.54	15.0	1.112	0.058	0.06	0.06	12#
		5240	/	/	/	/	/	/	/

Test Mode	EUT Position	Frequency (MHz)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/Kg), Limited=1.6 W/kg				
					Scaled Factor	Meas.	Scaled SAR	Correct SAR	Plot
802.11a	Horizontal-UP (5mm)	5260	14.70	15.5	1.202	0.346	0.42	0.42	13#
		5280	14.63	15.5	1.222	0.303	0.37	0.37	14#
		5320	15.10	15.5	1.096	0.207	0.23	0.23	15#
	Horizontal-Down (5mm)	5260	/	/	/	/	/	/	/
		5280	/	/	/	/	/	/	/
		5320	15.10	15.5	1.096	0.171	0.19	0.19	16#
	Vertical-Front (5mm)	5260	/	/	/	/	/	/	/
		5280	/	/	/	/	/	/	/
		5320	15.10	15.5	1.096	0.247	0.27	0.27	17#
	Vertical-Back (5mm)	5260	/	/	/	/	/	/	/
		5280	/	/	/	/	/	/	/
		5320	15.10	15.5	1.096	0.087	0.10	0.10	18#

Test Mode	EUT Position	Frequency (MHz)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/Kg), Limited=1.6 W/kg				
					Scaled Factor	Meas.	Scaled SAR	Correct SAR	Plot
802.11a	Horizontal-UP (5mm)	5500	6.50	10.0	2.239	0.324	0.73	0.73	19#
		5580	8.34	10.0	1.466	0.429	0.63	0.63	20#
		5700	9.82	10.0	1.042	0.458	0.48	0.48	21#
	Horizontal-Down (5mm)	5500	/	/	/	/	/	/	/
		5580	/	/	/	/	/	/	/
		5700	9.82	10.0	1.042	0.308	0.32	0.32	22#
	Vertical-Front (5mm)	5500	/	/	/	/	/	/	/
		5580	/	/	/	/	/	/	/
		5700	9.82	10.0	1.042	0.228	0.24	0.24	23#
	Vertical-Back (5mm)	5500	/	/	/	/	/	/	/
		5580	/	/	/	/	/	/	/
		5700	9.82	10.0	1.042	0.373	0.39	0.39	24#

Test Mode	EUT Position	Frequency (MHz)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/Kg), Limited=1.6 W/kg				
					Scaled Factor	Meas.	Scaled SAR	Correct SAR	Plot
802.11ac20	Horizontal-UP (5mm)	5745	14.61	15.0	1.094	0.446	0.49	0.49	25#
		5785	/	/	/	/	/	/	/
		5825	/	/	/	/	/	/	/
	Horizontal-Down (5mm)	5745	14.61	15.0	1.094	0.392	0.43	0.43	26#
		5785	/	/	/	/	/	/	/
		5825	/	/	/	/	/	/	/
	Vertical-Front (5mm)	5745	14.61	15.0	1.094	0.217	0.24	0.24	27#
		5785	/	/	/	/	/	/	/
		5825	/	/	/	/	/	/	/
	Vertical-Back (5mm)	5745	14.61	15.0	1.094	0.426	0.47	0.47	28#
		5785	14.31	15.0	1.172	0.486	0.57	0.57	29#
		5825	13.81	15.0	1.315	0.422	0.56	0.56	30#

Note:

1. When SAR or MPE is not measured at the maximum power level allowed for production to the individual channels tested to determine compliance.
2. According to **Notice 2012-DRS0529**, if the correction Δ SAR has a negative sign, **the measured SAR result should be corrected**, and has a positive sign, the measured SAR result shall not be corrected.

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 ($\sim 10\%$ 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

Body

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

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..

SAR SIMULTANEOUS TRANSMISSION DESCRIPTION

Simultaneous Transmission:

Description of Simultaneous Transmit Capabilities	
Transmitter Combination	Simultaneous?
WLAN + Bluetooth	√

Standalone SAR estimation:

Mode	Frequency (MHz)	EIRP (dBm)	Pavg (mW)	Distance (mm)	Estimated 1-g (W/kg)
Bluetooth Body	2480	4.0	2.51	5	0.11

NOTE:

When standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})} / x]$$

W/kg for test separation distances ≤ 50 mm;

where $x = 7.5$ for 1-g SAR.

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

Simultaneous SAR test exclusion considerations:

Mode(SAR1+SAR2)	Position	Reported SAR(W/kg)		$\Sigma \text{SAR} < 1.6 \text{ W/kg}$
		SAR1	SAR2	
2.4G WLAN + Bluetooth	Horizontal-UP	0.25	0.11	0.36
2.4G WLAN + Bluetooth	Horizontal-Down	0.39	0.11	0.50
2.4G WLAN + Bluetooth	Vertical-Front	0.14	0.11	0.25
2.4G WLAN + Bluetooth	Vertical-Back	0.12	0.11	0.23

Mode(SAR1+SAR2)	Position	Reported SAR(W/kg)		$\Sigma \text{SAR} < 1.6 \text{ W/kg}$
		SAR1	SAR2	
5G WLAN + Bluetooth	Horizontal-UP	0.73	0.11	0.84
5G WLAN + Bluetooth	Horizontal-Down	0.43	0.11	0.54
5G WLAN + Bluetooth	Vertical-Front	0.24	0.11	0.35
5G WLAN + Bluetooth	Vertical-Back	0.57	0.11	0.68

Conclusion:

Sum of SAR: $\Sigma \text{SAR} \leq 1.6 \text{ W/kg}$ therefore simultaneous transmission SAR with Volume Scans is **not required**.

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.

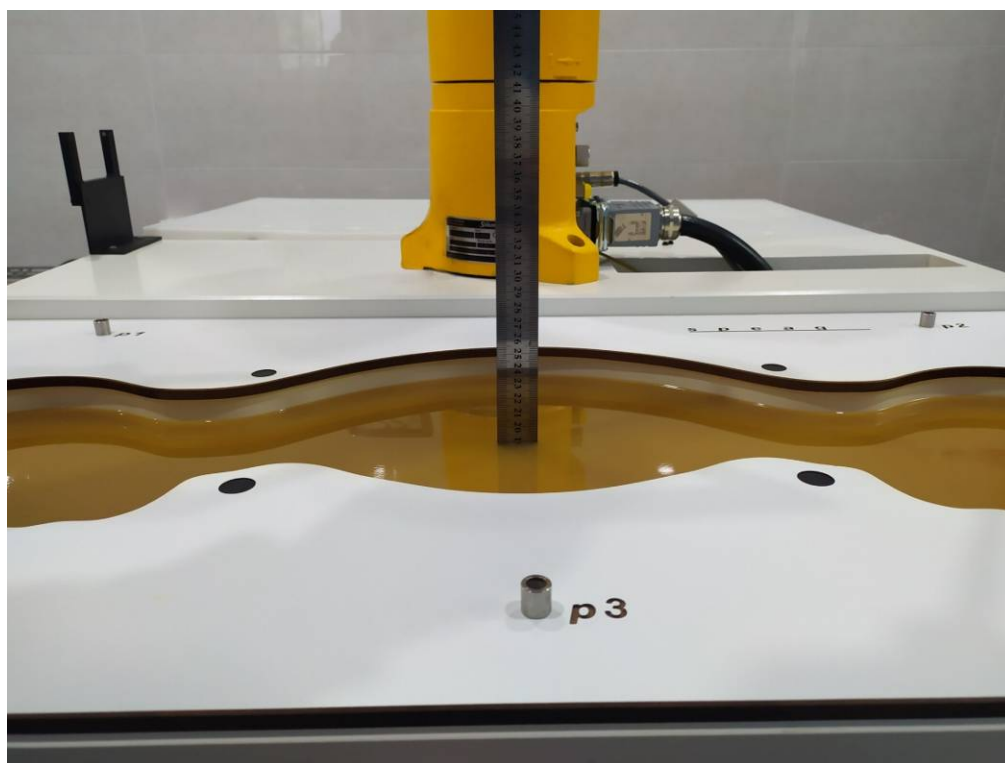
Measurement uncertainty evaluation for IEC/IEEE 62209-1528:2020 SAR test

Symbol	Input quantity X_i (source of uncertainty)	Ref.	Prob Dist. ^a PDF_i	Unc. $a(x_i)$	Div. ^a q_i	$u(x_i)=$ $a(x_i)/q_i$	c_i	$u(y)=$ $c_i \cdot u(x_i)$	v_i
Measurement system errors									
CF	Probe calibration	8.4.1.1	N ($k=2$)	6.55	2	3.3	1	3.3	∞
CF _{drift}	Probe calibration drift	8.4.1.2	R	1.0	$\sqrt{3}$	0.6	1	0.6	∞
LIN	Probe linearity and detection limit	8.4.1.3	R	4.7	$\sqrt{3}$	3.3	1	3.3	∞
BBS	Boundary signal	8.4.1.4	R	1.0	$\sqrt{3}$	0.6	1	0.6	∞
ISO	Probe isotropy	8.4.1.5	R	9.6	$\sqrt{3}$	5.5	1	5.5	∞
DAE	Other probe and data acquisition errors	8.4.1.6	N	1.0	1	1.0	1	1.0	∞
AMB	RF ambient and noise	8.4.1.7	N	1.0	1	1.0	1	1.0	∞
Δ_{xyz}	Probe positioning errors	8.4.1.8	N	0.8	1	0.8	2/8	0.9	∞
DAT	Data processing errors	8.4.1.9	N	2.0	1	2.0	1	2.0	∞
Phantom and device(DUT or validation antenna)errors									
$LIQ(\sigma)$	Measurement of phantom conductivity(σ)	8.4.2.1	N	2.5	1	2.5	$c_{\epsilon_s}, c_{\sigma}$	2.5	∞
$LIQ(T_c)$	Temperature effects(medium)	8.4.2.2	R	0.1	$\sqrt{3}$	0.05	$c_{\epsilon_s}, c_{\sigma}$	0.05	∞
EPS	Shell permittivity	8.4.2.3	R	4.0	$\sqrt{3}$	2.3	See8.4.2.3	2.3	∞
DIS	Distance between the radiating element of the DUT and the phantom medium	8.4.2.4	N	5.0	1	5.0	2	10.0	∞
D_{xyz}	Repeatability of positioning the DUT or source against the phantom	8.4.2.5	N	2.8	1	2.8	1	2.8	5
H	Device holder effects	8.4.2.5	N	2.3	1	2.3	1	2.3	∞
MOD	Effect of operating mode on	8.4.2.7	R	9.0	$\sqrt{3}$	5.2	1	5.2	∞
TAS	Time-average SAR	8.4.2.8	R	2.0	$\sqrt{3}$	1.1	1	1.1	∞
RF _{drift}	Variation in SAR due to drift in output of DUT	8.4.2.9	N	1%	1	1%	1	1%	$\pm 5\%$
VAL	Validation antenna uncertainty(validation measurement only)	8.4.2.10	N	5.0	1	5.0	1	5.0	∞
P_{in}	Uncertainty in accepted power(validation measurement only)	8.4.2.11	N	5.0	1	5.0	1	5.0	∞
Corrections to the SAR result(if applied)									
$C(\epsilon', \sigma)$	Phantom deviation from target(ϵ', σ)	8.4.3.1	N	0.9%	1	0.9%	1	0.9%	$\pm 5\%$
$C(R)$	SAR scaling	8.4.3.2	R	4.0	$\sqrt{3}$	2.3	1	2.3	$\pm 5\%$
$u(\Delta SAR)$	Combined uncertainty							13.2	
U	Expanded uncertainty and effective degrees of freedom		N ($k=2$)				$U=$	26.4	$v_{eff}=$
^a Other probability distributions and divisors may be used if they better represent available knowledge of the quantities concerned.									

APPENDIX B EUT TEST POSITION PHOTOS

Liquid depth $\geq 15\text{cm}$

Phantom: SAM-Twin V8.0 P1aP2a; Type: QD 000 P41 AA ; Serial: 1962



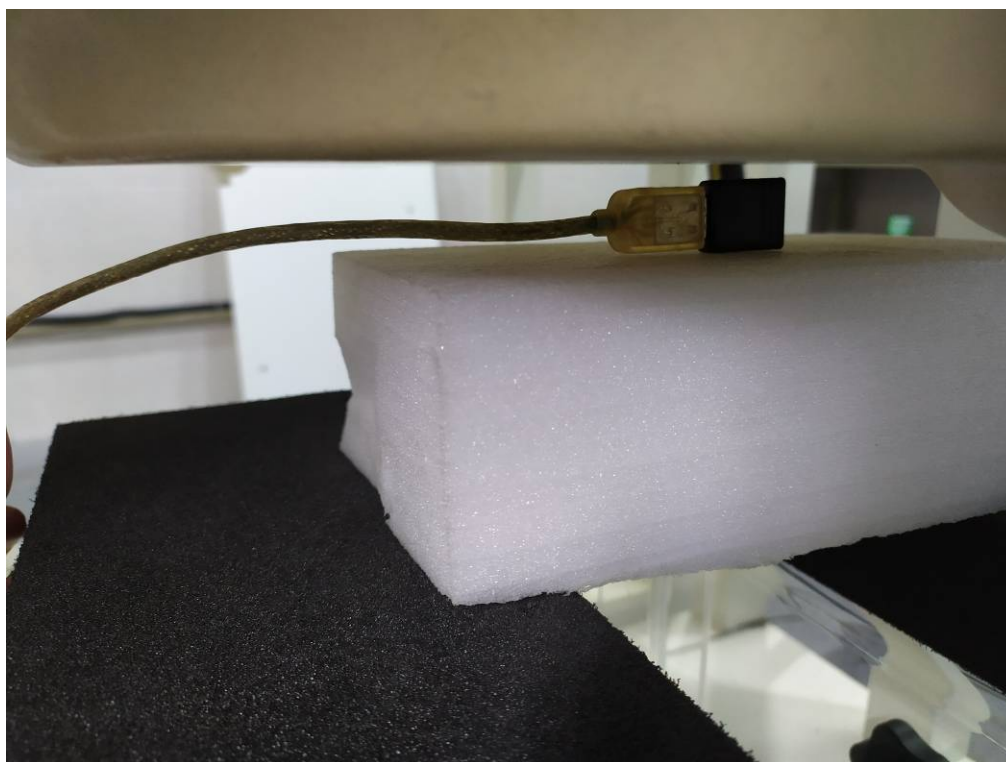
Horizontal-UP (5mm)



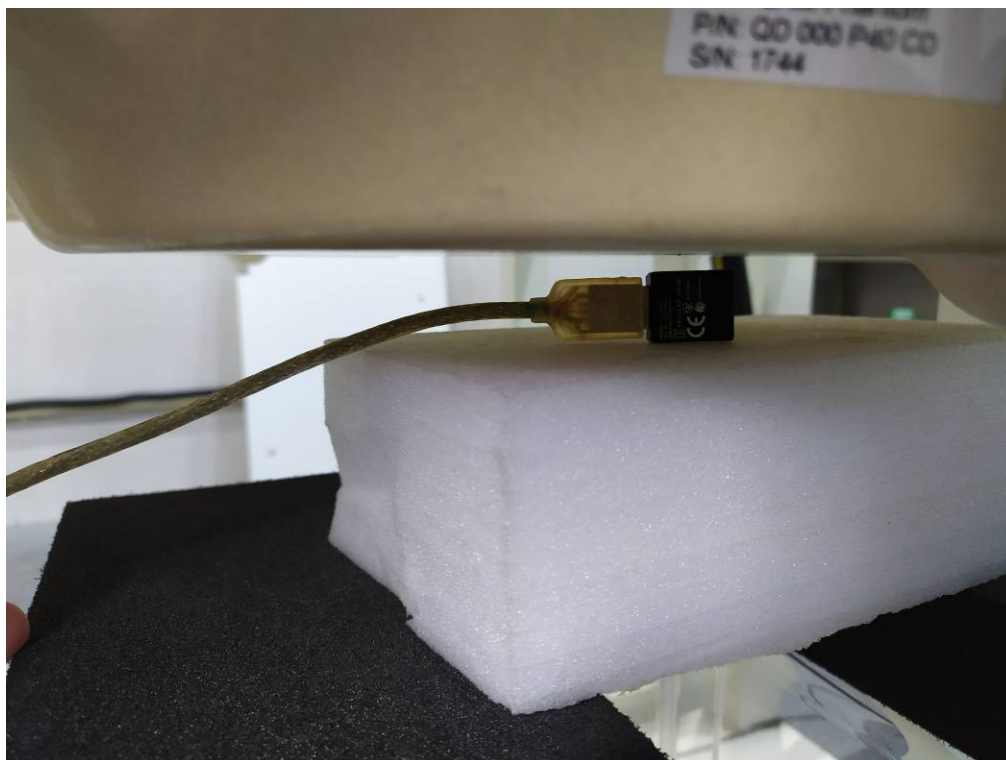
Horizontal-Down (5mm)



Vertical-Front (5mm)



Vertical-Back (5mm)



APPENDIX C PROBE CALIBRATION CERTIFICATES

Please Refer to the Attachment.

APPENDIX D DIPOLE CALIBRATION CERTIFICATES

Please Refer to the Attachment.

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