ACCREDITED
TESTING LABORATORY
CERTIFICATE # 4821.01

Bay Area Compliance Labs Corp.

SAR EVALUATION REPORT

For

Vuzix Corporation

25 Hendrix Rd, West Henrietta, New York, United States 14586

FCC ID: 2AA9D-472

Report Type:	**Product Type:**
Original Report	(Smart glass)M400

Report Number: RSZ190723002-SAA

Report Date: 2019-09-18

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Attestation of Test Results			
EUT Information	**EUT Description**	(Smart glass)M400	
	Tested Model	472	
	FCC ID	2AA9D-472	
	Serial Number	19072300108	
	Test Date	2019/08/14	
MODE		**Max. SAR Level(s) Measured**	**Limit (W/kg)**
WLAN 2.4G	1g Head SAR	**0.001**	**1. 6**
WLAN 5.2G	1g Head SAR	**0.01**	
WLAN 5.8G	1g Head SAR	**0.25**	

Applicable Standards	**FCC 47 CFR part 2.1093** Radiofrequency radiation exposure evaluation: portable devices
	IEEE1528:2013 IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
	IEC 62209-2:2010 Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices-Human models, instrumentation, and procedures-Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 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 616217 D04 SAR for laptop and tablets v01r02 KDB 248227 D01 802.11 Wi-Fi SAR v02r02

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 **FCC 47 CFR part 2.1093** and has been tested in accordance with the measurement procedures specified in IEEE 1528-2013 and RF exposure KDB procedures.

The results and statements contained in this report pertain only to the device(s) evaluated.

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	RSZ190723002-SAA	Original Report	2019-09-18

EUT DESCRIPTION

This report has been prepared on behalf of ***Vuzix Corporation*** and their product ***(Smart glass)M400*** , Model: ***472***, FCC ID: ***2AA9D-472*** or the EUT (Equipment under Test) as referred to in the rest of this report.

**All measurement and test data in this report was gathered from production sample serial number: 19072300108 (Assigned by BACL, Shenzhen).The EUT supplied by the applicant was received on 2019-07-24.*

Technical Specification

Device Type:	Portable
Exposure Category:	Population / Uncontrolled
Antenna Type(s):	Internal Antenna
Proximity sensor for SAR reduction:	None
Face-Head Accessories:	None
Operation Mode :	WLAN, Bluetooth
Frequency Band:	WLAN (2.4G): 2412-2462 MHz WLAN (5.2G): 5180-5240 MHz WLAN (5.8G): 5745-5825 MHz Bluetooth: 2402 -2480 MHz
Conducted RF Power:	WLAN (2.4G): 17.95 dBm WLAN (5.2G): 15.42 dBm WLAN (5.8G): 16.40 dBm Bluetooth(BDR/EDR): 6.53 dBm BLE: 6.35 dBm
Power Source:	Rechargeable Battery
Normal Operation:	Next to Head

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

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

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

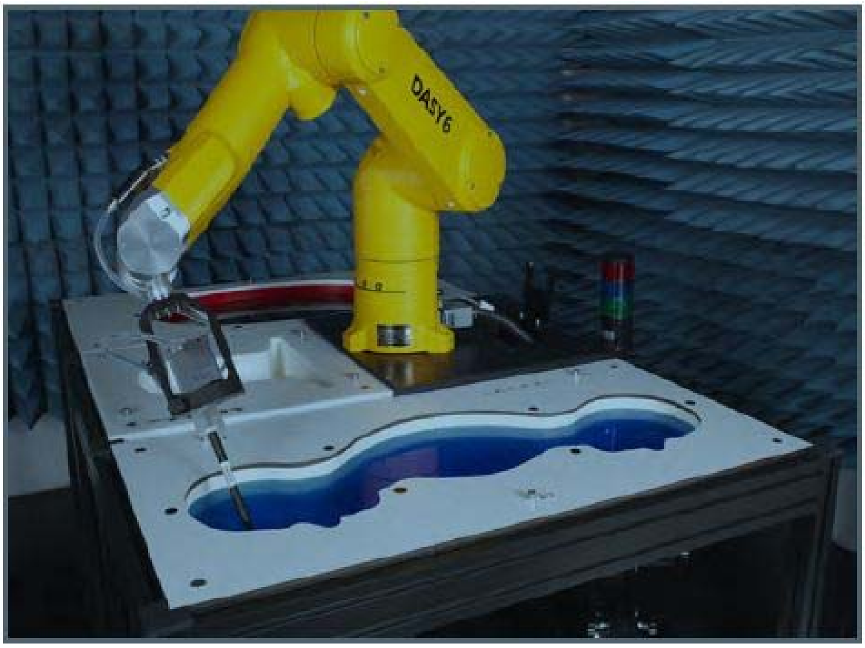
The test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect data is located at 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China.

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.: 342867, the FCC Designation No.: CN1221.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062B.

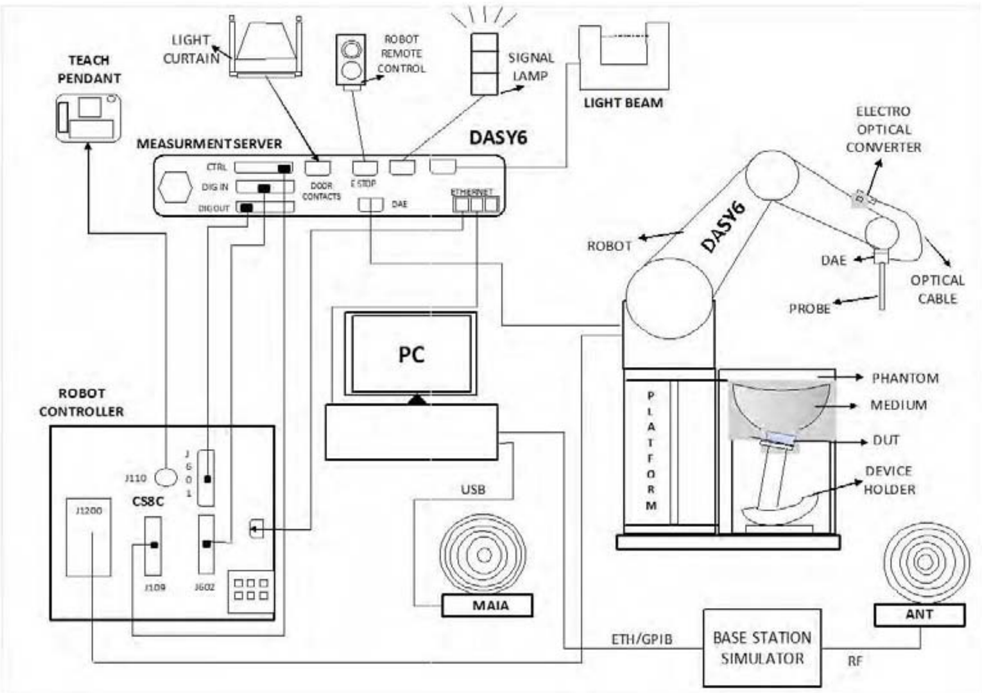
DESCRIPTION OF TEST SYSTEM

These measurements were performed with the automated near-field scanning system DASY6 from Schmid & Partner Engineering AG (SPEAG) which is the Fifth generation of the system shown in the figure hereinafter:



DASY6 System Description

The DASY6 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.

DASY6 Measurement Server

The DASY6 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 DASY6 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 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

SAM Twin Phantom

The SAM Twin Phantom (shown in front of DASY6) is a fiberglass shell phantom with shell thickness 2 mm, except in the ear region where the thickness is increased to 6 mm. The phantom has three measurement areas: 1) Left Head, 2) Right Head, and 3) Flat Section. For larger devices, the use of the ELI-Phantom (shown behind DASY6) is required. For devices such as glasses with a wireless link, the Face Down Phantom is the most suitable (between the SAM Twin and ELI phantoms).

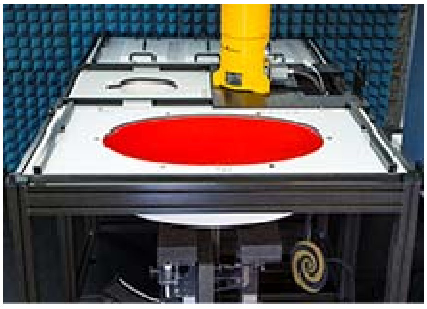
When the phantom is mounted inside allocated slot of the DASY6 platform, phantom reference points can be taught directly in the DASY5 V5.2 software. When the DASY6 platform is used to mount the

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.

ELI Phantom



The ELI phantom is intended for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30MHz to 6 GHz. ELI is fully compatible with the latest draft of the standard IEC 62209-2 and the use of all known tissue simulating liquids. ELI has been optimized for performance and can be integrated into a SPEAG standard phantom table. A cover is provided to prevent evaporation of water and changes in liquid parameters. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points.

The phantom 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 ELI phantom.

Robots

The DASY6 system uses the high-precision industrial robots TX60L, TX90XL, and RX160L from St aubli SA (France). The TX robot family - the successor of the well-known RX robot family - continues to offer the features important for DASY6 applications:

- 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 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 provided

Calibration Frequency Points for EX3DV4 E-Field Probes SN: 7522 Calibrated: 2018/11/02

Calibration Frequency Point(MHz)	Frequency Range(MHz)		Conversion Factor		
	From	To	X	Y	Z
750 Head	650	800	9.78	9.78	9.78
750 Body	650	800	9.8	9.8	9.8
850 Head	800	950	9.46	9.46	9.46
850 Body	800	950	9.54	9.54	9.54
1750 Head	1650	1810	8.2	8.2	8.2
1750 Body	1650	1810	7.88	7.88	7.88
1900 Head	1810	1920	7.91	7.91	7.91
1900 Body	1810	1920	7.48	7.48	7.48
2000 Head	1920	2100	7.78	7.78	7.78
2000 Body	1920	2100	7.36	7.36	7.36
2300 Head	2200	2399	7.35	7.35	7.35
2300 Body	2200	2399	7.27	7.27	7.27
2450 Head	2399	2500	6.97	6.97	6.97
2450 Body	2399	2500	7.05	7.05	7.05
2600 Head	2500	2700	6.79	6.79	6.79
2600 Body	2500	2700	6.95	6.95	6.95
5250 Head	5140	5360	5.05	5.05	5.05
5250 Body	5140	5360	4.77	4.77	4.77
5600 Head	5490	5700	4.48	4.48	4.48
5600 Body	5490	5700	4.27	4.27	4.27
5800 Head	5700	5910	4.76	4.76	4.76
5800 Body	5700	5910	4.31	4.31	4.31

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 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 properties 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.

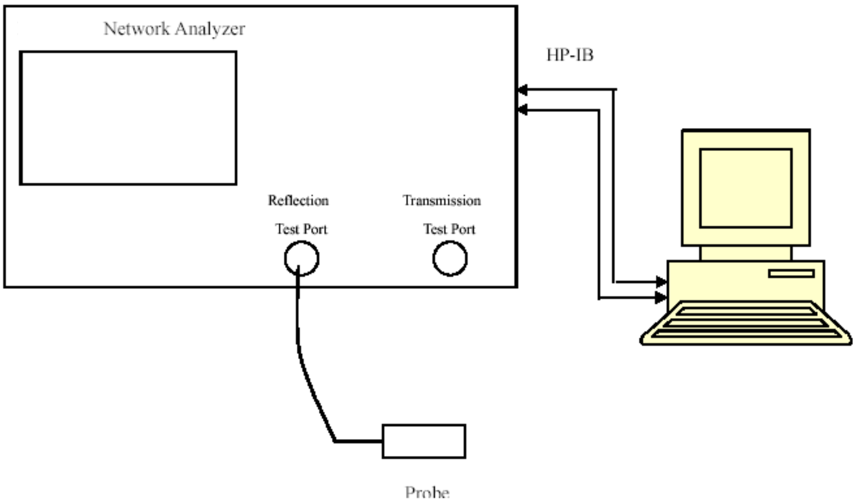
EQUIPMENT LIST AND CALIBRATION

Equipments List & Calibration Information

Equipment	Model	S/N	Calibration Date	Calibration Due Date
DASY5 Test Software	DASY52 52.10.2	N/A	NCR	NCR
DASY6 Measurement Server	DASY6 6.0.31	N/A	NCR	NCR
Data Acquisition Electronics	DAE4	1562	2018/11/6	2019/11/6
E-Field Probe	EX3DV4	7522	2018/11/2	2019/11/2
Mounting Device	MD4HHTV5	SD 000 H01 KA	NCR	NCR
SAM Twin Phantom	SAM-Twin V8.0	1962	NCR	NCR
Dipole, 2450MHz	D2450V2	751	2017/10/12	2020/10/12
Dipole, 5200MHz	ALS-D-5200-S-2	230-00805	2016/10/5	2019/10/5
Dipole, 5800 MHz	ALS-D-5800-S-2	240-00855	2016/10/5	2019/10/5
Simulated Tissue Liquid Head	HBBL600-10000V6	180622-2	Each Time	
Network Analyzer	8753D	3410A08288	2019/04/25	2020/04/25
Dielectric Assessment Kit	DAK-3.5	1248	NCR	NCR
Anritsu Signal Generator	68369B	4114	2018/12/24	2019/12/24
Power Meter	E4419B	GB39511341	2019/06/22	2020/06/22
Power Amplifier	5S1G4	71377	NCR	NCR
Directional Coupler	4242-10	3307	NCR	NCR
Attenuator	3dB	5402	NCR	NCR
Attenuator	10dB	AU 3842	NCR	NCR

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)	$\Delta\varepsilon_r$	Δσ	
2412	Simulated Tissue Liquid Head	37.845	1.751	39.27	1.77	-3.63	-1.07	±5
2437	Simulated Tissue Liquid Head	38.205	1.773	39.22	1.79	-2.59	-0.95	±5
2450	Simulated Tissue Liquid Head	38.073	1.799	39.20	1.80	-2.88	-0.06	±5
2462	Simulated Tissue Liquid Head	38.354	1.824	39.18	1.81	-2.11	0.77	±5

**Liquid Verification above was performed on 2019/08/14*

Frequency (MHz)	Liquid Type	Liquid Parameter		Target Value		Delta (%)		Tolerance (%)
		ε_r	σ (S/m)	ε_r	σ (S/m)	$\Delta\varepsilon_r$	Δσ	
5180	Simulated Tissue Liquid Head	34.613	4.522	36.01	4.63	-3.88	-2.33	±5
5200	Simulated Tissue Liquid Head	34.745	4.556	36.0	4.66	-3.49	-2.23	±5
5240	Simulated Tissue Liquid Head	34.978	4.589	35.94	4.70	-2.68	-2.36	±5

**Liquid Verification above was performed on 2019/08/14.*

Frequency (MHz)	Liquid Type	Liquid Parameter		Target Value		Delta (%)		Tolerance (%)
		ε_r	Ơ (S/m)	ε_r	Ơ (S/m)	$\Delta\varepsilon_r$	ΔƠ	
5745	Simulated Tissue Liquid Head	34.296	5.136	35.28	5.22	-2.79	-1.61	±5
5785	Simulated Tissue Liquid Head	34.178	5.151	35.22	5.26	-2.96	-2.07	±5
5800	Simulated Tissue Liquid Head	34.159	5.173	35.30	5.27	-3.23	-1.84	±5
5825	Simulated Tissue Liquid Head	34.023	5.188	35.28	5.30	-3.56	-2.11	±5

**Liquid Verification above was performed on 2019/08/14.*

System Accuracy Verification

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

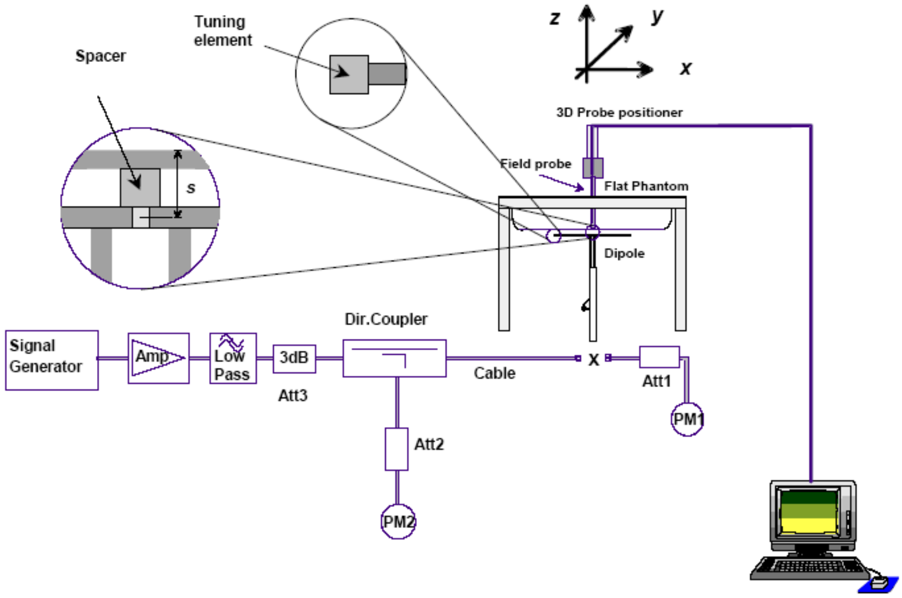
The spacing distances in the **System Verification Setup Block Diagram** is given by the following:

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 (MHz)	Liquid Type	Input Power (mW)	Measured SAR (W/kg)		Normalized to 1W (W/kg)	Target Value (W/Kg)	Delta (%)	Tolerance (%)
2019/08/14	2450	Simulated Tissue Liquid Head	100	1g	5.11	51.1	52.5	-2.667	±10
2019/08/14	5200	Simulated Tissue Liquid Head	100	1g	7.71	77.1	73.68	4.642	±10
2019/08/14	5800	Simulated Tissue Liquid Head	100	1g	8.36	83.6	78.05	7.111	±10

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

SAR SYSTEM VALIDATION DATA

System Performance 2450 MHz Head

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

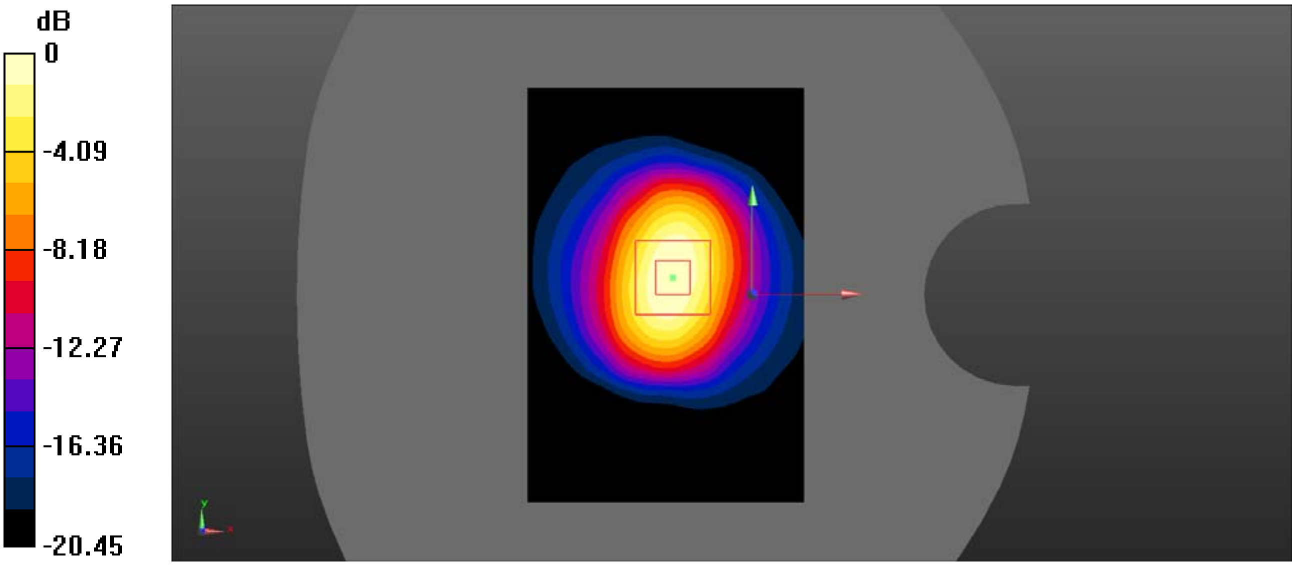
Communication System: UID 0, CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.799 S/m; ε_r = 38.073; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN7522; ConvF(6.97, 6.97, 6.97) @ 2450 MHz;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1562; Calibrated: 11/6/2018
- Phantom: SAM-Twin V8.0 P1aP2a; Type: QD 000 P41 AA ; Serial: 1962
- Measurement SW: DASY52, Version 52.10 (2);

Head 2450MHz Pin=100mW/Area Scan (81x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 5.73 W/kg

Head 2450MHz Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 54.26 V/m; Power Drift = 0.057 dB
Peak SAR (extrapolated) = 10.7 W/kg
SAR(1 g) = 5.11 W/kg; SAR(10 g) = 2.39 W/kg
Maximum value of SAR (measured) = 5.97 W/kg



0 dB = 5.97 W/kg = 7.76 dBW/kg

System Performance 5200 MHz Head

DUT: Dipole 5200MHz; Type: ALS-D-5200-S-2; Serial: 230-00805

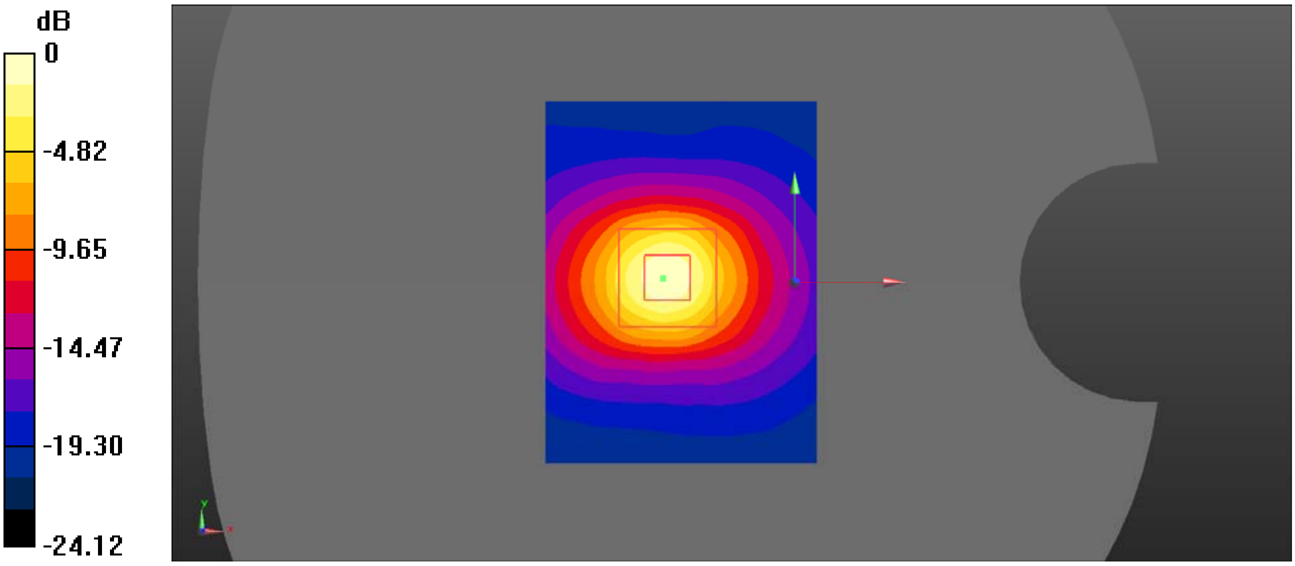
Communication System: UID 0, CW (0); Frequency: 5200 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5200 MHz; σ = 4.556 S/m; ε_r = 34.745; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7522; ConvF(5.05, 5.05, 5.05) @ 5200 MHz;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1562; Calibrated: 11/6/2018
- Phantom: SAM-Twin V8.0 P1aP2a; Type: QD 000 P41 AA ; Serial: 1962
- Measurement SW: DASY52, Version 52.10 (2);

Head 5200MHz Pin=100mW/Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 14.1 W/kg

Head 5200MHz Pin=100mW/Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 36.57 V/m; Power Drift = 0.144 dB
Peak SAR (extrapolated) = 29.1 W/kg
SAR(1 g) = 7.71 W/kg; SAR(10 g) = 2.61 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 14.5 W/kg



0 dB = 14.5 W/kg = 11.61 dBW/kg

System Performance 5800 MHz Head

DUT: Dipole 5800MHz; Type: ALS-D-5800-S-2; Serial: 240-00855

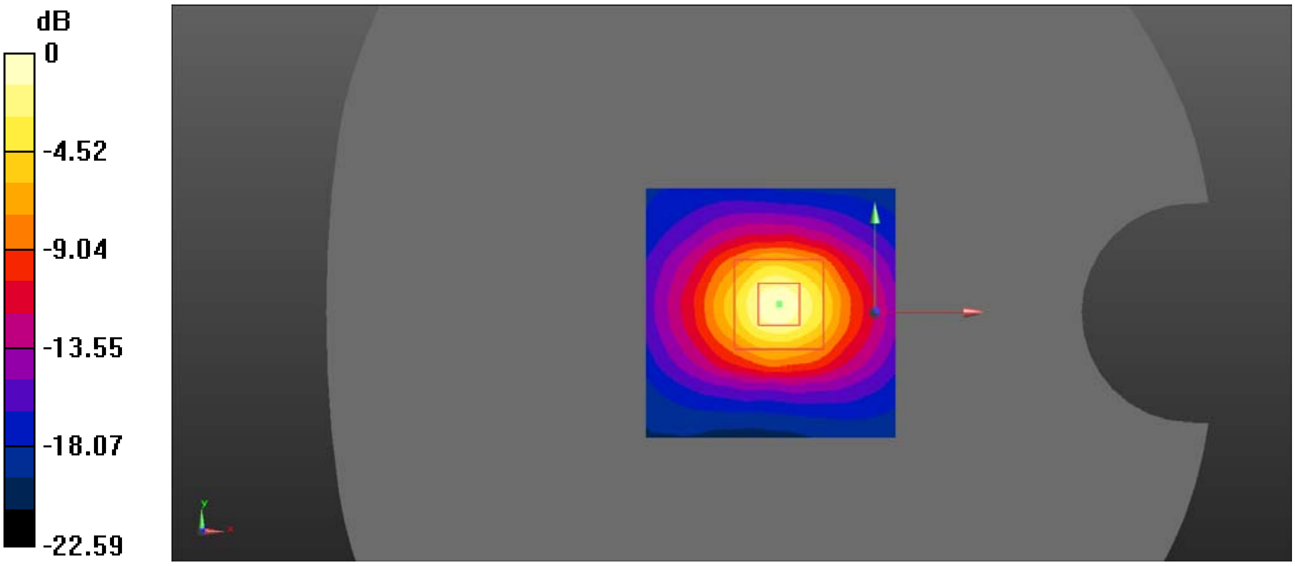
Communication System: UID 0, CW (0); Frequency: 5800 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5800 MHz; σ = 5.173 S/m; ε_r = 34.159; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN7522; ConvF(4.76, 4.76, 4.76) @ 5800 MHz;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1562; Calibrated: 11/6/2018
- Phantom: SAM-Twin V8.0 P1aP2a; Type: QD 000 P41 AA ; Serial: 1962
- Measurement SW: DASY52, Version 52.10 (2);

Head 5800MHz Pin=100mW/Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 14.7 W/kg

Head 5800MHz Pin=100mW/Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 52.25V/m; Power Drift = 0.027 dB
Peak SAR (extrapolated) = 40.2 W/kg
SAR(1 g) = 8.36 W/kg; SAR(10 g) = 2.56 W/kg
Maximum value of SAR (measured) = 16.2 W/kg



0 dB = 16.2 W/kg = 12.10dBW/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.

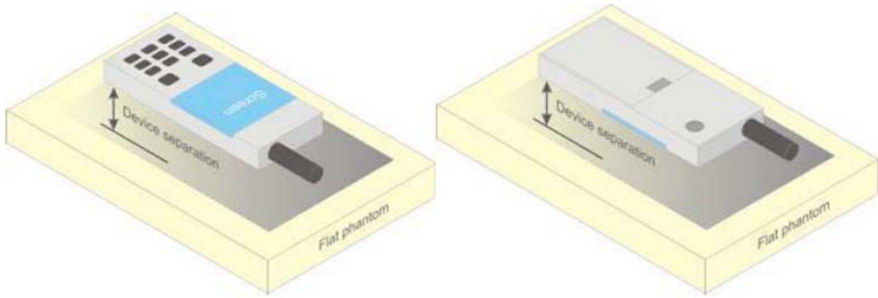


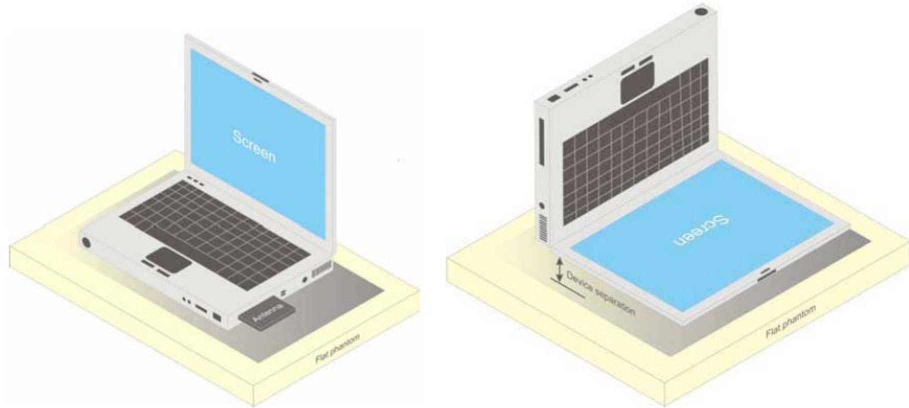
Figure 5 – Test positions for body-worn devices

Test positions for Body-supported device

A typical example of a body supported device is a wireless enabled laptop device that among other orientations may be supported on the thighs of a sitting user. To represent this orientation, the device shall be positioned with its base against the flat phantom. Other orientations may be specified by the manufacturer in the user instructions. If the intended use is not specified, the device shall be tested directly against the flat phantom in all usable orientations.

The screen portion of the device shall be in an open position at a 90° angle as seen in Figure below (left side), or at an operating angle specified for intended use by the manufacturer in the operating instructions. Where a body supported device has an integral screen required for normal operation, then the screen-side will not need to be tested if it ordinarily remains 200 mm from the body. Where a screen mounted antenna is present, this position shall be repeated with the screen against the flat phantom as shown in Figure below (right side), if this is consistent with the intended use.

Other devices that fall into this category include tablet type portable computers and credit card transaction authorisation terminals, point-of-sale and/or inventory terminals. Where these devices may be torso or limb-supported, the same principles for body-supported devices are applied.



a) Portable computer with external antenna plug-in-radio-card (left side) or with internal antenna located in screen section (right side)

Test Distance for SAR Evaluation

For this case the EUT(Equipment Under Test) is set 0mm away from the phantom, the test distance is 0mm.

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

Provision Applicable

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

EUT Exercise Software

Wi-Fi test in the engineer mode.

“AiThinker Serial Tool V1.2.3.exe” Software was used, and the power level is default.

Maximum Target Output Power

Max Target Power(dBm)			
Mode/Band	Channel		
	Low	Middle	High
2.4G WLAN	18.2	18.2	18.2
5.2G WLAN	15.7	15.7	15.7
5.8G WLAN	16.7	16.7	16.7
Bluetooth BDR/EDR	6.8	6.8	6.8
Bluetooth BLE	6.8	6.8	6.8

Test Results:

Bluetooth:

Mode	Channel frequency (MHz)	RF Output Power (dBm)
BDR(GFSK)	2402	4.94
	2441	4.76
	2480	6.36
	2411	**6.53**
EDR(π/4-DQPSK)	2402	3.61
	2441	3.71
	2480	5.09
	2409	5.31
EDR(8-DPSK)	2402	4.06
	2441	3.88
	2480	5.46
	2410	5.39
Bluetooth LE(1M)	2402	4.56
	2440	4.48
	2480	**6.35**
Bluetooth LE(2M)	2402	4.61
	2440	4.57
	2480	6.42

WLAN 2.4G:

Mode	Channel frequency (MHz)	Data Rate	RF Output Power(dBm)
802.11b	2412	1Mbps	17.44
	2437		17.83
	2462		17.47
802.11g	2412	6Mbps	17.38
	2437		17.86
	2462		**17.95**
802.11n HT20	2412	MCS0	16.70
	2437		17.09
	2462		17.10
802.11n HT40	2422	MCS0	17.70
	2437		17.70
	2452		17.69

WLAN 5.2G:

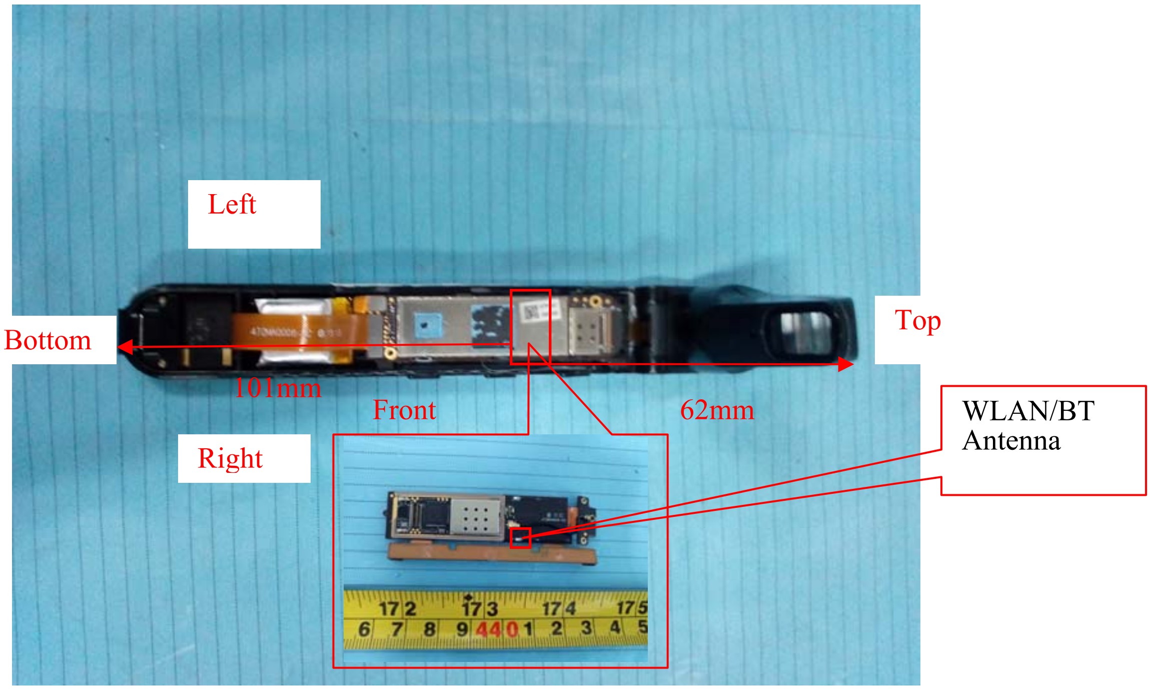
Mode	Channel frequency (MHz)	Data Rate	RF Output Power(dBm)
802.11a	5180	1Mbps	14.26
	5200		14.69
	5240		14.16
802.11n20	5180	6Mbps	14.45
	5200		14.74
	5240		14.23
802.11n40	5190	MCS0	14.94
	5230		15.28
802.11ac20	5180	MCS0	14.58
	5200		14.98
	5240		14.21
802.11ac40	5190	MCS0	14.85
	5230		15.25
802.11ac80	5210	MCS0	**15.42**

WLAN 5.8G:

Mode	Channel frequency (MHz)	Data Rate	RF Output Power(dBm)
802.11a	5745	1Mbps	15.81
	5785		15.51
	5825		14.94
802.11n20	5745	6Mbps	15.86
	5785		15.75
	5825		14.90
802.11n40	5755	MCS0	16.42
	5795		16.03
802.11ac20	5745	MCS0	15.62
	5785		15.61
	5825		15.02
802.11ac40	5755	MCS0	**16.40**
	5795		16.05
802.11ac80	5775	MCS0	16.32

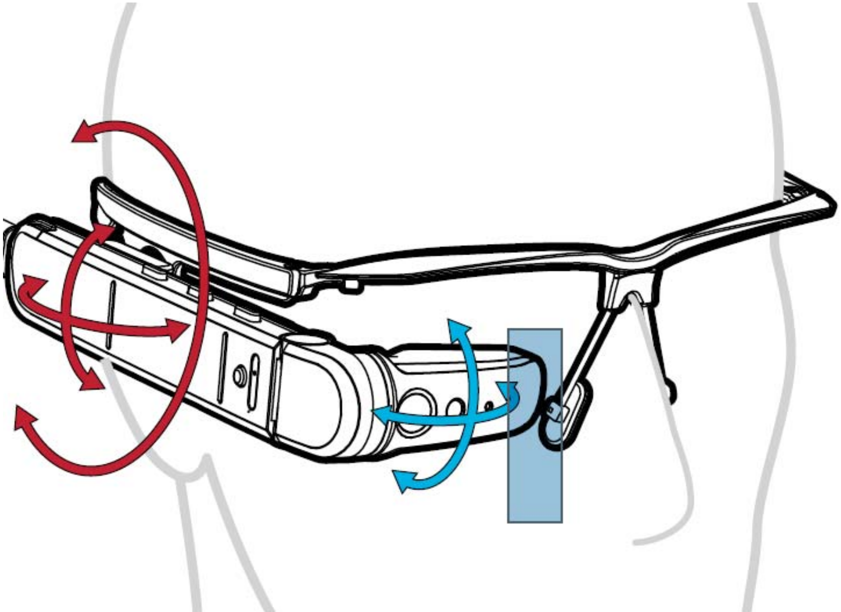
Standalone SAR test exclusion considerations

Antennas Location:



Antenna Distance To Edge

Antenna Distance To Edge(mm)						
Antenna	**Front**	**Back**	**Left**	**Right**	**Top**	**Bottom**
WLAN Antenna (Wi-Fi & BT)	7	10	<5	5	62	101



Note: According to user guide,This device is normally used close to the head. So only the front side needs the SAR evaluation.

Standalone SAR test exclusion considerations

Mode	Frequency (MHz)	P_{avg} (dBm)	P_{avg} (mW)	Distance (mm)	Calculated value	Threshold (1-g)	SAR Test Exclusion
WLAN 2.4G	2462	18.2	66.07	7	14.8	3.0	NO
WLAN 5.2 G	5240	15.7	37.15	7	12.1	3.0	NO
WLAN 5.8 G	5825	16.7	46.77	7	16.1	3.0	NO
Bluetooth	2480	6.8	4.47	7	1.1	3.0	YES

NOTE:

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [$\sqrt{f(GHz)}$] ≤ 3.0 for 1-g SAR and ≤7.5 for 10-g extremity SAR, where

1. f(GHz) is the RF channel transmit frequency in GHz.
2. Power and distance are rounded to the nearest mW and mm before calculation.
3. The result is rounded to one decimal place for comparison.
4. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion.

SAR MEASUREMENT RESULTS

This page summarizes the results of the performed dosimetric evaluation.

SAR Test Data

Environmental Conditions

Temperature:	22.6-23.5 ℃
Relative Humidity:	63%
ATM Pressure:	101.5 kPa
Test Date:	2019/08/14

Testing was performed by Seven Liang, Ricardo Lan,Yates Li.

WLAN 2.4G:

EUT Position	Frequency (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/kg)			
					Scaled Factor	Meas. SAR	Scaled SAR	Plot
Front to Phantom (0mm)	2412	802.11b	/	/	/	/	/	/
	2437	802.11b	17.83	18.2	1.089	0.001	0.001	1#
	2462	802.11b	/	/	/	/	/	/

WLAN 5.2G:

EUT Position	Frequency (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/kg)			
					Scaled Factor	Meas. SAR	Scaled SAR	Plot
Front to Phantom (0mm)	5180	802.11a	/	/	/	/	/	/
	5200	802.11a	14.69	15.7	1.262	0.005	0.01	2#
	5240	802.11a	/	/	/	/	/	/

WLAN 5.8G:

EUT Position	Frequency (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/kg)			
					Scaled Factor	Meas. SAR	Scaled SAR	Plot
Front to Phantom (0mm)	5745	802.11a	/	/	/	/	/	/
	5785	802.11a	15.51	16.7	1.315	0.191	0.25	3#
	5825	802.11a	/	/	/	/	/	/

Note:

1. When the 1-g SAR is≤ 0.8W/Kg, testing for other channels are optional.
2. 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.
3. 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.
4. For modes that peak SAR is too low to evaluate, a SAR value 0.01 W/kg is considered as their Scaled SAR.
5. Only front side touch to head for use with normal condition.

2.4 GHz 802.11g/n OFDM SAR Test Exclusion Consideration:

Modulation Mode	Pavg (dBm)	Pavg (mW)	Reported SAR(W/kg)	Adjusted SAR(W/kg)	Limit(W/kg)	SAR Test Exclusion
802.11b(DSSS)	18.2	66.069	0.001	/	/	/
802.11g(OFDM)	18.2	66.069	/	0.001	1.2	Yes
802.11n HT20(OFDM)	18.2	66.069	/	0.001	1.2	Yes
802.11n HT40(OFDM)	18.2	66.069	/	0.001	1.2	Yes

Note:
KDB 248227 D01-When SAR measurement is required for 2.4 GHz 802.11g/n OFDM configurations, the measurement and test reduction procedures for OFDM are applied. SAR is not required for the following 2.4 GHz OFDM conditions.
a) When KDB Publication 447498 D01 SAR test exclusion applies to the OFDM configuration.
b) When the highest *reported* SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

5.2 GHz 802.11 a/g/n/ac OFDM SAR Test Exclusion Consideration:

Modulation Mode	Pavg (dBm)	Pavg (mW)	Reported SAR(W/kg)	Adjusted SAR(W/kg)	Limit(W/kg)	SAR Test Exclusion
802.11a(OFDM)	15.7	37.154	0.01	/	/	/
802.11g(OFDM)	15.7	37.154	/	0.01	1.2	Yes
802.11n HT20(OFDM)	15.7	37.154	/	0.01	1.2	Yes
802.11n HT40(OFDM)	15.7	37.154	/	0.01	1.2	Yes

Note:
KDB 248227 D01-When SAR measurement is required for 5.2 GHz 802.11 a/g/n/ac OFDM configurations, the measurement and test reduction procedures for OFDM are applied. SAR is not required for the following 5.2 GHz 802.11 a/g/n/ac OFDM conditions.
a) When KDB Publication 447498 D01 SAR test exclusion applies to the OFDM configuration.
b) When the highest *reported* SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

5.8 GHz 802.11 a/g/n/ac OFDM SAR Test Exclusion Consideration:

Modulation Mode	Pavg (dBm)	Pavg (mW)	Reported SAR(W/kg)	Adjusted SAR(W/kg)	Limit(W/kg)	SAR Test Exclusion
802.11a(OFDM)	16.7	46.774	0.25	/	/	/
802.11g(OFDM)	16.7	46.774	/	0.25	1.2	Yes
802.11n HT20(OFDM)	16.7	46.774	/	0.25	1.2	Yes
802.11n HT40(OFDM)	16.7	46.774	/	0.25	1.2	Yes

Note:

KDB 248227 D01-When SAR measurement is required for 5.8 GHz 802.11 a/g/n/ac OFDM configurations, the measurement and test reduction procedures for OFDM are applied. SAR is not required for the following 5.8GHz 802.11 a/g/n/ac OFDM conditions.

a) When KDB Publication 447498 D01 SAR test exclusion applies to the OFDM configuration.

b) When the highest *reported* SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

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

Head

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	
/	/	/	/	/	/	/

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?**
Wi-Fi+ Bluetooth	×

Note: WIFI and bluetooth Shared antenna.

SAR Test Plots:

Plot 1#

DUT: (Smart glass)M400 ; Type: 472; Serial: 19072300108

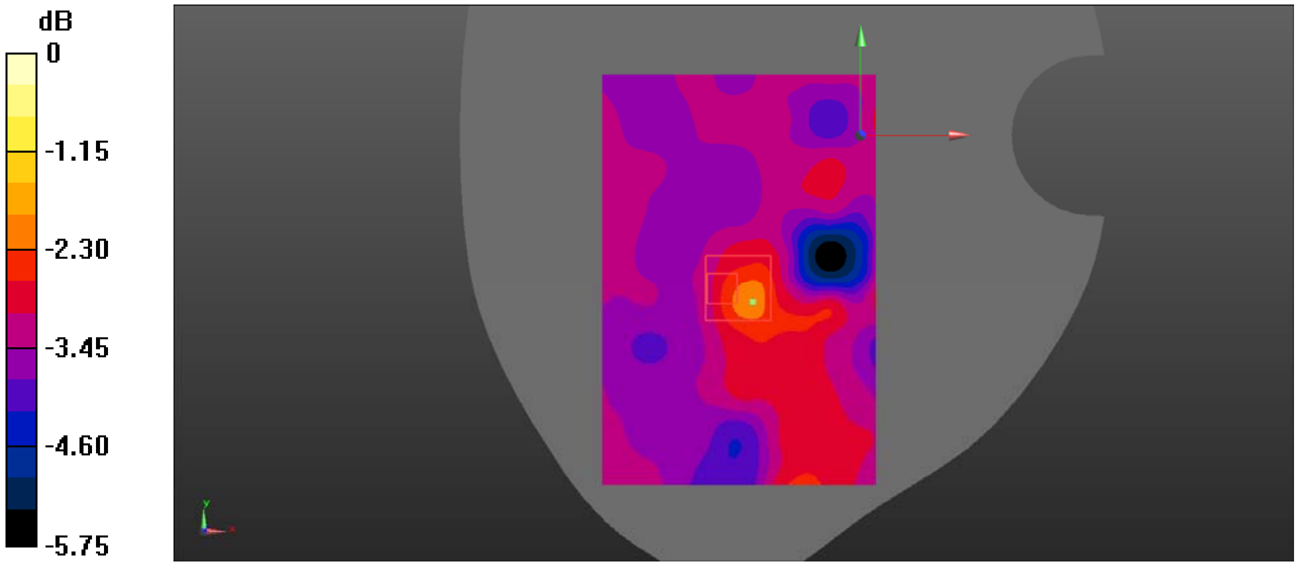
Communication System: UID 0, 2.4G DTS (0); Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.773 S/m; ε_r = 38.205; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7522; ConvF(6.97, 6.97, 6.97) @ 2437 MHz;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1562; Calibrated: 11/6/2018
- Phantom: SAM-Twin V8.0 P1aP2a; Type: QD 000 P41 AA ; Serial: 1962
- Measurement SW: DASY52, Version 52.10 (2);

Body Back/WLAN 802.11b Mid/ Area Scan (81x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.0474 W/kg

Body Back/WLAN 802.11b Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.381 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.0770 W/kg
SAR(1 g) = 0.0011 W/kg; SAR(10 g) = 0.000119 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.0772 W/kg



0 dB = 0.0772 W/kg = -11.12 dBW/kg

Plot 2#

DUT: (Smart glass)M400 ; Type: 472; Serial: 19072300108

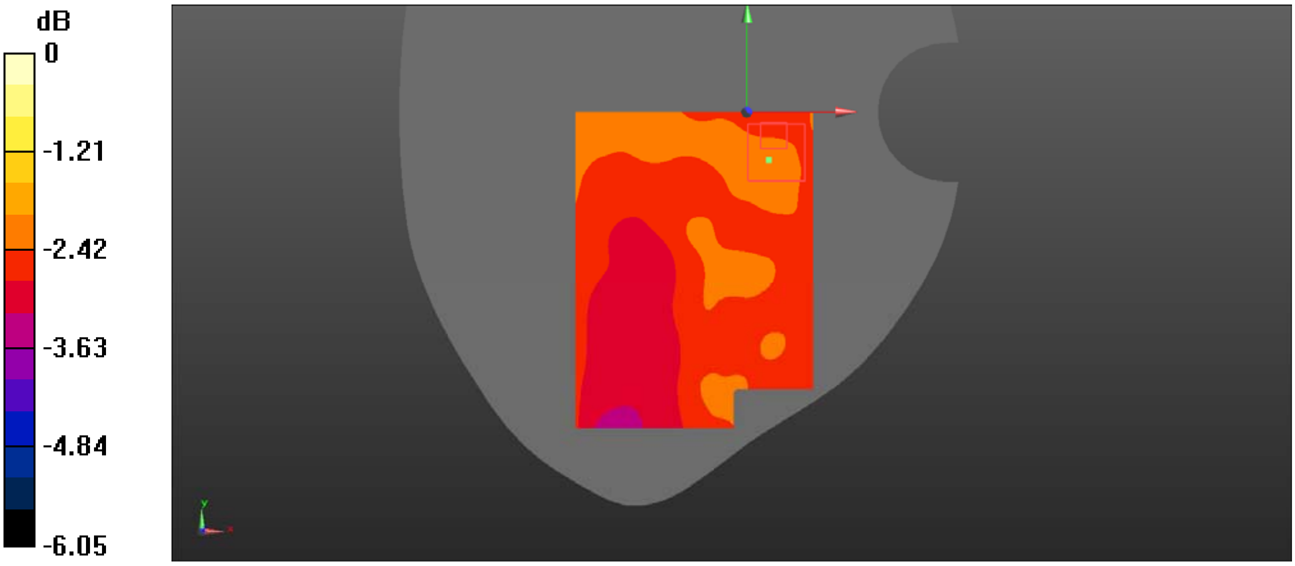
Communication System: UID 0, 5.2G WiFi (0); Frequency: 5200 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5200 MHz; $\sigma = 4.556$ S/m; $\varepsilon_r = 34.745$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7522; ConvF(5.05, 5.05, 5.05) @ 5200 MHz;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1562; Calibrated: 11/6/2018
- Phantom: SAM-Twin V8.0 P1aP2a; Type: QD 000 P41 AA ; Serial: 1962
- Measurement SW: DASY52, Version 52.10 (2);

Body Back/WLAN 5.2G 802.11a Mid/ Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.114 W/kg

Body Back/WLAN 5.2G 802.11a Mid/Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 5.171 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 0.195 W/kg
SAR(1 g) = 0.00487 W/kg; SAR(10 g) = 0.000919 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.190 W/kg



0 dB = 0.190 W/kg = -7.21 dBW/kg

Plot 3#

DUT: (Smart glass)M400 ; Type: 472; Serial: 19072300108

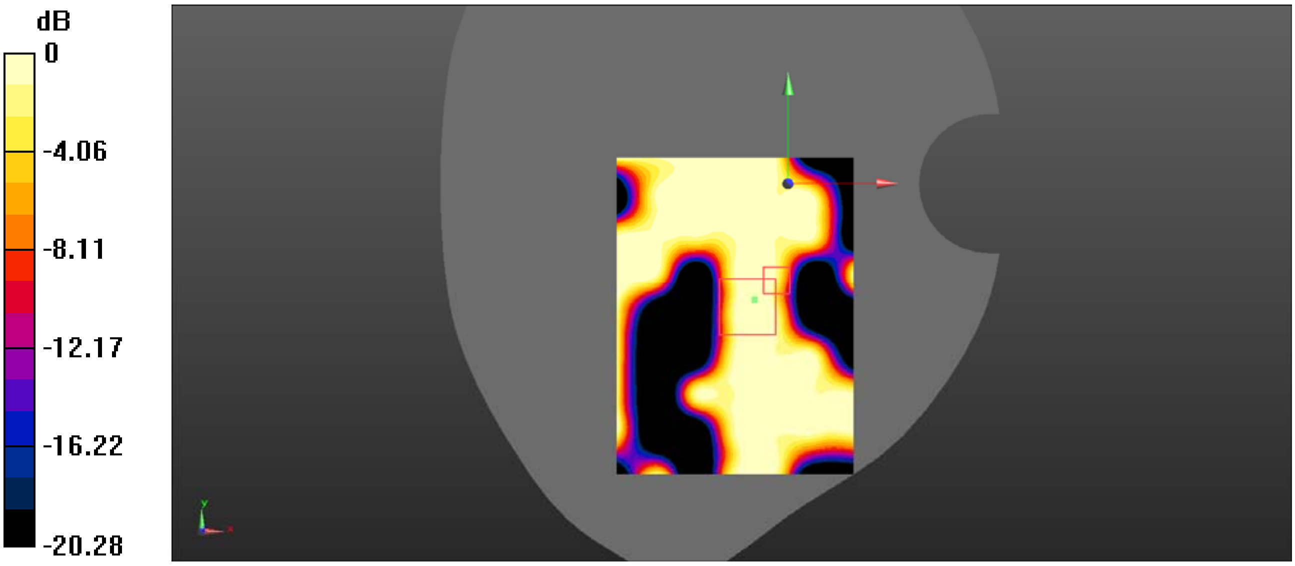
Communication System: UID 0, 5.8G Wi-Fi (0); Frequency: 5785 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5785 MHz; σ = 5.151 S/m; ε_r = 34.178; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7522; ConvF(4.76, 4.76, 4.76) @ 5785 MHz;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1562; Calibrated: 11/6/2018
- Phantom: SAM-Twin V8.0 P1aP2a; Type: QD 000 P41 AA ; Serial: 1962
- Measurement SW: DASY52, Version 52.10 (2);

Body Back/WLAN 5.8G 802.11a Mid/Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.499 W/kg

Body Back/WLAN 5.8G 802.11a Mid/Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 5.989 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.312 W/kg
SAR(1 g) = 0.191 W/kg; SAR(10 g) = 0.183 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.213 W/kg



0 dB = 0.213 W/kg = -6.72 dBW/kg

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	6.6	6.6
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)						24.3	23.9

Measurement uncertainty evaluation for IEC62209-2 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	6.6	6.6
Axial Isotropy	4.7	R	√3	1	1	2.7	2.7
Hemispherical Isotropy	9.6	R	√3	0	0	0.0	0.0
Linearity	4.7	R	√3	1	1	2.7	2.7
Modulation Response	0.0	R	√3	1	1	0.0	0.0
Detection limits	1.0	R	√3	1	1	0.6	0.6
Boundary effect	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							
Device holder Uncertainty	6.3	N	1	1	1	6.3	6.3
Test sample positioning	2.8	N	1	1	1	2.8	2.8
Power scaling	4.5	R	√3	1	1	2.6	2.6
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
Algorithm for correcting SAR for deviations in permittivity and conductivity	1.9	N	1	1	0.84	1.1	0.9
Liquid conductivity (meas.)	2.5	N	1	0.64	0.43	1.6	1.1
Liquid permittivity (meas.)	2.5	N	1	0.6	0.49	1.5	1.2
Temp. unc. - Conductivity	1.7	R	√3	0.78	0.71	0.8	0.7
Temp. unc. - Permittivity	0.3	R	√3	0.23	0.26	0.0	0.0
Combined standard uncertainty		RSS				12.2	12.1
Expanded uncertainty 95 % confidence interval)						24.5	24.2

APPENDIX B EUT TEST POSITION PHOTOS

Please Refer to the Attachment.

APPENDIX C PROBE CALIBRATION CERTIFICATES

Please Refer to the Attachment.

APPENDIX D DIPOLE CALIBRATION CERTIFICATES

Please Refer to the Attachment.

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