

SAR EVALUATION REPORT

For

Autel Intelligent Tech. Corp., Ltd.

6-10th Floor, Building B1, Zhiyuan, Xueyuan Road, Xili, Nanshan, Shenzhen, 518055, China

FCC ID: WQ8MAXISYSMS908S

Report Type: Original Report	Product Type: AUTOMOTIVE DIAGNOSTIC & ANALYSIS SYSTEM
Report Number: RSZ170419010-20B	
Report Date: 2017-06-13	
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Reviewed By: Engineer	
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Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

Attestation of Test Results			
EUT Information	Product Type	AUTOMOTIVE DIAGNOSTIC & ANALYSIS SYSTEM	
	Tested Model	Tested Model: MaxiSys MS908S Multiple Models: MaxiSys MS908S Pro, MaxiSys ADAS, MaxiSys CV	
	FCC ID	WQ8MAXISYSMS908S	
	Serial Number	17041901021	
	Test Date	2017-05-23	
MODE		Max. SAR Level(s) Reported(W/kg)	Limit(W/kg)
WLAN 5G (5150-5250MHz)	1g Body SAR	1.00	1.6
WLAN 5G (5725-5850MHz)	1g Body SAR	1.03	
Applicable Standards	ANSI / IEEE C95.1 : 2005 IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fileds,3 kHz to 300 GHz.		
	ANSI / IEEE C95.3 : 2002 IEEE Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields With Respect to Human Exposure to SuchFields,100 kHz—300 GHz.		
	RSS-102 Issue 5 March 2015 Radio Frequency (RF) Exposure Compliance of Radio communication Apparatus (All Frequency Bands).		
	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 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 RSS-102 Issue 5 March 2015 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.			

TABLE OF CONTENTS

DOCUMENT REVISION HISTORY	4
EUT DESCRIPTION	5
TECHNICAL SPECIFICATION	5
REFERENCE, STANDARDS, AND GUIDELINES	6
SAR LIMITS	7
FACILITIES.....	8
DESCRIPTION OF TEST SYSTEM	9
EQUIPMENT LIST AND CALIBRATION	14
EQUIPMENTS LIST & CALIBRATION INFORMATION	14
SAR MEASUREMENT SYSTEM VERIFICATION	15
LIQUID VERIFICATION	15
SYSTEM ACCURACY VERIFICATION.....	16
SAR SYSTEM VALIDATION DATA	17
EUT TEST STRATEGY AND METHODOLOGY	19
TEST DISTANCE FOR SAR EVALUATION	21
SAR EVALUATION PROCEDURE.....	21
TEST METHODOLOGY	21
CONDUCTED OUTPUT POWER MEASUREMENT	22
PROVISION APPLICABLE	22
TEST PROCEDURE	22
MAXIMUM TARGET OUTPUT POWER	22
TEST RESULTS:	23
SAR TEST EXCLUSION CONSIDERATIONS.....	24
ANTENNAS LOCATION:	24
ANTENNA DISTANCE TO EDGE	24
SAR TEST EXCLUSION FOR THE EUT EDGE CONSIDERATIONS RESULT	24
SAR MEASUREMENT RESULTS.....	26
SAR TEST DATA.....	26
SAR MEASUREMENT VARIABILITY	28
SAR PLOTS (SUMMARY OF THE HIGHEST SAR VALUES).....	29
APPENDIX A MEASUREMENT UNCERTAINTY	39
APPENDIX B EUT TEST POSITION PHOTOS	41
LIQUID DEPTH $\geq 15\text{CM}$	41
BODY BACK SETUP PHOTO(0MM).....	42
BODY LEFT SETUP PHOTO(0MM).....	42
BODY TOP SETUP PHOTO(0MM).....	43
APPENDIX C CALIBRATION CERTIFICATES	44

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	RSZ170419010-20B	Original Report	2017-06-13

EUT DESCRIPTION

This report has been prepared on behalf of *Autel Intelligent Tech. Corp., Ltd.* and their product *AUTOMOTIVE DIAGNOSTIC & ANALYSIS SYSTEM*, Model: *MaxiSys MS908S*, FCC ID: *WQ8MAXISYSMS908S* or the EUT (Equipment under Test) as referred to in the rest of this report.

Note: This series products model: MaxiSys MS908S Pro, MaxiSys ADAS, MaxiSys CV and MaxiSys MS908S are identical; they have the identical schematics, only named differently. Model MaxiSys MS908S was selected for fully testing, the detailed information can be referred to the declaration which was stated and guaranteed by the applicant.

All measurement and test data in this report was gathered from production sample serial number: 17041901021 (Assigned by BACL, Kunshan). The EUT was received on 2017-04-19.

Technical Specification

Device Type:	Portable
Exposure Category:	Population / Uncontrolled
Antenna Type(s):	Internal Antenna
Operation Mode :	WLAN
Frequency Band:	WLAN 5G: 5180 MHz-5240 MHz; 5745 MHz-5825 MHz
Conducted RF Power:	WLAN 5G(5180-5240 MHz): 17.67 dBm
	WLAN 5G(5745-5825 MHz): 15.73 dBm
Dimensions (L*W*H):	30 cm (L) x22 cm (W) x 5 cm (H)
Power Source:	3.7 VDC Rechargeable Battery
Normal Operation:	Body Supported and Handheld

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. (Kunshan) to collect test data is located on No.248 Chenghu Road,Kunshan,Jiangsu province,China.

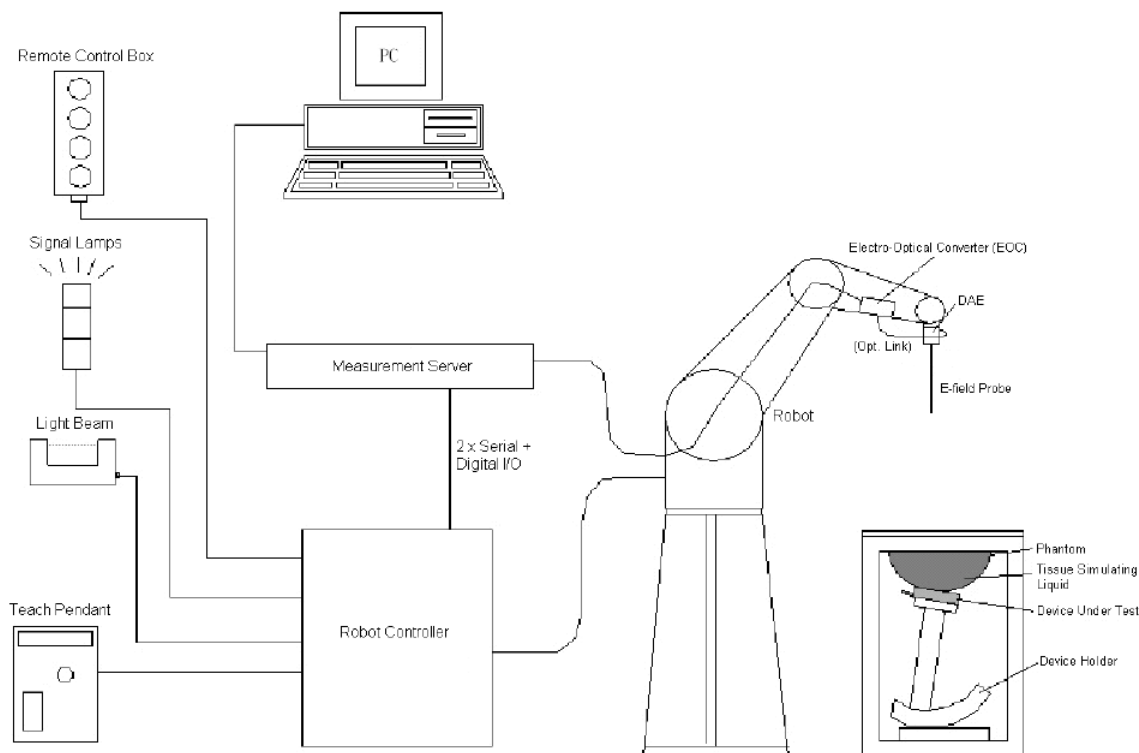
DESCRIPTION OF TEST SYSTEM

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



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

Data Acquisition Electronics

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

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

The input impedance of both the DAE4 as well as of the DAE3 box is 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 is a fiberglass shell phantom with 2mm shell thickness (except the ear region, where shell thickness

increases to 6 mm). The phantom has three measurement areas:

- _ Left hand
- _ Right hand
- _ Flat phantom

The phantom table for the DASY systems based on the TX90XL and RX160L robots have the size of 100 x 50 x 85 cm (L x W x H).

The phantom table for the compact DASY systems based on the RX60L robot have the size of 100 x 75 x 91 cm (L x W x H); these tables are reinforced for mounting of the robot onto the table.

For easy dislocation these tables have fork lift cut outs at the bottom.

The bottom plate contains three pairs of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. Only one device holder is necessary if two phantoms are used (e.g., for different liquids)

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



Triple Flat Phantom

The SAM twin phantom is a fiberglass shell phantom with 2mm(± 0.2 mm) shell thickness . The phantom shell is compatible with SPEAG tissue simulating liquids (sugar and oil based). Use of other liquids may render the phantom warranty void (see note or consult SPEAG support).

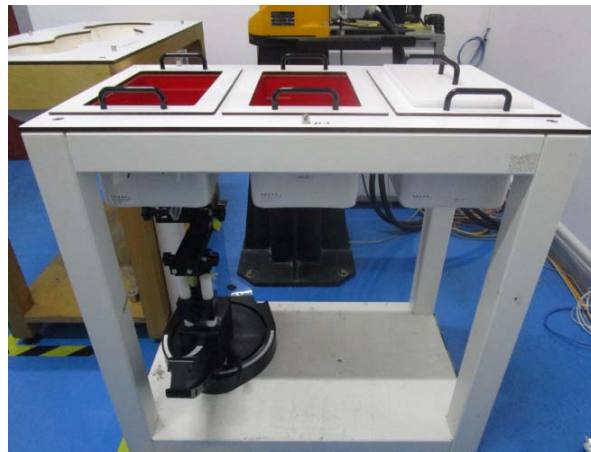
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Robots

The DASY5 system uses the high precision industrial robots TX90XL from Staubli SA (France). The TX robot family is the successor of the well known RX robot family and offers the same features important for our application:

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

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

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/m³ 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 x 7 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 IEEE SCC-34/SC-2 in P1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. Other head and body tissue parameters that have not been specified in P1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equations described in Reference [12] and extrapolated according to the head parameters specified in P1528.

Recommended Tissue Dielectric Parameters for Head and Body

Frequency (MHz)	Head Tissue		Body Tissue	
	ϵ_r	σ (S/m)	ϵ_r	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800-2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5800	35.3	5.27	48.2	6.00

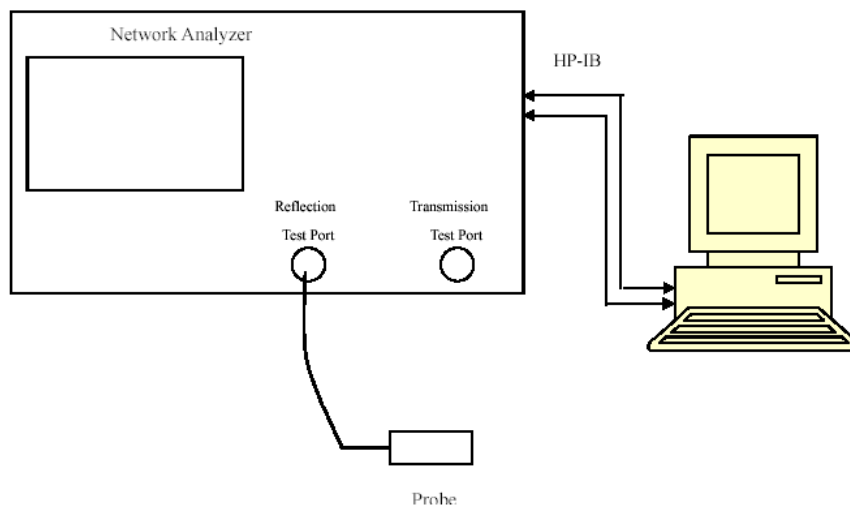
EQUIPMENT LIST AND CALIBRATION

Equipments List & Calibration Information

Equipment	Model	S/N	Calibration Date	Calibration Due Date
Robot	RX90	D03688	N/A	N/A
DASY5 Test Software	DASY52.8	N/A	N/A	N/A
DASY5 Measurement Server	DASY5 4.5.12	1567	N/A	N/A
Data Acquisition Electronics	DAE3	379	2016/10/04	2017/10/3
E-Field Probe	EX3DV4	7431	2016/10/04	2017/10/03
Dipole,5GHz	D5GHzV2	1245	2016/11/7	2019/11/6
Mounting Device	MD4HHTV5	BJPCTC0152	N/A	N/A
Triple Flat Phantom 5.1C	QD 000 P51 CA	1130	N/A	N/A
Simulated Tissue 5250 MHz Body	TS-5250-B	1701525002	Each Time	/
Simulated Tissue 5800 MHz Body	TS-5800-B	1701580002	Each Time	/
Network Analyzer	8753B	2625A00809	2016/10/6	2017/10/5
S-Parameter Test Set	85047A	3033A02428	2016/10/6	2017/10/5
Dielectric probe kit	85070B	US33020324	2016/6/13	2017/6/12
Signal Generator	SMBV100A	261558	2016/7/4	2017/7/4
Power Meter	E4419B	MY41291878	2017/1/7	2018/1/6
Power Meter Sensor	8481A	2702A68993	2016/5/30	2017/5/29
Power Amplifier	10S1G4M1	18060	N/A	N/A
Power Amplifier	ZVA-183-S+	857001418	N/A	N/A
Directional Coupler	488Z	N/A	N/A	N/A
Attenuator	20dB, 100W	N/A	N/A	N/A
Attenuator	3dB, 150W	N/A	N/A	N/A

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)	$\Delta\epsilon_r$	$\Delta\sigma$ (S/m)	
5180	Simulated Tissue 5250 MHz Body	48.783	5.317	49.04	5.28	-0.53	0.78	± 5
5200	Simulated Tissue 5250 MHz Body	48.761	5.336	49.01	5.30	-0.52	0.69	± 5
5240	Simulated Tissue 5250 MHz Body	48.742	5.348	48.96	5.35	-0.45	0.04	± 5
5250	Simulated Tissue 5250 MHz Body	48.729	5.392	48.95	5.36	-0.44	0.64	± 5

*Liquid Verification above was performed on 2017-05-23.

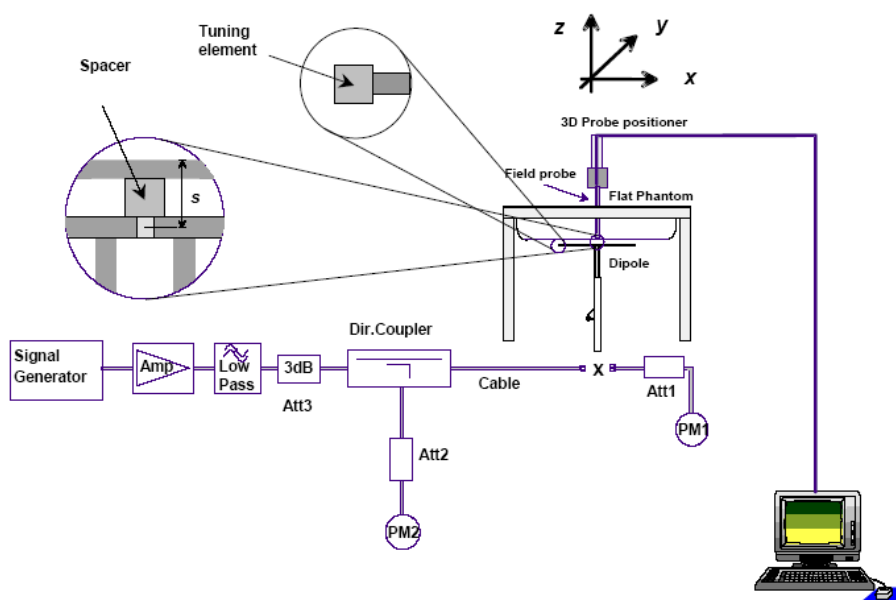
Frequency (MHz)	Liquid Type	Liquid Parameter		Target Value		Delta (%)		Tolerance (%)
		ϵ_r	σ (S/m)	ϵ_r	σ (S/m)	$\Delta\epsilon_r$	$\Delta\sigma$ (S/m)	
5745	Simulated Tissue 5800 MHz Body	48.093	5.984	48.27	5.94	-0.38	0.81	± 5
5785	Simulated Tissue 5800 MHz Body	48.107	6.017	48.22	5.98	-0.24	0.58	± 5
5800	Simulated Tissue 5800 MHz Body	47.986	6.122	48.2	6	-0.44	2.03	± 5
5825	Simulated Tissue 5800 MHz Body	47.839	6.215	48.2	6	-0.75	3.58	± 5

*Liquid Verification above was performed on 2017-05-23.

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.

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 (%)
2017-05-23	5250	Body	100	1g	7.60	76.0	77.9	-2.44	± 10
2017-05-23	5800	Body	100	1g	7.31	73.1	75.8	-3.56	± 10

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

SAR SYSTEM VALIDATION DATA

Test Plot *#: System Performance: 5250 MHz Body

DUT: D5GHzV2; Type: 5GHz; Serial: 1245

Communication System: CW; Frequency: 5250 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5250$ MHz; $\sigma = 5.392$ S/m; $\epsilon_r = 48.729$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7431; ConvF(4.98, 4.98, 4.98); Calibrated: 2016/10/4;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn379; Calibrated: 2016/10/4
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1130
- Measurement SW: DASY52, Version 52.8 (8);

Area Scan (61x41x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

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

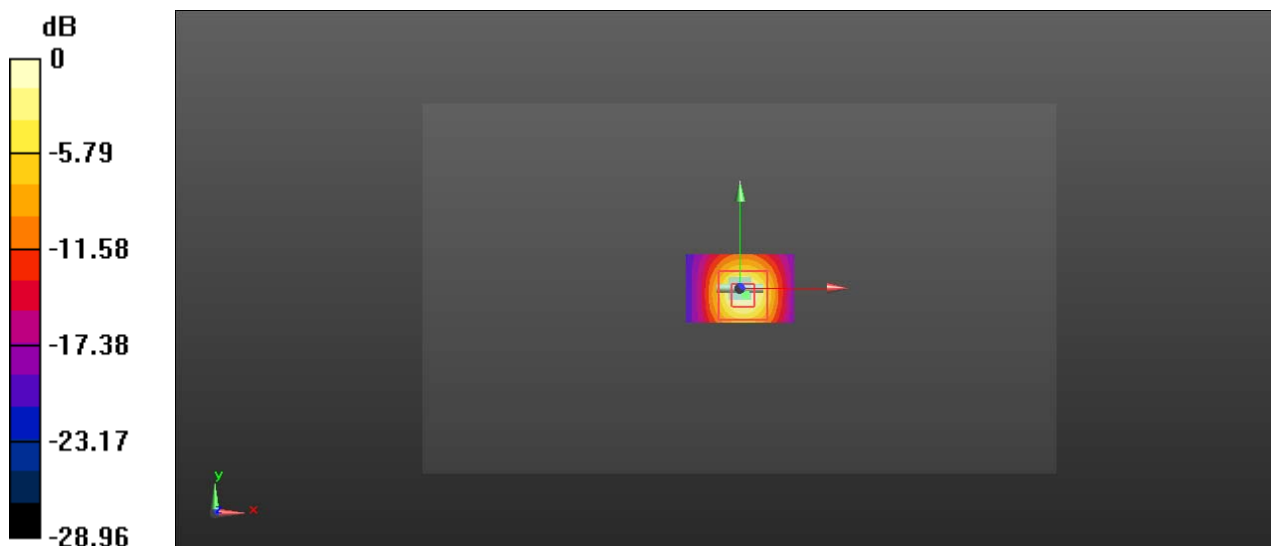
Zoom Scan (7x7x6)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=2$ mm

Reference Value = 41.89 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 29.0 W/kg

SAR(1 g) = 7.60 W/kg; SAR(10 g) = 2.14 W/kg

Maximum value of SAR (measured) = 15.6 W/kg



0 dB = 15.6 W/kg = 11.93 dBW/kg

Test Plot *#: System Performance: 5800 MHz Body**DUT: D5GHzV2; Type: 5GHz; Serial: 1245**

Communication System: CW; Frequency: 5800 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5800$ MHz; $\sigma = 6.122$ S/m; $\epsilon_r = 47.986$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7431; ConvF(4.38, 4.38, 4.38); Calibrated: 2016/10/4;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn379; Calibrated: 2016/10/4
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1130
- Measurement SW: DASY52, Version 52.8 (8);

Area Scan (61x41x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 16.2 W/kg

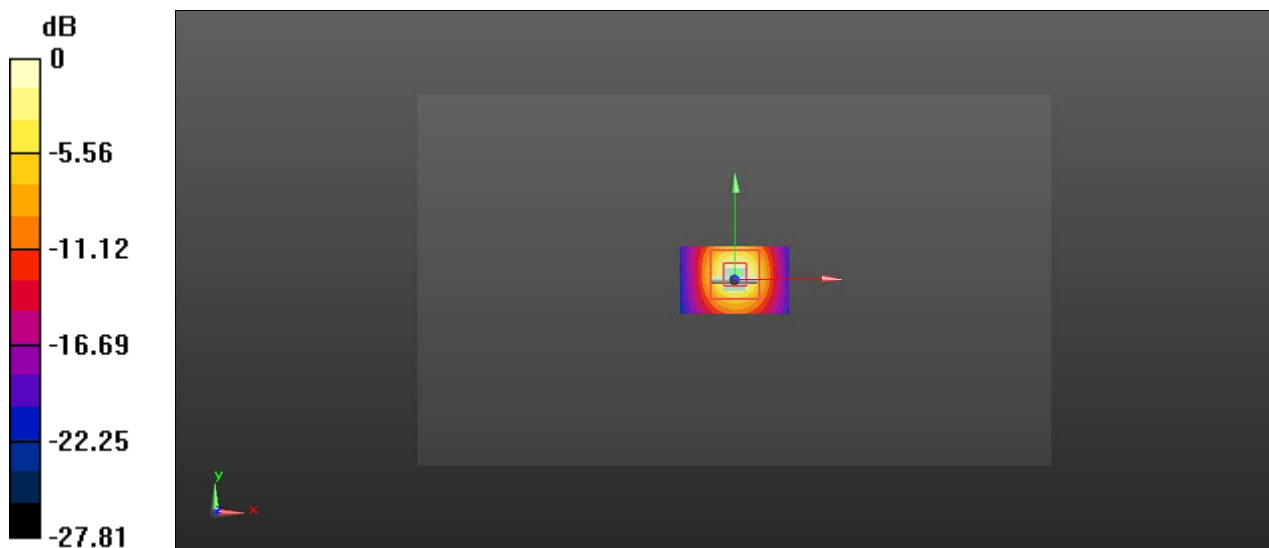
Zoom Scan (7x7x6)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm

Reference Value = 38.39 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 31.6 W/kg

SAR(1 g) = 7.31 W/kg; SAR(10 g) = 2.08 W/kg

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



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

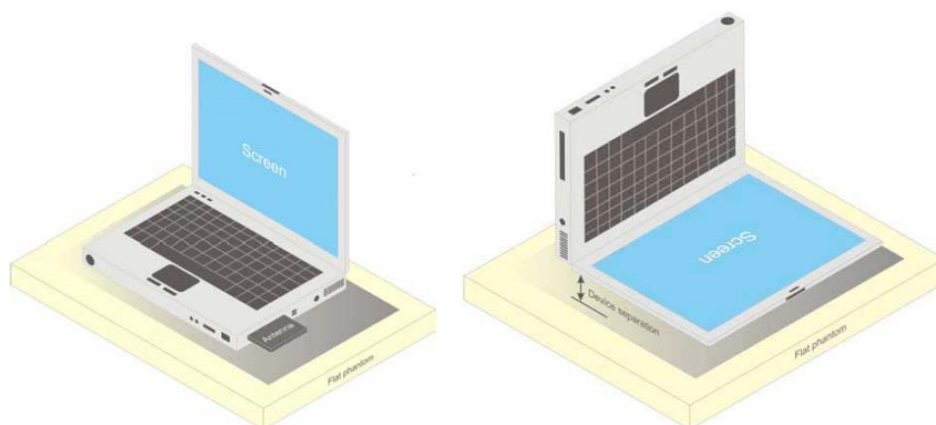
EUT TEST STRATEGY AND METHODOLOGY

Body-supported device

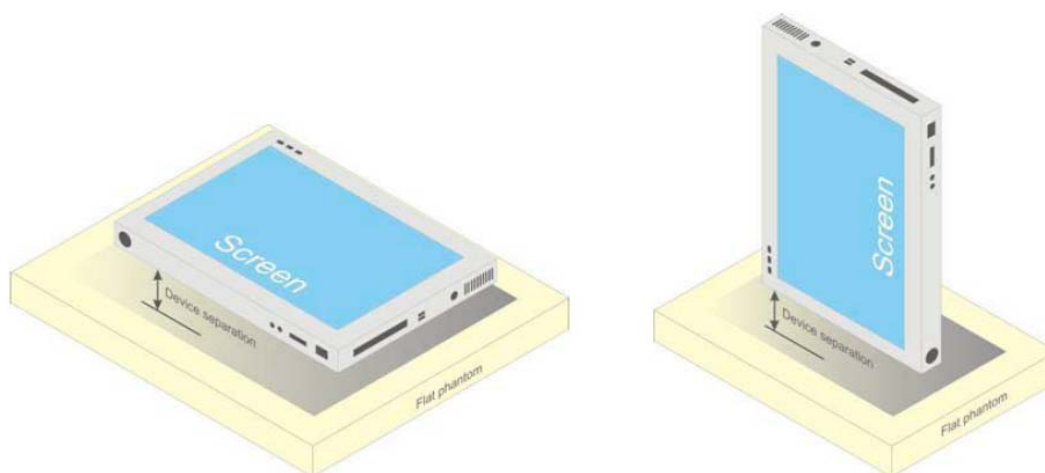
A typical example of a body supported device is a wireless enabled laptop device that among other orientations may be supported on the thighs of a sitting user. To represent this orientation, the device shall be positioned with its base against the flat phantom.

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 a (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 7a) (right side), if this is consistent with the intended use.

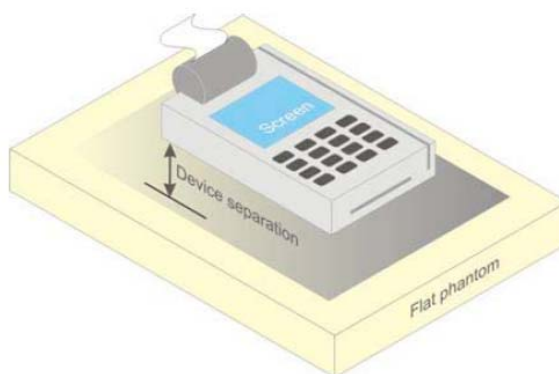
Other devices that fall into this category include tablet type portable computers and credit card transaction authorisation terminals, point-of-sale and/or inventory terminals. Where these devices may be torso or limb-supported, the same principles for body-supported devices are applied. The example in Figure b) shows a tablet form factor portable computer for which SAR should be separately assessed with d) each surface and e) the separation distances positioned against the flat phantom that correspond to the intended use as specified by the manufacturer. If the intended use is not specified in the user instructions, the device shall be tested directly against the flat phantom in all usable orientations. Some body-supported devices may allow testing with an external power supply (e.g. a.c. adapter) supplemental to the battery, but it shall be verified and documented in the measurement report that SAR is still conservative.



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



b) Tablet form factor portable computer



c) Wireless credit card transaction authorisation terminal

Figure 7 – Test positions for body supported devices

Test positions for Hand-held device

Hand-held device means a portable device which is located in a user's hand during its intended use. Hand-held usage of the device, not at the head or torso. The device shall be placed directly against the flat phantom as shown in Figure J.1, for those sides of the device that are in contact with the hand during intended use.

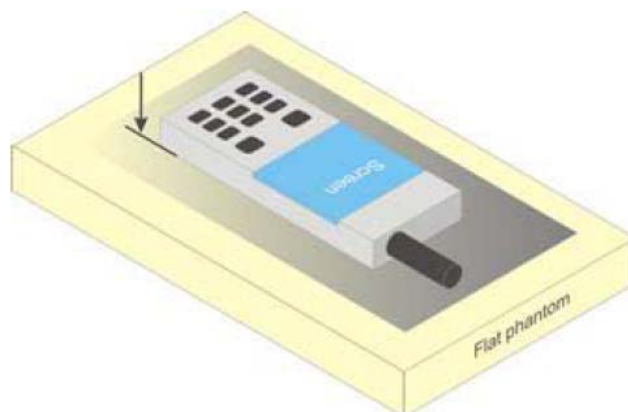


Figure J.1 – Test position for hand-held devices, not used at the head or torso

Test Distance for SAR Evaluation

For this case the DUT(Device Under Test) is set directly against 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.

Test methodology

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 248227 D01 802.11 Wi-Fi SAR v02r02

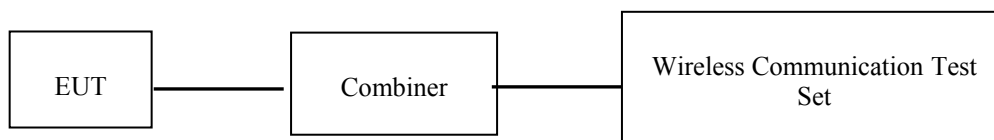
CONDUCTED OUTPUT POWER MEASUREMENT

Provision Applicable

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

Test Procedure

The RF output of the transmitter was connected to the input of the Wireless Communication Test Set through Combiner.



WLAN 5G

Maximum Target Output Power

Max Target Power(dBm)			
Mode/Band	Channel		
	Low	Middle	High
WLAN 5G(5150-5250MHz) (802.11 a)	17.7	17.7	17.7
WLAN 5G(5150-5250MHz) (802.11 n20)	17.6	17.6	17.6
WLAN 5G(5150-5250MHz) (802.11 n40)	17.3	17.3	17.3
WLAN 5G(5150-5250MHz) (802.11 ac20)	17.5	17.5	17.5
WLAN 5G(5150-5250MHz) (802.11 ac40)	17.2	17.2	17.2
WLAN 5G(5150-5250MHz) (802.11 ac80)	17.1	17.1	17.1
WLAN 5G(5725-5850MHz) (802.11 a)	15.8	15.8	15.8
WLAN 5G(5725-5850MHz) (802.11 n20)	15.6	15.6	15.6
WLAN 5G(5725-5850MHz) (802.11 n40)	15.2	15.2	15.2
WLAN 5G(5725-5850MHz) (802.11 ac20)	15.3	15.3	15.3
WLAN 5G(5725-5850MHz) (802.11 ac40)	14.9	14.9	14.9
WLAN 5G(5725-5850MHz) (802.11 ac80)	14.6	14.6	14.6

Test Results:**WLAN 5G(5180-5240 MHz):**

Mode	Channel frequency (MHz)	RF Output Power (dBm)
802.11a	5180	17.35
	5200	17.48
	5240	17.67
802.11n HT20	5180	17.11
	5200	17.42
	5240	17.58
802.11n HT40	5190	17.09
	5230	17.23
802.11ac20	5180	17.42
	5200	17.28
	5240	17.43
802.11ac40	5190	17.03
	5230	17.15
802.11ac80	5210	17.06

WLAN 5G(5745-5825 MHz):

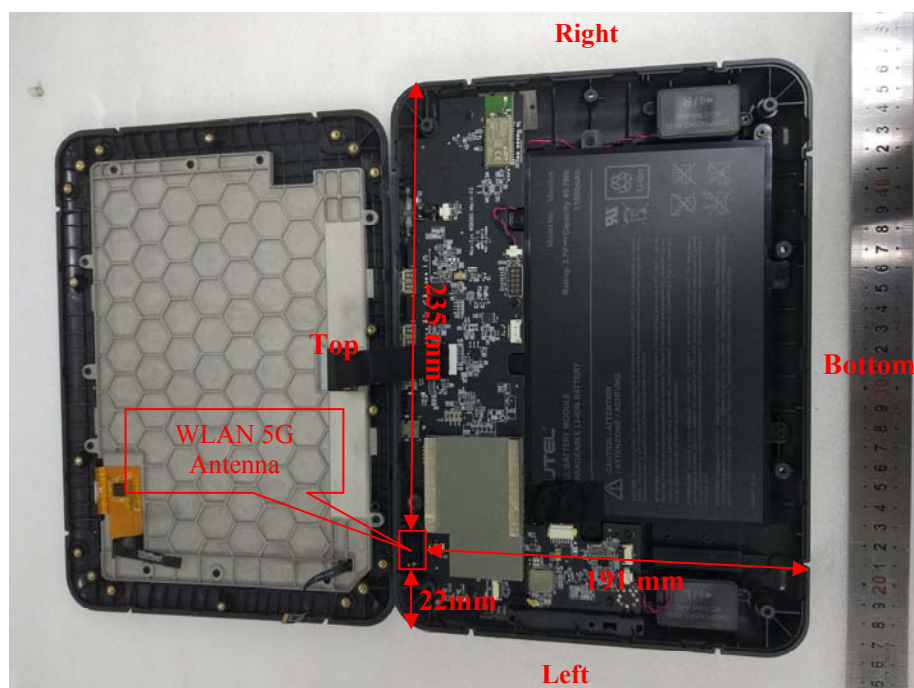
Mode	Channel frequency (MHz)	RF Output Power (dBm)
802.11a	5745	15.73
	5785	15.69
	5825	15.64
802.11n HT20	5745	15.59
	5785	15.41
	5825	15.47
802.11n HT40	5755	15.01
	5795	15.13
802.11ac20	5745	15.25
	5785	15.19
	5825	15.23
802.11ac40	5755	14.87
	5795	14.64
802.11ac80	5775	14.58

Note:

The output power was tested under data rate 54 for 802.11a, MCS7 for 802.11n-ht20 and 802.11n-ht40. MCS8 for 802.11ac20, MCS9 for 802.11ac40 and 802.11ac80.

SAR test exclusion considerations

Antennas Location:



Antenna Distance To Edge

Antenna Distance To Edge(mm)					
Antenna	Back	Left	Right	Top	Bottom
WLAN 5G	< 5	22	235	< 5	191

SAR test exclusion for the EUT edge considerations Result

Antenna Distance To Edge					
Mode	Back	Left	Right	Top	Bottom
WLAN 5G	Required	Judge	Judge	Required	Judge

Note:

Required: The distance is less than 5mm, the SAR test is required as Standalone SAR test exclusion considerations table.

Judge: Please refer the below tables for detail.

SAR test exclusion for the EUT edge considerations detail:**Distance < 50mm (To Edges)**

Antenna	Edge	Frequency (MHz)	Pavg (dBm)	Pavg (mW)	Distance (mm)	Calculated value	Threshold (1-g)	SAR Test required
WLAN 5.2G (5180-5240 MHz)	Left	5240	17.7	58.88	22	6.13	3	Yes
WLAN 5.8G (5745-5825 MHz)	Left	5825	15.8	38.02	22	4.17	3	Yes

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:

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

$[\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

1. $f(\text{GHz})$ 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.

5. The Time based average Power is used for calculation

Distance > 50mm (To Edges)

Antenna	Edge	Frequency (MHz)	Pavg (dBm)	Pavg (mW)	Distance (mm)	Test exclusion Threshold (mW)	SAR Test required
WLAN 5.2G (5180-5240 MHz)	Right	5240	17.7	58.88	235	1915.53	No
WLAN 5.8G (5745-5825 MHz)	Right	5825	15.8	38.02	235	1912.15	No
WLAN 5.2G (5180-5240 MHz)	Bottom	5240	17.7	58.88	191	1475.53	No
WLAN 5.8G (5745-5825 MHz)	Bottom	5825	15.8	38.02	191	1472.15	No

At 100 MHz to 6 GHz and for *test separation distances* > 50 mm, the SAR test exclusion threshold is determined according to the following:

a) $[\text{Power allowed at numeric threshold for 50 mm in step 1}) + (\text{test separation distance} - 50 \text{ mm}) \cdot (f(\text{MHz})/150)]$ mW, at 100 MHz to 1500 MHz

b) $[\text{Power allowed at numeric threshold for 50 mm in step 1}) + (\text{test separation distance} - 50 \text{ mm}) \cdot 10]$ mW at > 1500 MHz and ≤ 6 GHz

SAR MEASUREMENT RESULTS

This page summarizes the results of the performed dosimetric evaluation.

SAR Test Data

Environmental Conditions

Temperature:	22.3-23.8 °C
Relative Humidity:	51 %
ATM Pressure:	1002 mbar
Test Date:	2017-05-23

Testing was performed by Edison Hu, Zack Huang, Peter Lee.

WLAN 5G(5180-5240 MHz):

EUT Position	Frequency (MHz)	Test Mode	Power Drift (dB)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Body Back (0mm)	5180	802.11 a	/	/	/	/	/	/	/
	5200	802.11 a	0.11	17.48	17.7	1.052	0.447	0.47	1#
	5240	802.11 a	/	/	/	/	/	/	/
Body Top (0mm)	5180	802.11 a	0.06	17.35	17.7	1.084	0.892	0.97	2#
	5200	802.11 a	0.19	17.48	17.7	1.052	0.954	1.00	3#
	5240	802.11 a	-0.11	17.67	17.7	1.007	0.922	0.93	4#
Body Left (0mm)	5180	802.11 a	/	/	/	/	/	/	/
	5200	802.11 a	0.19	17.48	17.7	1.052	0.398	0.42	5#
	5240	802.11 a	/	/	/	/	/	/	/

WLAN 5G(5745-5825 MHz)

EUT Position	Frequency (MHz)	Test Mode	Power Drift (dB)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Body Back (0mm)	5745	802.11 a	/	/	/	/	/	/	/
	5785	802.11 a	-0.17	15.69	15.8	1.026	0.453	0.46	6#
	5825	802.11 a	/	/	/	/	/	/	/
Body Top (0mm)	5745	802.11 a	0.06	15.73	15.8	1.016	0.972	0.99	7#
	5785	802.11 a	0.04	15.69	15.8	1.026	0.916	0.94	8#
	5825	802.11 a	0.12	15.64	15.8	1.038	0.989	1.03	9#
Body Left (0mm)	5745	802.11 a	/	/	/	/	/	/	/
	5785	802.11 a	-0.03	15.69	15.8	1.026	0.351	0.36	10#
	5825	802.11 a	/	/	/	/	/	/	/

Note:

1. When the 1-g SAR is less than half of the limit value, testing for other channels are optional.
2. When SAR or MPE is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance.
3. KDB 447498-The test separation distances required for a device to demonstrate SAR or MPE compliance must be sufficiently conservative to support the operational separation distances required by the device and its antennas and radiating structures. The test separation distance 0mm is considered sufficiently conservative.

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 .

The Highest Measured SAR Configuration in Each Frequency Band

Body SAR

Frequency Band	Freq.(MHz)	EUT Position	Meas. SAR (W/kg)		Largest to Smallest SAR Ratio
			Original	Repeated	
(5140-5360 MHz) WLAN 5.2G	5200	Body Top	0.954	0.919	1.04
(5700-5910 MHz) WLAN 5.8G	5825	Body Top	0.989	0.965	1.02

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 Plots (Summary of the Highest SAR Values)

Test Plot 1#: WLAN 5.2G Body Back Middle Channel

DUT: AUTOMOTIVE DIAGNOSTIC & ANALYSIS SYSTEM; Type: MaxiSys MS908S; Serial: 17041901021

Communication System: 802.11 a ; Frequency: 5200 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5200$ MHz; $\sigma = 5.336$ S/m; $\epsilon_r = 48.761$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7431; ConvF(4.98, 4.98, 4.98); Calibrated: 2016/10/4;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn379; Calibrated: 2016/10/4
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1130
- Measurement SW: DASY52, Version 52.8 (8);

Area Scan (101x81x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 0.893 W/kg

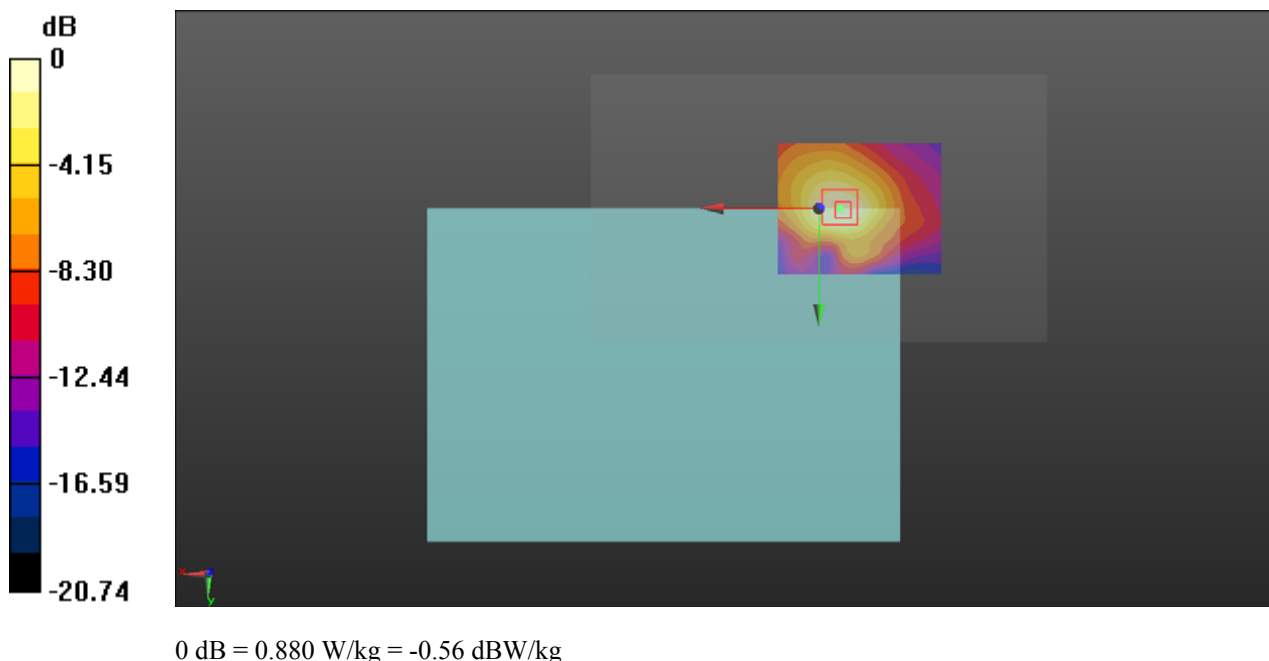
Zoom Scan (7x7x6)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=2$ mm

Reference Value = 8.422 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 1.33 W/kg

SAR(1 g) = 0.447 W/kg; SAR(10 g) = 0.197 W/kg

Maximum value of SAR (measured) = 0.880 W/kg



Test Plot 2#: WLAN 5.2G Body Top Low Channel**DUT: AUTOMOTIVE DIAGNOSTIC & ANALYSIS SYSTEM; Type: MaxiSys MS908S; Serial: 17041901021**

Communication System: 802.11 a ; Frequency: 5180 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5180$ MHz; $\sigma = 5.317$ S/m; $\epsilon_r = 48.783$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7431; ConvF(4.98, 4.98, 4.98); Calibrated: 2016/10/4;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn379; Calibrated: 2016/10/4
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1130
- Measurement SW: DASY52, Version 52.8 (8);

Area Scan (101x81x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 2.03 W/kg

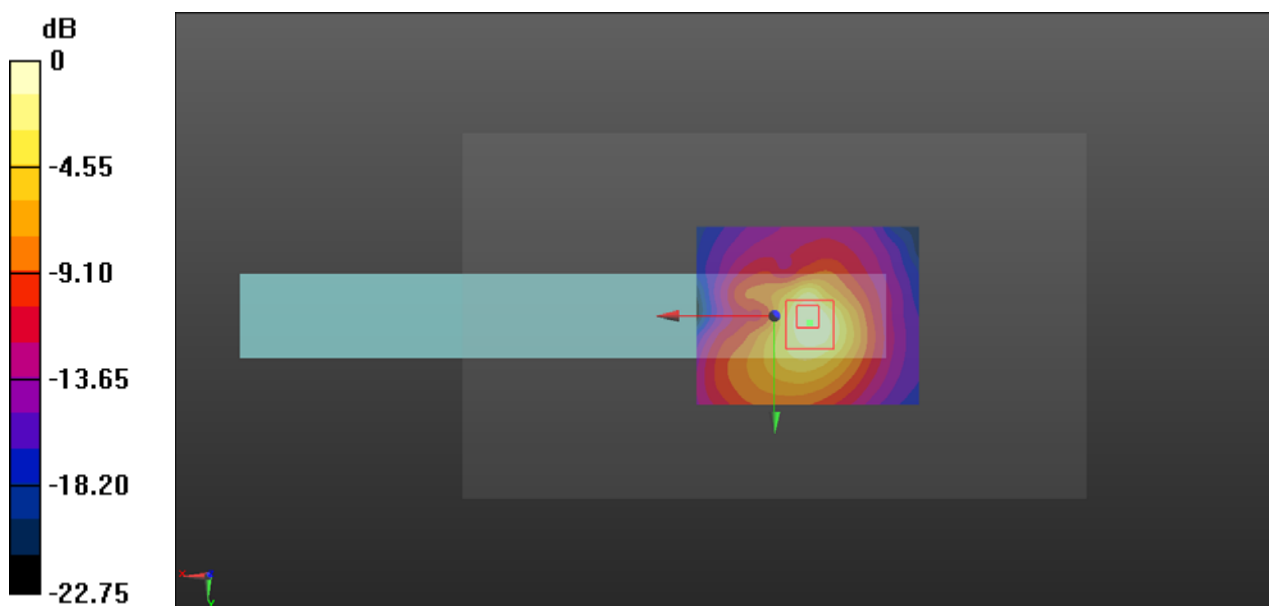
Zoom Scan (7x7x6)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=2$ mm

Reference Value = 5.684 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 2.86 W/kg

SAR(1 g) = 0.892 W/kg; SAR(10 g) = 0.361 W/kg

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



0 dB = 1.84 W/kg = 2.65 dBW/kg

Test Plot 3#: WLAN 5.2G Body Top Middle Channel**DUT: AUTOMOTIVE DIAGNOSTIC & ANALYSIS SYSTEM; Type: MaxiSys MS908S; Serial: 17041901021**

Communication System: 802.11 a ; Frequency: 5200 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5200$ MHz; $\sigma = 5.336$ S/m; $\epsilon_r = 48.761$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7431; ConvF(4.98, 4.98, 4.98); Calibrated: 2016/10/4;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn379; Calibrated: 2016/10/4
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1130
- Measurement SW: DASY52, Version 52.8 (8);

Area Scan (101x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 2.10 W/kg

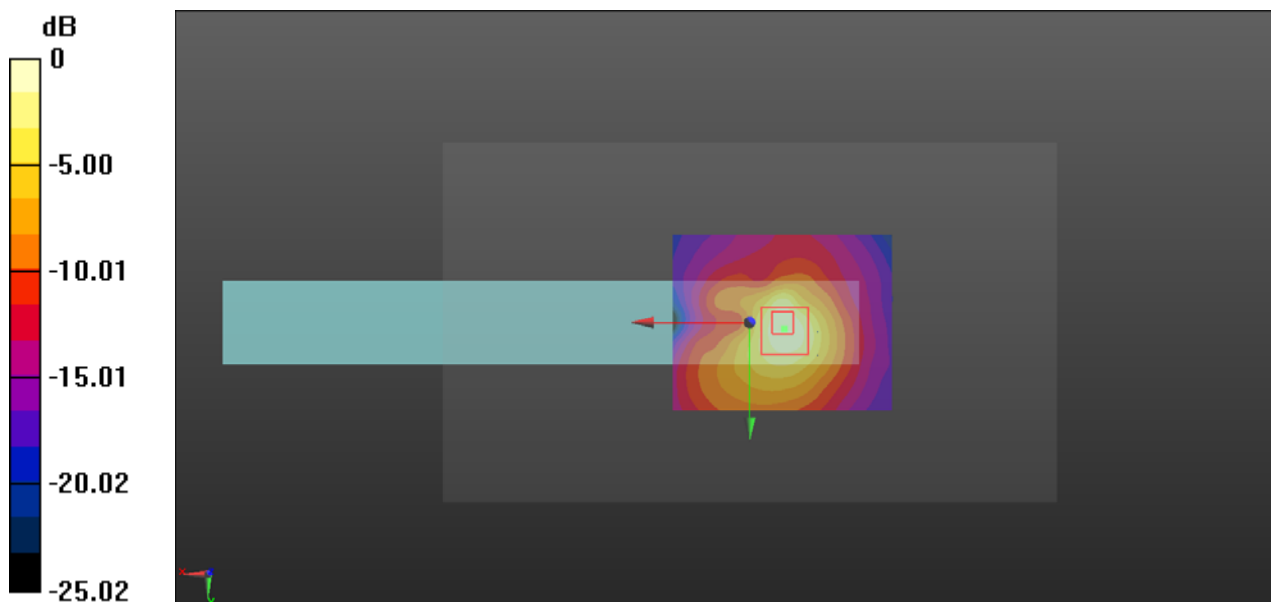
Zoom Scan (7x7x6)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm

Reference Value = 5.808 V/m; Power Drift = 0.19 dB

Peak SAR (extrapolated) = 3.11 W/kg

SAR(1 g) = 0.954 W/kg; SAR(10 g) = 0.380 W/kg

Maximum value of SAR (measured) = 1.96 W/kg



0 dB = 1.96 W/kg = 2.92 dBW/kg

Test Plot 4#: WLAN 5.2G Body Top High Channel**DUT: AUTOMOTIVE DIAGNOSTIC & ANALYSIS SYSTEM; Type: MaxiSys MS908S; Serial: 17041901021**

Communication System: 802.11 a ; Frequency: 5240 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5240$ MHz; $\sigma = 5.348$ S/m; $\epsilon_r = 48.742$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7431; ConvF(4.98, 4.98, 4.98); Calibrated: 2016/10/4;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn379; Calibrated: 2016/10/4
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1130
- Measurement SW: DASY52, Version 52.8 (8);

Area Scan (101x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 2.04 W/kg

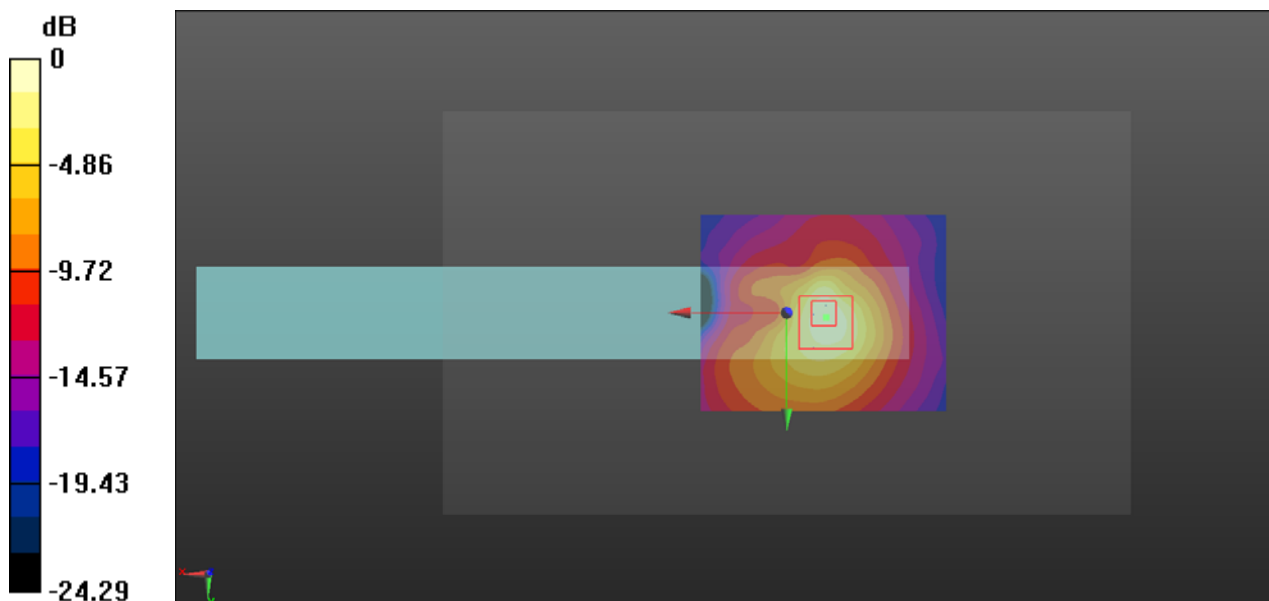
Zoom Scan (7x7x6)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm

Reference Value = 5.612 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 3.11 W/kg

SAR(1 g) = 0.922 W/kg; SAR(10 g) = 0.367 W/kg

Maximum value of SAR (measured) = 1.97 W/kg



0 dB = 1.97 W/kg = 2.94 dBW/kg

Test Plot 5#: WLAN 5.2G Body Left Middle Channel**DUT: AUTOMOTIVE DIAGNOSTIC & ANALYSIS SYSTEM; Type: MaxiSys MS908S; Serial: 17041901021**

Communication System: 802.11 a ; Frequency: 5200 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5200$ MHz; $\sigma = 5.336$ S/m; $\epsilon_r = 48.761$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7431; ConvF(4.98, 4.98, 4.98); Calibrated: 2016/10/4;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn379; Calibrated: 2016/10/4
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1130
- Measurement SW: DASY52, Version 52.8 (8);

Area Scan (151x101x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 0.733 W/kg

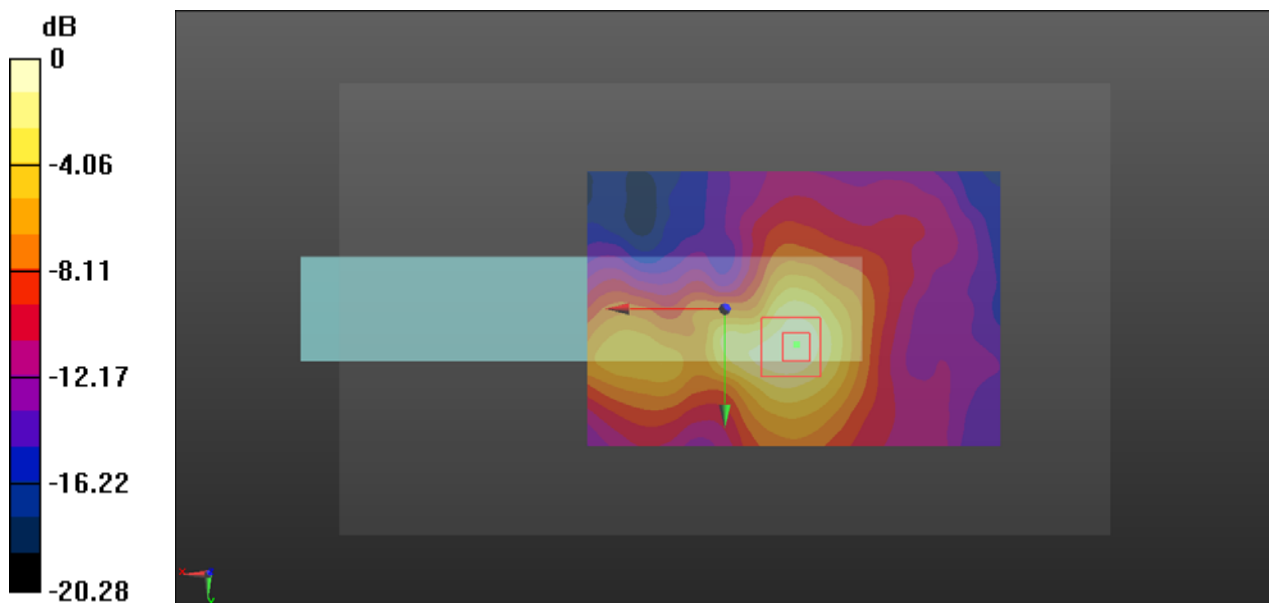
Zoom Scan (7x7x6)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=2$ mm

Reference Value = 4.358 V/m; Power Drift = 0.19 dB

Peak SAR (extrapolated) = 1.14 W/kg

SAR(1 g) = 0.398 W/kg; SAR(10 g) = 0.175 W/kg

Maximum value of SAR (measured) = 0.796 W/kg



0 dB = 0.796 W/kg = -0.99 dBW/kg

Test Plot 6#: WLAN 5.8G Body Back Middle Channel**DUT: AUTOMOTIVE DIAGNOSTIC & ANALYSIS SYSTEM; Type: MaxiSys MS908S; Serial: 17041901021**

Communication System: 802.11 a ; Frequency: 5785 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5785$ MHz; $\sigma = 6.017$ S/m; $\epsilon_r = 48.107$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7431; ConvF(4.38, 4.38, 4.38); Calibrated: 2016/10/4;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn379; Calibrated: 2016/10/4
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1130
- Measurement SW: DASY52, Version 52.8 (8);

Area Scan (101x81x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 0.973 W/kg

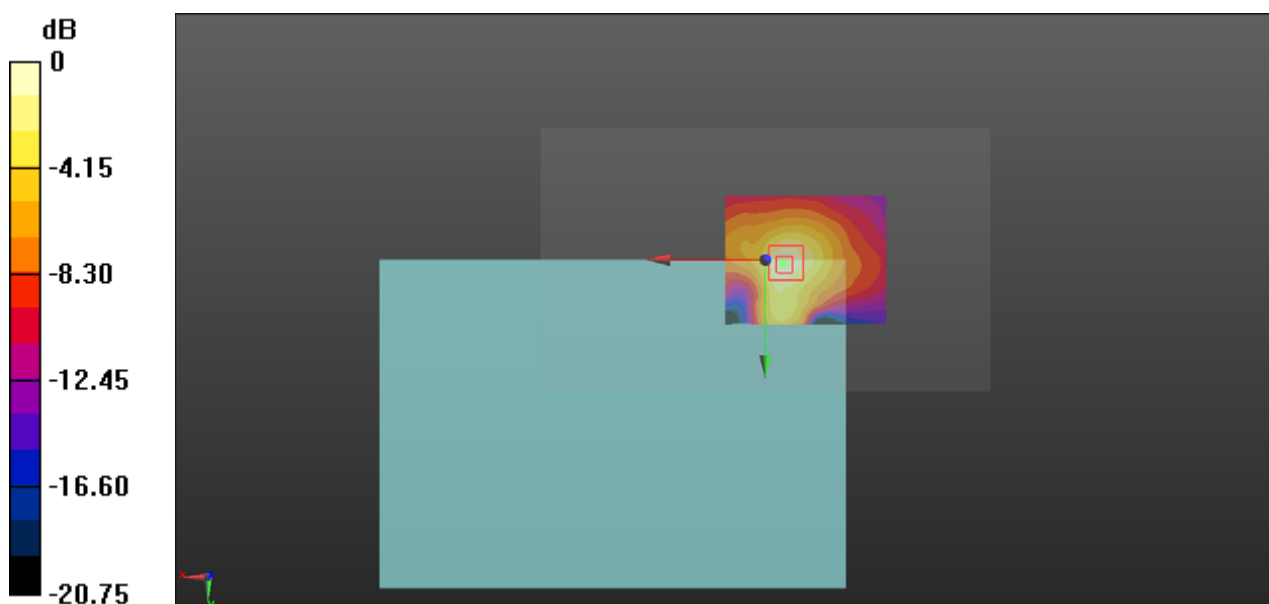
Zoom Scan (7x7x6)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=2$ mm

Reference Value = 6.862 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 1.59 W/kg

SAR(1 g) = 0.453 W/kg; SAR(10 g) = 0.189 W/kg

Maximum value of SAR (measured) = 0.990 W/kg



0 dB = 0.990 W/kg = -0.04 dBW/kg

Test Plot 7#: WLAN 5.8G Body Top Low Channel**DUT: AUTOMOTIVE DIAGNOSTIC & ANALYSIS SYSTEM; Type: MaxiSys MS908S; Serial: 17041901021**

Communication System: 802.11 a ; Frequency: 5745 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5745$ MHz; $\sigma = 5.984$ S/m; $\epsilon_r = 48.093$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7431; ConvF(4.38, 4.38, 4.38); Calibrated: 2016/10/4;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn379; Calibrated: 2016/10/4
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1130
- Measurement SW: DASY52, Version 52.8 (8);

Area Scan (101x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 2.22 W/kg

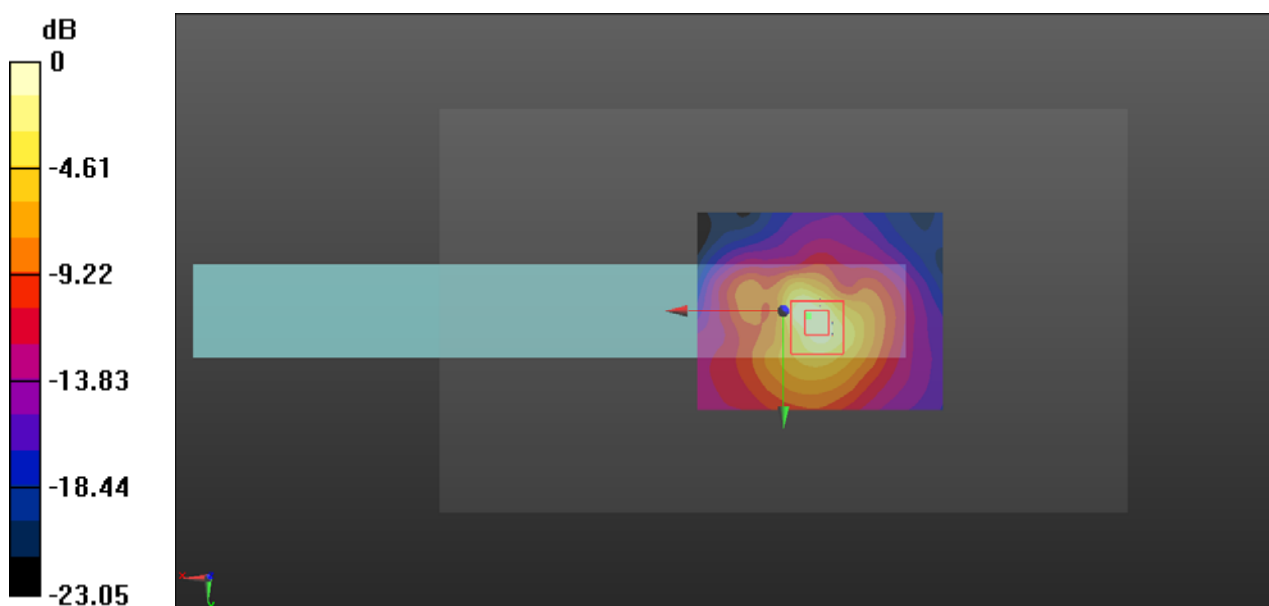
Zoom Scan (7x7x6)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm

Reference Value = 8.646 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 3.73 W/kg

SAR(1 g) = 0.972 W/kg; SAR(10 g) = 0.347 W/kg

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



0 dB = 2.17 W/kg = 3.36 dBW/kg

Test Plot 8#: WLAN 5.8G Body Top Middle Channel**DUT: AUTOMOTIVE DIAGNOSTIC & ANALYSIS SYSTEM; Type: MaxiSys MS908S; Serial: 17041901021**

Communication System: 802.11 a ; Frequency: 5785 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5785$ MHz; $\sigma = 6.017$ S/m; $\epsilon_r = 48.107$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7431; ConvF(4.38, 4.38, 4.38); Calibrated: 2016/10/4;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn379; Calibrated: 2016/10/4
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1130
- Measurement SW: DASY52, Version 52.8 (8);

Area Scan (101x81x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 2.21 W/kg

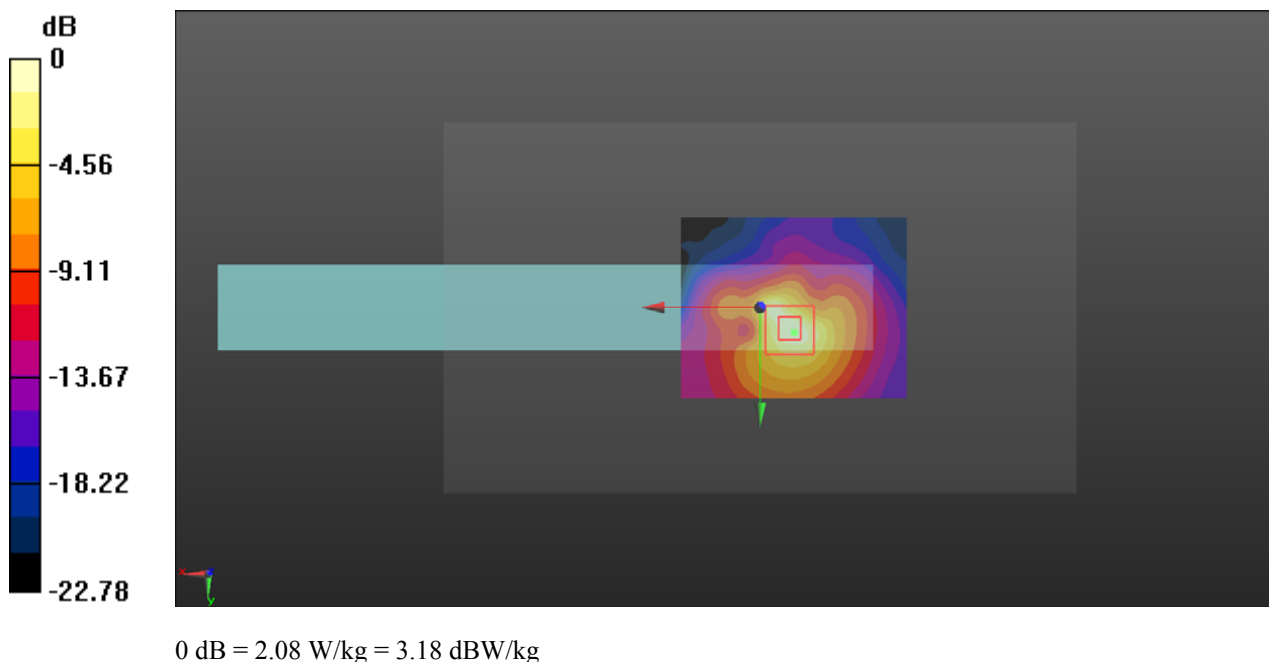
Zoom Scan (7x7x6)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=2$ mm

Reference Value = 8.932 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 3.46 W/kg

SAR(1 g) = 0.916 W/kg; SAR(10 g) = 0.329 W/kg

Maximum value of SAR (measured) = 2.08 W/kg



Test Plot 9#: WLAN 5.8G Body Top High Channel**DUT: AUTOMOTIVE DIAGNOSTIC & ANALYSIS SYSTEM; Type: MaxiSys MS908S; Serial: 17041901021**

Communication System: 802.11 a ; Frequency: 5825 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5825$ MHz; $\sigma = 6.215$ S/m; $\epsilon_r = 47.839$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7431; ConvF(4.38, 4.38, 4.38); Calibrated: 2016/10/4;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn379; Calibrated: 2016/10/4
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1130
- Measurement SW: DASY52, Version 52.8 (8);

Area Scan (101x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 2.33 W/kg

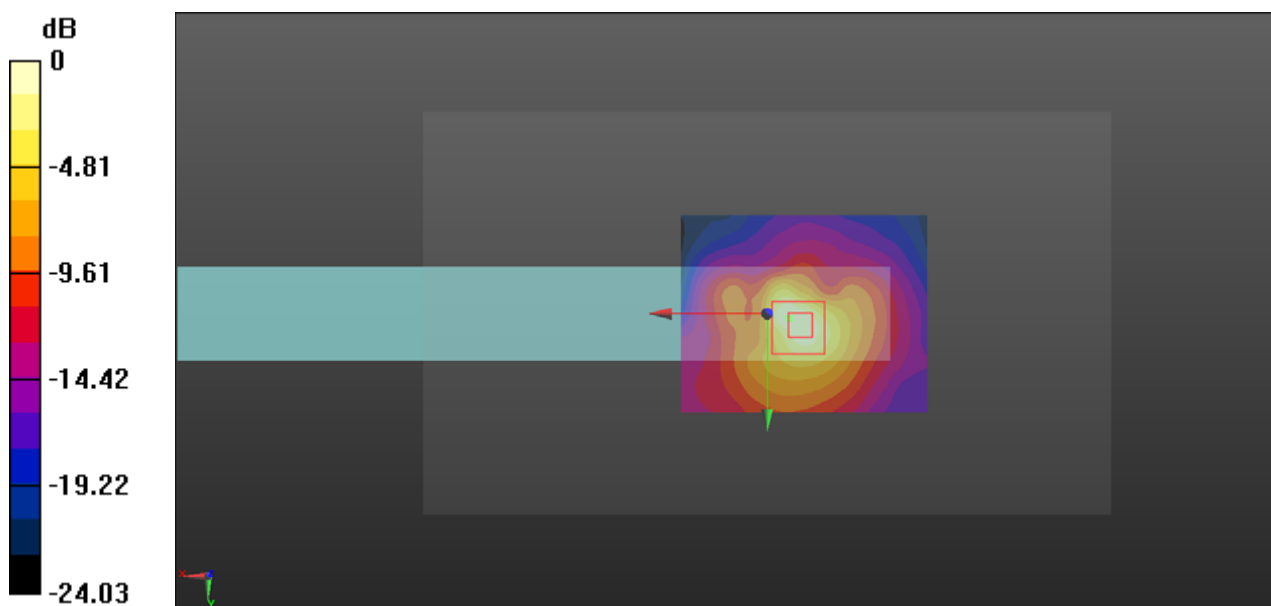
Zoom Scan (7x7x6)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm

Reference Value = 9.015 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 3.92 W/kg

SAR(1 g) = 0.989 W/kg; SAR(10 g) = 0.349 W/kg

Maximum value of SAR (measured) = 2.23 W/kg



0 dB = 2.23 W/kg = 3.48 dBW/kg

Test Plot 10#: WLAN 5.8G Body Left Middle Channel**DUT: AUTOMOTIVE DIAGNOSTIC & ANALYSIS SYSTEM; Type: MaxiSys MS908S; Serial: 17041901021**

Communication System: 802.11 a ; Frequency: 5785 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5785$ MHz; $\sigma = 6.017$ S/m; $\epsilon_r = 48.107$; $\rho = 1000$ kg/m³

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7431; ConvF(4.38, 4.38, 4.38); Calibrated: 2016/10/4;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn379; Calibrated: 2016/10/4
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1130
- Measurement SW: DASY52, Version 52.8 (8);

Area Scan (151x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.751 W/kg

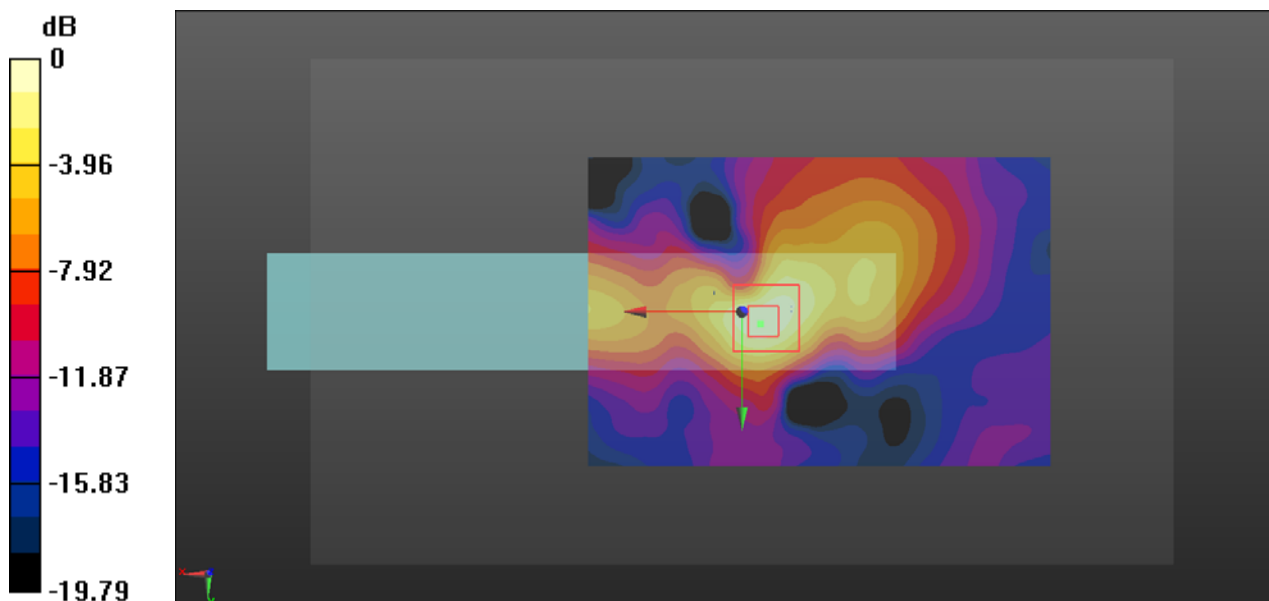
Zoom Scan (7x7x6)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm

Reference Value = 7.222 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 1.20 W/kg

SAR(1 g) = 0.351 W/kg; SAR(10 g) = 0.140 W/kg

Maximum value of SAR (measured) = 0.782 W/kg



0 dB = 0.782 W/kg = -1.07 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

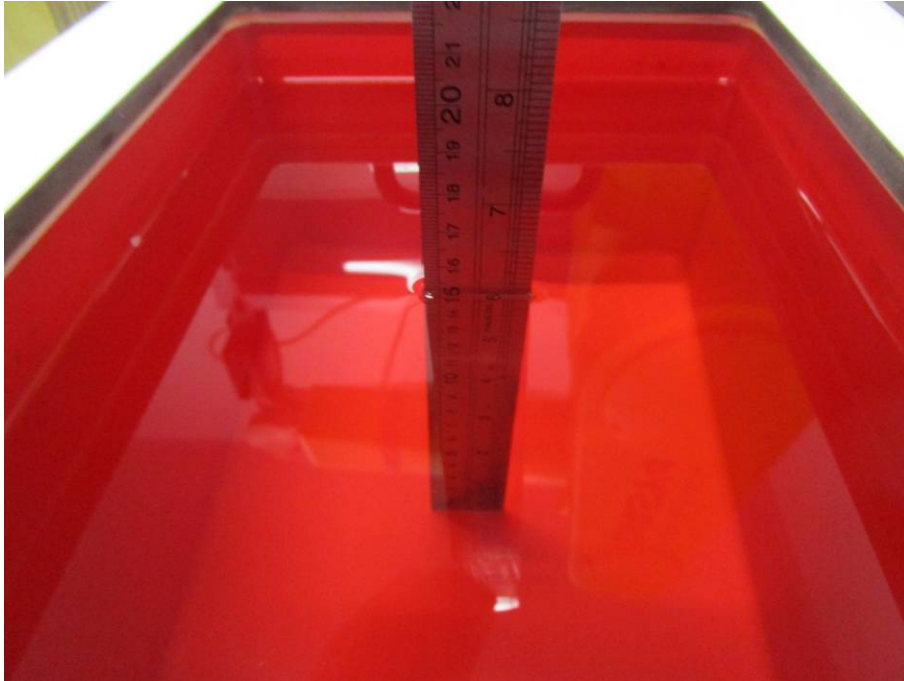
Source of uncertainty	Tolerance/ uncertainty ± %	Probability distribution	Divisor	ci (1 g)	ci (10 g)	Standard uncertainty ± %, (1 g)	Standard uncertainty ± %, (10 g)
Measurement system							
Probe calibration	6.55	N	1	1	1	6.6	6.6
Axial Isotropy	4.7	R	$\sqrt{3}$	1	1	2.7	2.7
Hemispherical Isotropy	9.6	R	$\sqrt{3}$	0	0	0.0	0.0
Boundary effect	1.0	R	$\sqrt{3}$	1	1	0.6	0.6
Linearity	4.7	R	$\sqrt{3}$	1	1	2.7	2.7
Detection limits	1.0	R	$\sqrt{3}$	1	1	0.6	0.6
Readout electronics	0.3	N	1	1	1	0.3	0.3
Response time	0.0	R	$\sqrt{3}$	1	1	0.0	0.0
Integration time	0.0	R	$\sqrt{3}$	1	1	0.0	0.0
RF ambient conditions – noise	1.0	R	$\sqrt{3}$	1	1	0.6	0.6
RF ambient conditions–reflections	1.0	R	$\sqrt{3}$	1	1	0.6	0.6
Probe positioner mech. Restrictions	0.8	R	$\sqrt{3}$	1	1	0.5	0.5
Probe positioning with respect to phantom shell	6.7	R	$\sqrt{3}$	1	1	3.9	3.9
Post-processing	2.0	R	$\sqrt{3}$	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	$\sqrt{3}$	1	1	2.9	2.9
Phantom and set-up							
Phantom uncertainty (shape and thickness tolerances)	4.0	R	$\sqrt{3}$	1	1	2.3	2.3
Liquid conductivity target)	5.0	R	$\sqrt{3}$	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	$\sqrt{3}$	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	$\sqrt{3}$	1	1	2.7	2.7
Hemispherical Isotropy	9.6	R	$\sqrt{3}$	0	0	0.0	0.0
Linearity	4.7	R	$\sqrt{3}$	1	1	2.7	2.7
Modulation Response	0.0	R	$\sqrt{3}$	1	1	0.0	0.0
Detection limits	1.0	R	$\sqrt{3}$	1	1	0.6	0.6
Boundary effect	1.0	R	$\sqrt{3}$	1	1	0.6	0.6
Readout electronics	0.3	N	1	1	1	0.3	0.3
Response time	0.0	R	$\sqrt{3}$	1	1	0.0	0.0
Integration time	0.0	R	$\sqrt{3}$	1	1	0.0	0.0
RF ambient conditions – noise	1.0	R	$\sqrt{3}$	1	1	0.6	0.6
RF ambient conditions–reflections	1.0	R	$\sqrt{3}$	1	1	0.6	0.6
Probe positioner mech. Restrictions	0.8	R	$\sqrt{3}$	1	1	0.5	0.5
Probe positioning with respect to phantom shell	6.7	R	$\sqrt{3}$	1	1	3.9	3.9
Post-processing	2.0	R	$\sqrt{3}$	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	$\sqrt{3}$	1	1	2.6	2.6
Drift of output power	5.0	R	$\sqrt{3}$	1	1	2.9	2.9
Phantom and set-up							
Phantom uncertainty (shape and thickness tolerances)	4.0	R	$\sqrt{3}$	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	$\sqrt{3}$	0.78	0.71	0.8	0.7
Temp. unc. - Permittivity	0.3	R	$\sqrt{3}$	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

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



Body Back Setup Photo(0mm)



Body Left Setup Photo(0mm)



Body Top Setup Photo(0mm)



APPENDIX C CALIBRATION CERTIFICATES

Please Refer to the Attachment.

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