



TEST REPORT

Reference No...... : WTX20X08059171W
Applicant : Creature Information(Guangzhou)Technology Co., Limited
Address : Room B4A05,Block B,203 Changfu Road, Tianhe district,Guangzhou
Product Name : Notebook(Tablet PC)
Test Model..... : NB01
FCC Part 2.1093,
Standards : ANSI / IEEE C95.1 :2005+A1:2010
ANSI / IEEE C95.3 :2002(R2008)
Date of Receipt sample : Aug.25, 2020
Date of Test..... : Aug.25, 2020 to Nov.02, 2020
Date of Issue : Nov.03, 2020
Test Result..... : **Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

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1. General Information

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Creature Information(Guangzhou)Technology Co., Limited
Address of applicant: Room B4A05,Block B,203 Changfu Road, Tianhe district,Guangzhou
Manufacturer: Creature Information(Guangzhou)Technology Co., Limited
Address of manufacturer: Room B4A05,Block B,203 Changfu Road, Tianhe district,Guangzhou

General Description of EUT:	
Product Name:	Notebook(Tablet PC)
Trade Name:	/
Model No.:	NB01
Adding Model:	Y11、Y11 A、Y11 G、Y11 J、Y11 Plus、Y11 Power、Y11 Pro、Y11 Turbo、Y11 S、Y12、Y12 Plus、Y12 Power、Y12 Pro、Y12 Turbo、Y13、Y13 A、Y13 G、Y13 J、Y13 Plus、Y13 Power、Y13 Pro、Y13 S、Y13 Turbo、Y14、Y14 A、Y14 G、Y14 J、Y14 Plus、Y14 Power、Y14 Pro、Y14 S、Y15、Y15 Plus、Y15 Power、Y15 Pro、Y14 Turbo、X11、X12、X13、X13 A、X13 G、X13 J、X13 Power、X13 Plus、X13 Pro、X13 S、X13 Turbo、X14、X14 A、X14 G、X14 J、X14 Plus、X14 Power、X14 Pro、X14 S、X14 Turbo、X15、X15 A、X15 G、X15 J、X15 Plus、X15 Power、X15 Pro、X15 S、X15 Turbo、X17、X17 Plus、X17 Power、X17 Pro、X17 Turbo、S11 A、S11 G、S11、S11 J、S11 S、S12、S12 A、S12 G、S12 J、S12 S、S13、S13 A、S13 G、S13 J、S13 Plus、S13 Pro、S13 S、S13 Turbo、S14、S14 A、S14 G、S14 J、S14 Plus、S14 S、S14 Turbo、S15、S15 A、S15 G、S15 J、S15 Plus、S15 Pro、S15 S、S15 Turbo、S17、S17 Plus、S17 Pro、S17 Turbo、T70、T70 S、T70 Plus、T70 Pro、T70 Power、T70 Turbo、T80、T80 S、T80 Plus、T80 Pro、T80 Power、T80 Turbo、T100、T100 S、T100 Plus、T100 Pro、T100 Power、T100 Turbo、T200、T200 S、T200 Plus、T200 Pro、T200 Power、T200 Turbo、I6、I7、I8、I9、I10、I13、M11、M12、M13、M14、M15、M17、B1、B2、B3、B4、B5、B6、B7、B8、B9、B10、S1、S2、S3、S4、S5、S6、S7、S8、S9
Rated Voltage:	DC7.6V
Battery capacity:	5000mAh
Software Version:	/



Hardware Version:	/
<i>Note: The test data is gathered from a production sample, provided by the manufacturer. The appearance of others models listed in the report is different from main-test model Y13, but the circuit and the electronic construction do not change, declared by the manufacturer.</i>	





Technical Characteristics of EUT:	
WIFI(2.4G)	
Support Standards:	802.11b, 802.11g, 802.11n-HT20/ HT40
Frequency Range:	2412-2462MHz for 802.11b/g/n(HT20), 2422-2452MHz for 802.11n(HT40)
RF Output Power:	28.25dBm (Conducted)
Type of Modulation:	DBPSK,BPSK,DQPSK,QPSK,16QAM,64QAM
Data Rate:	1-11Mbps, 6-54Mbps, up to 150Mbps
Quantity of Channels:	11 for 802.11b/g/n-HT20,7 for 802.11b/g/n-HT40
Channel Separation:	5MHz
Antenna Type:	Integral Antenna
Antenna Gain:	1.0dBi
Bluetooth	
Bluetooth Version:	V5.0
Frequency Range:	2402-2480MHz
RF Output Power:	10.61dBm (Conducted)
Data Rate:	1Mbps, 2Mbps, 3Mbps
Modulation:	GFSK, Pi/4 QDPSK, 8DPSK
Quantity of Channels:	79/40
Channel Separation:	1MHz/2MHz
Antenna Type:	Integral Antenna
Antenna Gain:	1.0dBi
Wi-Fi(5GHz)	
Support Standards:	802.11a, 802.11n-HT20/40, 802.11ac-HT80
Frequency Range:	Band 1: 5180-5240MHz,Band 2: 5260-5320MHz, Band 3: 5500-5700MHz,Band 4: 5745-5825MHz
RF Output Power:	22.16dBm (Conducted)
Type of Modulation:	BPSK,QPSK, 16QAM, 64QAM, 256-QAM
Type of Antenna:	Integral Antenna
Antenna Gain:	1.0dBi;



1.2 Test Standards

The following report is prepared on behalf of the Creature Information(Guangzhou)Technology Co., Limited in accordance with FCC 47 CFR Part 2.1093, ANSI/IEEE C95.1-2005+A1:2010, ANSI / IEEE C95.3 :2002(R2008), IEEE 1528-2013, and KDB 865664 D01 v01r04 and KDB 865664 D02 v01r02 and KDB 616217 D04 v01r02 and 248227 D01 802 11 Wi-Fi SAR v02r02.

The objective is to determine compliance with FCC Part 2.1093 of the Federal Communication Commissions rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with KDB 865664 D01 v01r04 and KDB 865664 D02 v01r02. The public notice KDB 447498 D01 v06 for Mobile and Portable Devices RF Exposure Procedure also.

1.4 Test Facility

Address of the test laboratory

Laboratory: Waltek Testing Group (Shenzhen) Co., Ltd.

Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road, Block 70 Bao'an District, Shenzhen, Guangdong, China

FCC – Registration No.: 125990

Waltek Testing Group (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. The Designation Number is CN5010. Test Firm Registration Number is 125990.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Waltek Testing Group (Shenzhen) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.



2. Summary of Test Results

The maximum results of Specific Absorption Rate (SAR) have found during testing are as follows:

Frequency Band	Body (0mm Gap)	SAR _{1g} Limit (W/kg)
	Maximum SAR _{1g} (W/kg)	
WLAN 2.4GHz	0.645	1.6
WLAN 5GHz	0.250	1.6
BT	0.363	1.6
Simultaneous Transmission	1.008	1.6

Remark:

*The highest reported SAR values for body and simultaneous transmission conditions are **0.645W/kg** and **1.008W/kg** respectively.*

The device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR Part 2.1093 and ANSI/IEEE C95.1-2005+A1:2010, and had been tested in accordance with the measurement methods and procedure specified in KDB 865664 D01 v01r04, KDB 865664 D02 v01r02 and IEC 62209-2:2010.

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3. Specific Absorption Rate (SAR)

3.1 Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

3.2 SAR Definition

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (ρ). The equation description is as below:

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

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

SAR measurement can be either related to the temperature elevation in tissue by

$$\text{SAR} = C \left(\frac{\delta T}{\delta t} \right)$$

Where: C is the specific heat capacity, δT is the temperature rise and δt is the exposure duration, or related to the electrical field in the tissue by

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

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

However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.



4. SAR Measurement System

4.1 The Measurement System

Comosar is a system that is able to determine the SAR distribution inside a phantom of human being according to different standards. The Comosar system consists of the following items:

- Main computer to control all the system
- 6 axis robot
- Data acquisition system
- Miniature E-field probe
- Phone holder
- Head simulating tissue

The following figure shows the system.



The EUT under test operating at the maximum power level is placed in the phone holder, under the phantom, which is filled with head simulating liquid. The E-Field probe measures the electric field inside the phantom. The OpenSAR software computes the results to give a SAR value in a 1g or 10g mass.

4.2 Probe

For the measurements the Specific Dosimetric E-Field Probe SSE5 SN 09/13 EP168 with following specifications is used

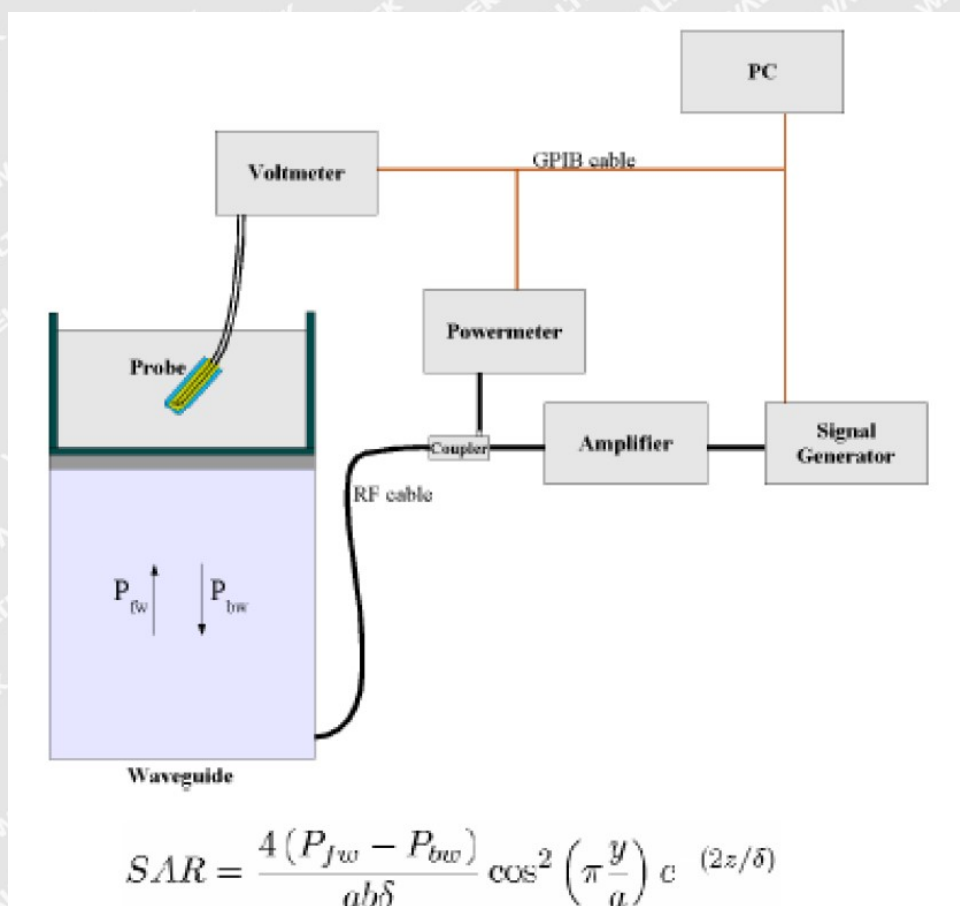
- Dynamic range: 0.01-100 W/kg
- Probe Length: 330 mm
- Length of Individual Dipoles: 4.5 mm
- Maximum external diameter: 8 mm
- Probe Tip External Diameter : 5 mm

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- Distance between dipoles / probe extremity: 2.7mm
 - Probe linearity: <0.25 dB
 - Axial Isotropy: <0.25 dB
 - Spherical Isotropy: <0.50 dB
 - Calibration range: 700 to 3000MHz for head & body simulating liquid.
- Angle between probe axis (evaluation axis) and surface normal line: less than 30°

Probe calibration is realized, in compliance with EN 62209-1 and IEEE 1528 STD, with CALISAR, Antennessa proprietary calibration system. The calibration is performed with the EN 62209-1 annexe technique using reference guide at the five frequencies.



Where :

P_{fw} = Forward Power

P_{bw} = Backward Power

a and b = Waveguide dimensions

δ = Skin depth

Keithley configuration:

Rate = Medium; Filter = ON; RDGS = 10; Filter type = Moving Average; Range auto after each calibration, a SAR measurement is performed on a validation dipole and compared with a NPL calibrated probe, to verify it.

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The calibration factors, $CF(N)$, for the 3 sensors corresponding to dipole 1, dipole 2 and dipole 3 are:

$$CF(N) = SAR(N) / V_{lin}(N) \quad (N=1,2,3)$$

The linearised output voltage $V_{lin}(N)$ is obtained from the displayed output voltage $V(N)$ using

$$V_{lin}(N) = V(N) * (1 + V(N) / DCP(N)) \quad (N=1,2,3)$$

where DCP is the diode compression point in mV.



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4.3 Probe Calibration Process

Dosimetric Assessment Procedure

Each E-Probe/Probe Amplifier combination has unique calibration parameters. SATIMO Probe calibration procedure is conducted to determine the proper amplifier settings to enter in the probe parameters. The amplifier settings are determined for a given frequency by subjecting the probe to a known E-field density (1 mW/cm²) using an with CALISAR, Antenna proprietary calibration system.

Free Space Assessment Procedure

The free space E-field from amplified probe outputs is determined in a test chamber. This calibration can be performed in a TEM cell if the frequency is below 1 GHz and in a waveguide or other methodologies above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is rotated 360 degrees until the three channels show the maximum reading. The power density readings equates to 1mW/cm².

Temperature Assessment Procedure

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated head tissue. The E-field in the medium correlates with the temperature rise in the dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

Where:

$$SAR = C \frac{\Delta T}{\Delta t}$$

Δt = exposure time (30 seconds),

C = heat capacity of tissue (brain or muscle),

ΔT = temperature increase due to RF exposure.

SAR is proportional to $\Delta T / \Delta t$, the initial rate of tissue heating, before thermal diffusion takes place. The electric field in the simulated tissue can be used to estimate SAR by equating the thermally derived SAR to that with the E- field component.

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

Where:

σ = simulated tissue conductivity,

ρ = Tissue density (1.25 g/cm³ for brain tissue)

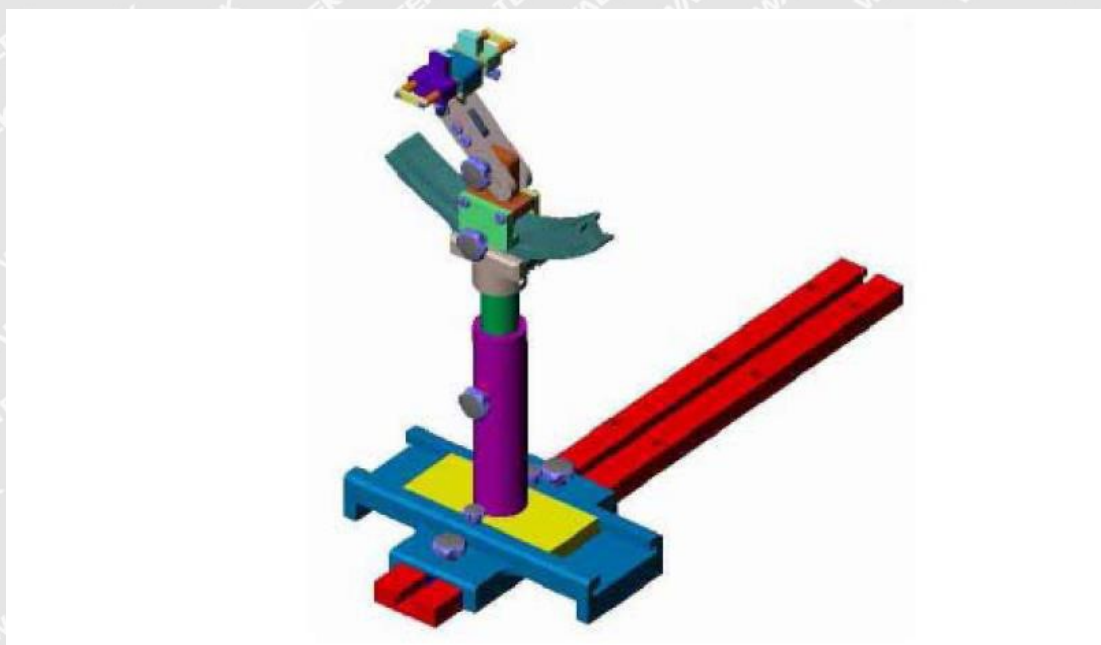


4.4 Phantom

For the measurements the Specific Anthropomorphic Mannequin (SAM) defined by the IEEE SCC-34/SC2 group is used. The phantom is a polyurethane shell integrated in a wooden table. The thickness of the phantom amounts to 2mm +/- 0.2mm. It enables the dosimetric evaluation of left and right phone usage and includes an additional flat phantom part for the simplified performance check. The phantom set-up includes a cover, which prevents the evaporation of the liquid.

4.5 Device Holder

The positioning system allows obtaining cheek and tilting position with a very good accuracy. In compliance with CENELEC, the tilt angle uncertainty is lower than 1°.



System Material	Permittivity	Loss Tangent
Delrin	3.7	0.005



4.6 Test Equipment List

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
E-Field Probe	MVG	SSE2	SN 45/15 EPGO280	2020-07-03	2021-07-02
2450MHz Dipole	MVG	SID2450	SN 13/15 DIP 2G450-364	2020-03-11	2021-03-10
5 GHz Waveguide	MVG	SWG5500	SN 49/16 WGA45	2020-07-03	2021-07-02
Dielectric Probe Kit	SATIMO	SCLMP	SN 47/12 OCPG49	2020-03-11	2021-03-10
SAM Phantom	SATIMO	SAM	SN/ 47/12 SAM95	N/A	N/A
MULTIMETER	KEITHLEY	Keithley 2000	4006367	2020-04-28	2021-04-27
Power meter	Keithley	3500	JC-2017-09-001	2020-04-28	2021-04-27
Power meter	Keithley	3500	JC-2017-09-001	2020-04-28	2021-04-27
Power Sensor	Agilent	11636B	JC-2017-10-002	2020-04-28	2021-04-27
Signal Generator	Rohde & Schwarz	SMR20	100047	2020-04-28	2021-04-27
Spectrum Analyzer	Agilent	E4407B	MY41440400	2020-04-28	2021-04-27
Universal Tester	Rohde & Schwarz	CMU200	112012	2020-04-28	2021-04-27
Network Analyzer	HP	8753C	SEMT-1064	2020-04-28	2021-04-27
Directional Couplers	Agilent	778D	20160	2020-04-28	2021-04-27

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5. Tissue Simulating Liquids

5.1 Composition of Tissue Simulating Liquid

For the measurement of the field distribution inside the SAM phantom with SMTIMO, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm. Please see the following photos for the liquid height.



Liquid Height for Body SAR

The Composition of Tissue Simulating Liquid

Frequency (MHz)	Water (%)	Salt (%)	Sugar (%)	HEC (%)	Preventol (%)	DGBE (%)
Body						
2450	68.6	0.1	0	0	0	31.3

Frequency (MHz)	Water (%)	Hexyl Carbitol (%)	Triton X-100 (%)
Body			
5200-5800	78.6	10.7	10.7



5.2 Tissue Dielectric Parameters for Head and Body Phantoms

The IEEE Std. 1528, FCC KDBs and CEI/IEC 62209 standards state that the system validation measurements must be performed using a reference dipole meeting the fore mentioned return loss and mechanical dimension requirements. The validation measurement must be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards. Per the standards, the dipole shall be positioned below the bottom of the phantom, with the dipole length centered and parallel to the longest dimension of the flat phantom, with the top surface of the dipole at the described distance from the bottom surface of the phantom.

Target Frequency (MHz)	Head		Body	
	Conductivity (σ)	Permittivity (ϵ_r)	Conductivity (σ)	Permittivity (ϵ_r)
150	0.76	52.3	0.80	61.9
300	0.87	45.3	0.92	58.2
450	0.87	43.5	0.94	56.7
750	0.89	41.9	0.96	55.5
835	0.90	41.5	0.97	55.2
900	0.97	41.5	1.05	55.0
915	0.98	41.5	1.06	55.0
1450	1.20	40.5	1.30	54.0
1610	1.29	40.3	1.40	53.8
1800-2000	1.40	40.0	1.52	53.3
2450	1.80	39.2	1.95	52.7
3000	2.40	38.5	2.73	52.0
5200	4.66	36.0	5.30	49.0
5300	35.9	4.76	5.42	48.9
5600	5.07	35.5	5.77	48.5
5800	5.27	35.3	6.00	48.2



5.3 Tissue Calibration Result

The dielectric parameters of the liquids were verified prior to the SAR evaluation using COMOSAR Dielectric Probe Kit and an Agilent Network Analyzer.

Calibration Result for Dielectric Parameters of Tissue Simulating Liquid

Body Tissue Simulating Liquid									
Freq. MHz.	Temp. (°C)	Conductivity			Permittivity			Limit (%)	Date
		Reading (σ)	Target (σ)	Delta (%)	Reading (ϵ_r)	Target (ϵ_r)	Delta (%)		
2450	21.3	1.91	1.95	-2.05	52.01	52.70	-1.31	± 5	2020-09-09
5200	21.2	5.16	5.30	-2.64	48.50	49.0	-1.02	± 5	2020-09-11
5300	21.2	5.26	5.42	-2.95	48.50	48.9	-0.82	± 5	2020-09-11
5600	21.2	5.52	5.77	-4.33	48.30	48.5	-0.41	± 5	2020-09-11
5800	21.2	5.76	6.00	-4.00	48.50	48.2	0.62	± 5	2020-09-11

Body Tissue Simulating Liquid									
Freq. MHz.	Temp. (°C)	Conductivity			Permittivity			Limit (%)	Date
		Reading (σ)	Target (σ)	Delta (%)	Reading (ϵ_r)	Target (ϵ_r)	Delta (%)		
2450	22.3	1.93	1.95	-1.03	51.17	52.70	-2.90	± 5	2020-11-02
5200	22.3	5.42	5.30	2.26	47.61	49.0	-2.84	± 5	2020-11-01
5300	22.3	5.54	5.42	2.21	47.02	48.9	-3.84	± 5	2020-11-01
5600	22.3	5.81	5.77	0.69	46.50	48.5	-4.12	± 5	2020-11-01
5800	22.3	5.92	6.00	-1.33	46.15	48.2	-4.25	± 5	2020-11-01

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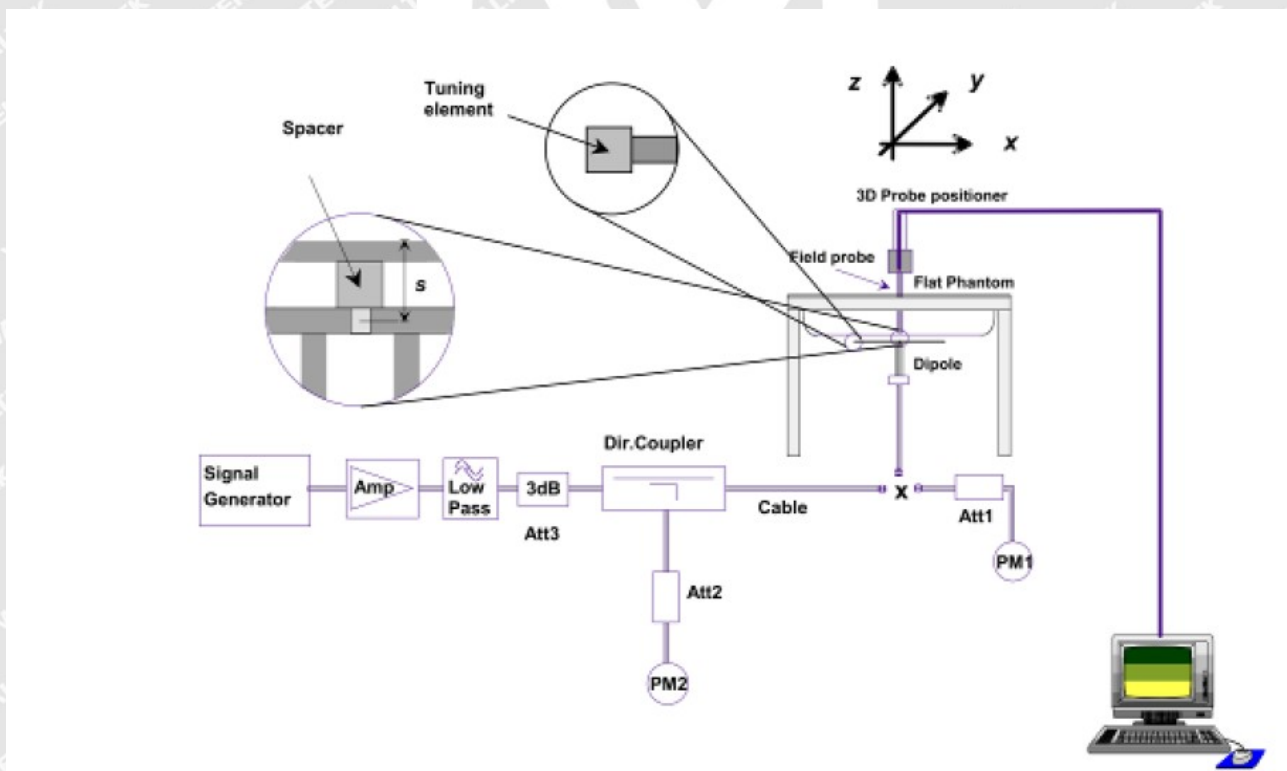
6. SAR Measurement Evaluation

6.1 Purpose of System Performance Check

The system performance check verifies that the system operates within its specifications. System and operator errors can be detected and corrected. It is recommended that the system performance check be performed prior to any usage of the system in order to guarantee reproducible results. The system performance check uses normal SAR measurements in a simplified setup with a well characterized source. This setup was selected to give a high sensitivity to all parameters that might fail or vary over time. The system check does not intend to replace the calibration of the components, but indicates situations where the system uncertainty is exceeded due to drift or failure.

6.2 System Setup

In the simplified setup for system evaluation, the EUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave which comes from a signal generator at frequency 2450MHz and 5000MHz. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom.



System Verification Setup Block Diagram



Setup Photo of Dipole Antenna

The output power on dipole port must be calibrated to 24 dBm(250 mW) before dipole is connected.

The output power on 5 GHz Waveguide must be calibrated to 20 dBm (100mW) before 5 GHz Waveguide is connected.

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6.3 Validation Results

Comparing to the original SAR value provided by SATIMO, the validation data should be within its specification of 10 %. Table 6.1 shows the target SAR and measured SAR after normalized to 1W input power. The table below indicates the system performance check can meet the variation criterion.

Frequency	Targeted SAR _{1g}	Measured SAR _{1g}	Normalized SAR _{1g}	Tolerance	Date
MHz	(W/kg)	(W/kg)	(W/kg)	(%)	
Body					
2450	50.33	12.59	50.36	0.06	2020-09-09
5200	154.45	16.681	166.81	8.00	2020-09-11
5400	163.31	17.329	173.29	6.11	2020-09-11
5600	165.72	17.111	171.11	3.25	2020-09-11
5800	170.71	16.681	166.81	-2.28	2020-09-11

Frequency	Targeted SAR _{1g}	Measured SAR _{1g}	Normalized SAR _{1g}	Tolerance	Date
MHz	(W/kg)	(W/kg)	(W/kg)	(%)	
Body					
2450	50.33	12.87	51.48	2.28	2020-11-02
5200	154.45	16.546	165.46	7.13	2020-11-01
5400	163.31	17.281	172.81	5.82	2020-11-01
5600	165.72	17.604	176.04	6.23	2020-11-01
5800	170.71	18.207	182.07	6.65	2020-11-01

Targeted and Measurement SAR

Please refer to Annex A for the plots of system performance check.

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7. EUT Testing Position

7.1 EUT Antenna Position

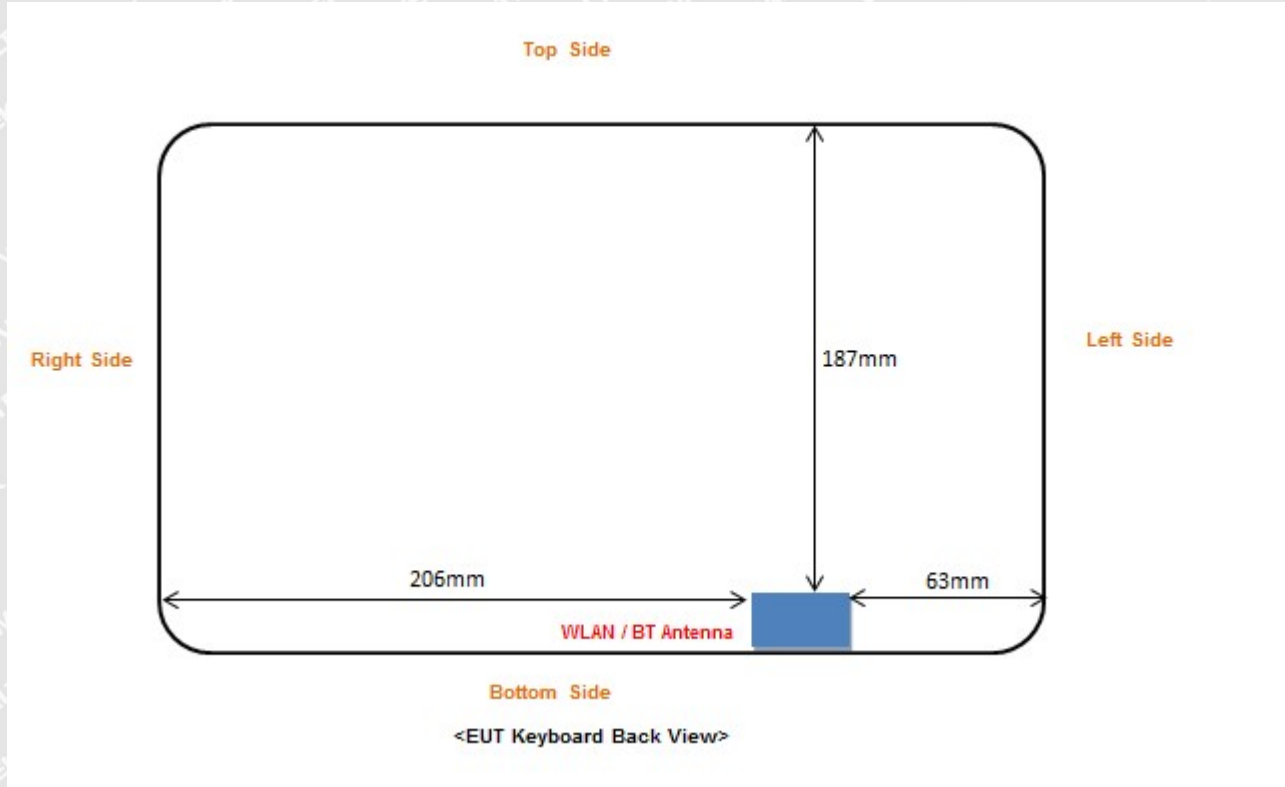


Fig 7.1 Block Diagram for EUT Antenna Position

EUT Size: Long*Width*Height=30.6cm*20.8cm*1.2cm

7.2 EUT Testing Position

SAR Test Exclusion Thresholds <50mm										
Frequency Bands	Frequency (MHz)	Tune-up Power(dBm)	Tune-up (mW)	Min test Separation Distance(mm)			Result			Limit
				Front	Back	Bottom	Front	Back	Bottom	
WLAN(2.4G)	2437	28.5	707.95	2	2	2	552.6	552.6	552.6	3
Bluetooth	2480	11.0	12.59	2	2	2	9.92	9.92	9.92	3
WLAN(5.2G)	5200	22.5	177.83	2	2	2	202.8	202.8	202.8	3
WLAN(5.3G)	5260	21.5	141.25	2	2	2	162.0	162.0	162.0	3
WLAN(5.6G)	5600	21.5	141.25	2	2	2	167.1	167.1	167.1	3
WLAN(5.8G)	5795	21.5	141.25	2	2	2	170.0	170.0	170.0	3

Note: 1.Refer to Chapter 9.1 Conducted RF Output Power
 2. Per KDB 447498 D01 V06, 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:

$$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$$



SAR Test Exclusion Thresholds >50mm

Frequency Bands	Frequency (MHz)	Tune-up Power(dBm)	Tune-up (mW)	Min test Separation Distance(mm)			Evaluation		
				Left	Right	Top	Left	Right	Top
WLAN(2.4G)	2437	28.5	707.95	63	206	187	196	1496	1396
Bluetooth	2480	11.0	12.59	63	206	187	196	1496	1396
WLAN(5.2G)	5200	22.5	177.83	63	206	187	166	1366	1466
WLAN(5.3G)	5260	21.5	141.25	63	206	187	166	1366	1466
WLAN(5.6G)	5600	21.5	141.25	63	206	187	162	1362	1462
WLAN(5.8G)	5795	21.5	141.25	63	206	187	162	1362	1462

Note: Refer to Chapter 9.1 Conducted RF Output Power

Body mode SAR assessments are required for this device. This EUT was tested in different positions for different SAR test modes, more information as below:

Body SAR tests, Test distance: 0mm						
Antennas	Front	Back	Right Side	Left Side	Top Side	Bottom
WLAN(2.4G)	Yes	Yes	No	Yes	No	Yes
Bluetooth	Yes	Yes	No	No	No	Yes
WLAN(5.2G)	Yes	Yes	No	Yes	No	Yes
WLAN(5.3G)	Yes	Yes	No	No	No	Yes
WLAN(5.6G)	Yes	Yes	No	No	No	Yes
WLAN(5.8G)	Yes	Yes	No	No	No	Yes

Remark:

- Referring to KDB 616217 D04 v01r02, KDB 248227 D01 v02r02 and KDB 447498 D01 v06, this device is overall diagonal dimension(>20cm) notebook, tested in direct contact (no gap) with flat phantom.

Please refer to Annex D for the EUT test setup photos.



8. SAR Measurement Procedures

8.1 Measurement Procedures

The measurement procedures are as follows:

- (a) Use base station simulator (if applicable) or engineering software to transmit RF power continuously (continuous Tx) in the highest power channel.
- (b) Keep EUT to radiate maximum output power or 100% factor (if applicable)
- (c) Measure output power through RF cable and power meter.
- (d) Place the EUT in the positions as Annex D demonstrates.
- (e) Set scan area, grid size and other setting on the SATIMO software.
- (f) Measure SAR results for the highest power channel on each testing position.
- (g) Find out the largest SAR result on these testing positions of each band
- (h) Measure SAR results for other channels in worst SAR testing position if the SAR of highest power channel is larger than 0.8 W/kg

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

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

8.2 Spatial Peak SAR Evaluation

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

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

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

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



8.3 Area & Zoom Scan Procedures

First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an Area Scan is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan is required. The Zoom Scan measures 5x5x7 points with step size 8, 8 and 5 mm for 300 MHz to 3 GHz, and 8x8x8 points with step size 4, 4 and 2.5 mm for 3 GHz to 6 GHz. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR-distribution over 10 g.

8.4 Volume Scan Procedures

The volume scan is used for assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the EUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing (step-size is 4, 4 and 2.5 mm). When all volume scan were completed, the software can combine and subsequently superpose these measurement data to calculating the multiband SAR.

8.5 SAR Averaged Methods

The local SAR inside the phantom is measured using small dipole sensing elements inside a probe body. The probe tip must not be in contact with the phantom surface in order to minimize measurements errors, but the highest local SAR will occur at the surface of the phantom.

An extrapolation is using to determinate this highest local SAR values. The extrapolation is based on a fourth-order least-square polynomial fit of measured data. The local SAR value is then extrapolated from the liquid surface with a 1mm step.

The measurements have to be performed over a limited time (due to the duration of the battery) so the step of measurement is high. It could vary between 5 and 8 mm. To obtain an accurate assessment of the maximum SAR averaged over 10g and 1 g requires a very fine resolution in the three dimensional scanned data array.

8.6 Power Drift Monitoring

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



9. SAR Test Result

9.1 Conducted RF Output Power

WLAN - Maximum Average Power					
Test Mode	Data Rate	Channel	Frequency (MHz)	Average Power (dBm)	Tune-up power (dBm)
802.11b	1Mbps	CH 01	2412	22.09	22.5
		CH 06	2437	24.17	24.5
		CH 11	2462	20.43	20.5
802.11g	6Mbps	CH 01	2412	25.45	25.5
		CH 06	2437	28.25	28.5
		CH 11	2462	25.35	25.5
802.11n (20MHz)	MCS0	CH 01	2412	25.30	25.5
		CH 06	2437	28.00	28.5
		CH 11	2462	25.21	25.5
802.11n (40MHz)	MCS0	CH 03	2422	22.70	22.5
		CH 07	2442	24.45	24.5
		CH 11	2452	23.11	23.5

WLAN(5.2G) - Conducted Power				
Test Mode	Channel	Frequency (MHz)	Average Power (dBm)	Tune-up power (dBm)
802.11a	36	5180	18.14	18.5
	40	5200	21.11	21.5
	48	5240	21.65	22.0
802.11n (HT20)	36	5180	17.98	18.0
	40	5200	22.16	22.5
	48	5240	21.72	22.0
802.11n (HT40)	38	5190	18.33	18.5
	46	5230	21.34	21.5
802.11ac (VHT80)	42	5210	18.32	18.5

WLAN(5.3G) - Conducted Power				
Test Mode	Channel	Frequency (MHz)	Average Power (dBm)	Tune-up power (dBm)
802.11a	CH 52	5260	21.09	21.5



	CH 56	5280	20.75	21.0
	CH 64	5320	15.91	16.0
802.11n (HT20)	CH 52	5260	21.13	21.5
	CH 56	5280	20.77	21.0
	CH 64	5320	16.10	16.5
802.11n (HT40)	CH 54	5270	19.79	20.0
	CH62	5310	15.39	15.5
802.11ac (VHT80)	CH 58	5290	14.86	15.0

WLAN(5.6G) – Conducted Power				
Test Mode	Channel	Frequency (MHz)	Average Power (dBm)	Tune-up power (dBm)
802.11a	CH 100	5500	19.12	19.5
	CH 120	5600	21.12	21.5
	CH 140	5700	19.25	19.5
802.11n (HT20)	CH 100	5500	19.62	20.0
	CH 120	5600	20.99	21.0
	CH 140	5700	18.91	19.0
802.11n (HT40)	CH 102	5510	17.35	17.5
	CH118	5590	19.11	19.5
	CH134	5670	18.14	18.5
802.11ac (VHT80)	CH106	5530	19.12	19.5
	CH122	5610	21.12	21.5

WLAN(5.8G) - Conducted Power				
Test Mode	Channel	Frequency (MHz)	Average Power (dBm)	Tune-up power (dBm)
802.11a	CH 149	5745	19.23	19.5
	CH 157	5785	19.37	19.5
	CH 165	5825	19.68	20.0
802.11n (HT20)	CH 149	5745	19.68	20.0
	CH 157	5785	18.92	19.0
	CH 165	5825	19.62	20.0
802.11n (HT40)	CH 151	5755	21.10	21.5
	CH159	5795	21.26	21.5
802.11ac (VHT80)	CH155	5775	20.33	20.5

Remark:

Waltek Testing Group (Shenzhen) Co., Ltd.
<http://www.semtest.com.cn>



1. Per KDB 248227 D01 v02r02, For 802.11b DSSS SAR measurements, DSSS SAR procedure applies to fixed exposure test position and initial test position procedure applies to multiple exposure test positions.
2. Per KDB 248227 D01 v02r02, For 802.11b DSSS SAR measurements, when the reported SAR of the highest measured maximum output power channel (see 3.1) for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration. When the reported SAR is > 0.8 W/kg, SAR is required for that exposure configuration using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.
3. For OFDM modes (802.11g/n), SAR is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and it is ≤ 1.2 W/kg.

Bluetooth - Maximum Average Power			
Test Mode	Data Rate	Average Power(dBm)	Tune-up power (dBm)
GFSK	1Mbps	10.61	11.0
4* π 4DQPSK	2Mbps	10.24	11.0
8DPSK	3Mbps	10.29	11.0

Bluetooth - Maximum Average Power					
Test Mode	Data Rate	Channel	Frequency (MHz)	Average Power (dBm)	Tune-up power (dBm)
BLE	1Mbps	CH 00	2402	9.27	9.5
		CH 19	2440	9.18	9.5
		CH 39	2480	9.43	9.5



9.2 Test Results for Standalone SAR Test

Body SAR

WLAN 2.4GHz –Body SAR Test									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
1.	802.11b	Back side	6	2437	24.17	24.5	1.079	0.020	0.022
2.	802.11b	Front side	6	2437	24.17	24.5	1.079	0.493	0.532
3.	802.11b	Left side	6	2437	24.17	24.5	1.079	0.017	0.018
4.	802.11b	Bottom side	6	2437	24.17	24.5	1.079	0.070	0.076

WLAN 2.4GHz –Body SAR Test									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
5.	802.11g	Back side	6	2437	28.25	28.5	1.059	0.039	0.041
6.	802.11g	Front Side	6	2437	28.25	28.5	1.059	0.609	0.645
7.	802.11g	Left side	6	2437	28.25	28.5	1.059	0.019	0.020
8.	802.11g	Bottom side	6	2437	28.25	28.5	1.059	0.081	0.086

Bluetooth– Body SAR Test									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
9.	GFSK	Back Side	39	2480	10.61	11.0	1.094	0.031	0.034
10.	GFSK	Front Side	39	2480	10.61	11.0	1.094	0.332	0.363
11.	GFSK	Bottom side	39	2480	10.61	11.0	1.094	0.021	0.023

WLAN 5.2GHz –Body SAR Test									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
12.	802.11n (HT20)	Back side	40	5200	22.16	22.5	1.081	0.117	0.127
13.	802.11n (HT20)	Front side	40	5200	22.16	22.5	1.081	0.231	0.250
14.	802.11n (HT20)	Left side	40	5200	22.16	22.5	1.081	0.036	0.039
15.	802.11n (HT20)	Bottom side	40	5200	22.16	22.5	1.081	0.154	0.167



WLAN 5.3GHz –Body SAR Test									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
16.	802.11n (HT20)	Back Side	52	5260	21.13	21.5	1.089	0.083	0.090
17.	802.11n (HT20)	Front Side	52	5260	21.13	21.5	1.089	0.196	0.213
18.	802.11n (HT20)	Bottom side	52	5260	21.13	21.5	1.089	0.125	0.136

WLAN 5.6GHz –Body SAR Test									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
19.	802.11a	Back Side	120	5600	21.12	21.5	1.091	0.098	0.107
20.	802.11a	Front Side	120	5600	21.12	21.5	1.091	0.108	0.118
21.	802.11a	Bottom side	120	5600	21.12	21.5	1.091	0.084	0.092

WLAN 5.8GHz –Body SAR Test									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
22.	802.11n (HT40)	Back Side	159	5795	21.26	21.5	1.057	0.021	0.022
23.	802.11n (HT40)	Front Side	159	5795	21.26	21.5	1.057	0.098	0.104
24.	802.11n (HT40)	Bottom side	159	5795	21.26	21.5	1.057	0.067	0.071

Remark: Per KDB 447498 D01 v06, if the highest output channel SAR for each exposure position ≤ 0.8 W/kg other channels SAR tests are not necessary.



9.3 Simultaneous Multi-band Transmission SAR Analysis

List of Mode for Simultaneous Multi-band Transmission

No.	Configurations	Body SAR
1	WLAN(Data) + Bluetooth(Data)	Yes

Remark:

2. The maximum SAR summation is calculated based on the same configuration and test position.

Body SAR

WLAN and Bluetooth

	WLAN(2.4G)	Bluetooth	Summed SAR (W/kg)
Position	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Back	0.041	0.034	0.075
Front	0.645	0.363	1.008
Left	0.020	0.023	0.043
Bottom	0.086	/	0.086

	WLAN(5G)	Bluetooth	Summed SAR (W/kg)
Position	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Back	0.127	0.034	0.161
Front	0.250	0.363	0.613
Left	0.039	0.023	0.062
Bottom	0.167	/	0.167

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10. Measurement Uncertainty

10.1 Uncertainty for EUT SAR Test

a	b	c	d	e= f(d,k)	f	g	h= c*f/e	i= c*g/e	k
Uncertainty Component	Sec.	Tol (+- %)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	Vi
Measurement System									
Probe calibration	E.2.1	7.0	N	1	1	1	7.00	7.00	∞
Axial Isotropy	E.2.2	2.5	R	$\sqrt{3}$	$(1_Cp)^{1/2}$	$(1_Cp)^{1/2}$	1.02	1.02	∞
Hemispherical Isotropy	E.2.2	4.0	R	$\sqrt{3}$	$(Cp)^{1/2}$	$(Cp)^{1/2}$	1.63	1.63	∞
Boundary effect	E.2.3	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	E.2.4	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞
System detection limits	E.2.5	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Readout Electronics	E.2.6	0.02	N	1	1	1	0.02	0.02	∞
Reponse Time	E.2.7	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Integration Time	E.2.8	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	∞
RF ambient Conditions – Noise	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
RF ambient Conditions - Reflections	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Probe positioner Mechanical Tolerance	E.6.2	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	∞
Probe positioning with respect to Phantom Shell	E.6.3	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	∞
Extrapolation, interpolation and integration Algorithms for Max. SAR Evaluation	E.5	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞
Test Sample Related									
Test sample positioning	E.4.2	0.03	N	1	1	1	0.03	0.03	N-1
Device Holder Uncertainty	E.4.1	5.00	N	1	1	1	5.00	5.00	
Output power Variation - SAR drift measurement	E.2.9	12.02	R	$\sqrt{3}$	1	1	6.94	6.94	∞
SAR scaling	E6.5	0.0	R	$\sqrt{3}$	1	1	0.0	0.0	∞
Phantom and Tissue Parameters									
Phantom Uncertainty (Shape and thickness tolerances)	E.3.1	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	∞
Uncertainty in SAR correction for deviations in permittivity and conductivity	E3.2	1.9	R	$\sqrt{3}$	1	0.84	1.10	0.90	∞
Liquid conductivity - deviation	E.3.2	5.00	R	$\sqrt{3}$	0.64	0.43	1.85	1.24	∞



from target value									
Liquid conductivity measurement uncertainty	E.3.3	5.00	N	1	0.64	0.43	3.20	2.15	∞
Liquid permittivity - deviation from target value	E.3.2	0.37	R	$\sqrt{3}$	0.6	0.49	0.13	0.10	∞
Liquid permittivity measurement uncertainty	E.3.3	10.00	N	1	0.6	0.49	6.00	4.90	∞
Combined Standard Uncertainty			RSS				12.98	12.53	
Expanded Uncertainty (95% Confidence interval)			K=2				25.32	24.43	

10.2 Uncertainty for System Performance Check

a	b	c	d	e= f(d,k)	f	g	h= c*f/e	i= c*g/e	k
Uncertainty Component	Sec.	Tol (+- %)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	Vi
Measurement System									
Probe calibration	E.2.1	7.0	N	1	1	1	7.00	7.00	∞
Axial Isotropy	E.2.2	2.5	R	$\sqrt{3}$	$(1_{Cp})^{1/2}$	$(1_{Cp})^{1/2}$	1.02	1.02	∞
Hemispherical Isotropy	E.2.2	4.0	R	$\sqrt{3}$	$(Cp)^{1/2}$	$(Cp)^{1/2}$	1.63	1.63	∞
Boundary effect	E.2.3	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	E.2.4	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞
System detection limits	E.2.5	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Modulation response	E.2.5	0	R	$\sqrt{3}$	0	0	0.0	0.0	∞
Readout Electronics	E.2.6	0.02	N	1	1	1	0.02	0.02	∞
Reponse Time	E.2.7	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Integration Time	E.2.8	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	∞
RF ambient Conditions – Noise	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
RF ambient Conditions - Reflections	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Probe positioner Mechanical Tolerance	E.6.2	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	∞
Probe positioning with respect to Phantom Shell	E.6.3	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	∞
Extrapolation, interpolation and integration Algorithms for Max.	E.5.2	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞



SAR Evaluation									
Dipole									
Dipole axis to liquid Distance	8,E.4.2	1.00	N	$\sqrt{3}$	1	1	0.58	0.58	N-1
Input power and SAR drift measurement	8,6.6.2	12.02	R	$\sqrt{3}$	1	1	6.94	6.94	∞
Deviation of experimental dipole from numerical dipole	E.6.4	5.5	R	$\sqrt{3}$	1	1	3.20	3.20	∞
Phantom and Tissue Parameters									
Phantom Uncertainty (Shape and thickness tolerances)	E.3.1	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	∞
Uncertainty in SAR correction for deviations in permittivity and conductivity	E3.2	2.0	R	$\sqrt{3}$	1	0.84	1.10	1.10	∞
Liquid conductivity - deviation from target value	E.3.2	5.00	R	$\sqrt{3}$	0.64	0.43	1.85	1.24	
Liquid conductivity - measurement uncertainty	E.3.3	5.00	N	1	0.64	0.43	3.20	2.15	
Liquid permittivity - deviation from target value	E.3.2	0.37	R	$\sqrt{3}$	0.6	0.49	0.13	0.10	
Liquid permittivity - measurement uncertainty	E.3.3	10.00	N	1	0.6	0.49	6.00	4.90	M
Combined Standard Uncertainty			RSS				12.00	11.50	
Expanded Uncertainty (95% Confidence interval)			K=2				23.39	22.43	

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Annex A. Plots of System Performance Check

MEASUREMENT 1

For Body Liquid

Type: Validation measurement (Fast, 75.00 %)

Measurement duration: 12 minutes 21 seconds

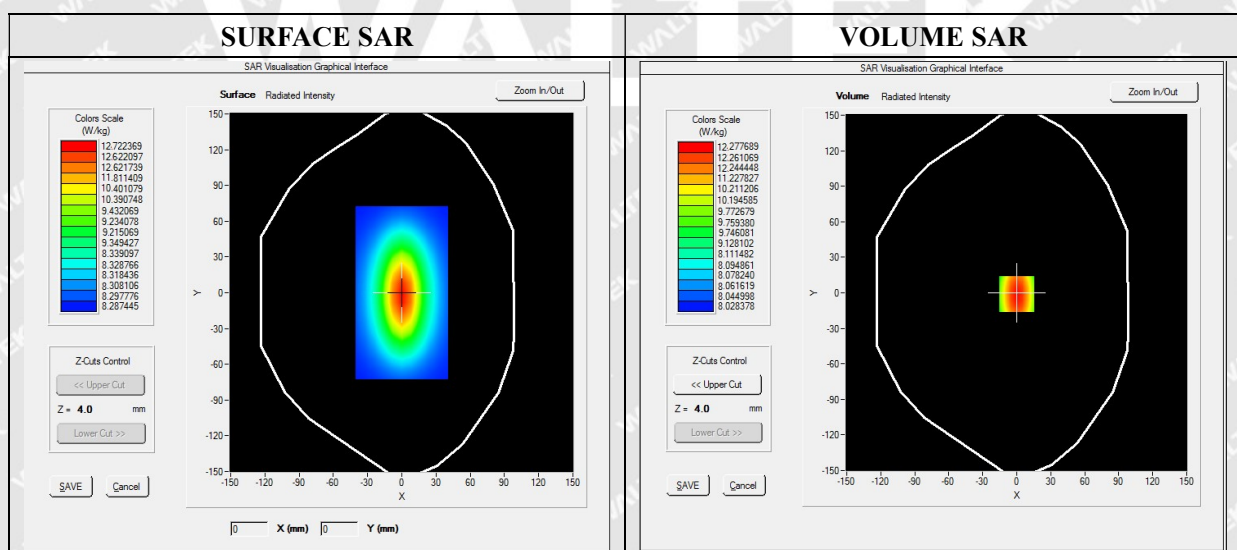
E-field Probe: SN 45/15 EPGO280; ConvF: 5.64; Calibrated: 2020-07-03

A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Dipole
Band	CW2450
Signal	CW (Crest factor: 1.0)

B. SAR Measurement Results

Frequency (MHz)	2450.000000
Relative Permittivity (real part)	52.010212
Conductivity (S/m)	1.910255
Power Variation (%)	1.369745
Ambient Temperature	21.1
Liquid Temperature	21.2



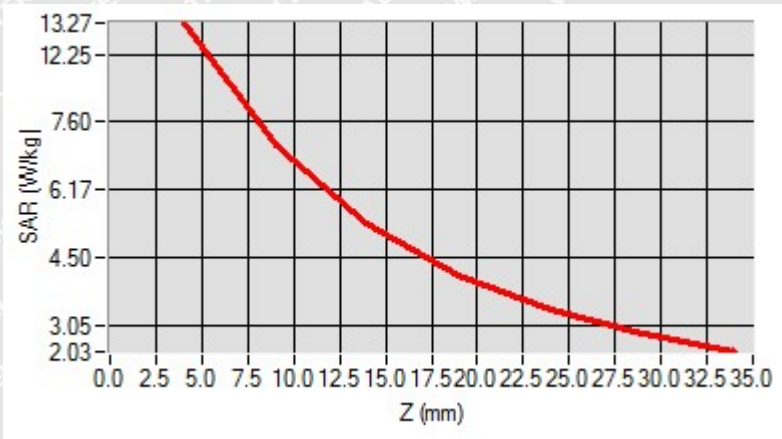


Maximum location: X=0.00, Y=0.00

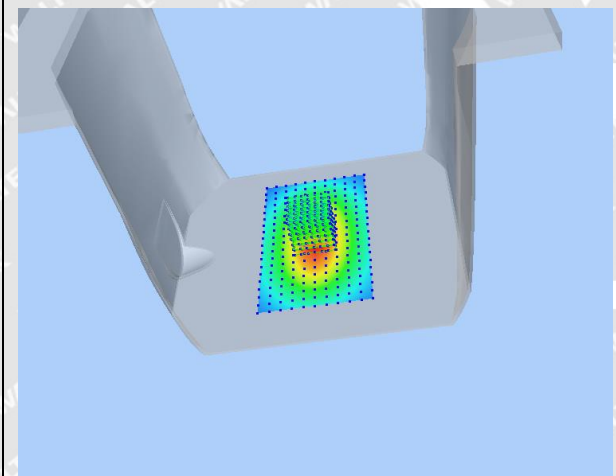
SAR 10g (W/Kg)	6.119522
SAR 1g (W/Kg)	12.592360

Z Axis Scan

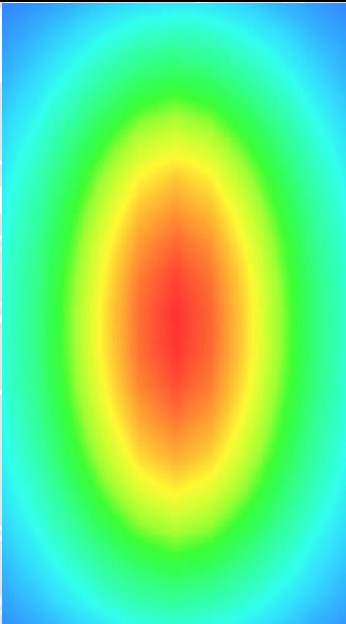
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	13.1911	11.7951	9.2945	8.5400	6.3712	4.6225



3D screen shot



Hot spot position





MEASUREMENT 2

Type: Validation measurement (Fast, 75.00 %)

Measurement duration: 12 minutes 21 seconds

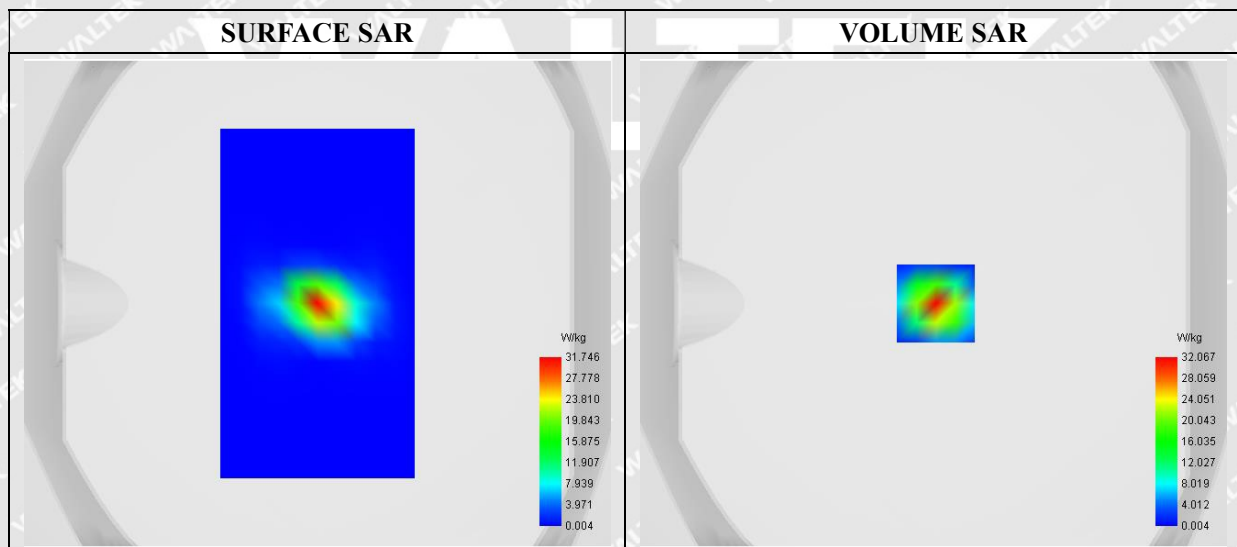
E-field Probe: SN 45/15 EPG0280; ConvF: Refer to the Calibration Certificate; Calibrated: 2020-07-03

A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Validation plane
Device Position	Dipole
Band	CW5200
Signal	CW (Crest factor: 1.0)

B. SAR Measurement Results

Frequency (MHz)	5200.000000
Relative Permittivity (real part)	48.501241
Conductivity (S/m)	5.160213
Power Variation (%)	0.749201
Ambient Temperature	21.1
Liquid Temperature	21.2

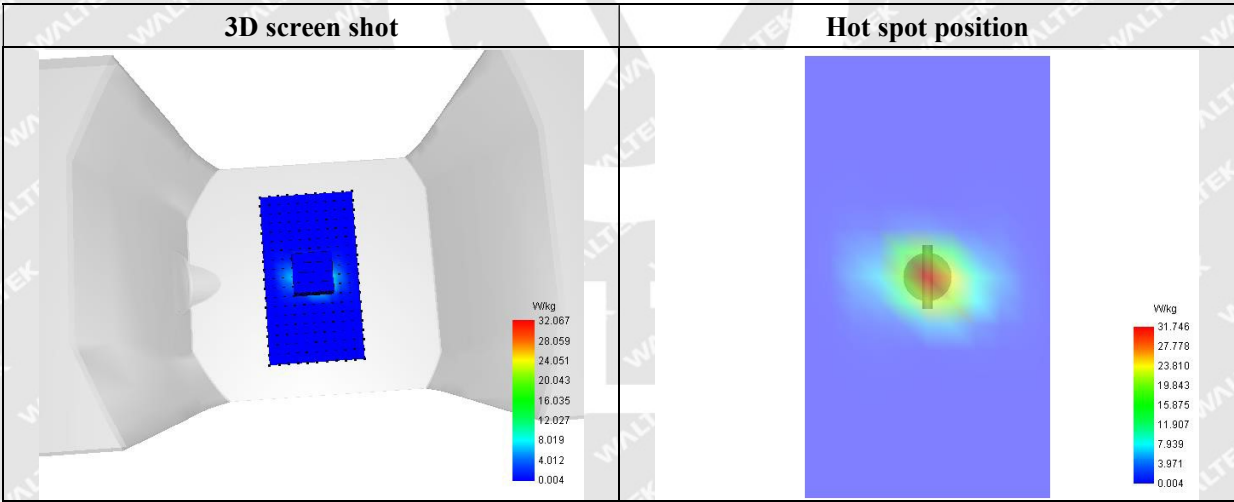
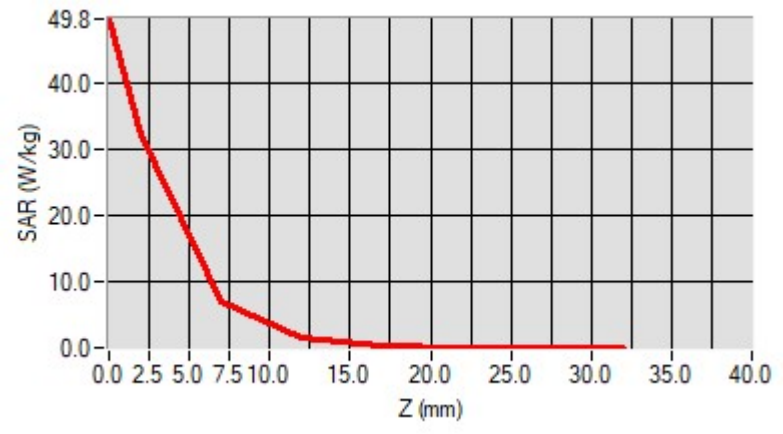




Maximum location: X=1.00, Y=0.00

SAR 10g (W/Kg)	6.047588
SAR 1g (W/Kg)	16.681175

Z (mm)	0.00	2.00	7.00	12.00	17.00	22.00	27.00
SAR (W/Kg)	49.8193	32.0669	7.0244	1.5969	0.3410	0.0635	0.0070





MEASUREMENT 3

Type: Validation measurement (Fast, 75.00 %)

Measurement duration: 12 minutes 21 seconds

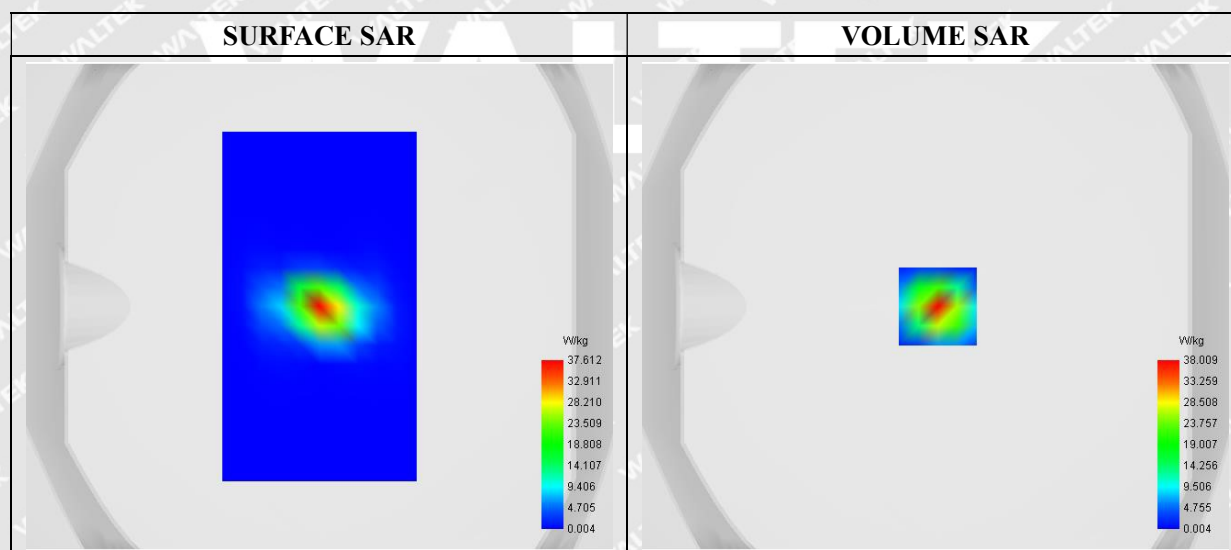
E-field Probe: SN 45/15 EPGO280; ConvF: Refer to the Calibration Certificate; Calibrated: 2020-07-03

A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Validation plane
Device Position	Dipole
Band	CW5400
Signal	CW (Crest factor: 1.0)

B. SAR Measurement Results

Frequency (MHz)	5400.000000
Relative Permittivity (real part)	48.502911
Conductivity (S/m)	5.261483
Power Variation (%)	0.943782
Ambient Temperature	21.1
Liquid Temperature	21.2

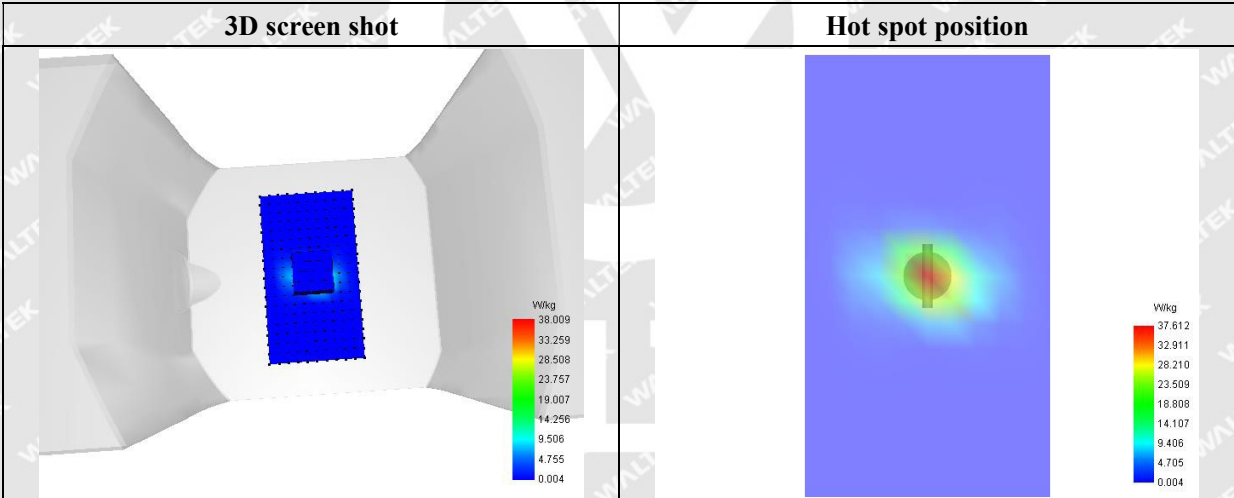
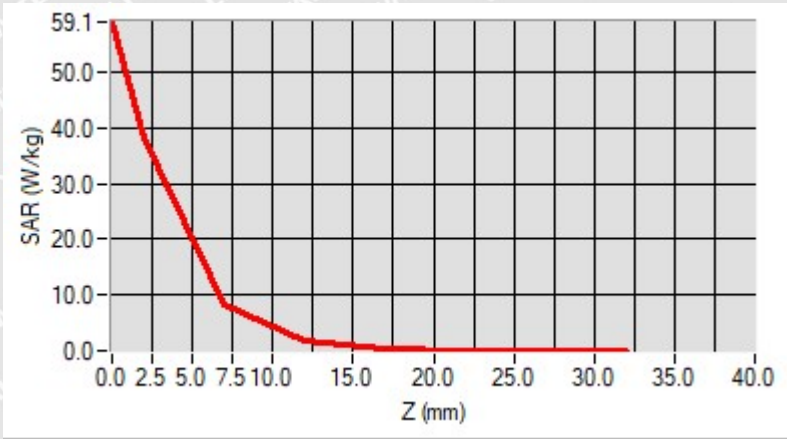


Maximum location: X=1.00, Y=0.00



SAR 10g (W/Kg)	5.872241
SAR 1g (W/Kg)	17.329716

Z (mm)	0.00	2.00	7.00	12.00	17.00	22.00	27.00
SAR (W/Kg)	59.0521	38.0093	8.3284	1.8732	0.3993	0.0816	0.0132





MEASUREMENT 4

Type: Validation measurement (Fast, 75.00 %)

Measurement duration: 12 minutes 21 seconds

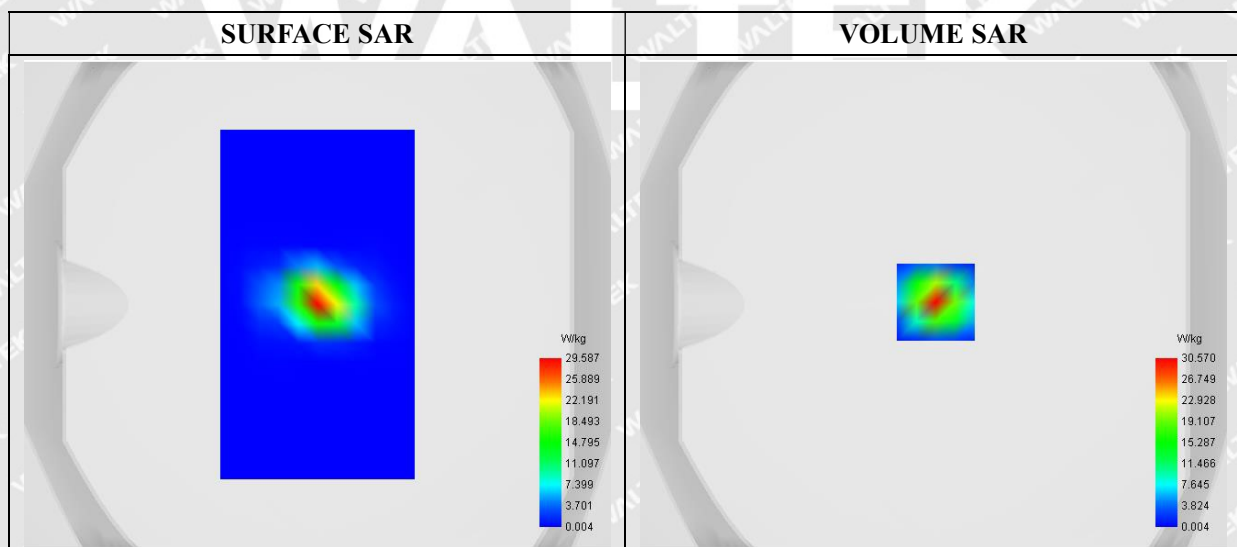
E-field Probe: SSE2 - SN 45/15 EPGO280; ConvF: Refer to the Calibration Certificate; Calibrated: 2020-07-03

A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Validation plane
Device Position	Dipole
Band	CW5600
Signal	CW (Crest factor: 1.0)

B. SAR Measurement Results

Frequency (MHz)	5600.000000
Relative Permittivity (real part)	48.302143
Conductivity (S/m)	5.521688
Power Variation (%)	0.749201
Ambient Temperature	21.1
Liquid Temperature	21.2

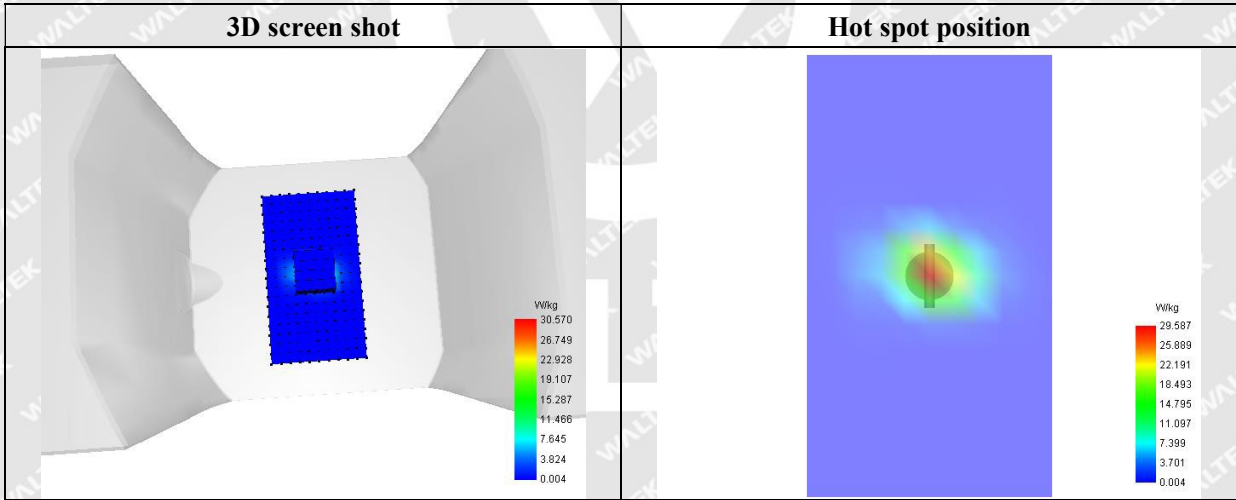
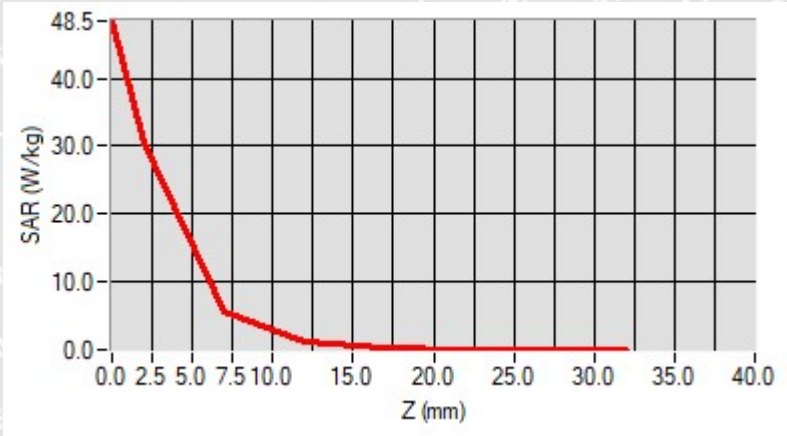


Maximum location: X=1.00, Y=1.00



SAR 10g (W/Kg)	5.912341
SAR 1g (W/Kg)	17.110732

Z (mm)	0.00	2.00	7.00	12.00	17.00	22.00	27.00
SAR (W/Kg)	48.4695	30.5699	5.7100	1.0698	0.1906	0.0364	0.0052





MEASUREMENT 5

Type: Validation measurement (Fast, 75.00 %)

Measurement duration: 12 minutes 21 seconds

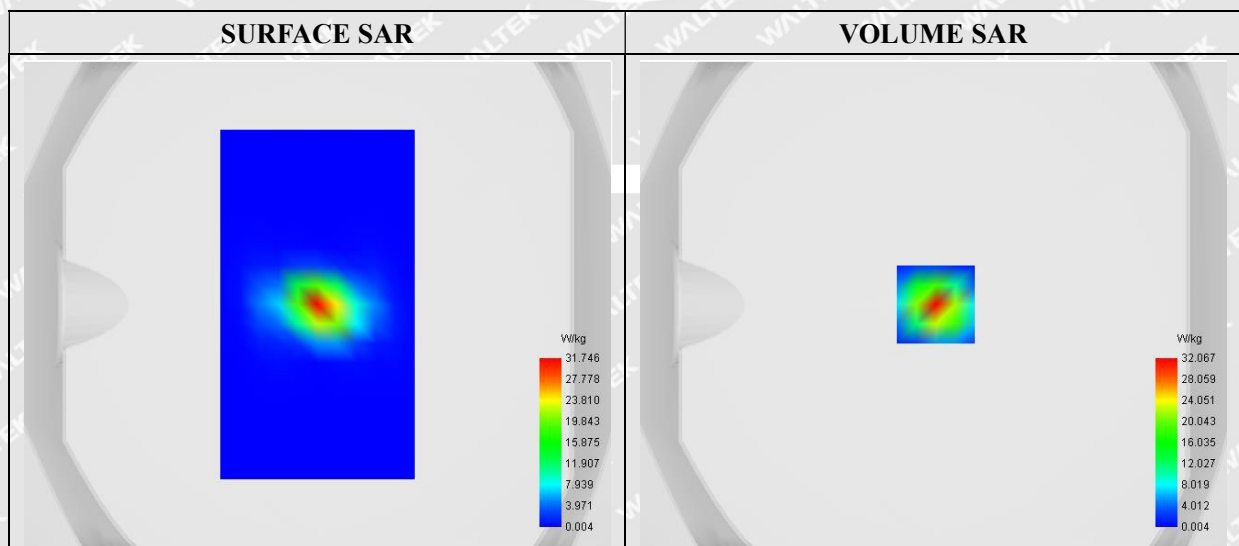
E-field Probe: SSE2 - SN 45/15 EPGO280; ConvF: Refer to the Calibration Certificate; Calibrated: 2020-07-03

A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Validation plane
Device Position	Dipole
Band	CW5800
Signal	CW (Crest factor: 1.0)

B. SAR Measurement Results

Frequency (MHz)	5800.000000
Relative Permittivity (real part)	48.501939
Conductivity (S/m)	5.761487
Power Variation (%)	0.749201
Ambient Temperature	21.1
Liquid Temperature	21.2

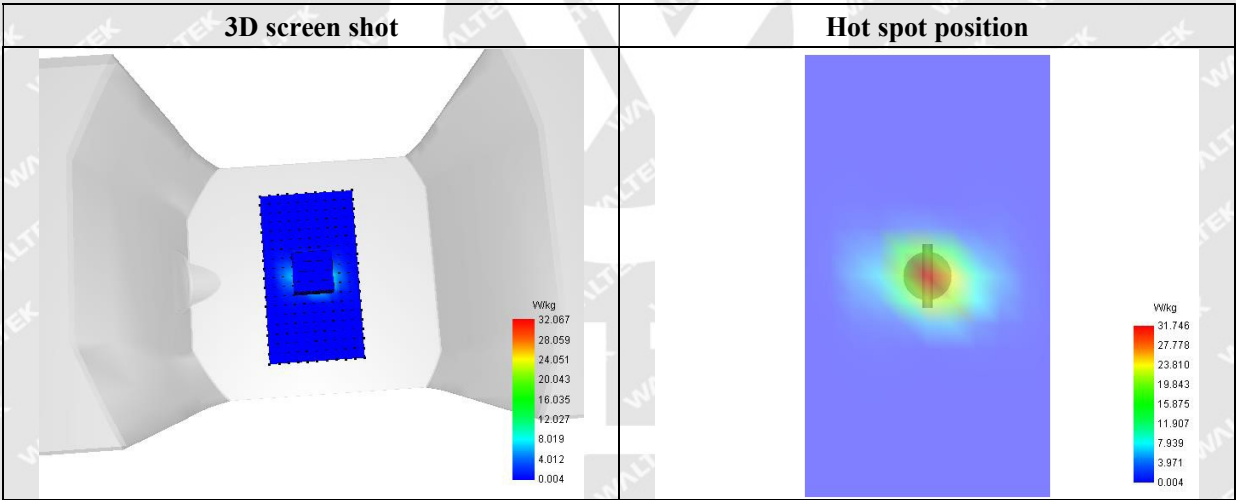
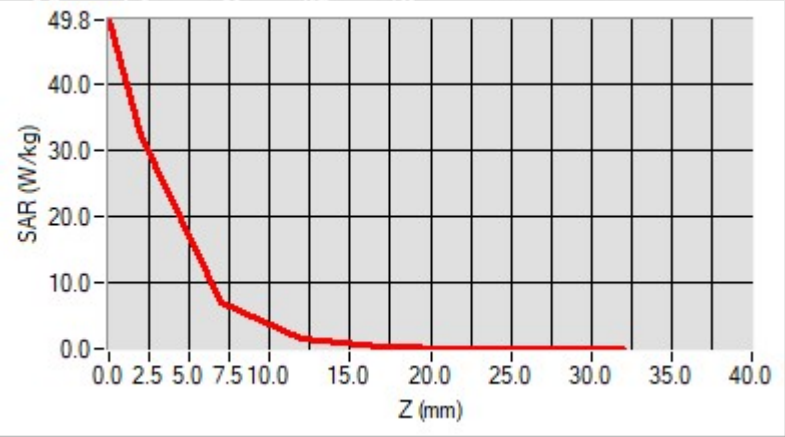


Maximum location: X=1.00, Y=0.00



SAR 10g (W/Kg)	6.047588
SAR 1g (W/Kg)	16.681175

Z (mm)	0.00	2.00	7.00	12.00	17.00	22.00	27.00
SAR (W/Kg)	49.8193	32.0669	7.0244	1.5969	0.3410	0.0635	0.0070





MEASUREMENT 6

Type: Validation measurement (Fast, 75.00 %)

Measurement duration: 12 minutes 21 seconds

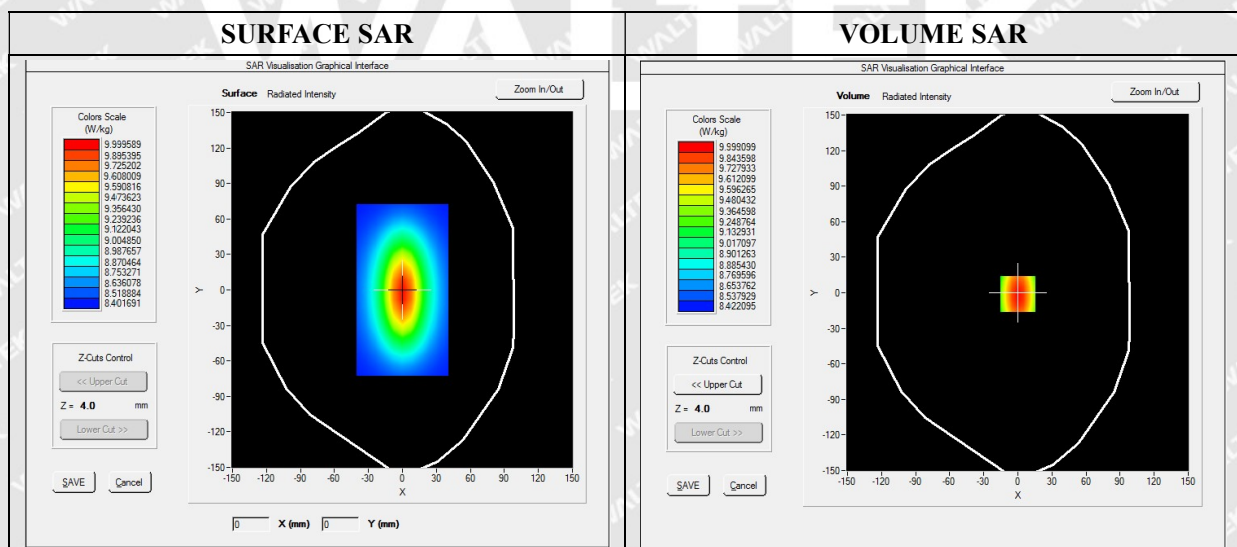
E-field Probe: SN 45/15 EPGO280; ConvF: 5.64; Calibrated: 2020-07-03

A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Validation plane
Device Position	Dipole
Band	CW2450
Signal	CW (Crest factor: 1.0)

B. SAR Measurement Results

Frequency (MHz)	2450.000000
Relative Permittivity (real part)	51.170383
Conductivity (S/m)	1.931039
Power Variation (%)	0.963737
Ambient Temperature	22.0
Liquid Temperature	22.3



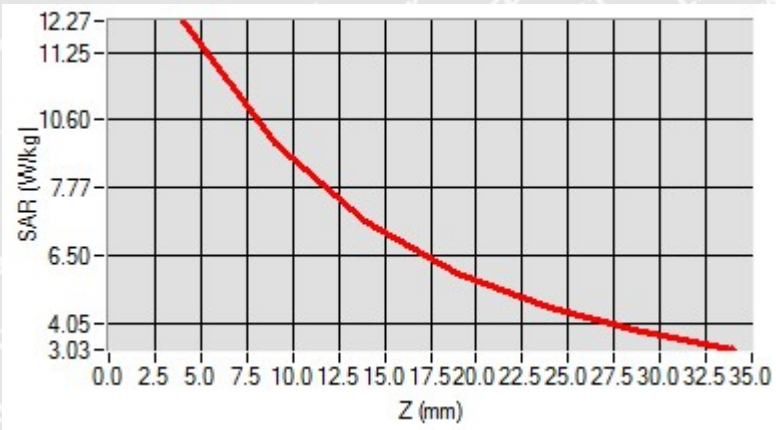


Maximum location: X=0.00, Y=0.00

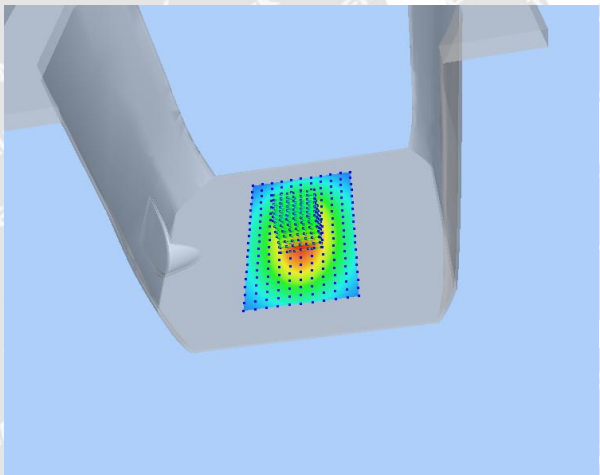
SAR 10g (W/Kg)	6.124252
SAR 1g (W/Kg)	12.870381

Z Axis Scan

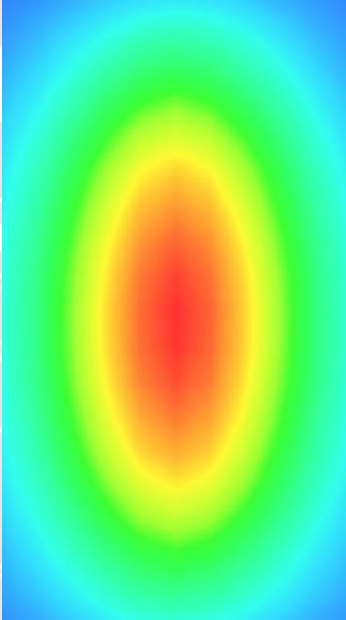
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	12.14333	10.3644	8.4587	6.4358	5.6134	3.5723



3D screen shot



Hot spot position





MEASUREMENT 7

Type: Validation measurement (Fast, 75.00 %)

Measurement duration: 12 minutes 21 seconds

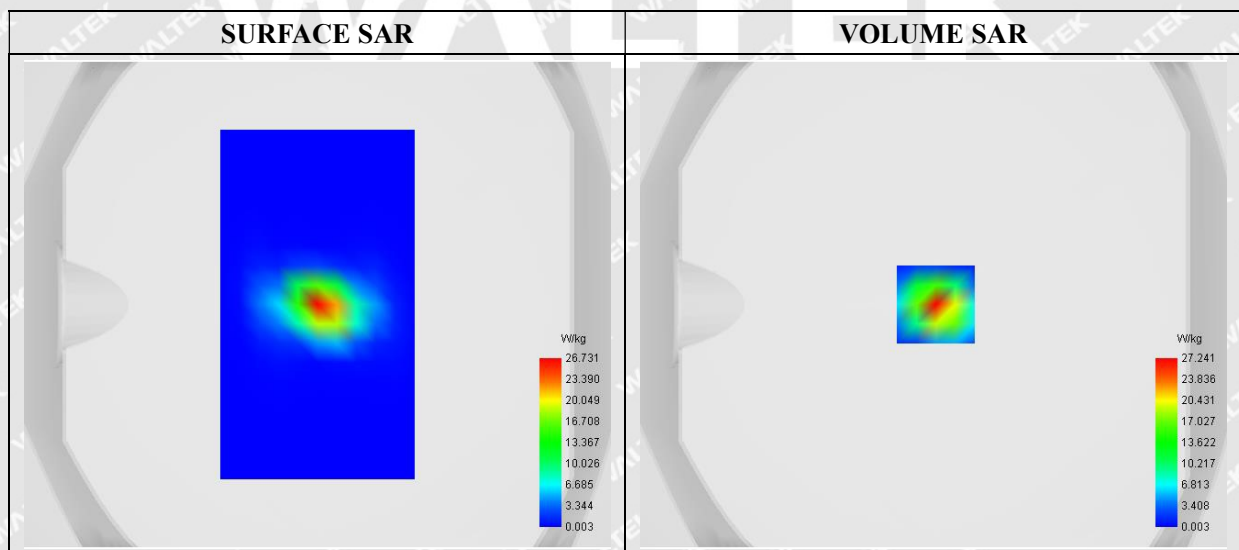
E-field Probe: SN 45/15 EPGO280; ConvF: 5.64; Calibrated: 2020-07-03

A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Validation plane
Device Position	Dipole
Band	CW5200
Signal	CW (Crest factor: 1.0)

B. SAR Measurement Results

Frequency (MHz)	5200.000000
Relative Permittivity (real part)	47.612911
Conductivity (S/m)	5.421483
Power Variation (%)	0.943782
Ambient Temperature	22.0
Liquid Temperature	22.3

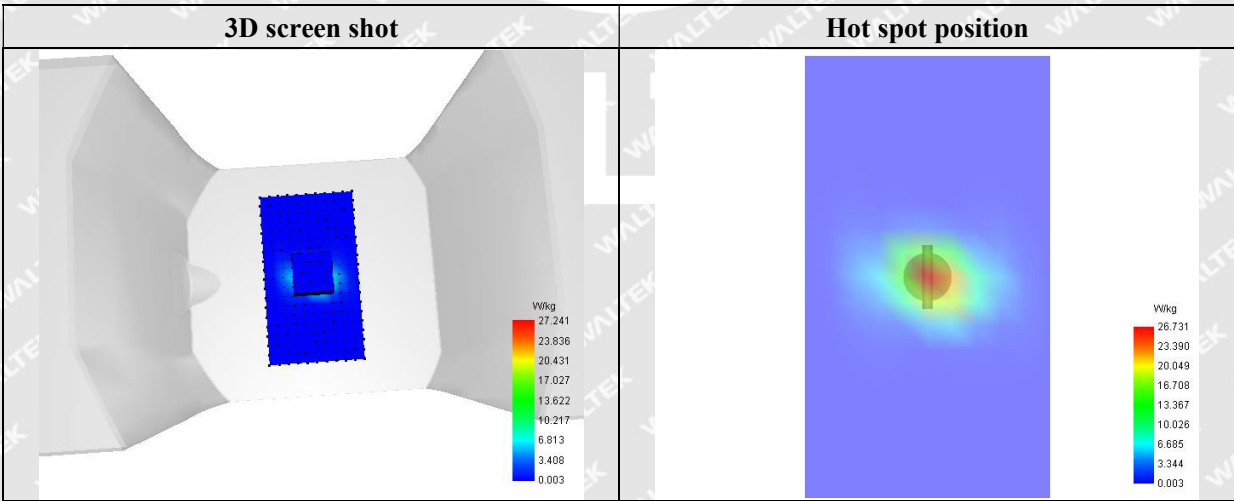
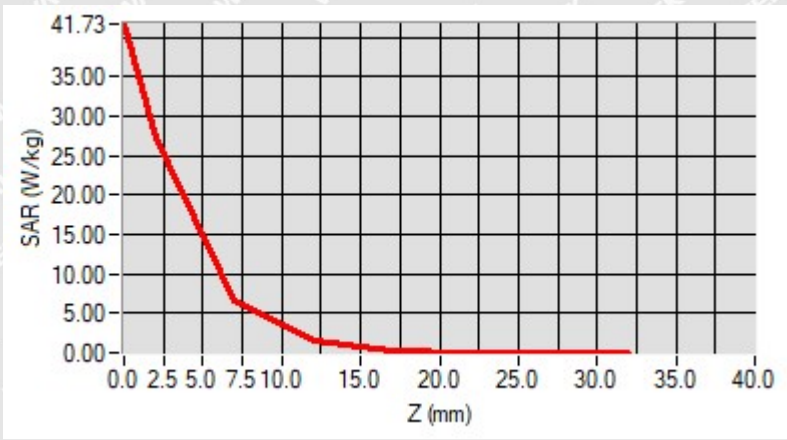




Maximum location: X=1.00, Y=0.00

SAR 10g (W/Kg)	5.810334
SAR 1g (W/Kg)	16.546226

Z (mm)	0.00	2.00	7.00	12.00	17.00	22.00	27.00
SAR (W/Kg)	41.7264	27.2408	6.5746	1.6234	0.3765	0.0793	0.0129





MEASUREMENT 8

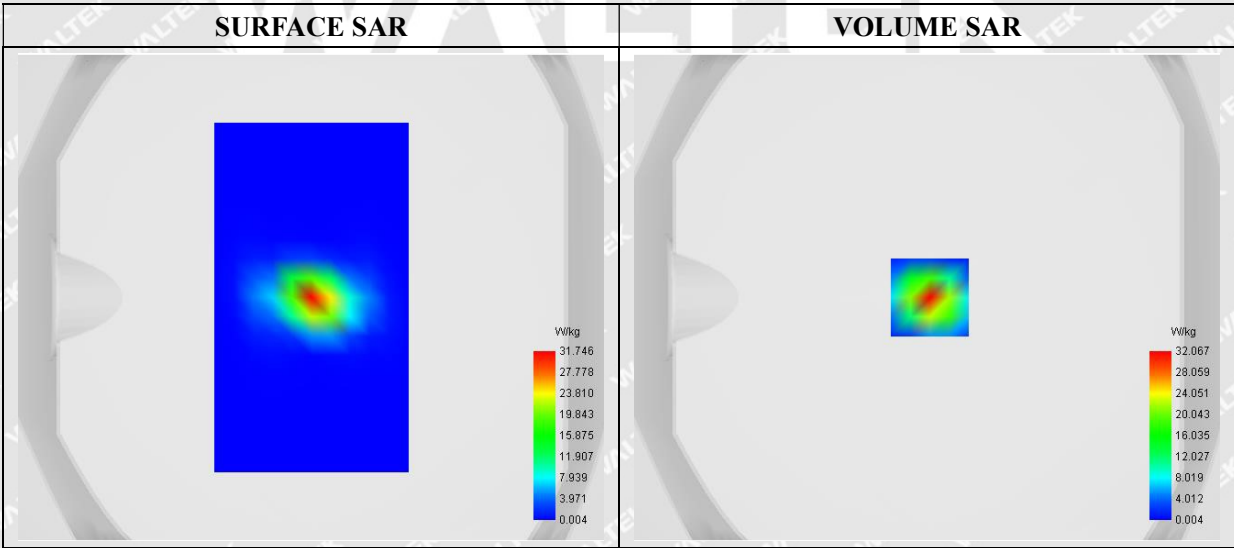
Type: Validation measurement (Fast, 75.00 %)
Measurement duration: 12 minutes 21 seconds
E-field Probe: SN 45/15 EPGO280; ConvF: 5.64; Calibrated: 2020-07-03

A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Validation plane
Device Position	Dipole
Band	CW5400
Signal	CW (Crest factor: 1.0)

B. SAR Measurement Results

Frequency (MHz)	5400.000000
Relative Permittivity (real part)	47.020839
Conductivity (S/m)	5.540192
Power Variation (%)	1.028731
Ambient Temperature	22.0
Liquid Temperature	22.3

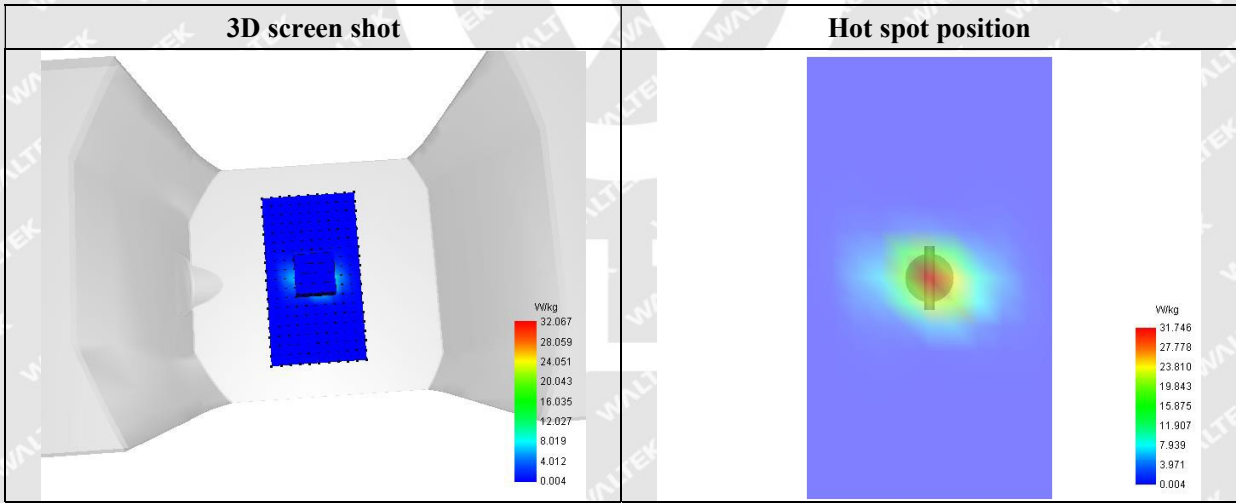
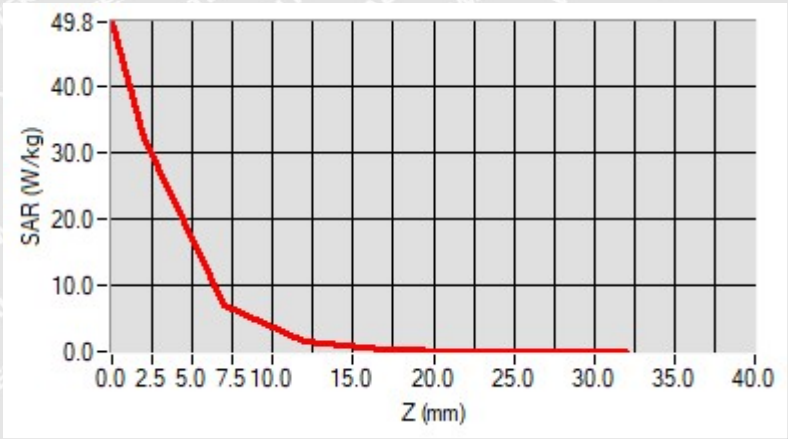




Maximum location: X=1.00, Y=0.00

SAR 10g (W/Kg)	5.947588
SAR 1g (W/Kg)	17.281175

Z (mm)	0.00	2.00	7.00	12.00	17.00	22.00	27.00
SAR (W/Kg)	49.8193	32.0669	7.0244	1.5969	0.3410	0.0635	0.0070





MEASUREMENT 9

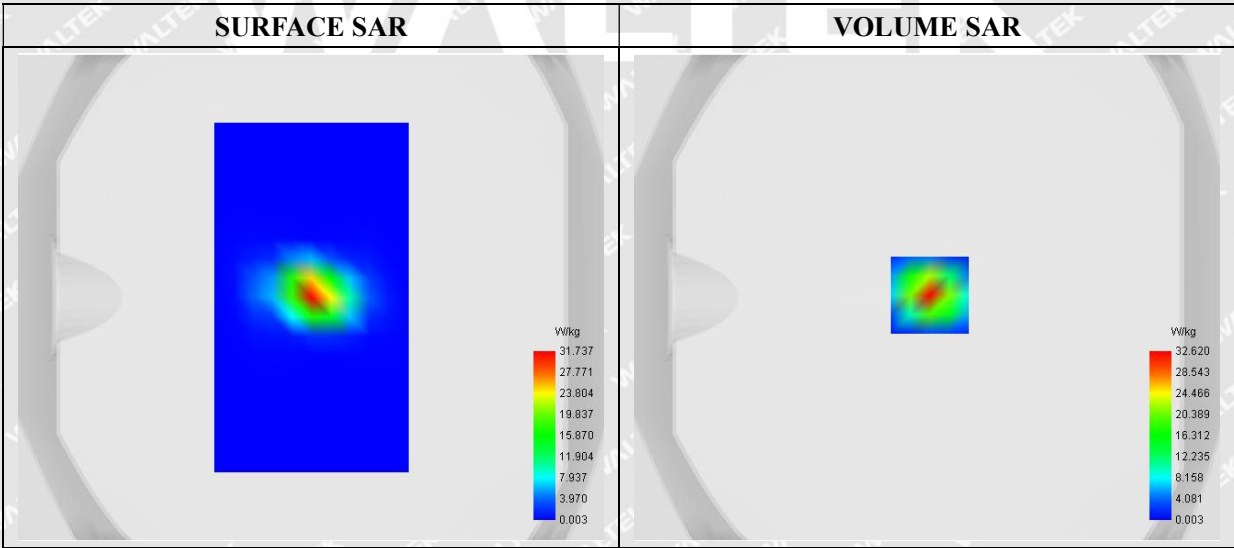
Type: Validation measurement (Fast, 75.00 %)
Measurement duration: 12 minutes 21 seconds
E-field Probe: SN 45/15 EPGO280; ConvF: 5.64; Calibrated: 2020-07-03

A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Validation plane
Device Position	Dipole
Band	CW5600
Signal	CW (Crest factor: 1.0)

B. SAR Measurement Results

Frequency (MHz)	5600.000000
Relative Permittivity (real part)	46.501254
Conductivity (S/m)	5.810512
Power Variation (%)	1.643281
Ambient Temperature	22.0
Liquid Temperature	22.3

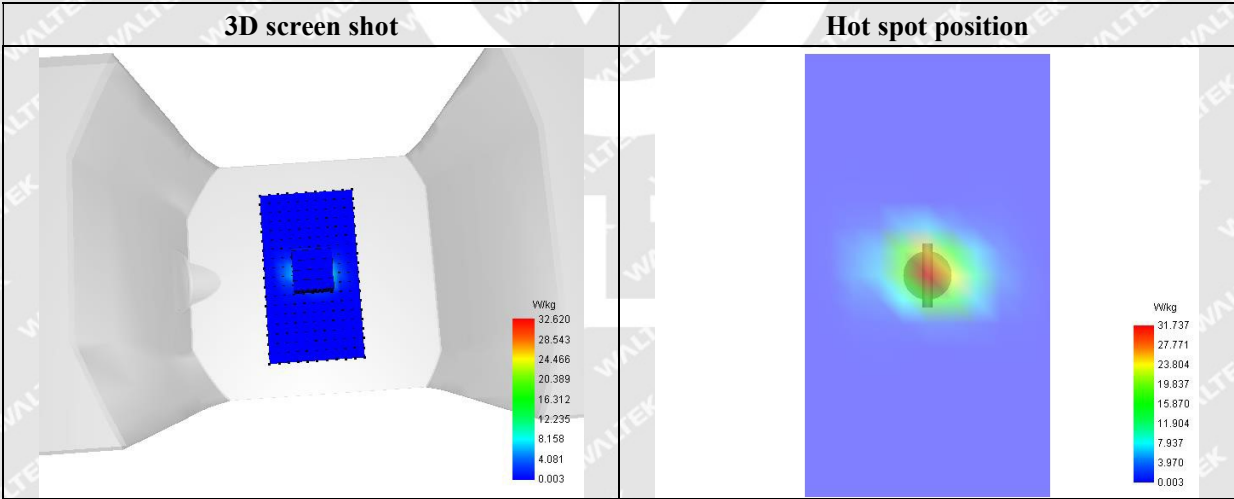
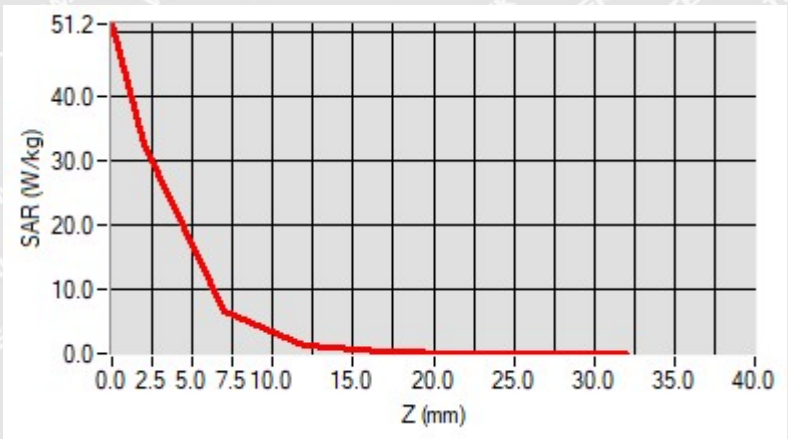




Maximum location: X=1.00, Y=1.00

SAR 10g (W/Kg)	5.922791
SAR 1g (W/Kg)	17.604052

Z (mm)	0.00	2.00	7.00	12.00	17.00	22.00	27.00
SAR (W/Kg)	51.2061	32.6198	6.6166	1.3486	0.2638	0.0509	0.0050





MEASUREMENT 10

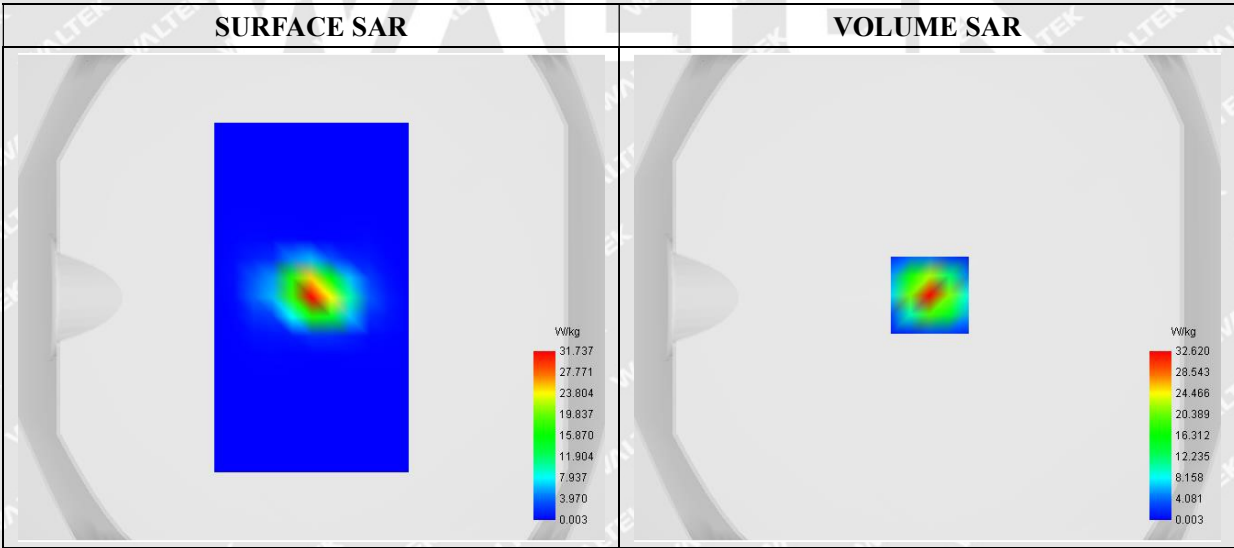
Type: Validation measurement (Fast, 75.00 %)
Measurement duration: 12 minutes 21 seconds
E-field Probe: SN 45/15 EPGO280; ConvF: 5.64; Calibrated: 2020-07-03

A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Validation plane
Device Position	Dipole
Band	CW5800
Signal	CW (Crest factor: 1.0)

B. SAR Measurement Results

Frequency (MHz)	5800.000000
Relative Permittivity (real part)	46.151254
Conductivity (S/m)	5.915012
Power Variation (%)	1.643281
Ambient Temperature	22.0
Liquid Temperature	22.3

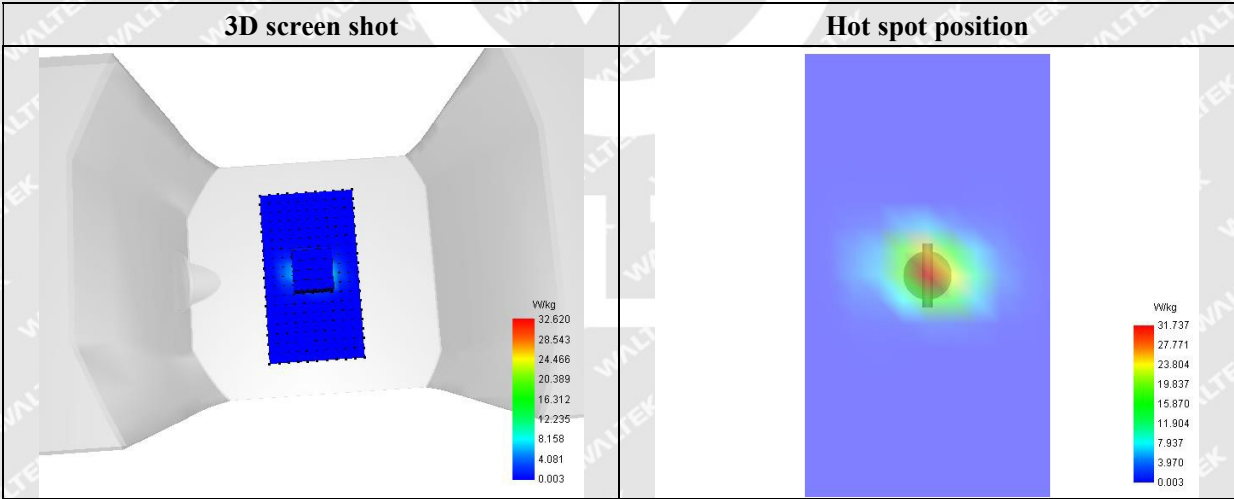
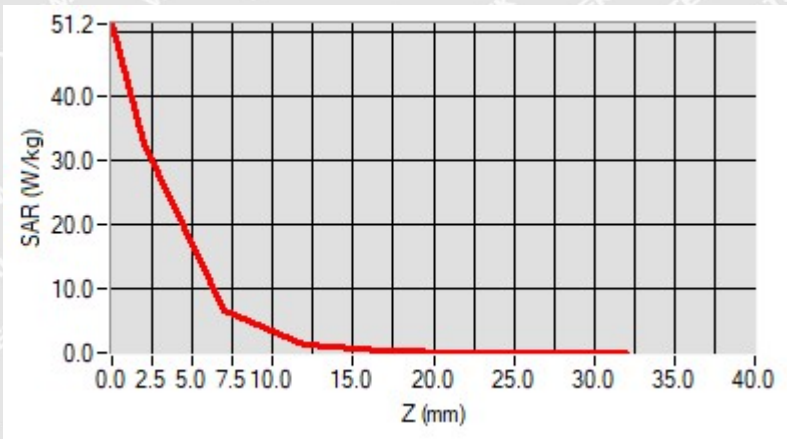




Maximum location: X=1.00, Y=1.00

SAR 10g (W/Kg)	6.221791
SAR 1g (W/Kg)	18.207052

Z (mm)	0.00	2.00	7.00	12.00	17.00	22.00	27.00
SAR (W/Kg)	51.2061	32.6198	6.6166	1.3486	0.2638	0.0509	0.0050





Annex B. Plots of SAR Measurement

<u>TYPE</u>	<u>BAND</u>	<u>PARAMETERS</u>
Notebook	WiFi(2.4G)_11b	Measurement 2: Flat Plane with Front side device position on Middle Channel in 802.11b mode
Notebook	WiFi(2.4G)_11g	Measurement 6: Flat Plane with Front side device position on Middle Channel in 802.11g mode
Notebook	Bluetooth	Measurement 9: Flat Plane with Back side device position on High Channel in GFSK mode
Notebook	WiFi(5.2G)_11 n (HT20)	Measurement 13: Flat Plane with Front side device position on Middle Channel in 802.11n mode
Notebook	WiFi(5.3G)_11n (HT20)	Measurement 17: Flat Plane with Front side device position on Low Channel in 802.11n mode
Notebook	WiFi(5.6G)_11a	Measurement 20: Flat Plane with Front side device position on Middle Channel in 802.11a mode
Notebook	WiFi(5.8G)_11 n (HT40)	Measurement 23: Flat Plane with Front side device position on High Channel in 802.11n mode
Remark: SAR plot is showed the highest measured SAR in each exposure configuration, wireless mode and frequency band combination.		

WALTEK



MEASUREMENT 2

Type: Phone measurement (Complete)

Date of measurement: 2020-09-09

Measurement duration: 12 minutes 3 seconds

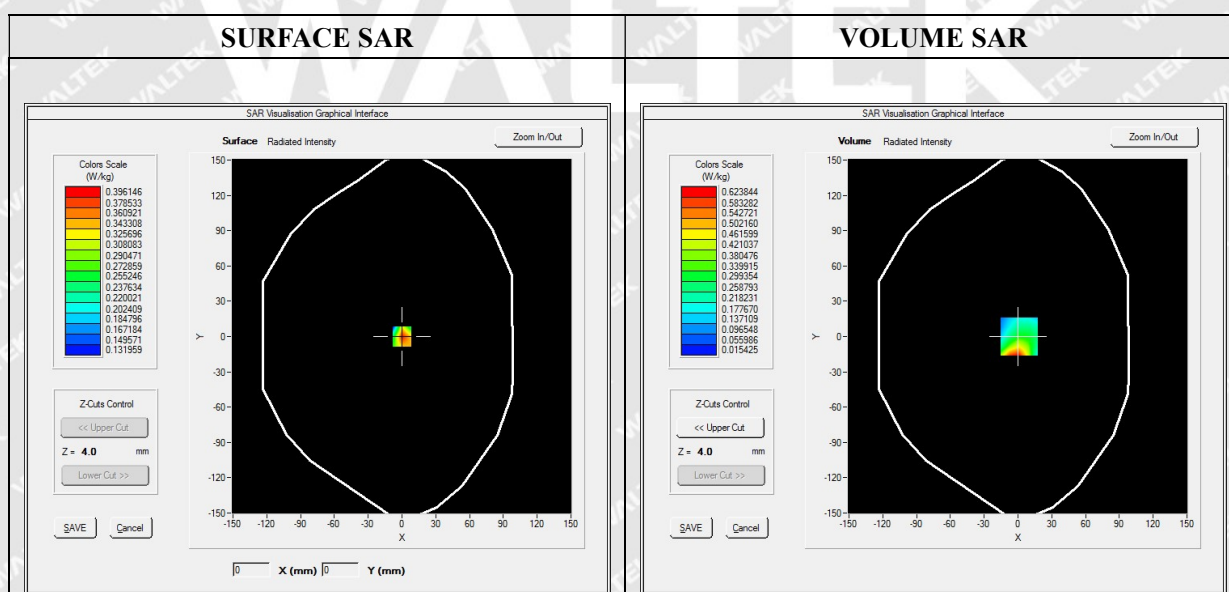
E-field Probe: SN 45/15 EPGO280; ConvF: 5.64; Calibrated: 2020-07-03

A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Flat Plane
Device Position	Front
Band	WiFi_802.11b
Channels	Middle
Signal	Duty Cycle 1:1

B. SAR Measurement Results

Frequency (MHz)	2437.000000
Relative Permittivity (real part)	52.010212
Conductivity (S/m)	1.910255
Power Variation (%)	2.403721
Ambient Temperature	21.1
Liquid Temperature	21.2

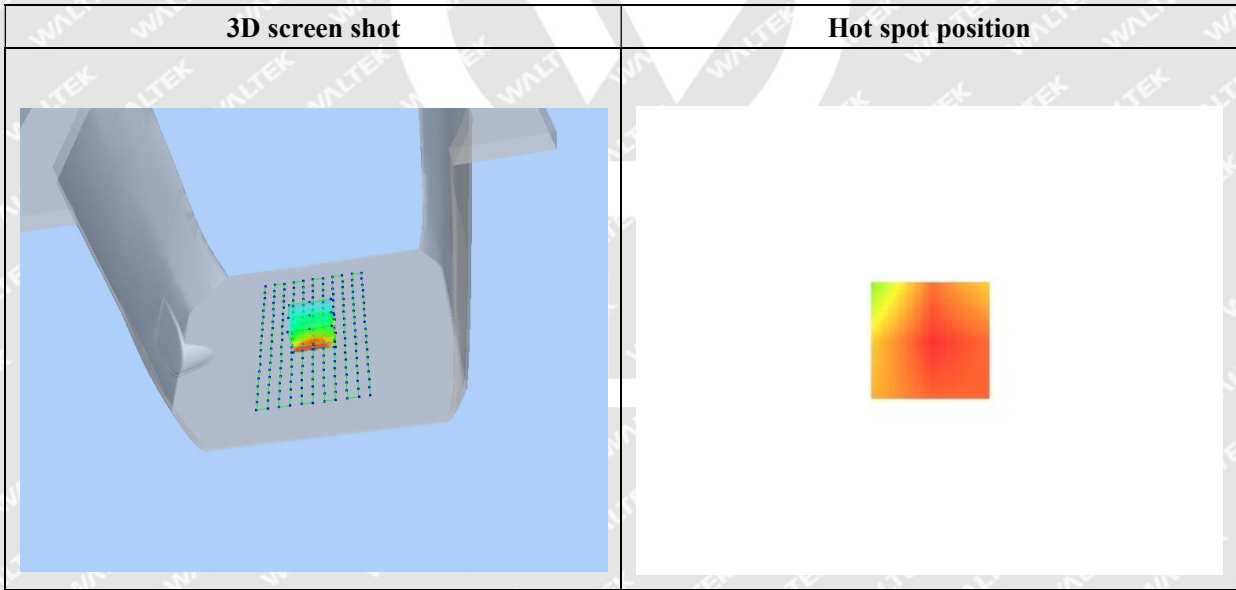
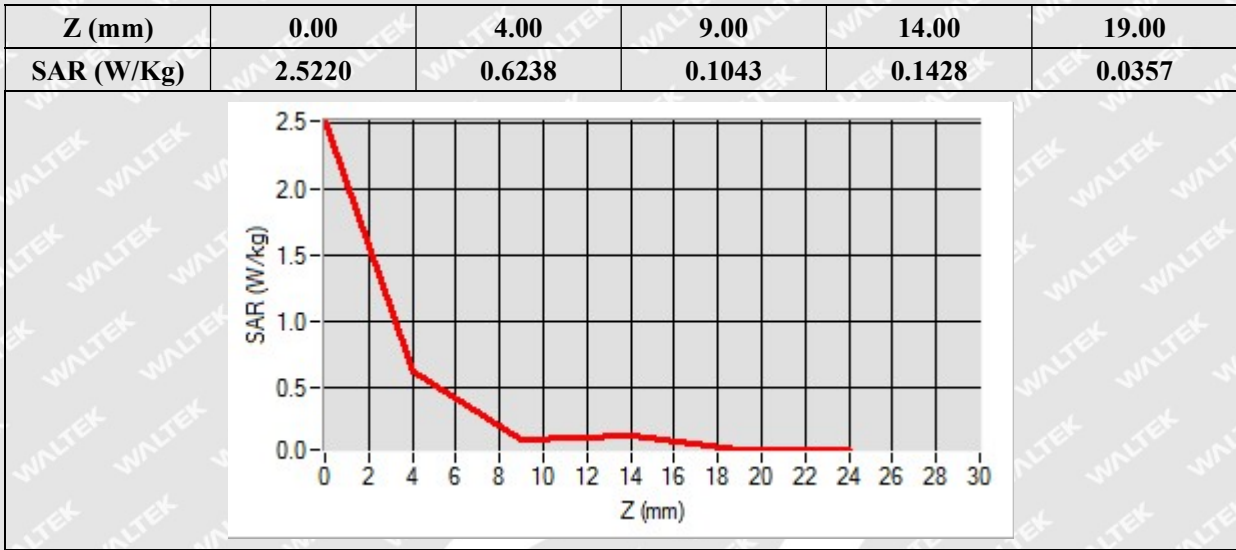


Maximum location: X=1.00, Y=0.00



SAR Peak: 1.10 W/kg

SAR 10g (W/Kg)	0.228089
SAR 1g (W/Kg)	0.492923





MEASUREMENT 6

Type: Phone measurement (Complete)

Date of measurement: 2020-09-09

Measurement duration: 12 minutes 3 seconds

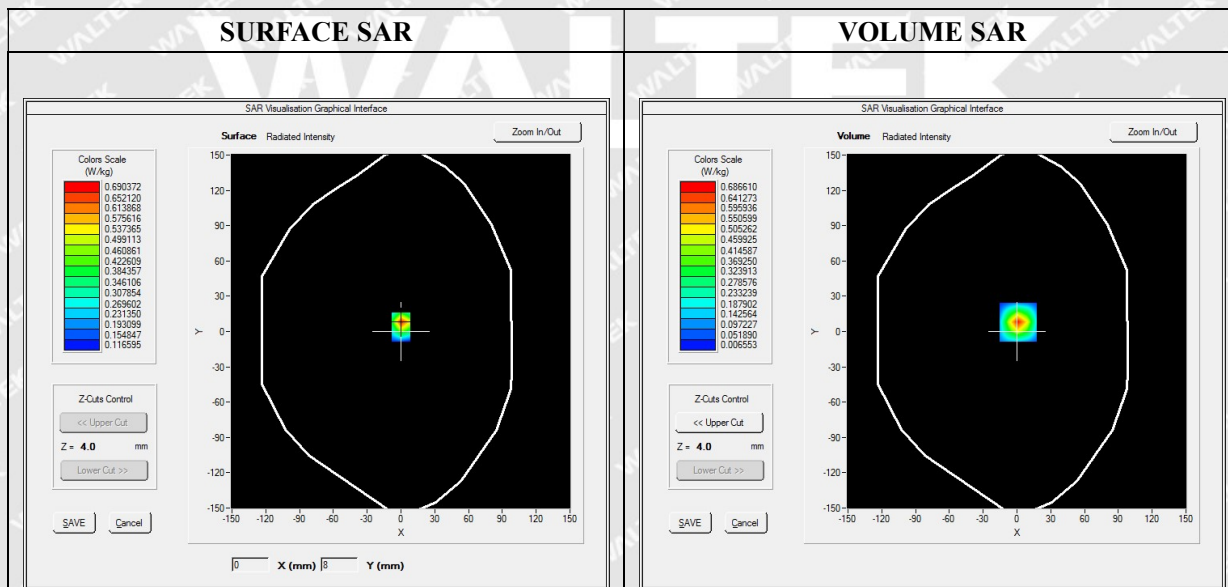
E-field Probe: SN 45/15 EPGO280; ConvF: 5.64; Calibrated: 2020-07-03

A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Flat Plane
Device Position	Front
Band	WiFi_802.11g
Channels	Middle
Signal	Duty Cycle 1:1

B. SAR Measurement Results

Frequency (MHz)	2437.000000
Relative Permittivity (real part)	52.010212
Conductivity (S/m)	1.910255
Power Variation (%)	2.403721
Ambient Temperature	21.1
Liquid Temperature	21.2

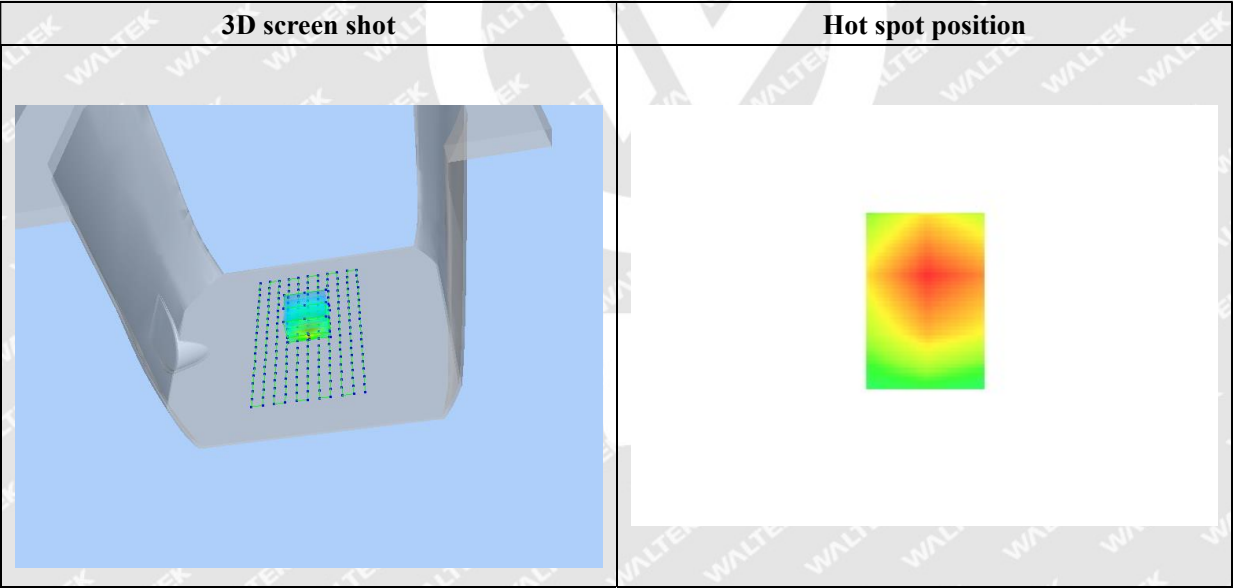
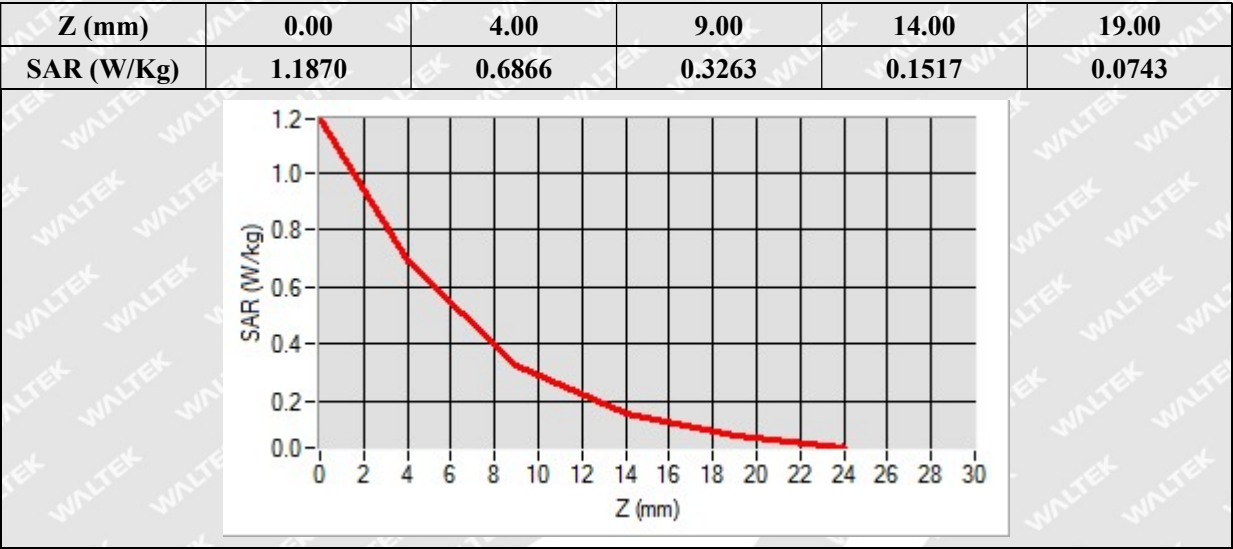


Maximum location: X=1.00, Y=8.00

SAR Peak: 1.18 W/kg



SAR 10g (W/Kg)	0.257637
SAR 1g (W/Kg)	0.609216





MEASUREMENT 10

Type: Tablet measurement (Complete)

Date of measurement: 2020-09-09

Measurement duration: 12 minutes 3 seconds

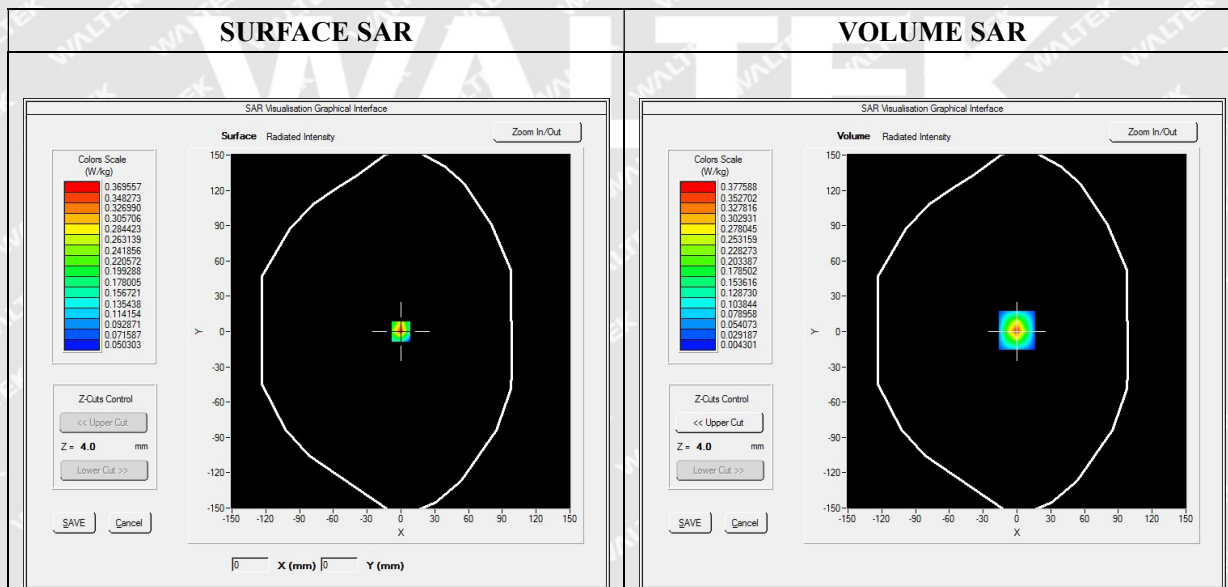
E-field Probe: SSE2 - SN 45/15 EPGO280; ConvF: Refer to the Calibration Certificate; Calibrated: 2020-07-03

A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=8mm dy=8mm dz=5mm
Phantom	Flat Plane
Device Position	Front
Band	GFSK
Channels	High
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	2480.000000
Relative Permittivity (real part)	52.710383
Conductivity (S/m)	1.931039
Power Variation (%)	0.908877
Ambient Temperature	21.1
Liquid Temperature	21.2

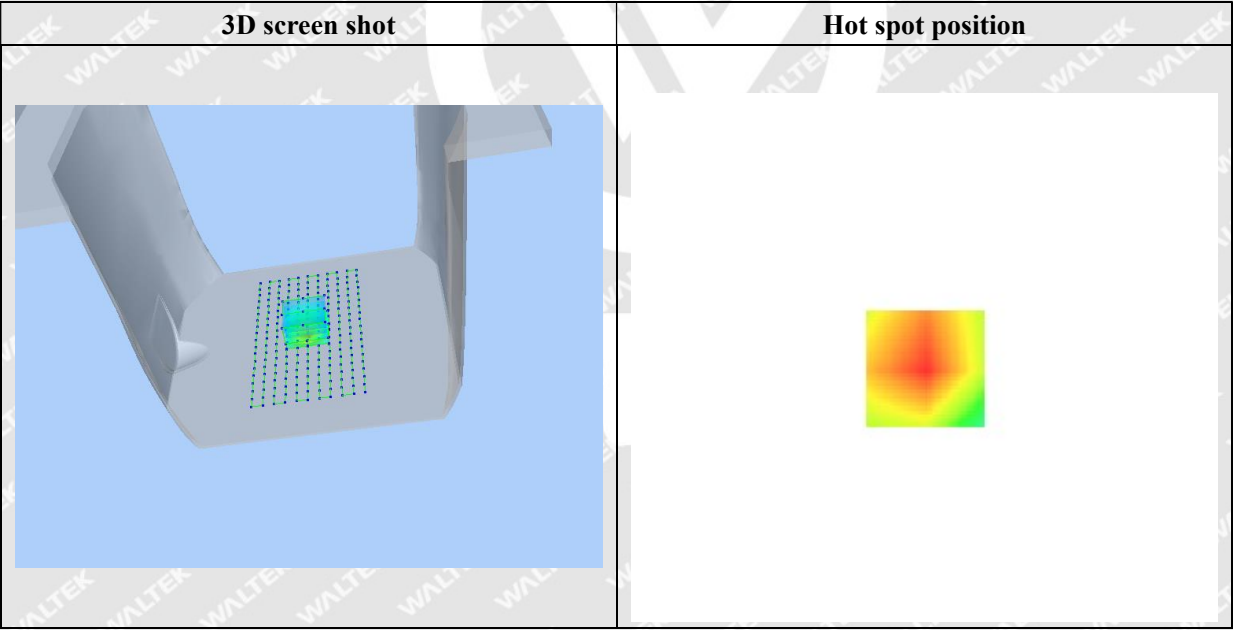
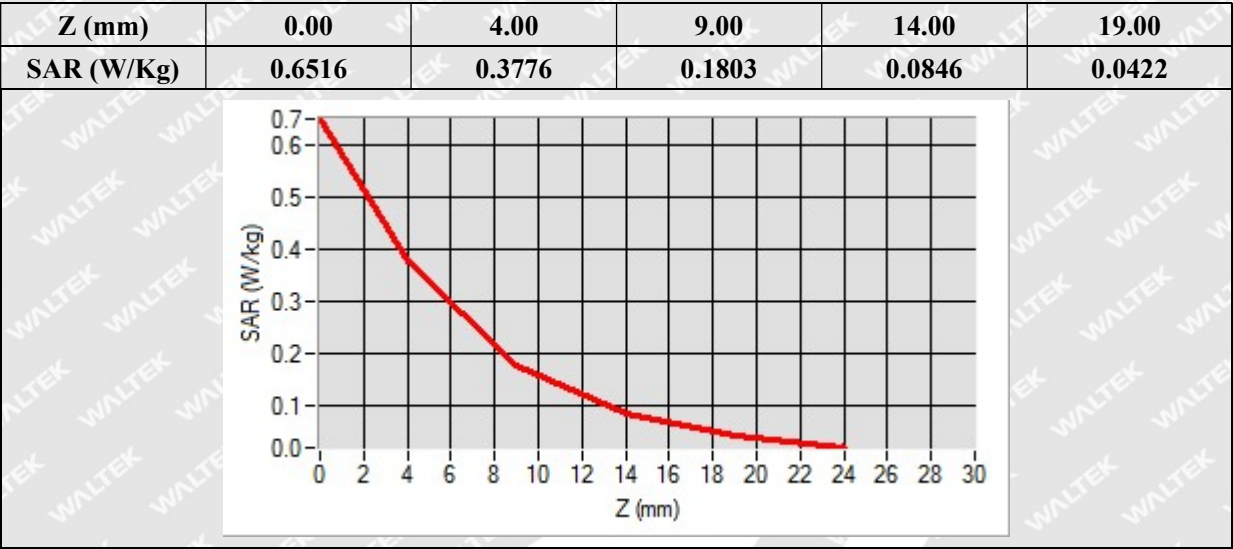


Maximum location: X=0.00, Y=1.00

SAR Peak: 0.65 W/kg



SAR 10g (W/Kg)	0.137828
SAR 1g (W/Kg)	0.332185





MEASUREMENT 13

Type: Phone measurement (Complete)

Date of measurement: 2020-09-11

Measurement duration: 12 minutes 3 seconds

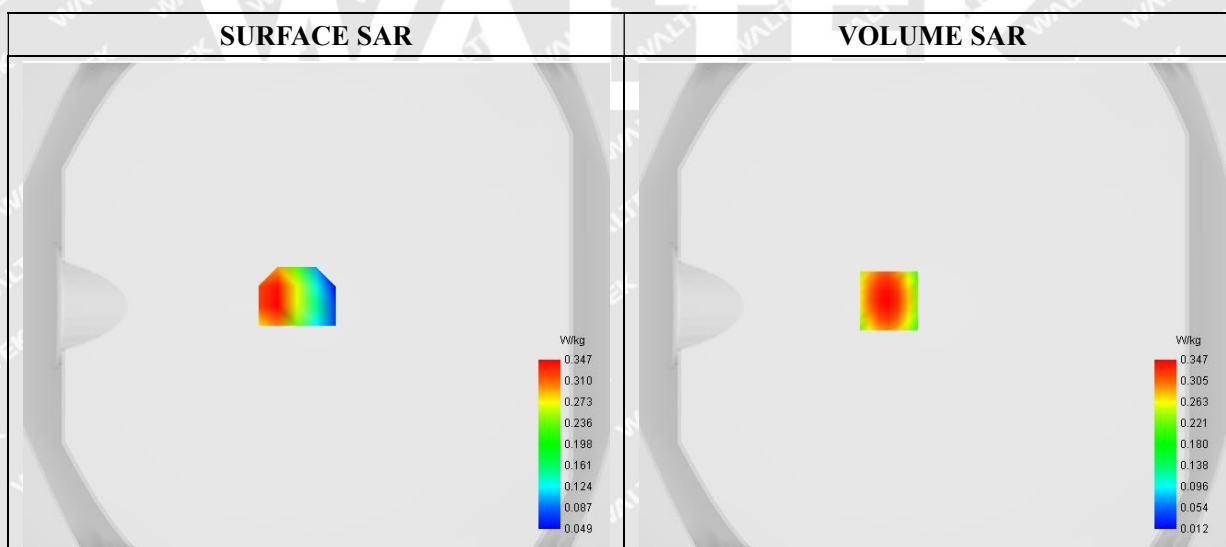
E-field Probe: SN 45/15 EPG0280; ConvF: 5.64; Calibrated: 2020-07-03

A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Flat Plane
Device Position	Front
Band	WiFi(5.2GHz)_802.11 n (HT20)
Channels	Middle
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5200.000000
Relative Permittivity (real part)	48.501241
Conductivity (S/m)	5.160213
Power Variation (%)	0.542660
Ambient Temperature	21.0
Liquid Temperature	21.3

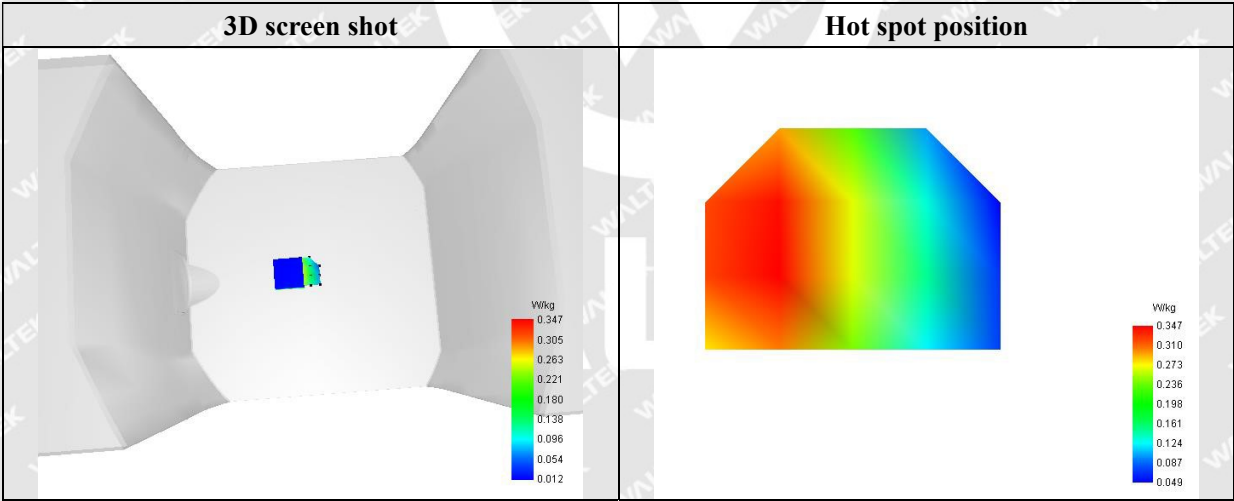
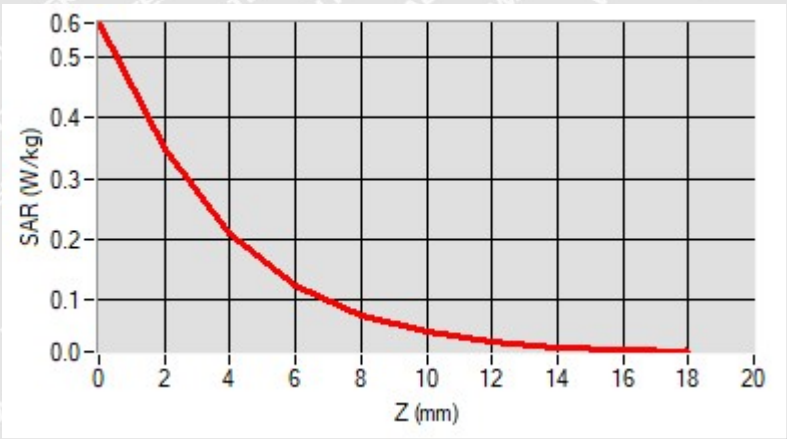


Maximum location: X=-18.00, Y=2.00



SAR 10g (W/Kg)	0.100370
SAR 1g (W/Kg)	0.231013

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00
SAR (W/Kg)	0.5566	0.3472	0.2092	0.1230	0.0734	0.0455	0.0301	0.0217	0.0169





MEASUREMENT 17

Type: Phone measurement (Complete)

Date of measurement: 2020-09-11

Measurement duration: 12 minutes 3 seconds

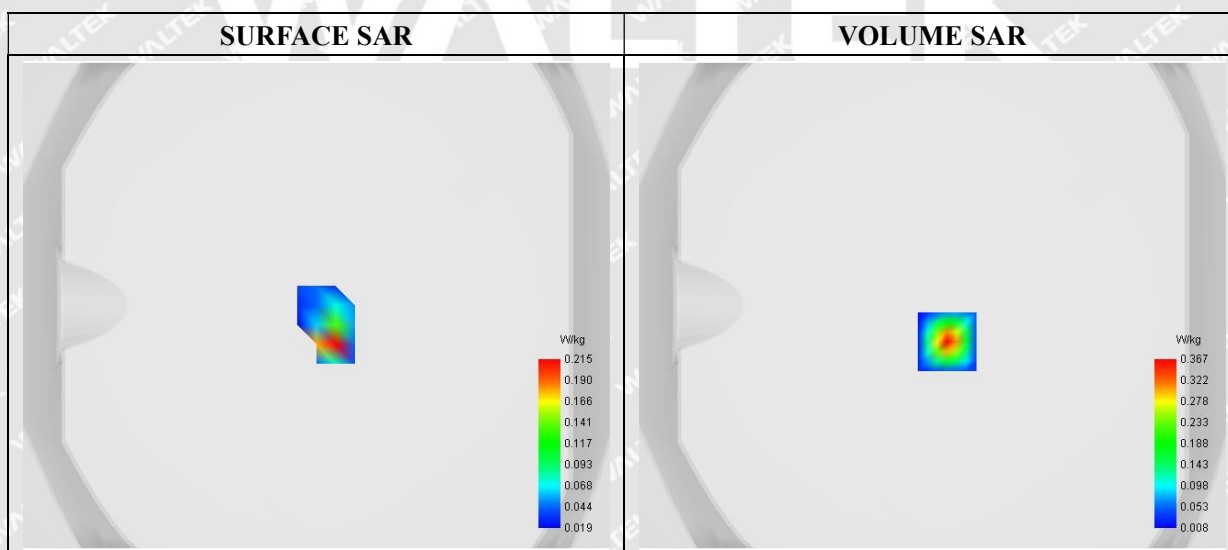
E-field Probe: SN 45/15 EPGO280; ConvF: 5.64; Calibrated: 2020-07-03

A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Flat Plane
Device Position	Front
Band	WiFi(5.3GHz)_802.11 n (HT20)
Channels	Low
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5260.000000
Relative Permittivity (real part)	48.420839
Conductivity (S/m)	5.190192
Power Variation (%)	0.463782
Ambient Temperature	21.0
Liquid Temperature	21.3

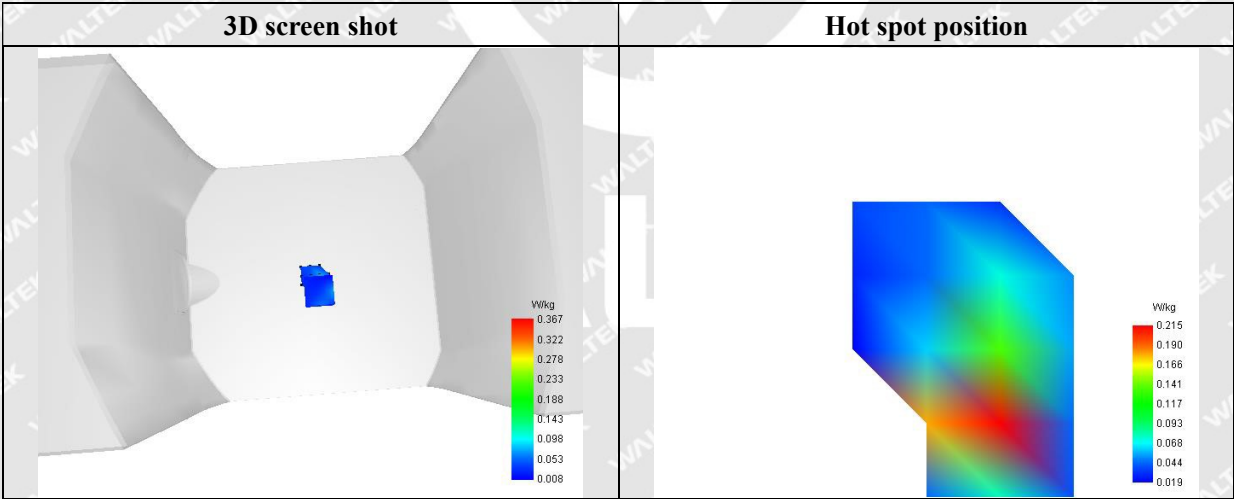
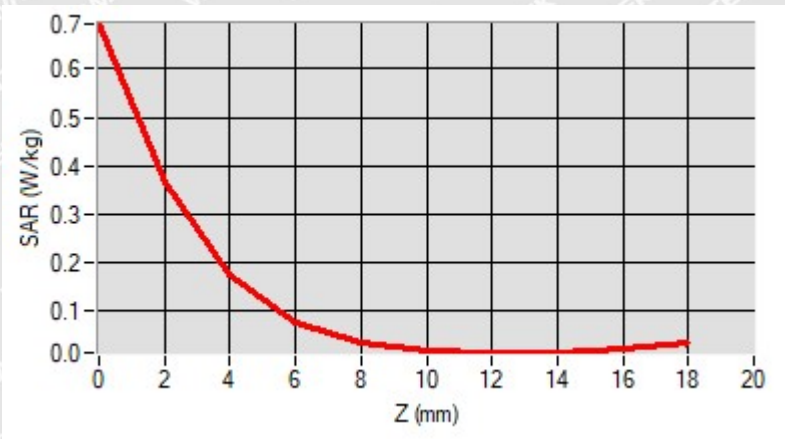




Maximum location: X=6.00, Y=-15.00

SAR 10g (W/Kg)	0.063436
SAR 1g (W/Kg)	0.195751

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00
SAR (W/Kg)	0.6933	0.3673	0.1733	0.0750	0.0329	0.0171	0.0129	0.0147	0.0213





MEASUREMENT 20

Type: Phone measurement (Complete)

Date of measurement: 2020-09-11

Measurement duration: 12 minutes 3 seconds

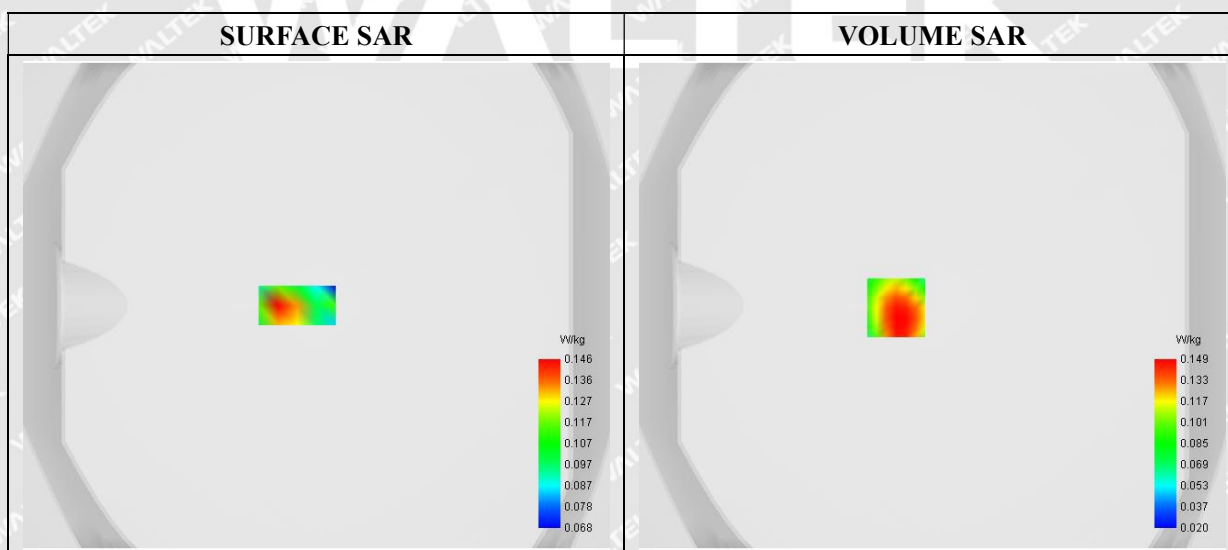
E-field Probe: SN 45/15 EPGO280; ConvF: 5.64; Calibrated: 2020-07-03

A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Flat Plane
Device Position	Front
Band	WiFi(5.6GHz)_802.11a
Channels	Middle
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5600.000000
Relative Permittivity (real part)	48.302143
Conductivity (S/m)	5.521688
Power Variation (%)	0.848732
Ambient Temperature	21.0
Liquid Temperature	21.3

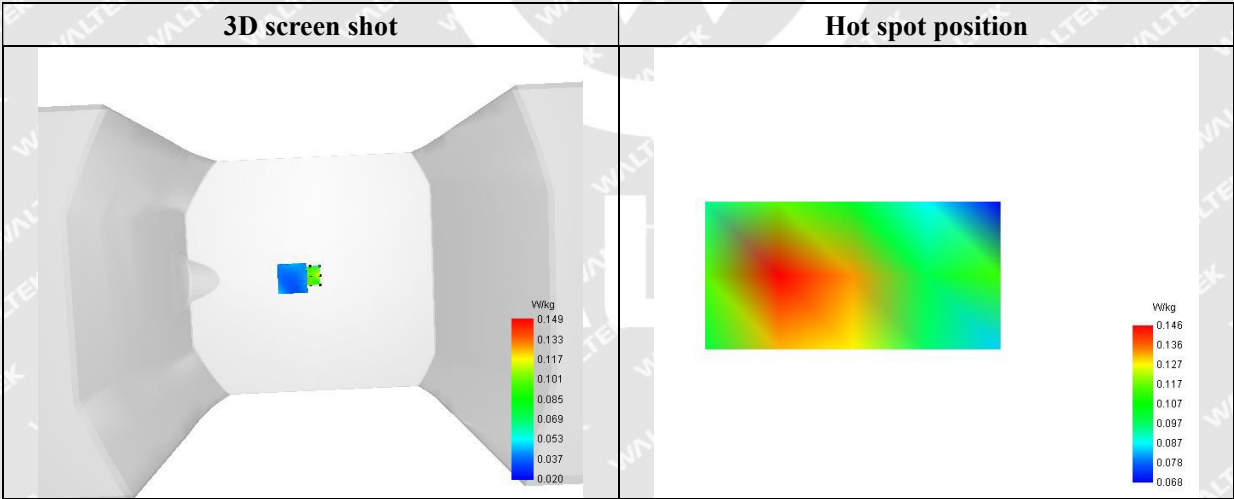
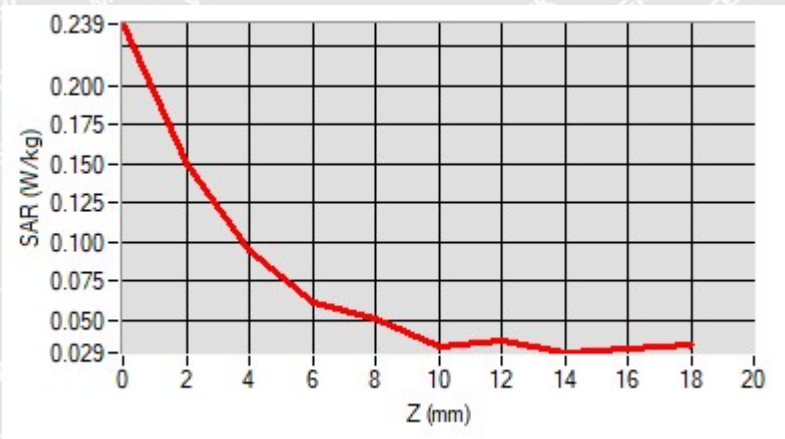




Maximum location: X=-15.00, Y=-1.00

SAR 10g (W/Kg)	0.064039
SAR 1g (W/Kg)	0.107964

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00
SAR (W/Kg)	0.2393	0.1492	0.0944	0.0608	0.0505	0.0330	0.0369	0.0289	0.0309





MEASUREMENT 23

Type: Phone measurement (Complete)

Date of measurement: 2020-09-11

Measurement duration: 12 minutes 3 seconds

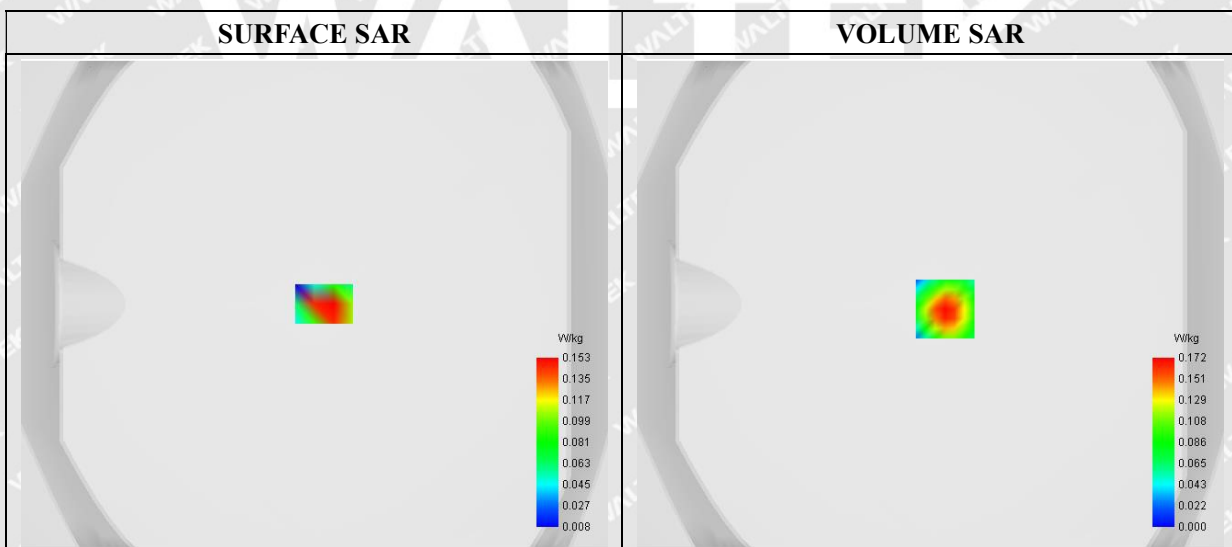
E-field Probe: SN 45/15 EPG0280; ConvF: 5.64; Calibrated: 2020-07-03

A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Flat Plane
Device Position	Front
Band	WiFi(5.8GHz)_802.11 n (HT40)
Channels	High
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5795.000000
Relative Permittivity (real part)	48.501939
Conductivity (S/m)	5.761487
Power Variation (%)	1.210512
Ambient Temperature	21.0
Liquid Temperature	21.3

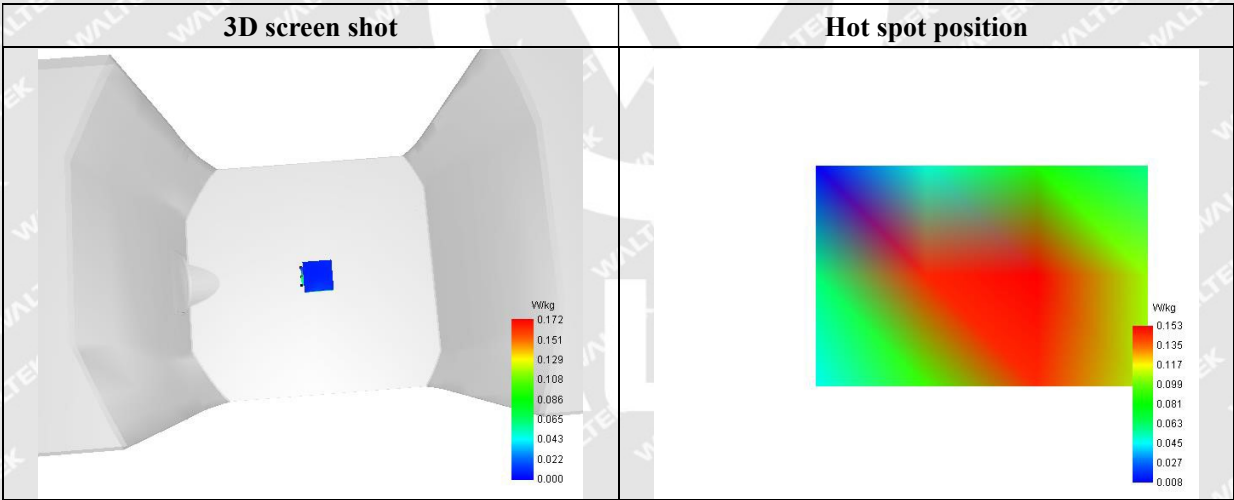


Maximum location: X=6.00, Y=-2.00



SAR 10g (W/Kg)	0.034437
SAR 1g (W/Kg)	0.097752

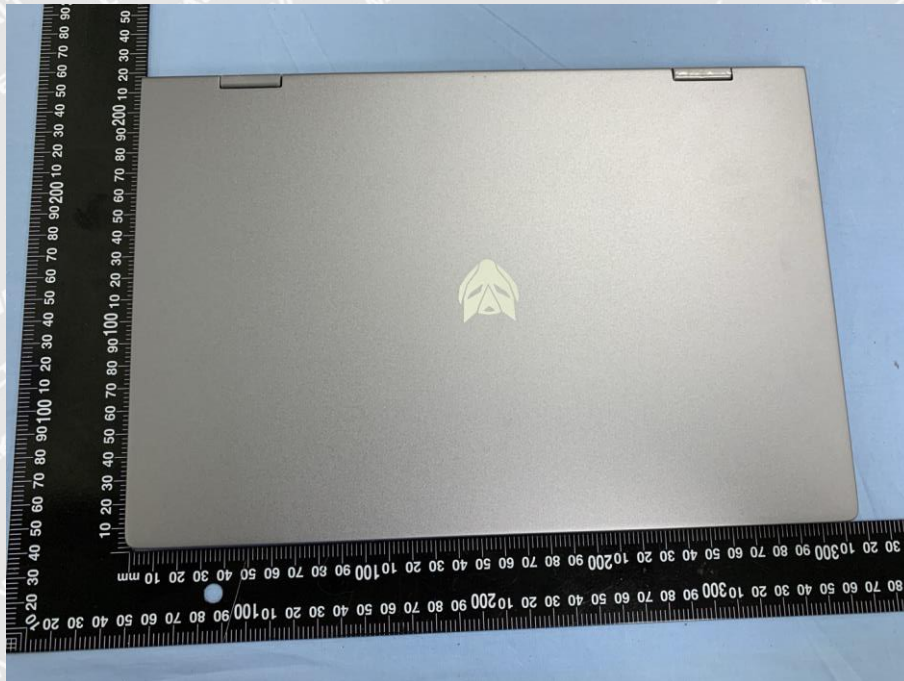
Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00
SAR (W/Kg)	0.3044	0.1713	0.0898	0.0444	0.0272	0.0076	0.0162	0.0060	0.0074



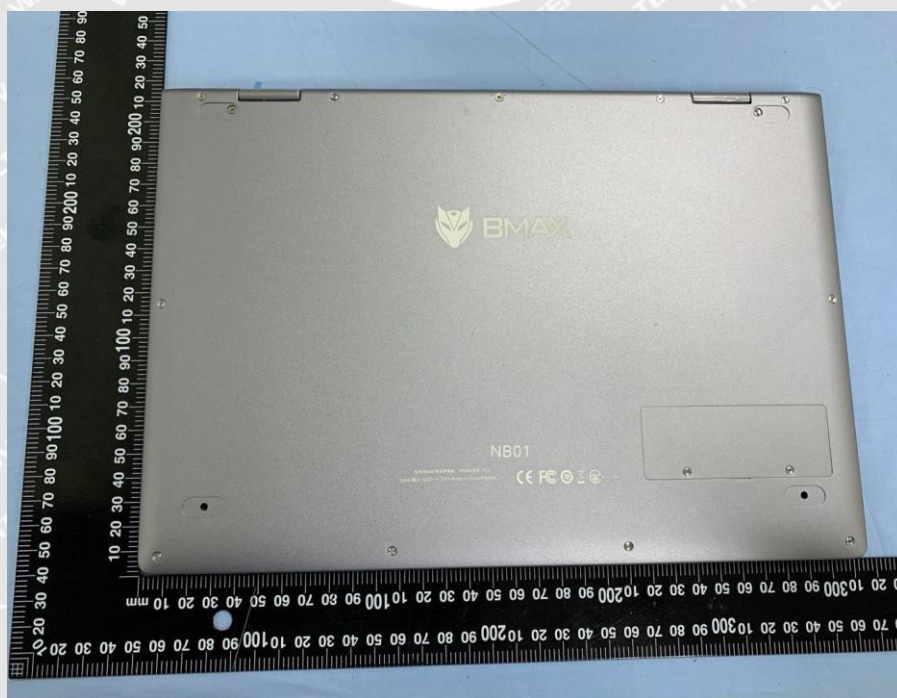


Annex C. EUT Photos

EUT View_1

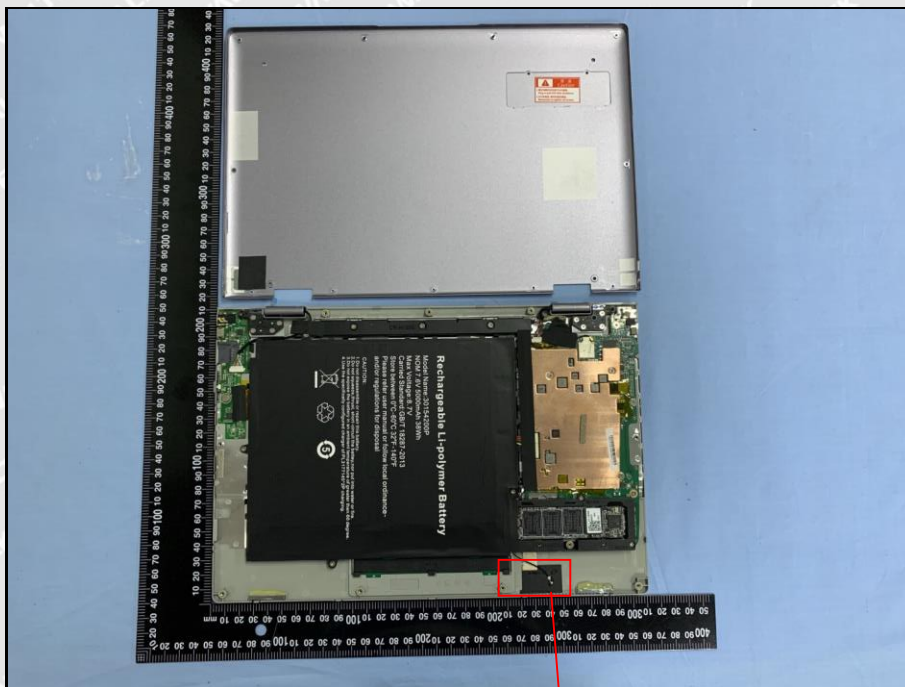


EUT View_2





Antenna View



Wi-Fi/BT Antenna

WALTEK

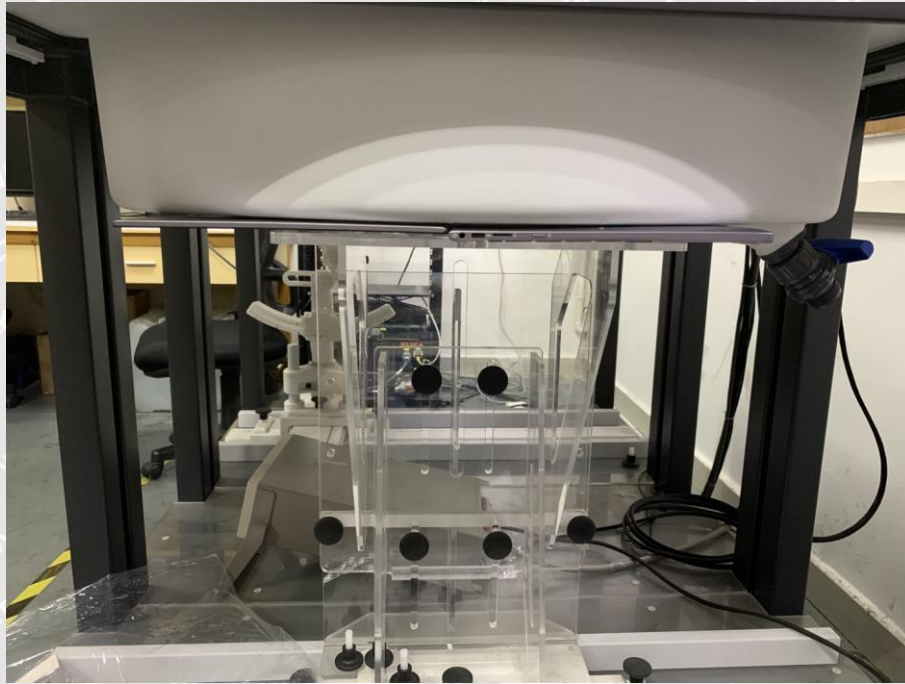


Annex D. Test Setup Photos

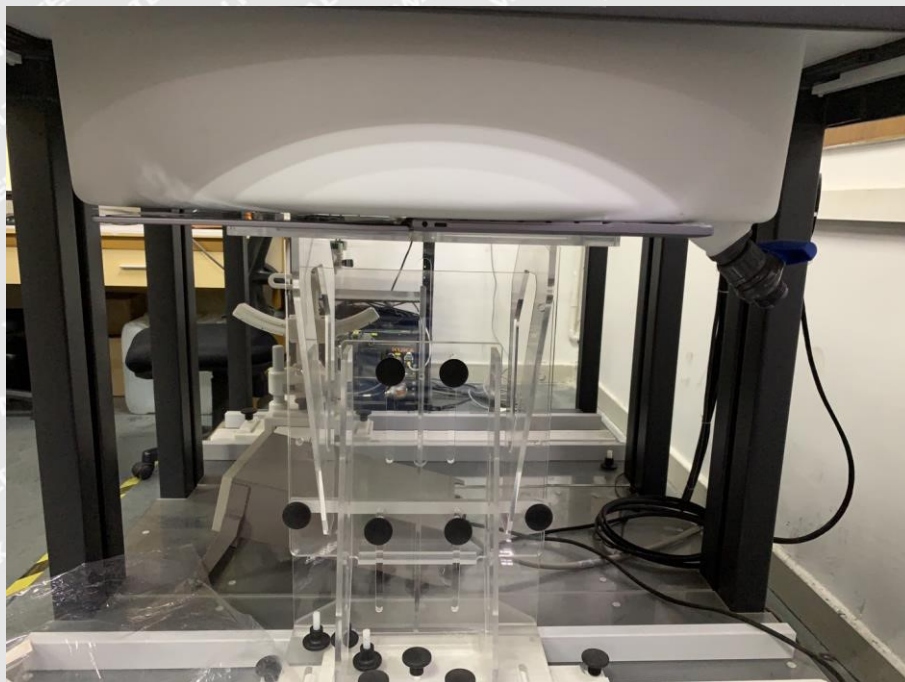
Body mode Exposure Conditions

Test View

Body Back



Body Front





Body Left



Body Bottom





Annex E. Calibration Certificate

Please refer to the exhibit for the calibration certificate



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

WALTEK