



# FCC SAR TEST REPORT

Report No.: STS2101023H01

Issued for

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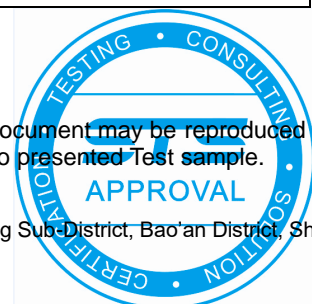
<b>Product Name:</b>	Tablet PC
<b>Brand Name:</b>	HAOVM
<b>Model Name:</b>	MediaPad P9
<b>Series Model:</b>	N/A
<b>FCC ID:</b>	2ASQ8-P9
<b>Test Standard:</b>	ANSI/IEEE Std. C95.1
	FCC 47 CFR Part 2 ( 2.1093)
	IEEE 1528: 2013
<b>Max. Report SAR (1g):</b>	Body: 0.641 W/kg

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### Test Report Certification

**Applicant's name** .....: Shenzhen Mediafly Technology CO.,LTD  
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**Manufacture's Name** .....: Shenzhen Mediafly Technology CO.,LTD  
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#### Product description

Product name .....: Tablet PC  
 Brand name .....: HAOVM  
 Model name .....: MediaPad P9  
 Series Model.....: 2ASQ8-P9

**Standards** .....: ANSI/IEEE Std. C95.1-1992  
 FCC 47 CFR Part 2 ( 2.1093)  
 IEEE 1528: 2013

The device was tested by Shenzhen STS Test Services Co., Ltd. in accordance with the measurement methods and procedures specified in KDB 865664 The test results in this report apply only to the tested sample of the stated device/equipment. Other similar device/equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

#### Date of Test

Date (s) of performance of tests .....: 11 Jan. 2021 ~ 13 Jan. 2021  
 Date of Issue.....: 22 Jan. 2021  
 Test Result.....: **Pass**

Testing Engineer :

*Lemon Li*

(Lemon Li)

Technical Manager :

*Sean She*

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Authorized Signatory :

*Vita Li*

(Vita Li)





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### Revision History

Rev.	Issue Date	Report No.	Effect Page	Contents
00	22 Jan. 2021	STS2101023H01	ALL	Initial Issue

Note: **Format version** of the report - V01





## 1. General Information

Environmental evaluation measurements of specific absorption rate (SAR) distributions in emulated human head and body tissues exposed to radio frequency (RF) radiation from wireless portable devices for compliance with the rules and regulations of the U.S. Federal Communications Commission (FCC).

### 1.1 EUT Description

Product Name	Tablet PC		
Brand Name	HAOVM		
Model Name	MediaPad P9		
Series Model	N/A		
Model Difference	N/A		
Battery	Rated Voltage: 3.8V Charge Limit: 4.35V Capacity: 5000mAh		
Device Category	Portable		
Product stage	Production unit		
RF Exposure Environment	General Population / Uncontrolled		
Hardware Version	P30-9863A-V1.0		
Software Version	P9_V1.0_20201225		
Frequency Range	WLAN 802.11b/g/n20/n40: 2412 to 2462 MHz WLAN 802.11a/n20/n40/ac20/ac40/ac80: 5180 to 5240 MHz WLAN 802.11a/n20/n40/ac20/ac40/ac80: 5745 to 5825 MHz Bluetooth: 2402 to 2480 MHz		
Max. Reported SAR(1g): (Limit:1.6W/kg)	Band	Mode	Body Worn and Hotspot(W/kg)
	DTS	2.4GHz WLAN	0.641
	NII	5.2GHz WLAN	0.542
	NII	5.8GHz WLAN	0.109
DSS	Bluetooth <sup>Note</sup>	0.263	
FCC Equipment Class	Part 15 Spread Spectrum Transmitter (DSS) Digital Transmission System (DTS) Unlicensed National Information Infrastructure TX (NII)		
Operating Mode	WLAN: 802.11 a/b/g/n(HT20)ac(VHT20) /n(HT40)/ac(VHT40)/ac(VHT80) Bluetooth: 5.0+EDR (GFSK + $\pi$ /4DQPSK+8DPSK) BLE:GFSK		
Antenna Specification	BT,WLAN: PIFA Antenna		
Hotspot Mode	Support		
DTM Mode	Not Support		
Note:	1. Bluetooth SAR was estimated 2. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform		



## 1.2 Test Environment

Ambient conditions in the SAR laboratory:

Items	Required
Temperature (°C)	18-25
Humidity (%RH)	30-70

## 1.3 Test Factory

ShenZhen STS Test Services Co.,Ltd.

A 1/F, Building B, Zhuoke Science Park, No.190 Chongqing Road, HepingShequ, Fuyong Sub-District, Bao'an District, Shenzhen, Guang Dong, China

FCC test Firm Registration No.: 625569

IC Registration No.: 12108A

A2LA Certificate No.: 4338.01





## 2. Test Standards and Limits

No.	Identity	Document Title
1	47 CFR Part 2	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	ANSI/IEEE Std. C95.1-1992	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz
3	IEEE Std. 1528-2013	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
4	FCC KDB 447498 D01 v06	Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies
5	FCC KDB 865664 D01 v01r04	SAR Measurement 100 MHz to 6 GHz
6	FCC KDB 865664 D02 v01r02	RF Exposure Reporting
7	FCC KDB 941225 D01 v03r01	SAR Measurement Procedures for 3G Devices
8	FCC KDB 941225 D06 v02r01	Hotspot Mode SAR
9	FCC KDB 648474 D04 v01r03	SAR Evaluation Considerations for Wireless Handsets
10	FCC KDB 248227 D01 Wi-Fi SAR v02r02	SAR Considerations for 802.11 Devices

(A). Limits for Occupational/Controlled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

(B). Limits for General Population/Uncontrolled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	1.6	4.0

NOTE: Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1 gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.

**Population/Uncontrolled Environments:**

Are defined as locations where there is the exposure of individuals 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).

**NOTE**

**GENERAL POPULATION/UNCONTROLLED EXPOSURE**

**PARTIAL BODY LIMIT**

**1.6 W/kg**



### 3. SAR Measurement System

#### 3.1 Definition of Specific Absorption Rate (SAR)

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.

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:

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

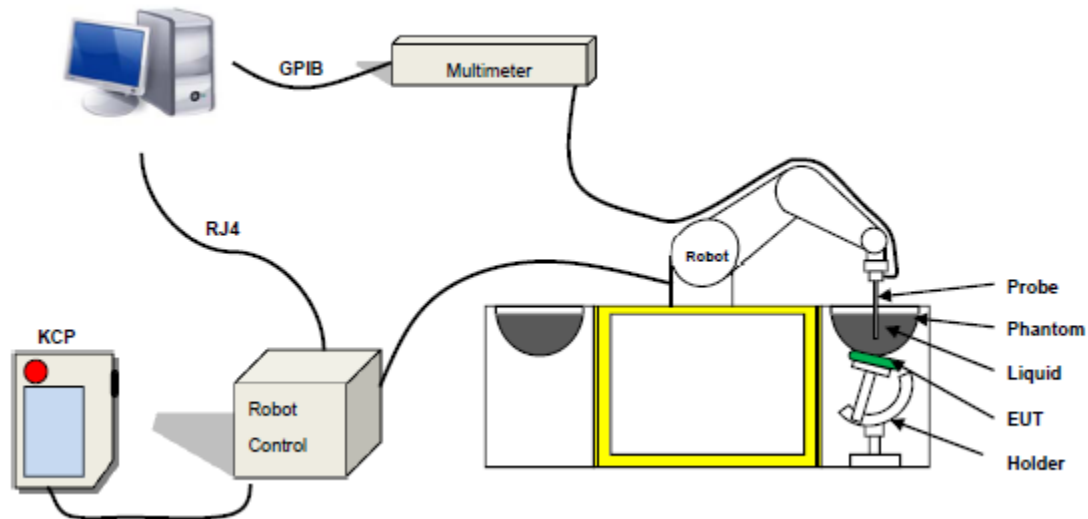
SAR is expressed in units of Watts per kilogram (W/kg) SAR measurement can be related to the electrical field in the tissue by

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

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

#### 3.2 SAR System

MVG SAR System Diagram:



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 Open SAR software computes the results to give a SAR value in a 1g or 10g mass.

### 3.2.1 Probe

For the measurements the Specific Dosimetric E-Field Probe SN 41/18 EPG0334 with following specifications is used

- Probe Length: 330 mm
- Length of Individual Dipoles: 2 mm
- Maximum external diameter: 8 mm
- Probe Tip External Diameter: 2.5 mm
- Distance between dipole/probe extremity: 1 mm
- Dynamic range: 0.01-100 W/kg
- Probe linearity: 3%
- Axial Isotropy: < 0.10 dB
- Spherical Isotropy: < 0.10 dB
- Calibration range: 450 MHz to 6 GHz for head & body simulating liquid.
- Angle between probe axis (evaluation axis) and surface normal line: less than 30°



Figure 1-MVG COMOSAR Dosimetric E field Dipole

### 3.2.2 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.

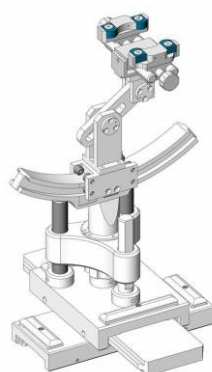


Figure-SN 32/14 SAM115



Figure-SN 32/14 SAM116

### 3.2.3 Device Holder



The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5 mm distance, a positioning uncertainty of  $\pm 0.5$  mm would produce a SAR uncertainty of  $\pm 20$  %. Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards.



## 4. Tissue Simulating Liquids

### 4.1 Simulating Liquids Parameter Check

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.

#### Head Tissue

Frequency (MHz)	cellulose	DGBE	HEC	NaCl	Preventol	Sugar	X100	Water	Conductivity	Permittivity
	%	%	%	%	%	%	%	%	$\sigma$	$\epsilon_r$
750	0.2	/	/	1.4	0.2	57.0	/	41.1	0.89	41.9
835	0.2	/	/	1.4	0.2	57.9	/	40.3	0.90	41.5
900	0.2	/	/	1.4	0.2	57.9	/	40.3	0.97	41.5
1800	/	44.5	/	0.3	/	/	30.45	55.2	1.4	40.0
1900	/	44.5	/	0.3	/	/	30.45	55.2	1.4	40.0
2000	/	44.5	/	0.3	/	/	/	55.2	1.4	40.0
2450	/	44.9	/	0.1	/	/	/	55.0	1.80	39.2
2600	/	45.0	/	0.1	/	/	/	54.9	1.96	39.0

#### Body Tissue

Frequency (MHz)	cellulose	DGBE	HEC	NaCl	Preventol	Sugar	X100	Water	Conductivity	Permittivity
	%	%	%	%	%	%	%	%	$\sigma$	$\epsilon_r$
750	0.2	/	/	0.9	0.1	47.2	/	51.7	0.96	55.5
835	0.2	/	/	0.9	0.1	48.2	/	50.8	0.97	55.2
900	0.2	/	/	0.9	0.1	48.2	/	50.8	1.05	55.0
1800	/	29.4	/	0.4	/	/	30.45	70.2	1.52	53.3
1900	/	29.4	/	0.4	/	/	30.45	70.2	1.52	53.3
2000	/	29.4	/	0.4	/	/	/	70.2	1.52	53.3
2450	/	31.3	/	0.1	/	/	/	68.6	1.95	52.7
2600	/	31.7	/	0.1	/	/	/	68.2	2.16	52.3

Tissue dielectric parameters for head and body phantoms

Frequency	$\epsilon_r$		$\sigma$ S/m	
	Head	Body	Head	Body
	300	45.3	58.2	0.87
450	43.5	56.7	0.87	0.94
900	41.5	55.0	0.97	1.05
1450	40.5	54.0	1.20	1.30
1800	40.0	53.3	1.40	1.52
2450	39.2	52.7	1.80	1.95
3000	38.5	52.0	2.40	2.73
5800	35.3	48.2	5.27	6.00

**LIQUID MEASUREMENT RESULTS**

Date	Ambient condition		Simulating Liquid		Parameters	Target	Measured	Deviation [%]	Limited [%]
	Temp. [°C]	Humidity [%]	Frequency	Temp. [°C]					
2021-01-11	22.7	47	2450 MHz	22.5	Permittivity	39.2	38.84	-0.92	± 5
					Conductivity	1.8	1.77	-1.67	± 5
2021-01-12	22.9	51	5200 MHz	22.7	Permittivity	36	35.74	-0.72	± 5
					Conductivity	4.66	4.58	-1.72	± 5
2021-01-13	22.5	50	5800 MHz	22.3	Permittivity	35.3	35.59	0.82	± 5
					Conductivity	5.27	5.07	-3.80	± 5

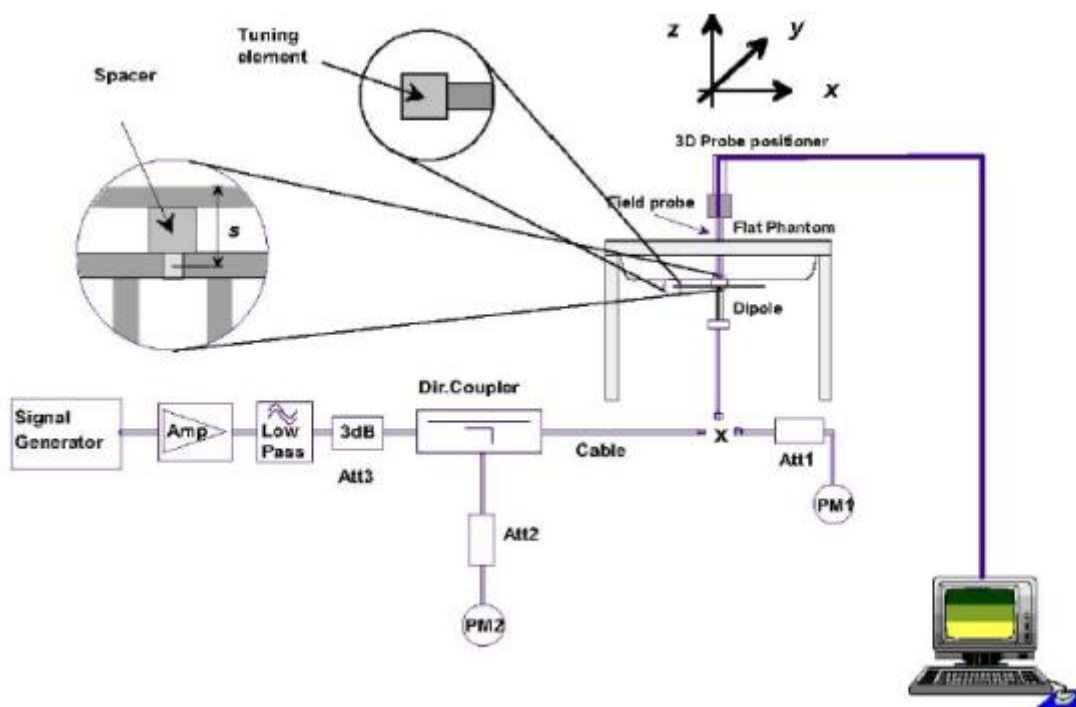


## 5. SAR System Validation

### 5.1 Validation System

Each MVG system is equipped with one or more system validation kits. These units, together with the predefined measurement procedures within the MVG software, enable the user to conduct the system performance check and system validation. System kit includes a dipole, and dipole device holder.

The system check verifies that the system operates within its specifications. It's performed daily or before every SAR measurement. The system check uses normal SAR measurement in the flat section of the phantom with a matched dipole at a specified distance. The system validation setup is shown as below.



### 5.2 Validation Result

Comparing to the original SAR value provided by MVG, the validation data should be within its specification of 10 %.

Date	Freq.	Power	Power drift	Tested Value	Normalized SAR	Target SAR	Tolerance
	(MHz)	(mW)	(%)	(W/Kg)	(W/kg)	(W/kg)	(%)
2021-01-11	2450	100	-0.78	5.274	52.74	52.40	0.65
2021-01-12	5200	100	3.29	15.863	158.63	159.00	-0.23
2021-01-13	5800	100	2.21	18.349	183.49	181.20	1.26

Note:

1. The tolerance limit of System validation  $\pm 10\%$ .
2. The dipole input power (forward power) was 100 mW.
3. The results are normalized to 1 W input power.



## 6. SAR Evaluation Procedures

The procedure for assessing the average SAR value consists of the following steps:

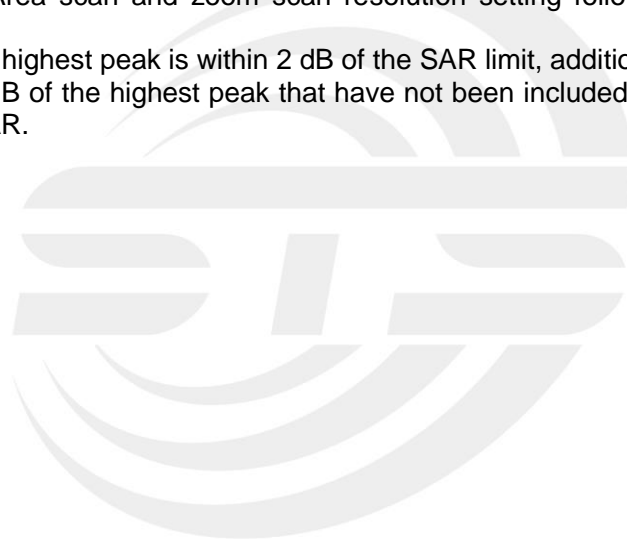
The following steps are used for each test position

- Establish a call with the maximum output power with a base station simulator. The connection between the mobile and the base station simulator is established via air interface
- Measurement of the local E-field value at a fixed location. This value serves as a reference value for calculating a possible power drift.
- Measurement of the SAR distribution with a grid of 8 to 16mm \* 8 to 16 mm and a constant distance to the inner surface of the phantom. Since the sensors cannot directly measure at the inner phantom surface, the values between the sensors and the inner phantom surface are extrapolated. With these values the area of the maximum SAR is calculated by an interpolation scheme.
- Around this point, a cube of 30 \* 30 \* 30 mm or 32 \* 32 \* 32 mm is assessed by measuring 5 or 8 \* 5 or 8\*4 or 5 mm. With these data, the peak spatial-average SAR value can be calculated.

Area Scan& Zoom Scan:

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 is performed around the highest E-field value to determine the averaged SAR -distribution over 10 g. Area scan and zoom scan resolution setting follows KDB 865664 D01v01r01 quoted below.

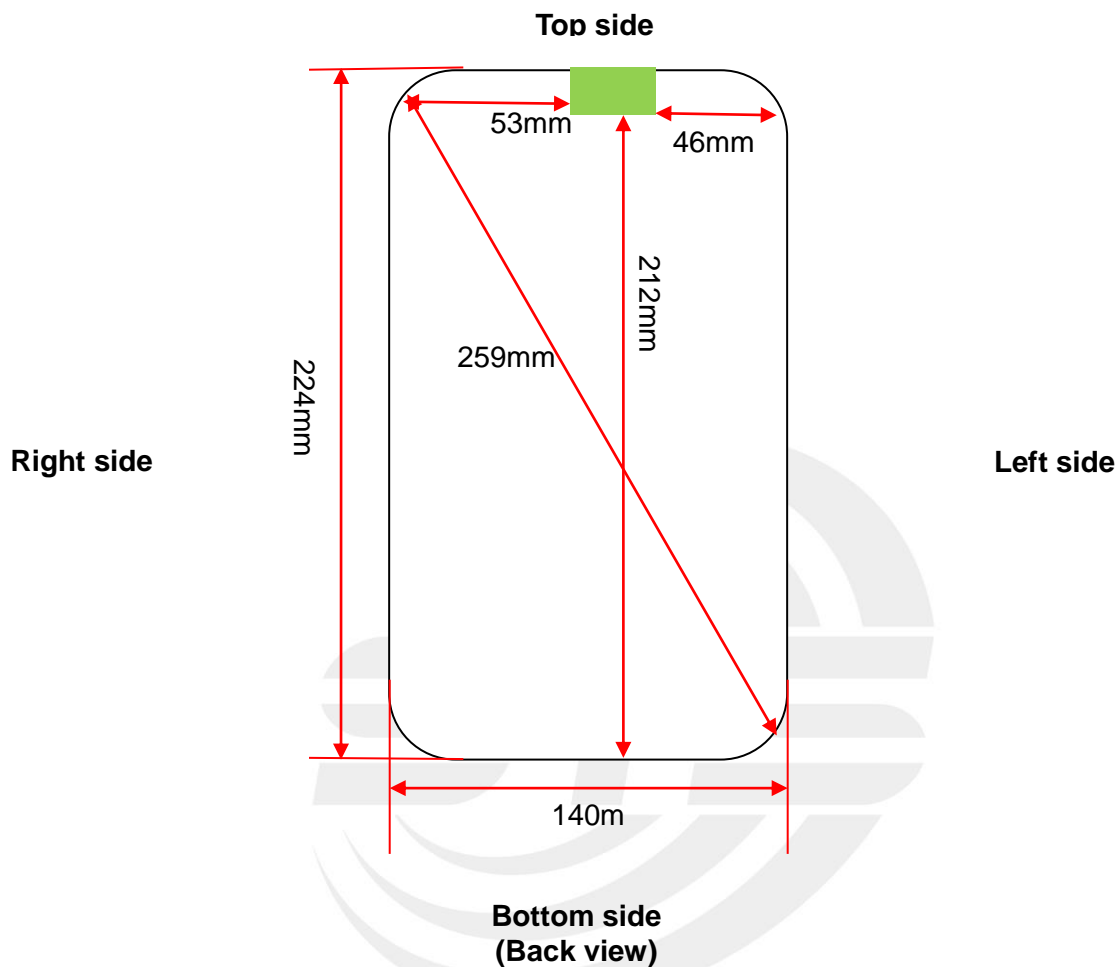
When the 1-g SAR of the highest peak is within 2 dB of the SAR limit, additional zoom scans are required for other peaks within 2 dB of the highest peak that have not been included in any zoom scan to ensure there is no increase in SAR.





## 7. EUT Antenna Location Sketch

It is a Tablet PC, support BT/WLAN mode.



 WLAN/BT Antenna

Note 1: The antenna information refer the manufacturer provide report, applicable only to the tested sample identified in the report.





### 7.1 SAR test exclusion consider table

The WLAN/BT SAR evaluation of Maximum power (dBm) summing tolerance.

Exposure Position	Wireless Interface	2.4G WLAN	BT	5.2G WLAN	5.8G WLAN
	Calculated Frequency(MHz)	2412	2480	5210	5775
Maximum power (dBm)	10	8	9	10	
Maximum rated power(mW)	10	6.310	7.943	10	
Back Side	Separation distance (mm)	5	5	5	5
	exclusion threshold(mW)	10	10	7	6
	Testing required?	YES	NO	YES	YES
Front Side	Separation distance (mm)	5	5	5	5
	exclusion threshold(mW)	10	10	7	6
	Testing required?	YES	NO	YES	YES
Left Edge	Separation distance (mm)	46	46	46	46
	exclusion threshold(mW)	86	86	59	56
	Testing required?	NO	NO	NO	NO
Right Edge	Separation distance (mm)	53	53	53	53
	exclusion threshold(mW)	111	111	81	77
	Testing required?	NO	NO	NO	NO
Top Edge	Separation distance (mm)	5	5	5	5
	exclusion threshold(mW)	10	10	7	6
	Testing required?	YES	NO	YES	YES
Bottom Edge	Separation distance (mm)	212	212	212	212
	exclusion threshold(mW)	1716	1716	1686	1682
	Testing required?	NO	NO	NO	NO

**Note:**

1. maximum power is the source-based time-average power and represents the maximum RF output power among production units.
2. per KDB 447498 D01, for larger devices, the test separation distance of adjacent edge configuration is determined by the closest separation between the antenna and the user.
3. per KDB 447498 D01, standalone SAR test exclusion threshold is applied; if the distance of the antenna to the user is <25mm,25mm is user to determine SAR exclusion threshold
4. per KDB 447498 D01, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distance ≤50mm are determined by:

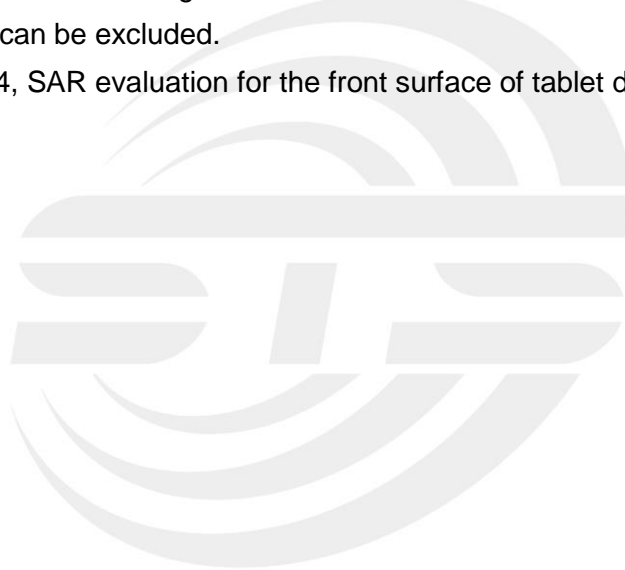
$$[(\text{max.power of channel, including tune-up tolerance, Mw})/(\text{min. test separation distance, mm})] * \sqrt{f(\text{GHz})} \leq 3.0 \text{ for 1-g SAR and } \leq 7.5 \text{ for 10-g extremity SAR, } f(\text{GHz}) \text{ is the RF channel transmit}$$



frequency in GHz. Power and distance are rounded to the nearest mW and mm before calculation. The result is rounded to one decimal place for comparison

For <50mm distance, we just calculate mW of the exclusion threshold value(3.0)to do compare

5. per KDB 447498 D01, at 100 MHz to 6GHz and for test separation distances >50mm, the SAR test exclusion threshold is determined according to the following
  - a) [threshold at 50mm in step 1]+(test separation distance -50mm)\*(f (MHz)/150)]mW, at 100 MHz to 1500 MHz
  - b) [threshold at 50mm in step1]+( test separation distance -50mm) \*10]mW at > 1500MHz and ≤ 6GHz
6. Per KDB 248227 D01, choose the highest output power channel to test SAR and determine further SAR exclusion 8.for each frequency band ,testing at higher data rates and higher order modulations is not required when the maximum average output power for each of each of these configurations is less than 1/4db higher than those measured at the lower data rate than 11b mode ,thus the SAR can be excluded.
7. Per KDB 616217 D04, SAR evaluation for the front surface of tablet display screens are generally not necessary.

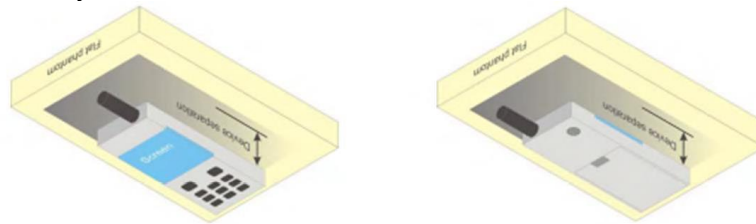


## 8. EUT Test Position

This EUT was tested in Front Face and Rear Face.

### 8.1 Body-worn Position Conditions:

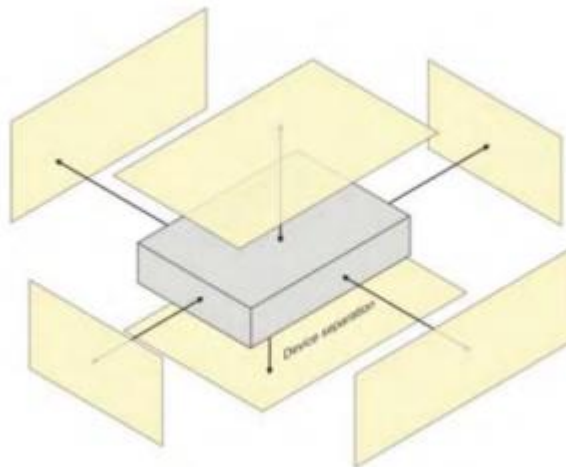
Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in KDB Publication 447498 D01 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. When the same wireless transmission configuration is used for testing body-worn accessory and hotspot mode SAR, respectively, in voice and data mode, SAR results for the most conservative *test separation distance* configuration may be used to support both SAR conditions. When the *reported SAR* for a body-worn accessory, measured without a headset connected to the handset, is  $> 1.2 \text{ W/kg}$ , the highest *reported SAR* configuration for that wireless mode and frequency band should be repeated for the body-worn accessory with a headset attached to the handset.



### 8.2 Hotspot mode exposure position condition

For handsets that support hotspot mode operations, with wireless router capabilities and various web browsing function, the relevant hand and body exposure condition are tested according to the hotspot SAR procedures in KDB 941225. A test separation distance of 10 mm is required between the phantom and all surface and edges with a transmitting antenna located within 25 mm from that surface or edge.

When form factor of a handset is smaller than 9cm x 5cm, a test separation distance of 5mm (instead of 10mm) is required for testing hotspot mode. When the separate distance required for body-worn accessory testing is larger than or equal to that tested for hotspot mode, in the same wireless mode and for the same surface of the phone, the hotspot mode SAR data may be used to support body-worn accessory SAR compliance for that particular configuration(surface).





## 9. Uncertainty

### 9.1 Measurement Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in IEEE 1528: 2013. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Uncertainty Component	Tol (+-%)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	vi
<b>Measurement System</b>								
Probe calibration	5.831	N	1	1	1	5.83	5.83	∞
Axial Isotropy	0.695	R	$\sqrt{3}$	$\sqrt{0.5}$	$\sqrt{0.5}$	0.28	0.28	∞
Hemispherical Isotropy	1.045	R	$\sqrt{3}$	$\sqrt{0.5}$	$\sqrt{0.5}$	0.43	0.43	∞
Boundary effect	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	0.685	R	$\sqrt{3}$	1	1	0.40	0.40	∞
System detection limits	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Modulation response	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Readout Electronics	0.021	N	1	1	1	0.021	0.021	∞
Response Time	0	R	$\sqrt{3}$	1	1	0	0	∞
Integration Time	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
RF ambient conditions-Noise	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
RF ambient conditions-reflections	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Probe positioner mechanical tolerance	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Probe positioning with respect to phantom shell	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Post-processing	2.3	R	$\sqrt{3}$	1	1	1.33	1.33	∞
<b>Test sample Related</b>								
Test sample positioning	2.6	N	1	1	1	2.6	2.6	∞
Device holder uncertainty	3	N	1	1	1	3	3	∞
SAR drift measurement	5	R	$\sqrt{3}$	1	1	2.89	2.89	∞
SAR scaling	5	R	$\sqrt{3}$	1	1	2.89	2.89	∞
<b>Phantom and tissue parameters</b>								
Phantom uncertainty(shape and thickness uncertainty)	4	R	$\sqrt{3}$	1	1	2.31	2.31	∞
Uncertainty in SAR correction for deviations in permittivity and conductivity	1.9	N	1	1	0.84	1.90	1.60	∞
Liquid conductivity(temperature uncertainty)	2.5	R	$\sqrt{3}$	0.78	0.71	1.13	1.02	∞
Liquid conductivity(measured)	4	N	1	0.78	0.71	3.12	2.84	M
Liquid permittivity(temperature uncertainty)	2.5	R	$\sqrt{3}$	0.23	0.26	0.33	0.38	∞
Liquid permittivity(measured)	5	N	1	0.23	0.26	1.15	1.30	M
Combined Standard Uncertainty		RSS				9.79	9.59	
Expanded Uncertainty (95% Confidence interval)		K=2				19.58	19.18	



### 9.2 System validation Uncertainty

Uncertainty Component	Tol (+- %)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	vi
<b>Measurement System</b>								
Probe calibration	5.831	N	1	1	1	5.83	5.83	∞
Axial Isotropy	0.695	R	$\sqrt{3}$	1	1	0.40	0.40	∞
Hemispherical Isotropy	1.045	R	$\sqrt{3}$	0	0	0.00	0.00	∞
Boundary effect	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	0.685	R	$\sqrt{3}$	1	1	0.40	0.40	∞
System detection limits	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Modulation response	3.0	R	$\sqrt{3}$	0	0	0.00	0.00	∞
Readout Electronics	0.021	N	1	1	1	0.021	0.021	∞
Response Time	0.0	R	$\sqrt{3}$	0	0	0.00	0.00	∞
Integration Time	1.4	R	$\sqrt{3}$	0	0	0.00	0.00	∞
RF ambient conditions-Noise	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
RF ambient conditions-reflections	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Probe positioner mechanical tolerance	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Probe positioning with respect to phantom shell	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Post-Processing	2.3	R	$\sqrt{3}$	1	1	1.33	1.33	∞
<b>System validation source</b>								
Deviation of experimental dipole from numerical dipole	5.0	N	1	1	1	5.00	5.00	∞
Input power and SAR drift measurement	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞
Other source contribution Uncertainty	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	∞
<b>Phantom and set-up</b>								
Phantom uncertainty(shape and thickness uncertainty)	4.0	R	$\sqrt{3}$	1	1	2.31	2.31	∞
Uncertainty in SAR correction for deviations in permittivity and conductivity	1.9	N	1	1	0.84	1.90	1.60	∞
Liquid conductivity(temperature uncertainty)	2.5	R	$\sqrt{3}$	0.78	0.71	1.13	1.02	∞
Liquid conductivity(measured)	4	N	1	0.78	0.71	3.12	2.84	M
Liquid permittivity(temperature uncertainty)	2.5	R	$\sqrt{3}$	0.23	0.26	0.33	0.38	∞
Liquid permittivity(measured)	5	N	1	0.23	0.26	1.15	1.30	M
Combined Standard Uncertainty		RSS				9.718	9.517	
Expanded Uncertainty (95% Confidence interval)		K=2				19.44	19.04	



## 10. Conducted Power Measurement

### 10.1 Test Result

#### 2.4G WLAN

Mode	Channel Number	Frequency (MHz)	Average Power (dBm)
802.11b	1	2412	9.01
	6	2437	6.99
	11	2462	6.97
802.11g	1	2412	8.41
	6	2437	6.74
	11	2462	6.59
802.11n20	1	2412	8.43
	6	2437	6.78
	11	2462	6.63
802.11n40	3	2422	6.77
	6	2437	6.22
	9	2452	5.29

#### 5.2G WLAN

Mode	Channel Number	Frequency (MHz)	Average Power (dBm)
802.11a	36	5180	7.08
	40	5200	7.31
	48	5240	7.35
802.11 n20	36	5180	7.15
	40	5200	7.35
	48	5240	7.48
802.11 n40	38	5190	6.73
	46	5230	6.92
802.11 ac20	36	5180	7.11
	40	5200	7.37
	48	5240	7.39
802.11 ac40	38	5190	6.78
	46	5230	6.93
802.11 ac80	42	5210	8.78



**5.8G WLAN**

Mode	Channel Number	Frequency (MHz)	Average Power (dBm)
802.11a	149	5745	8.32
	157	5785	7.40
	165	5825	6.32
802.11 n20	149	5745	8.34
	157	5785	7.42
	165	5825	6.35
802.11 n40	151	5755	7.64
	159	5795	6.69
802.11 ac20	149	5745	8.33
	157	5785	7.43
	165	5825	6.38
802.11 ac40	151	5755	7.63
	159	5795	6.69
802.11 ac80	155	5775	9.78

**Bluetooth**

Mode	Channel Number	Frequency (MHz)	Average Power (dBm)
GFSK(1Mbps)	0	2402	6.31
	39	2441	7.65
	78	2480	7.20
$\pi/4$ -DQPSK(2Mbps)	0	2402	4.61
	39	2441	6.89
	78	2480	6.47
8DPSK(3Mbps)	0	2402	4.55
	39	2441	6.88
	78	2480	6.44

**BLE**

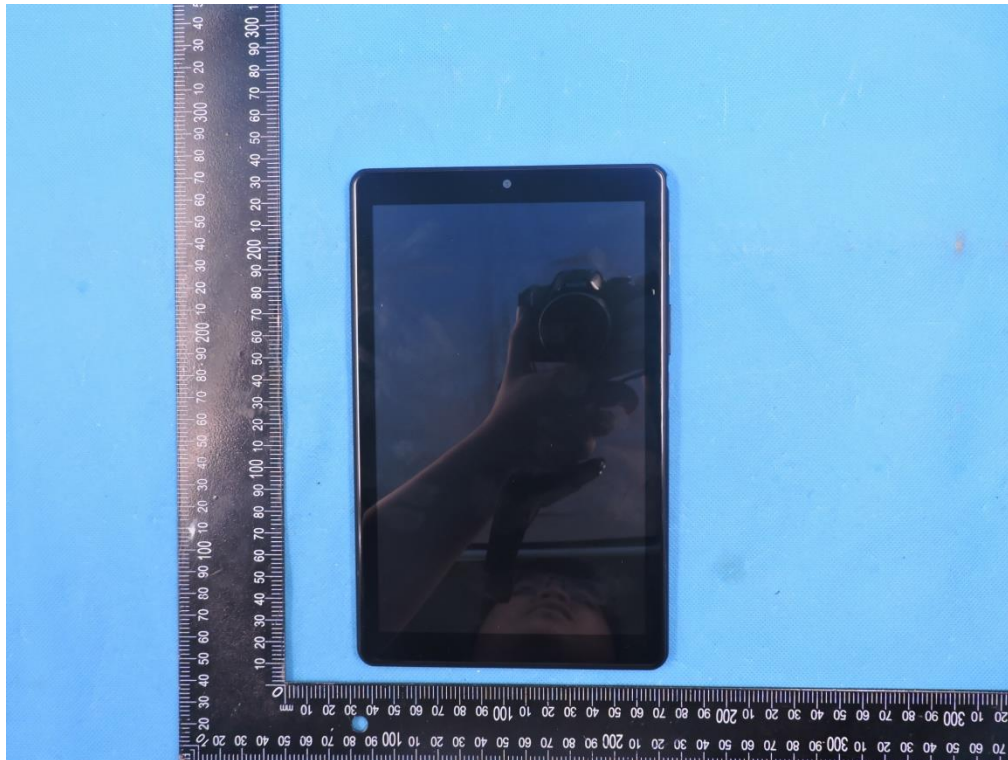
Mode	Channel Number	Frequency (MHz)	Average Power (dBm)
GFSK(1Mbps)	0	2402	-1.83
	19	2440	1.09
	39	2480	0.33
GFSK(2Mbps)	0	2402	-1.77
	19	2440	1.19
	39	2480	0.42



## 11. EUT And Test Setup Photo

### 11.1 EUT Photo

Front side



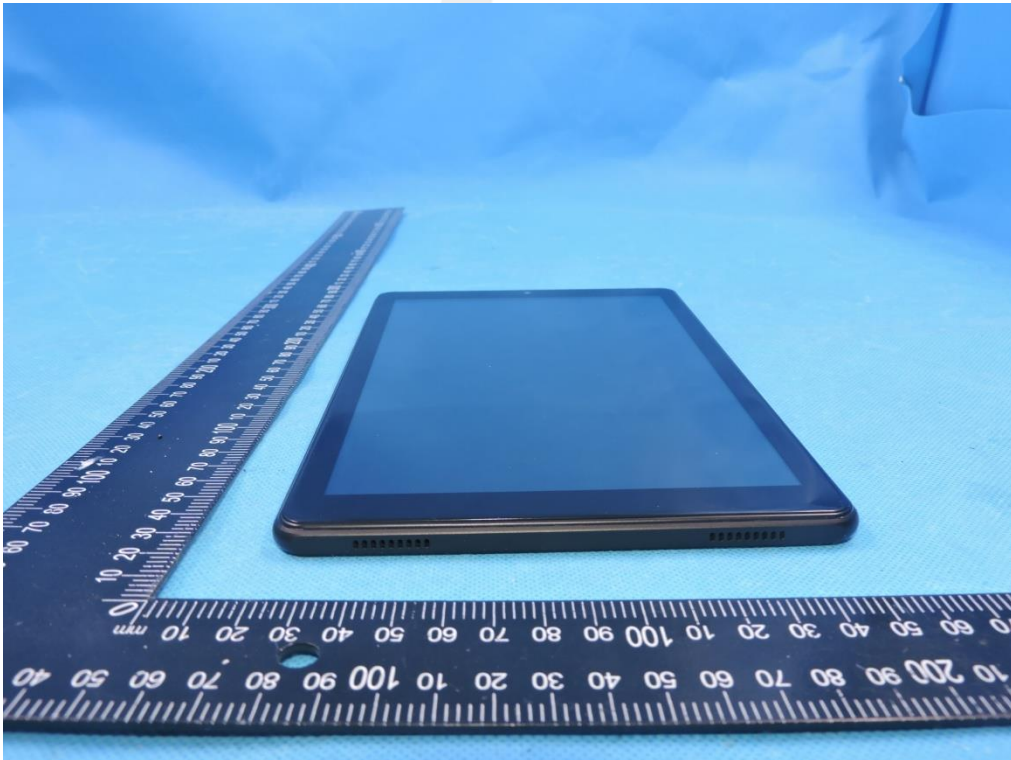
Back side



Top side

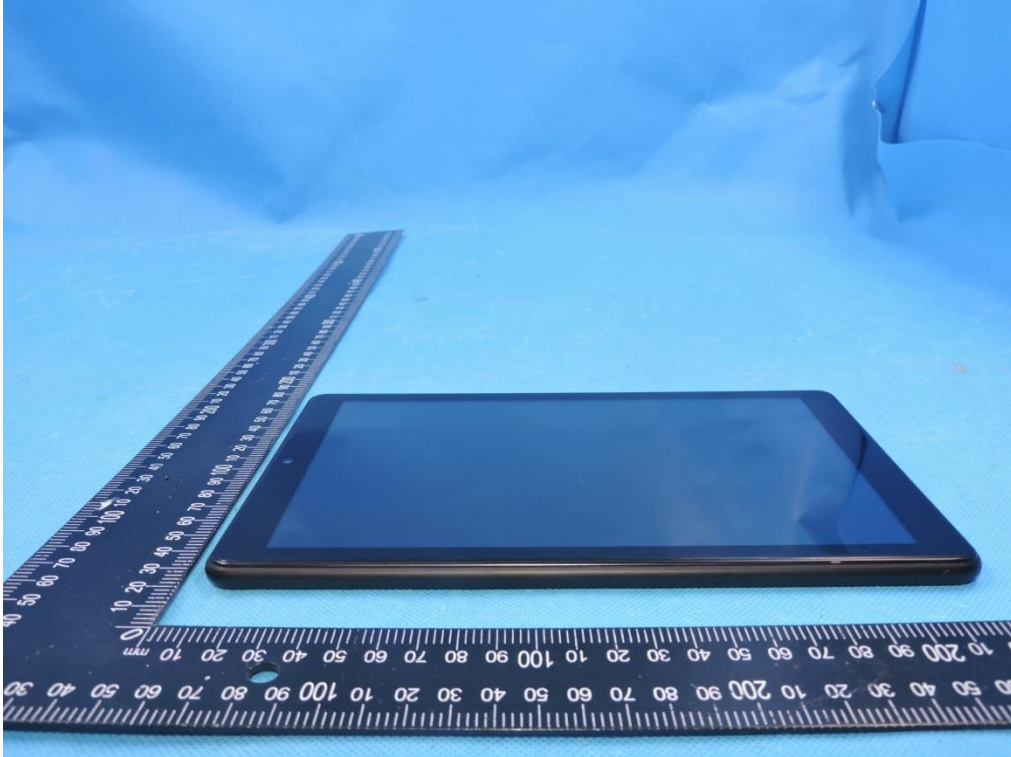


Bottom side

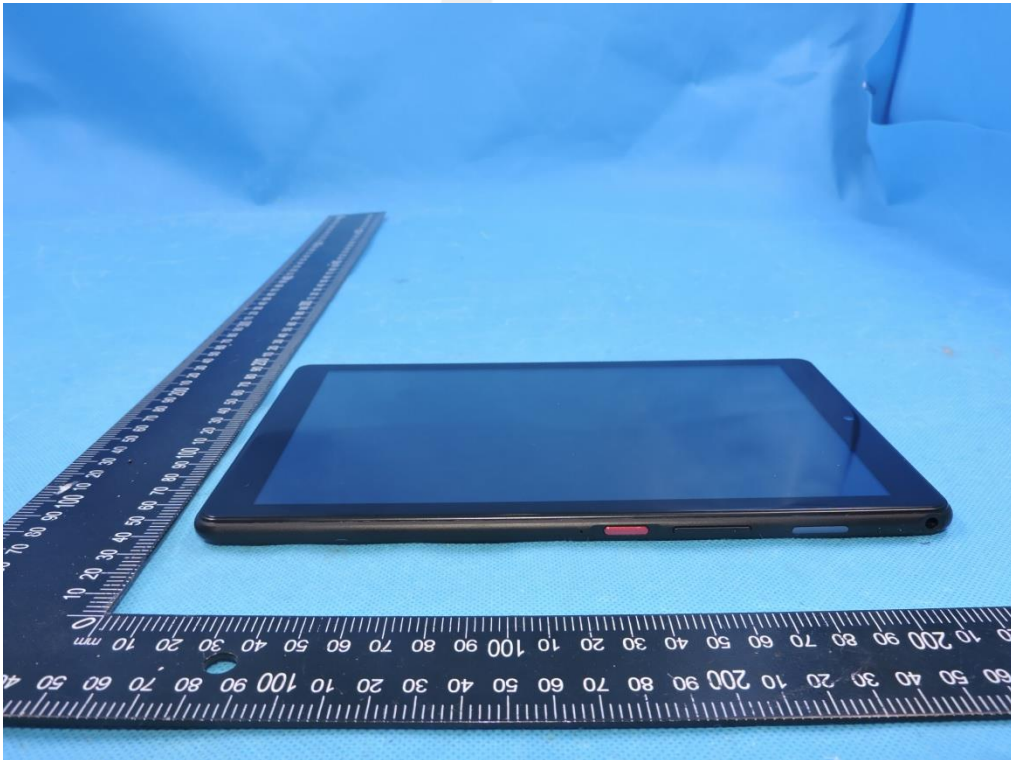




Left side



Right side



## 11.2 Setup Photo

Body Front side(separation distance is 0mm)



Body Back side(separation distance is 0mm)





Body top side(separation distance is 0mm)



Liquid depth (15 cm)







## 12. SAR Result Summary

### 12.1 Body-worn and Hotspot SAR

Band	Model	Test Position	Ch.	Result 1g (W/Kg)	Power Drift(%)	Max.Turn-up Power(dBm)	Meas.Output Power(dBm)	Scaled SAR (W/Kg)	Meas. No.
2.4GHz WLAN	802.11b	Front Side	1	0.415	-2.04	10	9.01	0.521	/
		Back Side	1	0.510	2.29	10	9.01	<b>0.641</b>	1
		Top Edge	1	0.126	-3.03	10	9.01	0.158	/
5.2G Hz WLAN	802.11a	Front Side	48	0.336	2.70	8	7.35	0.390	/
		Back Side	48	0.467	2.15	8	7.35	<b>0.542</b>	2
		Top Edge	48	0.117	-3.73	8	7.35	0.136	/
5.2GHz WLAN	802.11ac80	Front Side	42	0.218	1.48	9	8.78	0.229	/
		Back Side	42	0.305	-2.99	9	8.78	<b>0.321</b>	3
		Top Edge	42	0.075	0.93	9	8.78	0.079	/
5.2G Hz WLAN	802.11a	Front Side	149	0.072	-3.25	9	8.32	0.084	/
		Back Side	149	0.093	-3.49	9	8.32	<b>0.109</b>	4
		Top Edge	149	0.034	-2.75	9	8.32	0.040	/
5.2GHz WLAN	802.11ac80	Front Side	155	0.046	-0.28	10	9.78	0.048	/
		Back Side	155	0.059	-3.98	10	9.78	<b>0.062</b>	5
		Top Edge	155	0.026	3.57	10	9.78	0.027	/

Note:

- The test separation of all above table is 0mm.
- The Bluetooth and WLAN can't simultaneous transmission at the same time.
- Per KDB 447498 D01, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
  - Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
  - For WWAN: Scaled SAR(W/kg)= Measured SAR(W/kg)\*Tune-up Scaling Factor
- Per KDB 248227- When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is  $\leq 1.2$  W/kg. (The highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power was **0.509** W/Kg for Body)
3. When the user enables the personal Wireless router functions for the handsets, actual operations include simultaneous transmission of both the Wi-Fi transmitting frequency and thus cannot be evaluated for SAR under actual use conditions. The "Portable Hotspot" feature on the handset was NOT activated, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal.

Estimated SAR		Maximum Power		Antenna to user(mm)	Frequency(GHz)	Stand Alone SAR(1g) [W/kg]
		dBm	mW			
BT	Body	8	6.310	5	2.441	0.263





### 13. Equipment List

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
2450MHzDipole	MVG	SID2450	SN 30/14 DIP2G450-335	2020.07.14	2023.07.13
Waveguide	SATIMO	SWG5500	SN 13/14 WGA32	2020.07.14	2023.07.13
E-Field Probe	MVG	SSE2	SN 41/18 EPO334	2020.07.14	2021.07.13
Dielectric Probe Kit	MVG	SCLMP	SN 32/14 OCPG67	2020.11.24	2021.11.23
Antenna	MVG	ANTA3	SN 07/13 ZNTA52	N/A	N/A
Phantom1	MVG	SAM	SN 32/14 SAM115	N/A	N/A
Phantom2	MVG	SAM	SN 32/14 SAM116	N/A	N/A
Phone holder	MVG	N/A	SN 32/14 MSH97	N/A	N/A
Laptop holder	MVG	N/A	SN 32/14 LSH29	N/A	N/A
Attenuator	Agilent	99899	DC-18GHz	N/A	N/A
Directional coupler	Narda	4226-20	3305	N/A	N/A
Network Analyzer	Agilent	8753ES	US38432810	2020.10.12	2021.10.11
Multi Meter	Keithley	Multi Meter 2000	4050073	2020.10.10	2021.10.09
Signal Generator	Agilent	N5182A	MY50140530	2020.10.10	2021.10.09
Wireless Communication Test Set	Agilent	8960-E5515C	MY48360751	2020.10.10	2021.10.09
Wireless Communication Test Set	R&S	CMW500	117239	2020.10.10	2021.10.09
Power Amplifier	DESAY	ZHL-42W	9638	2020.10.12	2021.10.11
Power Meter	R&S	NRP	100510	2020.10.10	2021.10.09
Power Meter	Agilent	E4418B	GB43312526	2020.10.10	2021.10.09
Power Sensor	R&S	NRP-Z11	101919	2020.10.10	2021.10.09
Power Sensor	Agilent	E9301A	MY41497725	2020.10.10	2021.10.09
Temperature hygrometer	SuWei	SW-108	N/A	2020.10.12	2021.10.11
Thermograph	Elitech	RC-4	S/N EF7176501537	2020.10.12	2021.10.11

**Note:**

Per KDB 865664 D01, Dipole SAR Validation Verification, STS LAB has adopted 3 years calibration intervals. On annual basis, every measurement dipole has been evaluated and is in compliance with the following criteria:

1. There is no physical damage on the dipole
2. System validation with specific dipole is within 10% of calibrated value

Return-loss in within 20% of calibrated measurement

## Appendix A. System Validation Plots

### System Performance Check Data (2450MHz)

Type: Phone measurement (Complete)

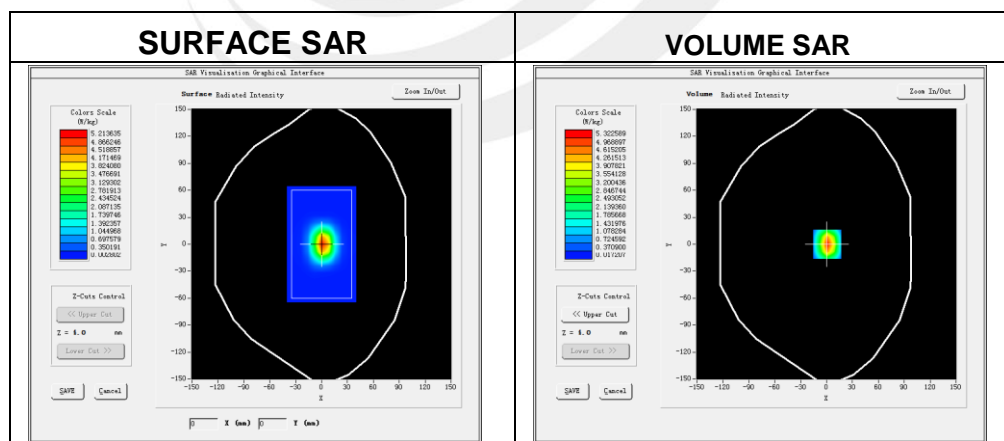
Area scan resolution: dx=8mm, dy=8mm

Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm

Date of measurement: 2021-01-11

#### Experimental conditions.

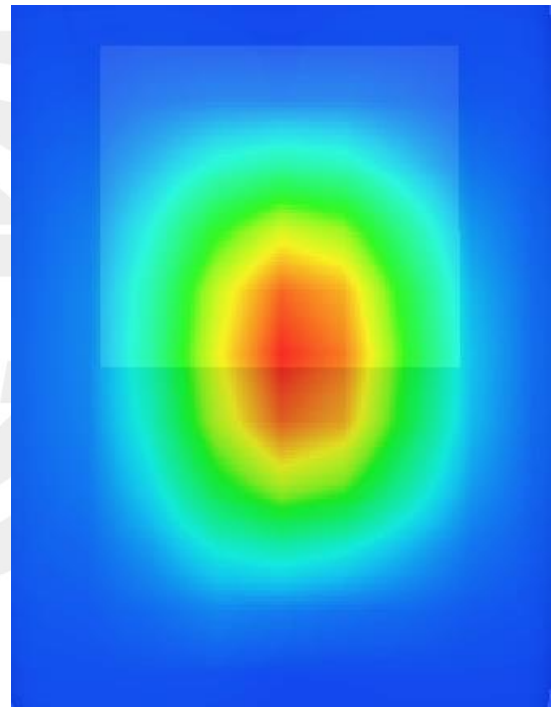
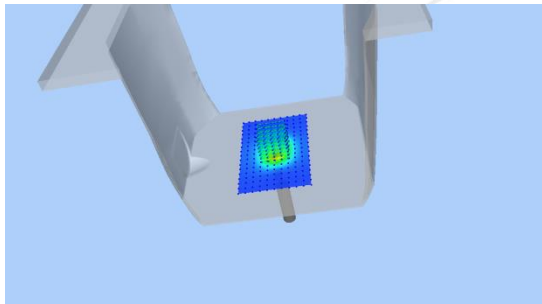
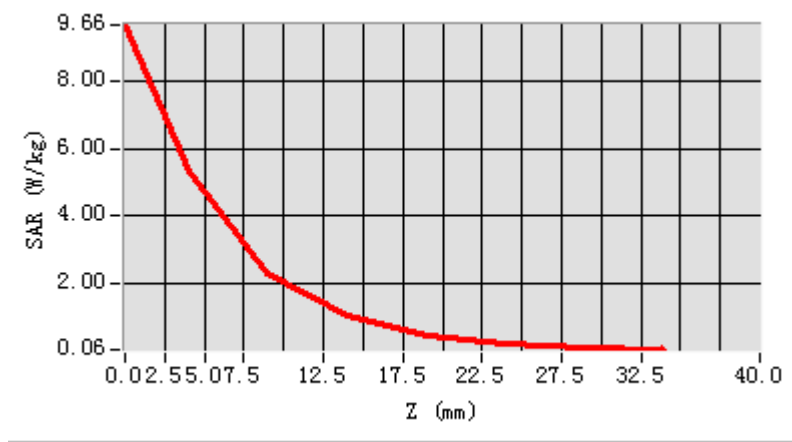
Device Position	Validation plane
Band	2450 MHz
Channels	-
Signal	CW
Frequency (MHz)	2450
Relative permittivity	38.84
Conductivity (S/m)	1.77
Probe	SN 41/18 EPGO334
ConvF	1.97
Crest factor	1:1



Maximum location: X=1.00, Y=0.00

SAR 10g (W/Kg)	2.386872
SAR 1g (W/Kg)	5.274150

### Z Axis Scan



### System Performance Check Data(5200MHz)

Type: Dipole measurement (Complete)

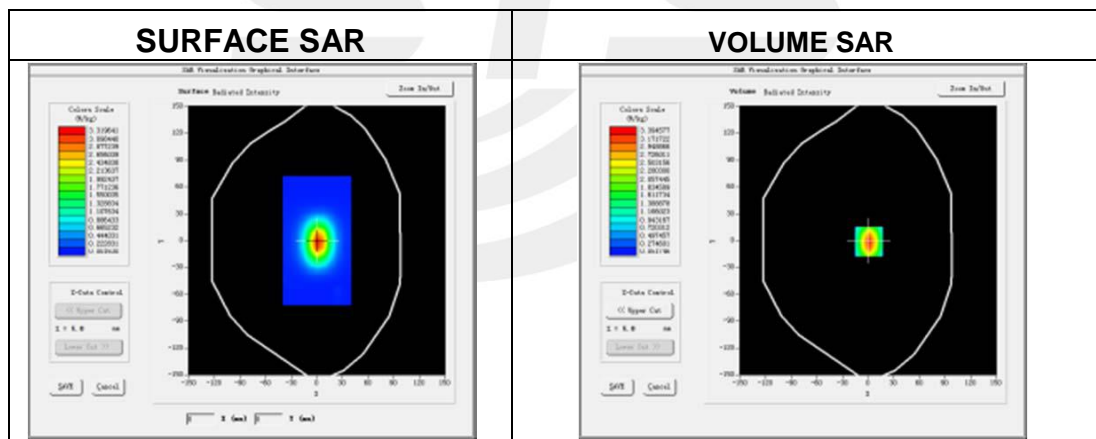
Area scan resolution: dx=8mm,dy=8mm

Zoom scan resolution: dx=4mm, dy=4mm, dz=2mm

Date of measurement: 2021-01-12

### Experimental conditions.

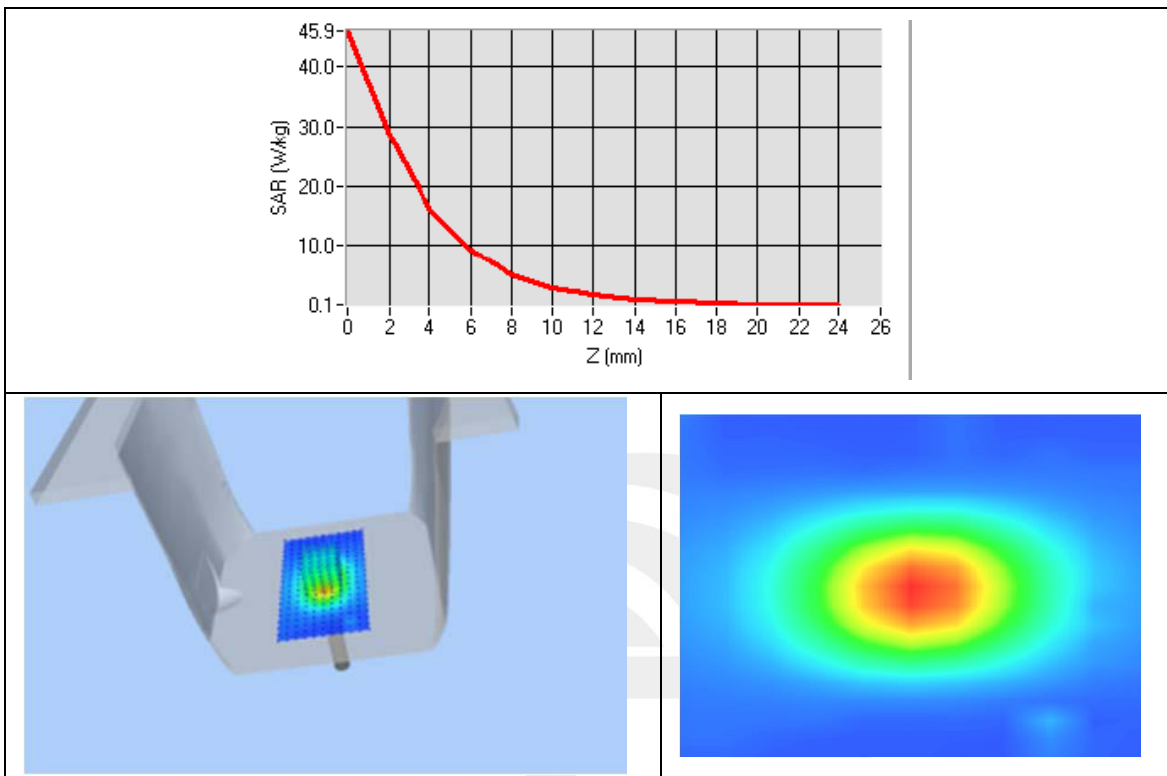
Device Position	Validation plane
Band	5200 MHz
Channels	-
Signal	CW
Frequency (MHz)	5200
Relative permittivity	35.74
Conductivity (S/m)	4.58
Probe	SN 41/18 EPGO334
ConvF	1.92
Crest factor:	1:1



Maximum location: X=7.00, Y=2.00

SAR 10g (W/Kg)	5.752103
SAR 1g (W/Kg)	15.862965

### Z Axis Scan



### System Performance Check Data(5800MHz)

Type: Dipole measurement (Complete)

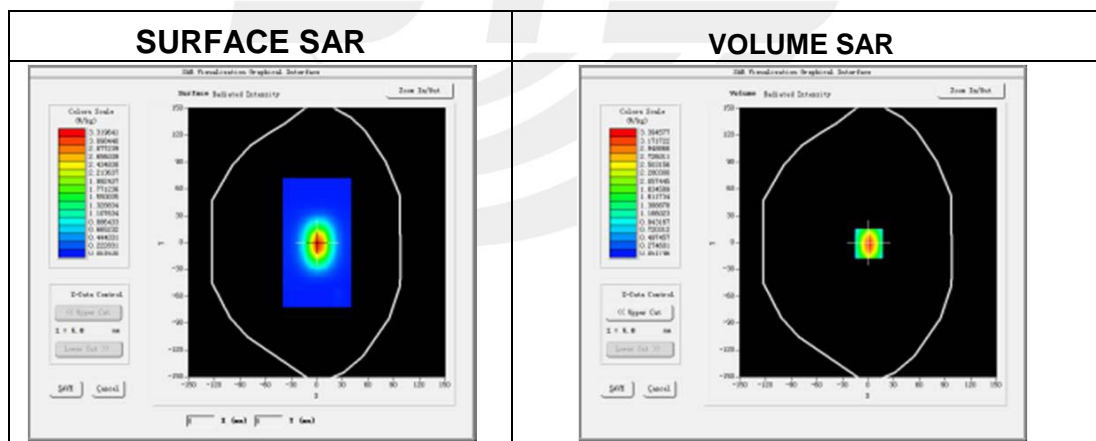
Area scan resolution: dx=8mm,dy=8mm

Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm

Date of measurement: 2021-01-13

### Experimental conditions.

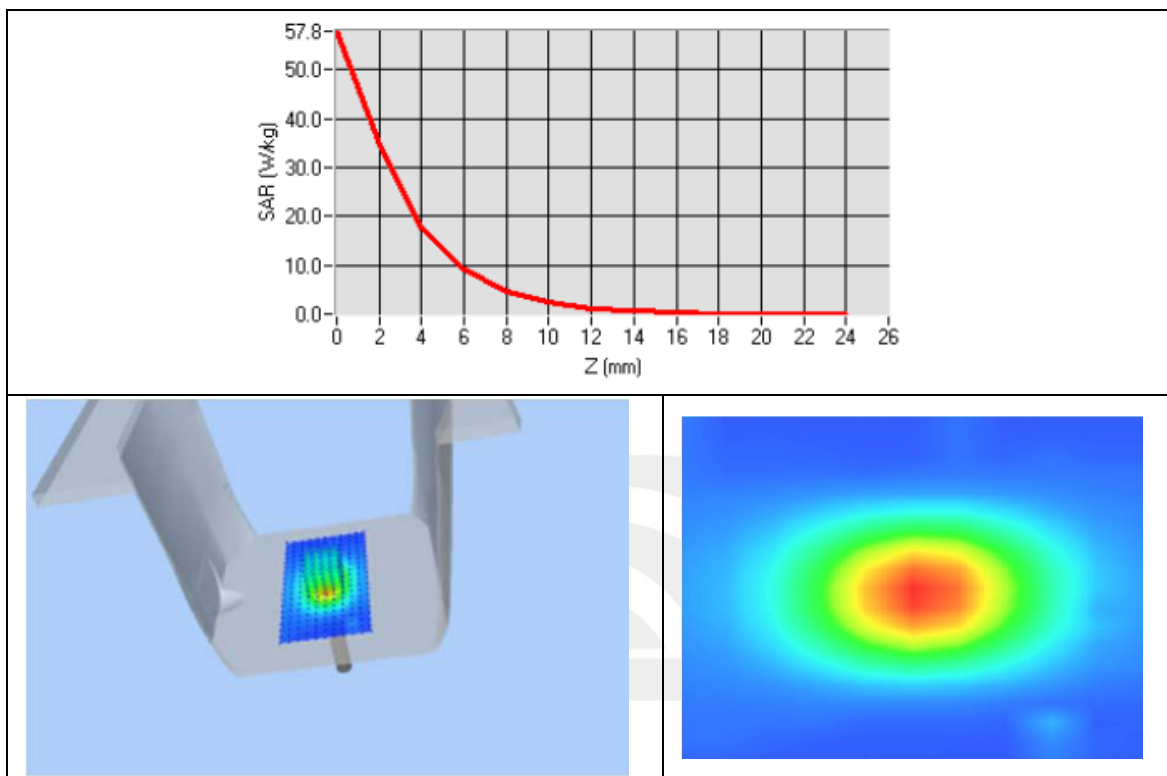
Device Position	Validation plane
Band	5800 MHz
Channels	-
Signal	CW
Frequency (MHz)	5800
Relative permittivity	35.59
Conductivity (S/m)	5.07
Probe	SN 41/18 EPGO334
ConvF	2.06
Crest factor:	1:1



Maximum location: X=7.00, Y=2.00

SAR 10g (W/Kg)	6.085373
SAR 1g (W/Kg)	18.349014

## Z Axis Scan





## Appendix B. SAR Test Plots

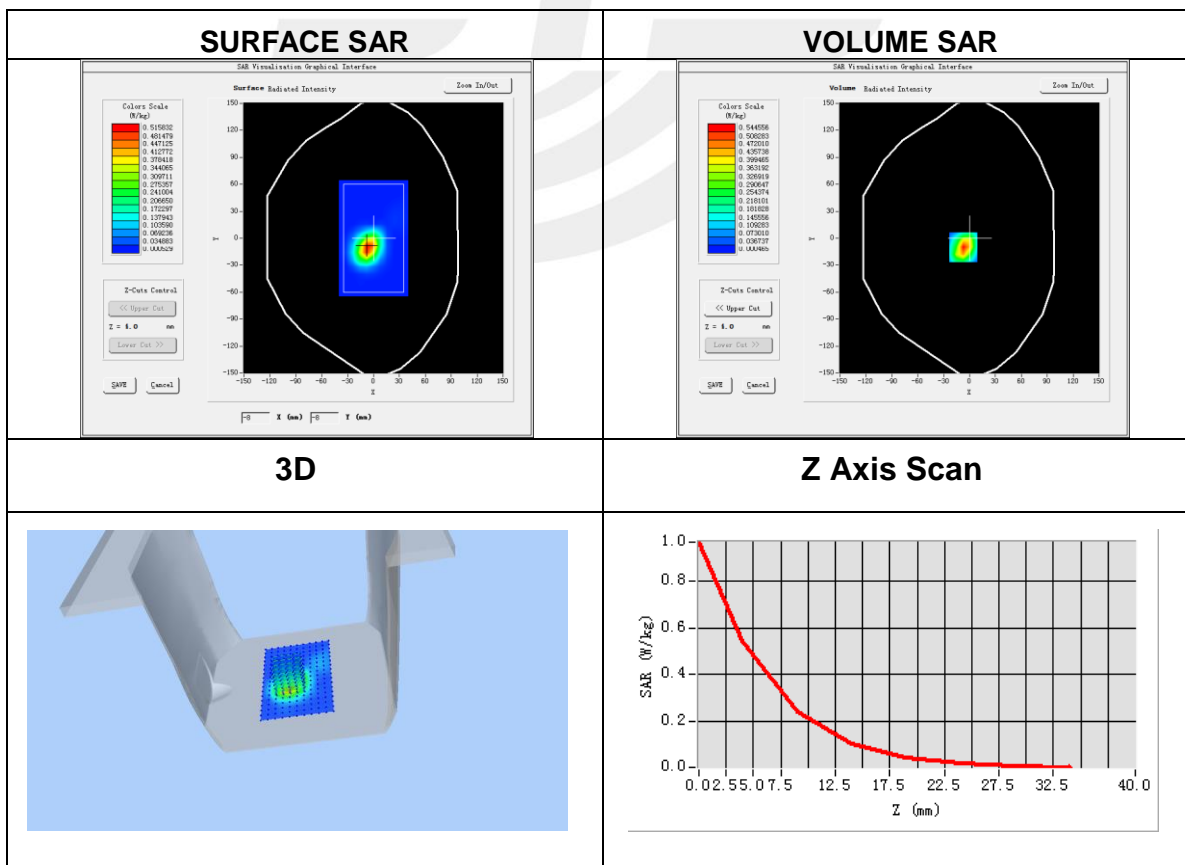
### Plot 1: DUT: Tablet PC; EUT Model: MediaPad P9

Test Date	2021-01-11
Probe	SN 41/18 EPGO334
ConvF	2.02
Area Scan	dx=8mm, dy=8mm, h= 5.00 mm
Zoom Scan	5x5x7,dx=8mm, dy=8mm, dz=5mm, Complete/ndx=8mm, dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Back side
Band	IEEE 802.11b ISM
Channels	1
Signal	IEEE802.b (Crest factor: 1.0)
Frequency (MHz)	2412
Relative permittivity (real part)	38.84
Conductivity (S/m)	1.77

Maximum location: X=-7.00, Y=-10.00

SAR Peak: 1.00W/kg

SAR 10g (W/Kg)	0.211420
SAR 1g (W/Kg)	0.509915



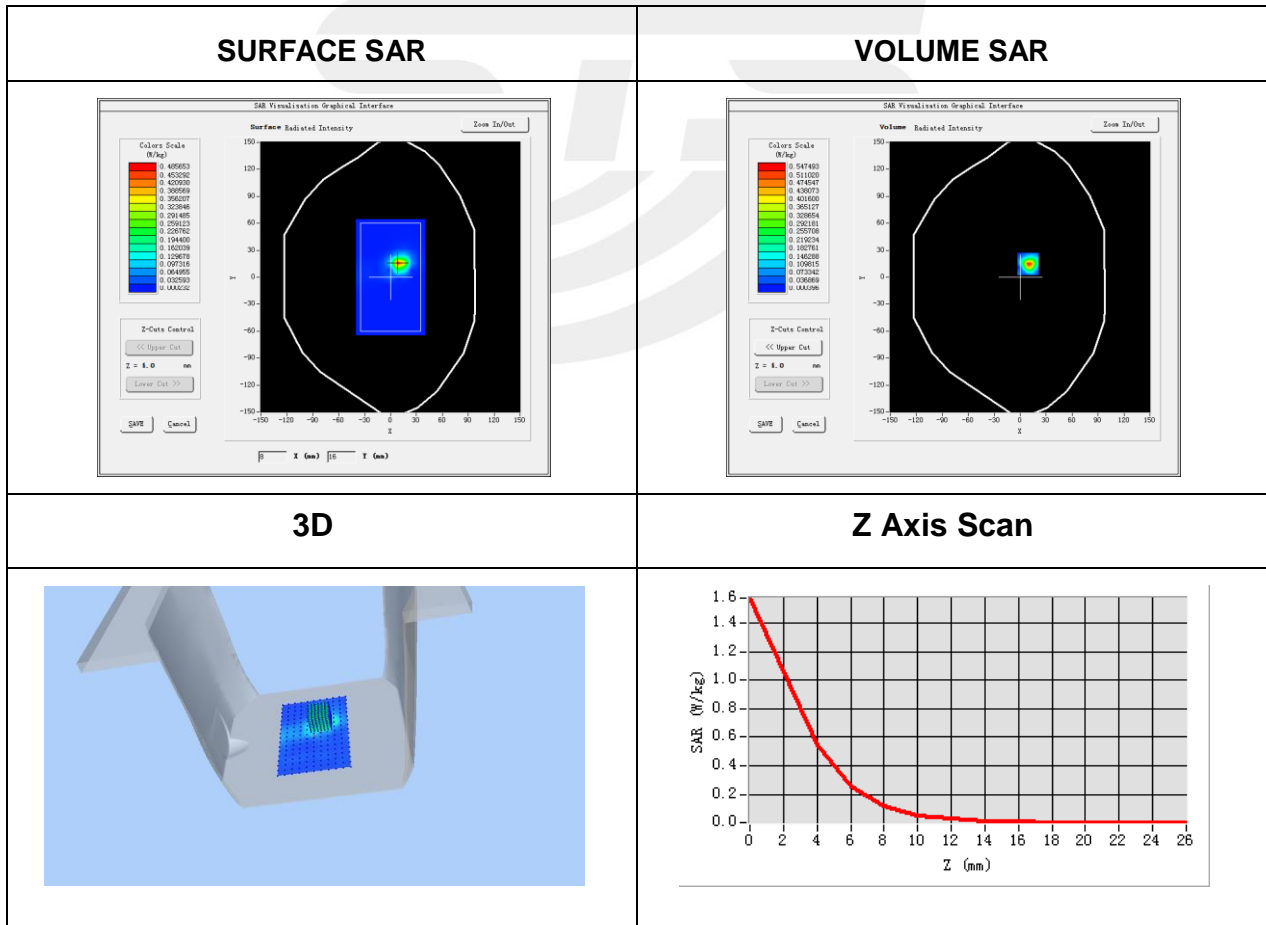
**Plot 2: DUT: Tablet PC; EUT Model: MediaPad P9**

Test Date	2021-01-12
Probe	SN 41/18 EPGO334
ConvF	1.92
Area Scan	dx=8mm, dy=8mm, h= 5.00 mm
Zoom Scan	5x5x7, dx=8mm, dy=8mm, dz=5mm, Complete/ndx=8mm, dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Back Side
Band	IEEE 802.11a ISM
Channels	48
Signal	IEEE802.a (Crest factor: 1.0)
Frequency (MHz)	5240
Relative permittivity (real part)	35.74
Conductivity (S/m)	4.58

Maximum location: X=9.00, Y=15.00

SAR Peak: 1.58 W/kg

SAR 10g (W/Kg)	0.105482
SAR 1g (W/Kg)	0.466716

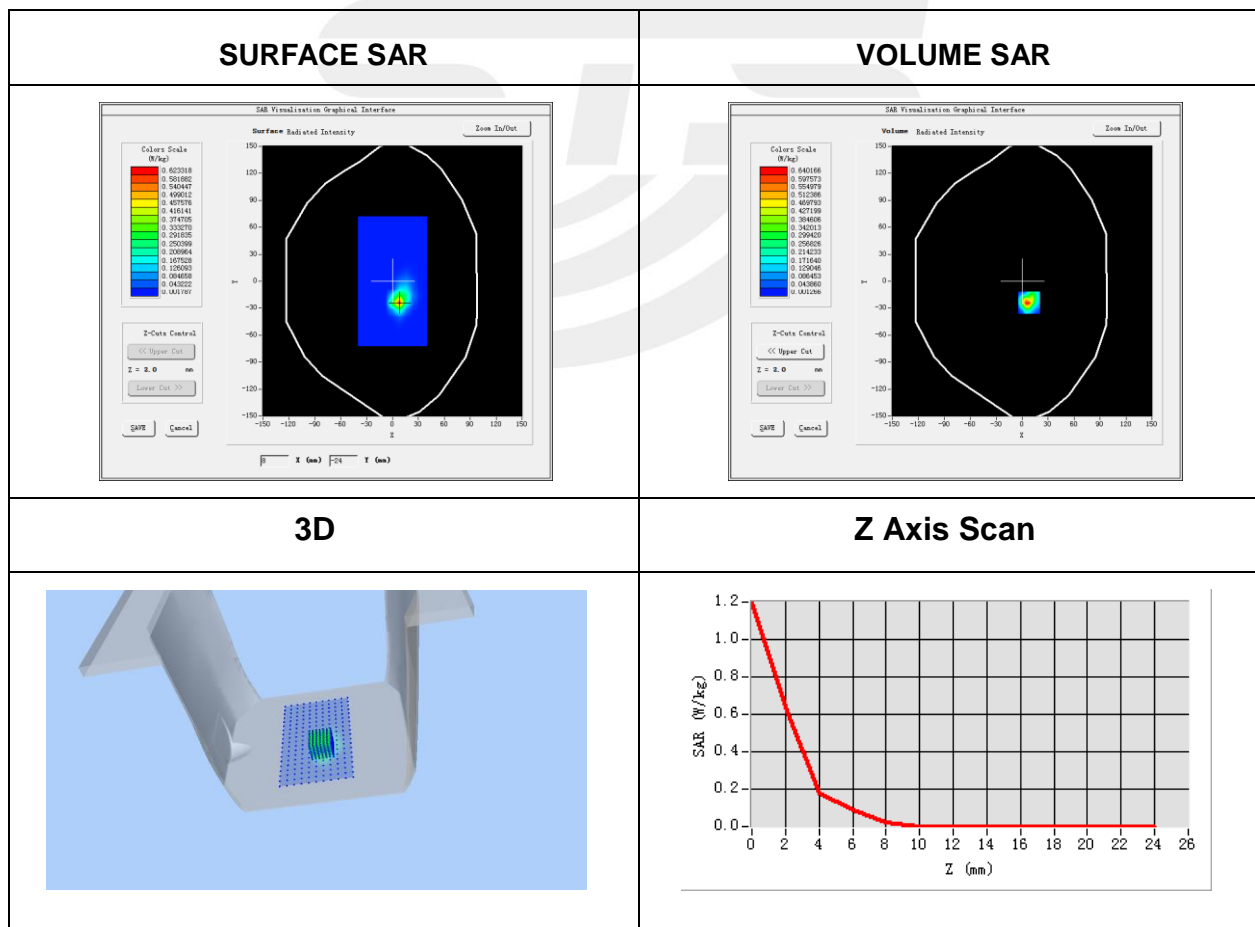


**Plot 3: DUT: Tablet PC; EUT Model: MediaPad P9**

Test Date	2021-01-12
Probe	SN 41/18 EPGO334
ConvF	1.92
Area Scan	dx=8mm, dy=8mm, h= 5.00 mm
Zoom Scan	5x5x7, dx=8mm, dy=8mm, dz=5mm, Complete/ndx=8mm, dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Back Side
Band	IEEE 802.11ac ISM
Channels	42
Signal	IEEE802.ac80 (Crest factor: 1.0)
Frequency (MHz)	5210
Relative permittivity (real part)	35.74
Conductivity (S/m)	4.58

Maximum location: X=8.00, Y=-24.00  
SAR Peak: 1.32 W/kg

SAR 10g (W/Kg)	0.077889
SAR 1g (W/Kg)	0.305449



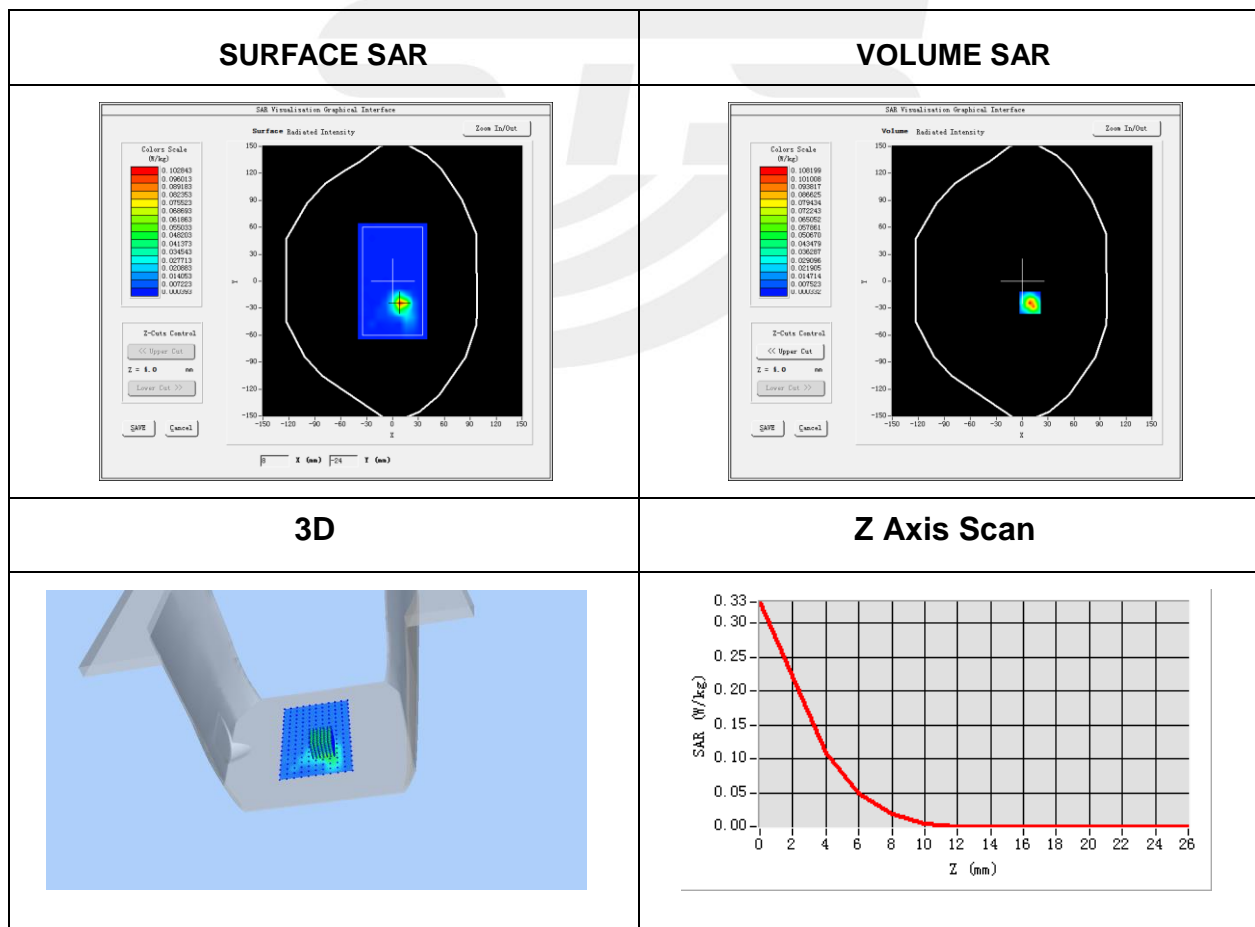
**Plot 4: DUT: Tablet PC; EUT Model: MediaPad P9**

Test Date	2021-01-13
Probe	SN 41/18 EPGO334
ConvF	2.06
Area Scan	dx=8mm, dy=8mm, h= 5.00 mm
Zoom Scan	5x5x7, dx=8mm, dy=8mm, dz=5mm, Complete/ndx=8mm, dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Back Side
Band	IEEE 802.11a ISM
Channels	149
Signal	IEEE802.a (Crest factor: 1.0)
Frequency (MHz)	5745
Relative permittivity (real part)	35.59
Conductivity (S/m)	5.07

Maximum location: X=9.00, Y=-24.00

SAR Peak: 0.32 W/kg

SAR 10g (W/Kg)	0.026221
SAR 1g (W/Kg)	0.092813

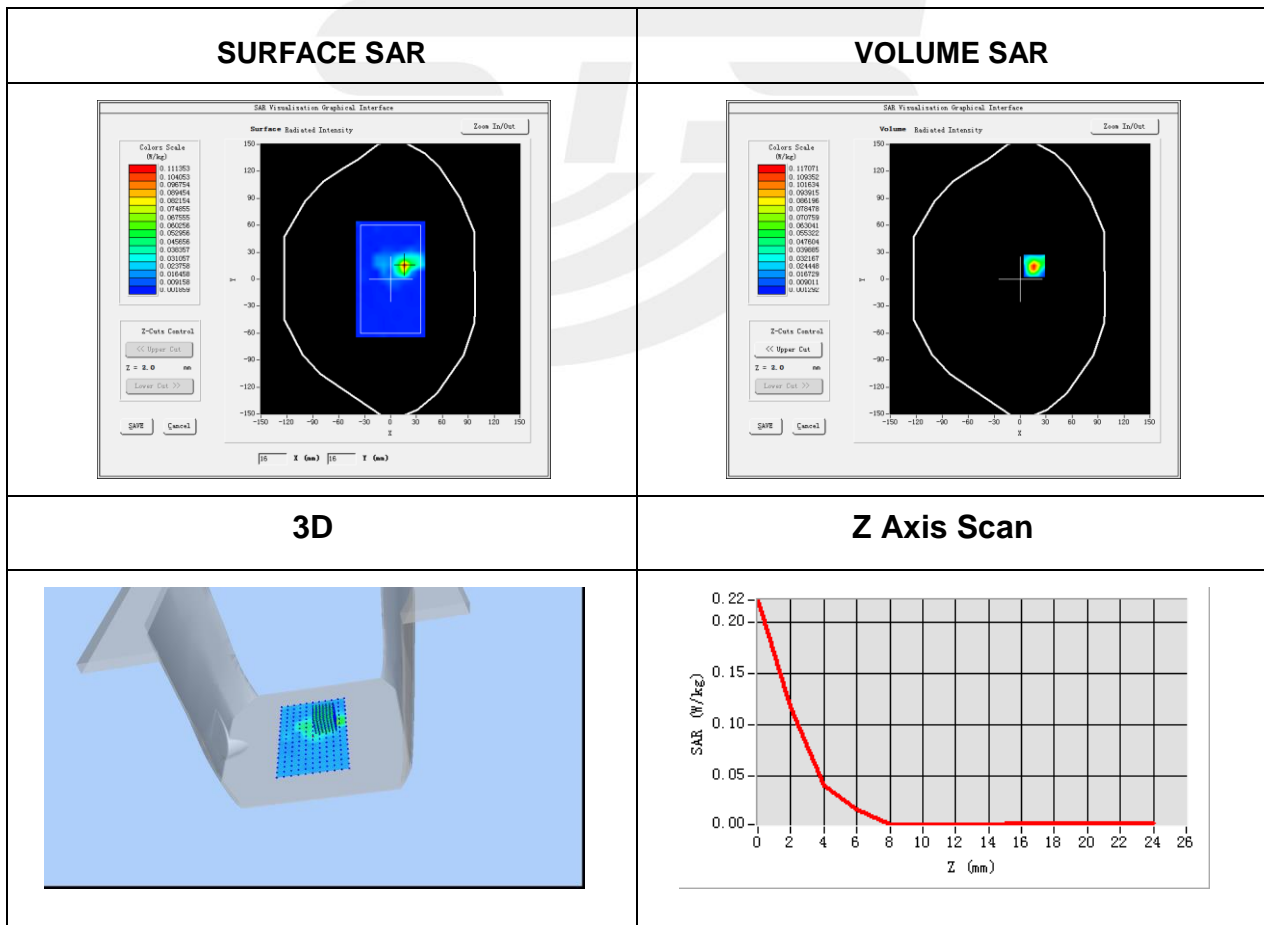


**Plot 5: DUT: Tablet PC; EUT Model: MediaPad P9**

Test Date	2021-01-13
Probe	SN 41/18 EPGO334
ConvF	2.06
Area Scan	dx=8mm, dy=8mm, h= 5.00 mm
Zoom Scan	5x5x7, dx=8mm, dy=8mm, dz=5mm, Complete/ndx=8mm, dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Back Side
Band	IEEE 802.11ac ISM
Channels	155
Signal	IEEE802.ac80 (Crest factor: 1.0)
Frequency (MHz)	5775
Relative permittivity (real part)	35.59
Conductivity (S/m)	5.07

Maximum location: X=16.00, Y=15.00  
SAR Peak: 0.24 W/kg

SAR 10g (W/Kg)	0.016993
SAR 1g (W/Kg)	0.058727





## Appendix C. Probe Calibration And Dipole Calibration Report

Refer the appendix Calibration Report.

※※※※END OF THE REPORT※※※※

