

FCC

SAR

TEST REPORT

ISSUED BY
Shenzhen BALUN Technology Co., Ltd.



FOR
Rugged Tablet PC

ISSUED TO
Jiangsu SEUIC Technology Co., Ltd.

NO.15 Xinghuo Road, Nanjing New & High Technology Industry
Development Zone, 210061, Nanjing City, Jiangsu Province, China



Tested by: Zong Liyao
Zong Liyao

Date Feb. 06, 2021

Approved by: Liao Jianming

Liao Jianming
(Technical Director)

Date Feb. 04, 2021

Report No.: BL-SZ20C0943-701

EUT Name: Rugged Tablet PC

Model Name: AUTOID Pad Air

Brand Name: Seuic, AUTOID

FCC ID: 2AC68-AUTOIDPAD

Test Standard: FCC 47 CFR Part 2.1093

ANSI C95.1: 1999

IEEE 1528: 2013

Maximum SAR: Body (1 g): 1.015 W/kg

Test Conclusion: Pass

Test Date: Jan. 16, 2021 ~ Jan. 21, 2021

Date of Issue: Feb. 04, 2021

NOTE: This test report of test results only related to testing samples, which can be duplicated completely for the legal use with the approval of the applicant; it shall not be reproduced except in full, without the written approval of Shenzhen BALUN Technology Co., Ltd. Any objections should be raised within thirty days from the date of issue. To validate the report, please contact us.

Revision History

<u>Version</u>	<u>Issue Date</u>	<u>Revisions Content</u>
<u>Rev. 01</u>	<u>Feb. 04, 2021</u>	<u>Initial Issue</u>

TABLE OF CONTENTS

1	ADMINISTRATIVE DATA (GENERAL INFORMATION)	5
1.1	Identification of the Testing Laboratory	5
1.2	Identification of the Responsible Testing Location	5
1.3	Test Environment Condition	5
1.4	Announce	5
2	PRODUCT INFORMATION	6
2.1	Applicant Information	6
2.2	Manufacturer Information	6
2.3	Factory Information	6
2.4	General Description for Equipment under Test (EUT)	6
2.5	Ancillary Equipment	6
2.6	Technical Information	7
3	SUMMARY OF TEST RESULTS	8
3.1	Test Standards	8
3.2	Device Category and SAR Limit	9
3.3	Test Result Summary	10
3.4	Test Uncertainty	11
4	SAR MEASUREMENT SYSTEM	13
4.1	Definition of Specific Absorption Rate (SAR)	13
4.2	SATIMO SAR System	13
5	SYSTEM VERIFICATION	22
5.1	Antenna Port Test Requirement	22
5.2	Purpose of System Check	22
5.3	System Check Setup	22
6	EUT TEST POSITION CONFIGURATIONS	23
6.1	Body-worn Position Conditions	23

7	SAR MEASUREMENT PROCEDURES	24
7.1	SAR Measurement Process Diagram	24
7.2	SAR Scan General Requirements.....	25
7.3	SAR Measurement Procedure	26
7.4	Area & Zoom Scan Procedures.....	26
8	CONDUCTED RF OUTPUT POWER.....	27
8.1	GSM.....	27
8.2	WCDMA	28
8.3	CDMA.....	29
8.4	LTE.....	30
8.5	WIFI.....	35
8.6	Bluetooth	43
9	EUT ANTENNA LOCATION SKETCH	44
9.1	SAR Test Exclusion Consider Table	46
10	TEST RESULTS	49
10.1	GSM 850	49
10.2	GSM 1900	49
10.3	WCDMA Band 2	49
10.4	WCDMA Band 5	49
10.5	CDMA BC0.....	50
10.6	LTE Band 5 (20MHz Bandwidth).....	50
10.7	LTE Band 7 (20MHz Bandwidth).....	50
10.8	LTE Band 38 (20MHz Bandwidth).....	51
10.9	LTE Band 41 (20MHz Bandwidth).....	51
10.10	WIFI 2.4GHz.....	51
10.11	WIFI 5GHz.....	52
10.12	Bluetooth	53
11	SAR Measurement Variability.....	54
12	SIMULTANEOUS TRANSMISSION	55
12.1	Simultaneous Transmission Mode Consider.....	55
12.2	Sum SAR of Simultaneous Transmission	57

13	TEST EQUIPMENTS LIST	59
ANNEX A	SIMULATING LIQUID VERIFICATION RESULT	60
ANNEX B	SYSTEM CHECK RESULT	61
ANNEX C	TEST DATA.....	80
ANNEX D	EUT EXTERNAL PHOTOS	94
ANNEX E	SAR TEST SETUP PHOTOS.....	94
ANNEX F	CALIBRATION REPORT	94

1 ADMINISTRATIVE DATA (GENERAL INFORMATION)

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196.
Description	All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055

1.3 Test Environment Condition

Ambient Temperature	21°C to 23°C
Ambient Relative Humidity	37% to 46%
Ambient Pressure	100 KPa to 102 KPa

1.4 Announce

- (1) The test report reference to the report template version v2.3.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
- (5) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.
- (6) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
- (7) The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Jiangsu SEUIC Technology Co., Ltd.
Address	NO.15 Xinghuo Road, Nanjing New & High Technology Industry Development Zone, 210061, Nanjing City, Jiangsu Province, China

2.2 Manufacturer Information

Manufacturer	Jiangsu SEUIC Technology Co., Ltd.
Address	NO.15 Xinghuo Road, Nanjing New & High Technology Industry Development Zone, 210061, Nanjing City, Jiangsu Province, China

2.3 Factory Information

Factory	Jiangsu SEUIC Technology Co., Ltd.
Address	3rd Floor, No.4 Building, Zhicheng Industrial Park, Zhida Road, Nanjing Jiangbei New Area, Nanjing City, China

2.4 General Description for Equipment under Test (EUT)

EUT Name	Rugged Tablet PC
Under Test Model Name	AUTOID Pad Air
Series Model Name	N/A
Description of Model name differentiation	N/A
Hardware Version	N/A
Software Version	N/A
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.5 Ancillary Equipment

Ancillary Equipment 1	Battery	
	Brand Name	N/A
	Model No.	D520
	Serial No.	N/A
	Capacity	9800 mAh
	Rated Voltage	3.85 V
	Limit Charge Voltage	4.4 V

2.6 Technical Information

Network and Wireless connectivity	2G Network GSM/GPRS/EGPRS 850/1900 MHz 3G Network CDMA 1x Band Class 0 EVDO Rel. 0/Rev. A Band Class 0 WCDMA/HSDPA/HSUPA Band 2/5 4G Network FDD LTE Band 5/7 TDD LTE Band 38/41 Bluetooth (BR+EDR+BLE) WIFI 802.11a, 802.11b, 802.11g, 802.11n and 802.11ac U-NII-1/2A/2C/3, NFC, GPS, GLONASS
Note : The EUT is a Rugged Tablet PC, which supports dual SIM card under the same transceiver. Each SIM supports GSM, WCDMA and LTE, and both SIM share the same transmitting electro circuit, NV parameters, so only SIM1 was tested in this report.	

The requirement for the following technical information of the EUT was tested in this report:

Operating Mode	GSM, WCDMA, FDD-LTE, 2.4G WLAN, 5G WLAN, Bluetooth		
Frequency Range	GSM 850	TX: 824 ~ 849 MHz	RX: 869 ~ 894 MHz
	GSM 1900	TX: 1850 ~ 1910 MHz	RX: 1930 ~ 1990 MHz
	WCDMA Band 2	TX: 1850 ~ 1910 MHz	RX: 1930 ~ 1990 MHz
	WCDMA Band 5	TX: 824 ~ 849 MHz	RX: 869 ~ 894 MHz
	CDMA BC 0	TX: 824.025 ~ 848.985 MHz	RX: 869.025 ~ 893.985 MHz
	LTE Band 5	TX: 824 ~ 849 MHz	RX: 869 ~ 894 MHz
	LTE Band 7	TX: 2500 ~ 2570 MHz	RX: 2620 ~ 2690 MHz
	LTE Band 38	TX: 2570 ~ 2620 MHz	RX: 2570 ~ 2620 MHz
	LTE Band 41	TX: 2555 ~ 2655 MHz	RX: 2555 ~ 2655 MHz
	802.11b/g /n(HT20/HT40)	2412 ~ 2462 MHz	
	802.11a/ /n(HT20/HT40) /ac(VHT20/VHT40 /VHT80)	5150 ~ 5250 MHz	
		5250 ~ 5350 MHz	
		5470 ~ 5725 MHz	
		5725 ~ 5850 MHz	
	Bluetooth	2402 ~ 2480 MHz	
Antenna Type	WWAN: PIFA Antenna WLAN: PIFA Antenna Bluetooth: PIFA Antenna		
Hotspot Function	N/A		
Exposure Category	General Population/Uncontrolled exposure		
EUT Stage	Portable Device		
Product	Type		
	☒ Production unit		☐ Identical prototype

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 2	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	ANSI/IEEE Std. C95.1-1999	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 941225 D01 v03r01	3G SAR MEAUREMENT PROCEDURES
6	FCC KDB 941225 D05 v02r05	SAR Evaluation Considerations for LTE Devices
7	FCC KDB 865664 D01 v01r04	SAR Measurement 100 MHz to 6 GHz
8	FCC KDB 865664 D02 v01r02	RF Exposure Reporting
9	FCC KDB 648474 D04 v01r03	SAR Evaluation Considerations for Wireless Handsets
10	KDB 248227 D01 v02r02	SAR Guidance for IEEE 802.11 (Wi-Fi) Transmitters

3.2 Device Category and SAR Limit

This device belongs to portable device category because its radiating structure is allowed to be used within 20 centimeters of the body of the user. Limit for General Population/Uncontrolled exposure should be applied for this device, it is 1.6 W/kg as averaged over any 1 gram of tissue.

Table of Exposure Limits:

Body Position	SAR Value (W/Kg)	
	General Population/ Uncontrolled Exposure	Occupational/ Controlled Exposure
Whole-Body SAR (averaged over the entire body)	0.08	0.4
Partial-Body SAR (averaged over any 1 gram of tissue)	1.60	8.0
SAR for hands, wrists, feet and ankles (averaged over any 10 grams of tissue)	4.0	20.0

NOTE:

General Population/Uncontrolled: Locations where there is the exposure of individuals who have no knowledge or control of their exposure. General population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

Occupational/Controlled: Locations where there is exposure that may be incurred by persons who are aware of the potential for exposure. In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

3.3 Test Result Summary

3.3.1 Highest SAR (1 g Value)

Frequency Band		Maximum Report SAR (W/kg) 1 g
		Body (Separation 0 mm)
GSM	GSM 850	0.403
	GSM 1900	0.377
WCDMA	Band 2	0.541
	Band 5	0.499
CDMA	BC 0	0.228
LTE	Band 5	0.154
	Band 7	0.368
	Band 38	0.572
	Band 41	0.439
WIFI	2.4 G	0.580
	5.3 G	0.729
	5.6 G	0.956
	5.8 G	1.015
Bluetooth	DH5	0.204
Limits (W/kg)		1.6
Test Verdict		Pass
Note 1: The highest Reported Body 1g SAR value is 1.015 W/kg.		
Note 2 The simultaneous transmission possibilities please refer to section 10.		

3.3.2 Highest Simultaneous SAR

Position	Simultaneous Configuration	Simultaneous SAR (W/kg)	Limit (W/kg)	Verdict
Body-worn	WWAN+5G WIFI MIMO	1.587	1.6	Pass

3.4 Test Uncertainty

3.4.1 Measurement uncertainty evaluation for SAR test

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in IEEE 1528 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 (10 g)	1g Ui (+-%)	10 g Ui (+-%)	Vi V _{eff}
Measurement System								
Probe calibration	5.8	N	1	1	1	5.80	5.80	∞
Axial Isotropy	3.5	R	$\sqrt{3}$	0.7	0.7	1.41	1.41	∞
Hemispherical Isotropy	5.9	R	$\sqrt{3}$	0.7	0.7	2.38	2.38	∞
Boundary effect	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	4.7	R	$\sqrt{3}$	1	1	2.71	2.71	∞
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	0.5	N	1	1	1	0.50	0.50	∞
Response Time	0.0	R	$\sqrt{3}$	1	1	0.00	0.00	∞
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	∞
Extrapolation, interpolation and integration Algorithms for Max. SAR Evaluation	2.3	R	$\sqrt{3}$	1	1	1.33	1.33	∞
Test sample Related								
Test sample positioning	2.6	N	1	1	1	2.60	2.60	N-1
Device Holder Uncertainty	3.0	N	1	1	1	3.00	3.00	N-1
Output power Variation - SAR drift measurement	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞
SAR scaling	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	∞
Phantom and Tissue Parameters								
Phantom Uncertainty (Shape and thickness tolerances)	4.0	R	$\sqrt{3}$	1	1	2.31	2.31	∞
SAR correction for deviation(in permittivity and conductivity)	2.0	N	1	1	0.84	2.00	1.68	∞
Liquid conductivity (temperature uncertainty)	2.5	R	$\sqrt{3}$	0.78	0.71	1.13	1.03	∞
Liquid conductivity - measurement uncertainty	5.0	N	1	0.78	0.71	3.90	3.55	M
Liquid permittivity (temperature uncertainty)	2.5	R	$\sqrt{3}$	0.23	0.26	0.33	0.38	∞
Liquid permittivity - measurement uncertainty	5.0	N	1	0.23	0.26	1.15	1.30	M
Combined Standard Uncertainty	-	RSS	-			10.72	10.56	-
Expanded Uncertainty (95% Confidence interval)	-	k	-			21.45	21.11	-

3.4.2 Measurement uncertainty evaluation for system check

This measurement uncertainty budget is suggested by IEEE 1528. The break down of the individual uncertainties is as follows:

Uncertainty Component	Tol (+ - %)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	V _i
Measurement System								
Probe calibration	5.8	N	1	1	1	5.80	5.30	∞
Axial Isotropy	3.5	R	$\sqrt{3}$	1	1	2.02	2.02	∞
Hemispherical Isotropy	5.9	R	$\sqrt{3}$	0	0	0.00	0.00	∞
Boundary effect	1.0	R	$\sqrt{3}$	1	1	0.58	0.56	∞
Probe Linearity	4.7	R	$\sqrt{3}$	1	1	2.71	2.71	∞
System detection limits	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Modulation response	0.0	R	$\sqrt{3}$	1	1	0.00	0.00	∞
Readout Electronics	0.5	N	1	1	1	0.50	0.50	∞
Response Time	0.0	R	$\sqrt{3}$	1	1	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	∞
Extrapolation, interpolation and integration Algorithms for Max. SAR Evaluation	2.3	R	$\sqrt{3}$	1	1	1.33	1.33	∞
Dipole								
Deviation of experimental dipole	5.5	N	1	1	1	5.00	5.00	∞
Dipole axis to liquid distance	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	∞
Power drift	0.5	R	$\sqrt{3}$	1	1	0.29	0.29	∞
Phantom and Tissue Parameters								
Phantom Uncertainty (Shape and thickness tolerances)	4.0	R	$\sqrt{3}$	1	1	2.31	2.31	∞
SAR correction for deviation(in permittivity and conductivity)	2.0	N	1	1	0.84	2.00	1.68	∞
Liquid conductivity (temperature uncertainty)	2.5	R	$\sqrt{3}$	0.78	0.71	1.13	1.02	∞
Liquid conductivity - measurement uncertainty	5.0	N	1	0.78	0.71	3.90	3.55	M
Liquid permittivity (temperature uncertainty)	2.5	R	$\sqrt{3}$	0.23	0.26	0.33	0.38	∞
Liquid permittivity - measurement uncertainty	5.0	N	1	0.23	0.26	1.15	1.30	M
Combined Standard Uncertainty	-	RSS	-			10.43	10.25	-
Expanded Uncertainty (95% Confidence interval)	-	k	-			20.86	20.51	-

4 SAR MEASUREMENT SYSTEM

4.1 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:

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

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

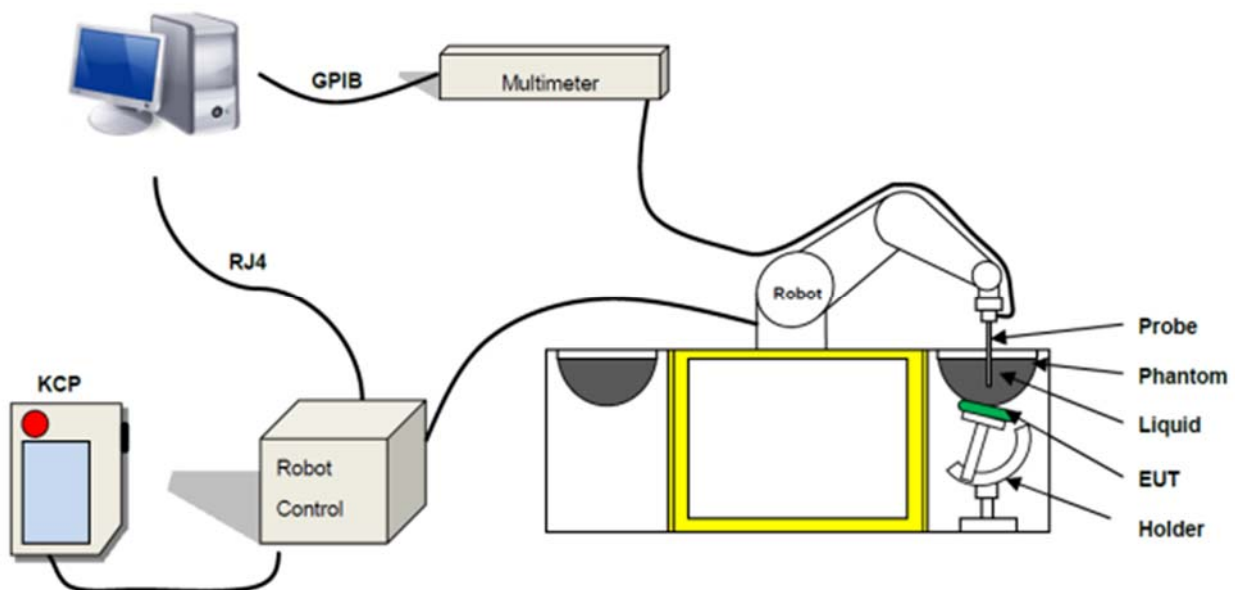
$$\text{SAR} = \frac{\sigma E^2}{\rho}$$

Where: σ is the conductivity of the tissue,

ρ is the mass density of the tissue and E is the RMS electrical field strength.

4.2 SATIMO SAR System

4.2.1 SATIMO SAR System Diagram



These measurements were performed with the automated near-field scanning system OPENSAR from SATIMO.

The system is based on a high precision robot (working range: 850 mm), which positions the probes with a positional repeatability of better than ± 0.02 mm. Special E- and H-field probes have been developed for measurements close to material discontinuity, the sensors of which are directly loaded with a Schottky diode and connected via highly resistive lines to the data acquisition unit.

The SAR measurements were conducted with dosimetric probe (manufactured by SATIMO), designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe has been calibrated according to the procedure described in SAR standard with accuracy of better than $\pm 10\%$. The spherical isotropy was evaluated with the procedure described in SAR standard and found to be better than ± 0.25 dB. The phantom used was the SAM Phantom as described in FCC supplement C, IEEE P1528.

4.2.2 Robot

The SATIMO SAR system uses the high precision robots from KUKA. For the 6-axis controller system, the robot controller version (KUKA) from KUKA is used. The KUKA robot series have many features that are important for our application:



- High precision (repeatability ± 0.035 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)

4.2.3 E-Field Probe

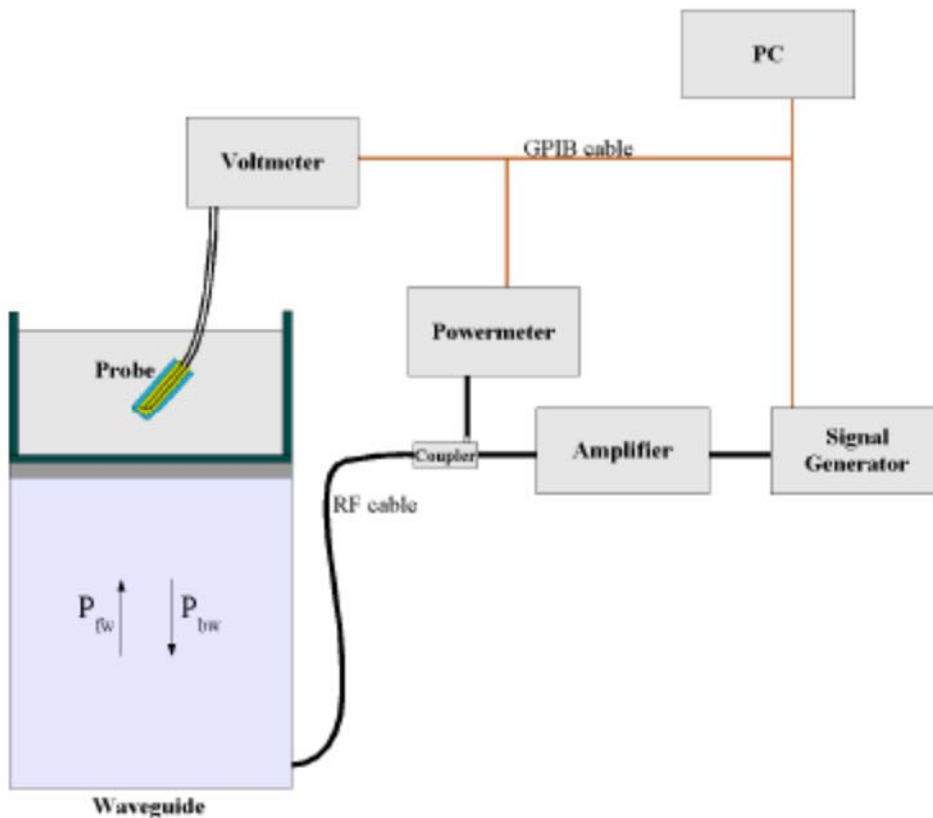
For the measurements the Specific Dosimetric E-Field Probe SN 34/15 EPGO 265 with following specifications is used

- Dynamic range: 0.01-100 W/kg
 - Tip Diameter : 2.5 mm
 - Lower detection limit : 10 mW/kg
(repeatability better than +/- 1mm)
 - Probe linearity: +/- 0.07 dB
 - Calibration range: 300 MHz to 6000 MHz for head & body simulating liquid.
- Angle between probe axis (evaluation axis) and surface normal line: less than 30°



E-Field Probe Calibration Process

Probe calibration is realized, in compliance with CENELEC EN 62209-1/-2 and IEEE 1528 std, with CALISAR, Antennessa proprietary calibration system. The calibration is performed with the IEC62209-1/2 annexe technique using reference guide at the five frequencies.



$$SAR = \frac{4(P_{fw} - P_{bw})}{ab\sigma} \cos^2 \left(\pi \frac{y}{a} \right) c^{(2\pi/\sigma)}$$

Where :

P_{fw} = Forward Power

P_{bw} = Backward Power

a and b = Waveguide Dimensions

l = 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.

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 the DCP is the diode compression point in mV.

4.2.4 Phantoms

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.

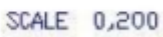
Photo of Phantom SN 30/13 SAM103



Photo of Phantom SN 30/13 SAM104



Serial Number	Positionner Material	Permittivity	Loss Tangent
SN 30/13 SAM103	Gelcoat with fiberglass	3.4	0.02
SN 30/13 SAM104	Gelcoat with fiberglass	3.4	0.02



SN 30/13 SAM103

4.2.5 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 ± 0.5 mm would produce a SAR uncertainty of ± 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.

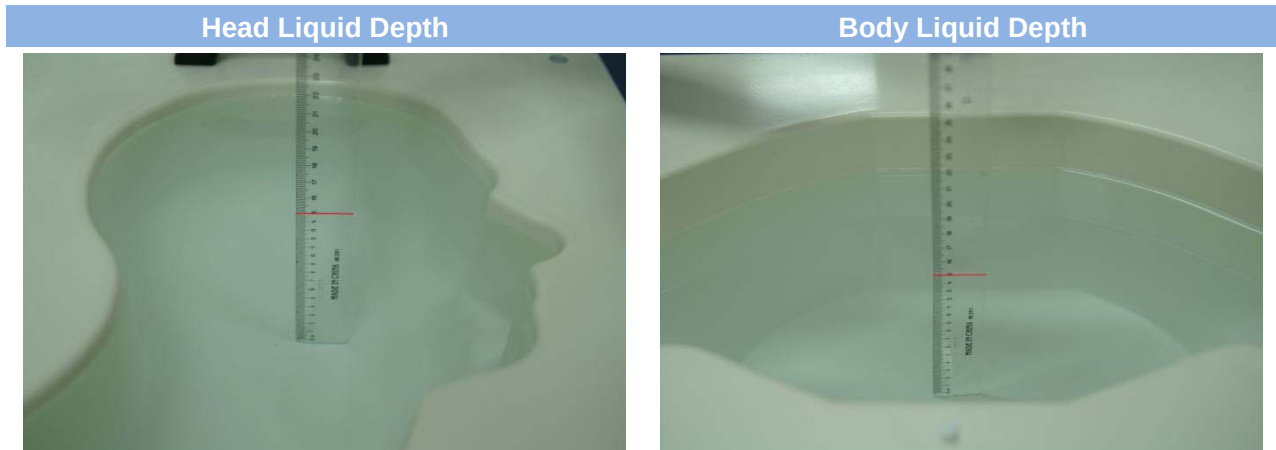


Serial Number	Holder Material	Permittivity	Loss Tangent
SN 25/13 MSH87	Deirin	3.7	0.005
SN 25/13 MSH88	Deirin	3.7	0.005

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° .

4.2.6 Simulating Liquid

For SAR measurement of the field distribution inside the phantom, the phantom must be filled with homogeneous tissue simulating liquid to a depth of at least 15 cm. 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. The nominal dielectric values of the tissue simulating liquids in the phantom and the tolerance of 5%.



The following table gives the recipes for tissue simulating liquid and the theoretical Conductivity/Permittivity.

Head (Reference IEEE1528)								
Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity σ (S/m)	Permittivity ϵ
750	41.1	57.0	0.2	1.4	0.2	0	0.89	41.9
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
900	40.3	57.9	0.2	1.4	0.2	0	0.97	41.5
1800, 1900, 2000	55.2	0	0	0.3	0	44.5	1.4	40.0
2450	55.0	0	0	0.1	0	44.9	1.80	39.2
2600	54.9	0	0	0.1	0	45.0	1.96	39.0
Frequency(MHz)	Water (%)	Hexyl Carbitol (%)			Triton X-100 (%)		Conductivity σ (S/m)	Permittivity ϵ
5200	62.52	17.24			17.24		4.66	36.0
5800	62.52	17.24			17.24		5.27	35.3
Body (From instrument manufacturer)								
Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity σ (S/m)	Permittivity ϵ
750	51.7	47.2	0	0.9	0.1	0	0.96	55.5
835	50.8	48.2	0	0.9	0.1	0	0.97	55.2
900	50.8	48.2	0	0.9	0.1	0	1.05	55.0
1800, 1900, 2000	70.2	0	0	0.4	0	29.4	1.52	53.3
2450	68.6	0	0	0.1	0	31.3	1.95	52.7
2600	68.2	0	0	0.1	0	31.7	2.16	52.5

Frequency(MHz)	Water	DGBE (%)	Salt (%)	Conductivity σ (S/m)	Permittivity ϵ
5200	78.60	21.40	/	5.54	47.86
5800	78.50	21.40	0.1	6.0	48.20

5 SYSTEM VERIFICATION

5.1 Antenna Port Test Requirement

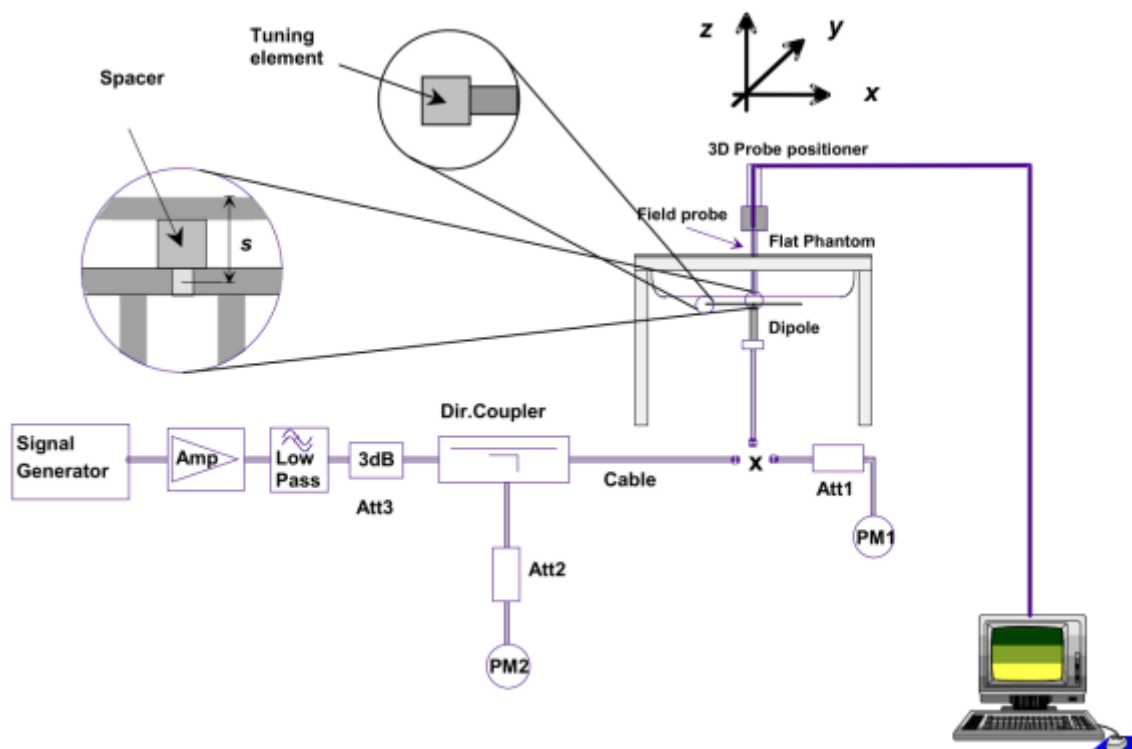
The SATIMO SAR system is equipped with one or more system validation kits. These units together with the predefined measurement procedures within the SATIMO software enable the user to conduct the system performance check and system validation. System validation kit includes a dipole, tripod holder to fix it underneath the flat phantom and a corresponding distance holder.

5.2 Purpose of System 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.

5.3 System Check 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 that comes from a signal generator. 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. The equipment setup is shown below:

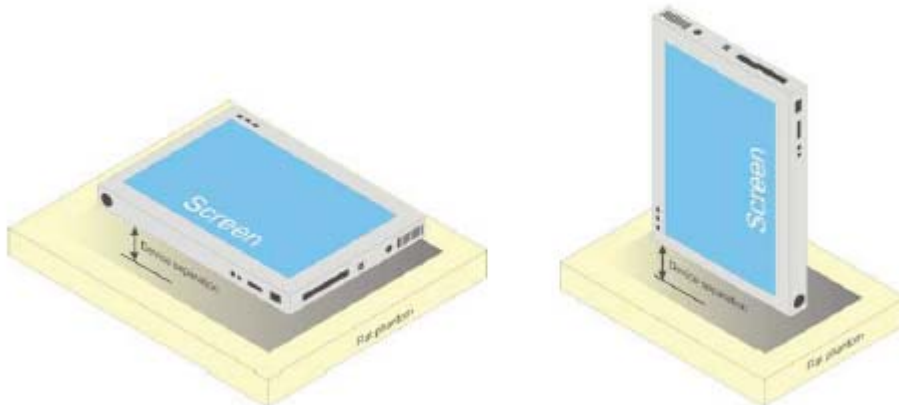


6 EUT TEST POSITION CONFIGURATIONS

According to KDB 648474 D04 Handset , handsets are tested for SAR compliance in head, body-worn accessory and other use configurations described in the following subsections.

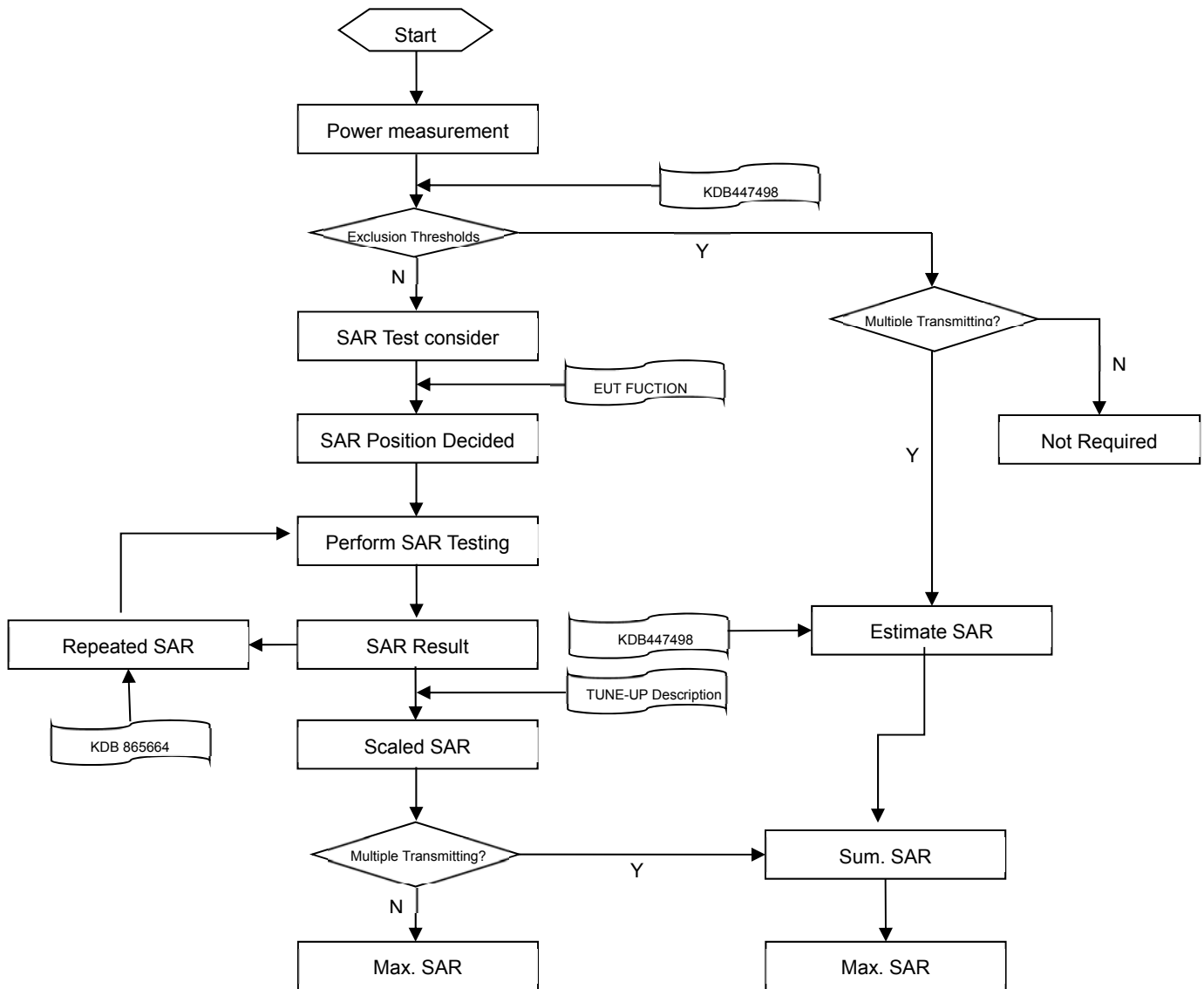
6.1 Body Position Conditions

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



7 SAR MEASUREMENT PROCEDURES

7.1 SAR Measurement Process Diagram



7.2 SAR Scan General Requirements

Probe boundary effect error compensation is required for measurements with the probe tip closer than half a probe tip diameter to the phantom surface. Both the probe tip diameter and sensor offset distance must satisfy measurement protocols; to ensure probe boundary effect errors are minimized and the higher fields closest to the phantom surface can be correctly measured and extrapolated to the phantom surface for computing 1-g SAR. Tolerances of the post-processing algorithms must be verified by the test laboratory for the scan resolutions used in the SAR measurements, according to the reference distribution functions specified in IEEE Std 1528-2013.

			≤3GHz	>3GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5±1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location			30°±1°	20°±1°
Maximum area scan spatial resolution: Δx Area , Δy Area			≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3–4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
			When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan spatial resolution: Δx Zoom , Δy Zoom			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3–4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: Δz Zoom (n)		≤ 5 mm	3–4 GHz: ≤ 4 mm
				4–5 GHz: ≤ 3 mm
				5–6 GHz: ≤ 2 mm
	graded grid	Δ z Zoom (1): between 1st two points closest to phantom surface	≤ 4 mm	3–4 GHz: ≤ 3 mm
				4–5 GHz: ≤ 2.5 mm
				5–6 GHz: ≤ 2 mm
	Δ z Zoom (n>1): between subsequent points		≤ 1.5·Δz Zoom (n-1)	
Minimum zoom scan volume	x, y, z		≥30 mm	3–4 GHz: ≥ 28 mm
				4–5 GHz: ≥ 25 mm
				5–6 GHz: ≥ 22 mm

Note:

1. δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.
2. * When zoom scan is required and the reported SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

7.3 SAR Measurement Procedure

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.

7.4 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 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 D01 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.

8 CONDUCTED RF OUPUT POWER

8.1 GSM

GPRS 850								
GSM850 Band	Burst Average Power(dBm)			Tune-up Limit (dBm)	Frame-Averaged power (dBm)			Tune-up Limit (dBm)
Channel	128	190	251		128	190	251	
GSM (GMSK, 1-Slot)	30.78	31.10	31.05	31.50	21.59	21.91	21.86	22.31
GPRS (GMSK, 1-Slot)	30.76	31.06	31.13	31.50	21.57	21.87	21.94	22.31
GPRS (GMSK, 2-Slots)	29.48	29.94	29.87	30.00	23.35	23.81	23.74	23.87
GPRS (GMSK, 3-Slots)	27.43	27.93	27.71	28.00	23.01	23.51	23.29	23.58
GPRS (GMSK, 4-Slots)	26.00	26.54	26.34	27.00	22.82	23.36	23.16	23.82
EGPRS (8PSK, 1-Slot)	29.47	29.80	29.83	30.00	20.28	20.61	20.64	20.81
EGPRS (8PSK, 2-Slots)	26.63	27.03	26.73	27.50	20.50	20.90	20.60	21.37
EGPRS (8PSK, 3-Slots)	24.89	24.80	25.04	25.50	20.47	20.38	20.62	21.08
EGPRS (8PSK, 4-Slots)	23.61	23.44	23.66	24.00	20.43	20.26	20.48	20.82
GPRS 1900								
GSM1900 Band	Burst Average Power(dBm)			Tune-up Limit (dBm)	Frame-Averaged power(dBm)			Tune-up Limit (dBm)
Channel	512	661	810		512	661	810	
GSM (GMSK, 1-Slot)	29.91	29.94	29.74	30.00	20.72	20.75	20.55	20.81
GPRS (GMSK, 1-Slot)	29.78	29.85	29.62	30.00	20.59	20.66	20.43	20.81
GPRS (GMSK, 2-Slots)	25.52	26.68	26.47	27.00	19.39	20.55	20.34	20.87
GPRS (GMSK, 3-Slots)	24.47	24.47	24.36	25.00	20.05	20.05	19.94	20.58
GPRS (GMSK, 4-Slots)	23.26	23.13	23.05	24.00	20.08	19.95	19.87	20.82
EGPRS (8PSK, 1-Slot)	28.65	28.87	28.71	29.00	19.46	19.68	19.52	19.81
EGPRS (8PSK, 2-Slots)	26.05	25.73	25.69	26.00	19.92	19.60	19.56	19.87
EGPRS (8PSK, 3-Slots)	23.94	23.69	23.73	24.00	19.52	19.27	19.31	19.58
EGPRS (8PSK, 4-Slots)	22.50	22.28	22.28	23.00	19.32	19.10	19.10	19.82

Note¹: SAR testing was performed on the maximum frame-averaged power mode.

Note²: The frame-averaged power is linearly proportion to the slot number configured and it is linearly scaled the maximum burst-averaged power based on time slots. The calculated method is shown as below:

Frame-averaged power = Burst averaged power (1 Tx Slot) – 9.19 dB

Frame-averaged power = Burst averaged power (2 Tx Slots) – 6.13 dB

Frame-averaged power = Burst averaged power (3 Tx Slots) - 4.42dB

Frame-averaged power = Burst averaged power (4 Tx Slots) – 3.18 dB

8.2 WCDMA

WCDMA	Band 2				Band 5			
Channel	9262	9400	9538	Tune-up Limit (dBm)	4132	4182	4233	Tune-up Limit (dBm)
RMC 12.2Kbps	22.15	22.01	21.94	23.00	22.37	22.47	22.48	23.00
HSDPA Subtest-1	21.48	21.29	21.22	22.00	21.59	21.68	21.69	22.00
HSDPA Subtest-2	21.51	21.34	21.23	22.00	21.62	21.71	21.69	22.00
HSDPA Subtest-3	21.03	20.86	20.75	21.50	21.12	21.23	21.20	22.00
HSDPA Subtest-4	21.00	20.85	20.74	21.50	21.15	21.22	21.21	22.00
HSUPA Subtest-1	21.16	20.90	20.97	21.50	20.79	20.89	20.90	21.00
HSUPA Subtest-2	19.57	19.34	19.23	20.00	19.60	19.74	19.59	20.00
HSUPA Subtest-3	20.44	20.29	20.16	21.50	20.60	20.74	20.64	21.00
HSUPA Subtest-4	19.26	19.06	19.19	20.00	19.46	19.56	19.40	20.00
HSUPA Subtest-5	21.44	21.27	21.24	21.50	21.56	21.66	21.69	22.00

8.3 CDMA

CDMA	BC0			
Channel	1013	384	777	Tune-up Limit (dBm)
1xRTT RC1 SO55	23.13	23.14	23.42	24.00
1xRTT RC3 SO55	23.19	23.39	23.43	24.00
1xRTT RC3 SO32 (FCH)	23.25	23.31	23.62	24.00
1xRTT RC3 SO32 (SCH)	23.15	23.18	23.38	24.00
1xEVDO Rel.0 RTAP 153.6kbps	23.20	23.17	23.37	23.50
1xEVDO Rel.A RETAP: 4096	23.13	23.26	23.39	23.50

8.4 LTE

FDD LTE Band 5									
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	20450	20525	20600		20450	20525	20600	
10 MHz	1 (RB_Pos:0)	22.31	22.32	22.44	23.00	21.29	21.76	21.54	22.00
	1 (RB_Pos:25)	22.25	22.26	22.37	23.00	21.22	21.71	21.46	22.00
	1 (RB_Pos:49)	22.28	22.27	22.39	23.00	21.24	21.75	21.43	22.00
	25 (RB_Pos:0)	21.36	21.35	21.42	22.00	20.39	20.41	20.60	21.00
	25 (RB_Pos:12)	21.41	21.33	21.43	22.00	20.52	20.43	20.58	21.00
	25 (RB_Pos:25)	21.36	21.27	21.40	22.00	20.46	20.41	20.53	21.00
	50 (RB_Pos:0)	21.42	21.34	21.40	22.00	20.50	20.37	20.53	21.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	20425	20525	20625		20425	20525	20625	
5 MHz	1 (RB_Pos:0)	22.30	22.30	22.36	23.00	21.53	21.84	21.55	22.00
	1 (RB_Pos:13)	22.33	22.33	22.50	23.00	21.56	21.92	21.65	22.00
	1 (RB_Pos:24)	22.17	22.35	22.37	23.00	21.47	21.90	21.60	22.00
	12 (RB_Pos:0)	21.31	21.31	21.41	22.00	20.47	20.52	20.55	21.00
	12 (RB_Pos:6)	21.33	21.34	21.53	22.00	20.47	20.51	20.61	21.00
	12 (RB_Pos:13)	21.27	21.24	21.46	22.00	20.42	20.49	20.60	21.00
	25 (RB_Pos:0)	21.33	21.30	21.40	22.00	20.43	20.41	20.41	21.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	20415	20525	20635		20415	20525	20635	
3.0 MHz	1 (RB_Pos:0)	22.33	22.28	22.48	23.00	21.29	21.73	21.52	22.00
	1 (RB_Pos:8)	22.25	22.21	22.41	23.00	21.26	21.69	21.50	22.00
	1 (RB_Pos:14)	22.24	22.26	22.41	23.00	21.25	21.68	21.46	22.00
	8 (RB_Pos:0)	21.32	21.30	21.47	22.00	20.50	20.43	20.56	21.00
	8 (RB_Pos:3)	21.34	21.34	21.49	22.00	20.53	20.47	20.64	21.00
	8 (RB_Pos:7)	21.28	21.30	21.45	22.00	20.47	20.42	20.54	21.00
	15 (RB_Pos:0)	21.35	21.32	21.50	22.00	20.40	20.39	20.48	21.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	20407	20525	20643		20407	20525	20643	
1.4 MHz	1 (RB_Pos:0)	22.22	22.21	22.34	23.00	21.40	21.66	21.42	22.00
	1 (RB_Pos:3)	22.27	22.23	22.43	23.00	21.50	21.69	21.45	22.00
	1 (RB_Pos:5)	22.17	22.22	22.38	23.00	21.40	21.60	21.42	22.00
	3 (RB_Pos:0)	22.18	22.21	22.37	23.00	21.34	21.45	21.56	22.00
	3 (RB_Pos:1)	22.29	22.27	22.41	23.00	21.43	21.50	21.62	22.00

	3 (RB_Pos:3)	22.21	22.22	22.37	23.00	21.34	21.43	21.57	22.00
	6 (RB_Pos:0)	21.19	21.20	21.41	22.00	20.45	20.22	20.63	21.00

FDD LTE Band 7									
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	20850	21100	21350		20850	21100	21350	
20 MHz	1 (RB_Pos:0)	18.51	18.68	18.48	19.00	18.17	18.19	17.91	18.50
	1 (RB_Pos:50)	18.50	18.61	18.41	19.00	18.09	18.12	17.91	18.50
	1 (RB_Pos:99)	18.56	18.63	18.41	19.00	18.18	18.14	17.94	18.50
	50 (RB_Pos:0)	17.53	17.67	17.53	18.00	16.65	16.81	16.55	17.00
	50 (RB_Pos:25)	17.58	17.70	17.55	18.00	16.63	16.83	16.58	17.00
	50 (RB_Pos:50)	17.61	17.68	17.51	18.00	16.74	16.74	16.53	17.00
	100 (RB_Pos:0)	17.60	17.65	17.52	18.00	16.76	16.78	16.58	17.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	20825	21100	21375		20825	21100	21375	
15 MHz	1 (RB_Pos:0)	18.48	18.66	18.48	19.00	17.56	18.10	17.99	18.50
	1 (RB_Pos:38)	18.43	18.59	18.44	19.00	17.47	18.07	17.94	18.50
	1 (RB_Pos:74)	18.48	18.58	18.47	19.00	17.51	18.09	17.94	18.50
	36 (RB_Pos:0)	17.54	17.66	17.46	18.00	16.59	16.82	16.60	17.00
	36 (RB_Pos:20)	17.53	17.65	17.53	18.00	16.60	16.84	16.58	17.00
	36 (RB_Pos:39)	17.50	17.64	17.47	18.00	16.58	16.80	16.60	17.00
	75 (RB_Pos:0)	17.47	17.61	17.49	18.00	16.64	16.79	16.58	17.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	20800	21100	21400		20800	21100	21400	
10 MHz	1 (RB_Pos:0)	18.47	18.59	18.49	19.00	17.51	18.08	17.55	18.50
	1 (RB_Pos:25)	18.44	18.58	18.43	19.00	17.49	18.08	17.56	18.50
	1 (RB_Pos:49)	18.49	18.62	18.49	19.00	17.47	18.06	17.55	18.50
	25 (RB_Pos:0)	17.53	17.67	17.47	18.00	16.57	16.77	16.62	17.00
	25 (RB_Pos:12)	17.53	17.67	17.52	18.00	16.59	16.83	16.65	17.00
	25 (RB_Pos:25)	17.49	17.67	17.51	18.00	16.62	16.80	16.63	17.00
	50 (RB_Pos:0)	17.47	17.68	17.49	18.00	16.57	16.77	16.57	17.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	20775	21100	21425		20775	21100	21425	
5 MHz	1 (RB_Pos:0)	18.46	18.64	18.41	19.00	17.77	18.20	17.66	18.50
	1 (RB_Pos:13)	18.52	18.71	18.51	19.00	17.84	18.31	17.74	18.50
	1 (RB_Pos:24)	18.45	18.64	18.44	19.00	17.75	18.23	17.68	18.50

	12 (RB_Pos:0)	17.47	17.65	17.47	18.00	16.65	16.85	16.60	17.00
	12 (RB_Pos:6)	17.53	17.67	17.48	18.00	16.70	16.87	16.63	17.00
	12 (RB_Pos:13)	17.48	17.67	17.49	18.00	16.66	16.88	16.58	17.00
	25 (RB_Pos:0)	17.49	17.65	17.47	18.00	16.61	16.79	16.52	17.00

TDD LTE Band 38									
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	37850	38000	38150		37850	38000	38150	
20 MHz	1 (RB_Pos:0)	22.51	22.75	22.80	23.00	21.91	21.97	22.26	23.00
	1 (RB_Pos:50)	22.51	22.55	22.81	23.00	21.80	21.98	22.22	23.00
	1 (RB_Pos:99)	22.58	22.48	22.74	23.00	21.96	21.84	22.27	23.00
	50 (RB_Pos:0)	21.61	21.77	21.73	22.00	20.76	20.88	21.02	22.00
	50 (RB_Pos:25)	21.75	21.67	21.77	22.00	20.77	20.97	20.89	22.00
	50 (RB_Pos:50)	21.69	21.71	21.81	22.00	20.77	20.91	21.03	22.00
	100 (RB_Pos:0)	21.65	21.75	21.72	22.00	20.78	20.87	20.95	22.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	37825	38000	38175		37825	38000	38175	
15 MHz	1 (RB_Pos:0)	22.42	22.71	22.77	23.00	21.87	22.28	22.15	23.00
	1 (RB_Pos:38)	22.38	22.60	22.81	23.00	21.73	22.16	22.21	23.00
	1 (RB_Pos:74)	22.59	22.63	22.73	23.00	21.89	22.16	22.07	23.00
	36 (RB_Pos:0)	21.43	21.62	21.69	22.00	20.55	20.78	20.80	21.00
	36 (RB_Pos:20)	21.43	21.64	21.79	22.00	20.55	20.77	20.93	21.00
	36 (RB_Pos:39)	21.50	21.55	21.67	22.00	20.66	20.76	20.86	21.00
	75 (RB_Pos:0)	21.51	21.58	21.68	22.00	20.68	20.72	20.80	21.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	37800	38000	38200		37800	38000	38200	
10 MHz	1 (RB_Pos:0)	22.42	22.66	22.76	23.00	21.81	22.17	22.26	23.00
	1 (RB_Pos:25)	22.43	22.67	22.71	23.00	21.76	22.15	22.24	23.00
	1 (RB_Pos:49)	22.42	22.67	22.59	23.00	21.81	22.11	22.20	23.00
	25 (RB_Pos:0)	21.48	21.71	21.79	22.00	20.65	20.80	20.93	21.00
	25 (RB_Pos:12)	21.47	21.67	21.74	22.00	20.62	20.79	20.95	21.00
	25 (RB_Pos:25)	21.50	21.66	21.73	22.00	20.63	20.80	20.95	21.00
	50 (RB_Pos:0)	21.54	21.68	21.78	22.00	20.63	20.81	21.04	22.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	37775	38000	38225		37775	38000	38225	
5 MHz	1 (RB_Pos:0)	22.48	22.64	22.78	23.00	21.82	22.03	22.29	23.00

	1 (RB_Pos:13)	22.42	22.61	22.79	23.00	21.93	22.07	22.34	23.00
	1 (RB_Pos:24)	22.50	22.64	22.71	23.00	21.84	22.02	22.26	23.00
	12 (RB_Pos:0)	21.54	21.68	21.81	22.00	20.71	20.87	20.95	21.00
	12 (RB_Pos:6)	21.67	21.62	21.74	22.00	20.67	20.83	20.96	21.00
	12 (RB_Pos:13)	21.55	21.76	21.79	22.00	20.74	20.87	21.04	22.00
	25 (RB_Pos:0)	21.53	21.63	21.70	22.00	20.68	20.76	20.83	21.00

TDD LTE Band 41									
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	40340	40740	41140		40340	40740	41140	
20 MHz	1 (RB_Pos:0)	21.79	22.04	21.79	22.50	21.19	21.34	21.22	22.00
	1 (RB_Pos:50)	21.77	21.96	21.79	22.50	21.12	21.21	21.19	22.00
	1 (RB_Pos:99)	21.82	21.89	21.84	22.50	21.20	21.18	21.28	22.00
	50 (RB_Pos:0)	20.87	21.13	20.82	21.50	19.93	20.23	19.93	21.00
	50 (RB_Pos:25)	20.87	21.10	20.80	21.50	19.94	20.18	19.93	21.00
	50 (RB_Pos:50)	20.88	20.97	20.79	21.50	19.93	20.15	19.97	21.00
	100 (RB_Pos:0)	20.86	21.04	20.79	21.50	19.94	20.16	19.90	21.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	40315	40740	41165		40315	40740	41165	
15 MHz	1 (RB_Pos:0)	21.77	22.03	21.79	22.50	21.09	21.55	21.14	22.00
	1 (RB_Pos:38)	21.78	21.97	21.75	22.50	21.09	21.46	21.08	22.00
	1 (RB_Pos:74)	21.82	21.99	21.84	22.50	21.13	21.46	21.24	22.00
	36 (RB_Pos:0)	20.83	21.07	20.74	21.50	19.87	20.14	19.86	21.00
	36 (RB_Pos:20)	20.91	21.08	20.81	21.50	19.97	20.17	19.80	21.00
	36 (RB_Pos:39)	20.78	20.93	20.73	21.50	19.91	20.08	19.89	21.00
	75 (RB_Pos:0)	20.81	21.00	20.73	21.50	19.88	20.11	19.83	21.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit (dBm)	16QAM			Tune up limit (dBm)
	Channel	40290	40740	41190		40290	40740	41190	
10 MHz	1 (RB_Pos:0)	21.76	22.02	21.73	22.50	21.12	21.50	21.14	22.00
	1 (RB_Pos:25)	21.74	21.98	21.74	22.50	21.11	21.44	21.15	22.00
	1 (RB_Pos:49)	21.80	21.99	21.77	22.50	21.14	21.43	21.28	22.00
	25 (RB_Pos:0)	20.85	21.09	20.75	21.50	19.92	20.14	19.89	21.00
	25 (RB_Pos:12)	20.87	21.04	20.78	21.50	19.97	20.19	19.93	21.00
	25 (RB_Pos:25)	20.86	21.02	20.76	21.50	19.91	20.12	19.85	21.00
	50 (RB_Pos:0)	20.82	21.03	20.73	21.50	19.97	20.17	19.92	21.00
Bandwidth (MHz)	RB Set	Power (dBm)							
		QPSK			Tune up limit	16QAM			Tune up limit
	Channel	40265	40740	41215		40265	40740	41215	

					(dBm)				(dBm)
5 MHz	1 (RB_Pos:0)	21.75	22.06	21.76	22.50	21.10	21.34	21.16	22.00
	1 (RB_Pos:13)	21.90	22.08	21.85	22.50	21.19	21.39	21.20	22.00
	1 (RB_Pos:24)	21.80	21.99	21.79	22.50	21.06	21.29	21.22	22.00
	12 (RB_Pos:0)	20.78	20.98	20.74	21.50	20.01	20.12	19.98	21.00
	12 (RB_Pos:6)	20.88	21.08	20.86	21.50	20.05	20.00	20.07	21.00
	12 (RB_Pos:13)	20.83	21.02	20.88	21.50	20.06	20.01	20.04	21.00
	25 (RB_Pos:0)	20.85	21.05	20.75	21.50	19.94	20.21	19.88	21.00

8.5 WIFI

8.5.1 2.4G WIFI (Main Antenna)

Band (GHz)	Mode	Channel	Freq. (MHz)	Peak Power (dBm)	Tune-up Limit (dBm)	SAR Test Require.
2.4 (2.4~2.4835)	802.11b	1	2412	13.12	13.50	No
		6	2437	13.16	13.50	Yes
		11	2462	12.15	12.50	No
	802.11g	1	2412	12.13	12.50	No
		6	2437	12.09	12.50	No
		11	2462	12.17	12.50	No
	802.11n(HT20)	1	2412	12.04	12.50	No
		6	2437	12.03	12.50	No
		11	2462	12.02	12.50	No
	802.11n(HT40)	3	2422	12.01	12.50	No
		6	2437	11.98	12.50	No
		9	2452	11.99	12.50	No

8.5.2 2.4G WIFI (Aux. Antenna)

Band (GHz)	Mode	Channel	Freq. (MHz)	Peak Power (dBm)	Tune-up Limit (dBm)	SAR Test Require.
2.4 (2.4~2.4835)	802.11b	1	2412	13.12	13.50	No
		6	2437	13.25	13.50	Yes
		11	2462	12.20	12.50	No
	802.11g	1	2412	12.03	12.50	No
		6	2437	12.14	12.50	No
		11	2462	12.06	12.50	No
	802.11n(HT20)	1	2412	12.23	12.50	No
		6	2437	12.24	12.50	No
		11	2462	12.22	12.50	No
	802.11n(HT40)	3	2422	12.01	12.50	No
		6	2437	12.00	12.50	No
		9	2452	11.98	12.50	No

8.5.3 2.4G WIFI (MIMO)

Band (GHz)	Mode	Channel	Freq. (MHz)	Peak Power (dBm)	Tune-up Limit (dBm)	SAR Test Require.
2.4 (2.4~2.4835)	802.11b	1	2412	16.16	16.50	Yes
		6	2437	16.14	16.50	No
		11	2462	15.09	15.50	No
	802.11g	1	2412	15.04	15.50	No
		6	2437	15.13	15.50	No
		11	2462	15.17	15.50	No
	802.11n(HT20)	1	2412	15.08	15.50	No
		6	2437	15.14	15.50	No
		11	2462	15.14	15.50	No
	802.11n(HT40)	3	2422	15.02	15.50	No
		6	2437	14.99	15.50	No
		9	2452	14.96	15.50	No

8.5.4 5G WIFI (Main Antenna)

Band (GHz)	Mode	Channel	Freq. (MHz)	Peak Power (dBm)	Tune-up Limit (dBm)	SAR Test Require.
5.2 (5.15~5.25)	802.11a	36	5180	12.03	12.50	No
		44	5220	12.06	12.50	No
		48	5240	12.09	12.50	No
	802.11n(HT20)	36	5180	12.23	12.50	No
		44	5220	12.24	12.50	No
		48	5240	12.04	12.50	No
	802.11n(HT40)	38	5190	11.08	11.50	No
		46	5230	11.05	11.50	No
	802.11ac(VHT20)	36	5180	11.23	11.50	No
		44	5220	11.24	11.50	No
		48	5240	11.03	11.50	No
	802.11ac(VHT40)	38	5190	11.02	11.50	No
		46	5230	11.01	11.50	No
5.3 (5.25~5.35)	802.11a	52	5260	12.02	12.50	No
		60	5300	11.95	12.50	No
		64	5320	12.06	12.50	Yes
	802.11n(HT20)	52	5260	12.20	12.50	No
		60	5300	12.18	12.50	No
		64	5320	12.21	12.50	No
	802.11n(HT40)	54	5270	11.04	11.50	No
		62	5310	11.02	11.50	No
	802.11ac(VHT20)	52	5260	11.21	11.50	No
		60	5300	11.18	11.50	No
		64	5320	11.19	11.50	No
	802.11ac(VHT40)	54	5270	11.04	11.50	No
		62	5310	11.01	11.50	No
5.6 (5.47~5.725)	802.11a	100	5500	12.15	12.50	Yes
		116	5580	12.01	12.50	No
		140	5700	12.18	12.50	Yes
		144	5720	12.15	12.50	Yes
	802.11n(HT20)	100	5500	11.98	12.50	No
		116	5580	12.01	12.50	No
		140	5700	12.02	12.50	No
		144	5720	12.00	12.50	No
	802.11n(HT40)	102	5510	11.05	11.50	No
		118	5590	11.09	11.50	No
		134	5670	11.05	11.50	No
		142	5710	11.03	11.50	No
	802.11ac(VHT20)	100	5500	11.05	11.50	No

		116	5580	11.01	11.50	No
		140	5700	10.92	11.50	No
		144	5720	11.08	11.50	No
	802.11ac(VHT40)	102	5510	11.05	11.50	No
		118	5590	11.05	11.50	No
		134	5670	11.01	11.50	No
		142	5710	11.04	11.50	No
	802.11ac(VHT80)	106	5530	9.35	10.50	No
		122	5610	9.29	10.50	No
		138	5690	9.25	10.50	No
5.8 (5.725~5.850)	802.11a	149	5745	11.98	12.50	Yes
		157	5785	12.25	12.50	Yes
		165	5825	12.11	12.50	No
	802.11n(HT20)	149	5745	12.22	12.50	No
		157	5785	12.20	12.50	No
		165	5825	11.93	12.50	No
	802.11n(HT40)	151	5755	11.02	11.50	No
		159	5795	11.01	11.50	No
	802.11ac(VHT20)	149	5745	11.21	11.50	No
		157	5785	11.24	11.50	No
		165	5825	11.23	11.50	No
	802.11ac(VHT40)	151	5755	11.03	11.50	No
		159	5795	11.02	11.50	No
	802.11ac(VHT80)	155	5775	9.52	10.50	No

Note: When multiple channel bandwidth configurations in a frequency band have the same maximum Tune-Up output power, the test configuration is determined by applying the following steps sequentially.

- 1) The largest channel bandwidth configuration is selected among the multiple configurations in a frequency band with the same maximum Tune-Up output power.
- 2) If multiple configurations have the same maximum Tune-Up output power and largest channel bandwidth, the lowest order modulation among the largest channel bandwidth configurations is selected.
- 3) If multiple configurations have the same maximum Tune-Up output power, largest channel bandwidth and lowest order modulation is selected.
- 4) When multiple transmission modes (802.11a/n/ac) have the same maximum Tune-Up output power, largest channel bandwidth, lowest order modulation and lowest data rate, the lowest order 802.11 mode is selected; i.e., 802.11a is chosen over 802.11n then ac.

8.5.5 5G WIFI (Aux. Antenna)

Band (GHz)	Mode	Channel	Freq. (MHz)	Peak Power (dBm)	Tune-up Limit (dBm)	SAR Test Require.
5.2 (5.15~5.25)	802.11a	36	5180	12.23	12.50	No
		44	5220	12.17	12.50	No
		48	5240	12.11	12.50	No
	802.11n(HT20)	36	5180	12.21	12.50	No
		44	5220	12.01	12.50	No
		48	5240	12.24	12.50	No
	802.11n(HT40)	38	5190	11.04	11.50	No
		46	5230	10.94	11.50	No
	802.11ac(VHT20)	36	5180	11.06	11.50	No
		44	5220	11.07	11.50	No
		48	5240	11.25	11.50	No
	802.11ac(VHT40)	38	5190	11.03	11.50	No
		46	5230	11.09	11.50	No
5.3 (5.25~5.35)	802.11a	52	5260	12.03	12.50	No
		60	5300	12.21	12.50	Yes
		64	5320	12.18	12.50	No
	802.11n(HT20)	52	5260	12.03	12.50	No
		60	5300	12.06	12.50	No
		64	5320	12.03	12.50	No
	802.11n(HT40)	54	5270	11.07	11.50	No
		62	5310	11.08	11.50	No
	802.11ac(VHT20)	52	5260	11.05	11.50	No
		60	5300	11.07	11.50	No
		64	5320	11.02	11.50	No
	802.11ac(VHT40)	54	5270	11.05	11.50	No
		62	5310	11.07	11.50	No
5.6 (5.47~5.725)	802.11a	100	5500	12.01	12.50	No
		116	5580	12.13	12.50	Yes
		140	5700	11.97	12.50	No
		144	5720	12.06	12.50	No
	802.11n(HT20)	100	5500	12.22	12.50	No
		116	5580	12.02	12.50	No
		140	5700	12.24	12.50	No
		144	5720	12.25	12.50	No
	802.11n(HT40)	102	5510	11.02	11.50	No
		118	5590	11.00	11.50	No
		134	5670	11.03	11.50	No
		142	5710	11.09	11.50	No
	802.11ac(VHT20)	100	5500	11.25	11.50	No

		116	5580	11.01	11.50	No
		140	5700	11.25	11.50	No
		144	5720	11.24	11.50	No
	802.11ac(VHT40)	102	5510	11.04	11.50	No
		118	5590	10.97	11.50	No
		134	5670	11.03	11.50	No
		142	5710	11.05	11.50	No
	802.11ac(VHT80)	106	5530	9.62	10.50	No
		122	5610	9.48	10.50	No
		138	5690	9.45	10.50	No
5.8 (5.725~5.850)	802.11a	149	5745	12.16	12.50	No
		157	5785	12.09	12.50	No
		165	5825	12.25	12.50	Yes
	802.11n(HT20)	149	5745	12.01	12.50	No
		157	5785	11.88	12.50	No
		165	5825	12.10	12.50	No
	802.11n(HT40)	151	5755	11.03	11.50	No
		159	5795	11.02	11.50	No
	802.11ac(VHT20)	149	5745	11.07	11.50	No
		157	5785	11.01	11.50	No
		165	5825	11.03	11.50	No
	802.11ac(VHT40)	151	5755	11.02	11.50	No
		159	5795	11.03	11.50	No
	802.11ac(VHT80)	155	5775	9.54	10.50	No

Note: When multiple channel bandwidth configurations in a frequency band have the same maximum Tune-Up output power, the test configuration is determined by applying the following steps sequentially.

- 1) The largest channel bandwidth configuration is selected among the multiple configurations in a frequency band with the same maximum Tune-Up output power.
- 2) If multiple configurations have the same maximum Tune-Up output power and largest channel bandwidth, the lowest order modulation among the largest channel bandwidth configurations is selected.
- 3) If multiple configurations have the same maximum Tune-Up output power, largest channel bandwidth and lowest order modulation is selected.
- 4) When multiple transmission modes (802.11a/n/ac) have the same maximum Tune-Up output power, largest channel bandwidth, lowest order modulation and lowest data rate, the lowest order 802.11 mode is selected; i.e., 802.11a is chosen over 802.11n then ac.

8.5.6 5G WIFI (MIMO)

Band (GHz)	Mode	Channel	Freq. (MHz)	Peak Power (dBm)	Tune-up Limit (dBm)	SAR Test Require.
5.2 (5.15~5.25)	802.11a	36	5180	15.08	15.50	No
		44	5220	15.16	15.50	No
		48	5240	15.17	15.50	No
	802.11n(HT20)	36	5180	15.22	15.50	No
		44	5220	15.23	15.50	No
		48	5240	15.00	15.50	No
	802.11n(HT40)	38	5190	14.07	14.50	No
		46	5230	14.05	14.50	No
	802.11ac(VHT20)	36	5180	14.17	14.50	No
		44	5220	14.13	14.50	No
		48	5240	14.16	14.50	No
	802.11ac(VHT40)	38	5190	14.06	14.50	No
		46	5230	14.04	14.50	No
5.3 (5.25~5.35)	802.11a	52	5260	15.15	15.50	No
		60	5300	15.14	15.50	No
		64	5320	15.17	15.50	Yes
	802.11n(HT20)	52	5260	15.07	15.50	No
		60	5300	15.21	15.50	No
		64	5320	15.14	15.50	No
	802.11n(HT40)	54	5270	14.04	14.50	No
		62	5310	14.06	14.50	No
	802.11ac(VHT20)	52	5260	14.12	14.50	No
		60	5300	14.17	14.50	No
		64	5320	14.10	14.50	No
	802.11ac(VHT40)	54	5270	14.07	14.50	No
		62	5310	14.06	14.50	No
5.6 (5.47~5.725)	802.11a	100	5500	15.22	15.50	Yes
		116	5580	15.16	15.50	No
		140	5700	15.07	15.50	Yes
		144	5720	15.04	15.50	Yes
	802.11n(HT20)	100	5500	15.09	15.50	No
		116	5580	15.05	15.50	No
		140	5700	15.13	15.50	No
		144	5720	15.01	15.50	No
	802.11n(HT40)	102	5510	14.03	14.50	No
		118	5590	14.06	14.50	No
		134	5670	14.05	14.50	No
		142	5710	14.07	14.50	No
	802.11ac(VHT20)	100	5500	14.13	14.50	No

		116	5580	14.09	14.50	No
		140	5700	14.08	14.50	No
		144	5720	14.06	14.50	No
	802.11ac(VHT40)	102	5510	14.06	14.50	No
		118	5590	14.08	14.50	No
		134	5670	14.06	14.50	No
		142	5710	14.05	14.50	No
	802.11ac(VHT80)	106	5530	12.63	13.50	No
		122	5610	12.64	13.50	No
		138	5690	12.60	13.50	No
5.8 (5.725~5.850)	802.11a	149	5745	15.16	15.50	Yes
		157	5785	15.14	15.50	Yes
		165	5825	15.21	15.50	Yes
	802.11n(HT20)	149	5745	15.16	15.50	No
		157	5785	15.21	15.50	No
		165	5825	15.17	15.50	No
	802.11n(HT40)	151	5755	13.99	14.50	No
		159	5795	13.91	14.50	No
	802.11ac(VHT20)	149	5745	14.12	14.50	No
		157	5785	14.13	14.50	No
		165	5825	14.20	14.50	No
	802.11ac(VHT40)	151	5755	14.00	14.50	No
		159	5795	13.97	14.50	No
	802.11ac(VHT80)	155	5775	12.53	13.50	No

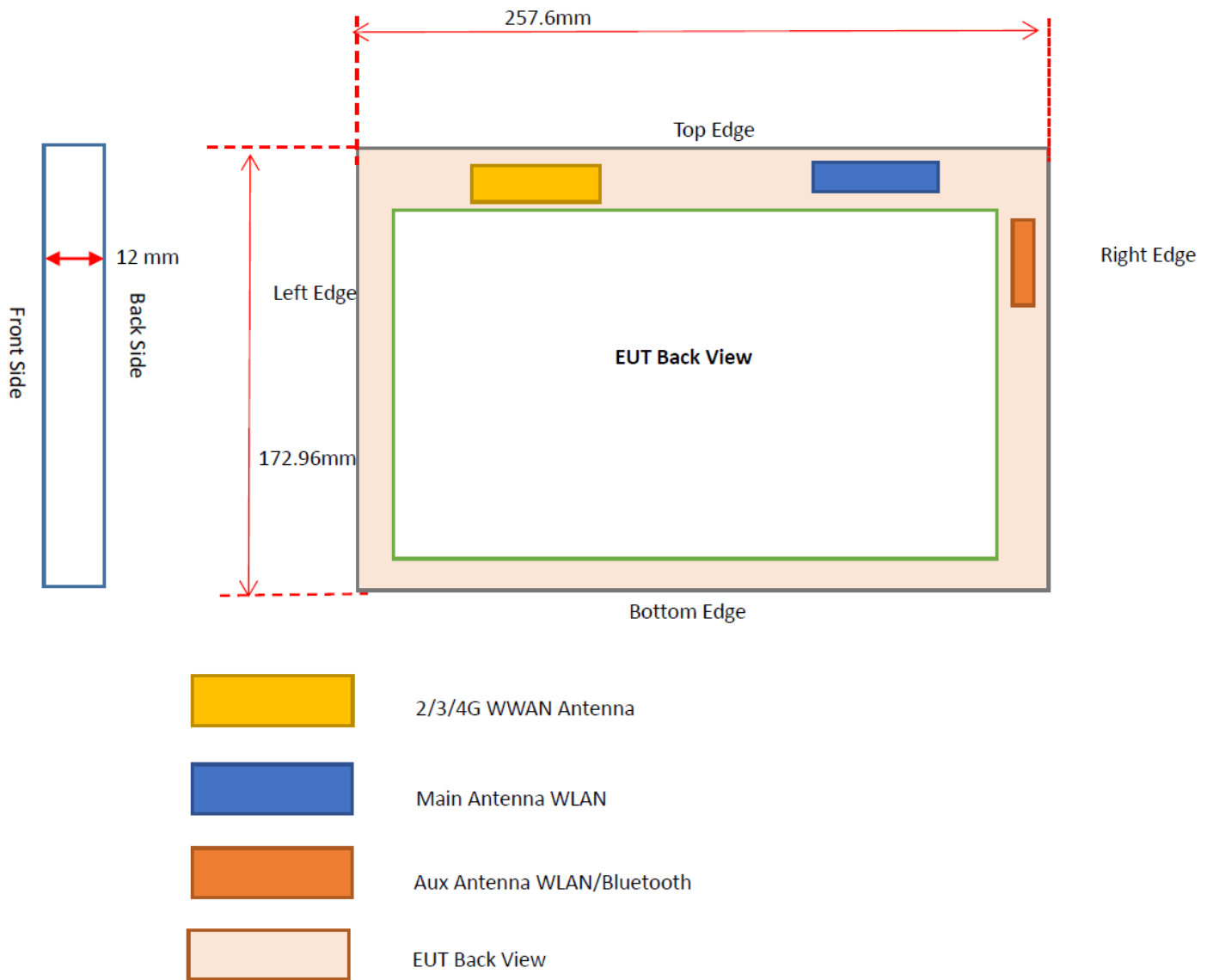
Note: When multiple channel bandwidth configurations in a frequency band have the same maximum Tune-Up output power, the test configuration is determined by applying the following steps sequentially.

- 1) The largest channel bandwidth configuration is selected among the multiple configurations in a frequency band with the same maximum Tune-Up output power.
- 2) If multiple configurations have the same maximum Tune-Up output power and largest channel bandwidth, the lowest order modulation among the largest channel bandwidth configurations is selected.
- 3) If multiple configurations have the same maximum Tune-Up output power, largest channel bandwidth and lowest order modulation is selected.
- 4) When multiple transmission modes (802.11a/n/ac) have the same maximum Tune-Up output power, largest channel bandwidth, lowest order modulation and lowest data rate, the lowest order 802.11 mode is selected; i.e., 802.11a is chosen over 802.11n then ac.

8.6 Bluetooth

Mode	GFSK			$\pi/4$ -DQPSK		
Channel	0	39	78	0	39	78
Frequency (MHz)	2402	2441	2480	2402	2441	2480
Peak Power (dBm)	8.36	7.60	9.39	7.50	6.60	8.56
Tune-Up Limit (dBm)	9.50			9.00		
Mode	8-DPSK			/		
Channel	0	39	78	/	/	/
Frequency (MHz)	2402	2441	2480	/	/	/
Peak Power (dBm)	7.78	7.02	8.85	/	/	/
Tune-Up Limit (dBm)	9.00			/		
Mode	BLE-1Mbps			BLE-2Mbps		
Channel	0	19	39	0	19	39
Frequency (MHz)	2402	2440	2480	2402	2440	2480
Peak Power (dBm)	-2.55	-3.46	-1.30	-2.36	-3.43	-1.13
Tune-Up Limit (dBm)	-1.00			-1.00		

9 EUT ANTENNA LOCATION SKETCH



Ant. 2/3/4G WWAN

Position	Back Side	Left Edge	Right Edge	Top Edge	Bottom Edge
Distance (mm)	<5.0	31.4	169.2	<5.0	172.0

WLAN/Bluetooth Ant. Aux.

Position	Back Side	Left Edge	Right Edge	Top Edge	Bottom Edge
Distance (mm)	<5	257.8	<5.0	19.8	136.4

WLAN Ant. Main

Position	Back Side	Left Edge	Right Edge	Top Edge	Bottom Edge
Distance (mm)	<5.0	165.9	62.1	<5.0	173.0

9.1 SAR Test Exclusion Consider Table

According with FCC KDB 447498 D01, Appendix A, <SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm> Table, this Device SAR test configurations consider as following :

Exposure Position	Wireless Interface	GPRS 850	GPRS 1900	WCDMA Band V	WCDMA Band II	CDMA BC0	LTE Band 5	LTE Band 7	LTE Band 41	2.4GHz WLAN AUX	2.4GHz WLAN MAIN	5GHz WLAN AUX	5GHz WLAN MAIN
	Calculated Frequency	848MHz	1909MHz	846MHz	1907MHz	848MHz	848MHz	2570MHz	2688MHz	2462MHz	2462MHz	5825MHz	5825MHz
	Maximum power (dBm)	23.87	20.87	25	25	23.5	25	19	22.5	17.34	17.42	16.33	16.46
	Maximum rated power (mW)	244.0	122.0	316.0	316.0	224.0	316.0	79.0	178.0	54.0	55.0	43.0	44.0
Back Side	Separation distance(mm)	5.0								5.0	5.0	5.0	5.0
	exclusion threshold	44.9	33.7	58.1	87.3	41.3	58.2	25.3	58.4	17.0	17.3	20.8	21.2
	Testing required?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Left	Separation distance(mm)	31.4								257.8	165.9	257.8	165.9
	exclusion threshold	7.2	5.4	9.3	13.9	6.6	9.3	4.0	9.3	2173.0	1254.0	2140.0	1221.0
	Testing required?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No
Right	Separation distance(mm)	169.2								5.0	62.1	5.0	62.1
	exclusion threshold	837.0	1301.0	836.0	1301.0	837.0	837.0	1286.0	1284.0	17.0	217.0	20.8	183.0
	Testing required?	No	No	No	No	No	No	No	No	Yes	No	Yes	No
Top	Separation distance(mm)	5.0								19.8	5.0	19.8	5.0
	exclusion threshold	44.9	33.7	58.1	87.3	41.3	58.2	25.3	58.4	4.3	17.3	5.3	21.2
	Testing required?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bottom	Separation distance(mm)	172.0								136.4	173.0	136.4	173.0
	exclusion threshold	853.0	1329.0	851.0	1329.0	853.0	853.0	1314.0	1311.0	960.0	1325.0	926.0	1292.0
	Testing required?	No	No	No	No	No	No	No	No	No	No	No	No

Note:

- Maximum power is the source-based time-average power and represents the maximum RF output power among production units.
- 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.
- Per KDB 447498 D01, standalone SAR test exclusion threshold is applied; If the distance of the antenna to the user is < 5mm, 5mm is used to determine SAR exclusion threshold
- Per KDB 447498 D01, 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:

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

- b. Power and distance are rounded to the nearest mW and mm before calculation
- c. The result is rounded to one decimal place for comparison
- d. For < 50 mm distance, we just calculate mW of the exclusion threshold value (3.0) to do compare.

This formula is $[3.0] / [\sqrt{f(\text{GHz})}] \cdot [(\text{min. test separation distance, mm})] = \text{exclusion threshold of mW}$.

5. Per KDB 447498 D01, at 100 MHz to 6 GHz and for test separation distances > 50 mm, the SAR test exclusion threshold is determined according to the following:
 - a. [Threshold at 50 mm in step 1) + (test separation distance - 50 mm) · (f(MHz)/150)] mW, at 100 MHz to 1500 MHz
 - b. [Threshold at 50 mm in step 1) + (test separation distance - 50 mm) · 10] mW at > 1500 MHz and ≤ 6 GHz
6. Per KDB 941225 D01, When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ 1/4 dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.
7. Per KDB 941225 D05, SAR test reduction is applied using the following criteria:
 - a. Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB, and 50% RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel.
 - b. When the reported SAR is > 0.8 W/kg, testing for other Channels is performed at the highest output power level for 1RB, and 50% RB configuration for that channel.
 - c. Testing for 100% RB configuration is performed at the highest output power level for 100% RB configuration across the Low, Mid and High Channel when the highest reported SAR for 1 RB and 50% RB are > 0.8 W/kg. Testing for the remaining required channels is not needed because the reported SAR for 100% RB Allocation < 1.45 W/kg.
 - d. Testing for 16-QAM modulation is not required because the reported SAR for QPSK is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of QPSK.
 - e. Testing for the other channel bandwidths is not required because the reported SAR for the highest channel bandwidth is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of the highest channel bandwidth.
8. Per KDB 248227 D01 SAR is not required for the following 2.4 GHz OFDM conditions.
 - a. When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.
 - b. 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.
9. Per KDB 248227 D01 SAR is not required for the following 2.4 GHz OFDM conditions.
 - a. When KDB Publication 447498 D01 SAR test exclusion applies to the OFDM configuration.
 - b. When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.
10. Per KDB 248227 D01 SAR is not required for the following U-NII-1 and U-NII-2A bands conditions.
 - a. When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, each band is tested independently for SAR.
 - b. When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration; otherwise, each band is tested independently for SAR.
11. Per KDB 248227 D01 5G WLAN Subsequent Test Configuration Procedures
SAR measurement requirements for the remaining 802.11 transmission mode configurations that have not been tested in the initial test configuration are determined separately for each standalone and aggregated frequency band, in each exposure condition, according to the maximum output power specified for production units.

- a. When SAR test exclusion provisions of KDB Publication 447498 D01 are applicable and SAR measurement is not required for the initial test configuration, SAR is also not required for the next highest maximum output power transmission mode subsequent test configuration(s) in that frequency band or aggregated band and exposure configuration.
- b. When the highest reported SAR for the initial test configuration (when applicable, include subsequent highest output channels), according to the initial test position or fixed exposure position requirements, is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for that subsequent test configuration.

10 TEST RESULTS

10.1GSM 850

Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (%)	1g Meas SAR (W/kg)	Meas. Power (dBm)	Max. tune- up power (dBm)	Scaling Factor	1g Scaled SAR (W/kg)	Meas. No.
Body (0mm)											
GPRS (2slots)	Back Side	0	190	836.6	-0.35	0.397	29.94	30.00	1.014	0.403	1#
	Left Edge	0	190	836.6	4.14	0.015	29.94	30.00	1.014	0.015	/
	Top Edge	0	190	836.6	1.17	0.306	29.94	30.00	1.014	0.310	/
Note: Refer to ANNEX C for the detailed test data for each test configuration.											

10.2GSM 1900

Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (%)	1g Meas SAR (W/kg)	Meas. Power (dBm)	Max. tune- up power (dBm)	Scaling Factor	1g Scaled SAR (W/kg)	Meas. No.
Body (0mm)											
GPRS (2slots)	Back Side	0	661	1880.0	2.26	0.350	26.68	27.00	1.078	0.377	2#
	Left Edge	0	661	1880.0	-4.23	0.023	26.68	27.00	1.078	0.025	/
	Top Edge	0	661	1880.0	1.57	0.170	26.68	27.00	1.078	0.183	/
Note: Refer to ANNEX C for the detailed test data for each test configuration.											

10.3WCDMA Band 2

Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (%)	1g Meas SAR (W/kg)	Meas. Power (dBm)	Max. tune- up power (dBm)	Scaling Factor	1g Scaled SAR (W/kg)	Meas. No.
Body (0mm)											
RMC	Back Side	0	9262	1852.4	-0.64	0.445	22.15	23.00	1.216	0.541	3#
	Left Edge	0	9262	1852.4	-0.37	0.016	22.15	23.00	1.216	0.019	/
	Top Edge	0	9262	1852.4	-1.79	0.237	22.15	23.00	1.216	0.288	/
Note: Refer to ANNEX C for the detailed test data for each test configuration.											

10.4WCDMA Band 5

Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (%)	1g Meas SAR (W/kg)	Meas. Power (dBm)	Max. tune- up power (dBm)	Scaling Factor	1g Scaled SAR (W/kg)	Meas. No.
Body (0mm)											
RMC	Back Side	0	4233	846.6	-0.40	0.443	22.48	23.00	1.127	0.499	4#
	Left Edge	0	4233	846.6	-2.28	0.023	22.48	23.00	1.127	0.026	/
	Top Edge	0	4233	846.6	-1.06	0.350	22.48	23.00	1.127	0.394	/
Note: Refer to ANNEX C for the detailed test data for each test configuration.											

10.5CDMA BC0

Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (%)	1g Meas SAR (W/kg)	Meas. Power (dBm)	Max. tune- up power (dBm)	Scaling Factor	1g Scaled SAR (W/kg)	Meas. No.
Body (0mm)											
1xRTT	Back Side	0	777	848.3	-4.18	0.209	23.62	24.00	1.091	0.228	5#
(RC3 SO32)	Left Edge	0	777	848.3	2.41	0.012	23.62	24.00	1.091	0.013	/
	Top Edge	0	777	848.3	-4.04	0.169	23.62	24.00	1.091	0.184	/
Note: Refer to ANNEX C for the detailed test data for each test configuration.											

10.6LTE Band 5 (20MHz Bandwidth)

Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	RB Num.	RB Start	Power Drift (%)	1g Meas SAR (W/kg)	Meas. Power (dBm)	Max. tune- up power (dBm)	Scaling Factor	1g Scaled SAR (W/kg)	Meas. No.
Body (0mm)													
QPSK	Back Side	0	20600	844.0	1	LOW	-0.44	0.135	22.44	23.00	1.138	0.154	6#
		0	20600	844.0	25	MID	0.66	0.111	21.43	22.00	1.140	0.127	/
	Left Edge	0	20600	844.0	1	LOW	2.23	0.010	22.44	23.00	1.138	0.011	/
		0	20600	844.0	25	MID	3.11	0.008	21.43	22.00	1.140	0.009	/
	Top Edge	0	20600	844.0	1	LOW	-0.97	0.099	22.44	23.00	1.138	0.113	/
		0	20600	844.0	25	MID	-2.71	0.081	21.43	22.00	1.140	0.092	/
Note: Refer to ANNEX C for the detailed test data for each test configuration.													

10.7LTE Band 7 (20MHz Bandwidth)

Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	RB Num.	RB Start	Power Drift (%)	1g Meas SAR (W/kg)	Meas. Power (dBm)	Max. tune- up power (dBm)	Scaling Factor	1g Scaled SAR (W/kg)	Meas. No.
Body (0mm)													
QPSK	Back Side	0	21100	2535	1	LOW	-1.25	0.342	18.68	19.00	1.076	0.368	7#
		0	21100	2535	50	MID	4.12	0.266	17.70	18.00	1.072	0.285	/
	Left Edge	0	21100	2535	1	LOW	3.78	0.036	18.68	19.00	1.076	0.039	/
		0	21100	2535	50	MID	3.44	0.028	17.70	18.00	1.072	0.030	/
	Top Edge	0	21100	2535	1	LOW	1.79	0.143	18.68	19.00	1.076	0.154	/
		0	21100	2535	50	MID	2.64	0.112	17.70	18.00	1.072	0.120	/
Note: Refer to ANNEX C for the detailed test data for each test configuration.													

10.8LTE Band 38 (20MHz Bandwidth)

Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	RB Num.	RB Start	Power Drift (%)	1g Meas SAR (W/kg)	Meas. Power (dBm)	Max. tune- up power (dBm)	Scaling Factor	1g Scaled SAR (W/kg)	Meas. No.
Body (0mm)													
QPSK	Back Side	0	38150	2610	1	MID	1.88	0.547	22.81	23.00	1.045	0.572	8#
		0	38150	2610	50	HIGH	1.00	0.442	21.81	22.00	1.045	0.462	/
	Left Edge	0	38150	2610	1	MID	-0.84	0.042	22.81	23.00	1.045	0.044	/
		0	38150	2610	50	HIGH	4.43	0.031	21.81	22.00	1.045	0.032	/
	Top Edge	0	38150	2610	1	MID	2.79	0.219	22.81	23.00	1.045	0.229	/
		0	38150	2610	50	HIGH	-2.47	0.174	21.81	22.00	1.045	0.182	/
Note: Refer to ANNEX C for the detailed test data for each test configuration.													

10.9LTE Band 41 (20MHz Bandwidth)

Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	RB Num.	RB Start	Power Drift (%)	1g Meas SAR (W/kg)	Meas. Power (dBm)	Max. tune- up power (dBm)	Scaling Factor	1g Scaled SAR (W/kg)	Meas. No.
Body (0mm)													
QPSK	Back Side	0	40740	2605	1	LOW	-2.05	0.395	22.04	22.50	1.112	0.439	9#
		0	40740	2605	50	LOW	-3.19	0.298	21.13	21.50	1.089	0.325	/
	Left Edge	0	40740	2605	1	LOW	-0.88	0.035	22.04	22.50	1.112	0.039	/
		0	40740	2605	50	LOW	2.09	0.029	21.13	21.50	1.089	0.032	/
	Top Edge	0	40740	2605	1	LOW	-2.55	0.155	22.04	22.50	1.112	0.172	/
		0	40740	2605	50	LOW	-1.05	0.124	21.13	21.50	1.089	0.135	/
Note: Refer to ANNEX C for the detailed test data for each test configuration.													

10.10 WIFI 2.4GHz

Mode	Antenna	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (%)	1g Meas SAR (W/kg)	Meas. Power (dBm)	Max. tune-up power (dBm)	Scaling Factor	Duty cycle (%)	Duty Factor	1g Scaled SAR (W/kg)	Meas. No.
Body (0mm)														
802.11b	Aux_0	Back Side	0	6	2437	2.23	0.542	13.25	13.50	1.059	99.01	1.010	0.580	10#
		Right Edge	0	6	2437	1.32	0.239	13.25	13.50	1.059	99.01	1.010	0.256	/
		Top Edge	0	6	2437	-0.94	0.057	13.25	13.50	1.059	99.01	1.010	0.061	/
	Main_1	Back Side	0	6	2437	-0.52	0.500	13.16	13.50	1.081	99.01	1.010	0.546	/
		Top Edge	0	6	2437	-2.34	0.152	13.16	13.50	1.081	99.01	1.010	0.166	/
	MIMO_0 1	Back Side	0	1	2412	-1.62	0.390	16.16	16.50	1.081	99.01	1.010	0.426	/
		Right Edge	0	1	2412	0.15	0.216	16.16	16.50	1.081	99.01	1.010	0.236	/
		Top Edge	0	1	2412	2.25	0.153	16.16	16.50	1.081	99.01	1.010	0.167	/
Note: Refer to ANNEX C for the detailed test data for each test configuration.														

10.11 WIFI 5GHz

Fre. Band	Mode	Antenn a	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (%)	1g Meas SAR (W/kg)	Meas. Power (dBm)	Max. tune-up power (dBm)	Scaling Factor	Duty cycle (%)	Duty Factor	1g Scaled SAR (W/kg)	Meas. No.
Body (0mm)															
5.3G	802.11 a	Aux_0	Back Side	0	60	5300	3.58	0.415	12.21	12.50	1.069	94.47	1.059	0.470	/
			Right Edge	0	60	5300	-2.76	0.418	12.21	12.50	1.069	94.47	1.059	0.473	/
			Top Edge	0	60	5300	2.62	0.094	12.21	12.50	1.069	94.47	1.059	0.106	/
		Main_1	Back Side	0	64	5320	-1.93	0.622	12.06	12.50	1.107	94.47	1.059	0.729	11#
			Top Edge	0	64	5320	-3.94	0.170	12.06	12.50	1.107	94.47	1.059	0.199	/
		MIMO_01	Back Side	0	64	5320	2.91	0.585	15.17	15.50	1.080	94.47	1.059	0.669	/
			Right Edge	0	64	5320	3.52	0.386	15.17	15.50	1.080	94.47	1.059	0.441	/
			Top Edge	0	64	5320	-0.59	0.185	15.17	15.50	1.080	94.47	1.059	0.211	/
5.6G	802.11 a	Aux_0	Back Side	0	116	5580	-4.31	0.488	12.13	12.50	1.089	94.47	1.059	0.563	/
			Right Edge	0	116	5580	-2.25	0.564	12.13	12.50	1.089	94.47	1.059	0.650	/
			Top Edge	0	116	5580	-3.50	0.090	12.13	12.50	1.089	94.47	1.059	0.104	/
		Main_1	Back Side	0	140	5700	-3.09	0.839	12.18	12.50	1.076	94.47	1.059	0.956	12#
				0	100	5500	3.12	0.811	12.15	12.50	1.084	94.47	1.059	0.931	/
				0	144	5720	-2.59	0.796	12.15	12.50	1.084	94.47	1.059	0.913	/
			Top Edge	0	140	5700	3.45	0.166	12.18	12.50	1.076	94.47	1.059	0.189	/
		MIMO_01	Back Side	0	100	5500	1.35	0.741	15.22	15.50	1.068	94.47	1.059	0.837	/
				0	140	5500	3.65	0.698	15.07	15.50	1.104	94.47	1.059	0.816	/
				0	144	5720	2.85	0.721	15.04	15.50	1.112	94.47	1.059	0.848	/
			Right Edge	0	100	5500	3.23	0.623	15.22	15.50	1.068	94.47	1.059	0.704	/
			Top Edge	0	100	5500	2.56	0.175	15.22	15.50	1.068	94.47	1.059	0.198	/
5.8G	802.11 a	Aux_0	Back Side	0	165	5825	1.59	0.568	12.25	12.50	1.059	94.47	1.059	0.637	/
			Right Edge	0	165	5825	-1.50	0.706	12.25	12.50	1.059	94.47	1.059	0.792	/
			Top Edge	0	165	5825	-3.45	0.080	12.25	12.50	1.059	94.47	1.059	0.090	/
		Main_1	Back Side	0	157	5785	-2.19	0.745	12.25	12.50	1.059	94.47	1.059	0.835	/
				0	149	5745	2.52	0.798	11.98	12.50	1.127	94.47	1.059	0.952	/
				0	157	5785	1.22	0.812	12.11	12.50	1.094	94.47	1.059	0.940	/
			Top Edge	0	157	5785	-1.68	0.158	12.25	12.50	1.059	94.47	1.059	0.177	/
		MIMO_01	Back Side	0	165	5825	3.12	0.879	15.21	15.50	1.070	94.47	1.059	0.996	/
				0	149	5745	-0.89	0.886	15.16	15.50	1.082	94.47	1.059	1.015	13#
				0	157	5785	3.46	0.872	15.14	15.50	1.086	94.47	1.059	1.003	/
			Right Edge	0	165	5825	1.25	0.669	15.21	15.50	1.070	94.47	1.059	0.758	/
			Top Edge	0	165	5825	-3.14	0.151	15.21	15.50	1.070	94.47	1.059	0.171	/
Note: Refer to ANNEX C for the detailed test data for each test configuration.															

10.12 Bluetooth

Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (%)	1g Meas SAR (W/kg)	Duty cycle Setting	Duty cycle Factor	Meas. Power (dBm)	Max. tune- up power (dBm)	Scaling Factor	1g Scaled SAR (W/kg)	Meas. No.
Body (0mm)													
DH5	Back Side	0	78	2480	1.08	0.153	77.01	1.299	9.39	9.50	1.026	0.204	14#
	Right Side	0	78	2480	0.13	0.136	77.01	1.299	9.39	9.50	1.026	0.181	/
	Top Edge	0	78	2480	-1.50	0.032	77.01	1.299	9.39	9.50	1.026	0.043	/
Note: Refer to ANNEX C for the detailed test data for each test configuration.													

11 SAR Measurement Variability

According to KDB 865664 D01, SAR measurement variability was assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. Alternatively, if the highest measured SAR for both head and body tissue-equivalent media are ≤ 1.45 W/kg and the ratio of these highest SAR values, i.e., largest divided by smallest value, is ≤ 1.10 , the highest SAR configuration for either head or body tissue-equivalent medium may be used to perform the repeated measurement. These additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

SAR repeated measurement procedure:

1. When the highest measured SAR is < 0.80 W/kg, repeated measurement is not required.
2. When the highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
3. If the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 , or when the original or repeated measurement is ≥ 1.45 W/kg, perform a second repeated measurement.
4. If the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 , and the original, first or second repeated measurement is ≥ 1.5 W/kg, perform a third repeated measurement.

Frequency Band (MHz)	Wireless Band	RF Exposure Conditions	Test Position	Highest Measured SAR (W/kg)	Repeated SAR (Yes/No)	Highest Measured SAR (W/kg)	Largest to Smallest SAR Ratio
5700	802.11 a	Body	Back Side	0.956	Yes	0.938	1.02
5745	802.11 a	Body	Back Side	1.015	Yes	0.997	1.02
Note: The ratio of largest to smallest SAR for the original and first repeated measurements is < 1.20 , the second repeated measurement is not required.							

12 SIMULTANEOUS TRANSMISSION

Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneous transmitting antenna. When the sum of SAR 1g of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit (SAR 1g 1.6 W/kg), the simultaneous transmission SAR is not required. When the sum of SAR 1g is greater than the SAR limit (SAR 1g 1.6 W/kg), SAR test exclusion is determined by the SAR to Peak Location Ratio (SPLSR).

12.1 Simultaneous Transmission Mode Consider

NO.	Mode	Body
1	GSM	+ 2.4G WIFI (Main Antenna)
		+ 2.4G WIFI (Aux. Antenna)
		+ 2.4G WIFI (MIMO)
		+ 5G WIFI (Main Antenna)
		+ 5G WIFI (Aux. Antenna)
		+ 5G WIFI (MIMO)
		+ Bluetooth
2	WCDMA	+ 2.4G WIFI (Main Antenna)
		+ 2.4G WIFI (Aux. Antenna)
		+ 2.4G WIFI (MIMO)
		+ 5G WIFI (Main Antenna)
		+ 5G WIFI (Aux. Antenna)
		+ 5G WIFI (MIMO)
		+ Bluetooth
3	CDMA	+ 2.4G WIFI (Main Antenna)
		+ 2.4G WIFI (Aux. Antenna)
		+ 2.4G WIFI (MIMO)
		+ 5G WIFI (Main Antenna)
		+ 5G WIFI (Aux. Antenna)
		+ 5G WIFI (MIMO)
		+ Bluetooth
4	LTE	+ 2.4G WIFI (Main Antenna)
		+ 2.4G WIFI (Aux. Antenna)
		+ 2.4G WIFI (MIMO)
		+ 5G WIFI (Main Antenna)
		+ 5G WIFI (Aux. Antenna)
		+ 5G WIFI (MIMO)
		+ Bluetooth
Note:		
1. WLAN and Bluetooth share the same antenna and can't transmit simultaneously.		
2. Both the 2.4G WLAN or 5G WLAN can transmit simultaneously with each WWAN.		
3. Bluetooth can transmit simultaneously with WWAN.		

12.2 Estimated SAR Calculation

According to KDB 447498 D01 when standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR was estimated according to following formula to result in substantially conservative SAR values of ≤ 0.4 W/kg to determine simultaneous transmission SAR test exclusion.

$$\text{Estimated SAR} = \frac{\text{Max. Tune Up Power (mw)}}{\text{Min Test Separation Distance}} * \frac{\sqrt{f_{\text{GHz}}}}{x} \quad (\text{where } x = 7.5 \text{ for 1-g SAR})$$

If the minimum test separation distance is < 5 mm, a distance of 5 mm is used for estimated SAR calculation. When the test separation distance is > 50 mm, the 0.4 W/kg is used for SAR-1g.

Antenna	Position	Antenna To user (mm)	SAR Testing	Estimated SAR (W/kg)
WWAN	Right Edge	169.2	NO	0.400
WALN (Main Antenna)	Left Edge	165.9	NO	0.400
	Right Edge	62.1	NO	0.400
WALN/BT (Aux. Antenna)	Left Edge	257.8	NO	0.400
WALN (MIMO Antenna)	Left Edge	165.9	NO	0.400

12.3 Sum SAR of Simultaneous Transmission

Band	Position	Stand alone SAR								SUM SAR						
		1	2	3	4	5	6	7	8	1+2	1+3	1+4	1+5	1+6	1+7	1+8
		WWA N	2.4G WIFI Aux.	2.4G WIFI MAIN	2.4G WIFI MIM O	5G WIFI Aux.	5G WIFI MAIN	5G WIFI MIM O	Bluet ooth	Sum SAR (WWAN +2.4G WIFI Aux.)	Sum SAR (WWAN +2.4G WIFI Main)	Sum SAR (WWAN +2.4G WIFI MIMO)	Sum SAR (WWAN +5G WIFI Aux.)	Sum SAR (WWAN +5G WIFI Main)	Sum SAR (WWAN +5G WIFI MIMO)	Sum SAR (WWAN +BT)
GSM 850	Back Side 0mm	0.409	0.580	0.549	0.426	0.637	0.956	1.015	0.204	0.989	0.958	0.835	1.046	1.365	1.424	0.613
	Left Edge 0mm	0.015	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.415	0.415	0.415	0.415	0.415	0.415	0.415
	Right Edge 0mm	0.400	0.256	0.400	0.236	0.792	0.400	0.758	0.181	0.656	0.800	0.636	1.192	0.800	1.158	0.581
	Top Edge 0mm	0.315	0.061	0.166	0.167	0.106	0.199	0.211	0.043	0.376	0.481	0.482	0.421	0.514	0.526	0.358
GSM 1900	Back Side 0mm	0.377	0.580	0.549	0.426	0.637	0.956	1.015	0.204	0.957	0.926	0.803	1.014	1.333	1.392	0.581
	Left Edge 0mm	0.025	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.425	0.425	0.425	0.425	0.425	0.425	0.425
	Right Edge 0mm	0.400	0.256	0.400	0.236	0.792	0.400	0.758	0.181	0.656	0.800	0.636	1.192	0.800	1.158	0.581
	Top Edge 0mm	0.183	0.061	0.166	0.167	0.106	0.199	0.211	0.043	0.244	0.349	0.350	0.289	0.382	0.394	0.226
WCDMA B2	Back Side 0mm	0.541	0.580	0.549	0.426	0.637	0.956	1.015	0.204	1.121	1.090	0.967	1.178	1.497	1.556	0.745
	Left Edge 0mm	0.019	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.419	0.419	0.419	0.419	0.419	0.419	0.419
	Right Edge 0mm	0.400	0.256	0.400	0.236	0.792	0.400	0.758	0.181	0.656	0.800	0.636	1.192	0.800	1.158	0.581
	Top Edge 0mm	0.288	0.061	0.166	0.167	0.106	0.199	0.211	0.043	0.349	0.454	0.455	0.394	0.487	0.499	0.331
WCDMA B5	Back Side 0mm	0.499	0.580	0.549	0.426	0.637	0.956	1.015	0.204	1.079	1.048	0.925	1.136	1.455	1.514	0.703
	Left Edge 0mm	0.026	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.426	0.426	0.426	0.426	0.426	0.426	0.426
	Right Edge 0mm	0.400	0.256	0.400	0.236	0.792	0.400	0.758	0.181	0.656	0.800	0.636	1.192	0.800	1.158	0.581
	Top Edge 0mm	0.394	0.061	0.166	0.167	0.106	0.199	0.211	0.043	0.455	0.560	0.561	0.500	0.593	0.605	0.437
CDMA BC0	Back Side 0mm	0.228	0.580	0.549	0.426	0.637	0.956	1.015	0.204	0.808	0.777	0.654	0.865	1.184	1.243	0.432
	Left Edge 0mm	0.013	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.413	0.413	0.413	0.413	0.413	0.413	0.413
	Right Edge 0mm	0.400	0.256	0.400	0.236	0.792	0.400	0.758	0.181	0.656	0.800	0.636	1.192	0.800	1.158	0.581
	Top Edge 0mm	0.184	0.061	0.166	0.167	0.106	0.199	0.211	0.043	0.245	0.350	0.351	0.290	0.383	0.395	0.227
LTE B5	Back Side 0mm	0.154	0.580	0.549	0.426	0.637	0.956	1.015	0.204	0.734	0.703	0.580	0.791	1.110	1.169	0.358
	Left Edge 0mm	0.011	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.411	0.411	0.411	0.411	0.411	0.411	0.411
	Right Edge 0mm	0.400	0.256	0.400	0.236	0.792	0.400	0.758	0.181	0.656	0.800	0.636	1.192	0.800	1.158	0.581
	Top Edge 0mm	0.113	0.061	0.166	0.167	0.106	0.199	0.211	0.043	0.174	0.279	0.280	0.219	0.312	0.324	0.156
LTE B7	Back Side 0mm	0.368	0.580	0.549	0.426	0.637	0.956	1.015	0.204	0.948	0.917	0.794	1.005	1.324	1.383	0.572
	Left Edge 0mm	0.039	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.439	0.439	0.439	0.439	0.439	0.439	0.439
	Right Edge 0mm	0.400	0.256	0.400	0.236	0.792	0.400	0.758	0.181	0.656	0.800	0.636	1.192	0.800	1.158	0.581
	Top Edge 0mm	0.154	0.061	0.166	0.167	0.106	0.199	0.211	0.043	0.215	0.320	0.321	0.260	0.353	0.365	0.197
LTE B38	Back Side 0mm	0.572	0.580	0.549	0.426	0.637	0.956	1.015	0.204	1.152	1.121	0.998	1.209	1.528	1.587	0.776
	Left Edge 0mm	0.044	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.444	0.444	0.444	0.444	0.444	0.444	0.444
	Right Edge 0mm	0.400	0.256	0.400	0.236	0.792	0.400	0.758	0.181	0.656	0.800	0.636	1.192	0.800	1.158	0.581
	Top Edge 0mm	0.229	0.061	0.166	0.167	0.106	0.199	0.211	0.043	0.290	0.395	0.396	0.335	0.428	0.440	0.272
LTE B41	Back Side 0mm	0.439	0.580	0.549	0.426	0.637	0.956	1.015	0.204	1.019	0.988	0.865	1.076	1.395	1.454	0.643
	Left Edge 0mm	0.039	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.439	0.439	0.439	0.439	0.439	0.439	0.439

	Right Edge 0mm	0.400	0.256	0.400	0.236	0.792	0.400	0.758	0.181	0.656	0.800	0.636	1.192	0.800	1.158	0.581
	Top Edge 0mm	0.172	0.061	0.166	0.167	0.106	0.199	0.211	0.043	0.233	0.338	0.339	0.278	0.371	0.383	0.215

Note:

- 1: The simultaneous transmission combinations of the three antennas contain combinations of two antennas, so only the worst simultaneous transmission combinations was shown in this table.
- 2: The highest Summed 1g SAR is 1.587 W/Kg < 1.6 W/kg, so Simultaneous Transmission SAR test is not required.

13 TEST EQUIPMENTS LIST

Description	Manufacturer	Model	Serial No./Version	Cal. Date	Cal. Due
Test Software	SATIMO	OpenSAR	V4_02_31	N/A	N/A
835MHz Dipole	SATIMO	SID 835	S/N 11/17 DIP 0G835-447	2019/03/20	2021/03/19
1900MHz Dipole	SATIMO	SID 1900	S/N 11/17 DIP 1G900-450	2019/03/20	2021/03/19
2450MHz Dipole	SATIMO	SID 2450	S/N 11/17 DIP 2G450-452	2019/03/20	2021/03/19
2600MHz Dipole	SATIMO	SID 2600	S/N 11/17 DIP 2G600-453	2019/03/20	2021/03/19
Waveguide	SATIMO	SWG5500	S/N 49/16 DIP WGA42	2019/03/20	2021/03/19
E-Field Probe	MVG	SSE2	S/N 34/15 EPGO265	2020/12/10	2021/12/09
MultiMeter	Keithley	MultiMeter 2000	4024022	2020/06/11	2021/06/10
Signal Generator	R&S	SMB100A	177746	2020/06/08	2021/06/07
Power Meter	R&S	NRVD-B2	7250BJ-0112/2011	2020/09/25	2021/09/24
Power Sensor	R&S	NRV-Z4	100381	2020/09/25	2021/09/24
Power Sensor	R&S	NRV-Z2	100211	2020/09/25	2021/09/24
Network Analyzer	R&S	ZVL-6	101380	2020/06/22	2021/06/21
Wireless Communication Test Set	Agilent	8960-E5515C	MY47510286	2020/06/08	2021/06/07
Wireless Communication Test Set	R&S	CMW 500	104946	2020/06/08	2021/06/07
Thermometer	Elitech	RC-4HC	N/A	2020/06/11	2021/06/10
Power Amplifier	SATIMO	6552B	22374	N/A	N/A
Dielectric Probe Kit	SATIMO	SCLMP	SN 25/13 OCPG56	N/A	N/A
Antenna	SATIMO	ANTA3	SN 17/13 ZNTA45	N/A	N/A
Phantom1	SATIMO	SAM	SN 11/17 SAM133	N/A	N/A
Phantom2	SATIMO	ELLI	SN 11/17 ELLI42	N/A	N/A
Attenuator	COM-MW	ZA-S1-31	1305003187	N/A	N/A
Directional coupler	AA-MCS	AAMCS-UDC	000272	N/A	N/A

Note: Per KDB 865664 Dipole SAR Validation Verification, BALUN 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;
3. Return-loss is within 20% of calibrated measurement.
4. Impedance (real or imaginary parts) is within 5 Ohms of calibrated measurement.

ANNEX A SIMULATING LIQUID VERIFICATION RESULT

The dielectric parameters of the liquids were verified prior to the SAR evaluation using an SCLMP Dielectric Probe Kit.

Date	Liquid Type	Fre. (MHz)	Temp. (°C)	Meas. Conductivity (σ) (S/m)	Meas. Permittivity (ϵ)	Target Conductivity (σ) (S/m)	Target Permittivity (ϵ)	Conductivity Tolerance (%)	Permittivity Tolerance (%)
2021.01.18	Head	835	21.5	0.92	40.62	0.90	41.50	2.22	-2.12
2021.01.16	Head	1900	21.9	1.42	39.67	1.40	40.00	1.43	-0.82
2021.01.17	Head	2450	21.4	1.83	38.75	1.80	39.20	1.67	-1.15
2021.01.19	Head	2600	21.2	2.01	38.25	1.96	39.01	2.55	-1.95
2021.01.20	Head	2600	21.4	1.91	39.60	1.96	39.01	-2.55	1.51
2021.01.20	Head	5200	21.5	4.62	36.73	4.66	35.99	-0.86	2.06
2021.01.20	Head	5400	21.5	4.87	35.71	4.86	35.76	0.21	-0.14
2021.01.21	Head	5600	21.2	5.09	35.91	5.07	35.53	0.39	1.07
2021.01.21	Head	5800	21.2	5.36	34.51	5.27	35.30	1.71	-2.24
Note: The tolerance limit of Conductivity and Permittivity is $\pm 5\%$.									

ANNEX B SYSTEM CHECK RESULT

Comparing to the original SAR value provided by SATIMO, the validation data should be within its specification of 10%(for 1 g).

Date	Liquid Type	Freq. (MHz)	Power (mW)	Measured SAR (W/kg)	Normalized SAR (W/kg)	Dipole SAR (W/kg)	Tolerance (%)	Targeted SAR(W/kg)	Tolerance (%)
2021.01.18	Head	835	100	0.916	9.16	9.58	-4.38	9.56	-4.18
2021.01.16	Head	1900	100	3.944	39.44	39.49	-0.13	39.70	-0.65
2021.01.17	Head	2450	100	5.137	51.37	54.31	-5.41	52.40	-1.97
2021.01.19	Head	2600	100	5.548	55.48	56.32	-1.49	55.30	0.33
2021.01.20	Head	2600	100	5.549	55.48	56.32	-1.49	55.30	0.33
2021.01.20	Head	5200	100	15.797	157.96	161.03	-1.91	159.00	-0.65
2021.01.20	Head	5400	100	17.170	171.7	168.17	2.10	166.40	3.19
2021.01.21	Head	5600	100	17.454	174.54	175.43	-0.51	173.80	0.43
2021.01.21	Head	5800	100	18.886	188.86	182.30	3.60	181.20	4.23

Note: The tolerance limit of System validation $\pm 10\%$.

System Performance Check Data(835 MHz)

Type: Phone measurement (Complete)

E-Field Probe: SN 34/15 EPGO265

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

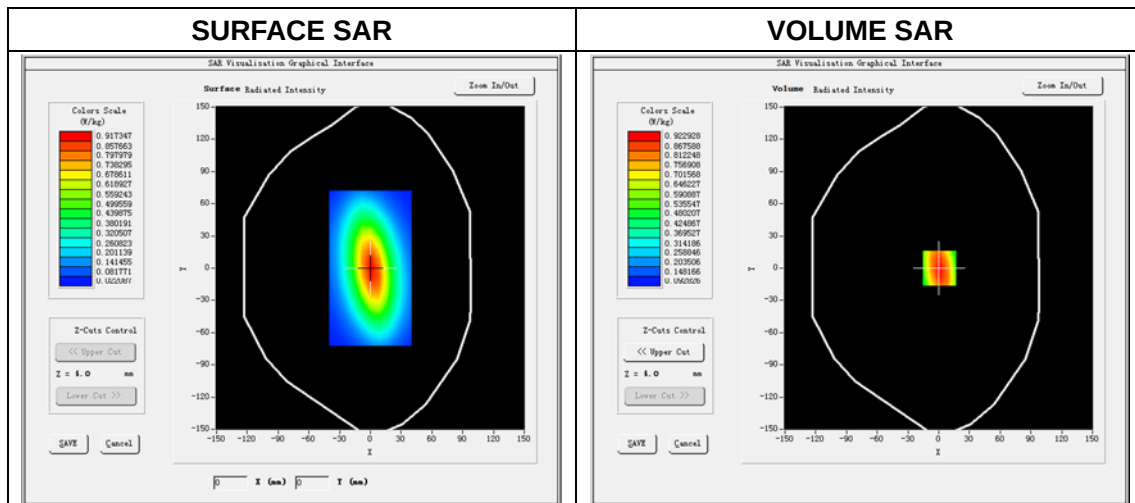
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm

Date of measurement: 2021.01.18

Measurement duration: 13 minutes 33 seconds

Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Band	835MHz
Signal	CW
Frequency (MHz)	835.000000
Relative permittivity (real part)	40.615043
Conductivity (S/m)	0.924140
Power drift (%)	0.340000
Ambient Temperature:	22.8°C
Liquid Temperature:	21.5°C
ConvF:	1.93
Crest factor:	1:1

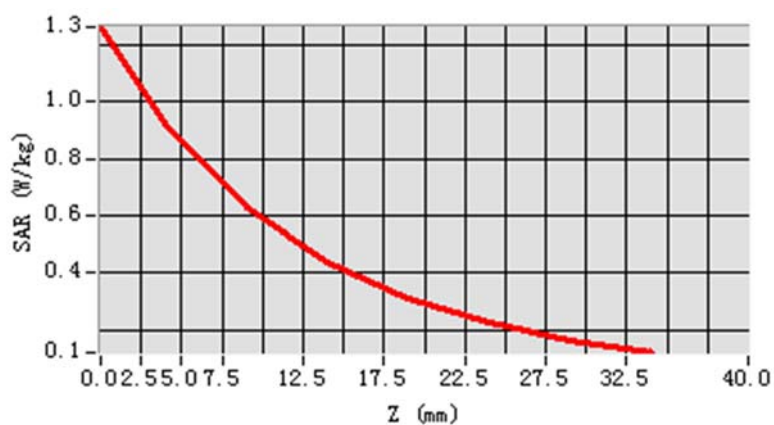


Maximum location: X=1.00, Y=0.00

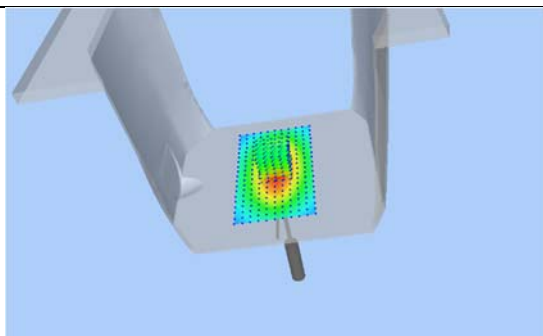
SAR Peak: 1.29 W/kg

SAR 10 g (W/Kg)	0.611418
SAR 1g (W/Kg)	0.916406

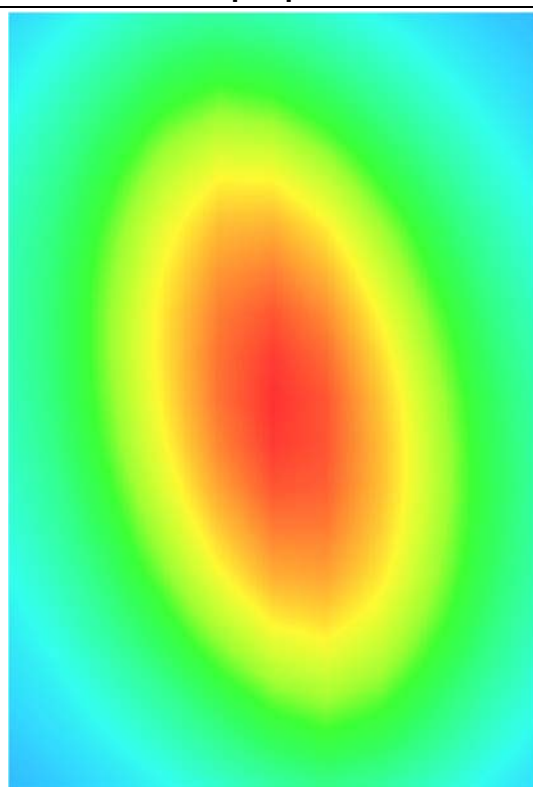
Z Axis Scan



3D screen shot



Hot spot position



System Performance Check Data(1900MHz)

Type: Phone measurement (Complete)

E-Field Probe: SN 34/15 EPGO265

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

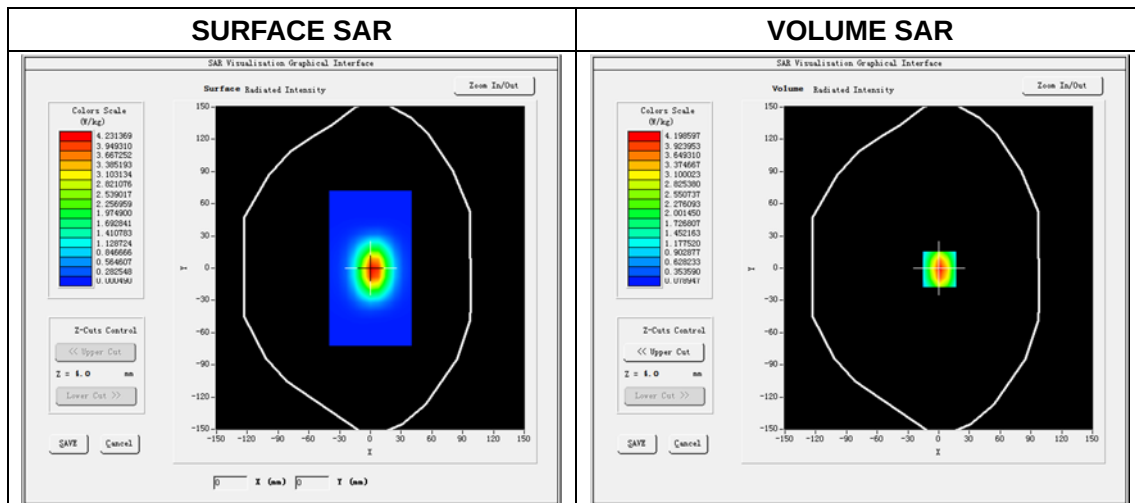
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm

Date of measurement: 2021.01.16

Measurement duration: 13 minutes 34 seconds

Experimental conditions.

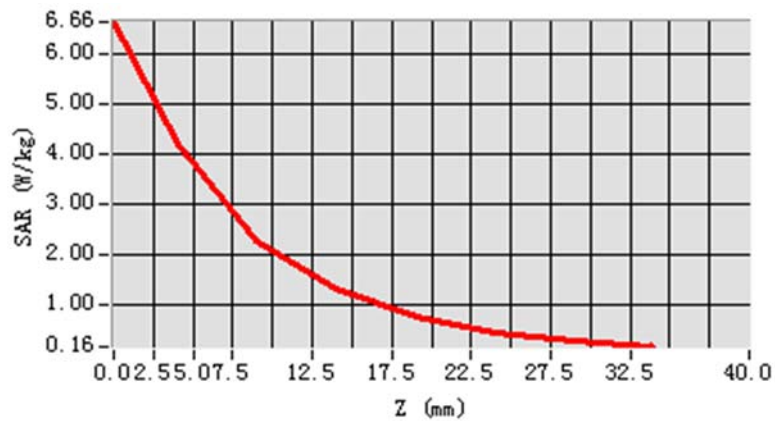
Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Band	1900MHz
Signal	CW
Frequency (MHz)	1900.000000
Relative permittivity (real part)	39.668810
Conductivity (S/m)	1.416151
Power drift (%)	-0.280000
Ambient Temperature:	22.7°C
Liquid Temperature:	21.9°C
ConvF:	2.46
Crest factor:	1:1



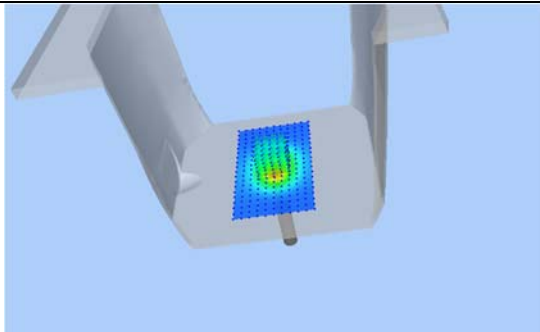
Maximum location: X=2.00, Y=-1.00
SAR Peak: 6.61W/kg

SAR 10g (W/Kg)	2.111651
SAR 1g (W/Kg)	3.944225

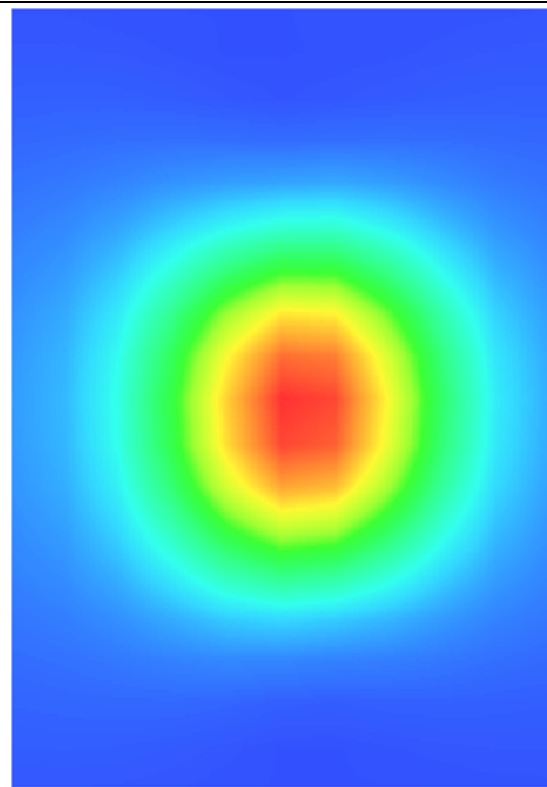
Z Axis Scan



3D screen shot



Hot spot position



System Performance Check Data(2450MHz)

Type: Phone measurement (Complete)

E-Field Probe: SN 34/15 EPGO265

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

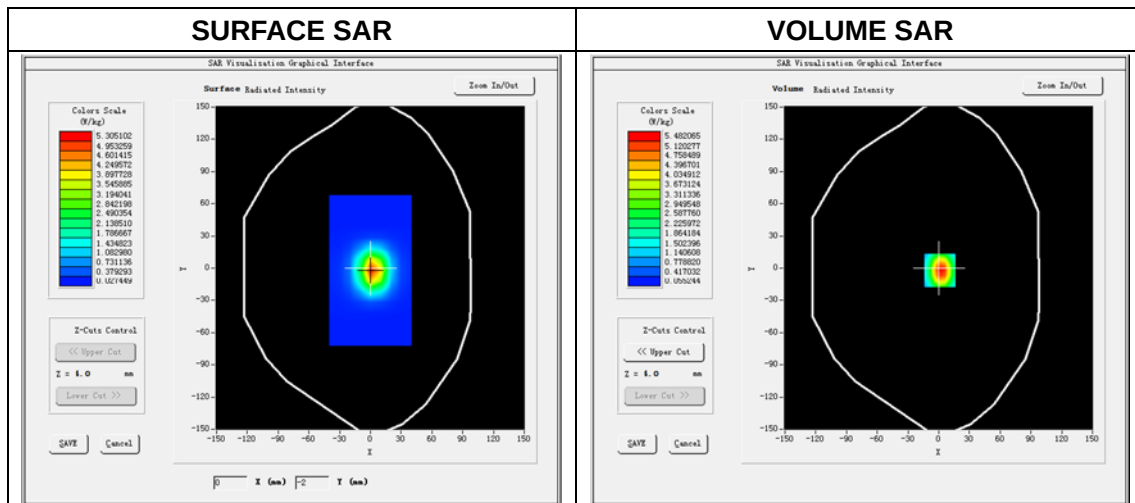
Zoom scan resolution: dx=5mm, dy=5mm, dz=5mm

Date of measurement: 2021.01.17

Measurement duration: 16 minutes 47 seconds

Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Band	2450MHz
Signal	CW
Frequency (MHz)	2450.000000
Relative permittivity (real part)	38.748260
Conductivity (S/m)	1.831573
Power drift (%)	-1.320000
Ambient Temperature:	22.6°C
Liquid Temperature:	21.4°C
ConvF:	2.55
Crest factor:	1:1

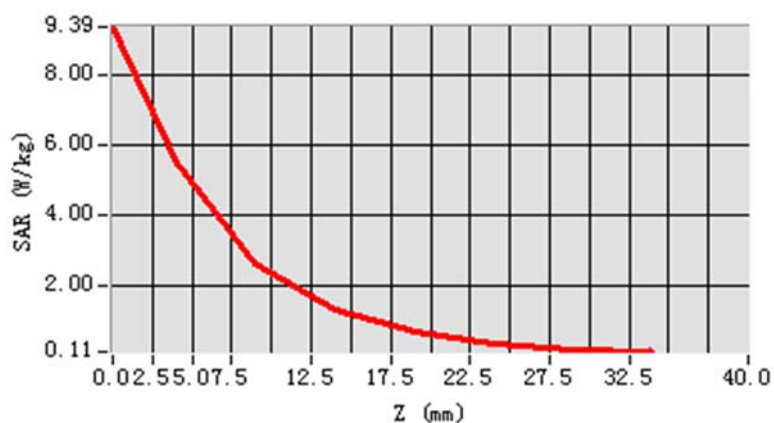


Maximum location: X=0.00, Y=-2.00

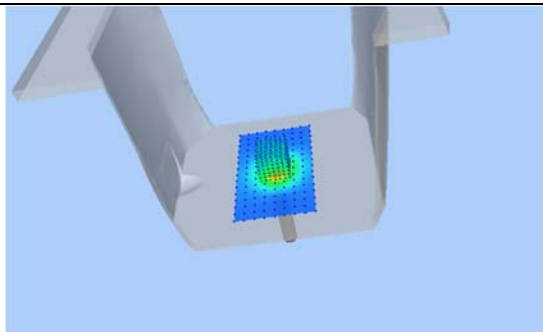
SAR Peak: 9.21 W/kg

SAR 10g (W/Kg)	2.346007
SAR 1g (W/Kg)	5.137320

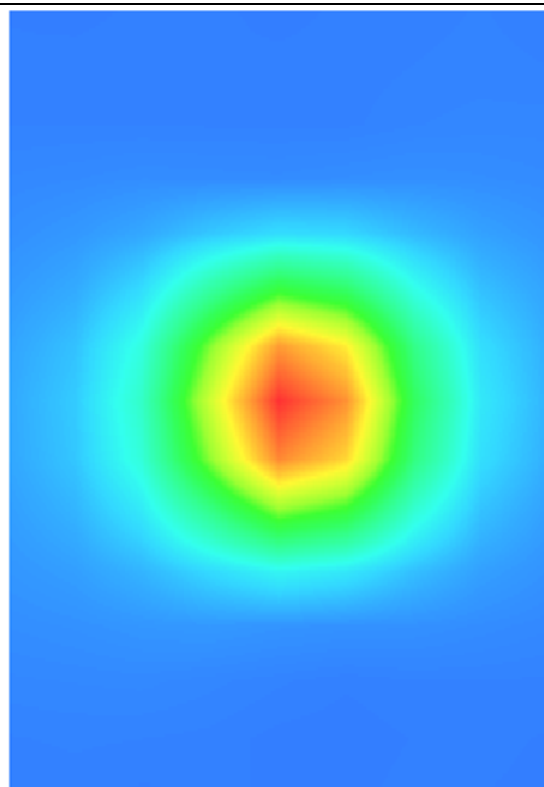
Z Axis Scan



3D screen shot



Hot spot position



System Performance Check Data(2600MHz Head)

Type: Phone measurement (Complete)

E-Field Probe: SN 34/15 EPGO265

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

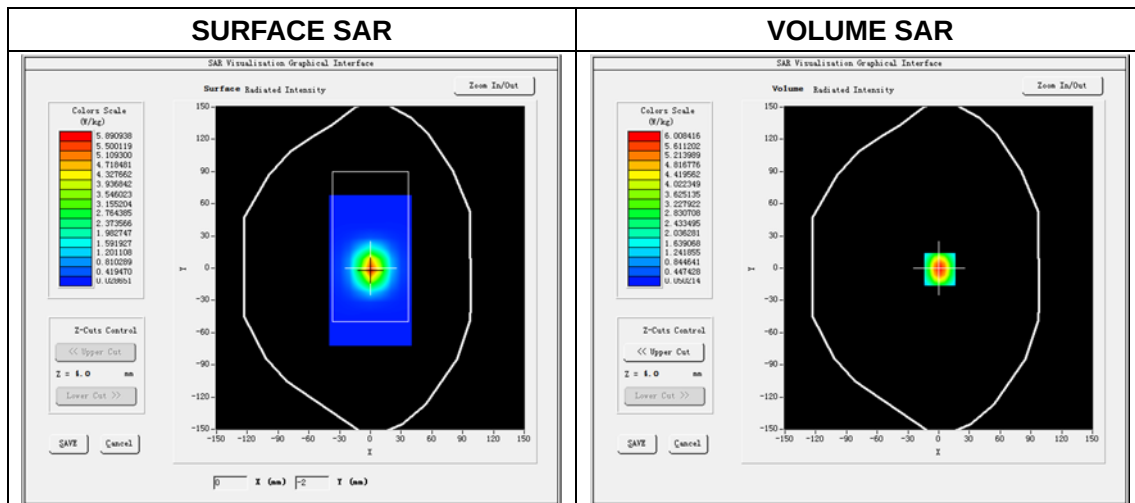
Zoom scan resolution: dx=5mm, dy=5mm, dz=5mm

Date of measurement: 2021.01.19

Measurement duration: 18 minutes 49 seconds

Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Band	2600MHz
Signal	CW
Frequency (MHz)	2600.000000
Relative permittivity (real part)	38.246435
Conductivity (S/m)	2.013111
Power drift (%)	-0.050000
Ambient Temperature:	22.3°C
Liquid Temperature:	21.2°C
ConvF:	2.38
Crest factor:	1:1

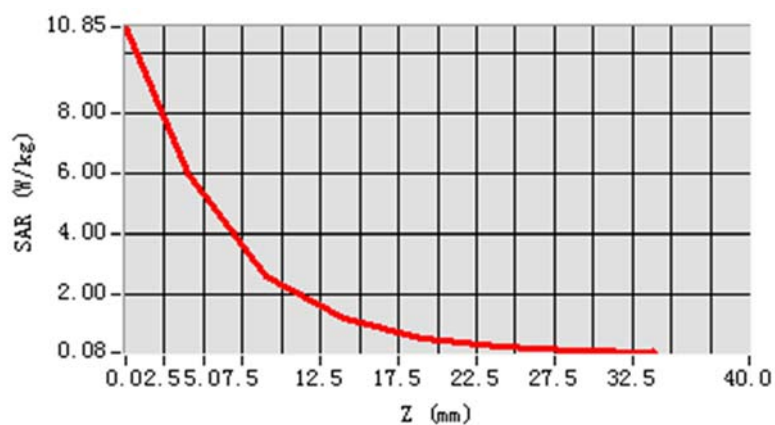


Maximum location: X=1.00, Y=-1.00

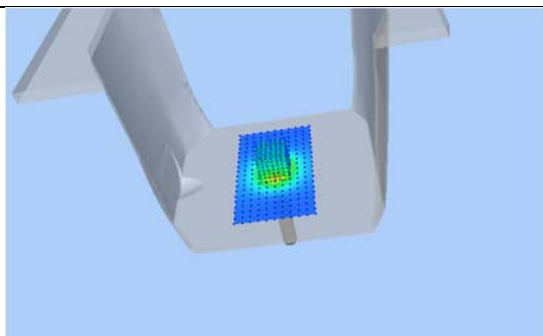
SAR Peak: 10.69 W/kg

SAR 10g (W/Kg)	2.449254
SAR 1g (W/Kg)	5.547556

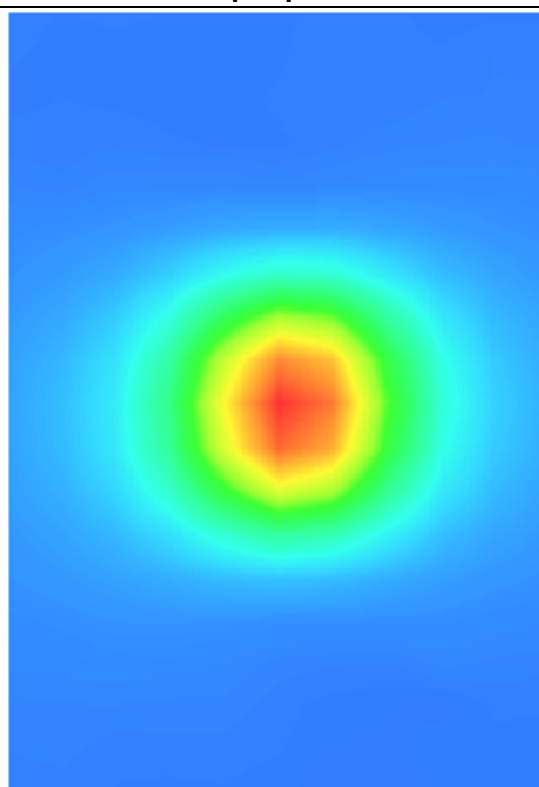
Z Axis Scan



3D screen shot



Hot spot position



System Performance Check Data(2600MHz Head)

Type: Phone measurement (Complete)

E-Field Probe: SN 34/15 EPGO265

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

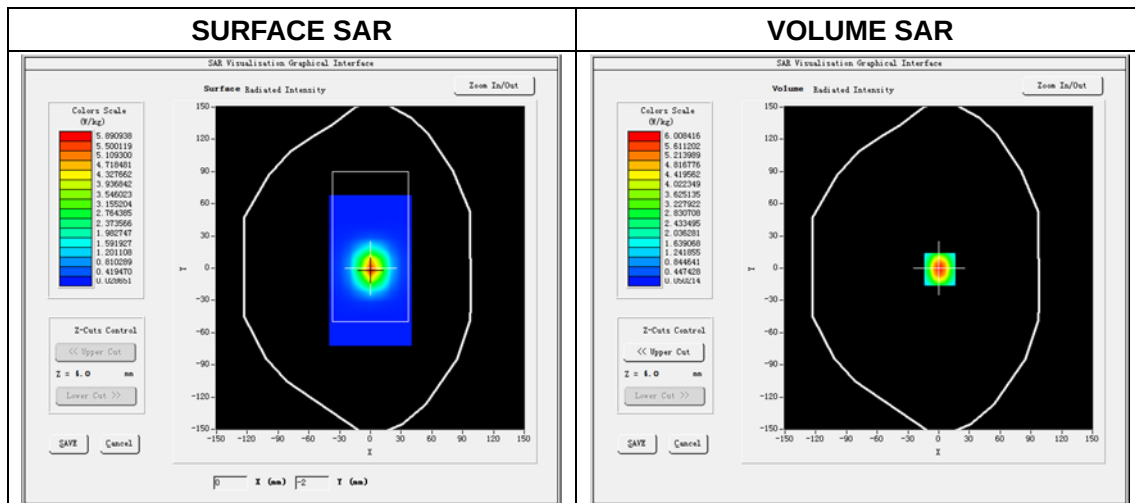
Zoom scan resolution: dx=5mm, dy=5mm, dz=5mm

Date of measurement: 2021.01.20

Measurement duration: 18 minutes 55 seconds

Experimental conditions.

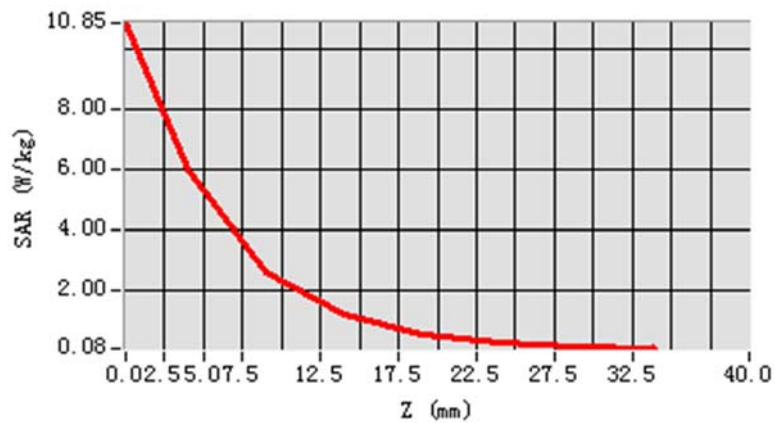
Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Band	2600MHz
Signal	CW
Frequency (MHz)	2600.000000
Relative permittivity (real part)	39.601435
Conductivity (S/m)	1.906311
Power drift (%)	-0.050000
Ambient Temperature:	22.5°C
Liquid Temperature:	21.4°C
ConvF:	2.38
Crest factor:	1:1



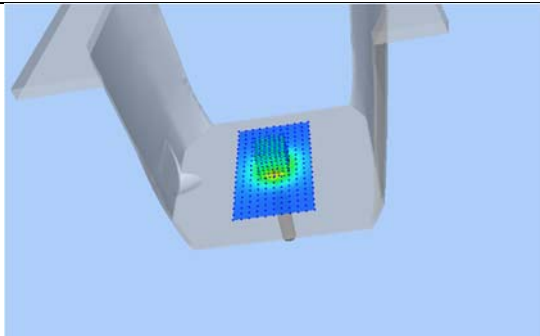
Maximum location: X=1.00, Y=-1.00
SAR Peak: 10.71 W/kg

SAR 10g (W/Kg)	2.452254
SAR 1g (W/Kg)	5.548556

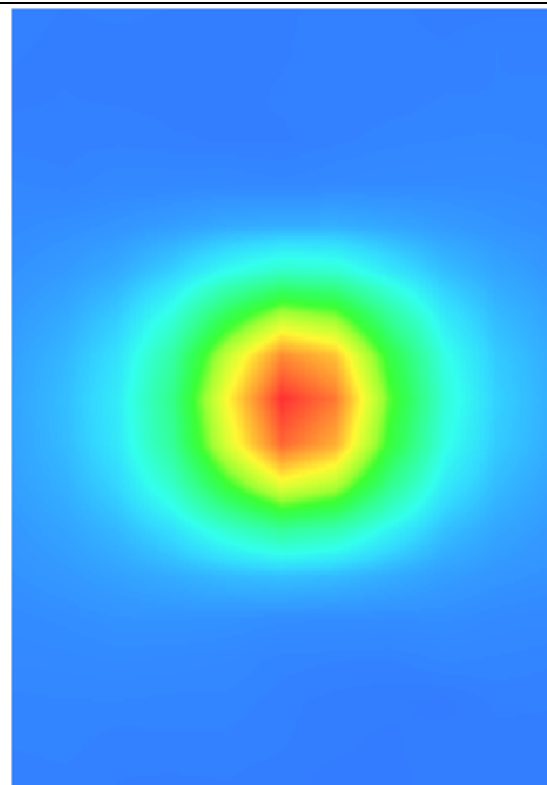
Z Axis Scan



3D screen shot



Hot spot position



System Performance Check Data(5200 MHz)

Type: Phone measurement (Complete)

E-Field Probe: SN 34/15 EPGO265

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

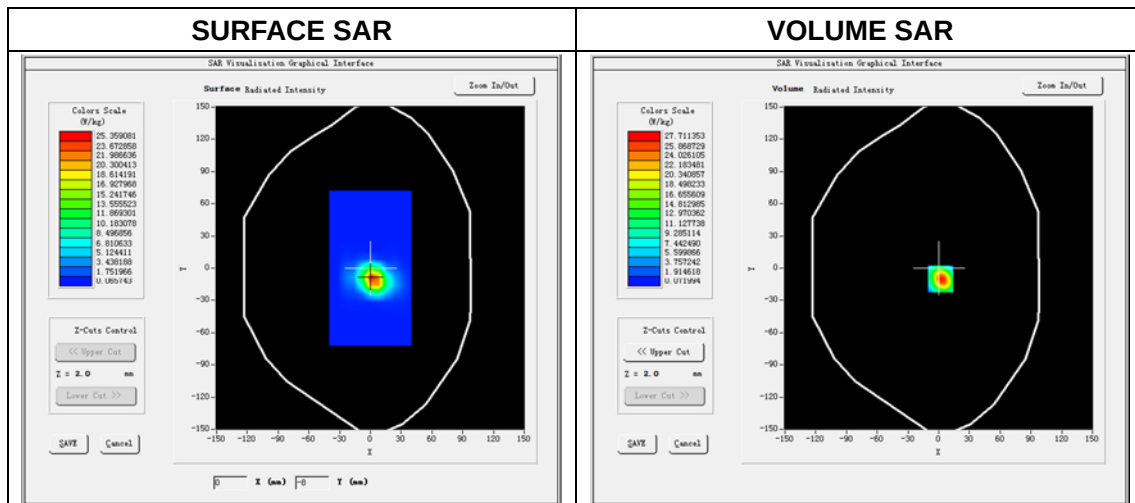
Zoom scan resolution: dx=4 mm, dy=4 mm, dz=2 mm

Date of measurement: 2021.01.20

Measurement duration: 29 minutes 41 seconds

Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Band	5200 MHz
Signal	CW
Frequency (MHz)	5200.000000
Relative permittivity (real part)	36.727843
Conductivity (S/m)	4.623484
Power drift (%)	-0.340000
Ambient Temperature:	22.7°C
Liquid Temperature:	21.5°C
ConvF:	2.09
Crest factor:	1:1

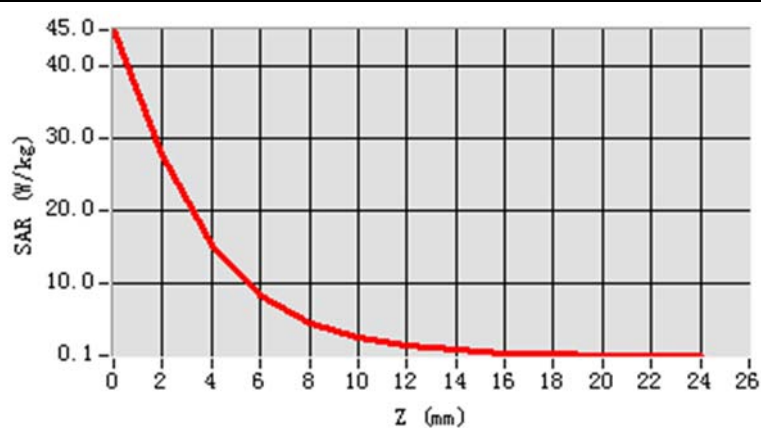


Maximum location: X=0.00, Y=-8.00

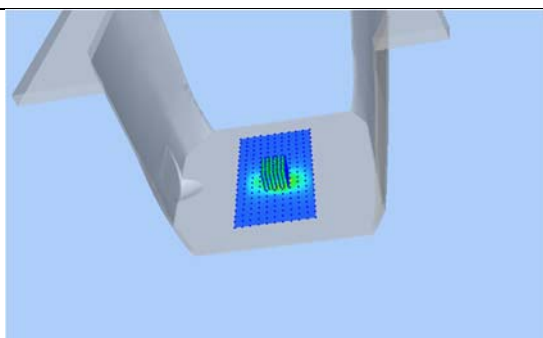
SAR Peak: 44.89 W/kg

SAR 10 g (W/Kg)	5.399306
SAR 1 g (W/Kg)	15.796874

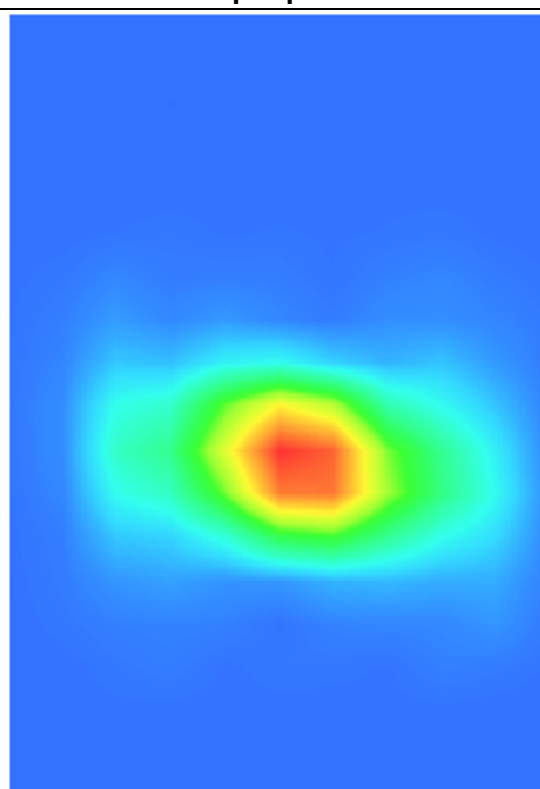
Z Axis Scan



3D screen shot



Hot spot position



System Performance Check Data(5400 MHz)

Type: Phone measurement (Complete)

E-Field Probe: SN 34/15 EPGO265

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

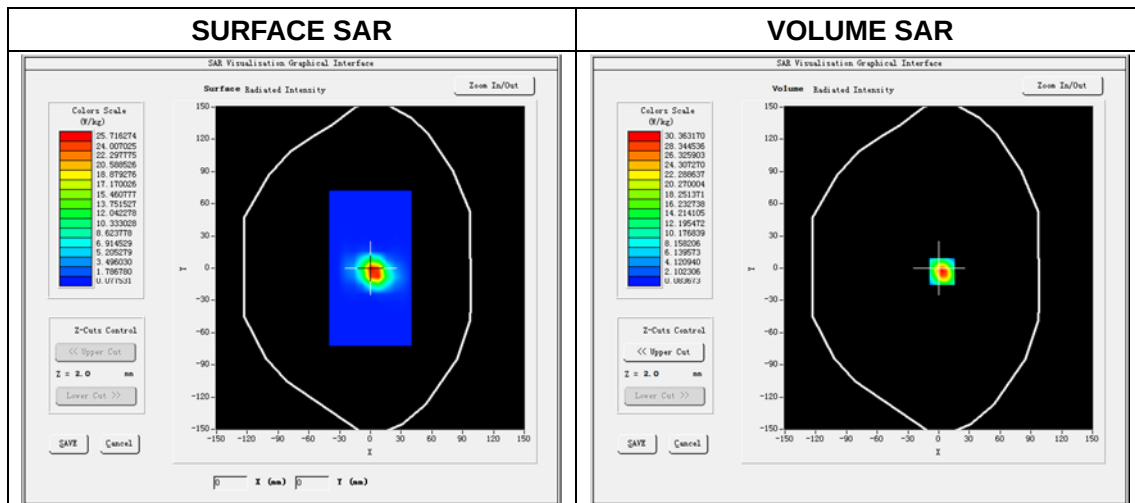
Zoom scan resolution: dx=4 mm, dy=4 mm, dz=2 mm

Date of measurement: 2021.01.20

Measurement duration: 30 minutes 52 seconds

Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Band	5400 MHz
Signal	CW
Frequency (MHz)	5400.000000
Relative permittivity (real part)	35.711142
Conductivity (S/m)	4.866797
Power drift (%)	-0.220000
Ambient Temperature:	22.7°C
Liquid Temperature:	21.5°C
ConvF:	2.04
Crest factor:	1:1

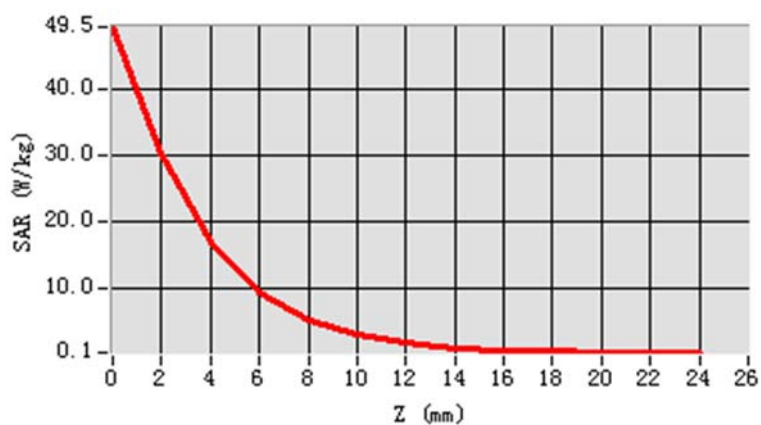


Maximum location: X=3.00, Y=-3.00

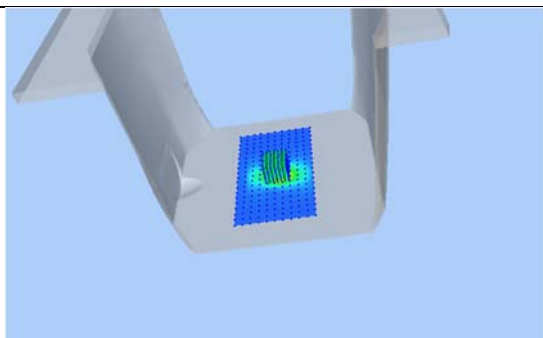
SAR Peak: 51.59 W/kg

SAR 10 g (W/Kg)	5.839836
SAR 1 g (W/Kg)	17.169503

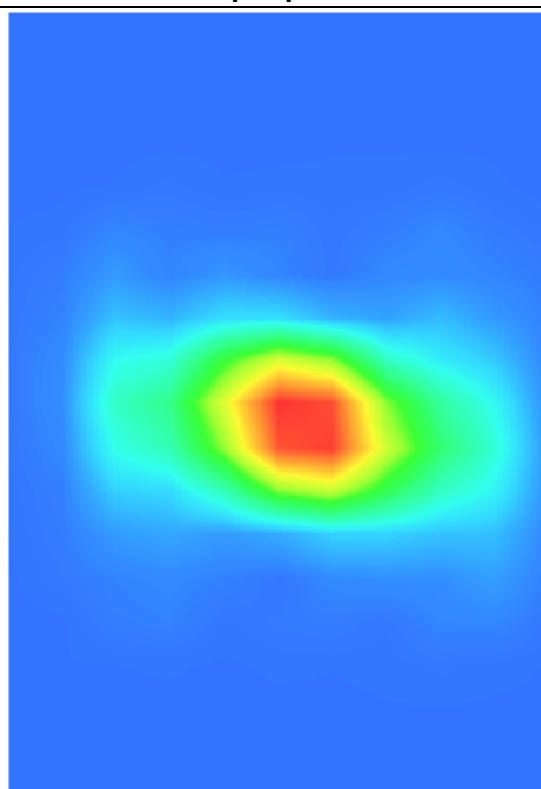
Z Axis Scan



3D screen shot



Hot spot position



System Performance Check Data(5600 MHz)

Type: Phone measurement (Complete)

E-Field Probe: SN 34/15 EPGO265

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

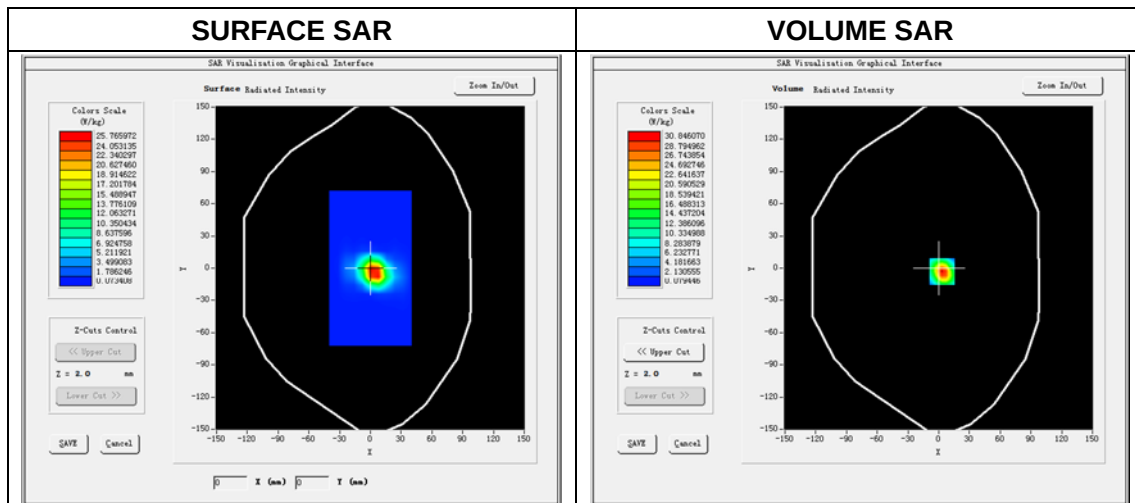
Zoom scan resolution: dx=4 mm, dy=4 mm, dz=2 mm

Date of measurement: 2021.01.21

Measurement duration: 30 minutes 11 seconds

Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Band	5600 MHz
Signal	CW
Frequency (MHz)	5600.000000
Relative permittivity (real part)	35.914236
Conductivity (S/m)	5.094163
Power drift (%)	-0.460000
Ambient Temperature:	22.4°C
Liquid Temperature:	21.2°C
ConvF:	2.20
Crest factor:	1:1

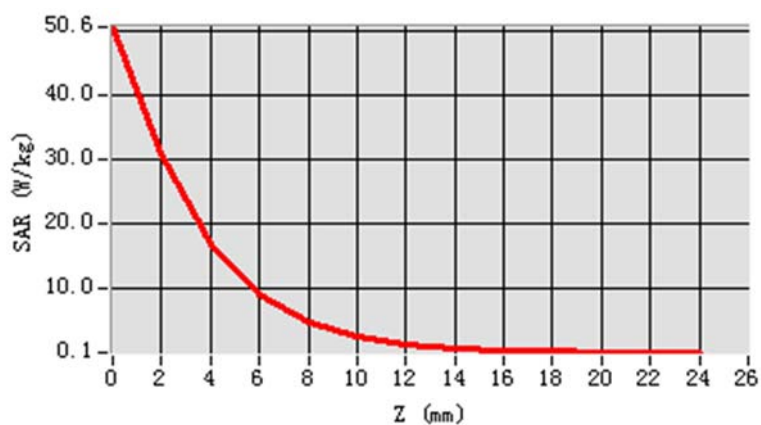


Maximum location: X=3.00, Y=-3.00

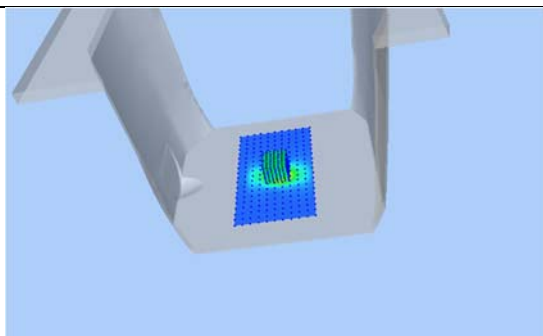
SAR Peak: 52.96 W/kg

SAR 10 g (W/Kg)	5.853483
SAR 1 g (W/Kg)	17.454273

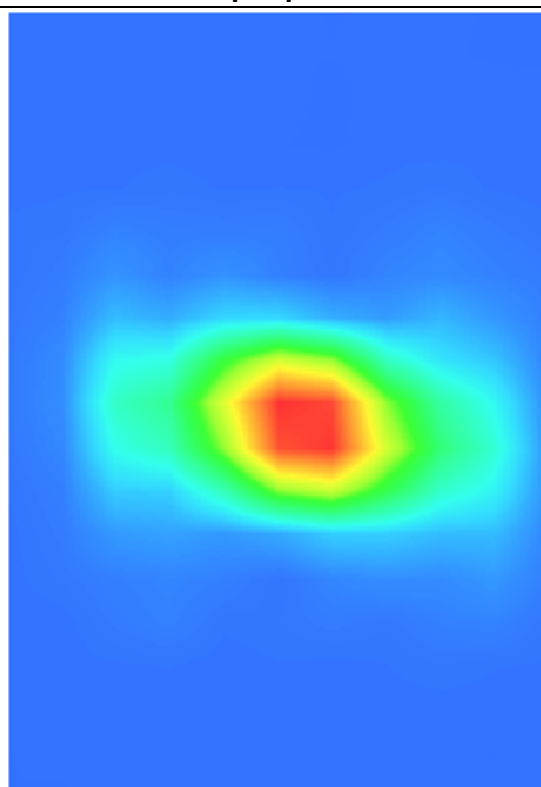
Z Axis Scan



3D screen shot



Hot spot position



System Performance Check Data(5800 MHz)

Type: Phone measurement (Complete)

E-Field Probe: SN 34/15 EPGO265

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

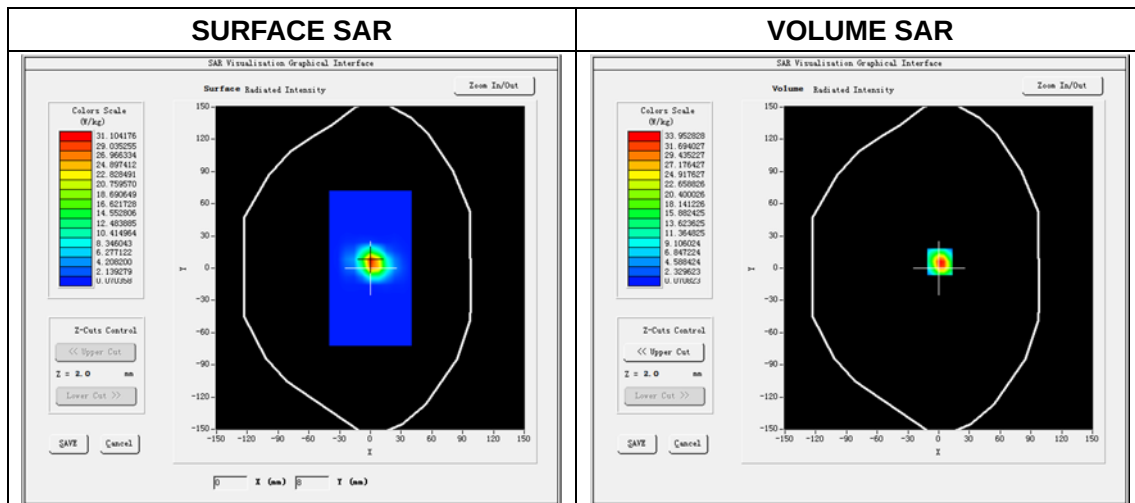
Zoom scan resolution: dx=4 mm, dy=4 mm, dz=2 mm

Date of measurement: 2021.01.21

Measurement duration: 29 minutes 34 seconds

Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Band	5800 MHz
Signal	CW
Frequency (MHz)	5800.000000
Relative permittivity (real part)	34.511462
Conductivity (S/m)	5.362456
Power drift (%)	-1.030000
Ambient Temperature:	22.4°C
Liquid Temperature:	21.2°C
ConvF:	2.17
Crest factor:	1:1

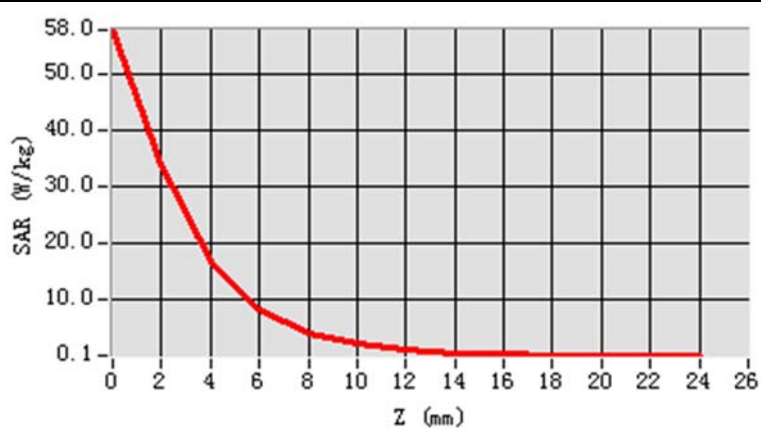


Maximum location: X=0.00, Y=8.00

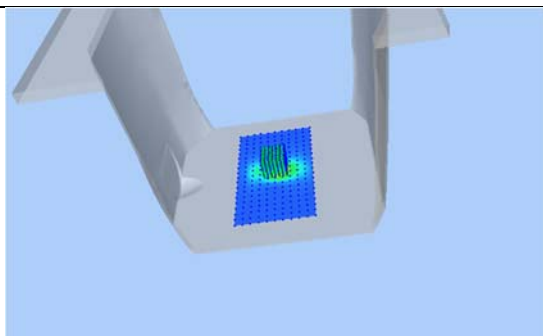
SAR Peak: 57.93 W/kg

SAR 10 g (W/Kg)	6.167398
SAR 1 g (W/Kg)	18.885895

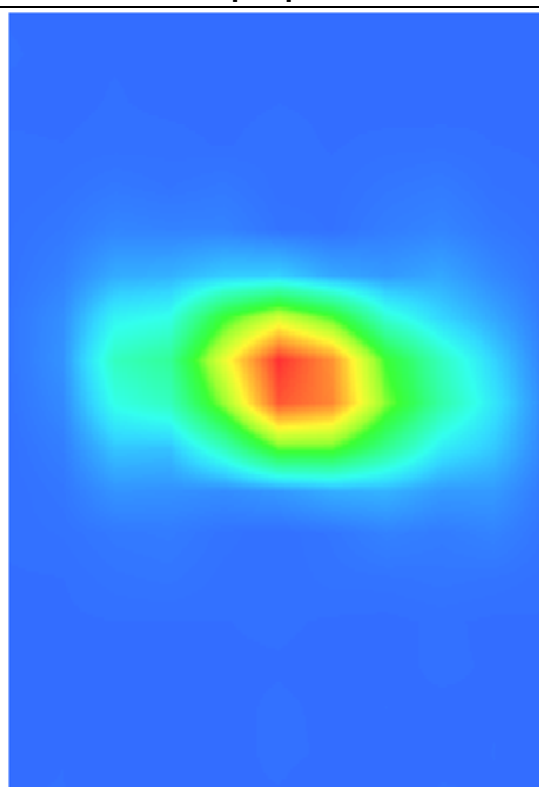
Z Axis Scan



3D screen shot



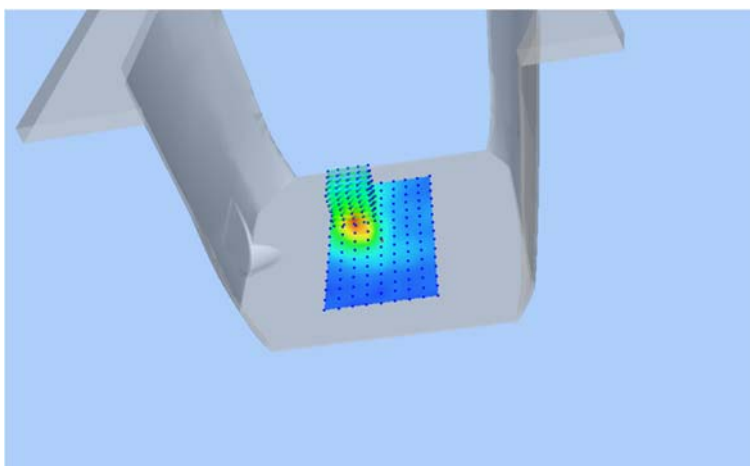
Hot spot position



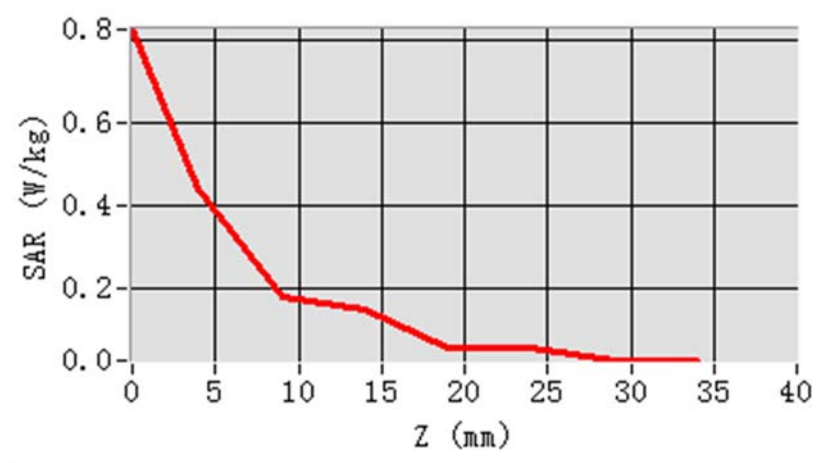
ANNEX C TEST DATA

MEAS. 1 Body Plane with Back Side 0mm on Middle Channel in GPRS 850(2TX Slots) mode

Test Date:	18/1/2021
Measurement duration:	10 minutes 18 seconds
Signal:	GPRS, f=836.6 MHz, Duty Cycle: 1:4.1
Liquid Parameters:	Permittivity: 40.16; Conductivity: 0.94 S/m
Test condition:	Ambient Temperature: 22.8°C, Liquid Temperature: 21.5°C
Probe:	SN 34/15 EPGO265, ConvF: 1.93
Area Scan:	sam_direct_droit2_surf10mm.txt, h= 5.00 mm
Zoom Scan:	5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location:	X=-20.000000, Y=38.000000
SAR 10g (W/Kg):	0.199771
SAR 1g (W/Kg):	0.396518
Power drift (%):	-0.35
3D screen shot	



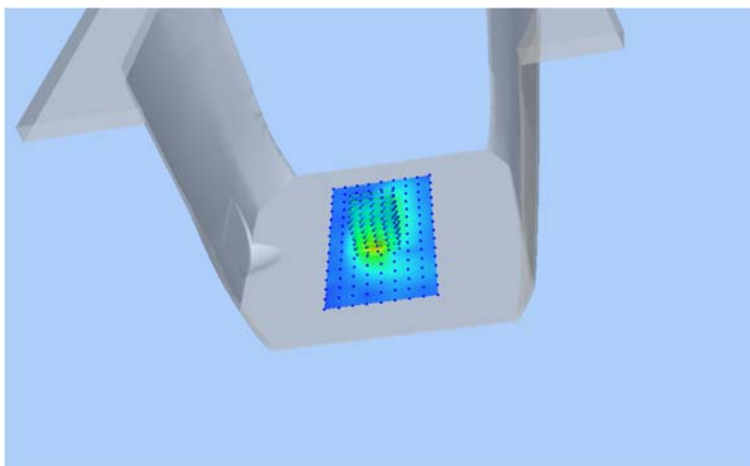
Z Axis Scan



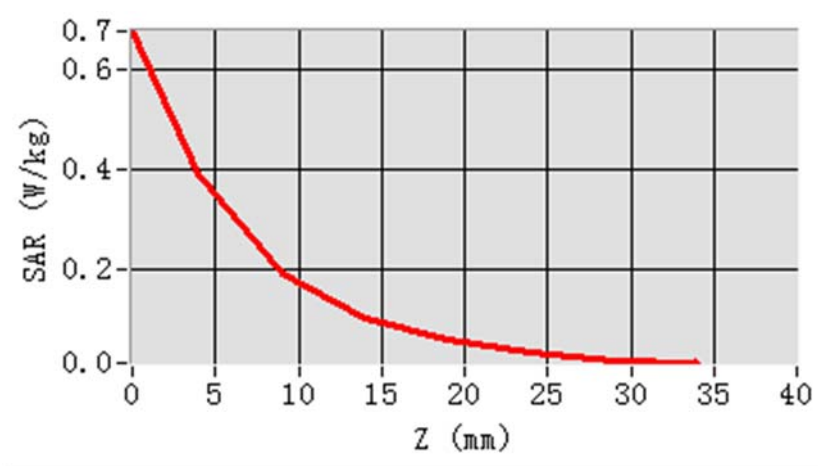
MEAS. 2 Body Plane with Back Side 0mm on Middle Channel in GPRS

1900(2TX Slots) mode

Test Date: 16/1/2021
Measurement duration: 12 minutes 19 seconds
Signal: GPRS, f=1880.0 MHz, Duty Cycle: 1:4.1
Liquid Parameters: Permittivity: 40.29; Conductivity: 1.41 S/m
Test condition: Ambient Temperature: 22.7°C, Liquid Temperature: 21.9°C
Probe: SN 34/15 EPGO265, ConvF: 2.46
Area Scan: sam_direct_droit2_surf10mm.txt, h= 5.00 mm
Zoom Scan: 5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location: X=0.000000, Y=-2.000000
SAR 10g (W/Kg): 0.146946
SAR 1g (W/Kg): 0.350123
Power drift (%): 2.26
3D screen shot



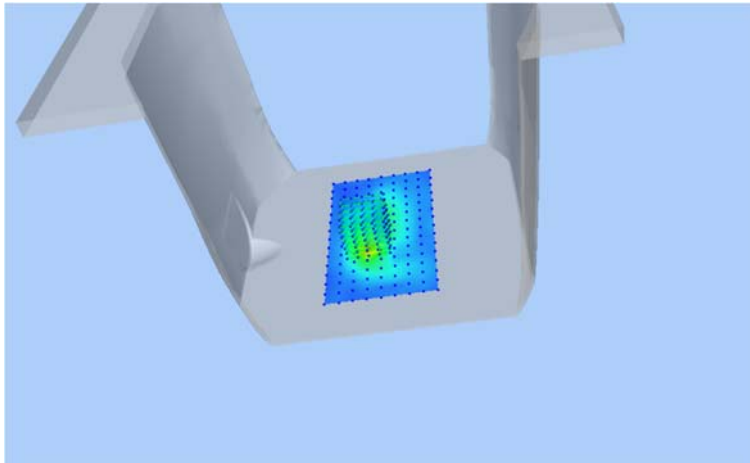
Z Axis Scan



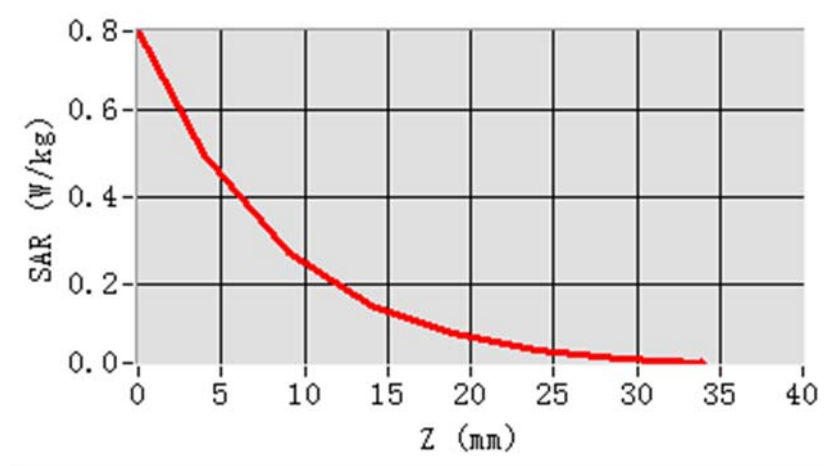
MEAS. 3 Body Plane with Back Side 0mm on Low Channel in WCDMA Band2

mode

Test Date: 16/1/2021
Measurement duration: 11 minutes 3 seconds
Signal: WCDMA, f=1852.4 MHz, Duty Cycle: 1:1.0
Liquid Parameters: Permittivity: 40.45; Conductivity: 1.39 S/m
Test condition: Ambient Temperature: 22.7°C, Liquid Temperature: 21.9°C
Probe: SN 34/15 EPGO265, ConvF: 2.46
Area Scan: sam_direct_droit2_surf10mm.txt, h= 5.00 mm
Zoom Scan: 5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location: X=-10.000000, Y=-12.000000
SAR 10g (W/Kg): 0.200471
SAR 1g (W/Kg): 0.444835
Power drift (%): -0.64
3D screen shot



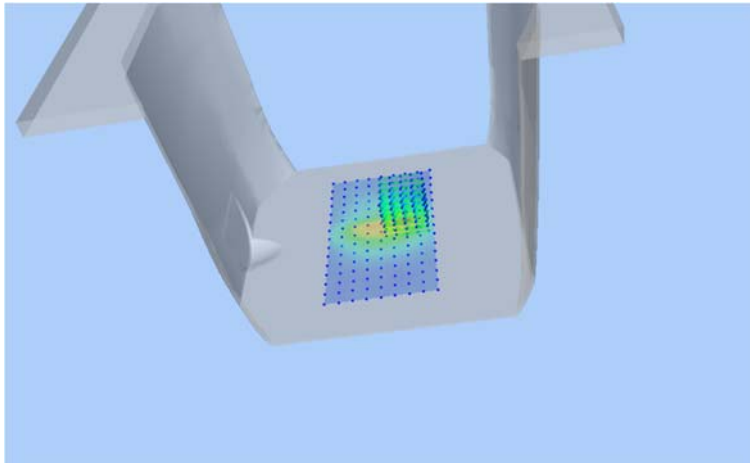
Z Axis Scan



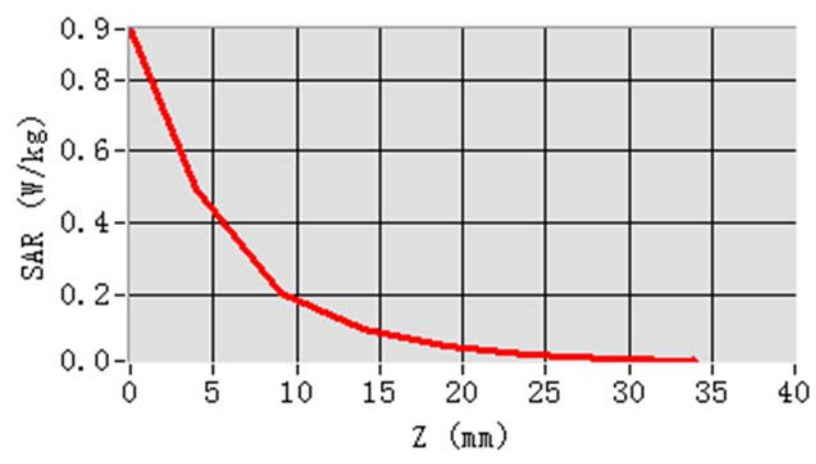
MEAS. 4 Body Plane with Back Side 0mm on High Channel in WCDMA Band5

mode

Test Date: 18/1/2021
Measurement duration: 12 minutes 9 seconds
Signal: WCDMA, f=846.6 MHz, Duty Cycle: 1:1.0
Liquid Parameters: Permittivity: 39.99; Conductivity: 0.95 S/m
Test condition: Ambient Temperature: 22.8°C, Liquid Temperature: 21.5°C
Probe: SN 34/15 EPGO265, ConvF: 1.93
Area Scan: sam_direct_droit2_surf10mm.txt, h= 5.00 mm
Zoom Scan: 5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location: X=20.000000, Y=8.000000
SAR 10g (W/Kg): 0.180655
SAR 1g (W/Kg): 0.443359
Power drift (%): -0.40
3D screen shot



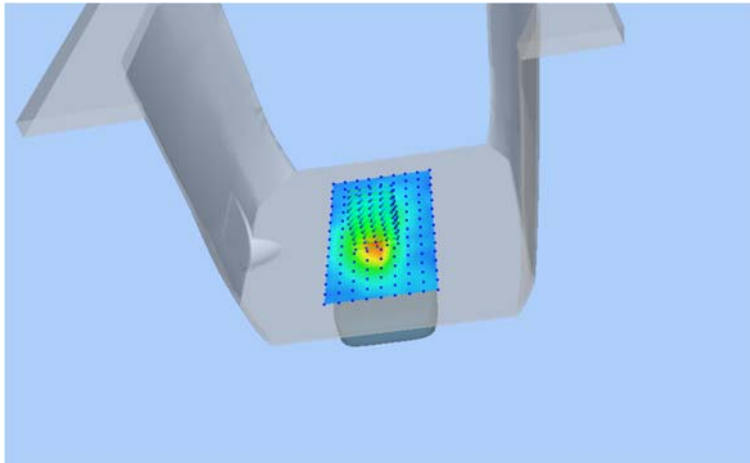
Z Axis Scan



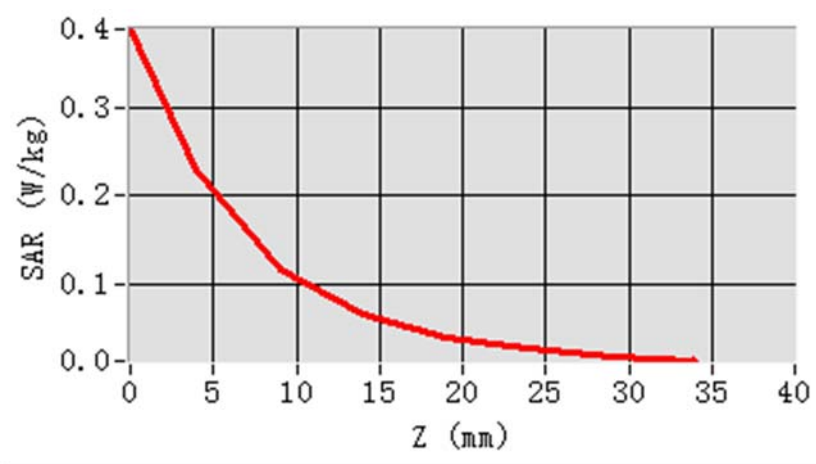
MEAS. 5 Body Plane with Back Side 0mm on High Channel in CDMA BC0

mode

Test Date: 18/1/2021
Measurement duration: 12 minutes 22 seconds
Signal: CDMA, f=848.3 MHz, Duty Cycle: 1:1.0
Liquid Parameters: Permittivity: 39.97; Conductivity: 0.95 S/m
Test condition: Ambient Temperature: 22.8°C, Liquid Temperature: 21.5°C
Probe: SN 34/15 EPGO265, ConvF: 1.93
Area Scan: sam_direct_droit2_surf10mm.txt, h= 5.00 mm
Zoom Scan: 5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location: X=0.000000, Y=-2.000000
SAR 10g (W/Kg): 0.099917
SAR 1g (W/Kg): 0.208875
Power drift (%): -4.18
3D screen shot



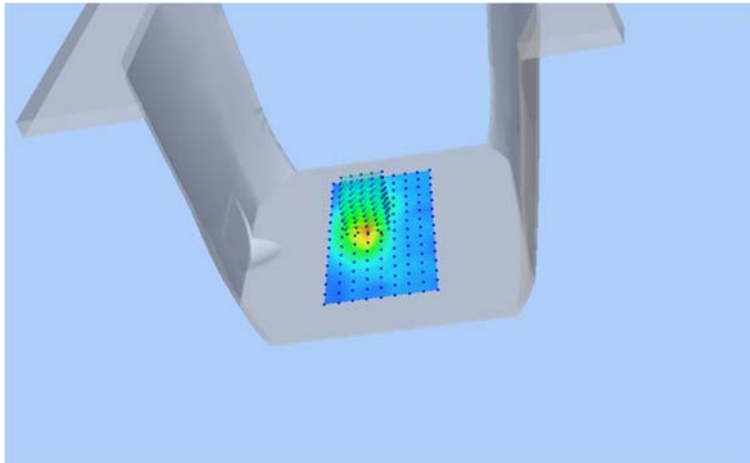
Z Axis Scan



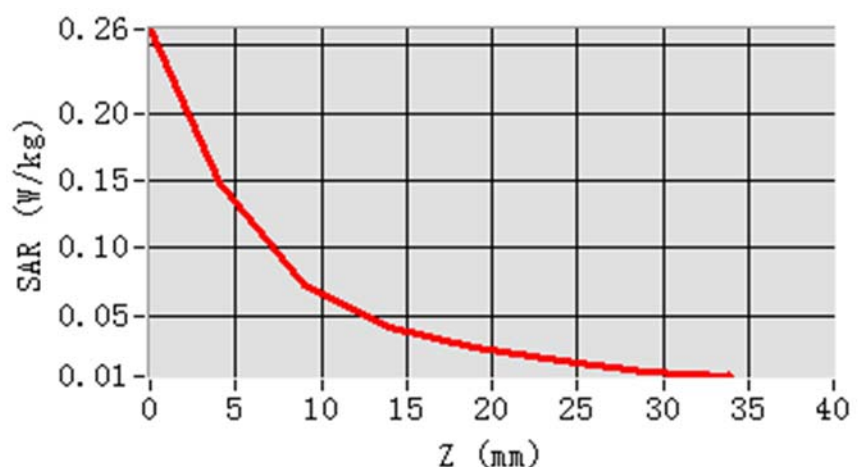
MEAS. 6 Body Plane with Back Side 0mm on High Channel in LTE Band5

mode

Test Date: 18/1/2021
Measurement duration: 11 minutes 17 seconds
Signal: LTE, f=844.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters: Permittivity: 40.08; Conductivity: 0.95 S/m
Test condition: Ambient Temperature: 22.8°C, Liquid Temperature: 21.5°C
Probe: SN 34/15 EPGO265, ConvF: 1.93
Area Scan: sam_direct_droit2_surf10mm.txt, h= 5.00 mm
Zoom Scan: 5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location: X=-10.000000, Y=18.000000
SAR 10g (W/Kg): 0.064661
SAR 1g (W/Kg): 0.134677
Power drift (%): -0.44
3D screen shot



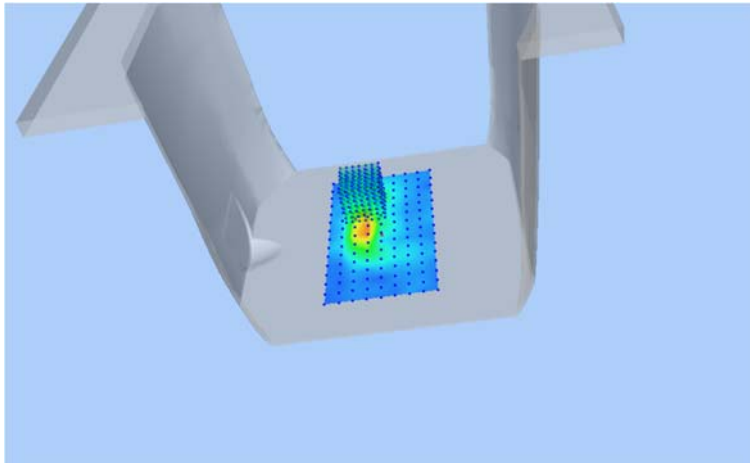
Z Axis Scan



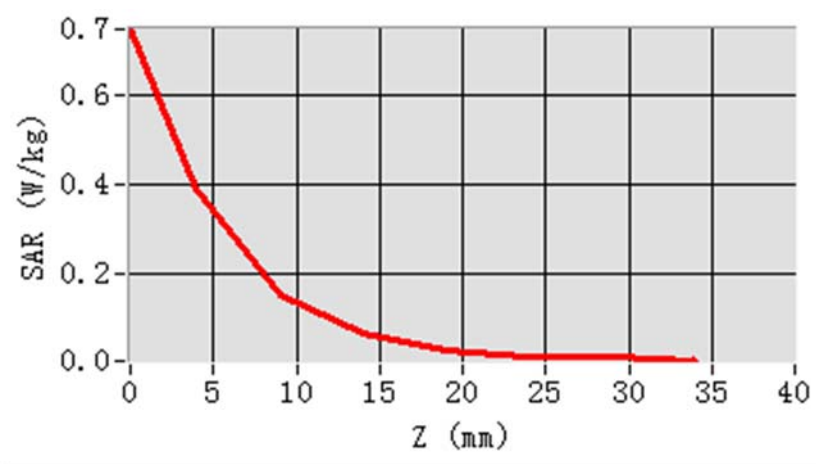
MEAS. 7 Body Plane with Back Side 0mm on Middle Channel in LTE Band7

mode

Test Date: 19/1/2021
Measurement duration: 15 minutes 7 seconds
Signal: LTE, f=2535.0 MHz, Duty Cycle: 1:1.0
Liquid Parameters: Permittivity: 39.62; Conductivity: 1.92 S/m
Test condition: Ambient Temperature: 22.3°C, Liquid Temperature: 21.2°C
Probe: SN 34/15 EPGO265, ConvF: 2.38
Area Scan: sam_direct_droit2_surf10mm.txt, h= 5.00 mm
Zoom Scan: 7x7x7,dx=5mm, dy=5mm, dz=5mm,Complete
Maximum location: X=-10.000000, Y=28.000000
SAR 10g (W/Kg): 0.119914
SAR 1g (W/Kg): 0.341932
Power drift (%): -1.25
3D screen shot



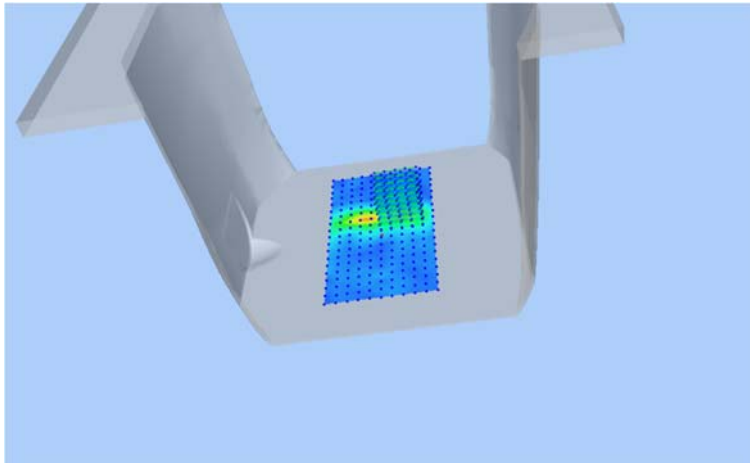
Z Axis Scan



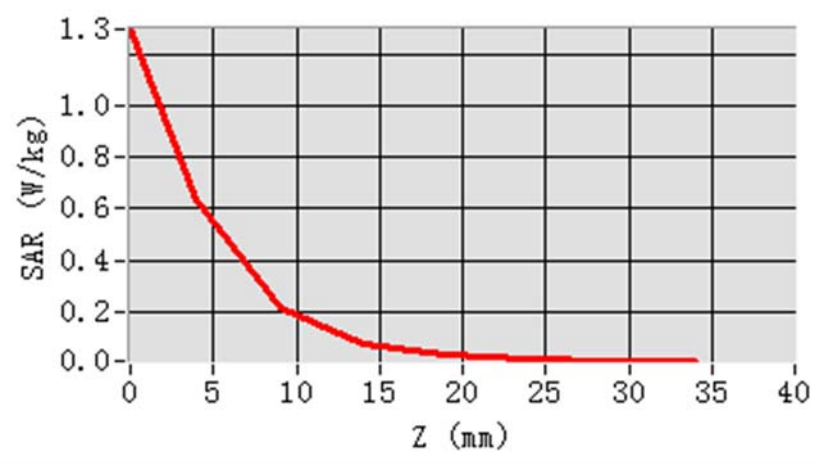
MEAS. 8 Body Plane with Back Side 0mm on High Channel in LTE Band38

mode

Test Date: 19/1/2021
Measurement duration: 14 minutes 26 seconds
Signal: LTE, f=2610.0 MHz, Duty Cycle: 1:1.58
Liquid Parameters: Permittivity: 38.10; Conductivity: 2.03 S/m
Test condition: Ambient Temperature: 22.3°C, Liquid Temperature: 21.2°C
Probe: SN 34/15 EPGO265, ConvF: 2.38
Area Scan: sam_direct_droit2_surf8mm.txt, h= 5.00 mm
Zoom Scan: 5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location: X=16.000000, Y=16.000000
SAR 10g (W/Kg): 0.172071
SAR 1g (W/Kg): 0.547074
Power drift (%): 1.88
3D screen shot

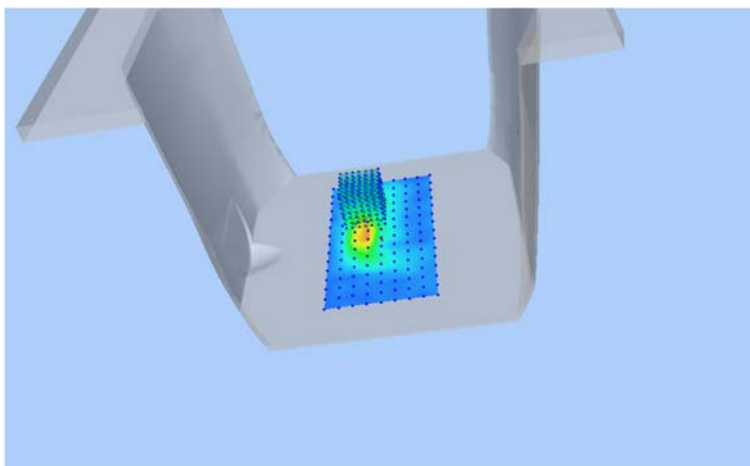


Z Axis Scan

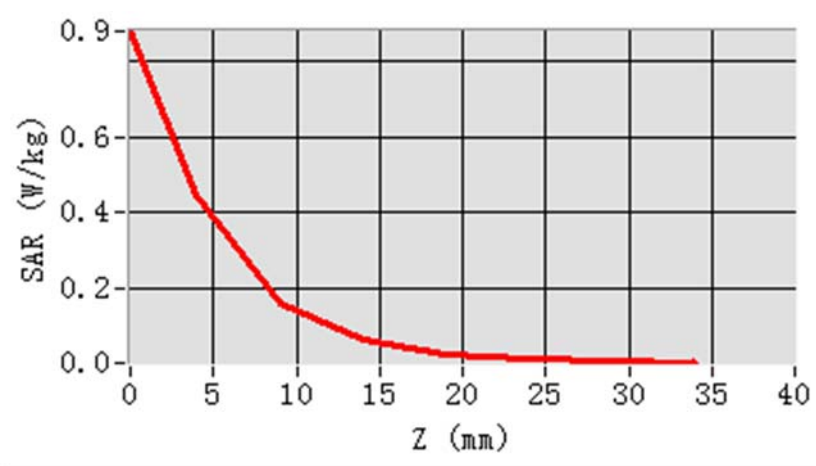


MEAS. 9 Body Plane with Back Side 0mm on Middle Channel in LTE Band41 mode

Test Date: 20/1/2021
Measurement duration: 15 minutes 7 seconds
Signal: LTE, f=2605.0 MHz, Duty Cycle: 1:1.58
Liquid Parameters: Permittivity: 39.58; Conductivity: 1.96 S/m
Test condition: Ambient Temperature: 22.5°C, Liquid Temperature: 21.4°C
Probe: SN 34/15 EPGO265, ConvF: 2.38
Area Scan: sam_direct_droit2_surf10mm.txt, h= 5.00 mm
Zoom Scan: 7x7x7,dx=5mm, dy=5mm, dz=5mm,Complete
Maximum location: X=-10.000000, Y=28.000000
SAR 10g (W/Kg): 0.136371
SAR 1g (W/Kg): 0.394892
Power drift (%): -2.05
3D screen shot



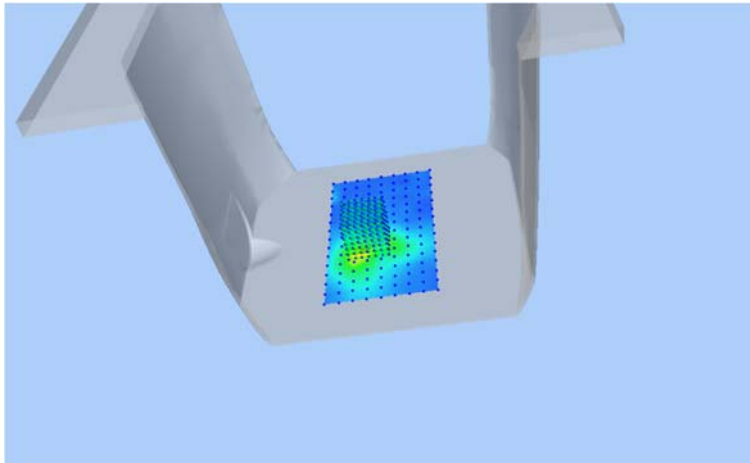
Z Axis Scan



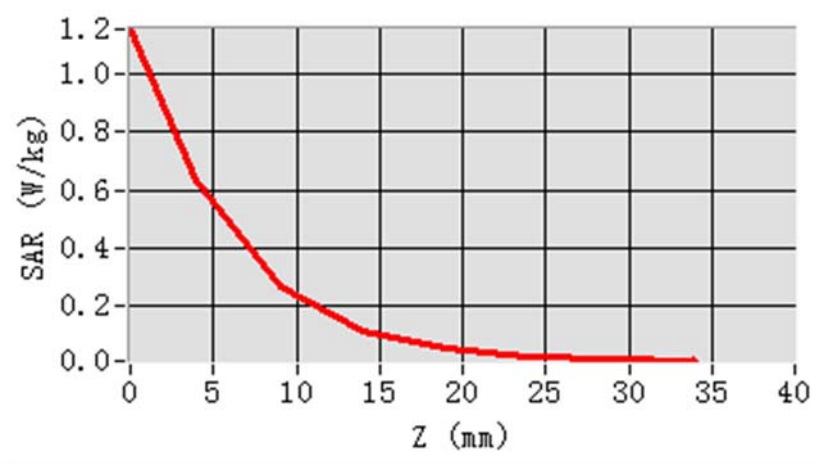
MEAS. 10 Body Plane with Back Side 0mm on 6 Channel in IEEE 802.11 b

mode Ant. Aux.

Test Date: 17/1/2021
Measurement duration: 15 minutes 48 seconds
Signal: WLAN, f=2437.0 MHz, Duty Cycle: 1:1.01
Liquid Parameters: Permittivity: 39.23; Conductivity: 1.80 S/m
Test condition: Ambient Temperature: 22.6°C, Liquid Temperature: 21.4°C
Probe: SN 34/15 EPGO265, ConvF: 2.55
Area Scan: sam_direct_droit2_surf10mm.txt, h= 5.00 mm
Zoom Scan: 7x7x7,dx=5mm, dy=5mm, dz=5mm,Complete
Maximum location: X=-10.000000, Y=-12.000000
SAR 10g (W/Kg): 0.206970
SAR 1g (W/Kg): 0.542084
Power drift (%): 2.23
3D screen shot



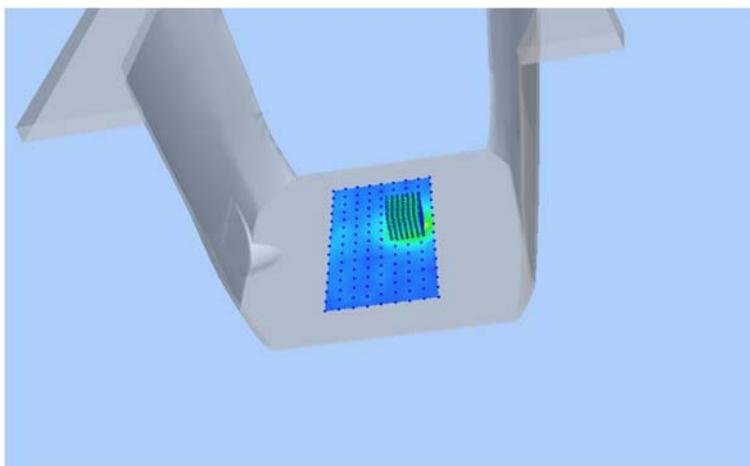
Z Axis Scan



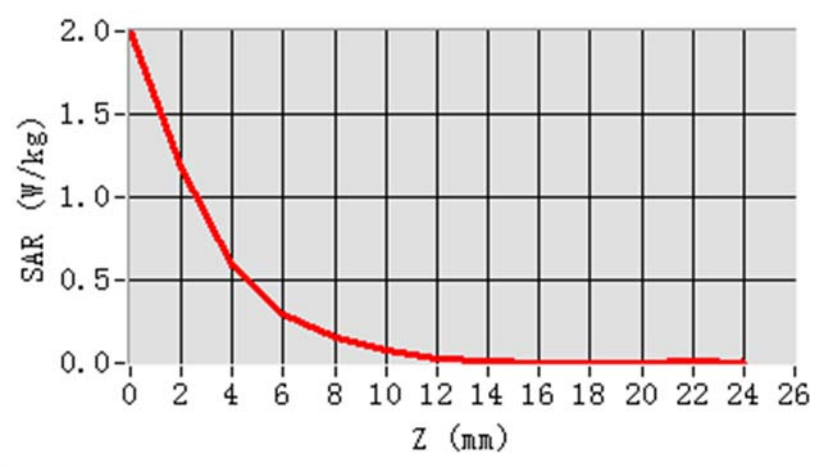
MEAS. 11 Body Plane with Back Side 0mm on Middle 64 in IEEE 802.11 a mode

Ant. Main

Test Date: 20/1/2021
Measurement duration: 21 minutes 51 seconds
Signal: WLAN, f=5320.0 MHz, Duty Cycle: 1:1.059
Liquid Parameters: Permittivity: 35.73; Conductivity: 4.85 S/m
Test condition: Ambient Temperature: 22.7°C, Liquid Temperature: 21.5°C
Probe: SN 34/15 EPGO265, ConvF: 2.04
Area Scan: sam_direct_droit2_surf10mm.txt, h= 5.00 mm
Zoom Scan: 7x7x12,dx=4mm, dy=4mm, dz=2mm,Complete
Maximum location: X=20.000000, Y=8.000000
SAR 10g (W/Kg): 0.198461
SAR 1g (W/Kg): 0.621878
Power drift (%): -1.93
3D screen shot



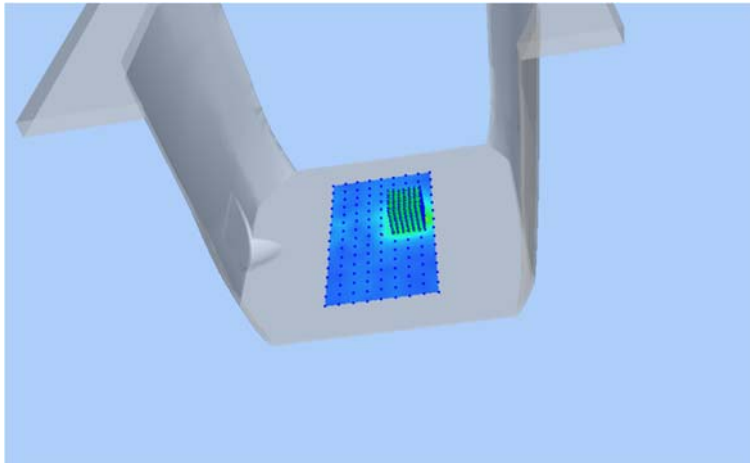
Z Axis Scan



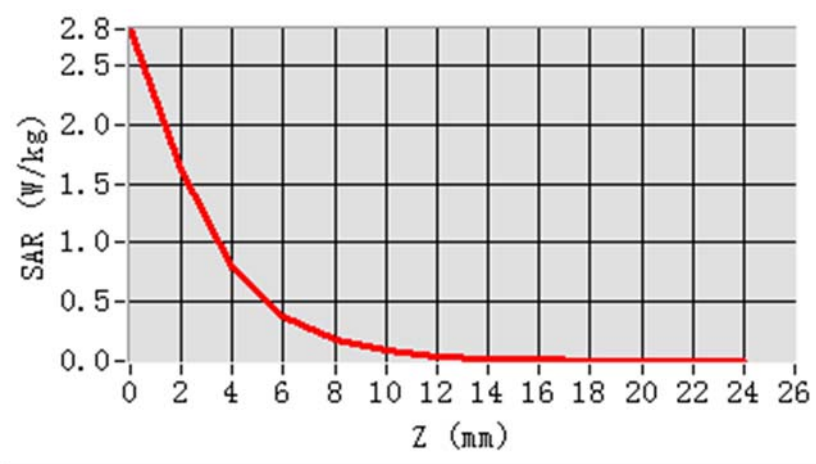
MEAS. 12 Body Plane with Back Side 0mm on 140 Channel in IEEE 802.11 a

mode An. Main

Test Date: 21/1/2021
Measurement duration: 21 minutes 16 seconds
Signal: WLAN, f=5700.0 MHz, Duty Cycle: 1:1.059
Liquid Parameters: Permittivity: 35.56; Conductivity: 5.24 S/m
Test condition: Ambient Temperature: 22.4°C, Liquid Temperature: 21.2°C
Probe: SN 34/15 EPGO265, ConvF: 2.20
Area Scan: sam_direct_droit2_surf10mm.txt, h= 5.00 mm
Zoom Scan: 7x7x12,dx=4mm, dy=4mm, dz=2mm,Complete
Maximum location: X=20.000000, Y=8.000000
SAR 10g (W/Kg): 0.248170
SAR 1g (W/Kg): 0.839016
Power drift (%): -3.09
3D screen shot

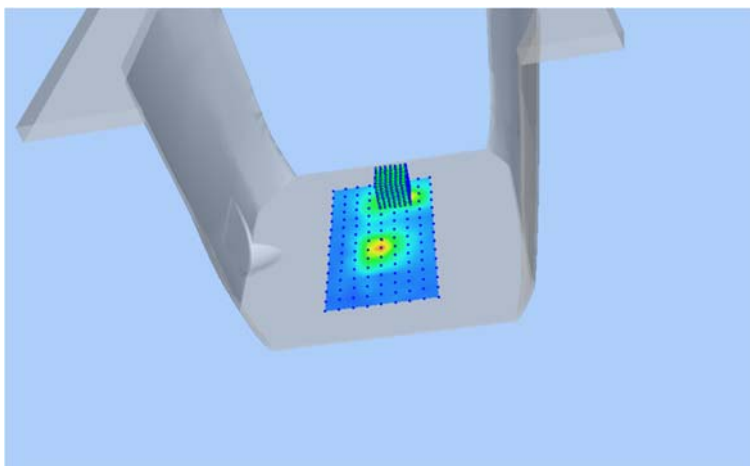


Z Axis Scan

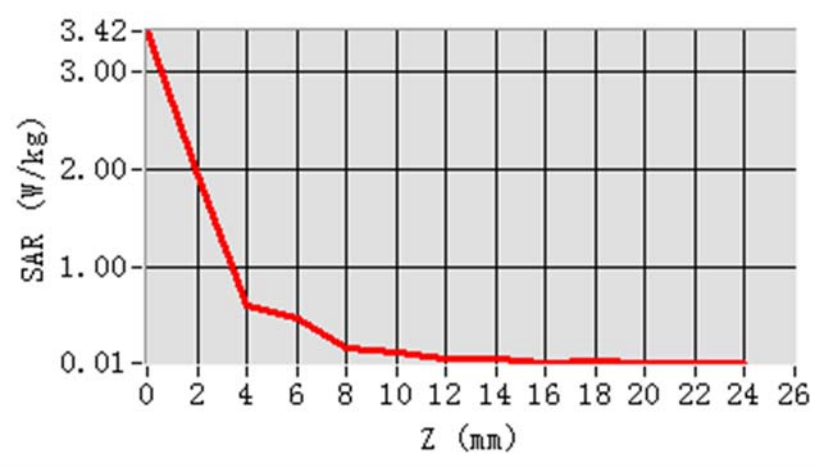


MEAS. 13 Body Plane with Back Side 0mm on 149 Channel in IEEE 802.11 a mode MIMO

Test Date: 21/1/2021
Measurement duration: 27 minutes 46 seconds
Signal: WLAN, f=5745.0 MHz, Duty Cycle: 1:1.059
Liquid Parameters: Permittivity: 34.82; Conductivity: 5.27 S/m
Test condition: Ambient Temperature: 22.4°C, Liquid Temperature: 21.2°C
Probe: SN 34/15 EPGO265, ConvF: 2.17
Area Scan: sam_direct_droit2_surf10mm.txt, h= 5.00 mm
Zoom Scan: 7x7x12,dx=4mm, dy=4mm, dz=2mm,Complete
Maximum location: X=10.000000, Y=48.000000
SAR 10g (W/Kg): 0.252154
SAR 1g (W/Kg): 0.885502
Power drift (%): -0.89
3D screen shot



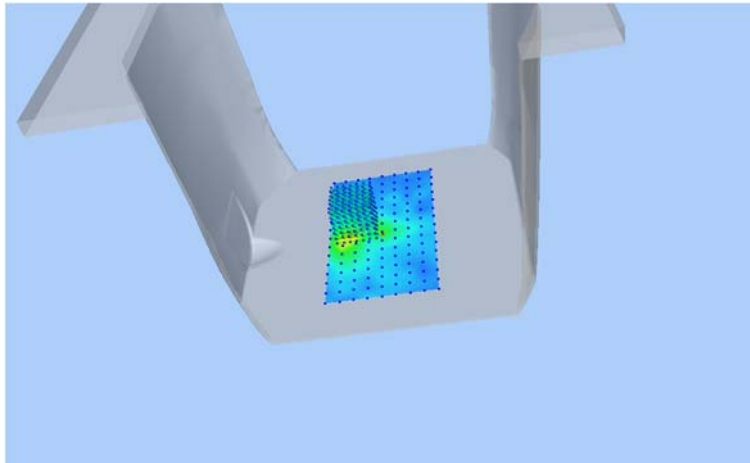
Z Axis Scan



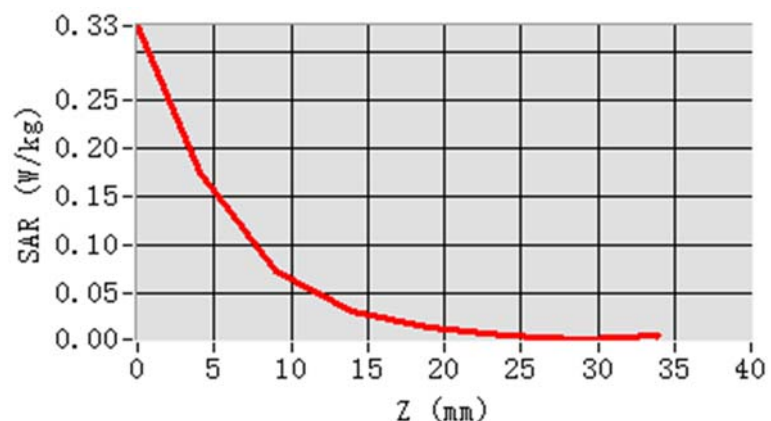
MEAS. 14 Body Plane with Back Side 0mm on High Channel in Bluetooth

mode Ant. Aux.

Test Date: 17/1/2021
Measurement duration: 14 minutes 49 seconds
Signal: Bluetooth, f=2480.0 MHz, Duty Cycle: 1:1.299
Liquid Parameters: Permittivity: 38.28; Conductivity: 1.87 S/m
Test condition: Ambient Temperature: 22.6°C, Liquid Temperature: 21.4°C
Probe: SN 34/15 EPGO265, ConvF: 2.55
Area Scan: sam_direct_droit2_surf8mm.txt, h= 5.00 mm
Zoom Scan: 5x5x7,dx=8mm, dy=8mm, dz=5mm,Complete
Maximum location: X=-20.000000, Y=8.000000
SAR 10g (W/Kg): 0.056860
SAR 1g (W/Kg): 0.153361
Power drift (%): 1.08
3D screen shot



Z Axis Scan



ANNEX D EUT EXTERNAL PHOTOS

Please refer the document “BL-SZ20C0943-AW.pdf”.

ANNEX E SAR TEST SETUP PHOTOS

Please refer the document “BL-SZ20C0943-AS.pdf”.

ANNEX F CALIBRATION REPORT

Please refer the document “CALIBRATION REPORT.pdf”.

--END OF REPORT--