



SAR Test Report

For



Applicant Name: Shenzhen DOOGEE Hengtong Technology CO., LTD
B, 2/F, Building A4, Silicon Valley Power Digital Industrial Park,
Address: No. 22, Dafu Industrial Zone, Guanlan Aobei Community,
Guanlan Street, Longhua New District, Shenzhen, Guangdong,
China
EUT Name: Tablet
Brand Name: DOOGEE
Model Number: R10
Series Model Number: Refer to section 2

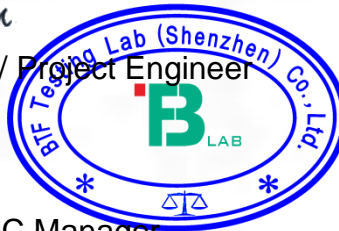
Issued By

Company Name: BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park,
Address: Tantou Community, Songgang Street, Bao'an District, Shenzhen,
China

Report Number: BTF230420R00401
EN 50566: 2017
Test Standards: EN 50663: 2017
EN 62479: 2010
IEC/IEEE 62209-1528: 2020

Test Conclusion: Pass
Test Date: 2023-05-08 to 2023-05-10
Date of Issue: 2023-05-16

Prepared By: 
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Date: 2023-05-16
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Date: 2023-05-16



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Revision History		
Version	Issue Date	Revisions Content
R_V0	2023-05-16	Original
<i>Note:</i>	<i>Once the revision has been made, then previous versions reports are invalid.</i>	

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1. Introduction

1.1 Identification of Testing Laboratory

Company Name:	BTF Testing Lab (Shenzhen) Co., Ltd.
Address:	F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China
Phone Number:	+86-0755-23146130
Fax Number:	+86-0755-23146130

1.2 Identification of the Responsible Testing Location

Test Location:	BTF Testing Lab (Shenzhen) Co., Ltd.
Address:	F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China
Description:	All measurement facilities used to collect the measurement data are located at F101,201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

1.3 Laboratory Condition

Ambient Temperature:	21°C to 25°C
Ambient Relative Humidity:	48% to 59%
Ambient Pressure:	100 kPa to 102 kPa

1.4 Announcement

- (1) The test report reference to the report template version v0.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing, reviewing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) This document may not be altered or revised in any way unless done so by BTF and all revisions are duly noted in the revisions section.
- (5) 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.
- (6) 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 Application Information

Company Name:	Shenzhen DOOGEE Hengtong Technology CO., LTD
Address:	B, 2/F, Building A4, Silicon Valley Power Digital Industrial Park, No. 22, Dafu Industrial Zone, Guanlan Aobei Community, Guanlan Street, Longhua New District, Shenzhen, Guangdong, China

2.2 Manufacturer Information

Company Name:	Shenzhen DOOGEE Hengtong Technology CO., LTD
Address:	B, 2/F, Building A4, Silicon Valley Power Digital Industrial Park, No. 22, Dafu Industrial Zone, Guanlan Aobei Community, Guanlan Street, Longhua New District, Shenzhen, Guangdong, China

2.3 Factory Information

Company Name:	Shenzhen DOOGEE Hengtong Technology CO., LTD
Address:	B, 2/F, Building A4, Silicon Valley Power Digital Industrial Park, No. 22, Dafu Industrial Zone, Guanlan Aobei Community, Guanlan Street, Longhua New District, Shenzhen, Guangdong, China

2.4 General Description of Equipment under Test (EUT)

EUT Name	Tablet
Under Test Model Name	R10
Series Model Name	R10Pro, R10S, R10E
Description of Model name differentiation	Only the model name is different, others are the same.

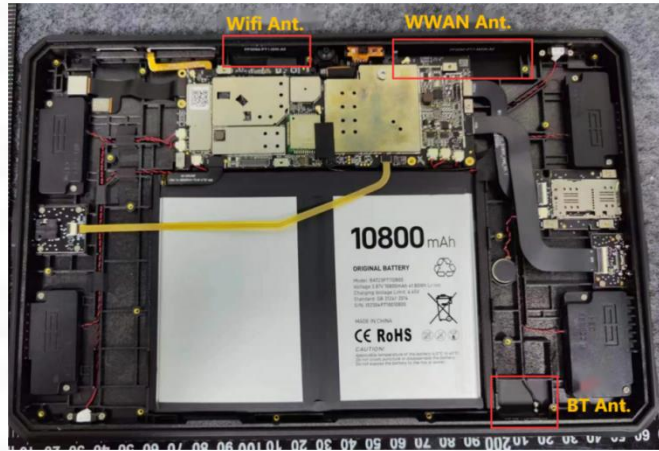
2.5 Equipment under Test Ancillary Equipment

Ancillary Equipment 1	Rechargeable Battery	
	Capacity	10800mAh
	Rated Voltage	3.87V

2.6 Technical Information

Network and Wireless connectivity	2G Network GSM/GPRS/EGPRS 900/1800 MHz 3G Network WCDMA/HSDPA/HSUPA Band 1/8 4G Network FDD LTE Band 1/3/7/8/20/28 TDD LTE Band 38/40 2.4G WIFI 802.11b, 802.11g, 802.11n(HT20/HT40) 5G WIFI 802.11a, 802.11n(HT20/HT40), 802.11ac(VHT20/VHT40/VHT80) Bluetooth (EDR+BLE)
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Antenna Information:



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

Operating Mode	GSM, WCDMA, LTE, WLAN, Bluetooth		
Frequency Range	GSM 900	Tx: 880 ~ 915 MHz	Rx: 925 ~ 960 MHz
	GSM 1800	Tx: 1710 ~ 1785 MHz	Rx: 1805 ~ 1880 MHz
	WCDMA Band 1	Tx: 1920 ~ 1980 MHz	Rx: 2110 ~ 2170 MHz
	WCDMA Band 8	Tx: 880 ~ 915 MHz	Rx: 925 ~ 960 MHz
	LTE Band 1	Tx: 1920 ~ 1980 MHz	Rx: 2110 ~ 2170 MHz
	LTE Band 3	Tx: 1710 ~ 1785 MHz	Rx: 1805 ~ 1880 MHz
	LTE Band 7	Tx: 2500 ~ 2570 MHz	Rx: 2620 ~ 2690 MHz
	LTE Band 8	Tx: 880 ~ 915 MHz	Rx: 925 ~ 960 MHz
	LTE Band 20	Tx: 832 ~ 862 MHz	Rx: 791 ~ 821 MHz
	LTE Band 28	Tx: 703 ~ 748 MHz	Rx: 758 ~ 803 MHz
	LTE Band 38	2570 ~ 2620 MHz	
	LTE Band 40	2300 ~ 2400 MHz	
	802.11b/g/n(HT20)	2412 ~ 2472 MHz	
	802.11n(HT40)	2422 ~ 2462 MHz	
	802.11a	5150 ~ 5250 MHz 5725 ~ 5850 MHz	
802.11n(HT20/HT40)			
802.11ac(VHT20/VHT40/VTH80)			
Antenna Type	WWAN: PIFA Antenna WLAN: PIFA Antenna BT: PIFA Antenna		
Hotspot Function	Support		
Power Reduction	Not Support		
Exposure Category	General Population/Uncontrolled exposure		
EUT Stage	Portable Device		
Product	Type		
	<input type="checkbox"/> Production unit		<input checked="" type="checkbox"/> Identical prototype

3. Summary of Test Results

3.1 Test Standards

No.	Identity	Document Title
1	EN 50566: 2017	Product standard to demonstrate the compliance of wireless communication devices with the basic restrictions and exposure limit values related to human exposure to electromagnetic fields in the frequency range from 30 MHz to 6 GHz: hand-held and body mounted devices in close proximity to the human body (30 MHz - 6 GHz)
2	EN 50663: 2017	Generic standard for assessment of low power electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (10 MHz- 300 GHz)
3	EN 62479: 2010	Assessment of the compliance of low power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz)
4	IEC/IEEE 62209-1528: 2020	Measurement procedure for the assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-worn wireless communication devices – Human models, instrumentation and procedures (Frequency range of 4 MHz to 10 GHz)
5	1999/519/EC	Council Recommendation of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz)

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

According to 1999/519/EC the limit for General Population/ Uncontrolled exposure should be applied for this device, it is 2.0 W/kg as averaged over any 10 gram of tissue.

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)	2.0	10.0
SAR for hands, wrists, feet and ankles (averaged over any 10 grams of tissue)	4.0	20.0

NOTE:
General Population/Uncontrolled Exposure: 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 Exposure: 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

<Maximum Reported Standalone SAR>

Frequency Band		Maximum Report SAR (W/kg) 10 g	
		Body SAR (Separation 0 mm)	Limb SAR (Separation 0 mm)
WWAN	GSM 900	0.603	0.603
	GSM 1800	0.474	0.474
	WCDMA Band 1	0.778	0.778
	WCDMA Band 8	0.623	0.623
	LTE FDD Band 1	0.879	0.879
	LTE FDD Band 3	0.289	0.289
	LTE FDD Band 7	0.625	0.625
	LTE FDD Band 8	0.329	0.329
	LTE FDD Band 20	0.158	0.158
	LTE FDD Band 28	0.056	0.056
	LTE FDD Band 38	0.173	0.173
	LTE FDD Band 40	0.258	0.258
WLAN	2.4G Wifi	0.319	0.319
	5.2G Wifi	0.569	0.569
	5.8G Wifi	0.191	0.191
Limits (W/kg)		2.0	4.0
Test Verdict		Pass	Pass

<Maximum Reported Simultaneous SAR>

Exposure Position	Simultaneous Configuration	Maximum Reported Simultaneous Transmission SAR (W/kg)	Limit (W/kg)	Verdict
Body 10g SAR (0mm Gap)	LTE Band 1 + 5.2G WIFI	1.448	2.0	Pass
Limb 10g SAR (0mm Gap)	LTE Band 1 + 5.2G WIFI	1.448	4.0	Pass

3.4 Test Uncertainty

3.4.1 Measurement uncertainty evaluation for SAR test (300MHz to 6GHz)

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in IEC/IEEE 62209-1528: 2020. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Uncertainty Component	Tol (+-%)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10 g Ui (+-%)	Vi veff
Measurement System								
Probe calibration	5.8	N	1	1	1	5.80	5.80	∞
Axial Isotropy	3.5	R	√3	√0.5	√0.5	1.43	1.43	∞
Hemispherical Isotropy	5.9	R	√3	√0.5	√0.5	2.41	2.41	∞
Boundary effect	1.0	R	√3	1	1	0.58	0.58	∞
Linearity	4.7	R	√3	1	1	2.71	2.71	∞
System detection limits	1.0	R	√3	1	1	0.58	0.58	∞
Modulation response	3.0	R	√3	1	1	1.73	1.73	∞
Readout Electronics	0.5	N	1	1	1	0.50	0.50	∞
Response Time	0	R	√3	1	1	0.00	0.00	∞
Integration Time	1.4	R	√3	1	1	0.81	0.81	∞
RF ambient Conditions - Noise	3.0	R	√3	1	1	1.73	1.73	∞
RF ambient Conditions - Reflections	3.0	R	√3	1	1	1.73	1.73	∞
Probe positioner Mechanical Tolerance	1.4	R	√3	1	1	0.81	0.81	∞
Probe positioning with respect to Phantom Shell	1.4	R	√3	1	1	0.81	0.81	∞
Extrapolation, interpolation and integration Algorithms for Max. SAR Evaluation	2.3	R	√3	1	1	1.33	1.33	∞
Test sample Related								
Test sample positioning	2.6	N	1	1	1	2.60	2.60	11
Device Holder Uncertainty	3.0	N	1	1	1	3.00	3.00	7
Output power Variation - SAR drift measurement	5.0	R	√3	1	1	2.89	2.89	∞
SAR scaling	2.0	R	√3	1	1	1.15	1.15	∞
Phantom and Tissue Parameters								
Phantom Shell Uncertainty - Shape, Thickness and Permittivity	4	R	√3	1	1	2.31	2.31	∞
Uncertainty in SAR correction for deviation in permittivity and conductivity	2.0	N	1	1	0.84	2.00	1.68	∞
Liquid conductivity measurement	4.0	N	1	0.78	0.71	3.12	2.84	5
Liquid permittivity measurement	5.0	N	1	0.23	0.26	1.15	1.30	5
Liquid Conductivity - Temperature Uncertainty	2.5	R	√3	0.78	0.71	1.13	1.02	∞
Liquid permittivity - Temperature Uncertainty	2.5	R	√3	0.23	0.26	0.33	0.38	∞
Combined Standard Uncertainty		RSS				10.47	10.34	
Expanded Uncertainty (95% Confidence interval)		k				20.95	20.69	

3.4.2 Measurement uncertainty evaluation for system check

This measurement uncertainty budget is suggested by IEC/IEEE 62209-1528: 2020. The breakdown of the individual uncertainties is as follows:

Uncertainty Component	Tol (+-%)	Prob. Dist.	Div.	Ci (1g)	Ci (10 g)	1g Ui (+-%)	10 g Ui (+-%)	Vi veff
Measurement System								
Probe calibration	5.8	N	1	1	1	5.80	5.80	∞
Axial Isotropy	3.5	R	√3	1	1	2.02	2.02	∞
Hemispherical Isotropy	5.9	R	√3	0	0	0.00	0.00	∞
Boundary effect	1	R	√3	1	1	0.58	0.58	∞
Linearity	4.7	R	√3	1	1	2.71	2.71	∞
System detection limits	1	R	√3	1	1	0.58	0.58	∞
Modulation response	0	N	√3	0	0	0.00	0.00	∞
Readout Electronics	0.5	N	1	1	1	0.50	0.50	∞
Response Time	0	R	√3	0	0	0.00	0.00	∞
Integration Time	1.4	R	√3	0	0	0.00	0.00	∞
RF ambient Conditions - Noise	3	R	√3	1	1	1.73	1.73	∞
RF ambient Conditions - Reflections	3	R	√3	1	1	1.73	1.73	∞
Probe positioner Mechanical Tolerance	1.4	R	√3	1	1	0.81	0.81	∞
Probe positioning with respect to Phantom Shell	1.4	R	√3	1	1	0.81	0.81	∞
Extrapolation, interpolation and integration Algorithms for Max. SAR Evaluation	2.3	R	√3	1	1	1.33	1.33	∞
Dipole								
Deviation of experimental source from numerical source	5	N	1	1	1	5.00	5.00	∞
Input Power and SAR drift measurement	0.5	R	√3	1	1	0.29	0.29	∞
Dipole Axis to Liquid Dist.	2.0	R	√3	1	1	1.15	1.15	∞
Phantom and Tissue Parameters								
Phantom Shell Uncertainty - Shape, Thickness and Permittivity	4	R	√3	1	1	2.31	2.31	∞
Uncertainty in SAR correction for deviation in permittivity and conductivity	2.0	N	1	1	0.84	2.00	1.68	∞
Liquid conductivity measurement	4	N	1	0.78	0.71	3.12	2.84	5
Liquid permittivity measurement	5.0	N	1	0.23	0.26	1.15	1.30	5
Liquid Conductivity - Temperature Uncertainty	2.5	R	√3	0.78	0.71	1.13	1.02	∞
Liquid permittivity - Temperature Uncertainty	2.5	R	√3	0.23	0.26	0.33	0.38	∞
Combined Standard Uncertainty		RSS				10.16	10.03	
Expanded Uncertainty (95% Confidence interval)		k				20.32	20.06	

4. Measurement System

4.1 Specific Absorption Rate (SAR) Definition

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

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

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

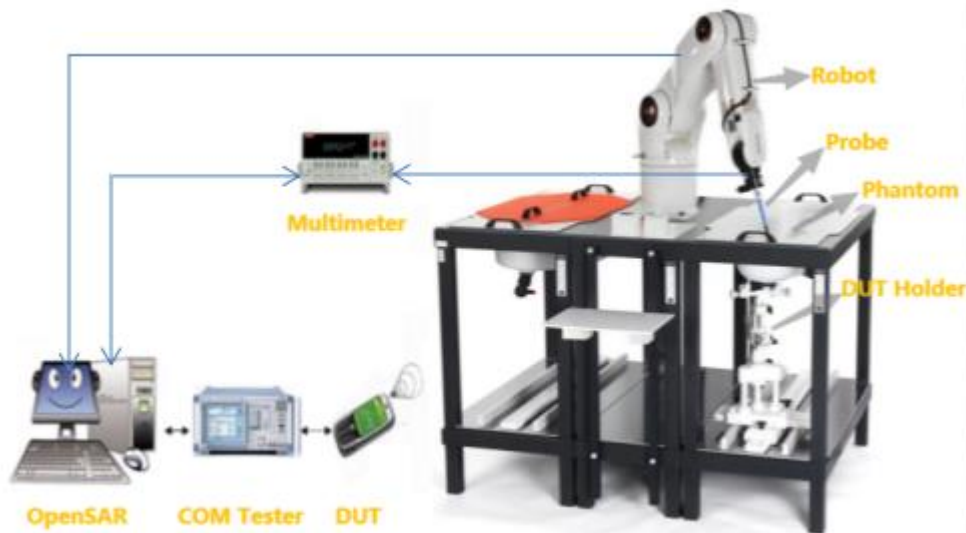
SAR is expressed in units of Watts per kilogram (W/kg) SAR measurement can be related to the electrical field in the tissue by

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

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

4.2 MVG SAR System

4.2.1 SAR system diagram



4.2.2 Robot



- A standard high precision 6-axis robot (Denso) with teaches pendant with Scanning System
- It must be able to scan all the volume of the phantom to evaluate the tridimensional distribution of SAR.
 - Must be able to set the probe orthogonal of the surface of the phantom ($\pm 30^\circ$).
 - Detects stresses on the probe and stop itself if necessary to keep the integrity of the probe.


4.2.3 E-Field Probe


For the measurements, the Specific Dosimetric SSE2 E-Field Probe with following specifications is used:

- Dynamic range: 0.01-100 W/kg
- Tip diameter: 2mm for SSE2
- Distance between probe tip and sensor centre: 1mm for SSE2
- Distance between sensor centre and the inner phantom surface: 2mm for $f \geq 4\text{GHz}$.
- Probe linearity: $< 0.25\text{dB}$.
- Axial Isotropy: $< 0.25\text{dB}$.
- Spherical Isotropy: $< 0.50\text{dB}$.
- Calibration range: 150 to 6000 MHz for head & body simulating liquid
- Angle between probe axis (evaluation axis) and surface normal line: less than 20° .

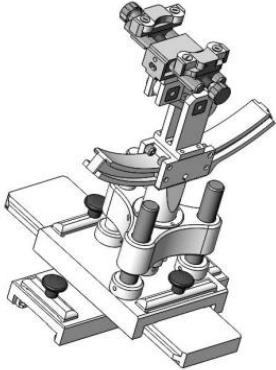



4.2.4 Phantoms

SAM Phantom			
<p>For the measurements the Specific Anthropomorphic Mannequin (SAM) defined by the IEEE SCC-34/SC2 group is used. The probe scanning of the E-Field is done in the 2 halves of the normalized head. The normalized shape of the phantom corresponds to the dimensions of 90% of an adult head size. It enables the dosimetric evaluation of left and right-hand phone usage and includes an additional flat phantom part for the simplified body performance check. The phantom set-up includes a cover, which prevents the evaporation of the liquid.</p>			
		<p>The thickness of the phantom amounts to $2\text{ mm} \pm 0.2\text{ mm}$. The materials for the phantom do not affect the radiation of the device under test (DUT) : $\epsilon_r' < 5$ The head is filled with tissue simulating liquid. The hand do not have to be modeled.</p>	
SAM Phantom			
TWIN SAM phantom			
Mechanical		Electrical	
Overall thickness	$2 \pm 0.2\text{ mm}$ (except ear area)	Relative permittivity	3.4
Dimensions	1000 mm(L) x 500 mm(W) x 200 mm(H)	Loss tangent	0.02
Maximum volume	27 L		
Material	Fiberglass based		

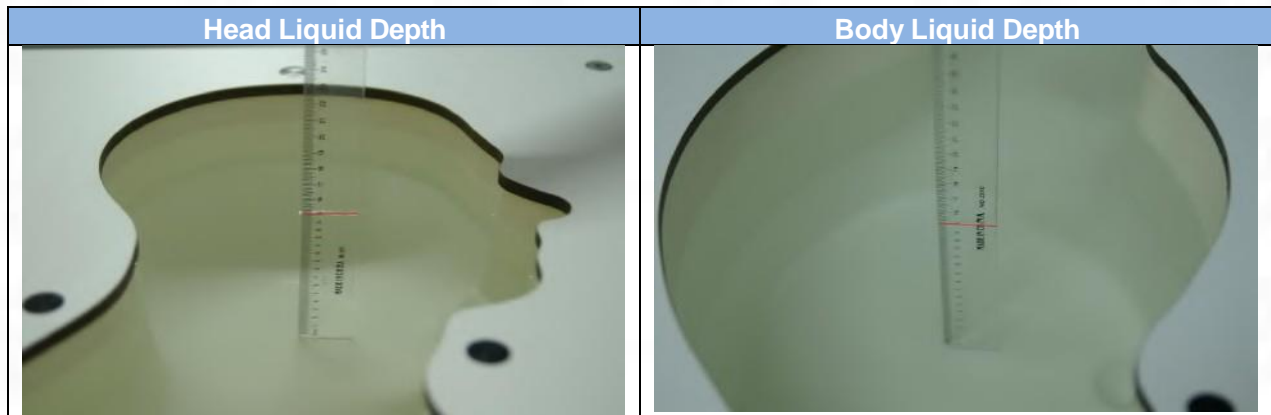
ELLIPTICAL Phantom	
<p>The phantom is for Body performance check filled with tissue-equivalent liquid to a depth of at least 150 mm, whose shell material is resistant to damage or reaction with tissue-equivalent liquid chemicals.</p>	
	<p>The shape of the phantom is an ellipse with length $600\text{ mm} \pm 5\text{ mm}$ and width $400\text{ mm} \pm 5\text{ mm}$. The phantom shell is made of low-loss and low-permittivity material, having loss tangent $\tan \delta \leq 0.05$ and relative permittivity: $\epsilon_r' \leq 5$ for $f \leq 3\text{ GHz}$ $3 \leq \epsilon_r' \leq 5$ for $f > 3\text{ GHz}$ The thickness of the bottom-wall of the flat phantom is 2.0 mm with a tolerance of $\pm 0.2\text{ mm}$.</p>
ELLI Phantom	
Technical & mechanical characteristics	
Shell thickness	$2\text{ mm} \pm 0.2\text{ mm}$
Filling volume	25 L
Dimensions	600 mm x 400 mm x 200mm
Permittivity	4.4
Loss tangent	0.017

4.2.5 Device Holder

					
System Material	Permittivity	Loss tangent	System Material	Permittivity	Loss tangent
Delrin	3.7	0.005	PMMA	2.9	0.028
<p>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°.</p>					

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.

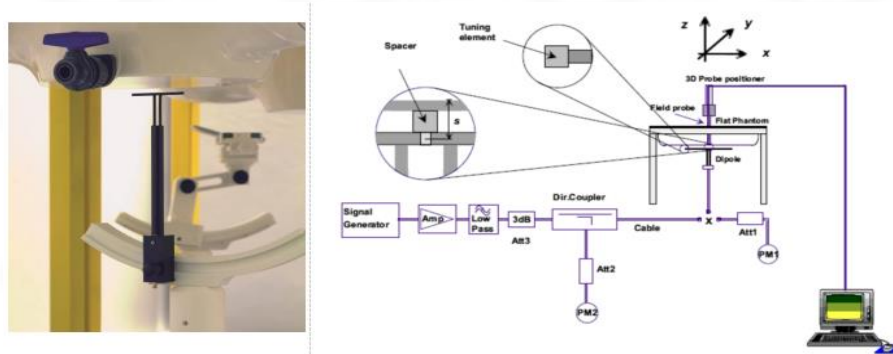
Head (Reference IEEE1528)								
Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity σ (S/m)	Permittivity ϵ
750	41.1	57.0	0.2	1.4	0.2	0	0.89	41.9
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
900	40.3	57.9	0.2	1.4	0.2	0	0.97	41.5
1800, 1900, 2000	55.2	0	0	0.3	0	44.5	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			/		5.30	49.00
5800	78.50	21.40			0.1		6.00	48.20

5. System Verification

5.1 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. The 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.

5.2 System Check Setup

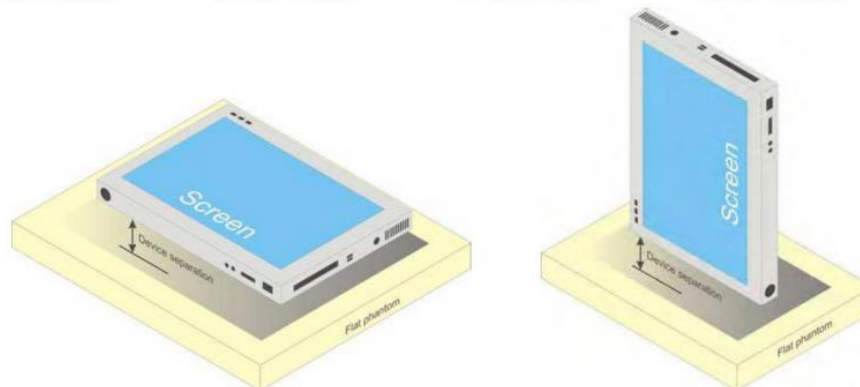


6. Test Position Configurations

According to IEC/IEEE 62209-1528: 2020, body-supported devices are tested for SAR compliance described in the following subsections.

6.1 Body-supported Position Conditions

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



b) Tablet form factor portable computer

6.2 Limb Position Conditions

Limb-worn devices are strapped to the arm or leg of the user while transmitting. These are similar to a body-worn device.

To assess this type of device, the following applies.

- a. The test positions of devices used with body-worn accessories shall be applied.
- b. The device shall be placed against the phantom such that the measured SAR is a conservative exposure (e.g. by opening or removing the strap as shown in Figure, if applicable).

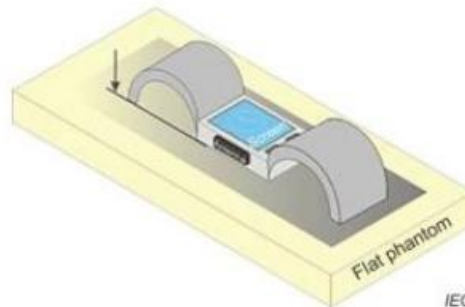
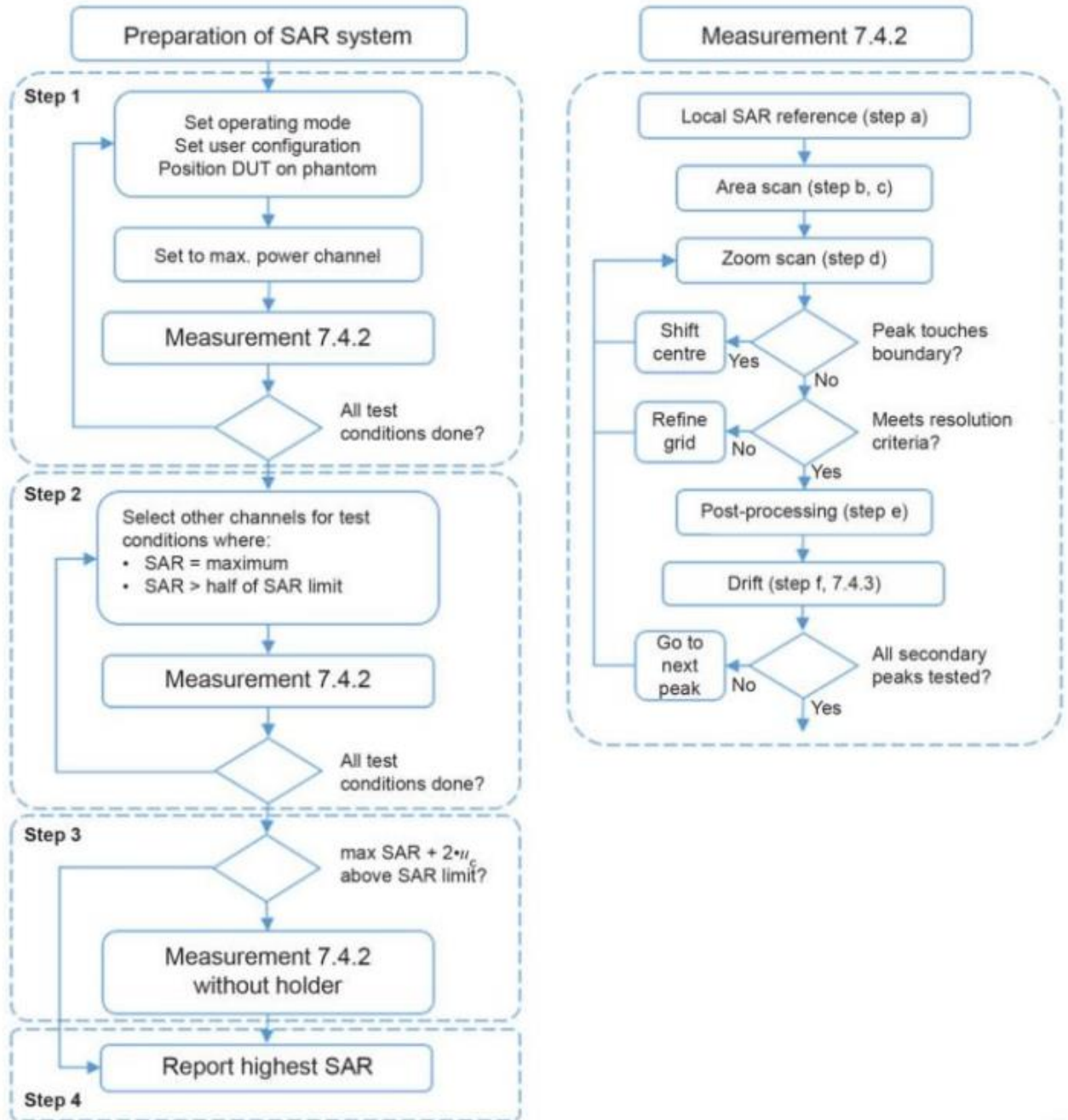


Figure 12 – Test position for limb-worn devices

7. Measurement Procedure

7.1 Measurement Process Diagram

Body SAR



IEC

7.2 Measurement Procedure

The following procedure shall be performed for each of the test conditions:

- a. Measure the local SAR at a test point within 8 mm of the phantom inner surface that is closest to the DUT. The test point can be close to the ear;
- b. Measure the SAR distribution within the phantom (area scan procedure). The SAR distribution is scanned along the inside surface of one side of the phantom head, at least for an area larger than the projection of the handset and antenna. The spatial grid step shall be less than 20 mm. The resolution accuracy can also be tested using the reference functions of 7.2.4. If surface scanning is used, then the distance between the geometrical centre of the probe dipoles and the inner surface of the phantom shall be 8,0 mm or less ($\pm 1,0$ mm). At all measurement points, the angle of the probe with respect to the line normal to the surface is recommended but not required to be less than 30° ;
- c. From the scanned SAR distribution, identify the position of the maximum SAR value, as well as the positions of any local maxima with SAR values within 2 dB of the maximum value that are not within the zoom-scan volume; Additional peaks shall be measured only when the primary peak is within 2 dB of the SAR limit (i.e., 1 W/kg for a 1,6 W/kg 1 g limit, or 1,26 W/kg for a 2 W/kg 10 g limit). This is consistent with the 2 dB threshold already stated;
- d. Measure SAR with a grid step of 8 mm or less in a volume with a minimum size of 30 mm by 30 mm and 30 mm in depth (zoom scan procedure). The grid step in the vertical direction shall be 5 mm or less (see C.3.3). Separate grids shall be centred on each of the local SAR maxima found in step c). Uncertainties due to field distortion between the media boundary and the dielectric cover/case of the probe should also be minimized, which is achieved if the distance between the phantom surface and physical tip of the probe is larger than half of the probe tip diameter. Other methods may utilize correction procedures for these boundary effects that enable high precision measurements closer than half the probe diameter. At all measurement points, the angle of the probe with respect to the line normal to the surface is recommended but not required to be less than 30° ;
- e. Use interpolation and extrapolation procedures defined described in IEC/IEEE 62209-1528, Annex C to determine the local SAR values at the spatial resolution needed for mass averaging;
- f. The local SAR should be measured at exactly the same location as used in a). The absolute value of the measurement drift, i.e., the difference between the SAR measured in f) and a), shall be recorded in the uncertainty budget. It is recommended that the drift be kept within $\pm 5\%$. If this is not possible, even with repeat testing, additional information, e.g., data for local SAR versus time, should be used to demonstrate that the output power applied during the test is appropriate for testing the device. Power reference measurements can be taken after each zoom scan, if more than one zoom scan is needed. However, the drift should always be recorded as the difference between the device initial state with fully charged battery and all subsequent measurements using that battery.

7.3 Area & Zoom Scan Procedure

For handsets operating above 300 MHz evaluated with the homogeneous head model, the SAR distribution is measured on a two-dimensional coarse grid at a fixed separation distance of less than 8 mm from the surface of the phantom shell. The scan region should cover all areas that are exposed and encompassed by the projection of the handset. In order to maintain a fixed distance of less than 8 mm from the surface to within ± 1 mm, as required by the measurement protocol, the exact shape and dimensions of the phantom inner surface shall be known, pre-calibrated, or preferably detected during the SAR measurement with a mechanical or optical surface-detection mechanism that meets the probe positioning requirements. This evaluation technique determines the maximum spacing between the grid points, i.e., it has been found that a 20 mm \times 20 mm grid is usually sufficient to achieve the required precision if two staggered one-dimensional cubic splines [55] are used to locate the maximum SAR location;

The maximum local SAR is evaluated on an interpolated grid at 1 mm to 2 mm resolution during the zoom scan. A zoom-scan volume of 32 mm \times 32 mm \times 30 mm, consisting of 5 \times 5 \times 7 points with the centre at the peak SAR location determined during the area scan, can be chosen. Although a scan resolution of 8 mm is sufficient for directions parallel to the surface, 5 mm is needed in the direction normal to the surface of the phantom to achieve the required extrapolation accuracy.

7.4 Test Reduction Procedure

IEC/IEEE 62209-1528 provides a reproducible and conservative measurement methodology to measure the SAR of handheld and body-mounted wireless communication devices, which can be used to determine compliance of such equipment with the human exposure basic restrictions. Clearly, there is a point where the power generated by wireless devices is at such a level that it is incapable of exceeding the basic restriction. Measurements following the procedure of IEC/IEEE 62209-1528 might then not be necessary.

There may be DUTs that generate power at such a level that it is incapable of exceeding the basic restriction of the respective exposure guideline. That level can be determined by a variety of techniques which do not require the actual exposure level measurements. Determining this level would speed up the process without compromising technical accuracy. EN 62479 proposes techniques for such purposes and may be applied.

7.4.1 Example 1

The maximum power level, $P_{\text{max}, m}$, that can be transmitted by a device before the SAR averaged over a mass, m , exceeds a given limit, SAR_{lim} , can be defined. Any device transmitting at power levels below $P_{\text{max}, m}$ can then be excluded from SAR testing. The lowest possible value for $P_{\text{max}, m}$ is:

$$P_{\text{max}, m} = \text{SAR}_{\text{lim}} \times m$$

For example, an exposure limit of $\text{SAR}_{\text{lim}} = 2 \text{ W/kg}$ and an averaging mass of $m = 10 \text{ g}$ give a total transmitting power of $P_{\text{max}, m} = 20 \text{ mW}$ that would conservatively meet this exposure limit. For an exposure limit of $\text{SAR}_{\text{lim}} = 1,6 \text{ W/kg}$ and an averaging mass of $m = 1 \text{ g}$, a total transmitting power of $P_{\text{max}, m} = 1,6 \text{ mW}$ would conservatively meet the exposure limit. This assessment is based on the unrealistic assumption that all of the conducted power is radiated by the antenna and then absorbed in the body (i.e. none of the power is transmitted for communication) and all of the absorbed power is concentrated in the averaging mass. EN 62479 gives less restrictive power thresholds that may be applied in certain cases.

7.4.2 Example 2

Simultaneous multi-band transmission means that the device can transmit multiple transmission modes at the same time, e.g., a WCDMA transmission at 2GHz and a WLAN transmission at 2.45GHz. The time-averaged output power of a secondary transmitter (i.e. the lower power transmitter, e.g. Bluetooth, WLAN) may be much lower than that of the primary transmitter can be excluded from SAR testing when used alone. However, when the primary and secondary transmitter are used together, the SAR limit may still be exceeded. A means of determining the threshold power for the secondary transmitter that allows it to be excluded from SAR testing is needed. One way of determining the threshold power level available to the secondary transmitter ($P_{available}$) is to calculate it from the measured peak spatial-average SAR of the primary transmitter (SAR_1) according to the equation:

$$P_{available} = P_{th,m} \times (SAR_{lim} - SAR_1) / SAR_{lim}$$

Where:

$P_{th,m}$ is the threshold exclusion power level taken from EN 62479 Annex B for the frequency of the secondary transmitter at the separation distance used in the testing.

If the output power of the secondary transmitter is less than $P_{available}$, SAR measurement for the secondary transmitter is not necessary.

The above formula can be easily generalized to the case where more than two transmitters are communicating simultaneously. If there are N simultaneous transmitters and the peak spatial-average SAR of the first N-1 transmitter are known (SAR_i), then the threshold power level available to the Nth transmitter can be found from

$$P_{available} = P_{max,m} \times (SAR_{lim} - \sum_{i=1}^{N-1} SAR_i) / SAR_{lim}$$

Alternatively, $P_{th,m}$ can be replaced by $P_{max,m}$, which is an easier approach but leads to more restrictive power threshold.

8. Conducted RF Output Power

8.1 GSM

Mode: GSM900		Maximum Tune-up(dBm)	Burst Average Power (dBm)			Division Factors	Frame-Average Power (dBm)		
			CH975	CH60	CH124		CH975	CH60	CH124
			880.2MHz	902.0MHz	914.8MHz		880.2MHz	902.0MHz	914.8MHz
GSM		35.50	34.67	34.28	35.17	-9.03	25.64	25.25	26.14
GPRS (GMSK)	1Tx slot	34.00	33.68	33.51	32.72	-9.03	24.65	24.48	23.69
	2Tx slots	34.00	33.63	33.59	32.66	-6.02	27.61	27.57	26.64
	3Tx slots	34.00	33.78	33.47	32.80	-4.26	29.52	29.21	28.54
	4Tx slots	34.00	33.69	33.51	32.61	-3.01	30.68	30.50	29.60
EGPRS (8PSK)	1Tx slot	24.00	23.18	23.21	23.70	-9.03	14.15	14.18	14.67
	2Tx slots	24.00	23.09	23.29	23.75	-6.02	17.07	17.27	17.73
	3Tx slots	24.00	23.30	23.11	23.69	-4.26	19.04	18.85	19.43
	4Tx slots	24.00	23.17	23.09	23.71	-3.01	20.16	20.08	20.70
Mode: GSM1800		Maximum Tune-up(dBm)	Burst Average Power (dBm)			Division Factors	Frame-Average Power (dBm)		
			CH512	CH700	CH885		CH512	CH700	CH885
			1710.2MHz	1747.8MHz	1784.8MHz		1710.2MHz	1747.8MHz	1784.8MHz
GSM		27.50	25.69	27.38	24.93	-9.03	16.66	18.35	15.90
GPRS (GMSK)	1Tx slot	27.00	26.53	26.59	26.94	-9.03	17.50	17.56	17.91
	2Tx slots	27.00	26.50	26.55	26.82	-6.02	20.48	20.53	20.80
	3Tx slots	27.00	26.55	26.59	26.92	-4.26	22.29	22.33	22.66
	4Tx slots	27.50	26.51	26.71	27.02	-3.01	23.50	23.70	24.01
EGPRS (8PSK)	1Tx slot	22.00	21.85	21.21	21.15	-9.03	12.82	12.18	12.12
	2Tx slots	22.00	21.82	21.20	21.05	-6.02	15.80	15.18	15.03
	3Tx slots	22.00	21.88	21.29	21.13	-4.26	17.62	17.03	16.87
	4Tx slots	22.00	21.82	21.24	21.27	-3.01	18.81	18.23	18.26

Note:
 1) Division Factors
 To average the power, the division factor is as follows:
 1Tx-slot = 1 transmit time slot out of 8 time slots=> conducted power divided by (8/1) => -9.03dB
 2Tx-slots = 2 transmit time slots out of 8 time slots=> conducted power divided by (8/2) => -6.02dB
 3Tx-slots = 3 transmit time slots out of 8 time slots=> conducted power divided by (8/3) => -4.26dB
 4Tx-slots = 4 transmit time slots out of 8 time slots=> conducted power divided by (8/4) => -3.01dB

8.2 WCDMA

Mode	Maximum Tune-up(dBm)	WCDMA Band I			
		Conducted Power (dBm)			
		CH9612	CH9750	CH9888	
RMC 12.2K	24.50	24.01	24.13	24.27	
HSDPA	Subtest-1	24.50	24.26	22.49	22.58
	Subtest-2	24.50	24.19	22.29	22.63
	Subtest-3	24.50	24.30	22.46	22.74
	Subtest-4	24.50	24.31	22.39	22.67
HSUPA	Subtest-1	24.50	23.72	24.23	23.52
	Subtest-2	24.50	22.96	24.36	22.13
	Subtest-3	24.50	22.93	24.29	22.25
	Subtest-4	24.50	22.79	24.23	22.33
	Subtest-5	24.50	22.86	24.33	22.23
Mode	Maximum Tune-up(dBm)	WCDMA Band VIII			
		Conducted Power (dBm)			
		CH2712	CH2788	CH2863	
RMC 12.2K	25.00	24.47	24.53	23.60	
HSDPA	Subtest-1	23.50	22.36	23.48	22.40
	Subtest-2	25.50	23.76	25.02	24.07
	Subtest-3	25.00	23.85	24.92	24.18
	Subtest-4	25.00	23.70	24.92	24.05
HSUPA	Subtest-1	24.00	22.67	23.76	22.95
	Subtest-2	24.00	22.71	23.86	22.99
	Subtest-3	24.00	22.71	23.88	23.13
	Subtest-4	24.00	22.76	23.88	23.04
	Subtest-5	24.50	22.65	24.00	22.93

8.3 LTE

LTE-FDD Band 1				Maximum Tune-up(dBm)	Conducted Power(dBm)				
Bandwidth	Modulation	RB allocation	RB offset		18025	18300	19575		
					1922.5MHz	1950MHz	1977.5MHz		
5MHz	QPSK	1	0	24.00	23.48	23.59	23.62		
			12	24.00	23.58	23.37	23.56		
			24	24.00	23.72	23.51	23.52		
		12	0	24.00	23.62	22.70	22.68		
			6	23.00	22.77	22.57	22.75		
			13	24.00	23.52	22.61	22.62		
		25	0	23.00	22.85	22.65	22.83		
			16QAM	1	0	23.50	23.06	22.86	23.04
					12	23.00	22.97	22.77	22.95
	24	23.50			23.01	22.81	22.99		
	12	0	22.50	22.35	22.15	22.33			
		6	22.50	22.18	21.99	22.17			
		13	22.50	22.12	21.92	22.10			
	25	0	22.50	22.27	22.07	22.25			
	Bandwidth	Modulation	RB allocation	RB offset	Maximum Tune-up(dBm)	18050	18300	18550	
1925MHz						1950MHz	1975MHz		
10MHz	QPSK	1	0	24.00	23.61	23.40	23.59		
			24	24.00	23.52	23.31	23.50		
			49	24.00	23.56	23.35	23.54		
		25	0	23.00	22.88	22.67	22.86		
			12	23.00	22.71	22.51	22.69		
			25	23.00	22.64	22.44	22.62		
		50	0	23.00	22.79	22.59	22.78		
			16QAM	1	0	23.50	23.00	22.80	22.99
					24	23.00	22.91	22.71	22.89
	49	23.00			22.96	22.75	22.94		
	25	0		22.50	22.29	22.09	22.27		
		12		22.50	22.13	21.93	22.11		
		25		22.50	22.06	21.87	22.04		
	50	0	22.50	22.21	22.01	22.19			

LTE-FDD Band 1				Maximum Tune-up(dBm)	Conducted Power(dBm)				
Bandwidth	Modulation	RB allocation	RB offset		18075	18300	18525		
					1927.5MHz	1950MHz	1972.5MHz		
15MHz	QPSK	1	0	24.00	23.63	23.43	23.61		
			38	24.00	23.54	23.33	23.52		
			74	24.00	23.58	23.37	23.56		
		38	0	23.00	22.90	22.70	22.88		
			18	23.00	22.73	22.53	22.71		
			37	23.00	22.66	22.46	22.65		
		75	0	23.00	22.82	22.62	22.80		
			16QAM	1	0	23.50	23.03	22.82	23.01
					38	23.00	22.94	22.73	22.92
	74	23.00			22.98	22.78	22.96		
	38	0		22.50	22.31	22.12	22.30		
		18		22.50	22.15	21.96	22.13		
		37		22.50	22.08	21.89	22.07		
	75	0	22.50	22.23	22.04	22.21			

Bandwidth	Modulation	RB allocation	RB offset	Maximum Tune-up(dBm)	18100	18300	18500
					1930MHz	1950MHz	1970MHz
20MHz	QPSK	1	0	24.00	23.72	23.51	23.72
			49	24.00	23.63	23.42	23.61
			99	24.00	23.48	23.56	23.48
		50	0	24.00	23.55	22.69	23.57
			25	23.00	22.82	22.61	22.80
			50	24.00	23.59	22.52	23.57
	100	0	23.00	22.90	22.70	22.88	
	16QAM	1	0	23.50	23.11	22.91	23.09
			49	23.50	23.02	22.82	23.00
			99	23.50	23.06	22.86	23.04
		50	0	22.50	22.39	22.20	22.38
			25	22.50	22.23	22.03	22.21
			50	22.50	22.16	21.97	22.15
		100	0	22.50	22.31	22.12	22.30

LTE-FDD Band 3				Maximum Tune-up(dBm)	Conducted Power(dBm)			
Bandwidth	Modulation	RB allocation	RB offset		19207	19575	19943	
					1710.7MHz	1747.5MHz	1784.3MHz	
1.4MHz	QPSK	1	0	24.00	23.54	23.49	23.67	
			2	24.00	23.71	23.29	23.01	
			5	24.00	23.69	23.50	23.59	
		3	0	24.00	23.72	23.48	23.72	
			1	23.00	22.89	22.49	22.22	
			3	24.00	23.60	23.58	23.64	
	6	0	23.00	22.98	22.57	22.31		
	16QAM	1	0	24.00	23.50	23.53	23.51	
			2	23.50	23.10	22.69	22.42	
			5	24.00	23.57	23.68	23.67	
		3	0	24.00	23.70	23.51	23.59	
			1	22.50	22.31	21.91	21.65	
			3	24.00	23.59	23.66	23.58	
		6	0	22.50	22.39	22.00	21.73	
		Bandwidth	Modulation	RB allocation	RB offset	Maximum Tune-up(dBm)	19215	19575
						1711.5MHz	1747.5MHz	1783.5MHz
3MHz	QPSK	1	0	24.00	23.82	23.40	23.12	
			8	24.00	23.73	23.31	23.03	
			14	24.00	23.77	23.35	23.07	
		8	0	23.50	23.08	22.68	22.41	
			4	23.00	22.91	22.51	22.24	
			7	23.00	22.84	22.44	22.18	
	15	0	23.00	23.00	22.60	22.33		
	16QAM	1	0	23.50	23.21	22.80	22.53	
			8	23.50	23.12	22.71	22.44	
			14	23.50	23.16	22.75	22.48	
		8	0	22.50	22.49	22.10	21.83	
			4	22.50	22.33	21.93	21.67	
			7	22.50	22.26	21.87	21.61	
		15	0	22.50	22.41	22.02	21.75	

LTE-FDD Band 3				Maximum Tune-up(dBm)	Conducted Power(dBm)				
Bandwidth	Modulation	RB allocation	RB offset		19225	19575	19925		
					1712.5MHz	1747.5MHz	1782.5MHz		
5MHz	QPSK	1	0	24.00	23.58	23.56	23.54		
			12	24.00	23.74	23.32	23.05		
			24	24.00	23.64	23.67	23.69		
		12	0	24.00	23.65	23.70	23.63		
			6	23.00	22.93	22.53	22.26		
			13	24.00	23.49	23.62	23.60		
		25	0	23.50	23.01	22.61	22.34		
			16QAM	1	0	24.00	23.70	23.62	23.51
					12	23.50	23.13	22.73	22.46
	24	24.00			23.60	23.64	23.60		
	12	0	24.00	23.50	23.69	23.53			
		6	22.50	22.34	21.95	21.69			
		13	24.00	23.57	23.57	23.67			
	25	0	22.50	22.42	22.03	21.77			
	Bandwidth	Modulation	RB allocation	RB offset	Maximum Tune-up(dBm)	19250	19575	19900	
10MHz	QPSK	1	0	24.00	23.85	23.43	23.15		
			24	24.00	23.75	23.34	23.06		
			49	24.00	23.80	23.38	23.10		
		25	0	23.50	23.11	22.70	22.43		
			12	23.00	22.94	22.54	22.27		
			25	23.00	22.87	22.47	22.20		
		50	0	23.50	23.03	22.62	22.35		
			16QAM	1	0	23.50	23.24	22.83	22.56
					24	23.50	23.14	22.74	22.47
	49	23.50			23.19	22.78	22.51		
	25	0	23.00	22.52	22.12	21.86			
		12	22.50	22.35	21.96	21.70			
		25	22.50	22.28	21.89	21.63			
	50	0	22.50	22.44	22.04	21.78			

LTE-FDD Band 3				Maximum Tune-up(dBm)	Conducted Power(dBm)				
Bandwidth	Modulation	RB allocation	RB offset		19275	19575	19875		
					1717.5MHz	1747.5MHz	1777.5MHz		
15MHz	QPSK	1	0	24.00	23.81	23.39	23.11		
			38	24.00	23.71	23.30	23.02		
			74	24.00	23.76	23.34	23.06		
		38	0	23.50	23.07	22.66	22.39		
			18	23.00	22.90	22.50	22.23		
			37	23.00	22.83	22.43	22.16		
		75	0	23.00	22.99	22.58	22.31		
			16QAM	1	0	23.50	23.20	22.79	22.52
					38	23.50	23.10	22.70	22.43
	74	23.50			23.15	22.74	22.47		
	38	0	22.50	22.48	22.08	21.82			
		18	22.50	22.31	21.92	21.66			
		37	22.50	22.25	21.85	21.59			
	75	0	22.50	22.40	22.00	21.74			

Bandwidth	Modulation	RB allocation	RB offset	Maximum Tune-up(dBm)	19300	19575	19850
					1720MHz	1747.5MHz	1775MHz
20MHz	QPSK	1	0	24.00	23.88	23.46	23.18
			49	24.00	23.78	23.37	23.09
			99	24.00	23.13	23.07	23.58
		50	0	24.00	23.90	23.86	23.08
			25	23.00	22.97	22.57	22.30
			50	24.00	23.21	23.51	23.78
	100	0	23.50	23.06	22.65	22.38	
	16QAM	1	0	24.00	23.67	23.41	23.27
			49	23.50	23.17	22.77	22.50
			99	24.00	23.32	23.12	23.60
		50	0	24.00	23.53	23.51	23.98
			25	22.50	22.38	21.99	21.73
			50	24.00	23.85	23.74	23.55
		100	0	22.50	22.46	22.07	21.81

LTE-FDD Band 7				Maximum Tune-up(dBm)	Conducted Power(dBm)			
Bandwidth	Modulation	RB allocation	RB offset		20775	21100	21425	
					2502.5MHz	2535MHz	2567.5MHz	
5MHz	QPSK	1	0	24.00	23.53	23.57	23.52	
			12	24.00	23.58	23.48	23.43	
			24	24.00	23.61	23.53	23.70	
		12	0	24.00	23.69	23.66	23.69	
			6	24.00	23.70	23.67	23.62	
			13	24.00	23.72	23.69	23.57	
	25	0	24.00	23.63	23.56	23.61		
	16QAM	1	0	24.00	23.50	23.59	23.55	
			12	24.00	23.57	23.55	23.63	
			24	24.00	23.59	23.50	23.68	
		12	0	24.00	23.51	23.64	23.50	
			6	24.00	23.57	23.59	23.62	
			13	24.00	23.60	23.62	23.71	
		25	0	23.50	23.27	23.17	23.13	
		10MHz	QPSK	1	0	24.00	23.61	23.51
24					24.00	23.52	23.42	23.37
49	24.00				23.56	23.46	23.41	
25	0			23.00	22.88	22.78	22.73	
	12			23.00	22.71	22.61	22.57	
	25			23.00	22.64	22.55	22.50	
50	0		23.00	22.79	22.70	22.65		
16QAM	1		0	23.50	23.00	22.91	22.86	
			24	23.00	22.91	22.82	22.77	
			49	23.00	22.96	22.86	22.81	
	25		0	22.50	22.29	22.20	22.15	
			12	22.50	22.13	22.03	21.99	
			25	22.50	22.06	21.97	21.92	
	50		0	22.50	22.21	22.12	22.07	

LTE-FDD Band 7				Maximum Tune-up(dBm)	Conducted Power(dBm)				
Bandwidth	Modulation	RB allocation	RB offset		20825	21100	21375		
					2507.5MHz	2535MHz	2562.5MHz		
15MHz	QPSK	1	0	24.00	23.63	23.53	23.48		
			38	24.00	23.54	23.44	23.39		
			74	24.00	23.58	23.48	23.43		
		38	0	23.00	22.90	22.80	22.76		
			18	23.00	22.73	22.64	22.59		
			37	23.00	22.66	22.57	22.52		
		75	0	23.00	22.82	22.72	22.67		
			16QAM	1	0	23.50	23.03	22.93	22.88
					38	23.00	22.94	22.84	22.79
	74	23.00			22.98	22.88	22.83		
	38	0	22.50	22.31	22.22	22.17			
		18	22.50	22.15	22.06	22.01			
		37	22.50	22.08	21.99	21.94			
	75	0	22.50	22.23	22.14	22.09			
		Bandwidth	Modulation	RB allocation	RB offset	Maximum Tune-up(dBm)	20850	21100	21350
						2510MHz	2535MHz	2560MHz	
20MHz	QPSK	1	0	24.00	23.72	23.62	23.57		
			49	24.00	23.63	23.53	23.48		
			99	24.00	23.62	23.55	23.60		
		50	0	24.00	23.72	23.72	23.60		
			25	24.00	23.62	23.67	23.57		
			50	24.00	23.61	23.50	23.50		
		100	0	24.00	23.56	23.61	23.53		
			16QAM	1	0	24.00	23.53	23.63	23.57
					49	24.00	23.42	23.65	23.55
	99	24.00			23.50	23.69	23.53		
	50	0	24.00	23.62	23.61	23.58			
		25	24.00	23.59	23.57	23.59			
		50	24.00	23.54	23.50	23.60			
	100	0	23.50	23.31	23.22	23.17			

LTE-FDD Band 8				Maximum Tune-up(dBm)	Conducted Power(dBm)				
Bandwidth	Modulation	RB allocation	RB offset		21457	21625	21793		
					880.7MHz	897.5MHz	914.3MHz		
1.4MHz	QPSK	1	0	24.00	23.67	23.67	23.70		
			2	24.00	23.58	23.54	23.51		
			5	24.00	23.69	23.48	23.63		
		3	0	24.00	23.68	23.54	23.64		
			1	23.00	22.77	22.73	22.70		
			3	24.00	23.62	23.53	23.68		
		6	0	23.00	22.85	22.81	22.79		
			16QAM	1	0	24.00	23.53	23.60	23.55
					2	23.00	22.97	22.93	22.90
	5	24.00			23.55	23.53	23.67		
	3	0	24.00	23.66	23.59	23.61			
		1	22.50	22.18	22.15	22.12			
		3	24.00	23.53	23.62	23.66			
	6	0	22.50	22.27	22.23	22.20			

Bandwidth	Modulation	RB allocation	RB offset	Maximum Tune-up(dBm)	21465	21625	21785
					881.5MHz	897.5MHz	913.5MHz
3MHz	QPSK	1	0	24.00	23.61	23.57	23.54
			8	24.00	23.52	23.48	23.45
			14	24.00	23.56	23.52	23.49
		8	0	23.00	22.88	22.84	22.81
			4	23.00	22.71	22.67	22.64
			7	23.00	22.64	22.60	22.57
	15	0	23.00	22.79	22.76	22.73	
	16QAM	1	0	23.50	23.00	22.97	22.94
			8	23.00	22.91	22.87	22.85
			14	23.00	22.96	22.92	22.89
		8	0	22.50	22.29	22.25	22.23
			4	22.50	22.13	22.09	22.06
			7	22.50	22.06	22.02	22.00
		15	0	22.50	22.21	22.17	22.14

LTE-FDD Band 8				Maximum Tune-up(dBm)	Conducted Power(dBm)			
Bandwidth	Modulation	RB allocation	RB offset		21475	21625	21775	
					882.5MHz	897.5MHz	912.5MHz	
5MHz	QPSK	1	0	24.00	23.51	23.59	23.49	
			12	24.00	23.54	23.50	23.47	
			24	24.00	23.53	23.60	23.57	
		12	0	24.00	23.53	23.60	23.56	
			6	23.00	22.73	22.70	22.67	
			13	24.00	23.48	23.65	23.62	
	25	0	23.00	22.82	22.78	22.75		
	16QAM	1	0	24.00	23.72	23.51	23.70	
			12	23.00	22.94	22.90	22.87	
			24	24.00	23.53	23.51	23.55	
		12	0	24.00	23.65	23.50	23.71	
			6	22.50	22.15	22.11	22.09	
			13	24.00	23.69	23.69	23.52	
		25	0	22.50	22.23	22.20	22.17	
		Bandwidth	Modulation	RB allocation	RB offset	Maximum Tune-up(dBm)	21500	21625
						885MHz	897.5MHz	910MHz
10MHz	QPSK	1	0	24.00	23.72	23.68	23.65	
			24	24.00	23.63	23.59	23.56	
			49	24.00	23.50	23.63	23.60	
		25	0	24.00	23.59	22.95	22.92	
			12	23.00	22.82	22.78	22.75	
			25	24.00	23.62	22.71	22.68	
	50	0	23.00	22.90	22.86	22.83		
	16QAM	1	0	24.00	23.55	23.07	23.04	
			24	23.50	23.02	22.98	22.95	
			49	24.00	23.51	23.02	22.99	
		25	0	24.00	23.67	22.36	22.33	
			12	22.50	22.23	22.19	22.17	
			25	24.00	23.65	22.13	22.10	
		50	0	22.50	22.31	22.28	22.25	

LTE-FDD Band 20				Maximum Tune-up(dBm)	Conducted Power(dBm)			
Bandwidth	Modulation	RB allocation	RB offset		24175	24300	24425	
					834.5MHz	847MHz	859.5MHz	
5MHz	QPSK	1	0	24.00	23.49	23.72	23.57	
			12	24.00	23.47	23.54	23.39	
			24	24.00	23.52	23.65	23.52	
		12	0	24.00	23.70	23.70	23.69	
			6	23.00	22.66	22.73	22.59	
			13	24.00	23.71	23.67	23.62	
	25	0	23.00	22.75	22.81	22.67		
		16QAM	1	0	24.00	23.59	23.56	23.63
				12	23.00	22.86	22.93	22.79
	24			24.00	23.60	23.63	23.60	
	12	0	0	24.00	23.54	23.52	23.69	
			6	22.50	22.08	22.15	22.01	
			13	24.00	23.64	23.60	23.65	
		25	0	22.50	22.16	22.23	22.09	
			16QAM	1	0	24.00	24.20	24.30
837MHz					847MHz	857MHz		
0	24.00	23.50			23.57	23.42		
10MHz	QPSK	1	24	23.50	23.41	23.48	23.33	
			49	24.00	23.45	23.52	23.37	
			0	23.00	22.77	22.84	22.69	
		25	12	23.00	22.61	22.67	22.53	
			25	23.00	22.54	22.60	22.46	
			0	23.00	22.69	22.76	22.61	
	16QAM	1	0	23.00	22.90	22.97	22.82	
			24	23.00	22.81	22.87	22.73	
			49	23.00	22.85	22.92	22.77	
		25	0	22.50	22.19	22.25	22.11	
			12	22.50	22.03	22.09	21.95	
			25	22.50	21.96	22.02	21.88	
		50	0	22.50	22.11	22.17	22.03	

LTE-FDD Band 20				Maximum Tune-up(dBm)	Conducted Power(dBm)		
Bandwidth	Modulation	RB allocation	RB offset		24225	24300	24375
					839.5MHz	847MHz	854.5MHz
15MHz	QPSK	1	0	24.00	23.52	23.59	23.45
			38	24.00	23.43	23.50	23.35
			74	24.00	23.47	23.54	23.39
		38	0	23.00	22.79	22.86	22.72
			18	23.00	22.63	22.70	22.55
			37	23.00	22.56	22.63	22.48
	75	0	23.00	22.71	22.78	22.64	
	16QAM	1	0	23.00	22.92	22.99	22.84
			38	23.00	22.83	22.90	22.75
			74	23.00	22.87	22.94	22.80
		38	0	22.50	22.21	22.28	22.14
			18	22.50	22.05	22.11	21.97
			37	22.50	21.98	22.05	21.91
		75	0	22.50	22.13	22.20	22.06

Bandwidth	Modulation	RB allocation	RB offset	Maximum Tune-up(dBm)	24250	24300	24350
					842MHz	847MHz	852MHz
20MHz	QPSK	1	0	24.00	23.61	23.68	23.53
			49	24.00	23.52	23.59	23.44
			99	24.00	23.59	23.67	23.63
		50	0	24.00	23.65	23.64	23.66
			25	23.00	22.71	22.78	22.63
			50	24.00	23.55	23.55	23.65
	100	0	23.00	22.79	22.86	22.72	
	16QAM	1	0	24.00	23.71	23.60	23.48
			49	23.00	22.91	22.98	22.84
			99	24.00	23.59	23.58	23.50
		50	0	24.00	23.58	23.62	23.49
			25	22.50	22.13	22.19	22.05
			50	24.00	23.56	23.58	23.68
		100	0	22.50	22.21	22.28	22.14

LTE-FDD Band 28				Maximum Tune-up(dBm)	Conducted Power(dBm)			
Bandwidth	Modulation	RB allocation	RB offset		27225	27375	27645	
					704.50MHz	719.50MHz	746.50MHz	
3MHz	QPSK	1	0	24.00	23.61	23.68	23.66	
			8	24.00	23.52	23.48	23.66	
			14	24.00	23.63	23.61	23.64	
		8	0	24.00	23.79	23.62	23.69	
			4	23.00	22.71	22.67	22.85	
			7	24.00	23.63	23.72	23.78	
	15	0	23.00	22.80	22.76	22.93		
	16QAM	1	0	24.00	23.68	23.66	23.78	
			8	23.50	22.92	22.88	23.05	
			14	24.00	23.61	23.68	23.75	
		8	0	24.00	23.77	23.70	23.76	
			4	22.50	22.13	22.09	22.26	
			7	24.00	23.58	23.69	23.67	
		15	0	22.50	22.21	22.18	22.34	
		Bandwidth	Modulation	RB allocation	RB offset	Maximum Tune-up(dBm)	27235	27385
705.50MHz							720.50MHz	745.50MHz
5MHz	QPSK	1	0	24.00	23.63	23.59	23.77	
			12	24.00	23.53	23.49	23.67	
			24	24.00	23.58	23.54	23.72	
		12	0	23.50	22.89	22.86	23.03	
			6	23.00	22.73	22.69	22.86	
			13	23.00	22.66	22.62	22.79	
	25	0	23.00	22.81	22.77	22.95		
	16QAM	1	0	23.50	23.02	22.98	23.16	
			12	23.50	22.93	22.89	23.07	
			24	23.50	22.97	22.93	23.11	
		12	0	22.50	22.31	22.27	22.44	
			6	22.50	22.14	22.11	22.28	
			13	22.50	22.08	22.04	22.21	
		25	0	22.50	22.23	22.19	22.36	

LTE-FDD Band 28				Maximum Tune-up(dBm)	Conducted Power(dBm)				
Bandwidth	Modulation	RB allocation	RB offset		27260	27410	27610		
					708.00MHz	723.00MHz	743.00MHz		
10MHz	QPSK	1	0	24.00	23.64	23.60	23.78		
			24	24.00	23.54	23.50	23.68		
			49	24.00	23.59	23.55	23.73		
		25	0	23.50	22.91	22.87	23.04		
			12	23.00	22.74	22.70	22.87		
			25	23.00	22.67	22.63	22.80		
	16QAM	50	0	23.00	22.82	22.78	22.96		
			1	0	23.50	23.03	22.99	23.17	
				24	23.50	22.94	22.90	23.08	
		49		23.50	22.98	22.94	23.12		
		25	0	22.50	22.32	22.28	22.45		
			12	22.50	22.16	22.12	22.29		
			25	22.50	22.09	22.05	22.22		
			50	0	22.50	22.24	22.20	22.37	
Bandwidth	Modulation	RB allocation	RB offset	Maximum Tune-up(dBm)	27285	27460	27585		
15MHz	QPSK	1	0	24.00	23.60	23.56	23.74		
			38	24.00	23.50	23.46	23.64		
			74	24.00	23.55	23.51	23.69		
		38	0	23.50	22.87	22.83	23.00		
			18	23.00	22.70	22.66	22.83		
			37	23.00	22.63	22.59	22.76		
		75	0	23.00	22.78	22.74	22.92		
		16QAM	1	0	23.50	22.99	22.95	23.13	
				38	23.50	22.90	22.86	23.04	
	74			23.50	22.94	22.91	23.08		
	38		0	22.50	22.28	22.24	22.41		
			18	22.50	22.12	22.08	22.25		
			37	22.50	22.05	22.01	22.18		
	75		0	22.50	22.20	22.16	22.33		
	Bandwidth		Modulation	RB allocation	RB offset	Maximum Tune-up(dBm)	27310	27460	27560
	20MHz		QPSK	1	0	24.00	23.67	23.63	23.81
		49			24.00	23.58	23.54	23.71	
		99			24.00	23.59	23.65	23.59	
50		0		24.00	23.71	23.79	23.65		
		25		23.00	22.77	22.73	22.90		
		50		24.00	23.82	23.75	23.64		
100		0		23.00	22.85	22.81	22.99		
16QAM		1		0	24.00	23.62	23.63	23.82	
				49	23.50	22.97	22.93	23.11	
			99	24.00	23.60	23.69	23.58		
		50	0	24.00	23.79	23.76	23.61		
			25	22.50	22.18	22.15	22.32		
			50	24.00	23.64	23.78	23.72		
		100	0	22.50	22.27	22.23	22.40		

LTE-TDD Band 38				Maximum Tune-up(dBm)	Conducted Power(dBm)		
Bandwidth	Modulation	RB allocation	RB offset		37775	38000	38225
					2572.50MHz	2595.00MHz	2617.50MHz
5MHz	QPSK	1	0	24.00	23.64	23.68	23.78
			12	24.00	23.61	23.55	23.57
			24	24.00	23.80	23.72	23.76
		12	0	24.00	23.81	23.63	23.82
			6	23.00	22.80	22.74	22.76
			13	24.00	23.74	23.76	23.64
	25	0	23.00	22.88	22.82	22.84	
	16QAM	1	0	24.00	23.79	23.74	23.61
			12	23.50	23.00	22.94	22.96
			24	24.00	23.62	23.80	23.78
		12	0	24.00	23.75	23.58	23.66
			6	22.50	22.21	22.16	22.18
			13	24.00	23.74	23.80	23.61
		25	0	22.50	22.30	22.24	22.26
Bandwidth		Modulation	RB allocation	RB offset	Maximum Tune-up(dBm)	37800	38000
	2575.00MHz					2595.00MHz	2615.00MHz
10MHz	QPSK	1	0	24.00	23.64	23.58	23.60
			24	24.00	23.55	23.49	23.51
			49	24.00	23.59	23.53	23.55
		25	0	23.00	22.91	22.85	22.87
			12	23.00	22.74	22.68	22.70
			25	23.00	22.67	22.61	22.63
	50	0	23.00	22.82	22.77	22.79	
	16QAM	1	0	23.50	23.03	22.98	23.00
			24	23.00	22.94	22.88	22.90
			49	23.00	22.98	22.93	22.95
		25	0	22.50	22.32	22.26	22.28
			12	22.50	22.16	22.10	22.12
			25	22.50	22.09	22.03	22.05
		50	0	22.50	22.24	22.18	22.20

LTE-TDD Band 38				Maximum Tune-up(dBm)	Conducted Power(dBm)		
Bandwidth	Modulation	RB allocation	RB offset		37825	38000	38175
					2577.50MHz	2595.00MHz	2612.50MHz
15MHz	QPSK	1	0	24.00	23.66	23.60	23.62
			38	24.00	23.57	23.51	23.53
			74	24.00	23.61	23.55	23.57
		38	0	23.00	22.93	22.87	22.89
			18	23.00	22.76	22.71	22.72
			37	23.00	22.69	22.64	22.66
	75	0	23.00	22.85	22.79	22.81	
	16QAM	1	0	23.50	23.06	23.00	23.02
			38	23.00	22.97	22.91	22.93
			74	23.50	23.01	22.95	22.97
		38	0	22.50	22.34	22.29	22.30
			18	22.50	22.18	22.12	22.14
			37	22.50	22.11	22.06	22.07
		75	0	22.50	22.26	22.21	22.22

Bandwidth	Modulation	RB allocation	RB offset	Maximum Tune-up(dBm)	37850	38000	38150
					2580.00MHz	2595.00MHz	2610.00MHz
20MHz	QPSK	1	0	24.00	23.75	23.69	23.69
			49	24.00	23.66	23.60	23.62
			99	24.00	23.76	23.59	23.75
		50	0	24.00	23.62	23.70	23.72
			25	23.00	22.85	22.79	22.81
			50	24.00	23.75	23.61	23.82
	100	0	23.00	22.93	22.87	22.89	
	16QAM	1	0	24.00	23.81	23.68	23.76
			49	23.50	23.05	22.99	23.01
			99	24.00	23.58	23.62	23.67
		50	0	24.00	23.72	23.68	23.76
			25	22.50	22.26	22.20	22.22
			50	24.00	23.74	23.71	23.76
		100	0	22.50	22.34	22.29	22.30

LTE-TDD Band 40				Maximum Tune-up(dBm)	Conducted Power(dBm)			
Bandwidth	Modulation	RB allocation	RB offset		38675	39150	39625	
					2662.50MHz	2710.00MHz	2757.50MHz	
5MHz	QPSK	1	0	24.00	23.73	23.81	23.66	
			12	24.00	23.56	23.45	23.58	
			24	24.00	23.58	23.60	23.74	
		12	0	24.00	23.62	23.69	23.60	
			6	23.00	22.75	22.64	22.77	
			13	24.00	23.77	23.63	23.58	
	25	0	23.00	22.83	22.73	22.85		
	16QAM	1	0	24.00	23.80	23.77	23.73	
			12	23.00	22.95	22.85	22.97	
			24	24.00	23.82	23.74	23.59	
		12	0	24.00	23.80	23.66	23.66	
			6	22.50	22.17	22.06	22.18	
			13	24.00	23.59	23.59	23.66	
		25	0	22.50	22.25	22.14	22.27	
		Bandwidth	Modulation	RB allocation	RB offset	Maximum Tune-up(dBm)	38700	39150
						2665.00MHz	2710.00MHz	2755.00MHz
10MHz	QPSK	1	0	24.00	23.59	23.48	23.61	
			24	24.00	23.50	23.39	23.52	
			49	24.00	23.54	23.43	23.56	
		25	0	23.00	22.86	22.75	22.88	
			12	23.00	22.69	22.59	22.71	
			25	23.00	22.62	22.52	22.64	
	50	0	23.00	22.78	22.67	22.79		
	16QAM	1	0	23.50	22.99	22.88	23.00	
			24	23.00	22.89	22.79	22.91	
			49	23.00	22.94	22.83	22.96	
		25	0	22.50	22.27	22.17	22.29	
			12	22.50	22.11	22.01	22.13	
			25	22.50	22.04	21.94	22.06	
		50	0	22.50	22.19	22.09	22.21	

Bandwidth	Modulation	RB allocation	RB offset	Maximum Tune-up(dBm)	38725	39150	39575	
					2667.50MHz	2710.00MHz	2752.50MHz	
15MHz	QPSK	1	0	24.00	23.61	23.50	23.63	
			38	24.00	23.52	23.41	23.54	
			74	24.00	23.56	23.45	23.58	
		38	0	23.00	22.88	22.78	22.90	
			18	23.00	22.71	22.61	22.73	
			37	23.00	22.65	22.54	22.66	
		75	0	23.00	22.80	22.69	22.82	
		16QAM	1	0	23.50	23.01	22.90	23.03
				38	23.00	22.92	22.81	22.94
	74			23.00	22.96	22.85	22.98	
	38		0	22.50	22.30	22.19	22.31	
			18	22.50	22.13	22.03	22.15	
			37	22.50	22.07	21.96	22.08	
	75	0	22.50	22.21	22.11	22.23		
	Bandwidth	Modulation	RB allocation	RB offset	Maximum Tune-up(dBm)	38750	39150	39550
					2670.00MHz	2710.00MHz	2750.00MHz	
20MHz	QPSK	1	0	24.00	23.70	23.59	23.72	
			49	24.00	23.61	23.50	23.63	
			99	24.00	23.75	23.65	23.70	
		50	0	23.00	23.67	23.59	23.79	
			25	23.00	22.80	22.69	22.82	
			50	23.00	23.66	23.59	23.60	
		100	0	23.00	22.88	22.78	22.90	
		16QAM	1	0	23.50	23.63	23.82	23.60
				49	23.50	23.00	22.89	23.02
	99			23.50	23.60	23.67	23.65	
	50		0	22.50	23.70	23.77	23.68	
			25	22.50	22.21	22.11	22.39	
			50	22.50	23.76	23.73	23.59	
	100		0	22.50	22.30	22.19	22.31	

8.4 Wifi

2.4G

Band (GHz)	Mode	Channel	Freq. (MHz)	EIRP(dBm)	Maximum Tune-up(dBm)	SAR Test Required.
2.4g (2.4~2.4835)	802.11b	1	2412	19.12	19.50	No
		7	2442	18.63	19.00	No
		13	2472	19.56	20.00	Yes
	802.11g	1	2412	18.37	18.50	No
		7	2442	18.24	18.50	No
		13	2472	18.25	18.50	No
	802.11n(HT20)	1	2412	19.52	20.00	No
		7	2442	20.02	20.50	No
		13	2472	19.79	20.00	No
	802.11ax(HT20)	1	2412	18.63	19.00	No
		7	2442	18.72	19.00	No
		13	2472	19.08	19.50	No
	802.11n(HT40)	3	2422	17.60	18.00	No
		7	2442	17.97	18.00	No
		11	2462	18.44	18.50	No
802.11ax(HT40)	3	2422	19.14	19.50	No	
	7	2442	19.40	19.50	No	
	11	2462	19.40	19.50	No	

Notes:
 1) For WiFi 2.4GHz, SAR tests at higher order modulations (including 802.11g/n) were not required since the maximum average output power for each of these configurations is not more than 1/4dB higher than the tested channel for the lowest data rate of 802.11b mode; When 802.11g/n SAR test is required, 802.11g/n SAR was evaluated based on the highest 802.11b SAR configuration in each exposure condition.

5G

Band (GHz)	Mode	Channel	Freq. (MHz)	EIRP(dBm)	Maximum Tune-up(dBm)	SAR Test Require.
U-NII-1 (5.150~5.250)	802.11a	36	5180	21.25	21.50	No
		40	5200	21.36	21.50	No
		48	5240	21.89	22.00	No
	802.11n(HT20)	36	5180	21.52	22.00	No
		40	5200	21.54	22.00	No
		48	5240	22.06	22.50	No
	802.11ac(VHT20)	36	5180	22.51	23.00	No
		40	5200	22.60	23.00	No
		48	5240	22.89	23.00	No
	802.11ax(VHT20)	36	5180	20.75	21.00	No
		40	5200	21.66	22.00	No
		48	5240	20.96	21.00	No
	802.11n(HT40)	38	5190	21.70	22.00	No
		46	5230	22.71	23.00	Yes
	802.11ac(VHT40)	38	5190	21.98	22.00	No
46		5230	22.22	22.50	No	
802.11ax(VHT40)	38	5190	20.54	21.00	No	
	46	5230	21.68	22.00	No	
802.11ac(VHT80)	42	5210	21.64	22.00	No	
802.11ax(VHT80)	42	5210	20.53	21.00	No	

Band (GHz)	Mode	Channel	Freq. (MHz)	EIRP(dBm)	Maximum Tune-up(dBm)	SAR Test Require.
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U-NII-3 (5.725~5.850)	802.11a	149	5745	13.57	14.00	No
		157	5785	13.26	13.50	No
		165	5825	13.53	14.00	No
	802.11n(HT20)	149	5745	13.73	14.00	No
		157	5785	13.25	13.50	No
		165	5825	13.52	14.00	No
	802.11ac(VHT20)	149	5745	13.75	14.00	No
		157	5785	13.26	13.50	No
		165	5825	13.37	13.50	No
	802.11ax(VHT20)	149	5745	13.59	14.00	No
		157	5785	13.51	14.00	No
		165	5825	13.02	13.50	No
	802.11n(HT40)	151	5755	13.32	13.50	No
		159	5795	13.40	13.50	No
	802.11ac(VHT40)	151	5755	13.69	14.00	No
		159	5795	13.72	14.00	No
	802.11ax(VHT40)	151	5755	13.08	13.50	No
		159	5795	13.91	14.00	No
802.11ac(VHT80)	155	5775	13.62	14.00	Yes	
802.11ax(VHT80)	155	5775	13.55	14.00	No	

Note:
 1) For WiFi 5G 802.11a/n/ac SAR tests, a communication link is set up with the test mode software for WiFi mode test. The EUT is operated at the RF continuous emission mode. Each channel should be tested at the lowest data rate.
 2) 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.
 a. The largest channel bandwidth configuration is selected among the multiple configurations in a frequency band with the same maximum tune-up output power.
 b. When multiple transmission modes (802.11a/g/n/ac) have the same maximum tune-up output power, largest channel bandwidth, lowest order modulation, the lowest order 802.11 mode is selected; i.e., 802.11a is chosen over 802.11n then 802.11ac.

8.5 Bluetooth

EDR	Mode	Maximum Tune-up(dBm)	EIRP(dBm)		
			0	39	78
			2402MHz	2441MHz	2480MHz
	GFSK	3.50	3.09	3.14	3.11
	$\pi/4$ QPSK	5.00	4.96	4.68	4.78
	8DPSK	5.00	4.85	4.63	3.72

BLE	Mode	Maximum Tune-up(dBm)	EIRP(dBm)		
			0	19	39
			2402MHz	2440MHz	2480MHz
	BLE_1M	1.50	1.22	0.31	-1.25

Note:
 Because the output power(eirp) of Bluetooth of the EUT is less than 20mW(13dBm), so standalone SAR are exempt according EN62479.

9. Test Result

General Notes:

The maximum SAR Value of each test band is marked bold.

The SAR test shall be performed at the high, middle and low frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit (<1.0 W/kg), testing at the high and low channels is optional apart for the worst-case configuration.

SAR plot is provided only for the highest measured SAR in each exposure configuration, wireless mode and frequency band combination.

Body/Limb													
Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (%)	10g Meas. SAR (W/kg)	Duty cycle (%)	Duty cycle Factor	Meas. Power (dBm)	Max. tune-up power (dBm)	Scaling Factor	10g Scaled SAR (W/kg)	Meas. No.
GPRS 900+4slots	Back	0	975	880.2	-0.020	0.561	100.00	1.000	33.69	34.00	1.074	0.603	1#
	Left	0	975	880.2	-1.430	0.011	100.00	1.000	33.69	34.00	1.074	0.012	/
	Right	0	975	880.2	0.800	0.033	100.00	1.000	33.69	34.00	1.074	0.035	/
	Top	0	975	880.2	-1.980	0.270	100.00	1.000	33.69	34.00	1.074	0.290	/
	Bottom	0	975	880.2	1.210	0.026	100.00	1.000	33.69	34.00	1.074	0.028	/

Notes:

1. The distance of the Body/Limb test is 0mm.
2. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit (< 1 W/kg), testing at the high and low channels is optional, apart from the worst-case configuration.
3. Refer to ANNEX C for the detailed test data for each test configuration.

Body/Limb													
Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (%)	10g Meas. SAR (W/kg)	Duty cycle (%)	Duty cycle Factor	Meas. Power (dBm)	Max. tune-up power (dBm)	Scaling Factor	10g Scaled SAR (W/kg)	Meas. No.
GPRS 1800+4slots	Back	0	885	1784.8	-1.230	0.424	100.00	1.000	27.02	27.50	1.117	0.474	2#
	Left	0	885	1784.8	1.030	0.010	100.00	1.000	27.02	27.50	1.117	0.011	/
	Right	0	885	1784.8	0.355	0.022	100.00	1.000	27.02	27.50	1.117	0.025	/
	Top	0	885	1784.8	2.180	0.176	100.00	1.000	27.02	27.50	1.117	0.197	/
	Bottom	0	885	1784.8	-1.010	0.016	100.00	1.000	27.02	27.50	1.117	0.018	/

Notes:

1. The distance of the Body/Limb test is 0mm.
2. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit (< 1 W/kg), testing at the high and low channels is optional, apart from the worst-case configuration.
3. Refer to ANNEX C for the detailed test data for each test configuration.

Body/Limb													
Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (%)	10g Meas. SAR (W/kg)	Duty cycle (%)	Duty cycle Factor	Meas. Power (dBm)	Max. tune-up power (dBm)	Scaling Factor	10g Scaled SAR (W/kg)	Meas. No.
WCDMA Band 1 RMC 12.2Kbps	Back	0	9888	1977.6	-1.030	0.738	100.00	1.000	24.27	24.50	1.054	0.778	3#
	Left	0	9888	1977.6	-2.930	0.012	100.00	1.000	24.27	24.50	1.054	0.013	/
	Right	0	9888	1977.6	1.950	0.042	100.00	1.000	24.27	24.50	1.054	0.044	/
	Top	0	9888	1977.6	-2.290	0.300	100.00	1.000	24.27	24.50	1.054	0.316	/
	Bottom	0	9888	1977.6	1.020	0.022	100.00	1.000	24.27	24.50	1.054	0.023	/

Notes:

1. The distance of the Body/Limb test is 0mm.
2. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit (< 1 W/kg), testing at the high and low channels is optional, apart from the worst-case configuration.
3. Refer to ANNEX C for the detailed test data for each test configuration.

Body/Limb													
Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (%)	10g Meas. SAR (W/kg)	Duty cycle (%)	Duty cycle Factor	Meas. Power (dBm)	Max. tune-up power (dBm)	Scaling Factor	10g Scaled SAR (W/kg)	Meas. No.
WCDMA Band 8 RMC 12.2Kbps	Back	0	2788	897.6	-2.800	0.559	100.00	1.000	24.53	25.00	1.114	0.623	4#
	Left	0	2788	897.6	2.050	0.010	100.00	1.000	24.53	25.00	1.114	0.011	/
	Right	0	2788	897.6	-1.330	0.010	100.00	1.000	24.53	25.00	1.114	0.011	/
	Top	0	2788	897.6	-0.480	0.217	100.00	1.000	24.53	25.00	1.114	0.242	/
	Bottom	0	2788	897.6	-2.020	0.019	100.00	1.000	24.53	25.00	1.114	0.021	/

Notes:

1. The distance of the Body/Limb test is 0mm.
2. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit (< 1 W/kg), testing at the high and low channels is optional, apart from the worst-case configuration.
3. Refer to ANNEX C for the detailed test data for each test configuration.

Body/Limb													
Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power	10g Meas.	Duty cycle	Duty	Meas.	Max. tune-	Scaling	10g Scaled	Meas. No.

					Drift (%)	SAR (W/kg)	(%)	cycle Factor	Power (dBm)	up power (dBm)	Factor	SAR (W/kg)	
LTE Band 1 (RB allocation/offset 1#0 BW: 20MHz)	Back	0	18100	1930	-0.700	0.824	100.00	1.000	23.72	24.00	1.067	0.879	5#
	Left	0	18100	1930	-1.430	0.022	100.00	1.000	23.72	24.00	1.067	0.023	/
	Right	0	18100	1930	1.820	0.050	100.00	1.000	23.72	24.00	1.067	0.053	/
	Top	0	18100	1930	-1.980	0.382	100.00	1.000	23.72	24.00	1.067	0.408	/
	Bottom	0	18100	1930	1.210	0.030	100.00	1.000	23.72	24.00	1.067	0.032	/

Notes:
 1. The distance of the Body/Limb test is 0mm.
 2. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit (< 1 W/kg), testing at the high and low channels is optional, apart from the worst-case configuration.
 3. Refer to ANNEX C for the detailed test data for each test configuration.

Body/Limb													
Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (%)	10g Meas. SAR (W/kg)	Duty cycle (%)	Duty cycle Factor	Meas. Power (dBm)	Max. tune-up power (dBm)	Scaling Factor	10g Scaled SAR (W/kg)	Meas. No.
LTE Band 3 (RB allocation/offset 1#0 BW: 20MHz)	Back	0	19300	1720.0	-4.120	0.281	100.00	1.000	23.88	24.00	1.028	0.289	6#
	Left	0	19300	1720.0	-1.430	0.011	100.00	1.000	23.88	24.00	1.028	0.011	/
	Right	0	19300	1720.0	2.020	0.015	100.00	1.000	23.88	24.00	1.028	0.015	/
	Top	0	19300	1720.0	-1.980	0.098	100.00	1.000	23.88	24.00	1.028	0.101	/
	Bottom	0	19300	1720.0	1.210	0.012	100.00	1.000	23.88	24.00	1.028	0.012	/

Notes:
 1. The distance of the Body/Limb test is 0mm.
 2. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit (< 1 W/kg), testing at the high and low channels is optional, apart from the worst-case configuration.
 3. Refer to ANNEX C for the detailed test data for each test configuration.

Body/Limb													
Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (%)	10g Meas. SAR (W/kg)	Duty cycle (%)	Duty cycle Factor	Meas. Power (dBm)	Max. tune-up power (dBm)	Scaling Factor	10g Scaled SAR (W/kg)	Meas. No.
LTE Band 7 (RB allocation/offset 1#0 BW: 20MHz)	Back	0	20850	2510.0	2.120	0.586	100.00	1.000	23.72	24.00	1.067	0.625	7#
	Left	0	20850	2510.0	-1.430	0.014	100.00	1.000	23.72	24.00	1.067	0.015	/
	Right	0	20850	2510.0	-1.950	0.023	100.00	1.000	23.72	24.00	1.067	0.025	/
	Top	0	20850	2510.0	-1.980	0.240	100.00	1.000	23.72	24.00	1.067	0.256	/
	Bottom	0	20850	2510.0	1.210	0.020	100.00	1.000	23.72	24.00	1.067	0.021	/

Notes:
 1. The distance of the Body/Limb test is 0mm.
 2. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit (< 1 W/kg), testing at the high and low channels is optional, apart from the worst-case configuration.
 3. Refer to ANNEX C for the detailed test data for each test configuration.

Body/Limb													
Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (%)	10g Meas. SAR (W/kg)	Duty cycle (%)	Duty cycle Factor	Meas. Power (dBm)	Max. tune-up power (dBm)	Scaling Factor	10g Scaled SAR (W/kg)	Meas. No.
LTE Band 8 (RB allocation/offset 1#0 BW: 10MHz)	Back	0	21500	885	-1.970	0.308	100.00	1.000	23.72	24.00	1.067	0.329	8#
	Left	0	21500	885	-1.430	0.010	100.00	1.000	23.72	24.00	1.067	0.011	/
	Right	0	21500	885	-2.140	0.020	100.00	1.000	23.72	24.00	1.067	0.021	/
	Top	0	21500	885	-1.980	0.152	100.00	1.000	23.72	24.00	1.067	0.162	/
	Bottom	0	21500	885	1.210	0.013	100.00	1.000	23.72	24.00	1.067	0.014	/

Notes:
 1. The distance of the Body/Limb test is 0mm.
 2. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit (< 1 W/kg), testing at the high and low channels is optional, apart from the worst-case configuration.
 3. Refer to ANNEX C for the detailed test data for each test configuration.

Body/Limb													
Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (%)	10g Meas. SAR (W/kg)	Duty cycle (%)	Duty cycle Factor	Meas. Power (dBm)	Max. tune-up power (dBm)	Scaling Factor	10g Scaled SAR (W/kg)	Meas. No.
LTE Band 20 (RB allocation/offset 1#0 BW: 20MHz)	Back	0	24300	847	4.670	0.147	100.00	1.000	23.68	24.00	1.076	0.158	9#
	Left	0	24300	847	-1.430	0.009	100.00	1.000	23.68	24.00	1.076	0.010	/
	Right	0	24300	847	0.070	0.012	100.00	1.000	23.68	24.00	1.076	0.013	/
	Top	0	24300	847	-1.980	0.059	100.00	1.000	23.68	24.00	1.076	0.063	/
	Bottom	0	24300	847	1.210	0.016	100.00	1.000	23.68	24.00	1.076	0.017	/

Notes:
 1. The distance of the Body/Limb test is 0mm.
 2. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit (< 1 W/kg), testing at the high and low channels is optional, apart from the worst-case configuration.
 3. Refer to ANNEX C for the detailed test data for each test configuration.

Body/Limb													
Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power	10g Meas.	Duty cycle	Duty	Meas.	Max. tune-	Scaling	10g Scaled	Meas. No.

					Drift (%)	SAR (W/kg)	(%)	cycle Factor	Power (dBm)	up power (dBm)	Factor	SAR (W/kg)	
LTE Band 28 (RB allocation/offset 1#0 BW: 20MHz)	Back	0	27560	738	-1.190	0.054	100.00	1.000	23.81	24.00	1.045	0.056	10#
	Left	0	27560	738	-1.430	0.008	100.00	1.000	23.81	24.00	1.045	0.008	/
	Right	0	27560	738	0.880	0.010	100.00	1.000	23.81	24.00	1.045	0.010	/
	Top	0	27560	738	-1.980	0.025	100.00	1.000	23.81	24.00	1.045	0.026	/
	Bottom	0	27560	738	1.210	0.009	100.00	1.000	23.81	24.00	1.045	0.009	/

Notes:
 1. The distance of the Body/Limb test is 0mm.
 2. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit (< 1 W/kg), testing at the high and low channels is optional, apart from the worst-case configuration.
 3. Refer to ANNEX C for the detailed test data for each test configuration.

Body/Limb													
Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (%)	10g Meas. SAR (W/kg)	Duty cycle (%)	Duty cycle Factor	Meas. Power (dBm)	Max. tune-up power (dBm)	Scaling Factor	10g Scaled SAR (W/kg)	Meas. No.
LTE Band 38 (RB allocation/offset 1#0 BW: 20MHz)	Back	0	37850	2580	-0.670	0.163	100.00	1.000	23.75	24.00	1.059	0.173	11#
	Left	0	37850	2580	-1.430	0.008	100.00	1.000	23.75	24.00	1.059	0.008	/
	Right	0	37850	2580	-2.960	0.009	100.00	1.000	23.75	24.00	1.059	0.010	/
	Top	0	37850	2580	-1.980	0.066	100.00	1.000	23.75	24.00	1.059	0.070	/
	Bottom	0	37850	2580	1.210	0.013	100.00	1.000	23.75	24.00	1.059	0.014	/

Notes:
 1. The distance of the Body/Limb test is 0mm.
 2. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit (< 1 W/kg), testing at the high and low channels is optional, apart from the worst-case configuration.
 3. Refer to ANNEX C for the detailed test data for each test configuration.

Body/Limb													
Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (%)	10g Meas. SAR (W/kg)	Duty cycle (%)	Duty cycle Factor	Meas. Power (dBm)	Max. tune-up power (dBm)	Scaling Factor	10g Scaled SAR (W/kg)	Meas. No.
LTE Band 40 (RB allocation/offset 1#0 BW: 20MHz)	Back	0	39550	2750	2.040	0.242	100.00	1.000	23.72	24.00	1.067	0.258	12#
	Left	0	39550	2750	-1.430	0.010	100.00	1.000	23.72	24.00	1.067	0.011	/
	Right	0	39550	2750	1.690	0.014	100.00	1.000	23.72	24.00	1.067	0.015	/
	Top	0	39550	2750	-1.980	0.095	100.00	1.000	23.72	24.00	1.067	0.101	/
	Bottom	0	39550	2750	1.210	0.020	100.00	1.000	23.72	24.00	1.067	0.021	/

Notes:
 1. The distance of the Body/Limb test is 0mm.
 2. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit (< 1 W/kg), testing at the high and low channels is optional, apart from the worst-case configuration.
 3. Refer to ANNEX C for the detailed test data for each test configuration.

Body/Limb													
Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (%)	10g Meas. SAR (W/kg)	Duty cycle (%)	Duty cycle Factor	Meas. Power (dBm)	Max. tune-up power (dBm)	Scaling Factor	10g Scaled SAR (W/kg)	Meas. No.
2.4g Wifi 802.11b	Back	0	13	2472	-1.160	0.288	100.00	1.000	19.56	20.00	1.107	0.319	13#
	Left	0	13	2472	3.820	0.029	100.00	1.000	19.56	20.00	1.107	0.032	/
	Right	0	13	2472	2.320	0.014	100.00	1.000	19.56	20.00	1.107	0.015	/
	Top	0	13	2472	3.770	0.170	100.00	1.000	19.56	20.00	1.107	0.188	/
	Bottom	0	13	2472	1.210	0.020	100.00	1.000	19.56	20.00	1.107	0.022	/

Notes:
 1. The distance of the Body/Limb test is 0mm.
 2. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit (< 1 W/kg), testing at the high and low channels is optional, apart from the worst-case configuration.
 3. Refer to ANNEX C for the detailed test data for each test configuration.

Body/Limb													
Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (%)	10g Meas. SAR (W/kg)	Duty cycle (%)	Duty cycle Factor	Meas. Power (dBm)	Max. tune-up power (dBm)	Scaling Factor	10g Scaled SAR (W/kg)	Meas. No.
5g Wifi U-NII-1 802.11n(HT40)	Back	0	46	5230	-1.800	0.532	100.00	1.000	22.71	23.00	1.069	0.569	14#
	Left	0	46	5230	1.550	0.156	100.00	1.000	22.71	23.00	1.069	0.167	/
	Right	0	46	5230	-0.440	0.100	100.00	1.000	22.71	23.00	1.069	0.107	/
	Top	0	46	5230	-1.980	0.323	100.00	1.000	22.71	23.00	1.069	0.345	/
	Bottom	0	46	5230	1.060	0.065	100.00	1.000	22.71	23.00	1.069	0.069	/

Notes:
 1. The distance of the Body/Limb test is 0mm.
 2. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit (< 1 W/kg), testing at the high and low channels is optional, apart from the worst-case configuration.
 3. Refer to ANNEX C for the detailed test data for each test configuration.

Body/Limb													
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Mode	Position	Dist. (mm)	Ch.	Freq. (MHz)	Power Drift (%)	10g Meas. SAR (W/kg)	Duty cycle (%)	Duty cycle Factor	Meas. Power (dBm)	Max. tune-up power (dBm)	Scaling Factor	10g Scaled SAR (W/kg)	Meas. No.
5g Wifi U-NII-3 802.11ac(VHT80)	Back	0	155	5775	-1.690	0.175	100.00	1.000	13.62	14.00	1.091	0.191	15#
	Left	0	155	5775	1.200	0.023	100.00	1.000	13.62	14.00	1.091	0.025	/
	Right	0	155	5775	-1.650	0.012	100.00	1.000	13.62	14.00	1.091	0.013	/
	Top	0	155	5775	-1.980	0.092	100.00	1.000	13.62	14.00	1.091	0.100	/
	Bottom	0	155	5775	1.210	0.016	100.00	1.000	13.62	14.00	1.091	0.017	/

Notes:
 1. The distance of the Body/Limb test is 0mm.
 2. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit (< 1 W/kg), testing at the high and low channels is optional, apart from the worst-case configuration.
 3. Refer to ANNEX C for the detailed test data for each test configuration.

10. Simultaneous Transmission

The device contain transmitters (GSM/WCDMA/LTE & Bluetooth/Wifi) can transmit multiple transmission modes at the same time, determining the threshold power level available to the secondary transmitter (Pavailable) is to calculate it from the measured peak spatial-average SAR of the primary transmitter (SAR1) according to the equation:

$$P_{available} = P_{th,m} \cdot (SAR_{lim} - SAR_1) / SAR_{lim}$$

where Pth,m is the threshold exclusion power level taken from Annex B of IEC 62479 for the frequency of the secondary transmitter at the separation distance used in the testing.

f GHz	BW %	Exemple d'interface air	Pmax' mW			
			s = 5 mm		s = 25 mm	
			m = 1 g	m = 10 g	m = 1 g	m = 10 g
2.442	3,4	802.11b	7,3	32	130	328
5,250	3,8	WiMAX	6,8	53	258	845
5.788	1,3	WiMAX	6,2	52	164	564

According to the test result, we could know the maximum SAR of body-supported/Limb is 0.879 W/Kg, so

$$P_{available1} = 32mW \times (2.0 - 0.879) / 2.0 = 17.94mW; P_{available1'} = 32mW \times (4.0 - 0.879) / 4.0 = 24.97mW$$

$$P_{available2} = 53mW \times (2.0 - 0.879) / 2.0 = 29.71mW; P_{available2'} = 53mW \times (4.0 - 0.879) / 4.0 = 41.35mW$$

$$P_{available3} = 52mW \times (2.0 - 0.879) / 2.0 = 29.15mW; P_{available3'} = 52mW \times (4.0 - 0.879) / 4.0 = 40.57mW$$

The maximum power of BT is 5.00 dBm = 3.16 mw < Pavailable1 & Pavailable1'
 So the SAR measurement for the secondary transmitter of BT is not necessary;
 The maximum power of 2.4g Wifi is 20.00 dBm = 100.00 mw > Pavailable1 & Pavailable1'
 So the SAR measurement for the secondary transmitter of 2.4g Wifi is necessary;
 The maximum power of 5.2g Wifi is 23.00 dBm = 199.5 mW > Pavailable2 & Pavailable2'
 So the SAR measurement for the secondary transmitter of 5.2g Wifi is necessary.
 The maximum power of 5.8g Wifi is 14.00 dBm = 25.12 mW < Pavailable3 & Pavailable3'
 So the SAR measurement for the secondary transmitter of 5.8g Wifi is not necessary either;

Application Simultaneous Transmission information:

Combination No.	Simultaneous Tx Mode
1	WWAN + WIFI

10.1 Sum SAR of Simultaneous Transmission

10.1.1 Body-Worn/Limb Simultaneous Transmission SAR Evaluation for WWAN Antenna and WLAN antenna

Band	Position	Standalone SAR(Reported SAR 10-g (W/Kg))			Sum SAR10-g (W/Kg) WWAN+WL AN-2.4g	Sum SAR10-g (W/Kg) WWAN+WL AN-5.2g	SAR10-g body-worn Limit (W/Kg)	SAR10-g Limb Limit (W/Kg)	Simultaneous Meas. Required
		WWAN	WLAN-2.4g	WLAN-5.2g					
GSM 900	Back	0.603	0.319	0.569	0.922	1.172	2.0	4.0	no
	Left	0.012	0.032	0.167	0.044	0.179	2.0	4.0	no
	Right	0.035	0.015	0.107	0.050	0.142	2.0	4.0	no
	Top	0.290	0.188	0.345	0.478	0.635	2.0	4.0	no
	Bottom	0.028	0.022	0.069	0.050	0.097	2.0	4.0	no
GSM 1800	Back	0.474	0.319	0.569	0.793	1.043	2.0	4.0	no
	Left	0.011	0.032	0.167	0.043	0.178	2.0	4.0	no
	Right	0.025	0.015	0.107	0.040	0.132	2.0	4.0	no
	Top	0.197	0.188	0.345	0.385	0.542	2.0	4.0	no
	Bottom	0.018	0.022	0.069	0.040	0.087	2.0	4.0	no
WCDMA Band 1	Back	0.778	0.319	0.569	1.097	1.347	2.0	4.0	no
	Left	0.013	0.032	0.167	0.045	0.180	2.0	4.0	no
	Right	0.044	0.015	0.107	0.059	0.151	2.0	4.0	no
	Top	0.316	0.188	0.345	0.504	0.661	2.0	4.0	no
	Bottom	0.023	0.022	0.069	0.045	0.092	2.0	4.0	no
WCDMA Band 8	Back	0.623	0.319	0.569	0.942	1.192	2.0	4.0	no
	Left	0.011	0.032	0.167	0.043	0.178	2.0	4.0	no
	Right	0.011	0.015	0.107	0.026	0.118	2.0	4.0	no
	Top	0.242	0.188	0.345	0.430	0.587	2.0	4.0	no
	Bottom	0.021	0.022	0.069	0.043	0.090	2.0	4.0	no
LTE band 1	Back	0.879	0.319	0.569	1.198	1.448	2.0	4.0	no
	Left	0.023	0.032	0.167	0.055	0.190	2.0	4.0	no
	Right	0.053	0.015	0.107	0.068	0.160	2.0	4.0	no
	Top	0.408	0.188	0.345	0.596	0.753	2.0	4.0	no
	Bottom	0.032	0.022	0.069	0.054	0.101	2.0	4.0	no
LTE band 3	Back	0.289	0.319	0.569	0.608	0.858	2.0	4.0	no
	Left	0.011	0.032	0.167	0.043	0.178	2.0	4.0	no
	Right	0.015	0.015	0.107	0.030	0.122	2.0	4.0	no
	Top	0.101	0.188	0.345	0.289	0.446	2.0	4.0	no
	Bottom	0.012	0.022	0.069	0.034	0.081	2.0	4.0	no
LTE band 7	Back	0.625	0.319	0.569	0.944	1.194	2.0	4.0	no
	Left	0.015	0.032	0.167	0.047	0.182	2.0	4.0	no
	Right	0.025	0.015	0.107	0.040	0.132	2.0	4.0	no
	Top	0.256	0.188	0.345	0.444	0.601	2.0	4.0	no
	Bottom	0.021	0.022	0.069	0.043	0.090	2.0	4.0	no
LTE band 8	Back	0.329	0.319	0.569	0.648	0.898	2.0	4.0	no
	Left	0.011	0.032	0.167	0.043	0.178	2.0	4.0	no
	Right	0.021	0.015	0.107	0.036	0.128	2.0	4.0	no
	Top	0.162	0.188	0.345	0.350	0.507	2.0	4.0	no
	Bottom	0.014	0.022	0.069	0.036	0.083	2.0	4.0	no
LTE band 20	Back	0.158	0.319	0.569	0.477	0.727	2.0	4.0	no
	Left	0.01	0.032	0.167	0.042	0.177	2.0	4.0	no
	Right	0.013	0.015	0.107	0.028	0.120	2.0	4.0	no
	Top	0.063	0.188	0.345	0.251	0.408	2.0	4.0	no
	Bottom	0.017	0.022	0.069	0.039	0.086	2.0	4.0	no
LTE band 28	Back	0.056	0.319	0.569	0.375	0.625	2.0	4.0	no
	Left	0.008	0.032	0.167	0.040	0.175	2.0	4.0	no
	Right	0.01	0.015	0.107	0.025	0.117	2.0	4.0	no
	Top	0.026	0.188	0.345	0.214	0.371	2.0	4.0	no
	Bottom	0.009	0.022	0.069	0.031	0.078	2.0	4.0	no
LTE band 38	Back	0.173	0.319	0.569	0.492	0.742	2.0	4.0	no
	Left	0.008	0.032	0.167	0.040	0.175	2.0	4.0	no
	Right	0.01	0.015	0.107	0.025	0.117	2.0	4.0	no
	Top	0.07	0.188	0.345	0.258	0.415	2.0	4.0	no
	Bottom	0.014	0.022	0.069	0.036	0.083	2.0	4.0	no
LTE band 40	Back	0.258	0.319	0.569	0.577	0.827	2.0	4.0	no
	Left	0.011	0.032	0.167	0.043	0.178	2.0	4.0	no
	Right	0.015	0.015	0.107	0.030	0.122	2.0	4.0	no
	Top	0.101	0.188	0.345	0.289	0.446	2.0	4.0	no
	Bottom	0.021	0.022	0.069	0.043	0.090	2.0	4.0	no

11. Test Equipment List

Description	Manufacturer	Model	Serial No./Version	Cal. Date	Cal. Due
E-Field Probe	MVG	SSE2	04/22 EPGO365	2023/02/06	2024/02/05
6 1/2 Digital Multimeter	Keithley	DMM6500	4527164	2022/11/24	2023/11/23
Wideband Radio Communication Tester	ROHDE & SCHWARZ	CMW500	161997	2022/11/24	2023/11/23
MXG Vector Signal Generator	Agilent	N5182A	MY46240163	2022/11/24	2023/11/23
E-Series Avg. Power Sensor	KEYSIGHT	E9300A	MY55050017	2023/03/24	2024/03/23
EPM Series Power Meter	KEYSIGHT	E4418B	MY41293435	2023/03/24	2024/03/23
10dB Attenuator	MIDWEST MICROWAVE	263-10dB	/	2023/03/24	2024/03/23
Coupler	MERRIMAC	CWM-10R-10.8G	LOT-83391	2023/03/24	2024/03/23
750MHz Validation Dipole	MVG	SID750	07/22 DIP 0G835-655	2023/02/06	2024/02/05
835MHz Validation Dipole	MVG	SID835	07/22 DIP 0G835-656	2023/02/06	2024/02/05
1800MHz Validation Dipole	MVG	SID1800	07/22 DIP 1G800-657	2023/02/06	2024/02/05
1900MHz Validation Dipole	MVG	SID1900	07/22 DIP 1G900-658	2023/02/06	2024/02/05
2450MHz Validation Dipole	MVG	SID2450	07/22 DIP 2G450-662	2023/02/06	2024/02/05
2600MHz Validation Dipole	MVG	SID2600	07/22 DIP 2G600-663	2023/02/06	2024/02/05
5200MHz-5800MHz Validation Dipole	MVG	SID5000	07/22 DIP5G000-670	2023/02/06	2024/02/05
LIMESAR Dielectric Probe	MVG	SCLMP	06/22 OCPG88	/	/
ENA Series Network Analyzer	Agilent	E5071B	MY42301221	2022/11/24	2023/11/23
Thermometer	Riters	DT-232	21A11	2023/03/24	2024/03/23
Antenna network emulator	MVG	ANTA 74	07/22 ANTA 74	/	/
SAM Phantom	MVG	SAM	07/22 SAM149	/	/
Mobile Phone Positioning System	MVG	MSH 118	07/22 MSH 118	/	/
Mechanical Calibration Kit	PNA	/	/	/	/
Open SAR test software	MVG	/	V5.3.5	/	/

Note: For dipole antennas, BTF has adopted 3 years as calibration intervals, and 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 in within 20% of calibrated measurement.
4. Impedance (real or imaginary parts) in 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.

Dielectric performance of tissue simulating liquid									
Frequency (MHz)	ϵ_r		σ (s/m)		Delta (ϵ_r)	Delta (σ)	Limit	Temp (°C)	Date
	Target	Measured	Target	Measured					
750	41.90	41.80	0.89	0.86	0.24%	3.37%	±5%	20.0	8/5/2023
835	41.50	41.41	0.90	0.87	0.22%	3.33%	±5%	20.0	8/5/2023
1800	40.00	39.91	1.40	1.37	0.23%	2.14%	±5%	20.0	9/5/2023
1900	40.00	39.88	1.40	1.41	0.30%	-0.71%	±5%	20.0	9/5/2023
2450	39.20	39.08	1.80	1.81	0.31%	-0.56%	±5%	20.0	10/5/2023
2600	39.00	38.88	1.96	1.97	0.31%	-0.51%	±5%	20.5	10/5/2023
5200	36.00	35.88	4.66	4.70	0.33%	-0.86%	±5%	20.5	10/5/2023
5800	41.50	41.41	5.27	5.31	0.34%	-0.76%	±5%	20.5	10/5/2023

NOTE: The dielectric parameters of the tissue-equivalent liquid should be measured under similar ambient conditions and within 2 °C of the conditions expected during the SAR evaluation to satisfy protocol requirements.

ANNEX B System Check Result

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

Frequency (MHz)	Input Power (mW)	10g SAR (W/Kg)	1g SAR (W/Kg)	10g SAR 1W input power normalized (W/Kg)	1g SAR 1W input power normalized (W/Kg)	10g SAR Standard target (1W) (W/Kg)	1g SAR Standard target (1W) (W/Kg)	10g SAR Deviation	1g SAR Deviation
750	16	0.092	0.138	5.80	8.70	5.55	8.49	-4.50%	-2.47%
835	16	0.106	0.163	6.68	10.28	6.22	9.56	-7.40%	-7.53%
1800	16	0.312	0.588	19.68	37.10	20.10	38.40	2.09%	3.39%
1900	16	0.322	0.630	20.32	39.75	20.50	39.70	0.88%	-0.13%
2450	16	0.352	0.793	22.21	50.03	24.00	52.40	7.46%	4.52%
2600	16	0.421	0.866	26.56	54.64	24.60	55.30	-0.08%	0.01%
5200	13	0.294	0.998	23.35	79.27	21.60	76.50	-7.97%	1.19%
5800	13	0.280	1.023	22.24	81.25	21.90	78.00	-4.09%	-3.50%

System Performance Check Data (750 MHz)

System check at 750 MHz

Date of measurement: 8/5/2023

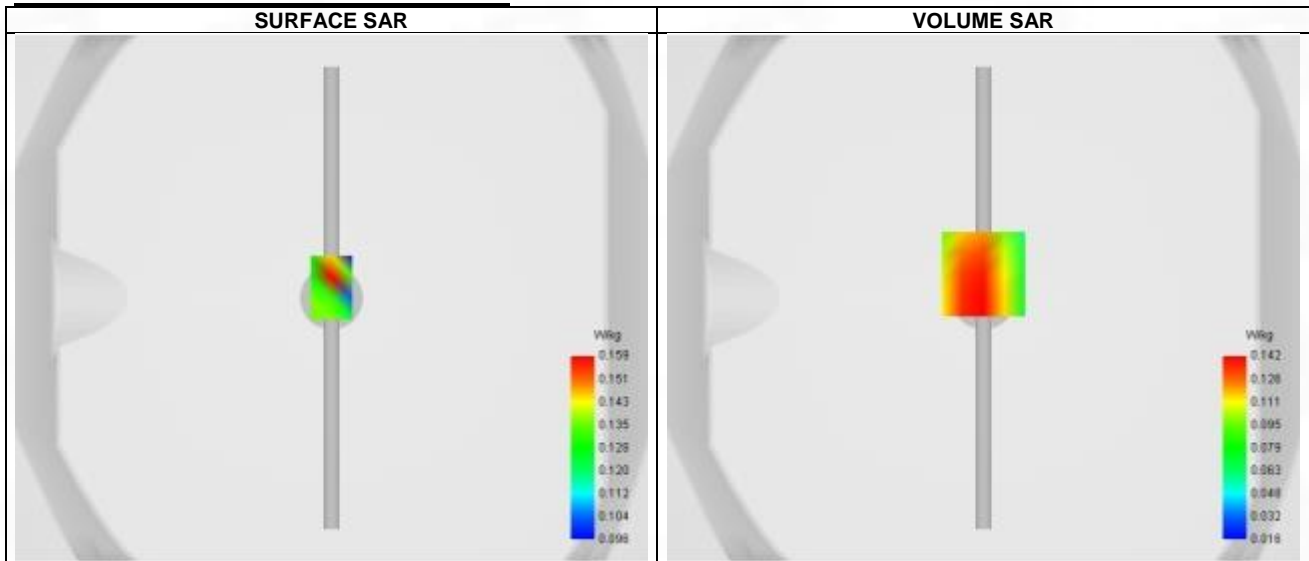
A. Experimental conditions.

Probe	SN 04/22 EPG0365
ConvF	1.65
Area Scan	dx=8mm dy=8mm, Adaptive 1 max
Zoom Scan	5x5x7, dx=8mm dy=8mm dz=5mm, Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW750
Channels	Middle
Signal	CW

B. Permittivity

Frequency (MHz)	750.000
Relative permittivity (real part)	41.800
Relative permittivity (imaginary part)	21.460
Conductivity (S/m)	0.860

C. SAR Surface and Volume



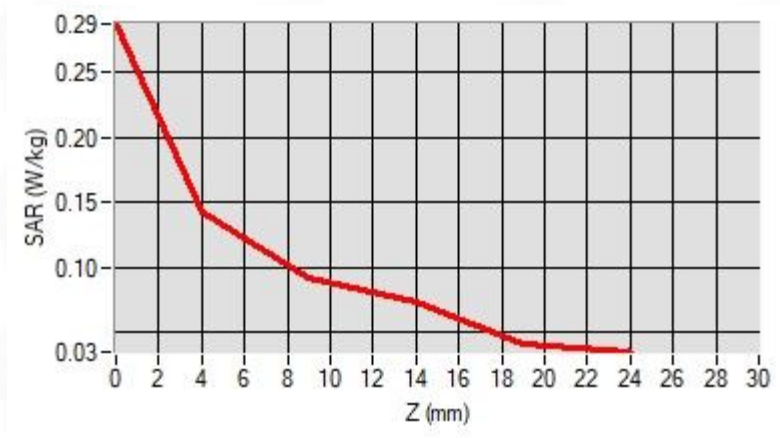
Maximum location: X=0.00, Y=9.00 ; SAR Peak: 0.20 W/kg

D. SAR 1g & 10g

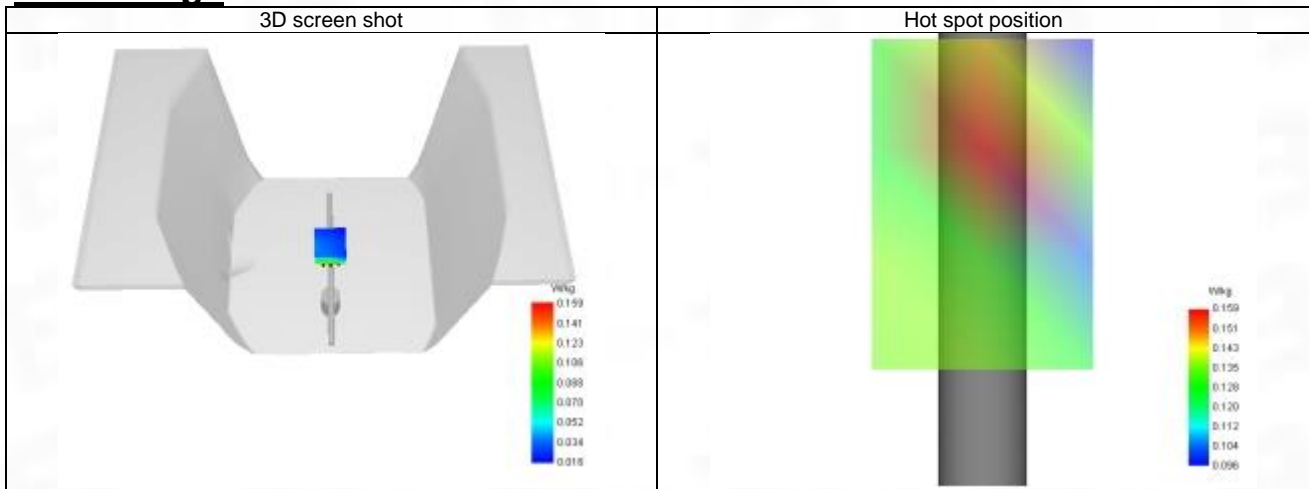
SAR 10g (W/Kg)	0.092
SAR 1g (W/Kg)	0.138
Variation (%)	-2.190
Horizontal validation criteria: minimum distance (mm)	0.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	0.000000

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.287	0.142	0.092	0.073	0.042



F. 3D Image



System Performance Check Data (835 MHz)

System check at 835 MHz

Date of measurement: 8/5/2023

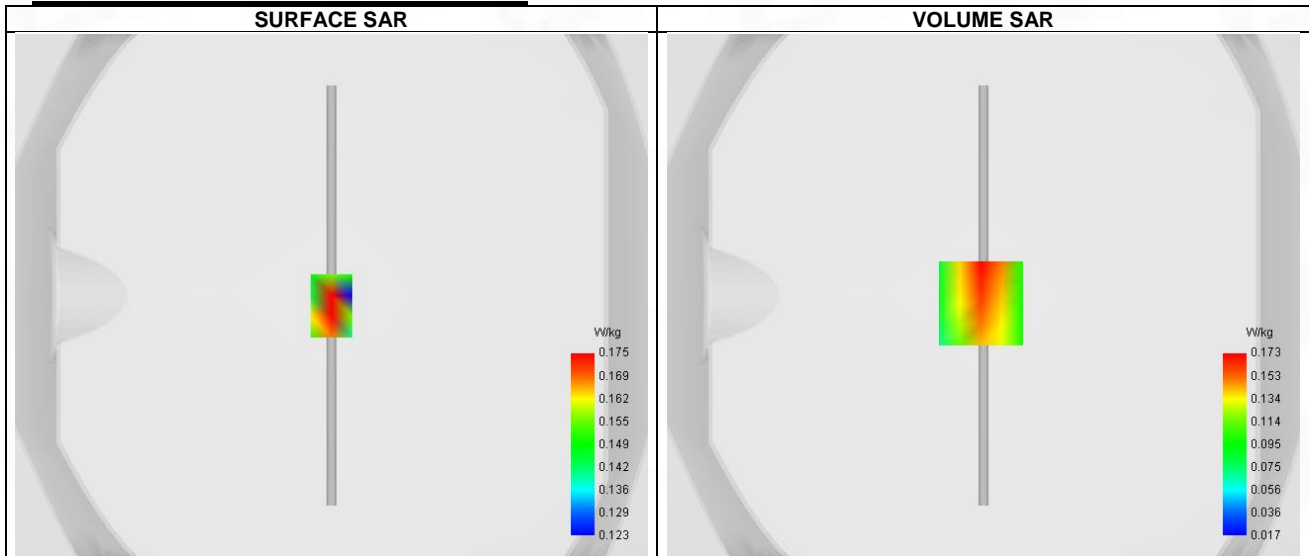
A. Experimental conditions.

Probe	SN 04/22 EPGO365
ConvF	1.68
Area Scan	dx=8mm dy=8mm, Adaptive 1 max
Zoom Scan	5x5x7, dx=8mm dy=8mm dz=5mm, Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW835
Channels	Middle
Signal	CW

B. Permittivity

Frequency (MHz)	835.000
Relative permittivity (real part)	41.410
Relative permittivity (imaginary part)	19.490
Conductivity (S/m)	0.870

C. SAR Surface and Volume



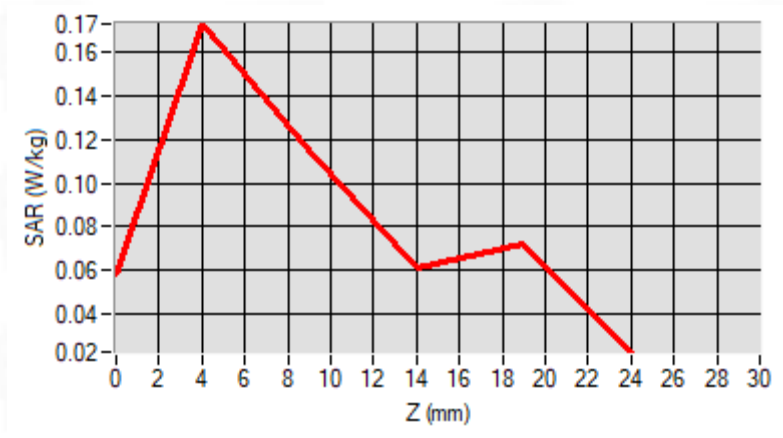
Maximum location: X=-1.00, Y=-3.00 ; SAR Peak: 0.26 W/kg

D. SAR 1g & 10g

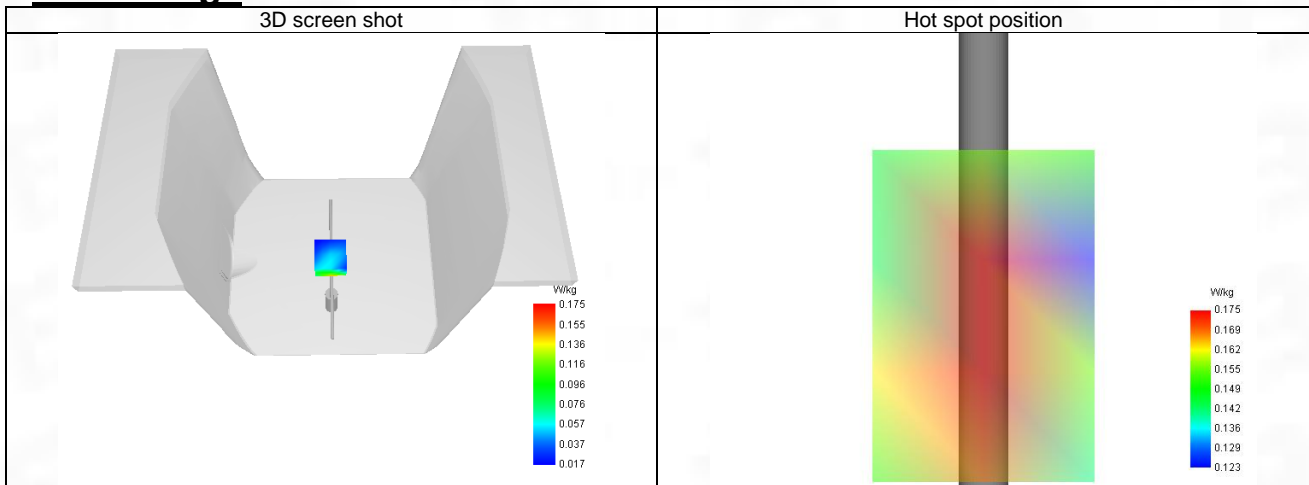
SAR 10g (W/Kg)	0.106
SAR 1g (W/Kg)	0.163
Variation (%)	-3.390
Horizontal validation criteria: minimum distance (mm)	0.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	0.000000

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.059	0.173	0.115	0.061	0.072



F. 3D Image



System Performance Check Data (1800 MHz)

System check at 1800 MHz

Date of measurement: 9/5/2023

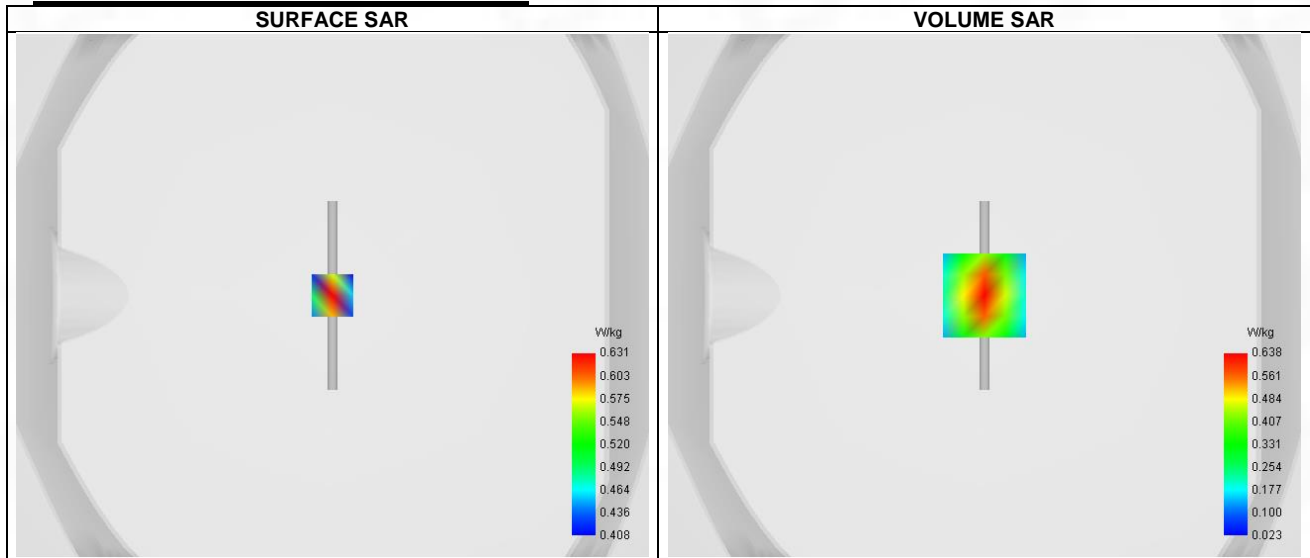
A. Experimental conditions.

Probe	SN 04/22 EPGO365
ConvF	1.96
Area Scan	dx=8mm dy=8mm, Adaptive 1 max
Zoom Scan	5x5x7, dx=8mm dy=8mm dz=5mm, Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW1800
Channels	Middle
Signal	CW

B. Permittivity

Frequency (MHz)	1800.000
Relative permittivity (real part)	39.910
Relative permittivity (imaginary part)	14.090
Conductivity (S/m)	1.370

C. SAR Surface and Volume



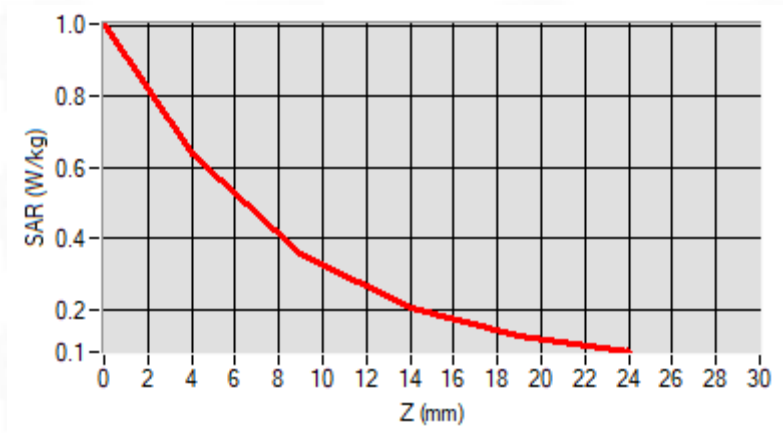
Maximum location: X=0.00, Y=0.00 ; SAR Peak: 1.00 W/kg

D. SAR 1g & 10g

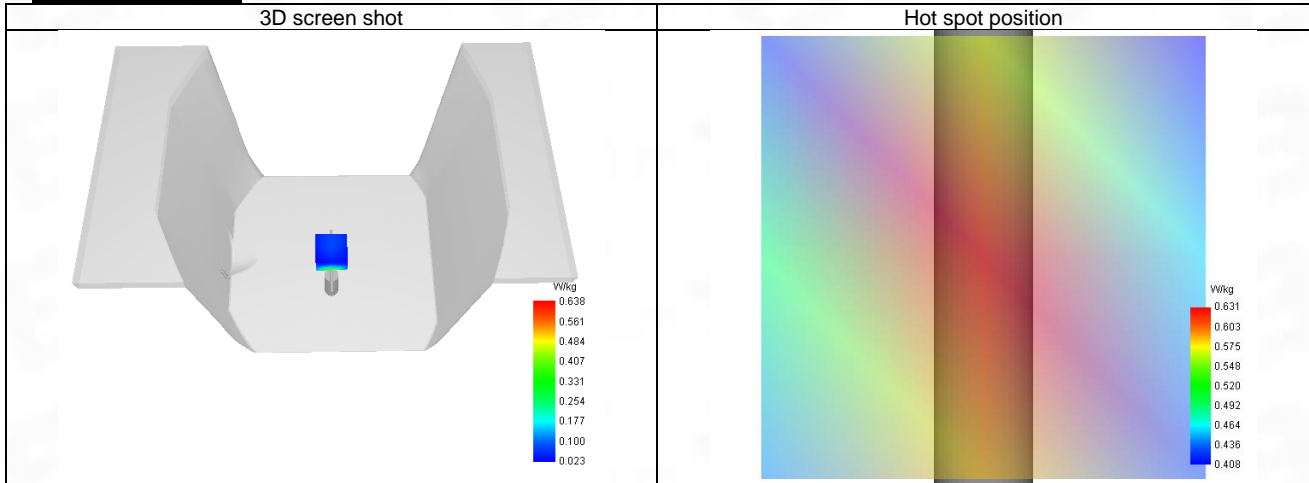
SAR 10g (W/Kg)	0.312
SAR 1g (W/Kg)	0.588
Variation (%)	-0.250
Horizontal validation criteria: minimum distance (mm)	0.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	0.000000

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.003	0.638	0.356	0.204	0.127



F. 3D Image



System Performance Check Data (1900 MHz)

System check at 1900 MHz

Date of measurement: 9/5/2023

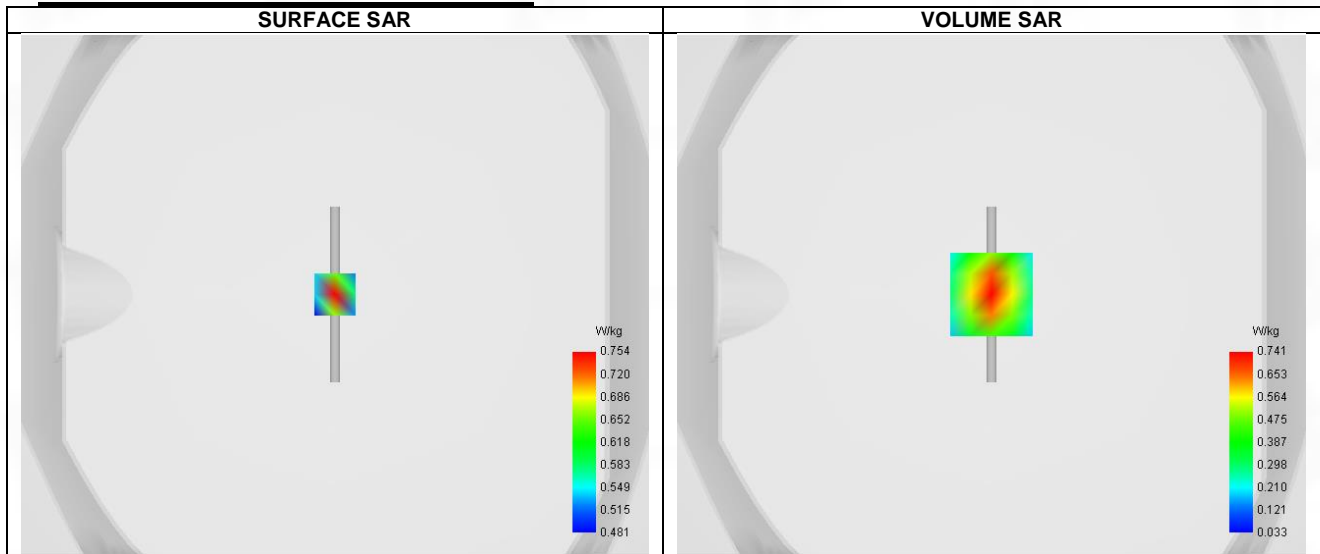
A. Experimental conditions.

Probe	SN 04/22 EPG0365
ConvF	2.24
Area Scan	dx=8mm dy=8mm, Adaptive 1 max
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW1900
Channels	Middle
Signal	CW

B. Permittivity

Frequency (MHz)	1900.000
Relative permittivity (real part)	39.880
Relative permittivity (imaginary part)	13.380
Conductivity (S/m)	1.410

C. SAR Surface and Volume



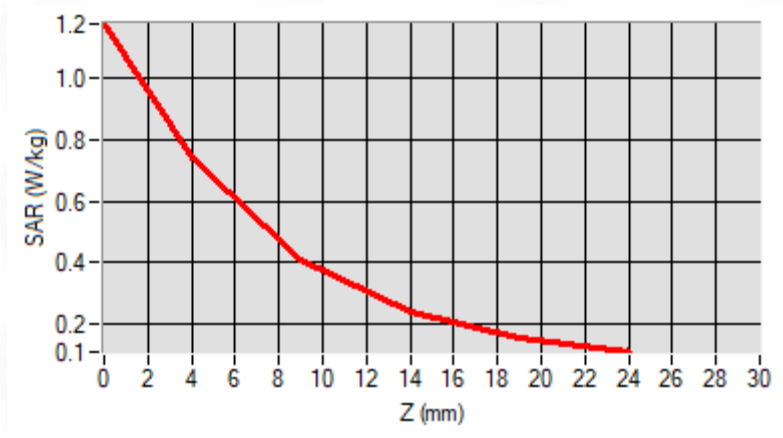
Maximum location: X=0.00, Y=0.00 ; SAR Peak: 1.18 W/kg

D. SAR 1g & 10g

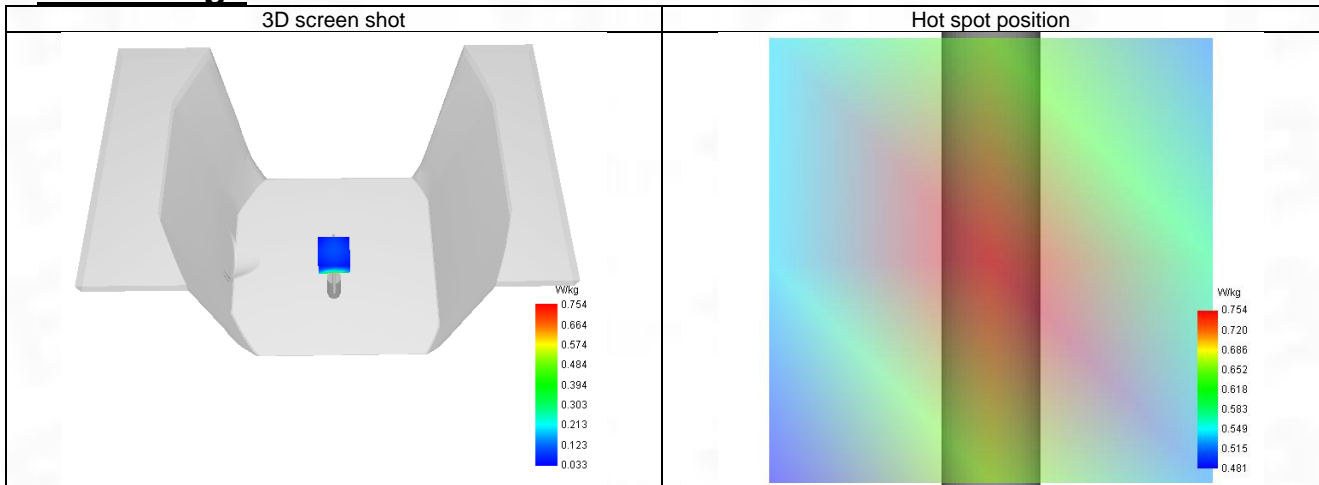
SAR 10g (W/Kg)	0.322
SAR 1g (W/Kg)	0.630
Variation (%)	-2.080
Horizontal validation criteria: minimum distance (mm)	0.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	0.000000

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.201	0.759	0.402	0.239	0.156



F. 3D Image



System Performance Check Data (2450 MHz)

System check at 2450 MHz

Date of measurement: 10/5/2023

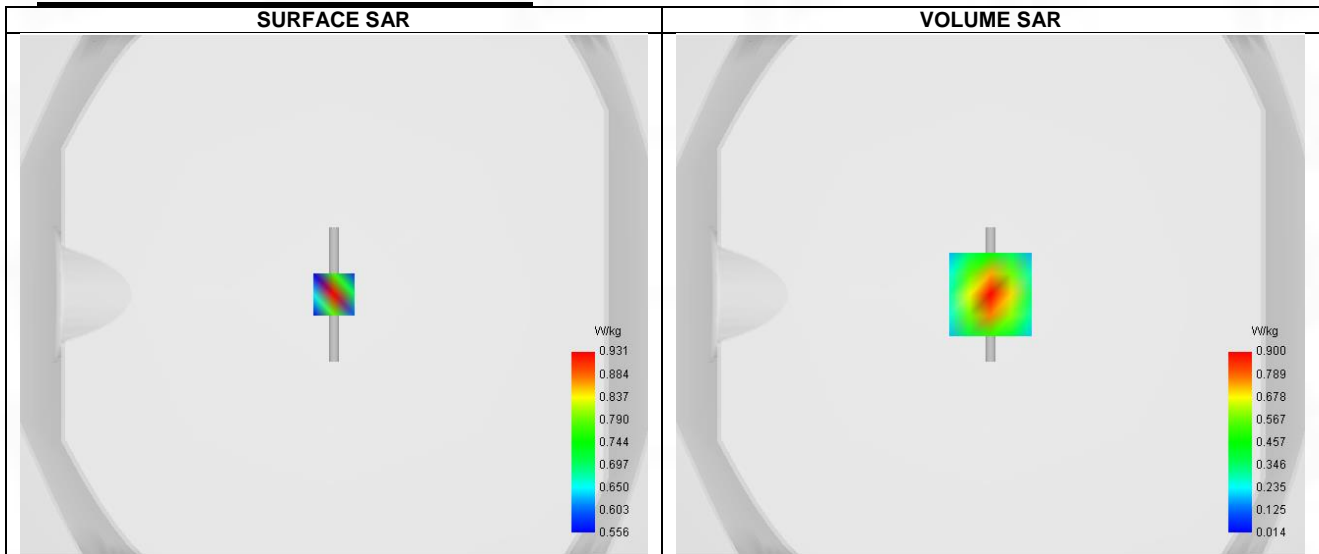
A. Experimental conditions.

Probe	SN 04/22 EPG0365
ConvF	2.36
Area Scan	dx=8mm dy=8mm, Adaptive 1 max
Zoom Scan	5x5x7, dx=8mm dy=8mm dz=5mm, Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW2450
Channels	Middle
Signal	CW

B. Permittivity

Frequency (MHz)	2450.000
Relative permittivity (real part)	39.080
Relative permittivity (imaginary part)	13.340
Conductivity (S/m)	1.810

C. SAR Surface and Volume



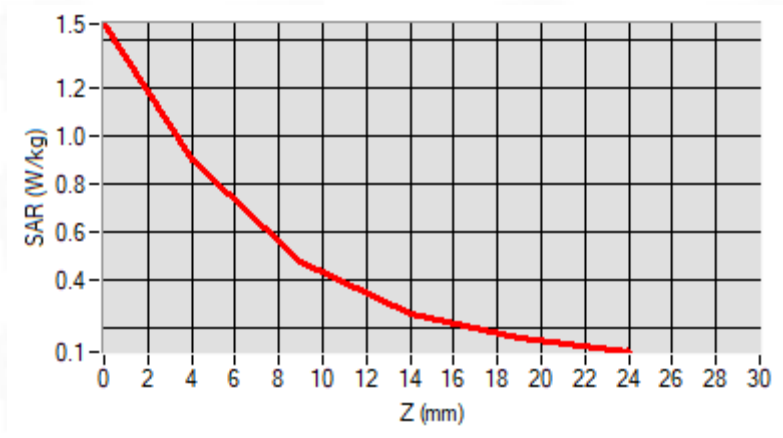
Maximum location: X=0.00, Y=0.00 ; SAR Peak: 1.47 W/kg

D. SAR 1g & 10g

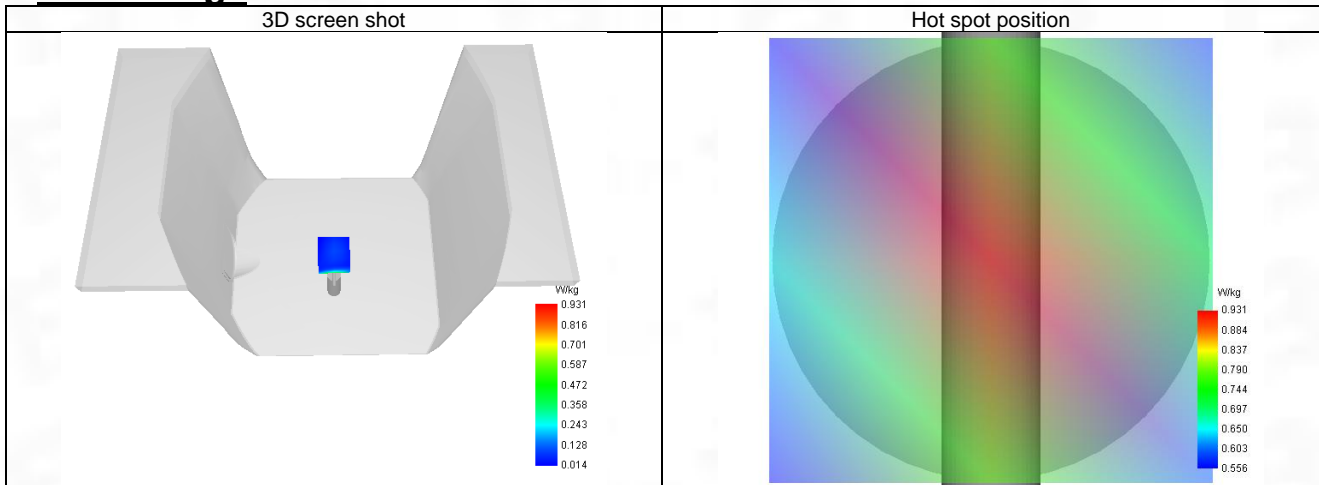
SAR 10g (W/Kg)	0.352
SAR 1g (W/Kg)	0.793
Variation (%)	-2.570
Horizontal validation criteria: minimum distance (mm)	0.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	0.000000

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.466	0.900	0.477	0.261	0.158



F. 3D Image



System Performance Check Data (2600 MHz)

System check at 2600 MHz

Date of measurement: 10/5/2023

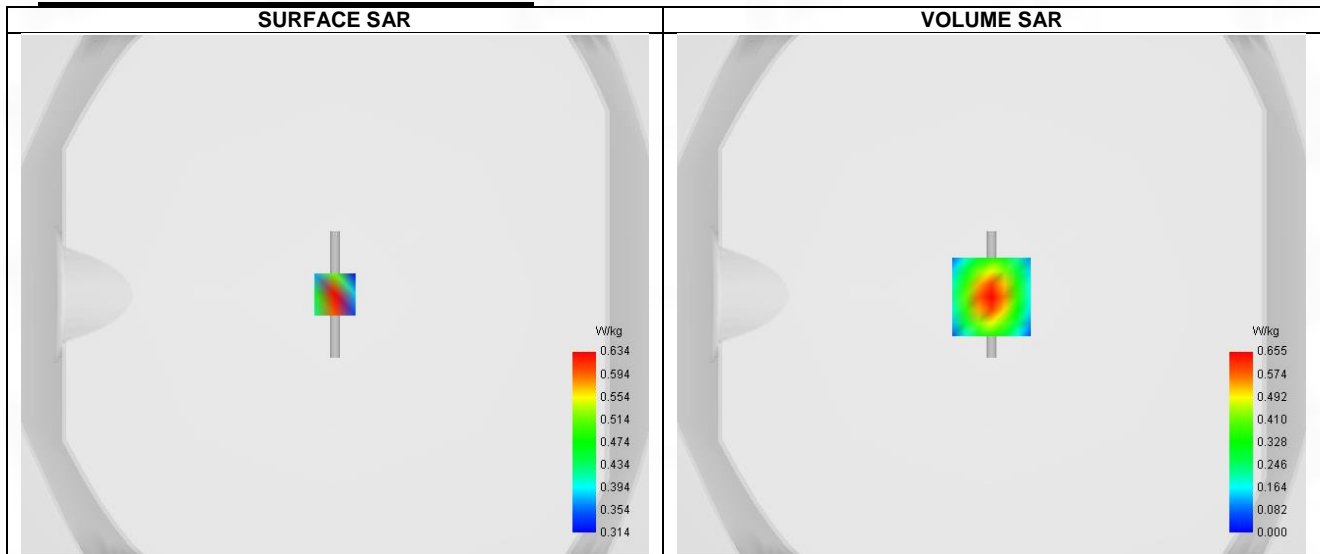
A. Experimental conditions.

Probe	SN 04/22 EPG0365
ConvF	2.40
Area Scan	dx=8mm dy=8mm, Adaptive 1 max
Zoom Scan	5x5x7, dx=8mm dy=8mm dz=5mm, Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW2600
Channels	Middle
Signal	CW

B. Permittivity

Frequency (MHz)	2600.000
Relative permittivity (real part)	39.880
Relative permittivity (imaginary part)	12.690
Conductivity (S/m)	1.970

C. SAR Surface and Volume



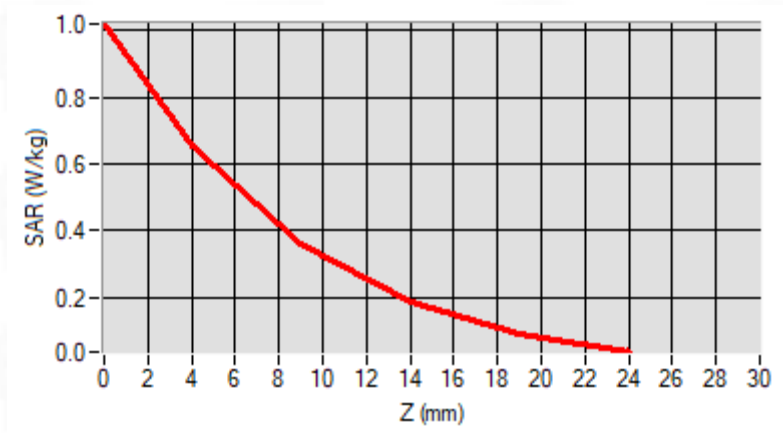
Maximum location: X=0.00, Y=-1.00 ; SAR Peak: 1.02 W/kg

D. SAR 1g & 10g

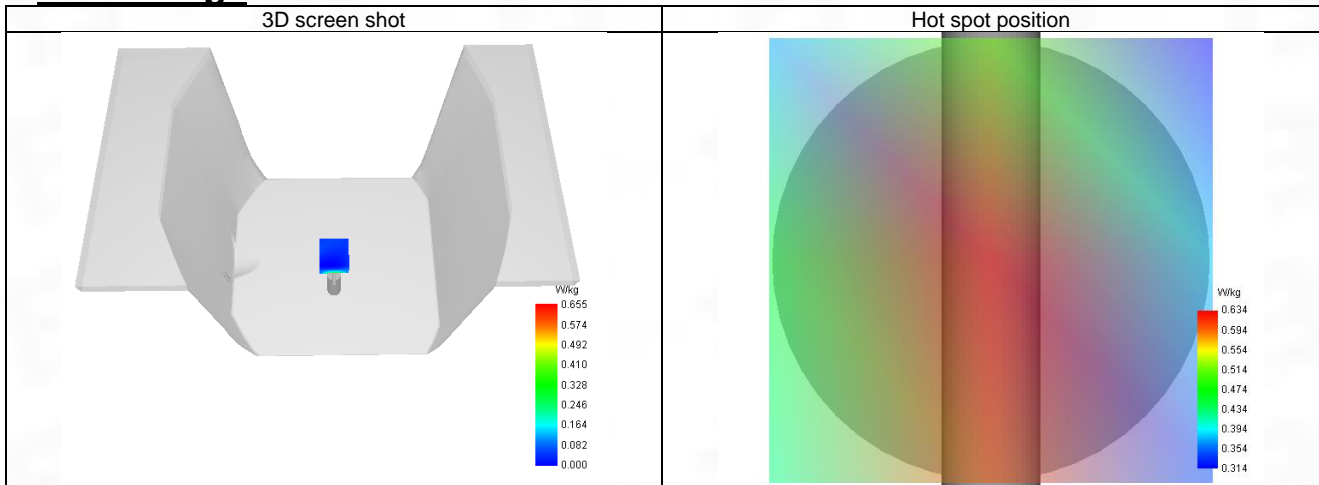
SAR 10g (W/Kg)	0.421
SAR 1g (W/Kg)	0.866
Variation (%)	2.980
Horizontal validation criteria: minimum distance (mm)	0.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	0.000000

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.020	0.655	0.359	0.187	0.091



F. 3D Image



System Performance Check Data (5200 MHz)

System check at 5200 MHz

Date of measurement: 10/5/2023

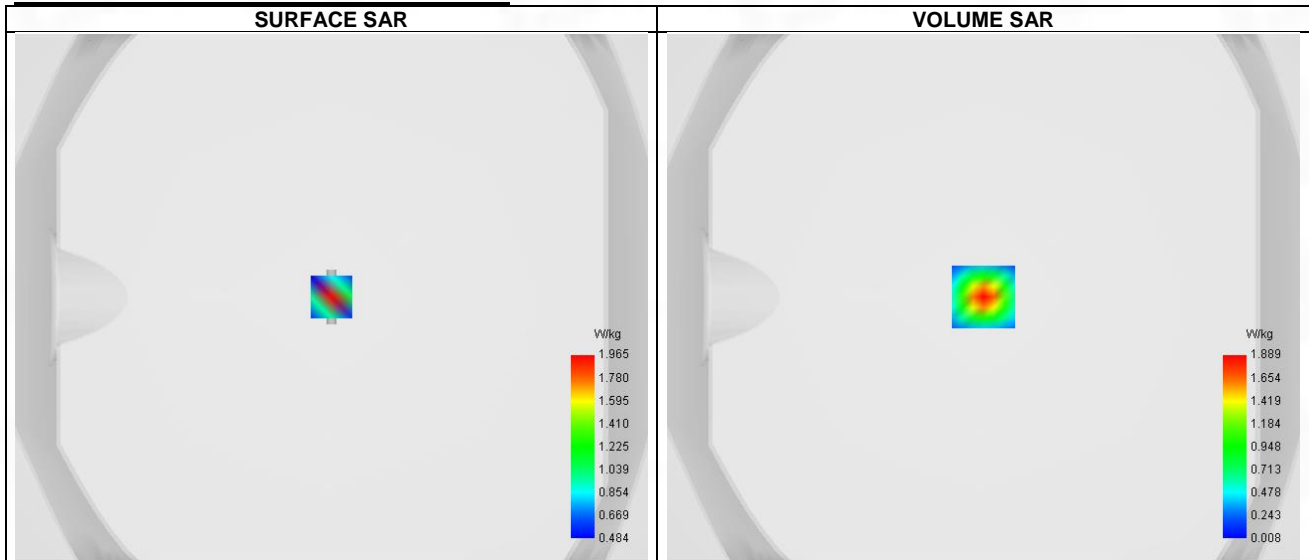
A. Experimental conditions.

Probe	SN 04/22 EPG0365
ConvF	2.24
Area Scan	dx=8mm dy=8mm, Adaptive 1 max
Zoom Scan	7x7x12,dx=4mm dy=4mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW5200
Channels	Middle
Signal	CW

B. Permittivity

Frequency (MHz)	5200.000
Relative permittivity (real part)	35.880
Relative permittivity (imaginary part)	16.250
Conductivity (S/m)	4.700

C. SAR Surface and Volume



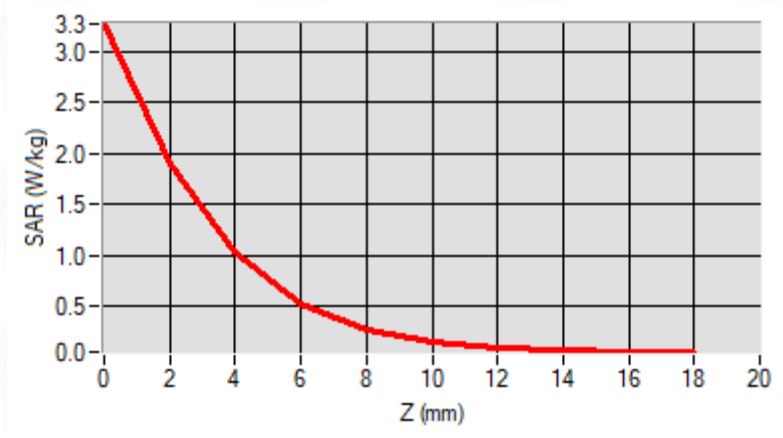
Maximum location: X=0.00, Y=0.00 ; SAR Peak: 3.38 W/kg

D. SAR 1g & 10g

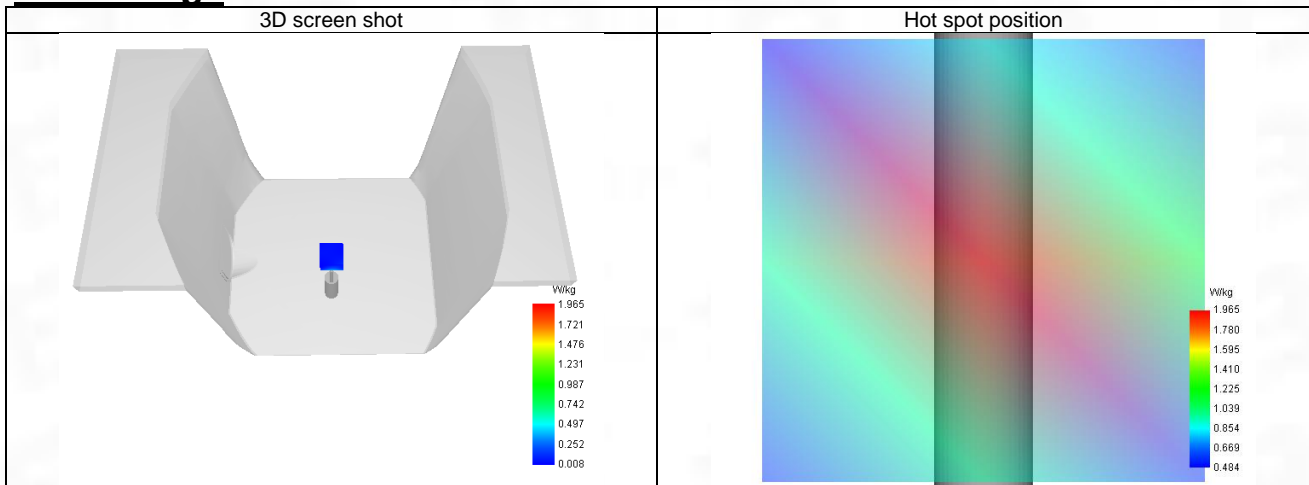
SAR 10g (W/Kg)	0.294
SAR 1g (W/Kg)	0.998
Variation (%)	-3.400
Horizontal validation criteria: minimum distance (mm)	0.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	0.000000

E. Z Axis Scan

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00
SAR (W/Kg)	3.268	1.889	1.021	0.523	0.266	0.142	0.085	0.060	0.052



F. 3D Image



System Performance Check Data (5800 MHz)

System check at 5800 MHz

Date of measurement: 10/5/2023

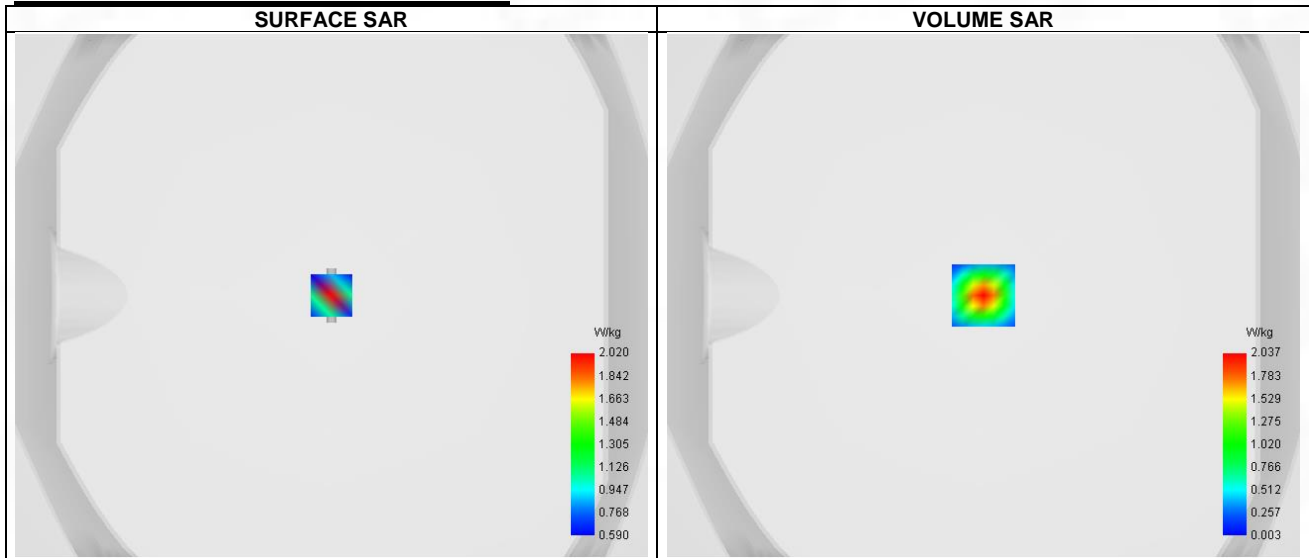
A. Experimental conditions.

Probe	SN 04/22 EPG0365
ConvF	2.04
Area Scan	dx=8mm dy=8mm, Adaptive 1 max
Zoom Scan	7x7x12,dx=4mm dy=4mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW5800
Channels	Middle
Signal	CW

B. Permittivity

Frequency (MHz)	5800.000
Relative permittivity (real part)	35.180
Relative permittivity (imaginary part)	16.480
Conductivity (S/m)	5.310

C. SAR Surface and Volume



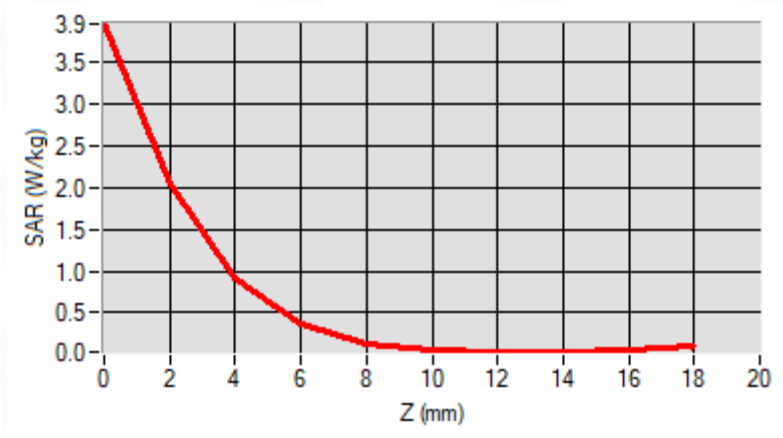
Maximum location: X=0.00, Y=0.00 ; SAR Peak: 4.17 W/kg

D. SAR 1g & 10g

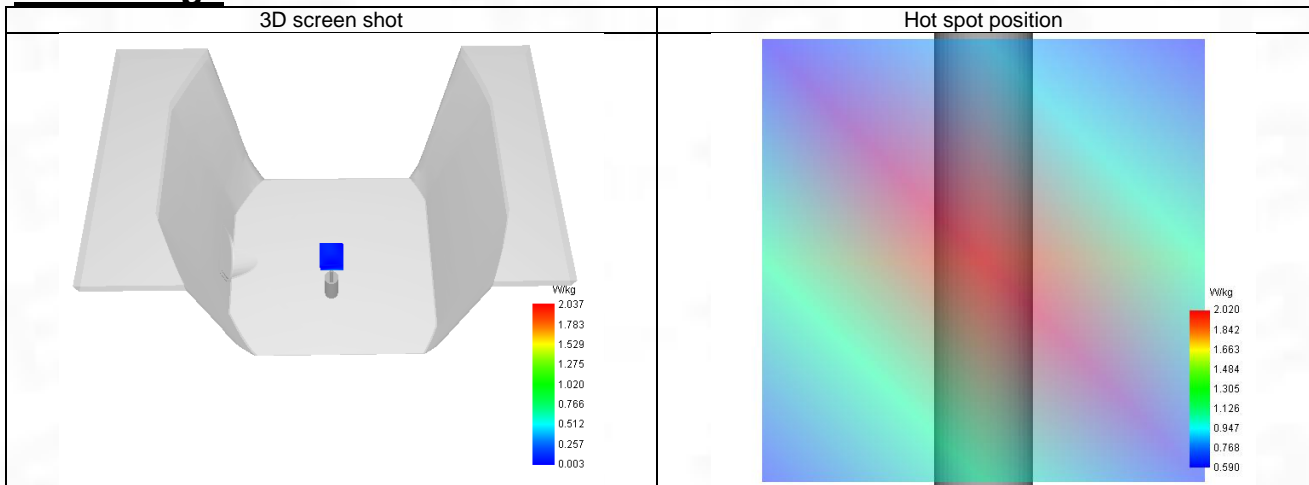
SAR 10g (W/Kg)	0.280
SAR 1g (W/Kg)	1.023
Variation (%)	0.490
Horizontal validation criteria: minimum distance (mm)	0.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	0.000000

E. Z Axis Scan

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00
SAR (W/Kg)	3.948	2.037	0.915	0.361	0.135	0.055	0.033	0.037	0.059



F. 3D Image



ANNEX C Test Data

1-Body/Limb with Back position in dist. 0mm on Channel 975 in GPRS900+4slots

SAR Measurement at GPRS900 (Body, Validation Plane)

Date of measurement: 8/5/2023

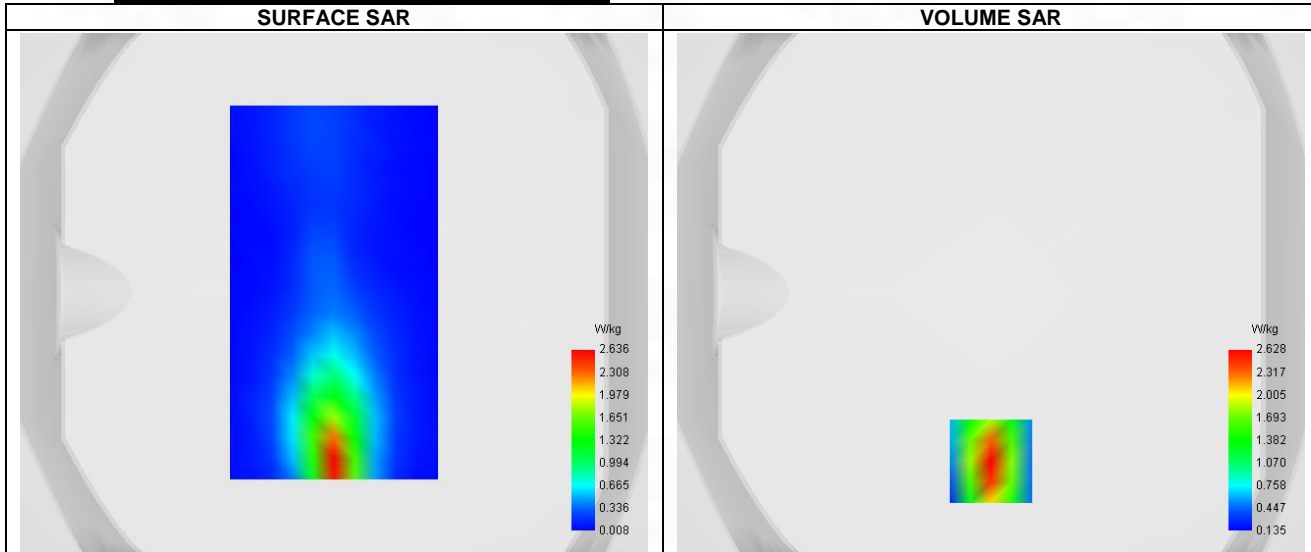
A. Experimental conditions.

Probe	SN 04/22 EPG0365
ConvF	1.68
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	GPRS900
Channels	Lower (975)
Signal	TDMA (GPRS)
Modulation	GMSK (CS-1)
TX-slots	4

B. Permittivity

Frequency (MHz)	880.200
Relative permittivity (real part)	41.340
Relative permittivity (imaginary part)	19.560
Conductivity (S/m)	0.893

C. SAR Surface and Volume



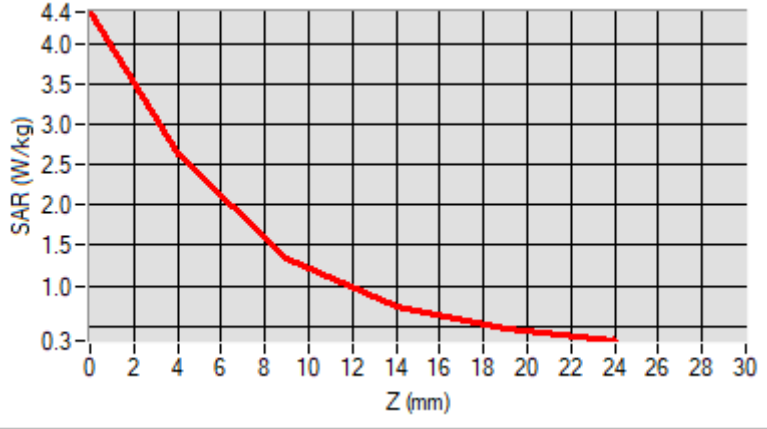
Maximum location: X=0.00, Y=-65.00 ; SAR Peak: 4.40 W/kg

D. SAR 1g & 10g

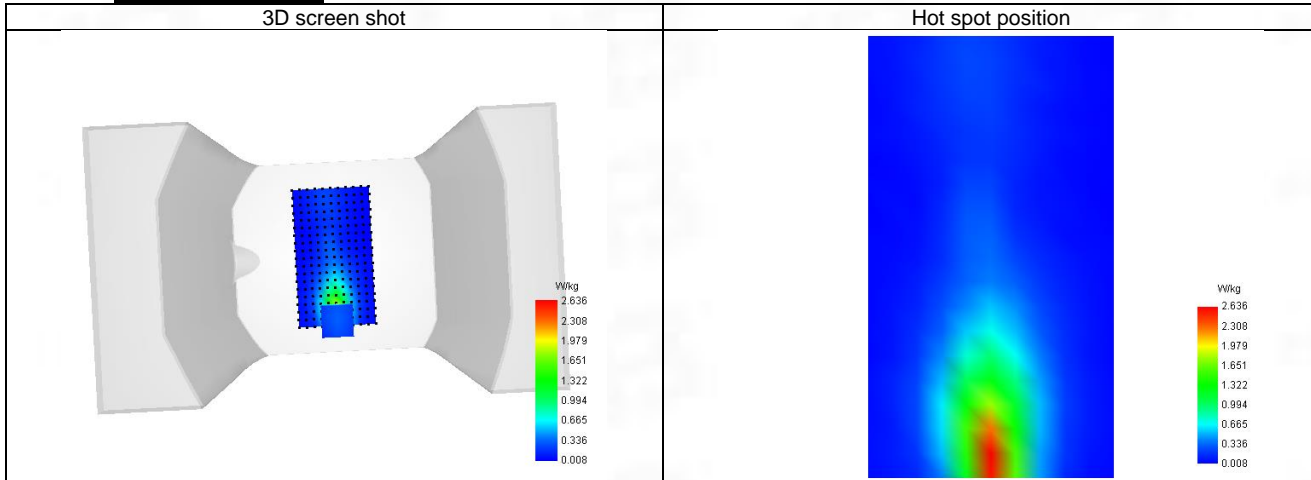
SAR 10g (W/Kg)	0.561
SAR 1g (W/Kg)	1.819
Variation (%)	-0.020
Horizontal validation criteria: minimum distance (mm)	0.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	0.000000

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	4.392	2.628	1.351	0.731	0.460



F. 3D Image



2-Body/Limb with Back position in dist. 0mm on Channel 885 in GPRS1800+4slots

SAR Measurement at GPRS1800 (Body, Validation Plane)

Date of measurement: 9/5/2023

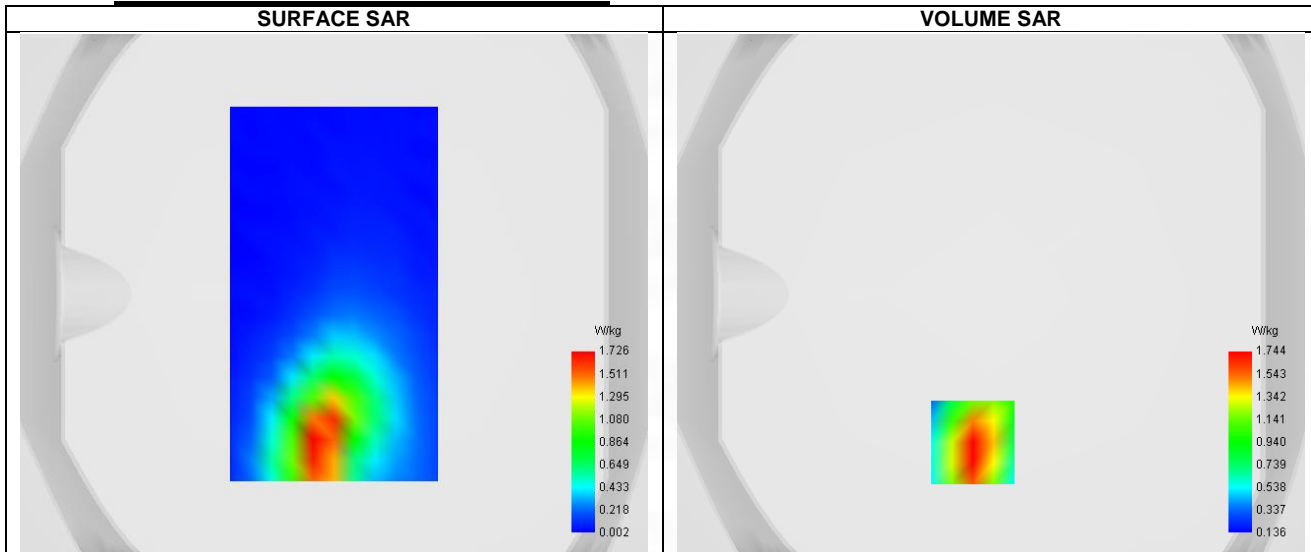
A. Experimental conditions.

Probe	SN 04/22 EPG0365
ConvF	1.96
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	GPRS1800
Channels	Higher (885)
Signal	TDMA (GPRS)
Modulation	GMSK (CS-1)
TX-slots	4

B. Permittivity

Frequency (MHz)	1784.800
Relative permittivity (real part)	39.934
Relative permittivity (imaginary part)	14.066
Conductivity (S/m)	1.362

C. SAR Surface and Volume



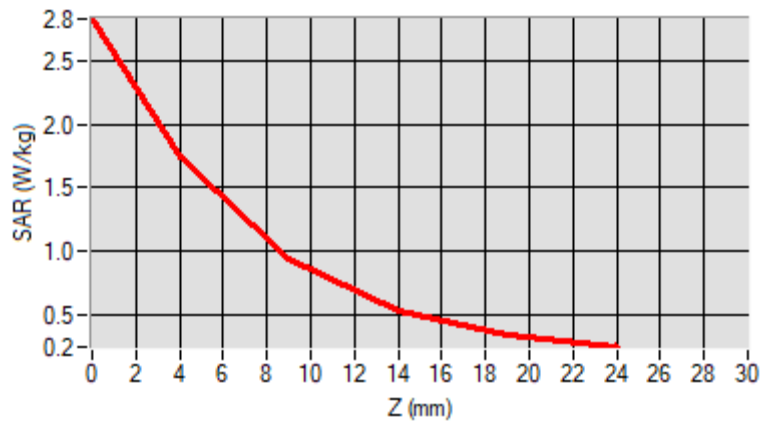
Maximum location: X=-7.00, Y=-57.00 ; SAR Peak: 2.87 W/kg

D. SAR 1g & 10g

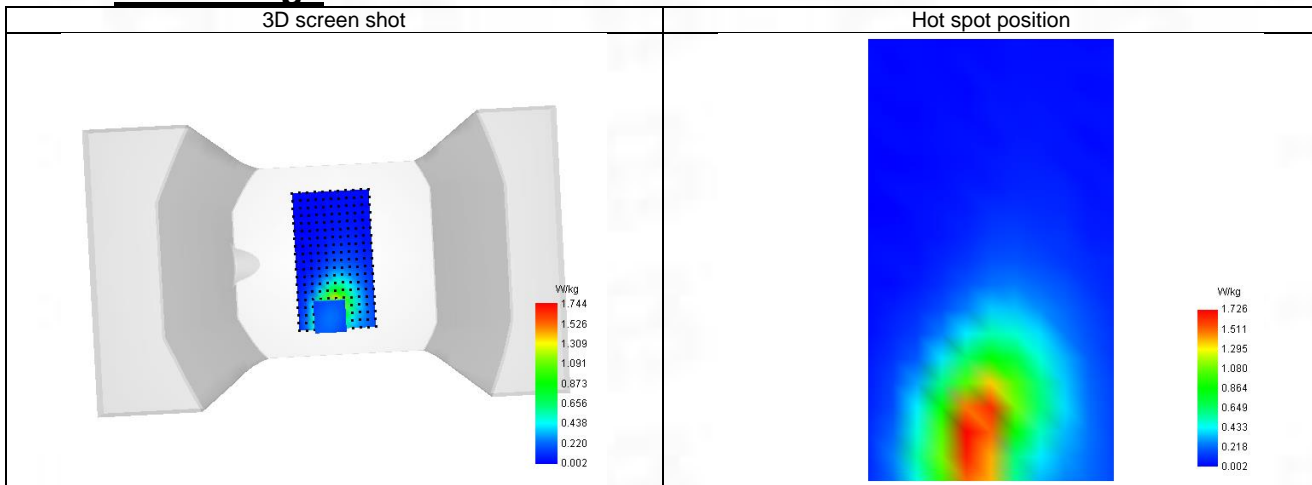
SAR 10g (W/Kg)	0.424
SAR 1g (W/Kg)	1.054
Variation (%)	-1.230
Horizontal validation criteria: minimum distance (mm)	0.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	0.000000

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	2.828	1.744	0.939	0.533	0.345



F. 3D Image



3-Body/Limb with Back position in dist. 0mm on Channel 9888 in WCDMA Band 1

SAR Measurement at Band 1 (UMTS) (Body, Validation Plane)

Date of measurement: 9/5/2023

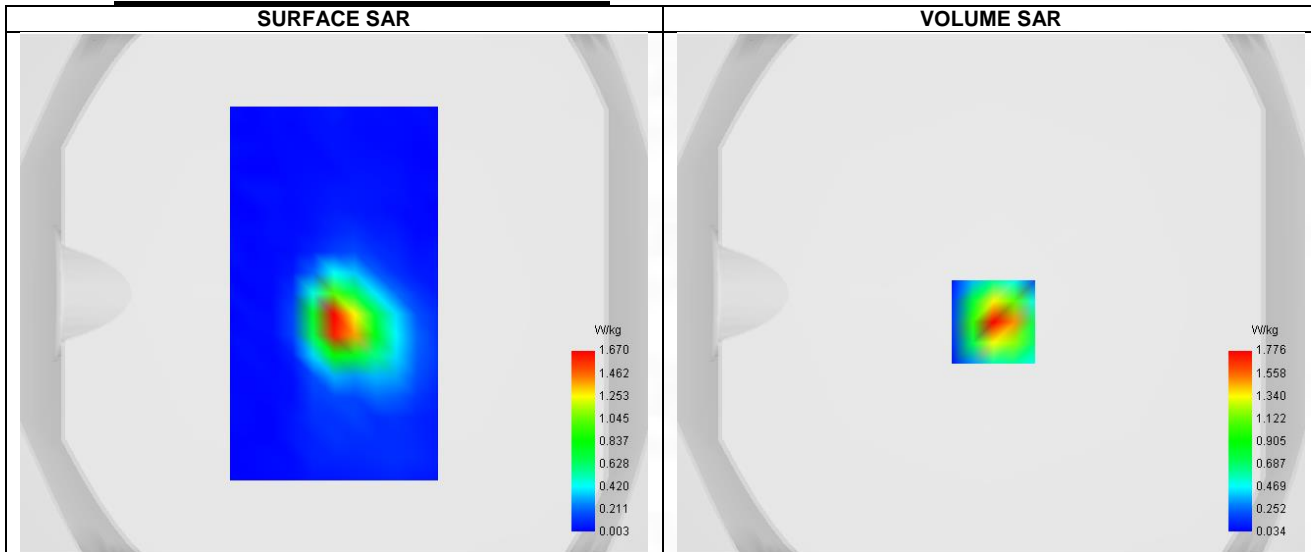
A. Experimental conditions.

Probe	SN 04/22 EPG0365
ConvF	2.33
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	Band 1 (UMTS)
Channels	Higher (9888)
Signal	WCDMA
Mode	Release 99
Connection Type	RMC, 12.2 kbps

B. Permittivity

Frequency (MHz)	1977.600
Relative permittivity (real part)	39.767
Relative permittivity (imaginary part)	13.493
Conductivity (S/m)	1.466

C. SAR Surface and Volume

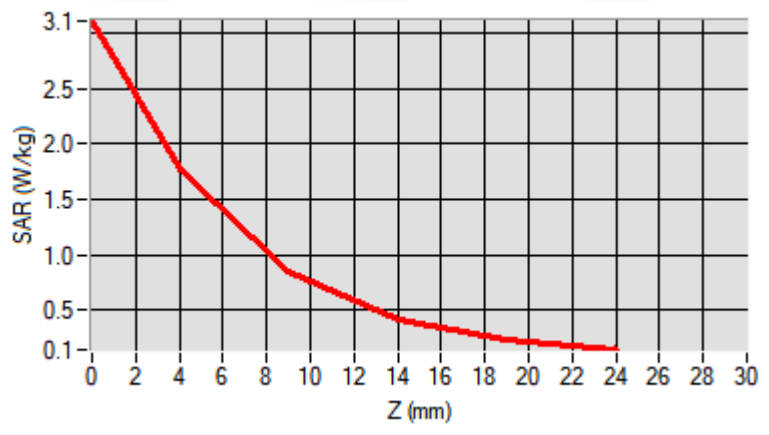


D. SAR 1g & 10g

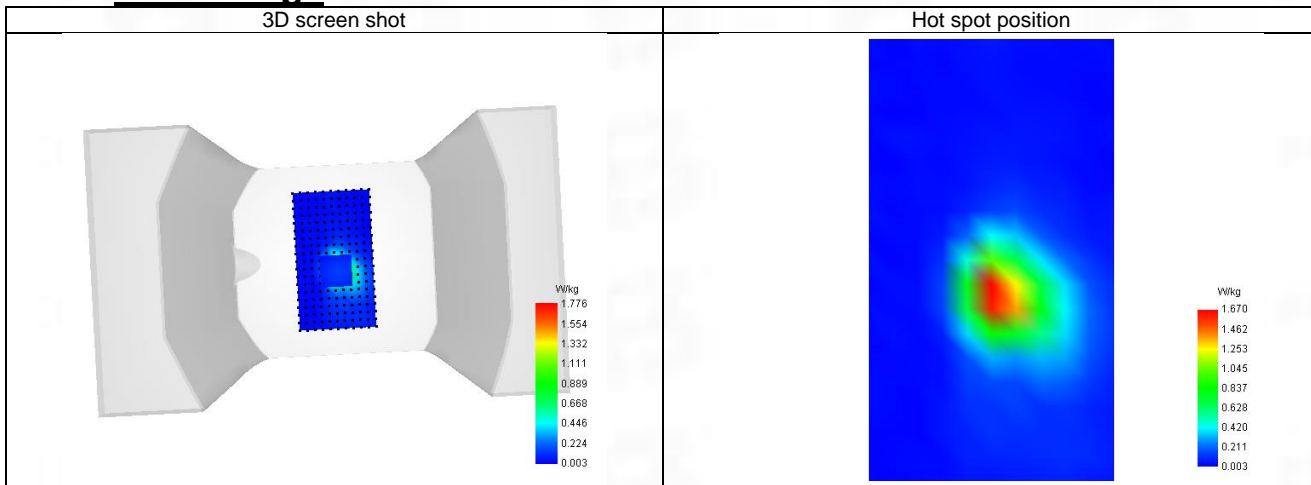
SAR 10g (W/Kg)	0.738
SAR 1g (W/Kg)	1.636
Variation (%)	-1.030
Horizontal validation criteria: minimum distance (mm)	0.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	0.000000

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	3.108	1.776	0.841	0.409	0.231



F. 3D Image



4-Body/Limb with Back position in dist. 0mm on Channel 2788 in WCDMA Band 8

SAR Measurement at Band 8 (900) (Body, Validation Plane)

Date of measurement: 8/5/2023

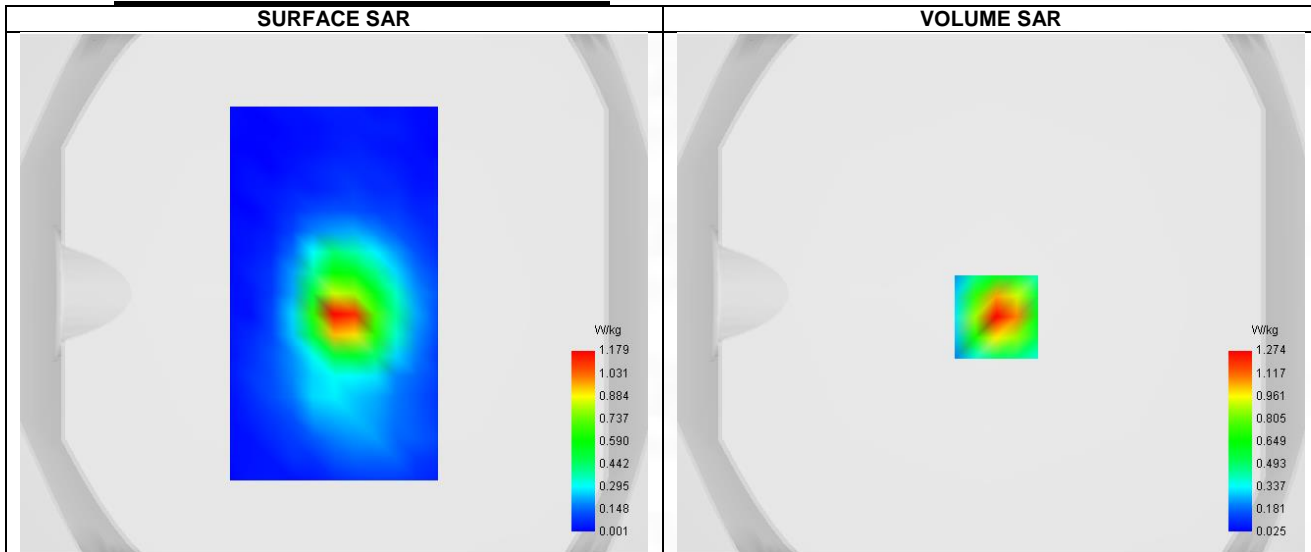
A. Experimental conditions.

Probe	SN 04/22 EPG0365
ConvF	1.68
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	Band 8 (900)
Channels	Middle (2788)
Signal	WCDMA
Mode	Release 99
Connection Type	RMC, 12.2 kbps

B. Permittivity

Frequency (MHz)	897.600
Relative permittivity (real part)	41.313
Relative permittivity (imaginary part)	19.587
Conductivity (S/m)	0.902

C. SAR Surface and Volume



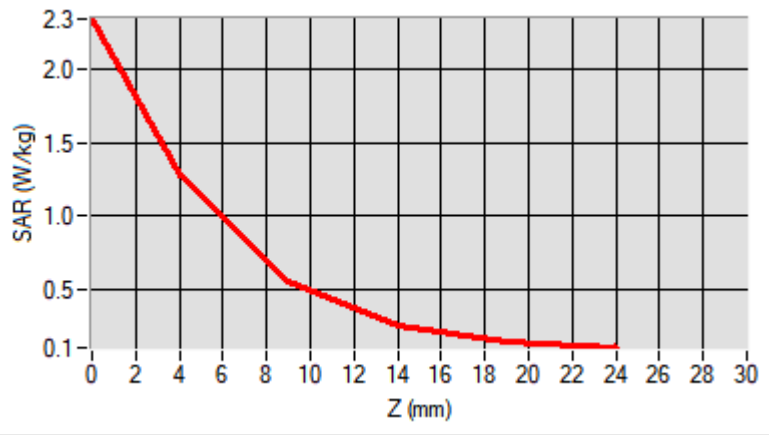
Maximum location: X=2.00, Y=-9.00 ; SAR Peak: 2.35 W/kg

D. SAR 1g & 10g

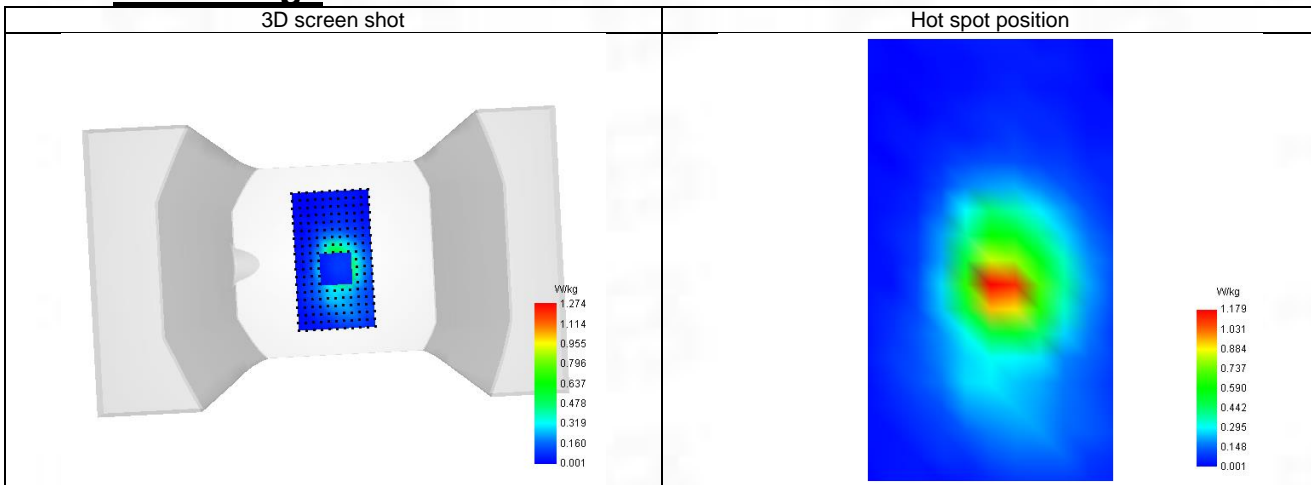
SAR 10g (W/Kg)	0.559
SAR 1g (W/Kg)	1.188
Variation (%)	-2.800
Horizontal validation criteria: minimum distance (mm)	0.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	0.000000

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	2.345	1.274	0.558	0.254	0.145



F. 3D Image



5-Body/Limb with Back position in dist. 0mm on Channel 18100 in LTE Band 1

SAR Measurement at LTE band 1 (Body, Validation Plane)

Date of measurement: 9/5/2023

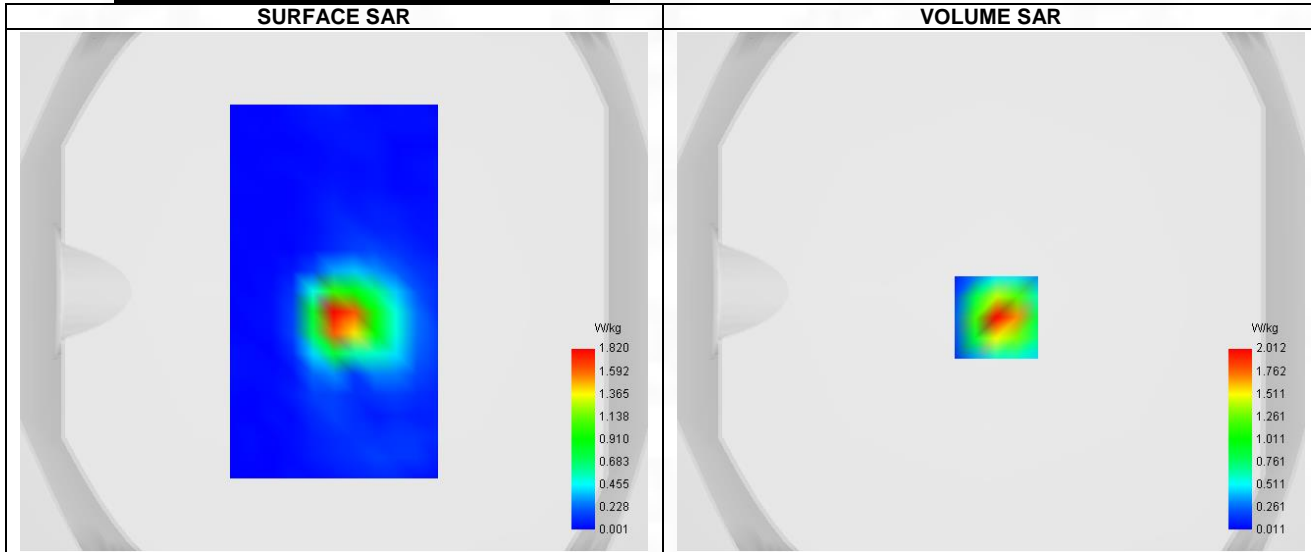
A. Experimental conditions.

Probe	SN 04/22 EPG0365
ConvF	2.24
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 1
Channels	Lower (18100)
Signal	LTE FDD
Cell Bandwidth	20 Mhz
Modulation	SC-OFDM - QPSK
RB offset	0
RB size	1

B. Permittivity

Frequency (MHz)	1921.090
Relative permittivity (real part)	39.849
Relative permittivity (imaginary part)	13.411
Conductivity (S/m)	1.425

C. SAR Surface and Volume



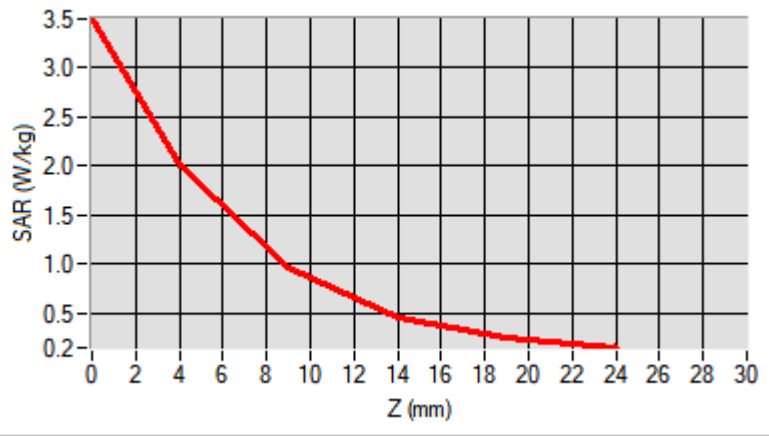
Maximum location: X=2.00, Y=-10.00 ; SAR Peak: 3.55 W/kg

D. SAR 1g & 10g

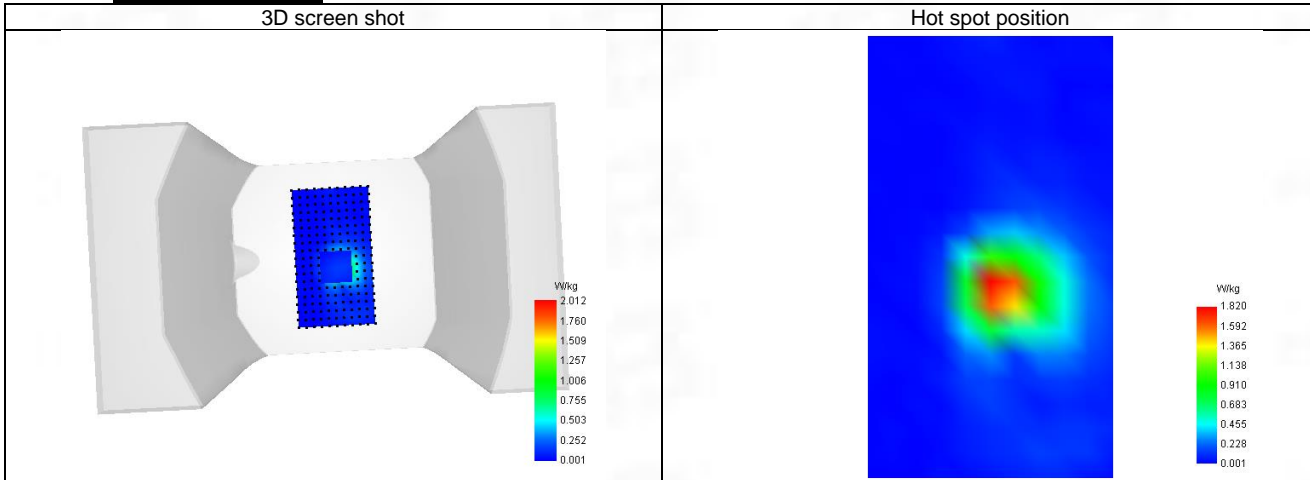
SAR 10g (W/Kg)	0.824
SAR 1g (W/Kg)	1.836
Variation (%)	-0.700
Horizontal validation criteria: minimum distance (mm)	0.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	0.000000

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	3.490	2.012	0.964	0.470	0.260



F. 3D Image



6-Body/Limb with Back position in dist. 0mm on Channel 19300 in LTE Band 3

SAR Measurement at LTE band 3 (Body, Validation Plane)

Date of measurement: 9/5/2023

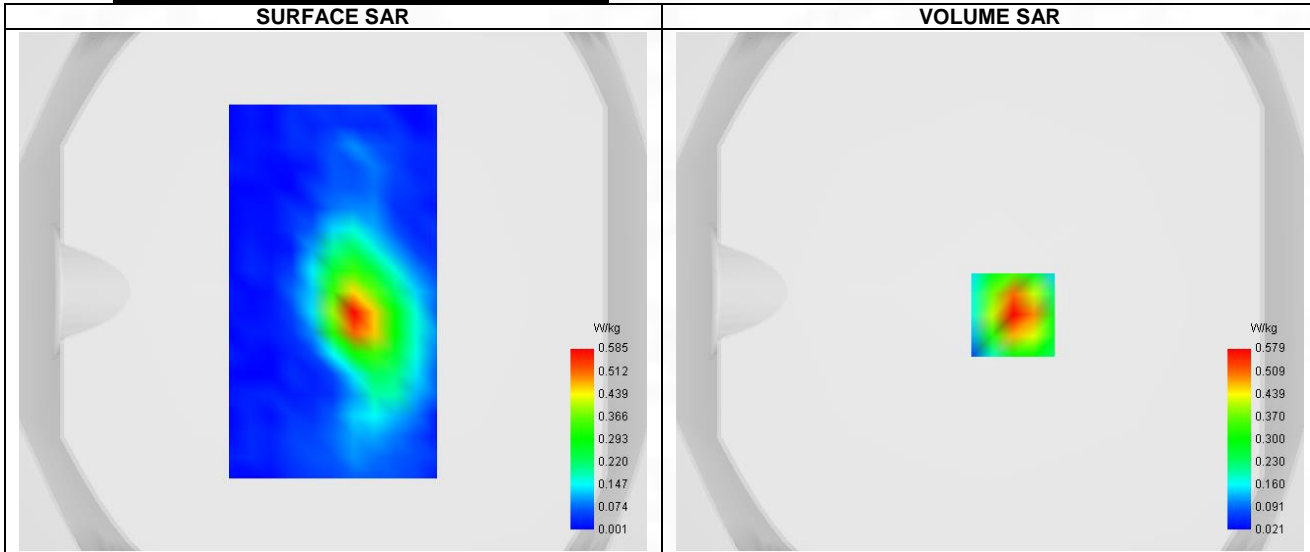
A. Experimental conditions.

Probe	SN 04/22 EPG0365
ConvF	1.96
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 3
Channels	Lower (19300)
Signal	LTE FDD
Cell Bandwidth	20 Mhz
Modulation	SC-OFDM - QPSK
RB offset	0
RB size	1

B. Permittivity

Frequency (MHz)	1711.090
Relative permittivity (real part)	40.048
Relative permittivity (imaginary part)	13.952
Conductivity (S/m)	1.324

C. SAR Surface and Volume

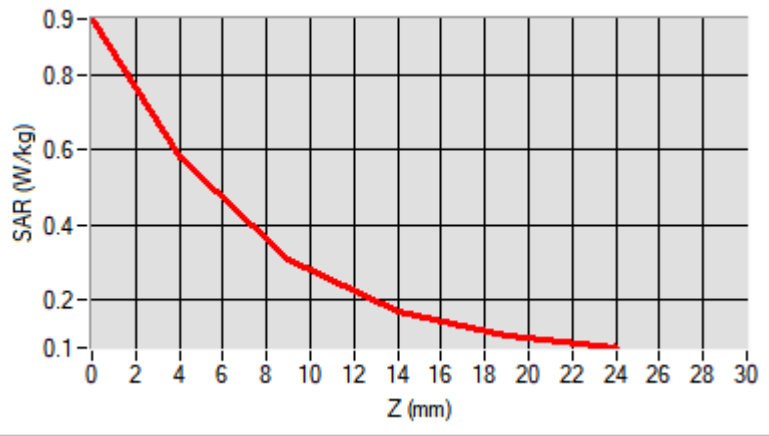


D. SAR 1g & 10g

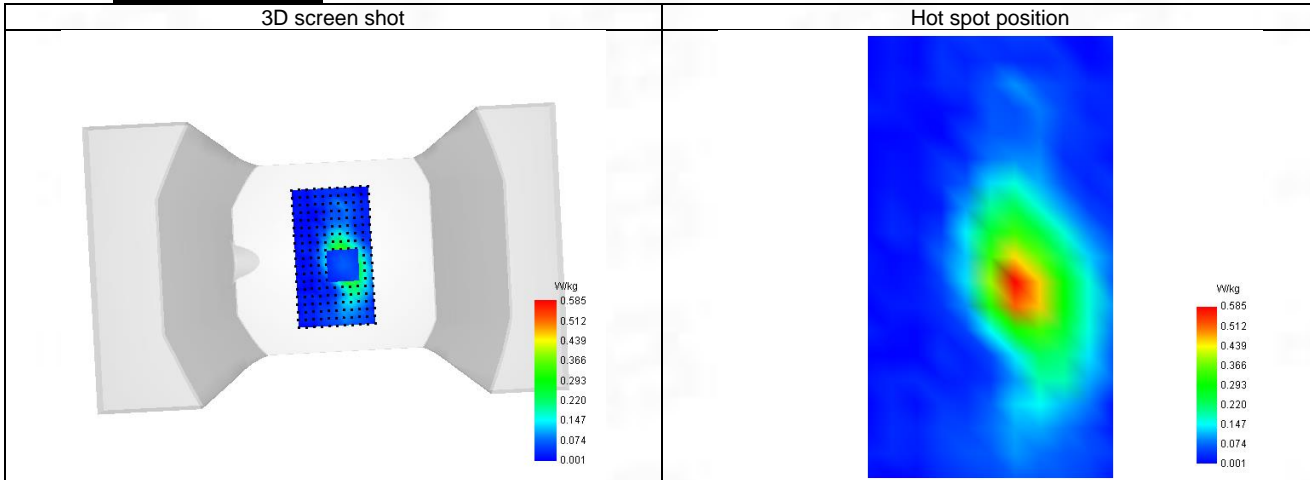
SAR 10g (W/Kg)	0.281
SAR 1g (W/Kg)	0.540
Variation (%)	-4.120
Horizontal validation criteria: minimum distance (mm)	0.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	0.000000

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.950	0.579	0.305	0.168	0.105



F. 3D Image



7-Body/Limb with Back position in dist. 0mm on Channel 20850 in LTE Band 7

SAR Measurement at LTE band 7 (Body, Validation Plane)

Date of measurement: 10/5/2023

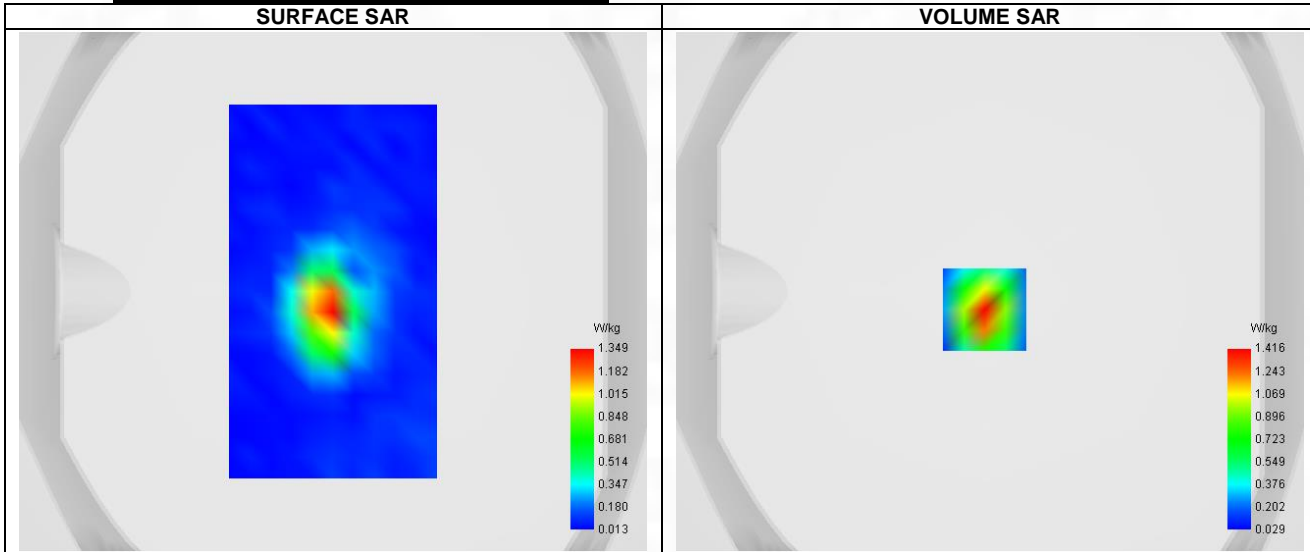
A. Experimental conditions.

Probe	SN 04/22 EPG0365
ConvF	2.36
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 7
Channels	Lower (20850)
Signal	LTE FDD
Cell Bandwidth	20 Mhz
Modulation	SC-OFDM - QPSK
RB offset	0
RB size	1

B. Permittivity

Frequency (MHz)	2501.090
Relative permittivity (real part)	39.012
Relative permittivity (imaginary part)	13.119
Conductivity (S/m)	1.864

C. SAR Surface and Volume



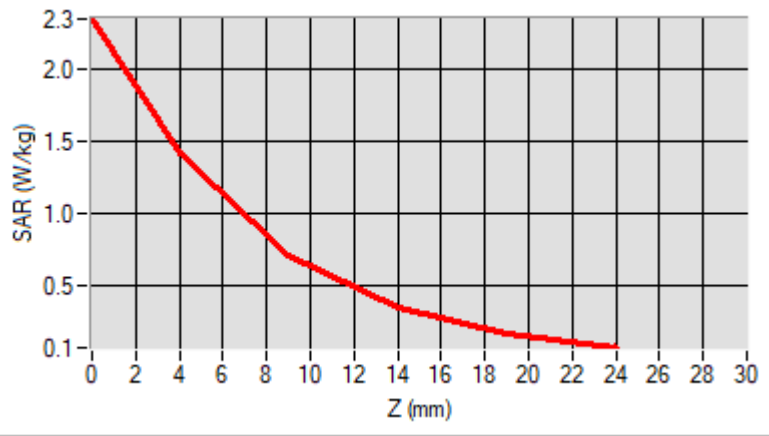
Maximum location: X=-2.00, Y=-7.00 ; SAR Peak: 2.35 W/kg

D. SAR 1g & 10g

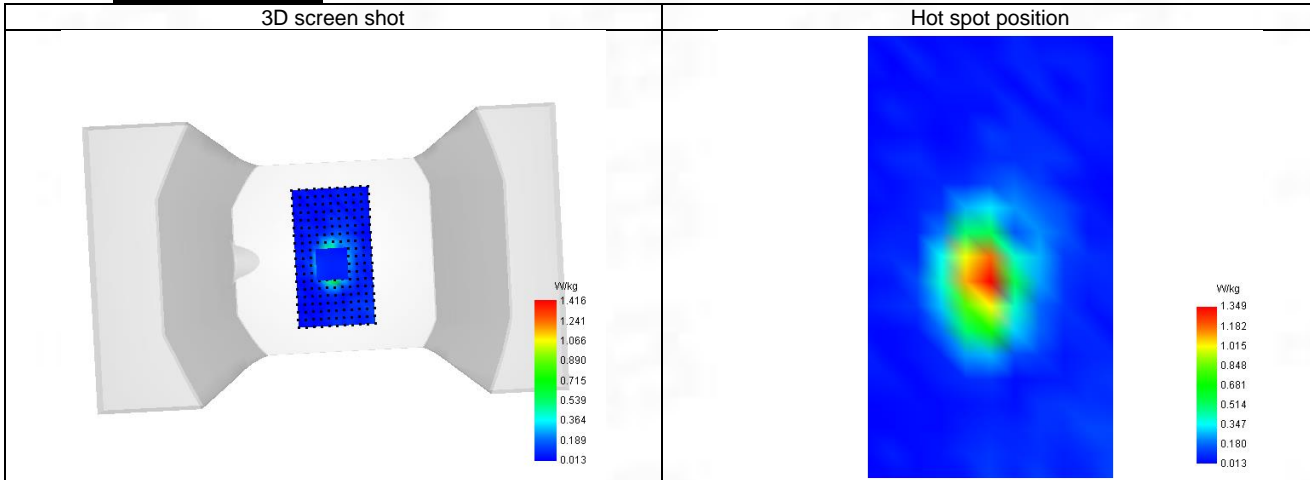
SAR 10g (W/Kg)	0.586
SAR 1g (W/Kg)	1.277
Variation (%)	2.120
Horizontal validation criteria: minimum distance (mm)	0.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	0.000000

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	2.342	1.416	0.717	0.350	0.171



F. 3D Image



8-Body/Limb with Back position in dist. 0mm on Channel 21500 in LTE Band 8

SAR Measurement at LTE band 8 (Body, Validation Plane)

Date of measurement: 8/5/2023

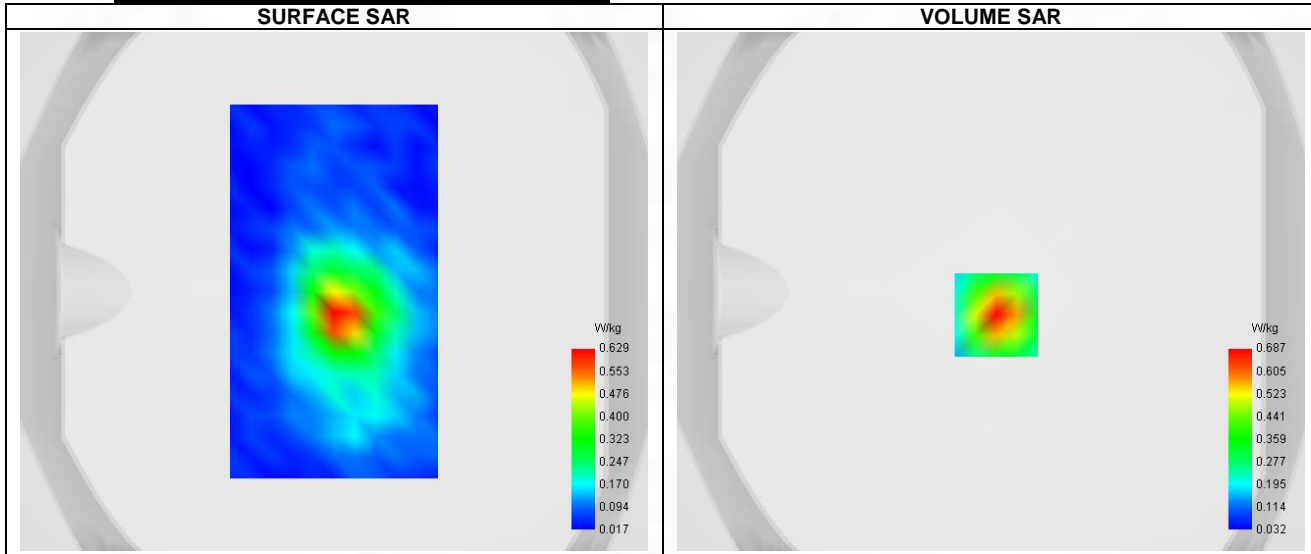
A. Experimental conditions.

Probe	SN 04/22 EPG0365
ConvF	1.68
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 8
Channels	Lower (21500)
Signal	LTE FDD
Cell Bandwidth	10 Mhz
Modulation	SC-OFDM - QPSK
RB offset	0
RB size	1

B. Permittivity

Frequency (MHz)	880.590
Relative permittivity (real part)	41.339
Relative permittivity (imaginary part)	19.561
Conductivity (S/m)	0.894

C. SAR Surface and Volume



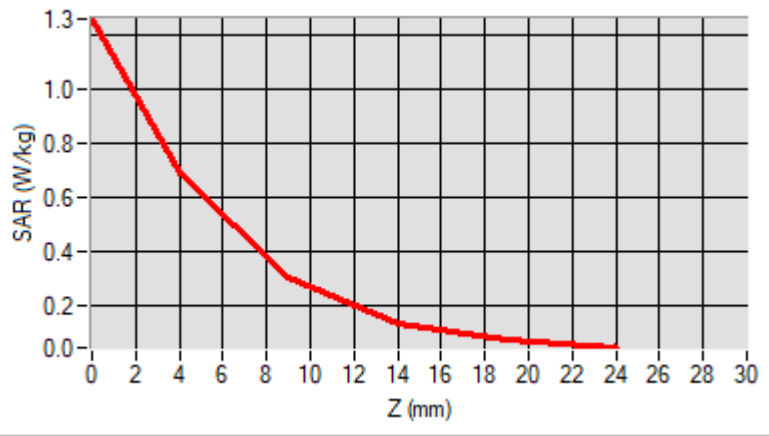
Maximum location: X=2.00, Y=-9.00 ; SAR Peak: 1.26 W/kg

D. SAR 1g & 10g

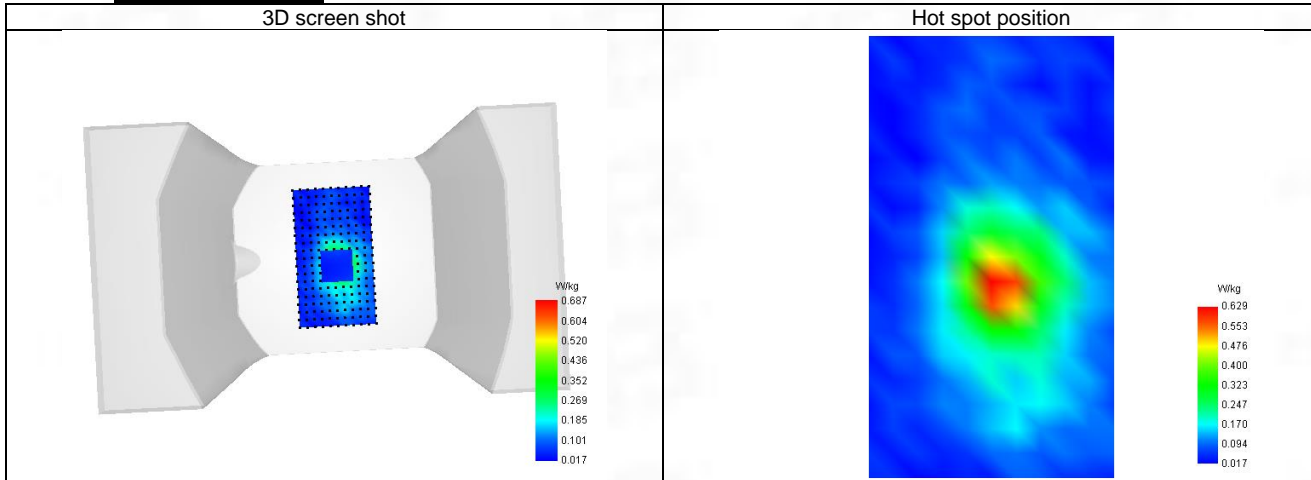
SAR 10g (W/Kg)	0.308
SAR 1g (W/Kg)	0.639
Variation (%)	-1.970
Horizontal validation criteria: minimum distance (mm)	0.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	0.000000

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.263	0.687	0.300	0.132	0.069



F. 3D Image



9-Body/Limb with Back position in dist. 0mm on Channel 24300 in LTE Band 20

SAR Measurement at LTE band 20 (Body, Validation Plane)

Date of measurement: 8/5/2023

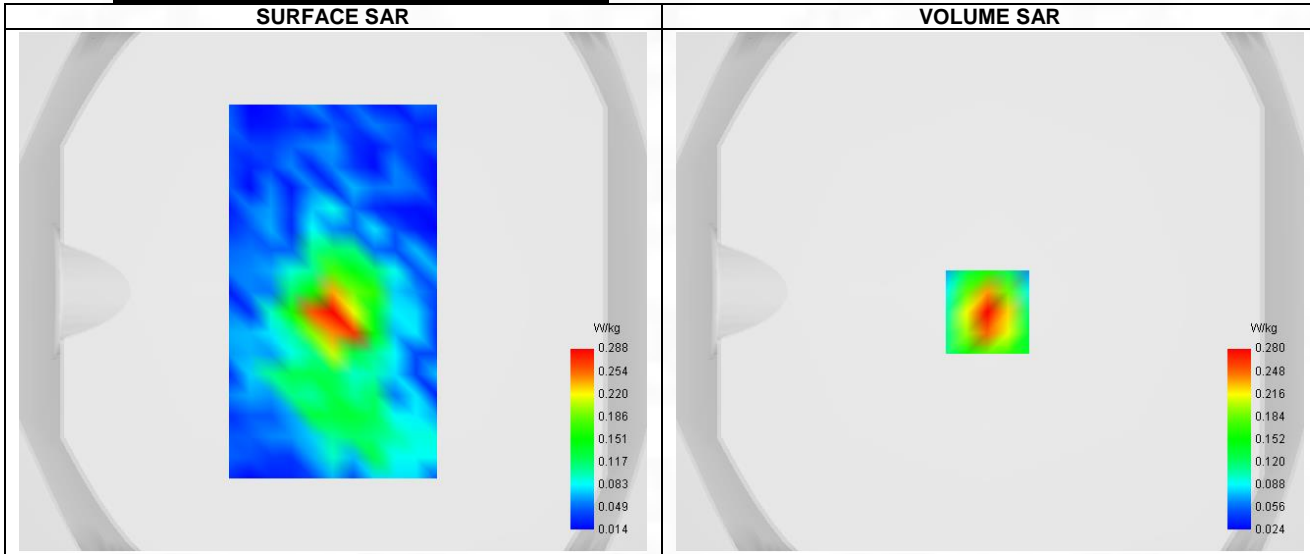
A. Experimental conditions.

Probe	SN 04/22 EPG0365
ConvF	1.68
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 20
Channels	Middle (24300)
Signal	LTE FDD
Cell Bandwidth	20 Mhz
Modulation	SC-OFDM - QPSK
RB offset	0
RB size	1

B. Permittivity

Frequency (MHz)	838.090
Relative permittivity (real part)	41.405
Relative permittivity (imaginary part)	19.495
Conductivity (S/m)	0.872

C. SAR Surface and Volume

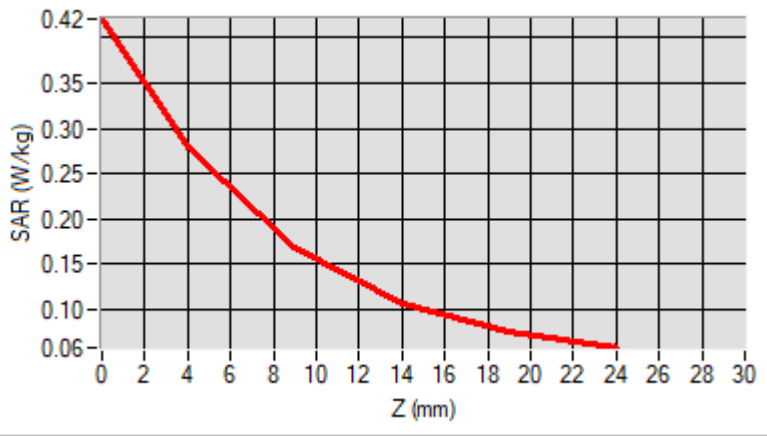


D. SAR 1g & 10g

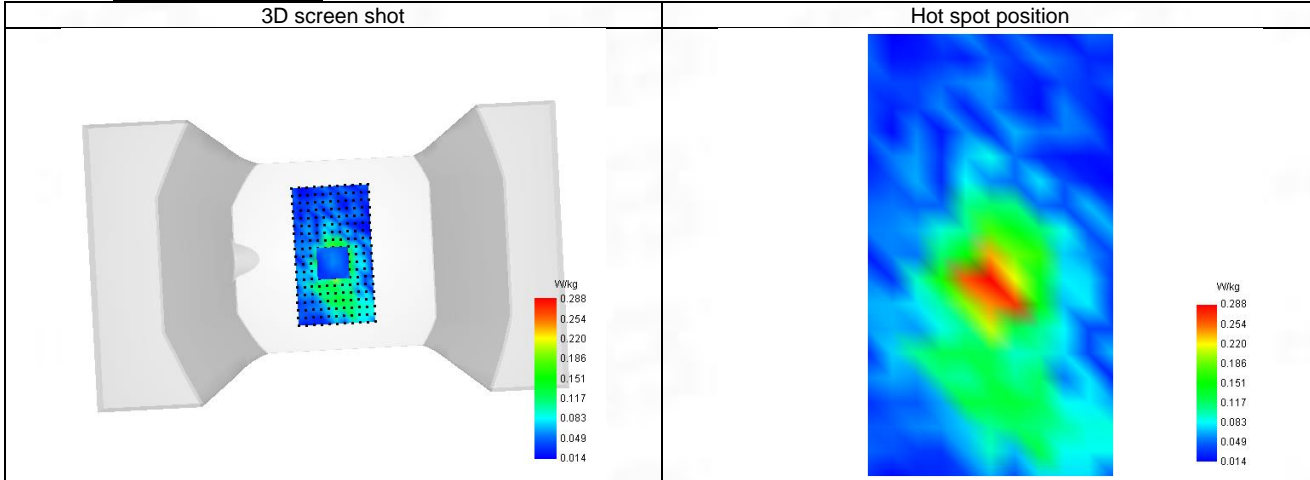
SAR 10g (W/Kg)	0.147
SAR 1g (W/Kg)	0.260
Variation (%)	4.670
Horizontal validation criteria: minimum distance (mm)	0.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	0.000000

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.421	0.280	0.168	0.108	0.077



F. 3D Image



10-Body/Limb with Back position in dist. 0mm on Channel 27560 in LTE Band 28

SAR Measurement at LTE band 28 (Body, Validation Plane)

Date of measurement: 8/5/2023

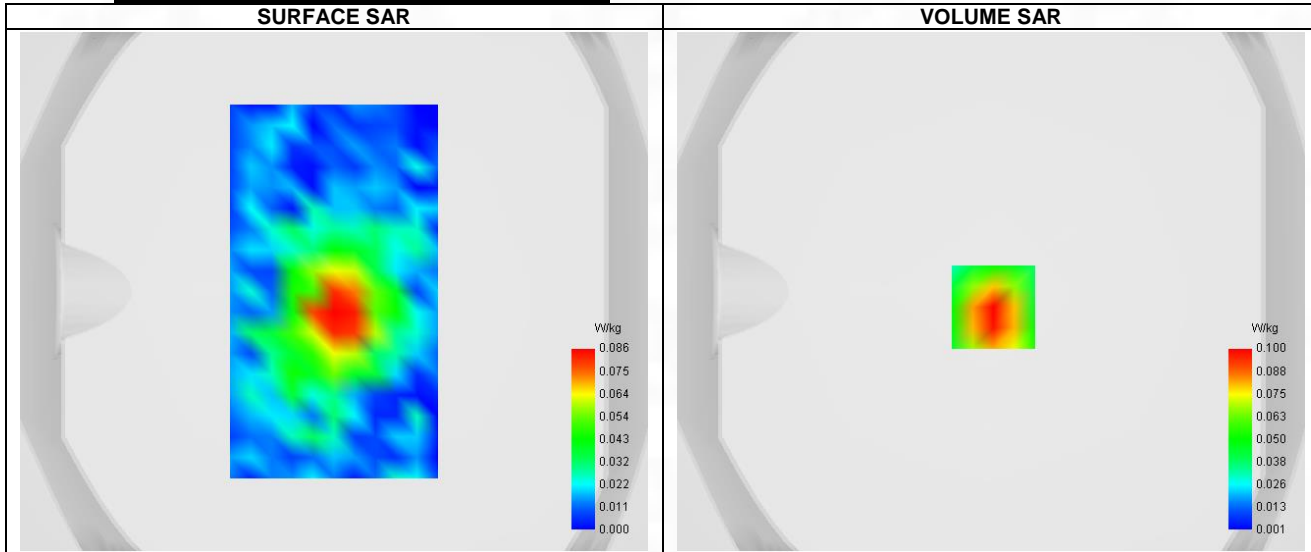
A. Experimental conditions.

Probe	SN 04/22 EPG0365
ConvF	1.65
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 28
Channels	Higher (27560)
Signal	LTE FDD
Cell Bandwidth	20 Mhz
Modulation	SC-OFDM - QPSK
RB offset	0
RB size	1

B. Permittivity

Frequency (MHz)	729.090
Relative permittivity (real part)	41.575
Relative permittivity (imaginary part)	19.325
Conductivity (S/m)	0.815

C. SAR Surface and Volume



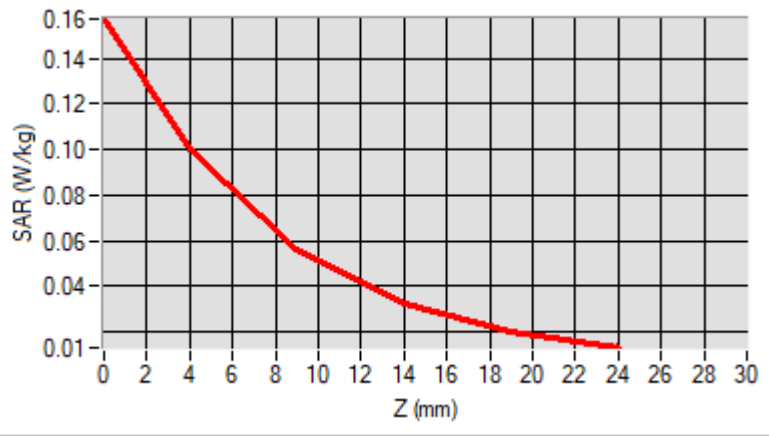
Maximum location: X=1.00, Y=-6.00 ; SAR Peak: 0.17 W/kg

D. SAR 1g & 10g

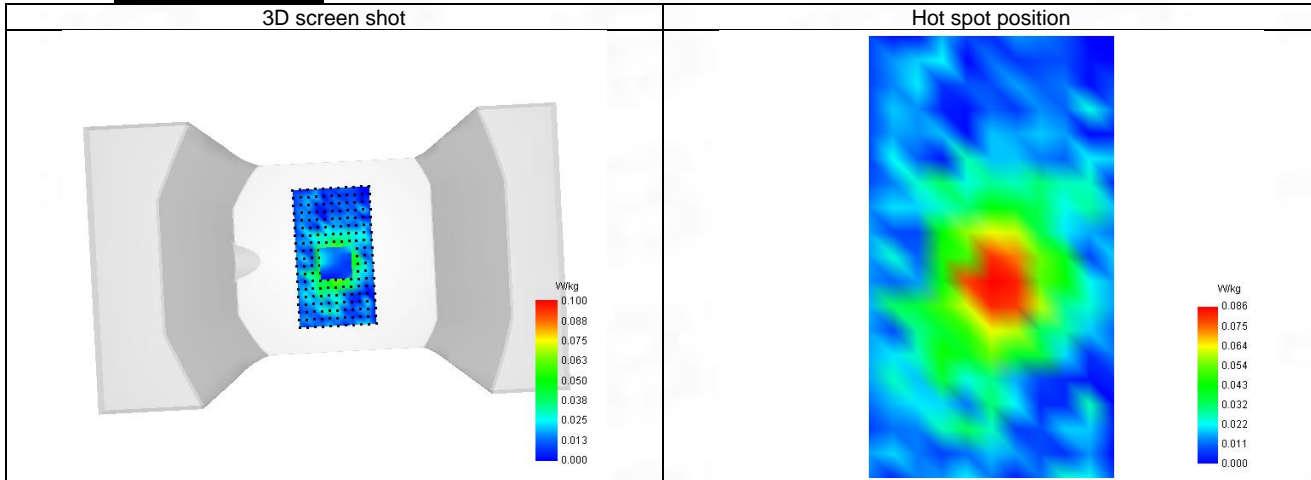
SAR 10g (W/Kg)	0.054
SAR 1g (W/Kg)	0.097
Variation (%)	-1.190
Horizontal validation criteria: minimum distance (mm)	0.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	0.000000

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.157	0.100	0.056	0.032	0.020



F. 3D Image



11-Body/Limb with Back position in dist. 0mm on Channel 37850 in LTE Band 38

SAR Measurement at LTE band 38 (Body, Validation Plane)

Date of measurement: 10/5/2023

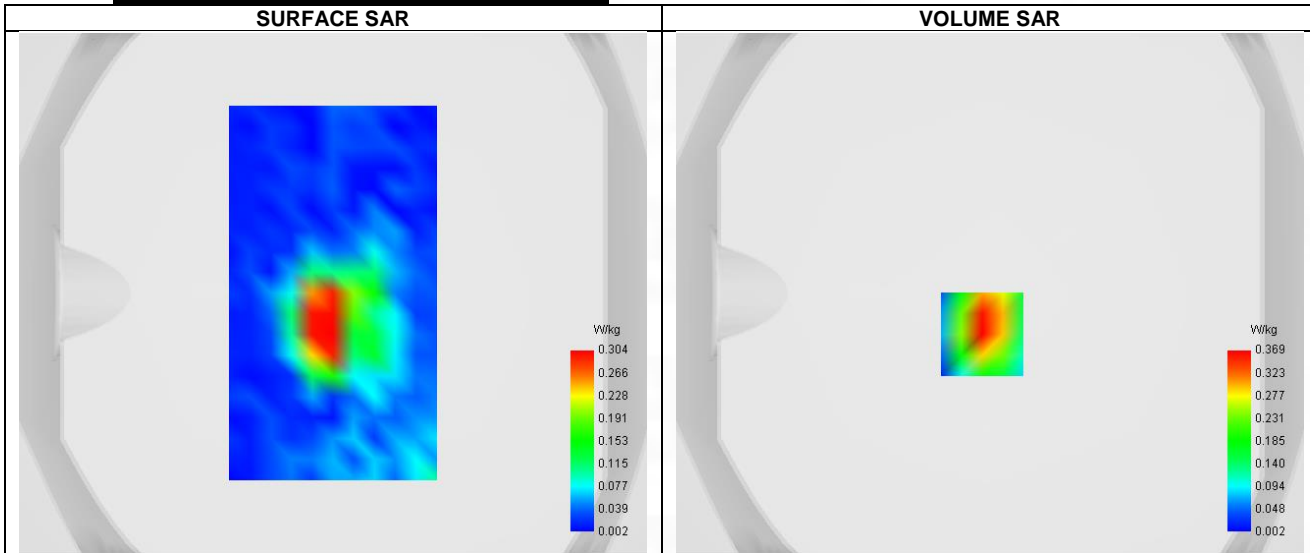
A. Experimental conditions.

Probe	SN 04/22 EPG0365
ConvF	2.40
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 38
Channels	Lower (37850)
Signal	LTE TDD
Cell Bandwidth	20 Mhz
Modulation	SC-OFDM - QPSK
RB offset	0
RB size	1
Subframe configuration	0
Special subframe configuration	0
Cyclic prefix	Normal
Duty Cycle (%)	0.61

B. Permittivity

Frequency (MHz)	2571.090
Relative permittivity (real part)	38.919
Relative permittivity (imaginary part)	12.815
Conductivity (S/m)	1.939

C. SAR Surface and Volume



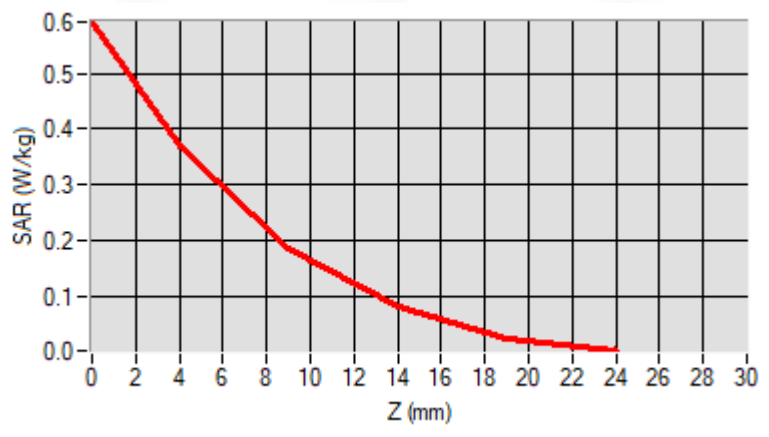
Maximum location: X=-3.00, Y=-16.00 ; SAR Peak: 0.63 W/kg

D. SAR 1g & 10g

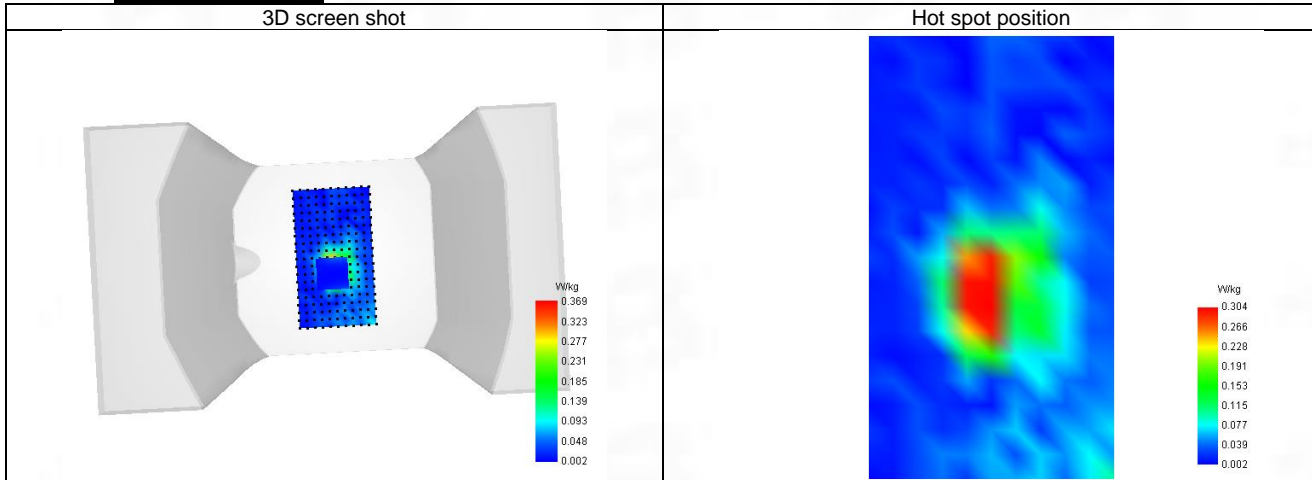
SAR 10g (W/Kg)	0.163
SAR 1g (W/Kg)	0.346
Variation (%)	-0.670
Horizontal validation criteria: minimum distance (mm)	0.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	0.000000

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.592	0.369	0.186	0.080	0.025



F. 3D Image



12-Body/Limb with Back position in dist. 0mm on Channel 39550 in LTE Band 40

SAR Measurement at LTE band 40 (Body, Validation Plane)

Date of measurement: 10/5/2023

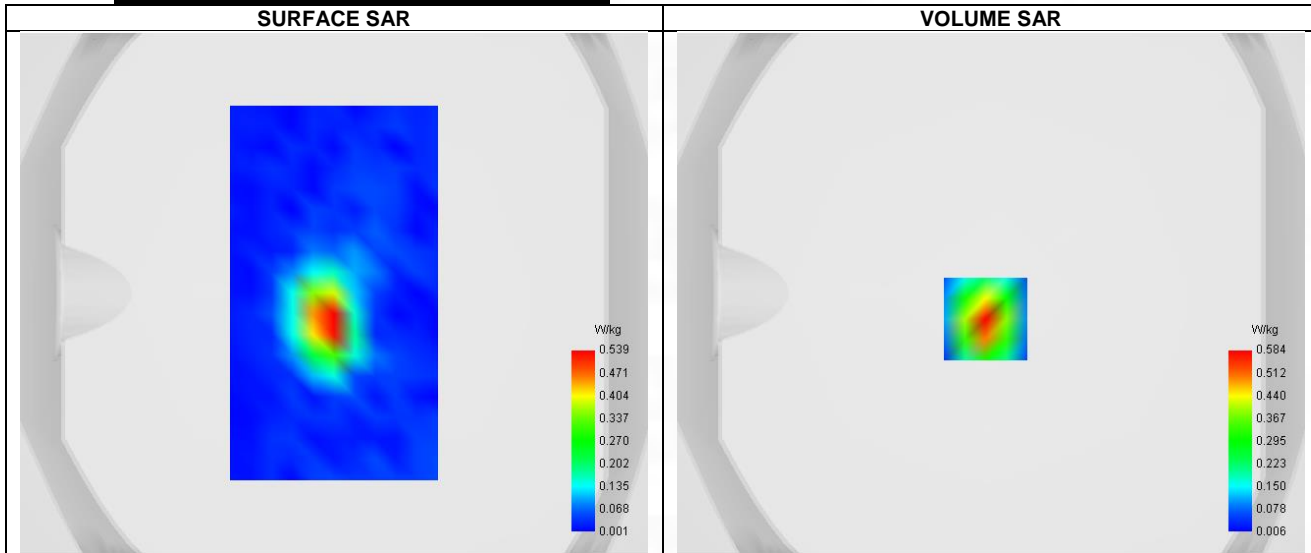
A. Experimental conditions.

Probe	SN 04/22 EPGO365
ConvF	2.36
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 40
Channels	Higher (39550)
Signal	LTE TDD
Cell Bandwidth	20 Mhz
Modulation	SC-OFDM - QPSK
RB offset	0
RB size	1
Subframe configuration	0
Special subframe configuration	0
Cyclic prefix	Normal
Duty Cycle (%)	0.61

B. Permittivity

Frequency (MHz)	2381.090
Relative permittivity (real part)	39.172
Relative permittivity (imaginary part)	13.639
Conductivity (S/m)	1.736

C. SAR Surface and Volume



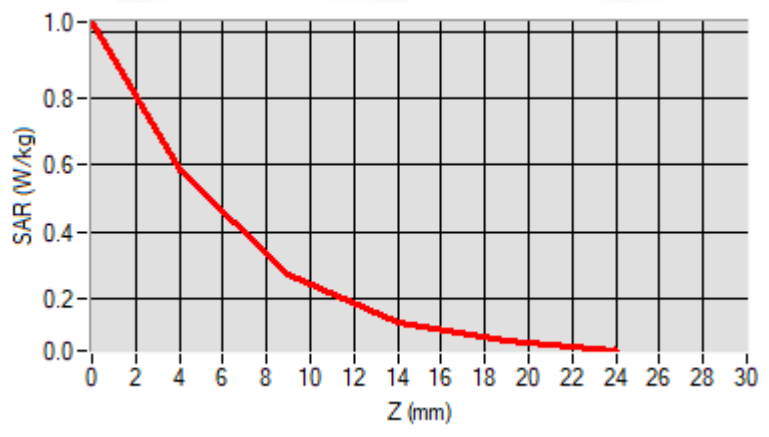
Maximum location: X=-2.00, Y=-10.00 ; SAR Peak: 1.03 W/kg

D. SAR 1g & 10g

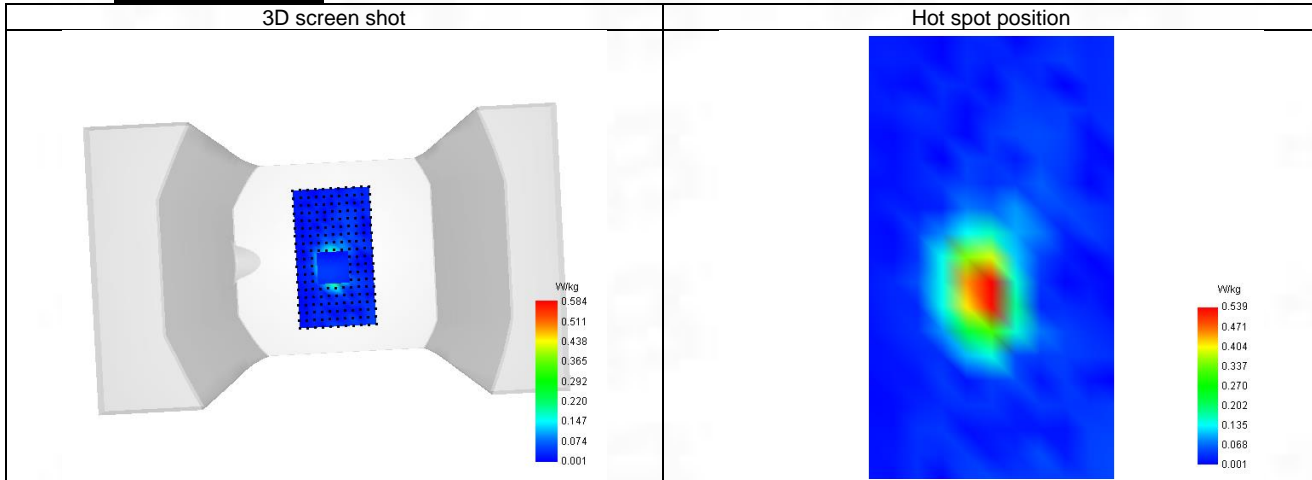
SAR 10g (W/Kg)	0.242
SAR 1g (W/Kg)	0.530
Variation (%)	2.040
Horizontal validation criteria: minimum distance (mm)	0.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	0.000000

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.028	0.584	0.274	0.131	0.073



F. 3D Image



13-Body/Limb with Back position in dist. 0mm on Channel 13 in IEEE 802.11b ISM

SAR Measurement at IEEE 802.11b ISM (Body, Validation Plane)

Date of measurement: 10/5/2023

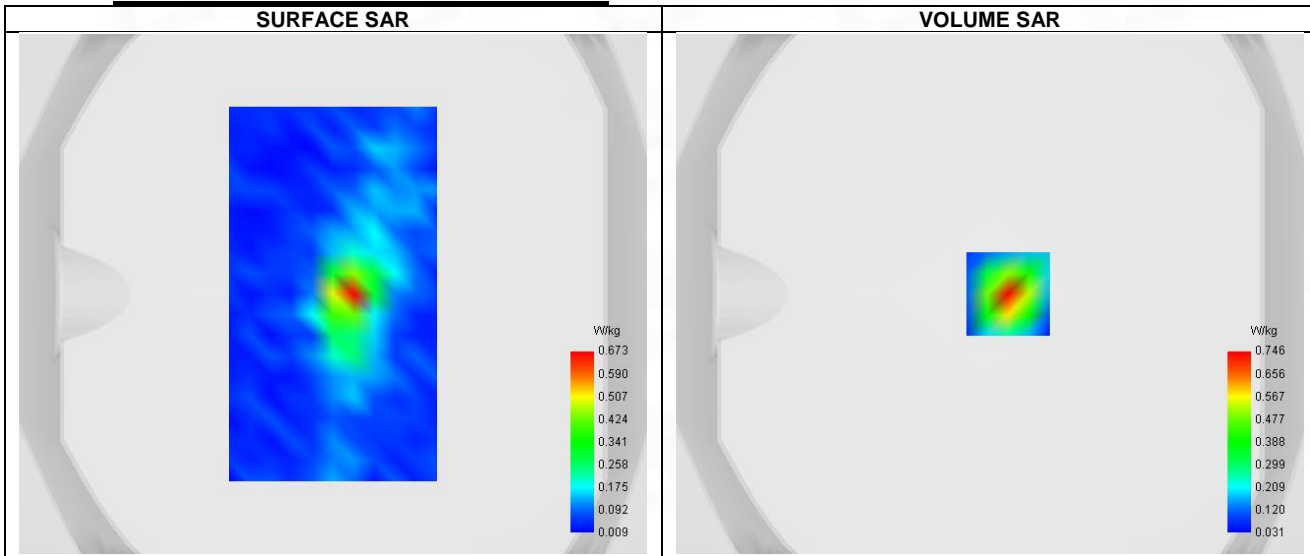
A. Experimental conditions.

Probe	SN 04/22 EPGO365
ConvF	2.36
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	IEEE 802.11b ISM
Channels	Higher (13)
Signal	IEEE 802.11

B. Permittivity

Frequency (MHz)	2472.000
Relative permittivity (real part)	39.051
Relative permittivity (imaginary part)	13.245
Conductivity (S/m)	1.833

C. SAR Surface and Volume



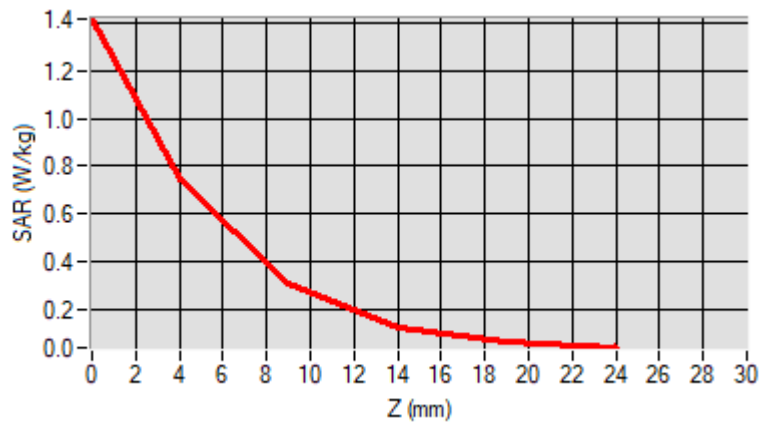
Maximum location: X=7.00, Y=0.00 ; SAR Peak: 1.41 W/kg

D. SAR 1g & 10g

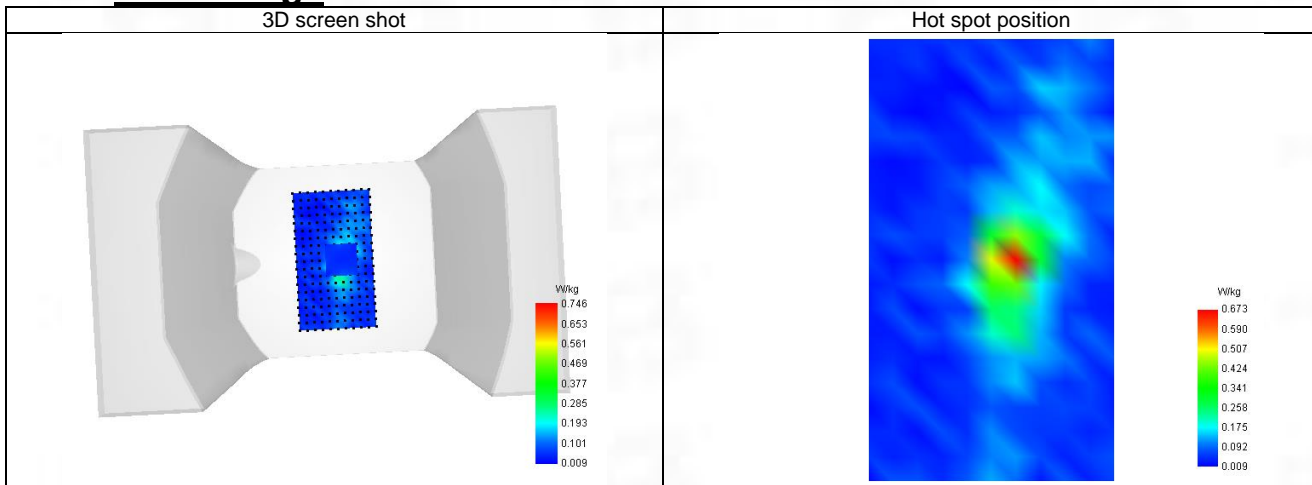
SAR 10g (W/Kg)	0.288
SAR 1g (W/Kg)	0.675
Variation (%)	-1.160
Horizontal validation criteria: minimum distance (mm)	0.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	0.000000

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.415	0.746	0.308	0.128	0.066



F. 3D Image



14-Body/Limb with Back position in dist. 0mm on Channel 46 in IEEE 802.11n U-NII

SAR Measurement at IEEE 802.11n U-NII (Body, Validation Plane)

Date of measurement: 10/5/2023

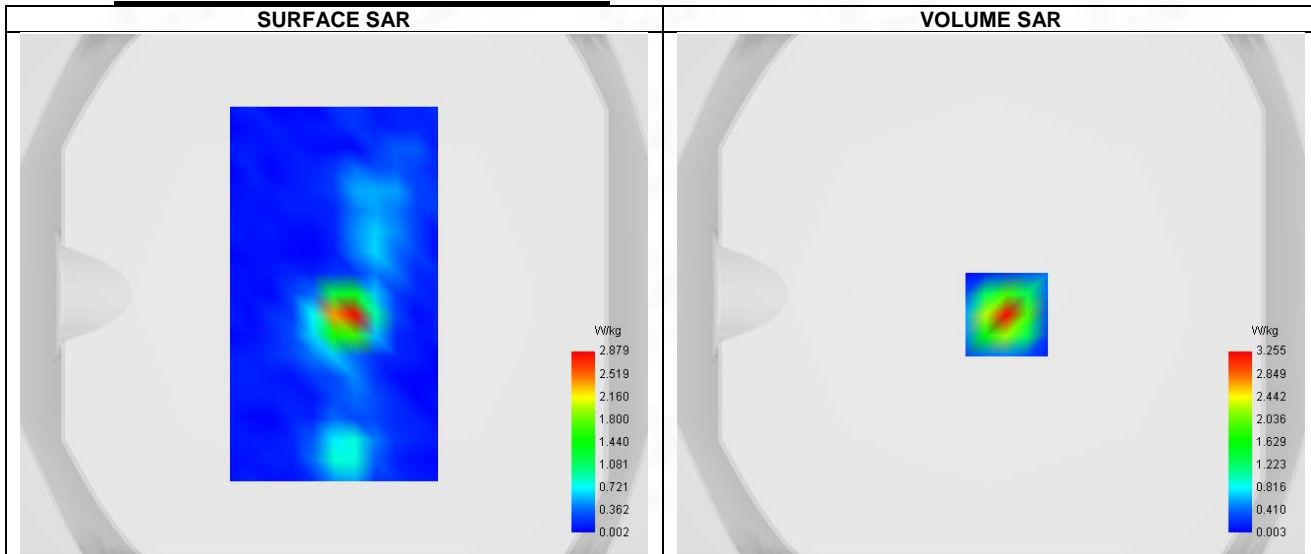
A. Experimental conditions.

Probe	SN 04/22 EPGO365
ConvF	2.24
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	IEEE 802.11n U-NII
Channels	Middle (46)
Signal	IEEE 802.11

B. Permittivity

Frequency (MHz)	5230.000
Relative permittivity (real part)	35.850
Relative permittivity (imaginary part)	16.280
Conductivity (S/m)	4.730

C. SAR Surface and Volume



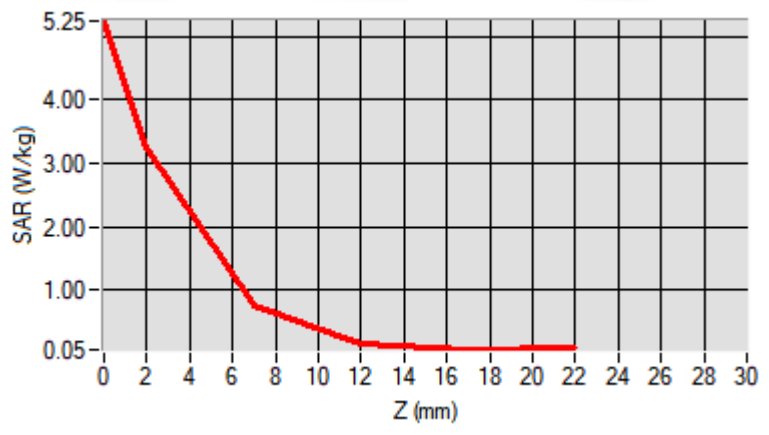
Maximum location: X=6.00, Y=-8.00 ; SAR Peak: 5.44 W/kg

D. SAR 1g & 10g

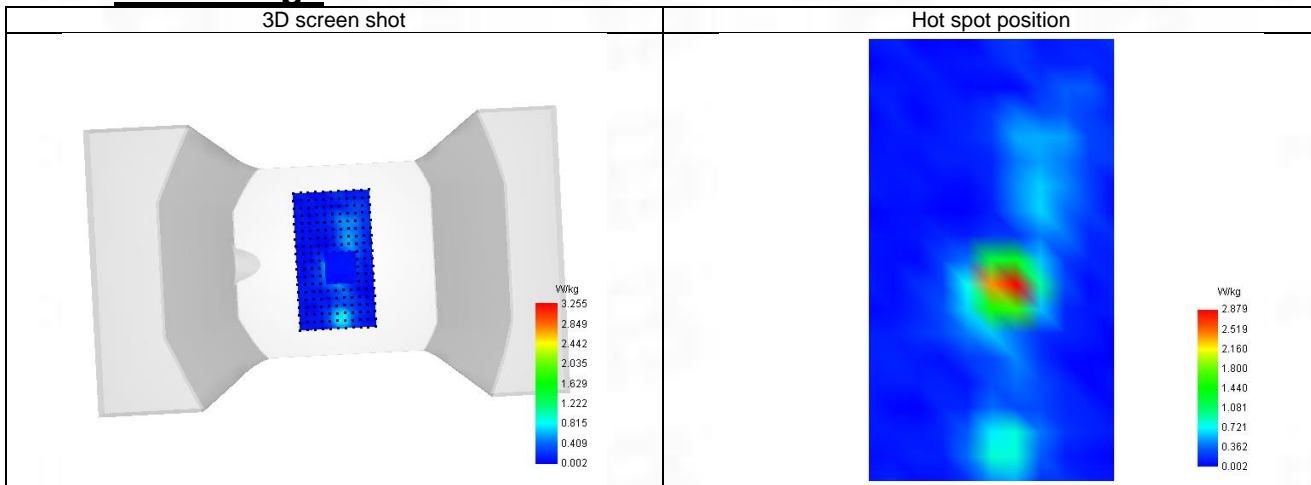
SAR 10g (W/Kg)	0.532
SAR 1g (W/Kg)	1.717
Variation (%)	-1.800
Horizontal validation criteria: minimum distance (mm)	0.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	0.000000

E. Z Axis Scan

Z (mm)	0.00	2.00	7.00	12.00	17.00
SAR (W/Kg)	5.249	3.255	0.757	0.135	0.054



F. 3D Image



15-Body/Limb with Back position in dist. 0mm on Channel 155 in IEEE 802.11ac U-NII

SAR Measurement at IEEE 802.11ac U-NII (Body, Validation Plane)

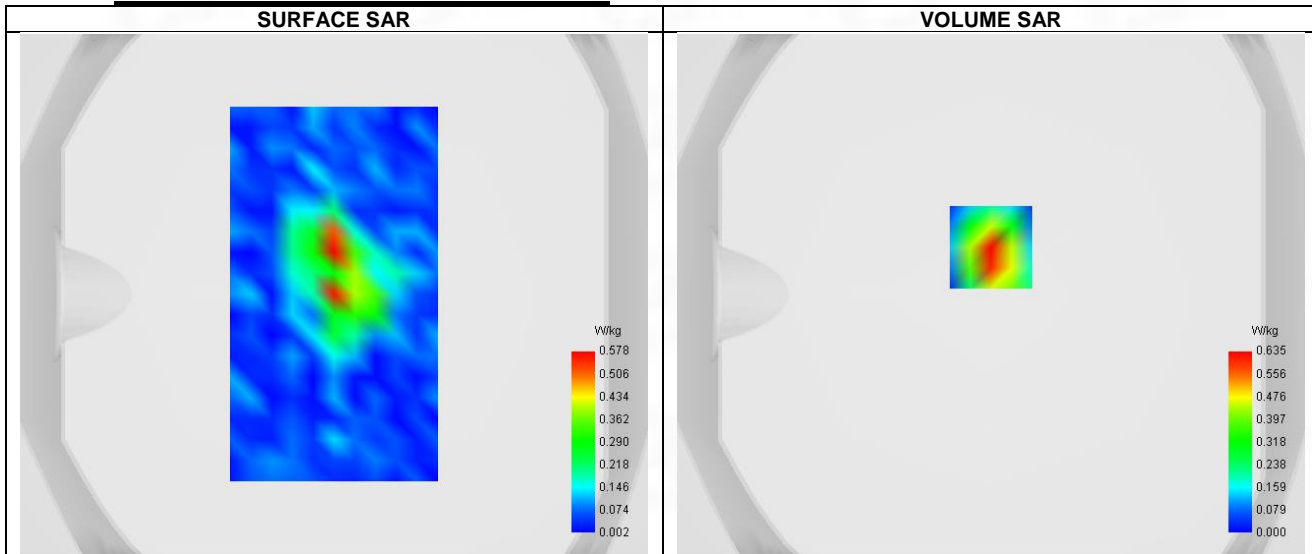
Date of measurement: 10/5/2023

A. Experimental conditions.

Probe	SN 04/22 EPGO365
ConvF	2.04
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	IEEE 802.11ac U-NII
Channels	Higher (155)
Signal	IEEE 802.11

B. Permittivity

Frequency (MHz)	5775.000
Relative permittivity (real part)	35.205
Relative permittivity (imaginary part)	16.595
Conductivity (S/m)	5.285

C. SAR Surface and Volume


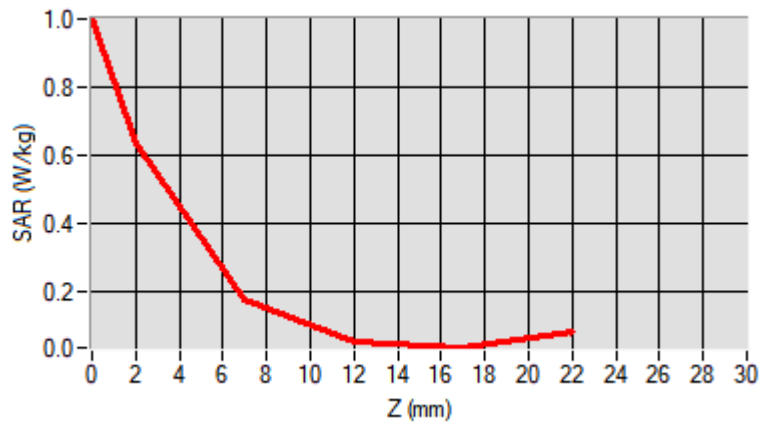
Maximum location: X=0.00, Y=18.00 ; SAR Peak: 1.05 W/kg

D. SAR 1g & 10g

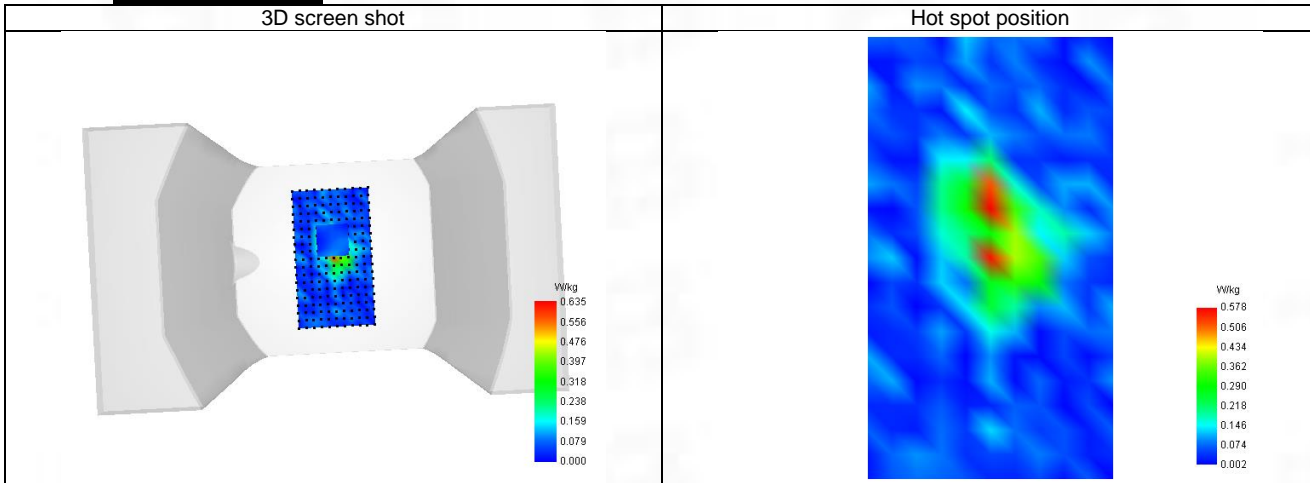
SAR 10g (W/Kg)	0.175
SAR 1g (W/Kg)	0.397
Variation (%)	-1.690
Horizontal validation criteria: minimum distance (mm)	0.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	0.000000

E. Z Axis Scan

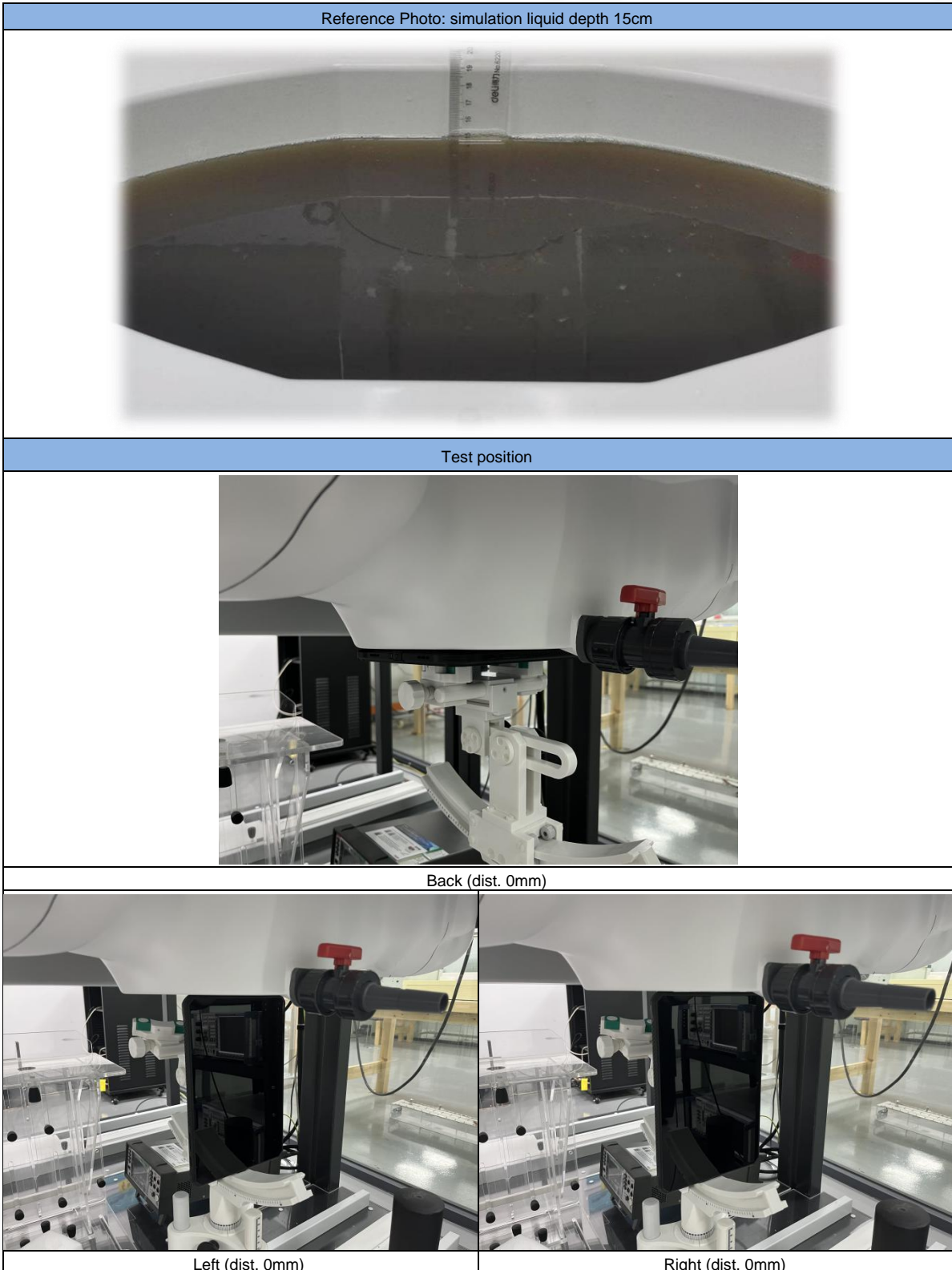
Z (mm)	0.00	2.00	7.00	12.00	17.00
SAR (W/Kg)	0.996	0.635	0.180	0.057	0.039

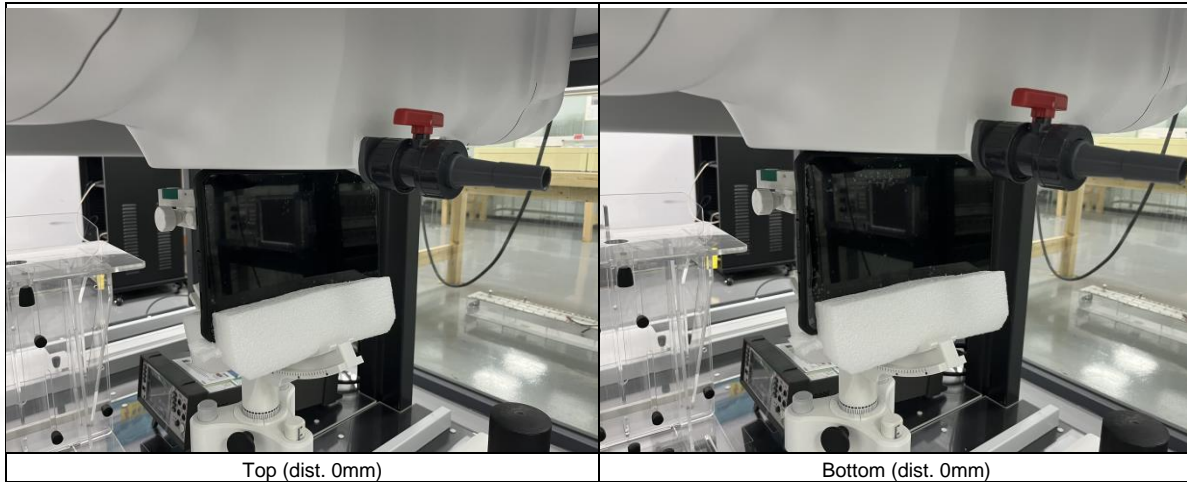


F. 3D Image



ANNEX D SAR Test Setup Photos





ANNEX E EUT External and Internal Photos

Please refer to RF Report.

ANNEX F Calibration Information

Please refer the document "Calibration.pdf".



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--END OF REPORT--