

FCC SAR REPORT

Applicant: TECNO MOBILE LIMITED

Address of Applicant: FLAT 39 8/F BLOCK D WAH LOK INDUSTRIAL CENTRE 31-35 SHAN MEI STREET FOTAN NT

Equipment Under Test (EUT)

Product Name: Mobile Phone

Model No.: BD4

Trade mark: TECNO

FCC ID: 2ADYY-BD4

Applicable standards: FCC 47 CFR Part 2.1093

Date of Test: 01 Sep., 2021 ~ 11 Sep., 2021

Test Result: Maximum Reported 1-g SAR (W/kg)
Head: 0.986 Body: 0.905 Hotspot: 1.173

Authorized Signature:



Bruce Zhang
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the JYT product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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2 Version

Version No.	Date	Description
00	14 Sep., 2021	Original

Tested by:

Carl Wei

Date:

14 Sep., 2021

Test Engineer

Reviewed by:

Tanet Wei

Date:

14 Sep., 2021

Project Engineer

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4 SAR Results Summary

The maximum results of Specific Absorption Rate (SAR) found during test as bellows:

<Highest Reported standalone SAR Summary>

Exposure Position	Frequency Band	Reported 1-g SAR (W/kg)	Equipment Class	Highest Reported 1-g SAR (W/kg)
Head	GSM 850	0.916	PCE	0.986
	GSM 1900	0.986		
	WCDMA Band V	0.797		
	WCDMA Band II	0.741		
	LTE Band 2	0.625		
	LTE Band 4	0.410		
	LTE Band 5	0.731		
	LTE Band 7	0.312		
	LTE Band 41	0.265		
	WLAN 2.4 GHz	0.676	DTS	
Body (10 mm Gap)	GSM 850	0.247	PCE	0.905
	GSM 1900	0.905		
	WCDMA Band V	0.389		
	WCDMA Band II	0.308		
	LTE Band 2	0.229		
	LTE Band 4	0.180		
	LTE Band 5	0.367		
	LTE Band 7	0.094		
	LTE Band 41	0.041		
	WLAN 2.4GHz	0.313	DTS	
Hotspot (10 mm Gap)	GSM 850	0.247	PCE	1.173
	GSM 1900	1.173		
	WCDMA Band V	0.389		
	WCDMA Band II	0.384		
	LTE Band 2	0.342		
	LTE Band 4	0.246		
	LTE Band 5	0.367		
	LTE Band 7	0.186		
	LTE Band 41	0.134		
	WLAN 2.4 GHz	0.313	DTS	

<Highest Reported simultaneous SAR Summary>

Exposure Position	Frequency Band	Reported 1-g SAR (W/kg)	Equipment Class	Highest Reported Simultaneous Transmission 1-g SAR (W/kg)
Top	GSM 1900	1.173	PCE	1.358
	Bluetooth	0.185	DTS	

Note:

- The highest simultaneous transmission is scalar summation of Reported standalone SAR per FCC KDB 690783 D01 v01r03, and scalar SAR summation of all possible simultaneous transmission scenarios are < 1.6W/kg.
- This device is compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-2005, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013.
- For FDD-LTE Band 38 is full covered by FDD-LTE Band 41, so only FDD-LTE Band 41 was tested.

5 General Information

5.1 Client Information

Applicant:	TECNO MOBILE LIMITED
Address of Applicant:	FLAT 39 8/F BLOCK D WAH LOK INDUSTRIAL CENTRE 31-35 SHAN MEI STREET FOTAN NT
Manufacturer:	TECNO MOBILE LIMITED
Address of Manufacturer:	FLAT 39 8/F BLOCK D WAH LOK INDUSTRIAL CENTRE 31-35 SHAN MEI STREET FOTAN NT
Factory:	SHENZHEN TECNO TECHNOLOGY CO., LTD.
Address:	101, Building 24, Waijing Industrial Park, Fumin Community, Fucheng Street, Longhua District, Shenzhen City, P.R.China

5.2 General Description of EUT

Product Name:	Mobile Phone			
Model No.:	BD4			
Category of device	Portable device			
Operation Frequency:	2G :	GSM850: 824.2~848.8 MHz		PCS 1900: 1850.2~1909.8 MHz
	3G :	Band II: 1852.4~1907.6 MHz		Band V: 826.4~846.6 MHz
		Band IV: 1712.4~1752.6 MHz		
	4G :	Band 2 :1850MHz~1910MHz		Band 4 :1710MHz~1755MHz
		Band 5 :824MHz~849MHz		Band 7: 2500MHz~2570MHz
		Band 38: 2570MHz~2620MHz		Band 41: 2555MHz~2655MHz
	Wi-Fi:	2412MHz~2462MHz		
Bluetooth: 2402 MHz ~ 2480 MHz				
Modulation technology:	2G:	☒ Voice(GMSK)	☒ GPRS(GMSK)	☒ EGPRS(GMSK, 8PSK)
	3G:	☒ RCM(QPSK)	☒ HSUPA(QPSK)	☒ HSDPA(QPSK,16QAM)
	4G:	☒ QPSK	☒ 16QAM	☒ 64QAM
	Wi-Fi:	☒ 802.11b(DSSS)		☒ 802.11g/n (OFDM)
	Bluetooth:	☒ BDR(GFSK)	☒ EDR(π /4-DQPSK, 8DPSK)	☒ LE(GFSK)
Antenna Type:	Internal Antenna			
Antenna Gain:	GSM 850: -5.50 dBi; PCS 1900: -1.00 dBi WCDMA Band V: -5.50 dBi ;WCDMA Band II: -1.00 dBi; LTE Band 2: -1.00 dBi; LTE Band 4: -1.00 dBi LTE Band 5: -5.50 dBi; LTE Band 7: 1.50 dBi LTE Band 38: 1.50 dBi; LTE Band 41: 1.50 dBi Bluetooth: 1.00 dBi; 2.4G Wi-Fi: 1.00 dBi;			
(E)GPRS Class:	(E)GPRS Class: 12			
Dimensions (L*W*H):	164 mm (L)× 76 mm (W)× 9 mm (H)			
Accessories information:	Adapter: Model: A8-501000 Input: AC100-240V, 50/60Hz, 200mA Output: DC 5.0V, 1.0A			Battery: Rechargeable Li-ion Battery 3.85V/4900mAh
				Headset: Support headset

5.3 Maximum RF Output Power

Mode	Average Power (dBm)	
	GSM 850	GSM 1900
GSM (Voice)	33.39	30.01
GPRS (1 TX Slot)	33.34	29.97
GPRS (2 TX Slots)	31.04	27.97
GPRS (3 TX Slots)	29.12	26.38
GPRS (4 TX Slots)	26.98	24.36
EGPRS (1 TX Slot)	26.59	26.09
EGPRS (2 TX Slots)	25.67	24.84
EGPRS (3 TX Slots)	23.31	22.77
EGPRS (4 TX Slots)	20.68	19.72

Mode	Average Power (dBm)	
	WCDMA Band V	WCDMA Band II
AMR 12.2 kbps	23.95	22.87
RMC 12.2 kbps	23.99	22.93
HSDPA Sub-test 1	23.57	22.78
HSDPA Sub-test 2	23.38	22.57
HSDPA Sub-test 3	22.98	22.36
HSDPA Sub-test 4	23.02	22.42
HSUPA Sub-test 1	21.90	20.64
HSUPA Sub-test 2	22.29	20.91
HSUPA Sub-test 3	21.74	20.57
HSUPA Sub-test 4	21.61	20.72
HSUPA Sub-test 5	23.57	22.79

Mode	Average Power (dBm)					
	LTE Band 2	LTE Band 4	LTE Band 5	LTE Band 7	LTE Band 38	LTE Band 41
BW/1.4 MHz	22.63	22.49	23.19	/	/	/
BW/3.0 MHz	22.59	22.53	23.03	/	/	/
BW/5.0 MHz	22.75	22.75	22.91	23.78	23.65	23.68
BW/10 MHz	22.68	22.47	23.20	23.77	23.66	23.77
BW/15 MHz	22.63	22.54	/	23.83	23.50	23.59
BW/20 MHz	22.73	22.78	/	23.84	23.69	23.97

WLAN 2.4 GHz Band Average Power (dBm)			
Mode/Band	b	g	n (HT-20)
WLAN 2.4GHz	16.07	13.98	13.63

Bluetooth Average Power (dBm)				
Mode/Band	1 Mbps(GFSK)	2 Mbps(π /4DQPSK)	3 Mbps (8DPSK)	LE (BT 4.0)
Bluetooth	9.01	7.68	8.36	2.34

5.4 Environment of Test Site

Temperature:	18°C ~25 °C
Humidity:	35%~75% RH
Atmospheric Pressure:	1010 mbar

5.5 Test Sample Plan

Sample Number	Used for Test Items
4#	SAR
<i>Remark: JianYan Testing Group Shenzhen Co., Ltd. is only responsible for the test project data of the above samples, and will keep the above samples for a month.</i>	

5.6 Test Location

JianYan Testing Group Shenzhen Co., Ltd.
No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community,Xinqiao Street,
Bao'an District, Shenzhen, Guangdong,People's Republic of China.
Tel: +86-755-23118282, Fax: +86-755-23116366
Email: info-JYTee@lets.com, Website: <http://www.ccis-cb.com>

6 Introduction

6.1 Introduction

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

6.2 SAR Definition

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

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

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

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

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

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

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

Where: σ is the conductivity of the tissue, ρ is the mass density of the tissue and E is the RMS electrical field strength. However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

7 RF Exposure Limits

7.1 Uncontrolled Environment

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The 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.

7.2 Controlled Environment

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). 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.

7.3 RF Exposure Limits

SAR Human Exposure Specified in ANSI/IEEE C95.1-1992 and Health Canada Safety Code 6

HUMAN EXPOSURE LIMITS		
	UNCONTROLLED ENVIRONMENT <i>General Population</i> (W/kg) or (mW/g)	CONTROLLED ENVIRONMENT <i>Occupational</i> (W/kg) or (mW/g)
SPATIAL PEAK SAR Brain	1.6	8.0
SPATIAL AVERAGE SAR Whole Body	0.08	0.4
SPATIAL PEAK SAR Hands, Feet, Ankles, Wrists	4.0	20

Note:

1. The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.
2. The Spatial Average value of the SAR averaged over the whole body.
3. The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

8 SAR Measurement System

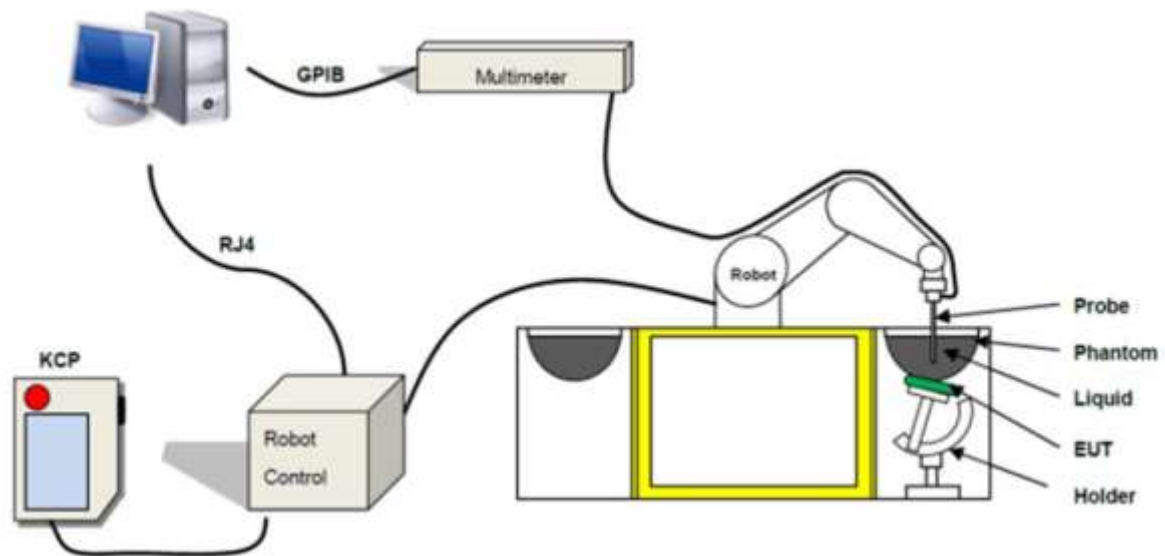


Fig. 8.1 MVG COMOSAR System Configurations

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

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

The MVG COMOSAR system for performance compliance tests is illustrated above graphically. This system consists of the following items:

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

8.1 E-Field Probe

The SAR measurement is conducted with the dosimetric probe (manufactured by MVG). The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency. This probe has a built in optical surface detection system to prevent from collision with phantom.

➤ E-Field Probe Specification

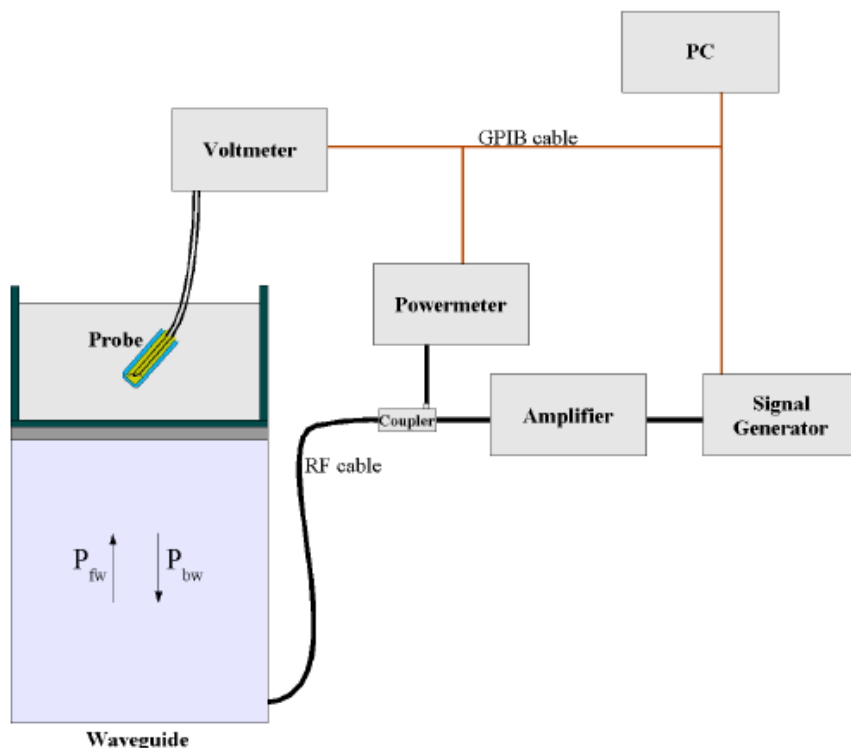
Device Type	COMOSAR DOSIMETRIC E FIELD PROBE
Model	SSE2
Frequency Range	150 MHz to 6 GHz
Dynamic Range	0.01W/kg to 100W/kg
Probe linearity	<0.25dB
Dimensions	Overall length: 330 mm Tip diameter: 2.5 mm Distance between dipoles / probe extremity: 1 mm



Fig. 8.2 Photo of E-Field Probe

➤ E-Field Probe Calibration

Probe calibration is realized, in compliance with EN/IEC 62209-1/-2 and IEEE 1528 std, with CALISAR, MVG proprietary calibration system. The calibration is performed with the technique using reference waveguide.



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

Where :

- P_{fw} = Forward Power
- P_{bw} = Backward Power
- a and b = Waveguide Dimensions
- σ = Skin Depth

Keithley configuration

Rate=Medium; Filter=ON; RDGS=10; FILTER TYPE=MOVING AVERAGE; RANGE AUTO

After each calibration, a SAR measurement performed on a validation dipole and compared with a NPL calibrated probe, to verify it.

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

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

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

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

Where the DCP is the dipole compression point in mV

8.2 Robot

The COMOSAR system uses the high precision robots from KUKA. For the 6-axis controller system, the robot controller version (KUKA-KRC2sr) from KUKA is used. The KUKA robot series have many features that are important for our application:

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



Fig. 8.4 Photo of Robot

8.3 Phantom

<SAM Phantom>

Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm	
Filling Volume	Approx. 27 liters	
Dimensions	Length: 1000mm; Width: 500mm; Height: 200mm	
Material	Fiberglass based	
Relative permittivity	3-4	
Loss tangent	0.02	
Measurement Areas	Left Head, Right Head, Flat phantom	

Fig. 8.7 Photo of SAM Phantom

The phantom developed by MVG is produced in accordance with the specified in the standards. It has been designed to fit the COMOSAR phantom tables and is delivered with a plastic cover to prevent liquid evaporation.

8.4 Device Holder

The positioning system is made of an extremely stable material, which ensures easy handling and reproducible positioning. It also allows correct positioning of the dipoles referenced by the IEEE, ANSI and IEC.

<Device Holder for SAM Phantom>

Model	Handset Positioning System	
Material properties	The positioning system is made of PETP. This material offers a low permittivity of 3.2 and low loss, with a loss tangent of 0.005 to minimize the influence of the DUT on measurement results.	
Mechanical properties	The positioning system developed by MVG allows a positioning resolution better than 1 mm. The system is fixed on a bottom rail “x axis” so that the positioning system can be quickly moved from the right to the left part of the phantom. In addition, it can be moved on a perpendicular “y axis” and the height can be adapted. The system is also composed of three rotation points for accurate positioning of the device's acoustical output.	
Accuracy and precision	A curved rail on the top part allows the fast switch from the cheek to the tilt position. The required 15° angle for the tilt position can be easily checked thanks to a printed scale on the curved rail with a tolerance of ± 1°	

Fig. 8.9 Photo of Device Holder

8.5 Test Equipment List

Manufacturer	Equipment Description	Model	Management Number	Cal. Information	
				Last Cal.	Due Date
MVG	COMOSAR DOSIMETRIC E FIELD PROBE	SSE2	WXJ076	05.20.2021	05.19.2022
MVG	COMOSAR 835 MHz REFERENCE DIPOLE	SID835	WXJ076-5	01.14.2021	01.13.2024
MVG	COMOSAR 1750 MHz REFERENCE DIPOLE	SID1750	WXJ076-8	01.14.2021	01.13.2024
MVG	COMOSAR 1900 MHz REFERENCE DIPOLE	SID1900	WXJ076-9	01.14.2021	01.13.2024
MVG	COMOSAR 2450 MHz REFERENCE DIPOLE	SID2450	WXJ076-12	01.14.2021	01.13.2024
MVG	COMOSAR 2600 MHz REFERENCE DIPOLE	SID2600	WXJ076-13	01.14.2021	01.13.2024
KEITHLEY	DIGIT MULTIMETER	DMM6500	WXJ076-1	12.17.2019	12.16.2022
MVG	MVG Measurement Software	OpenSAR	Version: V5_01_09	N.C.R	N.C.R
MVG	COMOSAR IEEE SAM PHANTOM	N/A	WXG009-2	N.C.R	N.C.R
MVG	COMOSAR IEEE SAM PHANTOM	N/A	WXG009-3	N.C.R	N.C.R
MVG	MOBILE PHONE POSITIONNING SYSTEM	N/A	WXG009-4	N.C.R	N.C.R
KUKA	Robot	KR 6 R900 sixx	WXG009-1	N.C.R	N.C.R
Anritsu	Universal Radio Communication Analyzer	MT8820C	WXJ008-5	03.03.2021	03.02.2022
R&S	Universal Radio Communication Tester	CMU200	WXJ008-2	06.18.2020	06.17.2021
HP	Network Analyzer	8753D	WXJ024	06.18.2020	06.17.2021
KEYSIGHT	EPM Series Power Meter	N1914A	WXJ075	08.29.2021	08.28.2022
KEYSIGHT	E-Series Power Sensor	E9300H	WXJ075-1	08.29.2021	08.28.2022
KEYSIGHT	E-Series Power Sensor	E9300H	WXJ075-2	08.29.2021	08.28.2022
KEYSIGHT	Signal Generator	N5173B	WXJ006-7	03.25.2021	03.24.2022
Huber Suhner	RF Cable	SUCOFLEX	WXG008-13	See Note 3	
Huber Suhner	RF Cable	SUCOFLEX	WXG008-14	See Note 3	
Huber Suhner	RF Cable	SUCOFLEX	WXG008-15	See Note 3	
Weinschel	Attenuator	23-3-34	WXG008-16	See Note 3	
Anritsu	Directional Coupler	MP654A	WXG008-17	See Note 3	
MVG	LIMESAR DIELECTRIC PROBE	SCLMP	WXG009-5	See Note 4	
TXC	Broadband Amplifier	BBA018000	WXG008-11	See Note 5	

Note:

- The calibration certificate of MVG can be referred to appendix C of this report.
- Referring to KDB 865664 D01v01r04, the dipole calibration interval can be extended to 3 years with justification. The dipoles are also not physically damaged, or repaired during the interval.
- The Insertion Loss calibration of Dual Directional Coupler and Attenuator were characterized via the network analyzer and compensated during system check.
- The dielectric probe kit was calibrated via the network analyzer, with the specified procedure (calibrated in pure water) and calibration kit (standard) short circuit, before the dielectric measurement. The specific procedure and calibration kit are provided by MVG.
- In system check we need to monitor the level on the spectrum analyzer, and adjust the power amplifier level to have precise power level to the dipole; the measured SAR will be normalized to 1 W input power according to the ratio of 1 W to the input power to the dipole. For system check, the calibration of the power amplifier is deemed not critically required for correct measurement; the spectrum analyzer is critical and we do have calibration for it
- Attenuator insertion loss is calibrated by the network Analyzer, which the calibration is valid, before system check.
- N.C.R means No Calibration Requirement.

9 Tissue Simulating Liquids

For the measurement of the field distribution inside the SAM phantom, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 9.1, for body SAR testing, the liquid height from the center of the flat phantom to liquid top surface is larger than 15 cm, which is shown in Fig. 9.2.



Fig. 9.1 Photo of Liquid Height for Head SAR
(depth>15cm)

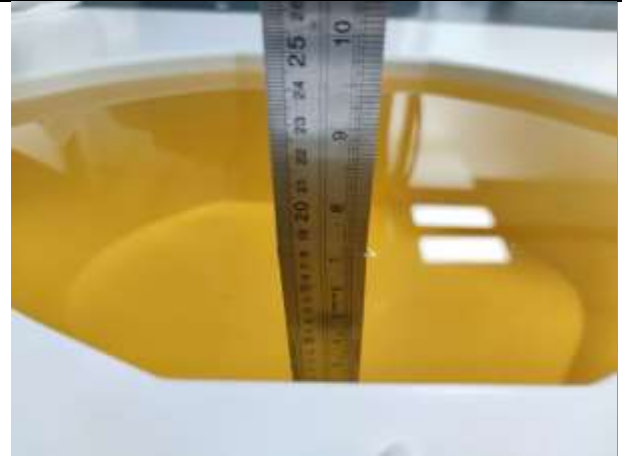


Fig. 9.2 Photo of Liquid Height for Body SAR
(depth>15cm)

The relative permittivity and conductivity of the tissue material should be within $\pm 5\%$ of the values given in the table below recommended by the FCC OET 65 supplement C and RSS 102 Issue 5.

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

(ϵ_r = relative permittivity, σ = conductivity and ρ = 1000 kg/m

The dielectric parameters of liquids were verified prior to the SAR evaluation using a MVG Liquid measurement Kit and an Agilent Network Analyzer.

The following table shows the measuring results for simulating liquid.

Frequency (MHz)	Liquid Temp. (°C)	Conductivity (σ)	Permittivity (ϵ_r)	Conductivity Target(σ)	Permittivity Target(ϵ_r)	Delta (σ)%	Delta (ϵ_r)%	Limit (%)	Date (mm/dd/yy)
835	22.5	0.92	40.85	0.90	41.5	2.22	-1.57	±5	09.02.2021
1750	22.3	1.37	40.19	1.37	40.1	0.00	0.22	±5	09.10.2021
1900	22.3	1.41	39.75	1.40	40.0	0.71	-0.63	±5	09.10.2021
2450	22.6	1.79	39.91	1.80	39.2	-0.56	1.81	±5	09.01.2021
2600	22.1	1.98	38.77	1.96	39.0	1.02	-0.59	±5	09.09.2021

10 SAR System Verification

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

➤ Purpose of System Performance check

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

➤ System Setup

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

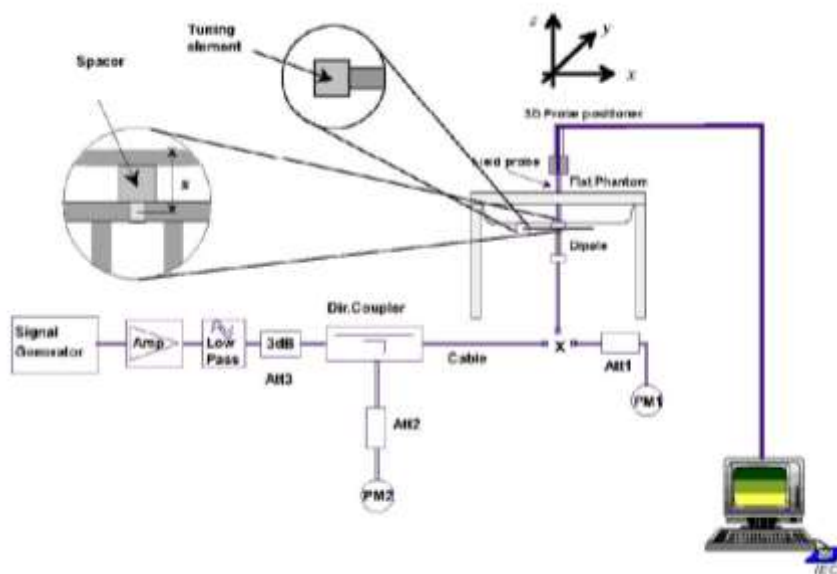


Fig.10.1 System Verification Setup Diagram

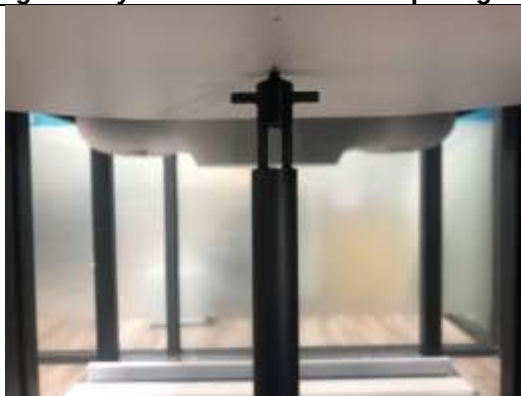


Fig.10.2 Photo of Dipole setup



➤ **System Verification Results**

Comparing to the original SAR value provided by MVG, the verification data should be within its specification of 10%. The table as below indicates the system performance check can meet the variation criterion and the plots can be referred to Appendix C of this report.

Date (mm/dd/yy)	Frequency (MHz)	Power fed onto dipole (mW)	Measured 1g SAR (W/kg)	Normalized to 1W 1g SAR (W/kg)	1W Target 1g SAR (W/kg)	Deviation (%)
09.02.2021	835	100	1.008	10.08	9.57	5.33
09.10.2021	1750	100	3.569	35.69	36.50	-2.22
09.10.2021	1900	100	3.902	38.58	39.60	-1.46
09.01.2021	2450	100	5.405	54.05	52.92	2.14
09.09.2021	2600	100	5.769	57.69	55.47	4.00

11 EUT Testing Position

This EUT was tested in nine different positions. They are right cheek/right tilted/left cheek/left tilted for head, Front/Back/ Left /Right /Top of the EUT with phantom 10 mm gap, as illustrated below, please refer to Appendix B for the test setup photos.

11.1 Handset Reference Points

- The vertical centreline passes through two points on the front side of the handset – the midpoint of the width w_t of the handset at the level of the acoustic output, and the midpoint of the width w_b of the bottom of the handset.
- The horizontal line is perpendicular to the vertical centreline and passes the center of the acoustic output. The horizontal line is also tangential to the handset at point A.
- The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centreline is not necessarily parallel to the front face of the handset, especially for clamshell handsets, handsets with flip covers, and other irregularly shaped handsets.



Fig.11.1 Illustration for Front, Back and Side of SAM Phantom

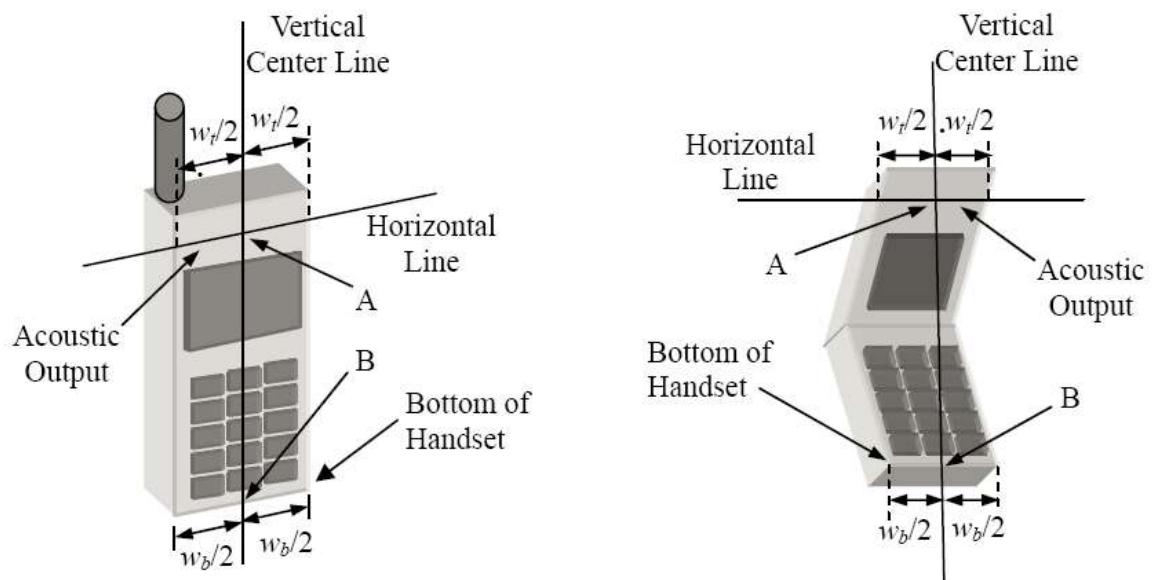


Fig. 11.2 Illustration for Handset Vertical and Horizontal Reference Lines

11.2 Positioning for Cheek / Touch

- To position the device with the vertical center line of the body of the device and the horizontal line crossing the center piece in a plane parallel to the sagittal plane of the phantom. While maintaining the device in this plane, align the vertical center line with the reference plane containing the three ear and mouth reference point (M: Mouth, RE: Right Ear and LE: Left Ear) and align the center of the ear piece with the line RE-LE.
- To move the device towards the phantom with the ear piece aligned with the line LE-RE until the phone touched the ear. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the phone until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost (see below figure)



Fig. 11.3 Illustration for Cheek Position

11.3 Positioning for Ear / 15° Tilt

- To position the device in the “cheek” position described above.
- While maintaining the device the reference plane described above and pivoting against the ear, moves it outward away from the mouth by an angle of 15 degrees or until contact with the ear is lost (see figure below).



Fig.11.4 Illustration for Tilted Position

11.4 SAR Evaluations near the Mouth/Jaw Regions of the SAM Phantom

Antennas located near the bottom of a phone may require SAR measurements around the mouth and jaw regions of the SAM head phantom. This typically applies to clam-shell style phones that are generally longer in the unfolded normal use positions or to certain older style long rectangular phones.

Under these circumstances, the following procedures apply, adopted from the FCC guidance on SAR handsets document FCC KDB Publication 648474 D04v01r03. The SAR required in these regions of SAM should be measured using a flat phantom. The phone should be positioned with a separation distance of 4 mm between the ear reference point (ERP) and the outer surface of the flat phantom shell. While maintaining this distance at the ERP location, the low (bottom) edge of the phone should be lowered from the phantom to establish the same separation distance between the peak SAR locations identified by the truncated partial SAR distribution measured with the SAM phantom. The distance from the peak SAR location to the phone is determined by the straight line passing perpendicularly through the phantom surface. When it is not feasible to maintain 4 mm separation at the ERP while also establishing the required separation at the peak SAR location, the top edge of the phone will be allowed to touch the phantom with a separation < 4 mm at the ERP. The phone should not be tilted to the left or right while placed in this inclined position to the flat phantom.

11.5 Body Worn Accessory Configurations

- To position the device parallel to the phantom surface with either keypad up or down.
- To adjust the device parallel to the flat phantom.
- To adjust the distance between the device surface and the flat phantom to 10 mm or holster surface and the flat phantom to 0 mm.

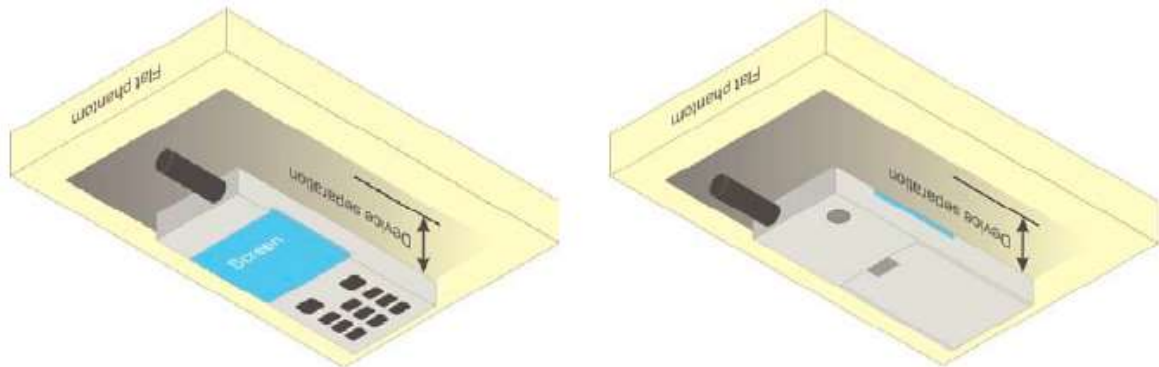


Fig.11.5 Illustration for Body Worn Position

11.6 Wireless Router (Hotspot) Configurations

Some battery-operated handsets have the capability to transmit and receive internet connectivity through simultaneous transmission of WIFI in conjunction with a separate licensed transmitter. The FCC has provided guidance in KDB Publication 941225 D06 where SAR test considerations for handsets ($L \times W \geq 9 \text{ cm} \times 5 \text{ cm}$) are based on a composite test separation distance of 10 mm from the front, back and edges of the device with antennas 2.5 cm or closer to the edge of the device, determined from general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions. Therefore, SAR must be evaluated for each frequency transmission and mode separately and summed with the WIFI transmitter according to KDB 648474 publication procedures. The "Portable Hotspot" feature on the handset was NOT activated, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal.

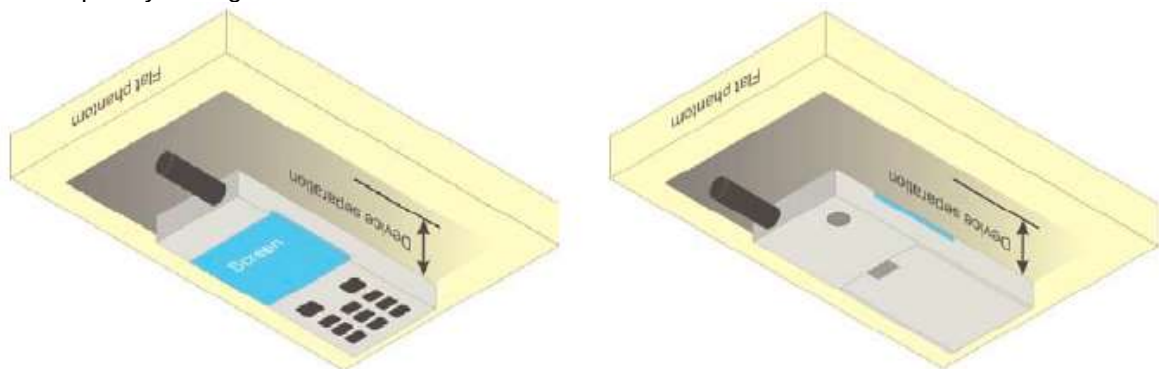


Fig.11.6 Illustration for Hotspot Position

12 Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

- For WWAN power measurement, use base station simulator to configure EUT WWAN transition in conducted connection with RF cable, at maximum power in each supported wireless interface and frequency band.
- Read the WWAN RF power level from the base station simulator.
- For WLAN/BT power measurement, use engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power in each supported wireless interface and frequency band.
- Connect EUT RF port through RF cable to the power meter or spectrum analyzer, and measure WLAN/BT output power.

<Conducted power measurement>

- Use base station simulator to configure EUT WWAN transmission in radiated connection, and engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power, in the highest power channel.
- Place the EUT in positions as Appendix B demonstrates.
- Set scan area, grid size and other setting on the OpenSAR software.
- Measure SAR results for the highest power channel on each testing position.
- Find out the largest SAR result on these testing positions of each band.
- Measure SAR results for other channels in worst SAR testing position if the Reported SAR or highest power channel is larger than 0.8 W/kg.

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

- Power reference measurement
- Area scan
- Zoom scan
- Power drift measurement

12.1 Spatial Peak SAR Evaluation

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

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

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

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

12.2 Power Reference Measurement

The Power Reference Measurement and Power Drift Measurement are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

12.3 Area & Zoom Scan Procedures

First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an Area Scan is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan is required. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR-distribution over 10g. Area scan and zoom scan resolution setting follows KDB 865664 D01v01r04 quoted below.

			≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5 ± 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location			$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
Maximum area scan spatial resolution: Δx_{Area} , Δy_{Area}			≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
			When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\leq$ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan spatial resolution: Δx_{Zoom} , Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1 st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm
Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.				
* When zoom scan is required and the <u>reported</u> SAR from the <u>area scan based 1-g SAR estimation</u> procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.				

12.4 Volume Scan Procedures

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

12.5 SAR Averaged Methods

In the COMOSAR system, the interpolation and extrapolation are both based on the modified Quadratic Shepard's method. The interpolation scheme combines a least-square fitted function method and a weighted average method, which are the two basic types of computational interpolation and approximation.

Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1g and 10g cubes, the extrapolation distance should not be larger than 5 mm.

12.6 Power Drift Monitoring

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

13 Conducted RF Output Power

13.1 GSM Conducted Power

Band: GSM 850	Burst Average Power (dBm)			Frame-Average Power(dBm)		
Channel	128	190	251	128	190	251
Frequency (MHz)	824.2	836.6	848.8	824.2	836.6	848.8
GSM (GMSK, Voice)	33.21	33.39	33.32	24.18	24.36	24.29
GPRS (GMSK, 1 TX slot)	33.15	33.34	33.25	24.12	24.31	24.22
GPRS (GMSK, 2 TX slots)	30.93	31.04	30.98	24.91	25.02	24.96
GPRS (GMSK, 3 TX slots)	29.01	29.12	29.06	24.75	24.86	24.80
GPRS (GMSK, 4 TX slots)	26.90	26.98	26.95	23.89	23.97	23.94
EGPRS (8PSK, 1 TX slot)	26.59	26.48	26.40	17.56	17.45	17.37
EGPRS (8PSK, 2 TX slots)	25.61	25.67	25.59	19.59	19.65	19.57
EGPRS (8PSK, 3 TX slots)	23.25	23.31	23.28	18.99	19.05	19.02
EGPRS (8PSK, 4 TX slots)	20.51	20.68	20.63	17.50	17.67	17.62

Remark:

- The frame-averaged power is linearly reported the maximum burst averaged power over 8 time slots. The calculated method are shown as below:
The duty cycle "x" of different time slots as below:
1 TX slot is 1/8, 2 TX slots is 2/8, 3 TX slots is 3/8 and 4 TX slots is 4/8
Based on the calculation formula:
Frame-averaged power = Burst averaged power + 10 log (x)
So,
Frame-averaged power (1 TX slot) = Burst averaged power (1 TX slot)– 9.03
Frame-averaged power (2 TX slots) = Burst averaged power (2 TX slots)– 6.02
Frame-averaged power (3 TX slots) = Burst averaged power (3 TX slots)– 4.26
Frame-averaged power (4 TX slots) = Burst averaged power (4 TX slots) – 3.01
- CS1 coding scheme was used in GPRS conducted power measurements and SAR testing, MCS5 coding scheme was used in EGPRS conducted power measurements and SAR testing (if necessary).

Note:

- For Head SAR testing, GSM Voice mode should be evaluated, therefore the EUT was set in GSM 850 Voice mode.
- For Body worn SAR testing, GSM Voice mode should be evaluated, therefore the EUT was set in GSM 850 Voice mode.
- For Hotspot mode SAR testing, GPRS and EGPRS mode should be evaluated, therefore the EUT was set in GPRS 2 TX slots mode due to the highest frame-averaged power.
- Per KDB447498 D01v06, the maximum output power channel is used for SAR testing and for further SAR test reduction.
- The EUT do not support DTM and VoIP function.

Band: PCS 1900	Burst Average Power (dBm)			Frame-Average Power(dBm)		
Channel	512	661	810	512	661	810
Frequency (MHz)	1850.2	1880.0	1909.8	1850.2	1880.0	1909.8
GSM (GMSK, Voice)	29.81	29.95	30.01	20.78	20.92	20.98
GPRS (GMSK, 1 TX slot)	29.75	29.86	29.97	20.72	20.83	20.94
GPRS (GMSK, 2 TX slots)	27.97	27.79	27.61	21.95	21.77	21.59
GPRS (GMSK, 3 TX slots)	26.38	26.18	25.96	22.12	21.92	21.70
GPRS (GMSK, 4 TX slots)	24.36	24.15	23.88	21.35	21.14	20.87
EGPRS (8PSK, 1 TX slot)	25.56	25.86	26.09	16.53	16.83	17.06
EGPRS (8PSK, 2 TX slots)	24.05	24.61	24.84	18.03	18.59	18.82
EGPRS (8PSK, 3 TX slots)	21.72	22.38	22.77	17.46	18.12	18.51
EGPRS (8PSK, 4 TX slots)	18.67	19.40	19.72	15.66	16.39	16.71

Remark:

- The frame-averaged power is linearly reported the maximum burst averaged power over 8 time slots. The calculated method are shown as below:
The duty cycle "x" of different time slots as below:
1 TX slot is 1/8, 2 TX slots is 2/8, 3 TX slots is 3/8 and 4 TX slots is 4/8
Based on the calculation formula:
Frame-averaged power = Burst averaged power + 10 log (x)
So,
Frame-averaged power (1 TX slot) = Burst averaged power (1 TX slot)– 9.03
Frame-averaged power (2 TX slots) = Burst averaged power (2 TX slots)– 6.02
Frame-averaged power (3 TX slots) = Burst averaged power (3 TX slots)– 4.26
Frame-averaged power (4 TX slots) = Burst averaged power (4 TX slots) – 3.01
- CS1 coding scheme was used in GPRS conducted power measurements and SAR testing, MCS5 coding scheme was used in EGPRS conducted power measurements and SAR testing (if necessary).

Note:

- For Head SAR testing, GSM Voice mode should be evaluated, therefore the EUT was set in GSM 1900 Voice mode.
- For Body worn SAR testing, GSM Voice mode should be evaluated, therefore the EUT was set in GSM Voice 1900 mode.
- For Hotspot mode SAR testing, GPRS and EGPRS mode should be evaluated, therefore the EUT was set in GPRS 3 TX slots mode due to the highest frame-averaged power.
- Per KDB447498 D01v06, the maximum output power channel is used for SAR testing and for further SAR test reduction.
- The EUT do not support DTM and VoIP function.

13.2 WCDMA Conducted Power

The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification. A summary of these settings are illustrated below:

HSDPA Setup Configuration:

- a. The EUT was connected to Base Station Rohde & Schwarz CMU200 referred to the Setup Configuration.
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting:
 - i. Set Gain Factors (β_c and β_d) and parameters were set according to each
 - ii. Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
 - iii. Set RMC 12.2kbps + HSDPA mode.
 - iv. Set Cell Power = -86 dBm
 - v. Set HS-DSCH Configuration Type to FRC (H-set 1, QPSK)
 - vi. Select HSDPA Uplink Parameters
 - vii. Set Delta ACK, Delta NACK and Delta CQI = 8
 - viii. Set Ack-Nack Repetition Factor to 3
 - ix. Set CQI Feedback Cycle (k) to 4 ms
 - x. Set CQI Repetition Factor to 2
 - xi. Power Ctrl Mode = All Up bits
- d. The transmitted maximum output power was recorded.

Table 1

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	$\beta_{hs}^{(1)}$	CM (dB) ⁽²⁾
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15 ⁽³⁾	15/15 ⁽³⁾	64	12/15 ⁽³⁾	24/15	1.0
3	15/15	8/15	64	15/8	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5

Note 1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$
Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$.
Note 3: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$.

HSDPA Sub-test setup configuration

HSUPA Setup Configuration:

- a. The EUT was connected to Base Station Rohde & Schwarz CMU200 referred to the Setup Configuration.
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting * :
 - i. Call Configs = 5.2B, 5.9B, 5.10B, and 5.13.2B with QPSK
 - ii. Set the Gain Factors (β_c and β_d) and parameters (AG Index) were set according to each specific sub-test in the following table, C11.1.3, quoted from the TS 34.121
 - iii. Set Cell Power = -86 dBm
 - iv. Set Channel Type = 12.2k + HSPA
 - v. Set UE Target Power
 - vi. Power Ctrl Mode= Alternating bits
 - vii. Set and observe the E-TFCI
 - viii. Confirm that E-TFCI is equal to the target E-TFCI of 75 for sub-test 1, and other subtest's E-TFCI
- d. The transmitted maximum output power was recorded.

Table 2

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	$\beta_{hs}^{(1)}$	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM ⁽²⁾ (dB)	MPR (dB)	AG ⁽⁴⁾ Index	E-TFCI
1	11/15 ⁽³⁾	15/15 ⁽³⁾	64	11/15 ⁽³⁾	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed1}: 47/15$ $\beta_{ed2}: 47/15$	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 ⁽⁴⁾	15/15 ⁽⁴⁾	64	15/15 ⁽⁴⁾	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$.

Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 10/15$ and $\beta_d = 15/15$.

Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 14/15$ and $\beta_d = 15/15$.

Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g.

Note 6: β_{ed} cannot be set directly; it is set by Absolute Grant Value.

HSUPA Sub-test setup configuration

WCDMA Conducted Power:

WCDMA Average power (dBm)			
Band	WCDMA Band V		
Channel	4132	4183	4233
Frequency (MHz)	826.4	836.6	846.6
AMR 12.2 kbps	23.20	23.77	23.95
RMC 12.2 kbps	23.21	23.79	23.99
HSDPA Sub-test 1	23.17	23.27	23.57
HSDPA Sub-test 2	22.99	23.21	23.38
HSDPA Sub-test 3	22.60	22.76	22.98
HSDPA Sub-test 4	22.58	22.81	23.02
HSUPA Sub-test 1	21.67	21.90	21.61
HSUPA Sub-test 2	21.83	22.07	22.29
HSUPA Sub-test 3	21.41	21.55	21.74
HSUPA Sub-test 4	21.21	21.38	21.61
HSUPA Sub-test 5	23.16	23.34	23.57

WCDMA Average power (dBm)			
Band	WCDMA Band II		
Channel	9262	9400	9538
Frequency (MHz)	1852.4	1880.0	1907.6
AMR 12.2 kbps	22.61	22.65	22.87
RMC 12.2 kbps	22.62	22.67	22.93
HSDPA Sub-test 1	22.53	22.33	22.78
HSDPA Sub-test 2	22.18	22.21	22.57
HSDPA Sub-test 3	21.96	22.19	22.36
HSDPA Sub-test 4	21.97	22.19	22.42
HSUPA Sub-test 1	20.14	20.47	20.64
HSUPA Sub-test 2	20.50	20.80	20.91
HSUPA Sub-test 3	20.06	20.41	20.57
HSUPA Sub-test 4	20.28	20.59	20.72
HSUPA Sub-test 5	22.46	22.58	22.79

Note:

1. Applying the subtest setup in Table C.11.1.3 of 3GPP TS 34.121-1
2. Per KDB 941225 D01, RMC 12.2kbps mode is used to evaluate SAR due the highest output power. If AMR 12.2 kbps power is < 0.25dB higher than RMC 12.2kbps, SAR tests with AMR 12.2 kbps can be excluded.
3. AMR, HSDPA RF power will not be larger than RMC 12.2kbps, detailed information is included in Tune-up Procure exhibit.

13.3 LTE Conducted Power

13.3.1 Largest channel bandwidth standalone SAR test requirements

QPSK with 1 RB allocation

Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required for 1 RB allocation; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel.⁸ When the reported SAR of a required test channel is > 1.45 W/kg, SAR is required for all three RB offset configurations for that required test channel.

QPSK with 50% RB allocation

The procedures required for 1 RB allocation in section 4.2.1 are applied to measure the SAR for QPSK with 50% RB allocation.⁹

QPSK with 100% RB allocation

For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation in sections 4.2.1 and 4.2.2 are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.

Higher order modulations

For each modulation besides QPSK; e.g., 16-QAM, 64-QAM, apply the QPSK procedures in sections 4.2.1, 5.2.2 and 4.2.3 to determine the QAM configurations that may need SAR measurement. For each configuration identified as required for testing, SAR is required only when the highest maximum output power for the configuration in the higher order modulation is $> \frac{1}{2}$ dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is > 1.45 W/kg.

13.3.2 Other channel bandwidth standalone SAR test requirements

For the other channel bandwidths used by the device in a frequency band, apply all the procedures required for the largest channel bandwidth in section 4.2 to determine the channels and RB configurations that need SAR testing and only measure SAR when the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is $> \frac{1}{2}$ dB higher than the equivalent channel configurations in the largest channel bandwidth configuration or the reported SAR of a configuration for the largest channel bandwidth is > 1.45 W/kg. The equivalent channel configuration for the RB allocation, RB offset and modulation etc. is determined for the smaller channel bandwidth according to the same number of RB allocated in the largest channel bandwidth. For example, 50 RB in 10 MHz channel bandwidth does not apply to 5 MHz channel bandwidth; therefore, this cannot be tested in the smaller channel bandwidth. However, 50% RB allocation in 10 MHz channel bandwidth is equivalent to 100% RB allocation in 5 MHz channel bandwidth; therefore, these are the equivalent configurations to be compared to determine the specific channel and configuration in the smaller channel bandwidth that need SAR testing.

13.3.3 TDD LTE configuration setup for SAR measurement

According to KDB 941225 D05v02r03 and April 2013 TCB workshop slides, SAR must be tested with a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by 3GPP.

- see 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations
- “special subframe S” contains both uplink and downlink transmissions and must be taken into consideration to determine the transmission duty factor
 - according to the worst case uplink and downlink cyclic prefix requirements for UpPTS to determine the highest SAR test duty factor

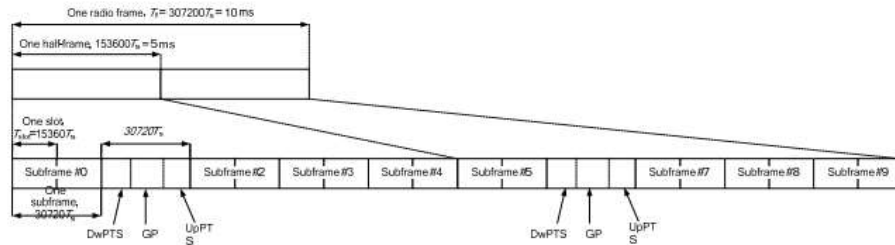


Figure 4.2-1: Frame structure type 2 (for 5 ms switch-point periodicity)

Table 4.2-1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS)

Special subframe configuration	Normal cyclic prefix in downlink			Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	$6592 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$	$7680 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$
1	$19760 \cdot T_s$			$20480 \cdot T_s$		
2	$21952 \cdot T_s$			$23040 \cdot T_s$		
3	$24144 \cdot T_s$			$25600 \cdot T_s$		
4	$26336 \cdot T_s$			$7680 \cdot T_s$		
5	$6592 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$20480 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$		
8	$24144 \cdot T_s$			-	-	-
9	$13168 \cdot T_s$			-	-	-

Per 3GPP 36.211 section 4.2, each radio frame of length $T_F=37200 \cdot T_s = 10$ ms consists of two half-frames of length $153600 \cdot T_s = 5$ ms each. Each half-frame consists of five subframes of length $30720 \cdot T_s = 1$ ms. So, the uplink duty factor in special subframe as below:

Special Subframe configuration	Normal cyclic prefix in downlink		Extended cyclic prefix in downlink	
	Duty factor of Uplink		Duty factor of Uplink	
	Normal cyclic prefix in uplink	Extended cyclic prefix in uplink	Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	7.14%	8.33%	7.14%	8.33%
1	7.14%	8.33%	7.14%	8.33%
2	7.14%	8.33%	7.14%	8.33%
3	7.14%	8.33%	7.14%	8.33%
4	7.14%	8.33%	14.27%	16.67%
5	14.27%	16.67%	14.27%	16.67%
6	14.27%	16.67%	14.27%	16.67%
7	14.27%	16.67%	14.27%	16.67%
8	14.27%	16.67%	/	/
9	14.27%	16.67%	/	/

Table 4.2-2: Uplink-downlink configurations

Uplink-downlink configuration	Downlink-to-Uplink Switch-point periodicity	Subframe number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U	U	D	S	U	U	D

According to above table:

1. The highest duty factor is configuration 0;
2. The duty factor of uplink in one half-frame with normal cyclic prefix is: $(3\text{ms} + 0.143\text{ms})/5\text{ms}=62.86\%$;
3. The duty factor of uplink in one half-frame with extended cyclic prefix is: $(3\text{ms} + 0.167\text{ms})/5\text{ms}=63.34\%$;
4. For purpose to get the worst case SAR test duty factor, the duty factor of normal cyclic prefix in uplink scaled-up to the extended cyclic prefix in uplink, the scaling factor is $63.34\%/62.86\%=1.008$, and the scaling factor will be taken into the final measured SAR.

LTE Band 2 part

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					18607	18900	19193
					1850.7MHz	1880.0MHz	1909.3MHz
Band 2	1.4	QPSK	1	0	22.00	21.92	22.63
			1	2	21.90	21.99	22.54
			1	5	21.89	21.97	22.56
			3	0	21.06	21.02	21.71
			3	1	20.97	20.94	21.62
			3	2	21.05	21.05	21.61
			6	0	21.12	21.09	21.60
		16QAM	1	0	20.90	20.87	21.32
			1	2	20.86	20.75	21.28
			1	5	20.79	20.90	21.35
			3	0	20.16	20.20	20.68
			3	1	20.15	20.21	20.52
			3	2	20.20	20.25	20.51
			6	0	20.16	20.05	20.61

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					18615	18900	19185
					1851.5MHz	1880.0MHz	1908.5MHz
Band 2	3	QPSK	1	0	22.06	21.98	22.54
			1	7	22.05	22.02	22.57
			1	14	22.09	22.04	22.59
			8	0	21.10	21.08	21.62
			8	4	21.11	21.00	21.66
			8	7	21.09	21.03	21.58
			15	0	21.05	20.97	21.67
		16QAM	1	0	20.81	20.92	21.62
			1	7	20.76	21.01	21.66
			1	14	20.84	20.95	21.64
			8	0	20.26	20.20	20.85
			8	4	20.26	20.16	20.86
			8	7	20.21	20.20	20.91
			15	0	19.97	20.14	20.66

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					18625	18900	19175
					1852.5MHz	1880.0MHz	1907.5MHz
Band 2	5	QPSK	1	0	21.98	22.19	22.67
			1	12	21.97	22.21	22.73
			1	24	22.10	22.25	22.75
			12	0	21.09	21.13	21.74
			12	6	21.11	21.03	21.57
			12	11	21.04	21.03	21.58
			25	0	21.16	21.12	21.64
		16QAM	1	0	21.13	20.85	21.03
			1	12	21.04	20.93	21.03
			1	24	21.15	20.94	21.16
			12	0	20.17	20.08	20.70
			12	6	20.20	20.09	20.62
			12	11	20.22	20.10	20.71
			25	0	20.16	20.16	20.80

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					18650	18900	19150
					1855.0MHz	1880.0MHz	1905.0MHz
Band 2	10	QPSK	1	0	21.95	22.11	22.52
			1	24	22.01	22.11	22.59
			1	49	22.04	22.15	22.68
			25	0	21.14	21.12	21.55
			25	12	21.13	21.07	21.49
			25	24	21.12	21.08	21.57
			50	0	21.07	21.11	21.58
		16QAM	1	0	20.83	20.85	21.20
			1	24	20.92	20.95	21.31
			1	49	20.94	20.95	21.40
			25	0	20.25	20.17	20.57
			25	12	20.18	20.18	20.53
			25	24	20.19	20.17	20.62
			50	0	20.13	20.09	20.45

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					18675	18900	19125
					1857.5MHz	1880.0MHz	1902.5MHz
Band 2	15	QPSK	1	0	21.67	21.91	22.42
			1	37	21.67	22.08	22.59
			1	74	21.71	22.07	22.63
			36	0	20.96	21.08	21.52
			36	16	21.05	21.01	21.51
			36	35	21.05	21.13	21.53
			75	0	21.12	20.96	21.60
		16QAM	1	0	20.83	21.14	21.16
			1	37	20.78	21.10	21.31
			1	74	20.75	21.31	21.50
			36	0	20.12	20.07	20.65
			36	16	20.10	20.08	20.73
			36	35	20.16	20.06	20.62
			75	0	20.14	20.22	20.71

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					18700	18900	19100
					1860.0MHz	1880.0MHz	1900.0MHz
Band 2	20	QPSK	1	0	21.90	22.15	22.18
			1	49	21.92	22.09	22.51
			1	99	22.06	22.53	22.73
			50	0	21.10	21.07	21.29
			50	24	21.01	21.00	21.33
			50	49	21.07	21.12	21.37
			100	0	21.12	21.05	21.28
		16QAM	1	0	21.41	20.96	20.85
			1	49	21.34	20.98	21.18
			1	99	21.40	21.26	21.45
			50	0	20.56	20.24	20.57
			50	24	20.42	20.15	20.54
			50	49	20.50	20.20	20.45
			100	0	20.47	20.13	20.60

LTE Band 4 part

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					19957	20175	20393
					1710.7MHz	1732.5MHz	1754.3MHz
Band 4	1.4	QPSK	1	0	22.42	21.98	22.41
			1	2	22.42	21.94	22.45
			1	5	22.44	21.91	22.49
			3	0	21.54	21.15	21.44
			3	1	21.60	21.02	21.45
			3	2	21.49	21.05	21.44
			6	0	21.56	21.13	21.42
		16QAM	1	0	21.62	21.49	21.43
			1	2	21.69	21.57	21.34
			1	5	21.52	21.54	21.21
			3	0	20.83	20.81	20.62
			3	1	20.92	20.82	20.72
			3	2	20.80	20.81	20.63
			6	0	20.81	20.77	20.65

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					19965	20175	20385
					1711.5MHz	1732.5MHz	1753.5MHz
Band 4	3	QPSK	1	0	22.50	22.06	22.43
			1	7	22.53	22.00	22.44
			1	14	22.39	22.09	22.48
			8	0	21.65	21.00	21.47
			8	4	21.51	21.03	21.48
			8	7	21.37	21.10	21.58
			15	0	21.47	21.12	21.46
		16QAM	1	0	21.37	21.64	21.36
			1	7	21.33	21.74	21.39
			1	14	21.26	21.63	21.38
			8	0	20.86	20.57	20.70
			8	4	20.81	20.42	20.68
			8	7	20.75	20.68	20.78
			15	0	20.64	20.60	20.41

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					19975	20175	20375
					1712.5MHz	1732.5MHz	1752.5MHz
Band 4	5	QPSK	1	0	22.64	22.09	22.56
			1	12	22.46	22.08	22.72
			1	24	22.47	22.15	22.75
			12	0	21.50	21.00	21.40
			12	6	21.49	21.03	21.41
			12	11	21.49	21.02	21.35
			25	0	21.43	21.04	21.32
		16QAM	1	0	21.19	20.99	21.02
			1	12	21.15	21.13	21.07
			1	24	21.03	21.06	21.12
			12	0	20.79	20.10	20.37
			12	6	20.74	20.16	20.42
			12	11	20.75	20.14	20.40
			25	0	20.85	20.58	20.54

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20000	20175	20350
					1715.0MHz	1732.5MHz	1750.0MHz
Band 4	10	QPSK	1	0	22.44	22.29	22.07
			1	24	22.26	22.22	22.25
			1	49	22.21	22.25	22.47
			25	0	21.39	21.05	21.14
			25	12	21.42	21.08	21.15
			25	24	21.42	21.09	21.14
			50	0	21.28	21.09	21.22
		16QAM	1	0	21.65	21.40	20.78
			1	24	21.56	20.88	20.87
			1	49	21.58	20.96	21.15
			25	0	20.75	20.34	20.58
			25	12	20.77	20.27	20.57
			25	24	20.66	20.31	20.57
			50	0	20.62	20.25	20.51

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20025	20175	20325
					1717.5MHz	1732.5MHz	1747.5MHz
Band 4	15	QPSK	1	0	22.50	22.21	22.11
			1	37	22.13	22.13	22.17
			1	74	22.04	22.19	22.54
			36	0	21.28	21.11	21.24
			36	16	21.34	21.00	21.29
			36	35	21.33	21.05	21.24
			75	0	21.11	21.10	21.06
		16QAM	1	0	21.66	21.12	20.98
			1	37	21.34	20.95	21.10
			1	74	21.23	21.01	21.46
			36	0	20.88	20.55	20.51
			36	16	20.92	20.59	20.70
			36	35	20.95	20.62	20.65
			75	0	20.88	20.56	20.59

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20050	20175	20300
					1720.0MHz	1732.5MHz	1745.0MHz
Band 4	20	QPSK	1	0	22.78	22.16	22.41
			1	49	22.40	22.10	22.29
			1	99	22.28	22.28	22.51
			50	0	21.29	21.16	21.37
			50	24	21.32	21.15	21.09
			50	49	21.32	21.04	21.12
			100	0	21.23	21.13	21.15
		16QAM	1	0	21.61	21.39	21.13
			1	49	21.55	21.27	21.20
			1	99	21.48	21.11	21.05
			50	0	20.81	20.78	20.51
			50	24	20.83	20.79	20.37
			50	49	20.74	20.79	20.40
			100	0	20.81	20.74	20.54

LTE Band 5 part:

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20407	20525	20643
					824.7MHz	836.5MHz	848.3MHz
Band 5	1.4	QPSK	1	0	23.35	23.58	23.70
			1	2	23.39	23.61	23.78
			1	5	23.33	23.62	23.73
			3	0	22.31	22.60	22.63
			3	1	22.37	22.58	22.77
			3	2	22.41	22.57	22.75
			6	0	22.38	22.49	22.63
		16QAM	1	0	22.14	22.82	22.63
			1	2	22.15	22.88	22.72
			1	5	22.14	22.88	22.70
			3	0	21.59	21.71	21.58
			3	1	21.55	21.69	21.64
			3	2	21.62	21.72	21.67
			6	0	21.56	21.65	21.43

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20415	20525	20635
					825.5MHz	836.5MHz	847.5MHz
Band 5	3	QPSK	1	0	23.51	23.42	23.72
			1	7	23.52	23.41	23.76
			1	14	23.36	23.43	23.77
			8	0	22.42	22.48	22.73
			8	4	22.44	22.53	22.65
			8	7	22.47	22.51	22.75
			15	0	22.33	22.53	22.63
		16QAM	1	0	22.26	22.65	22.54
			1	7	22.31	22.60	22.42
			1	14	22.34	22.66	22.49
			8	0	21.63	21.61	21.84
			8	4	21.63	21.62	21.85
			8	7	21.66	21.76	21.94
			15	0	21.32	21.56	21.83

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20425	20525	20625
					826.5MHz	836.5MHz	846.5MHz
Band 5	5	QPSK	1	0	23.54	23.49	23.67
			1	12	23.57	23.51	23.81
			1	24	23.66	23.60	23.83
			12	0	22.48	22.66	22.64
			12	6	22.50	22.67	22.67
			12	11	22.49	22.67	22.67
			25	0	22.48	22.63	22.73
		16QAM	1	0	22.21	22.29	22.26
			1	12	22.32	22.66	22.54
			1	24	22.40	22.39	22.51
			12	0	21.53	21.60	21.68
			12	6	21.50	21.65	21.75
			12	11	21.52	21.59	21.69
			25	0	21.54	21.49	21.67

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20450	20525	20600
					829MHz	836.5MHz	844MHz
Band 5	10	QPSK	1	0	23.45	23.55	23.65
			1	24	23.56	23.51	23.75
			1	49	23.55	23.62	23.84
			25	0	22.55	22.59	22.49
			25	12	22.42	22.45	22.61
			25	24	22.43	22.54	22.55
			50	0	22.51	22.55	22.76
		16QAM	1	0	22.43	22.52	22.60
			1	24	22.50	22.49	22.70
			1	49	22.41	22.60	22.73
			25	0	21.69	21.70	21.64
			25	12	21.69	21.71	21.65
			25	24	21.72	21.64	21.65
			50	0	21.79	21.68	21.64

LTE Band 7 part:

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20775	21100	21425
					2502.5MHz	2535.0MHz	2567.5MHz
Band 7	5	QPSK	1	0	23.09	22.96	22.92
			1	12	23.10	22.93	22.87
			1	24	23.19	22.89	22.84
			12	0	21.96	22.00	21.75
			12	6	22.03	22.04	21.77
			12	11	21.96	22.03	21.78
			25	0	21.95	21.87	21.64
		16QAM	1	0	21.80	21.70	21.60
			1	12	21.83	21.66	21.50
			1	24	21.94	21.68	21.51
			12	0	21.07	21.02	20.90
			12	6	21.07	21.03	20.91
			12	11	21.05	21.03	20.92
			25	0	21.21	20.96	20.94

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20800	21100	21400
					2505.0MHz	2535.0MHz	2565.0MHz
Band 7	10	QPSK	1	0	23.03	22.87	22.68
			1	24	22.89	22.95	22.73
			1	49	23.01	22.87	22.54
			25	0	21.91	21.99	21.76
			25	12	22.05	21.86	21.73
			25	24	21.89	21.82	21.70
			50	0	21.96	21.89	21.82
		16QAM	1	0	21.42	21.81	21.71
			1	24	21.59	21.80	21.57
			1	49	21.52	21.85	21.51
			25	0	21.17	21.14	20.83
			25	12	21.16	21.12	20.90
			25	24	21.11	21.10	20.82
			50	0	21.15	21.14	20.97

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20825	21100	21375
					2507.5MHz	2535.0MHz	2562.5MHz
Band 7	15	QPSK	1	0	22.63	22.91	22.76
			1	37	22.71	22.88	22.68
			1	74	22.73	22.82	22.56
			36	0	21.92	21.96	21.89
			36	16	21.86	21.92	21.71
			36	35	21.96	21.88	21.82
			75	0	21.90	21.79	21.88
		16QAM	1	0	21.89	21.87	21.82
			1	37	21.94	21.73	21.70
			1	74	21.87	21.79	21.68
			36	0	21.15	21.11	21.09
			36	16	21.12	21.13	21.11
			36	35	21.15	21.13	21.11
			75	0	21.16	21.11	20.95

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20850	21100	21350
					2510.0MHz	2535.0MHz	2560.0MHz
Band 7	20	QPSK	1	0	23.01	22.92	22.95
			1	49	23.06	22.92	22.88
			1	99	23.20	22.84	22.76
			50	0	21.87	21.91	21.92
			50	24	21.99	21.93	21.96
			50	49	21.95	21.84	21.97
			100	0	21.87	21.87	21.90
		16QAM	1	0	21.89	21.85	21.55
			1	49	21.80	21.71	21.52
			1	99	21.75	21.70	21.35
			50	0	21.20	21.29	21.09
			50	24	21.16	21.23	21.04
			50	49	21.20	21.24	21.05
			100	0	21.19	21.01	20.95

LTE Band 38 part:

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					37775	38000	38225
					2572.50MHz	2595.00MHz	2617.50MHz
Band 38	5	QPSK	1	0	22.56	23.44	23.41
			1	12	22.69	23.53	23.43
			1	24	22.78	23.65	23.48
			12	0	21.61	22.39	22.55
			12	6	21.74	22.40	22.56
			12	11	21.77	22.43	22.57
			25	0	21.64	22.32	22.56
		16QAM	1	0	21.77	22.37	22.50
			1	12	21.89	22.62	22.58
			1	24	22.16	22.79	22.73
			12	0	20.82	21.48	21.61
			12	6	20.84	21.55	21.62
			12	11	20.78	21.43	21.55
			25	0	20.95	21.52	21.54

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					378000	38000	38200
					2575.00MHz	2595.00MHz	2615.00MHz
Band 38	10	QPSK	1	0	22.91	23.33	23.53
			1	24	22.87	23.52	23.56
			1	49	22.99	23.66	23.47
			25	0	21.69	22.44	22.49
			25	12	21.86	22.24	22.58
			25	24	21.83	22.35	22.61
			50	0	21.86	22.36	22.62
		16QAM	1	0	21.80	22.16	22.56
			1	24	22.23	22.37	22.63
			1	49	21.98	22.30	22.59
			25	0	21.01	21.33	21.76
			25	12	21.05	21.34	21.80
			25	24	21.02	21.43	21.76
			50	0	20.98	21.63	21.62

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					37825	38000	38175
					2577.50MHz	2595.00MHz	2612.50MHz
Band 38	15	QPSK	1	0	22.43	23.27	23.44
			1	37	22.52	23.50	23.36
			1	74	22.73	23.50	23.40
			36	0	21.78	22.27	22.62
			36	16	21.80	22.29	22.64
			36	35	21.80	22.29	22.64
			75	0	21.84	22.49	22.59
		16QAM	1	0	22.14	22.15	22.71
			1	37	22.27	22.35	22.78
			1	74	22.31	22.40	22.83
			36	0	20.98	21.37	21.66
			36	16	20.99	21.38	21.61
			36	35	21.02	21.45	21.62
			75	0	20.98	21.53	21.72

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					37850	38000	38150
					2580.00MHz	2595.00MHz	2610.00MHz
Band 38	20	QPSK	1	0	22.84	22.96	23.41
			1	49	22.79	23.29	23.69
			1	99	22.90	23.38	23.52
			50	0	21.83	22.43	22.52
			50	24	21.85	22.45	22.64
			50	49	21.85	22.45	22.65
			100	0	22.06	22.59	22.66
		16QAM	1	0	21.92	22.52	22.48
			1	49	22.06	22.47	22.50
			1	99	22.11	22.55	22.51
			50	0	20.99	21.50	21.79
			50	24	20.99	21.50	21.80
			50	49	21.00	21.51	21.80
			100	0	21.19	21.60	21.62

LTE Band 41 part:

LTE Band	Band width (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)				
					40065	40355	40640	40750	41215
					2537.5MHz	2566.5MHz	2595.0MHz	2624.0MHz	2652.5MHz
Band 41	5	QPSK	1	0	23.11	23.14	23.33	23.20	23.65
			1	12	23.16	23.10	23.49	23.39	23.68
			1	24	23.09	23.21	23.54	23.14	23.56
			12	0	21.99	22.01	22.56	22.25	22.67
			12	6	22.07	22.21	22.54	22.58	22.69
			12	11	22.03	22.28	22.56	22.40	22.57
			25	0	22.02	22.22	22.48	22.60	22.65
		16QAM	1	0	22.01	22.35	22.56	22.61	22.80
			1	12	22.28	22.48	22.63	22.55	22.91
			1	24	21.93	22.41	22.67	22.70	22.86
			12	0	21.09	21.23	21.57	21.65	21.75
			12	6	21.10	21.35	21.64	21.51	21.70
			12	11	21.15	21.30	21.58	21.60	21.76
			25	0	21.07	21.21	21.63	21.41	21.65

LTE Band	Band width (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)				
					40090	40365	40640	40915	41190
					2540.0MHz	2567.5MHz	2595.0MHz	2622.5MHz	2650.0MHz
Band 41	10	QPSK	1	0	23.08	23.17	23.27	23.42	23.71
			1	24	23.14	23.35	23.50	23.55	23.77
			1	49	23.12	23.40	23.51	23.36	23.64
			25	0	22.06	22.10	22.27	22.40	22.58
			25	12	22.09	22.15	22.41	22.51	22.60
			25	24	22.05	22.02	22.45	22.32	22.61
			50	0	21.89	22.09	22.41	22.30	22.65
		16QAM	1	0	21.99	22.10	22.24	22.41	22.68
			1	24	22.24	22.14	22.36	22.35	22.60
			1	49	21.92	22.02	22.31	22.30	22.63
			25	0	21.20	21.02	21.36	21.23	21.86
			25	12	21.30	21.15	21.51	21.35	21.75
			25	24	21.16	21.10	21.42	21.20	21.80
			50	0	21.09	21.03	21.53	21.10	21.67

LTE Band	Band width (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)				
					40115	40375	40640	40900	41165
					2542.5MHz	2568.5MHz	2595.0MHz	2673.5MHz	2647.5MHz
Band 41	15	QPSK	1	0	22.97	23.02	23.17	23.25	23.59
			1	37	23.08	23.19	23.45	23.35	23.41
			1	74	23.07	23.11	23.39	23.07	23.33
			36	0	22.02	22.10	22.38	22.25	22.66
			36	16	22.08	22.21	22.41	22.40	22.63
			36	35	22.01	22.03	22.39	22.16	22.55
			75	0	21.99	22.10	22.37	22.10	22.56
		16QAM	1	0	22.25	22.10	22.45	22.50	22.80
			1	37	22.36	22.35	22.39	22.41	22.85
			1	74	22.17	22.22	22.34	22.39	22.82
			36	0	21.12	21.32	21.50	21.55	21.81
			36	16	21.23	21.41	21.62	21.51	21.70
			36	35	21.16	21.30	21.41	21.40	21.76
			75	0	21.15	21.40	21.57	21.23	21.72

LTE Band	Band width (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)				
					40140	40390	40640	40890	41140
					2545.0MHz	2570.0MHz	2595.0MHz	2620.0MHz	2645.0MHz
Band 41	20	QPSK	1	0	23.16	23.02	23.22	23.52	23.95
			1	49	23.21	23.15	23.39	23.14	23.79
			1	99	23.21	23.05	23.47	23.36	23.97
			50	0	22.01	22.10	22.26	22.30	22.71
			50	24	22.04	22.01	22.43	22.50	22.70
			50	49	22.04	22.09	22.29	22.64	22.75
			100	0	22.00	22.02	22.43	22.56	22.73
		16QAM	1	0	22.11	22.10	22.50	22.42	22.81
			1	49	22.06	22.21	22.33	22.59	22.70
			1	99	22.09	22.11	22.42	22.43	22.74
			50	0	21.13	21.35	21.56	21.62	21.82
			50	24	21.35	21.49	21.61	21.70	21.74
			50	49	21.20	21.40	21.50	21.55	21.83
			100	0	21.13	21.22	21.63	21.30	21.78

Note:

1. Per KDB 447498 D01v05r02 section 4.1, 6), the required test channels number is 5 for LTE Band 41.

13.4 WLAN 2.4 GHz Band Conducted Power

Channel	Frequency (MHz)	Average Power (dBm)		
		802.11 b	802.11 g	802.11n (HT20)
CH 01	2412	15.21	12.37	12.01
CH 06	2437	15.78	13.98	13.63
CH 11	2462	16.07	13.86	12.93

Note:

- Per KDB 447498 D01v06, the 1-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* $\leq$ 50 mm are determined by:

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$$
for 1-g SAR, where
 - f(GHz) is the RF channel transmit frequency in GHz
 - Power and distance are rounded to the nearest mW and mm before calculation
 - The result is rounded to one decimal place for comparison

Channel	Frequency (GHz)	Max. Tune-up Power (dBm)	Max. Power (mW)	Test distance (mm)	Result	exclusion thresholds for 1-g SAR
b/CH 11	2.462	16.5	44.67	5	14.03	3.0
g/CH 06	2.437	14.5	28.18	5	8.79	3.0

- Base on the result of note1, RF exposure evaluation of 802.11 b mode is required.
- Per KDB 248227 D01v02r02, choose the highest output power channel to test SAR and determine further SAR exclusion.
- Per KDB 248227 D01v02r02, In the 2.4 GHz band, separate SAR procedures are applied to DSSS and OFDM configurations to simplify DSSS test requirements. SAR is not required for the following 2.4 GHz OFDM conditions:
 - When KDB Publication 447498 SAR test exclusion applies to the OFDM configuration.
 - When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.
- The output power of all data rate were pre-scan, just the worst case (the lowest data rate) of all mode were shown in report.
- Per KDB 248227 D01V02r02 section 2.2, when the EUT in continuously transmitting mode, the actual duty cycle is 99.82%, so the duty cycle factor is 1.01.

13.5 Bluetooth Conducted Power

Average Power (dBm)				
Channel	Frequency (MHz)	GFSK	$\pi/4$ -DQPSK	8DPSK
CH 00	2402	7.28	5.67	6.55
CH 39	2441	9.01	7.50	8.18
CH 78	2480	8.66	7.68	8.36

Average Power (dBm)		
Channel	Frequency (MHz)	BLE
CH 00	2402	-0.39
CH 20	2442	1.85
CH 39	2480	2.34

Note:

- Per KDB 447498 D01v06, the 1-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* $\leq$ 50 mm are determined by:

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$$
for 1-g SAR, where
 - $f(\text{GHz})$ is the RF channel transmit frequency in GHz
 - Power and distance are rounded to the nearest mW and mm before calculation
 - The result is rounded to one decimal place for comparison

Channel	Frequency (GHz)	Max. tune-up Power (dBm)	Max. Power (mW)	Test distance (mm)	Result	exclusion thresholds for 1-g SAR
CH 39	2.441	9.5	8.91	5	2.78	3.0

- The max. tune-up power was provided by manufacturer, base on the result of note 1, RF exposure evaluation is not required.
- The output power of all data rate were pre-scan, just the worst case of all mode were shown in report.
- When the minimum *test separation distance* is < 5 mm, a distance of 5 mm according is applied to determine SAR test exclusion.

14 Exposure Positions Consideration

14.1 EUT Antenna Locations

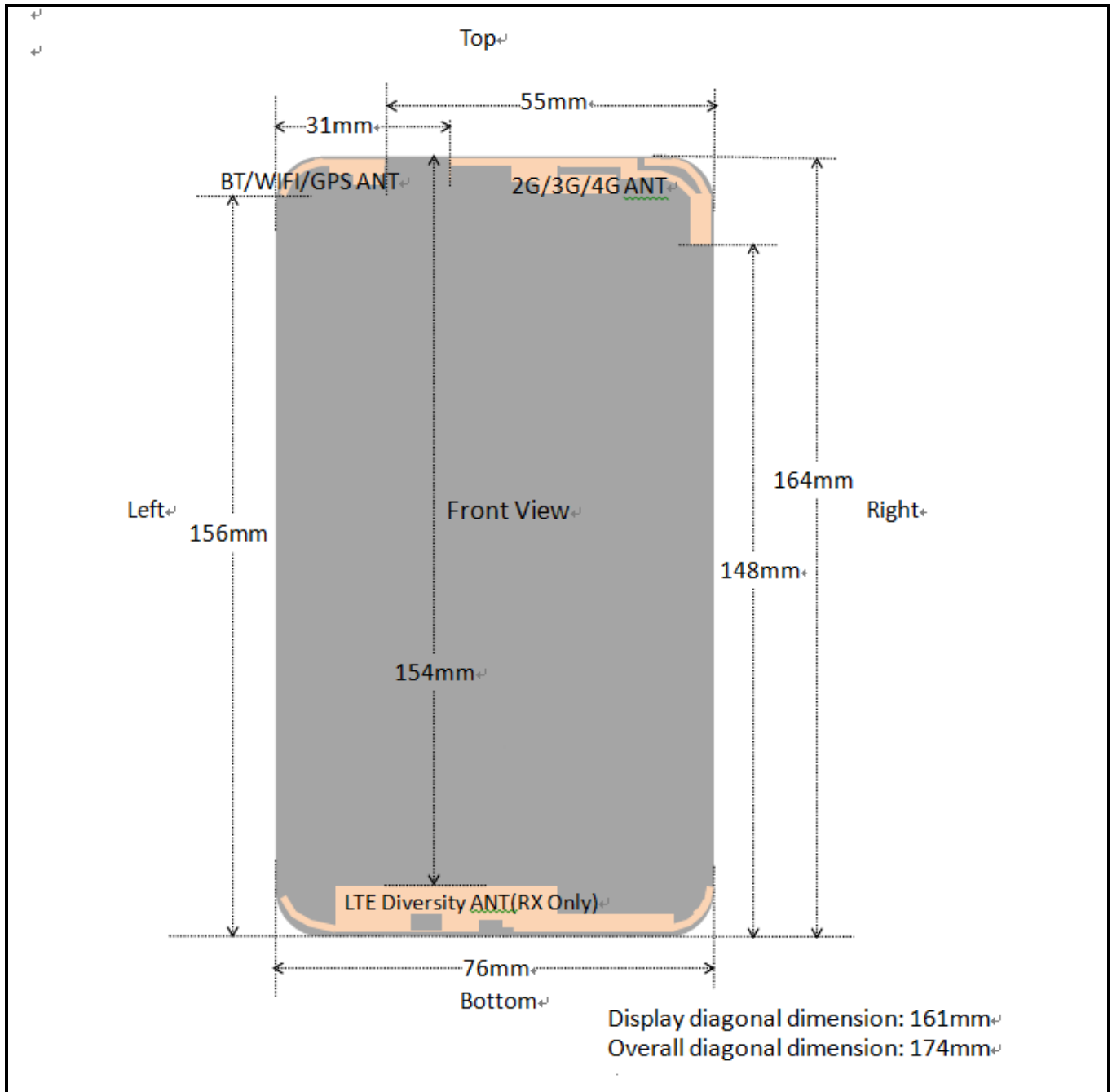


Fig.14.1 EUT Antenna Locations

Note: This antenna diagram is only used as a reference for the distance from the antenna to each edge. For the specific shape of the antenna, please refer to the physical photo.

14.2 Test Positions Consideration

Distance of Antennas to EUT edge/surface Test distance: 10mm						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
2G/3G/4G	<25mm	<25mm	<25mm	148mm	<25mm	31mm
WLAN & Bluetooth	<25mm	<25mm	<25mm	156mm	55mm	<25mm

Test Positions Test distance: 10mm						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
2G/3G/4G	Yes	Yes	Yes	Yes	Yes	No
WLAN & Bluetooth	Yes	Yes	Yes	No	No	Yes

Note:

1. Head/Body-worn/Hotspot mode SAR assessments are required.
2. Referring to KDB 941225 D06 v02r01, when the overall device length and width are $\geq 9\text{cm} \times 5\text{cm}$, the test distance is 10mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge.
3. Per KDB 447498 D01v06, for handsets the test separation distance is determined by the smallest distance between the outer surface of the device and the user, which is 0 mm for head SAR, 10 mm for hotspot SAR, and 10 mm for body-worn SAR.

15 SAR Test Results Summary

15.1 Standalone Head SAR Data

➤ GSM Head SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Variation (%)	Tune-Up Limit (dBm)	Meas. SAR _{1g} (W/kg)	Scaling Factor	Reported SAR _{1g} (W/kg)
	GSM850/Voice	Right Cheek	190	836.6	33.39	-1.19	34.0	0.559	1.151	0.643
	GSM850/Voice	Right Tilted	190	836.6	33.39	-2.14	34.0	0.453	1.151	0.521
	GSM850/Voice	Left Cheek	190	836.6	33.39	-2.60	34.0	0.779	1.151	0.897
	GSM850/Voice	Left Cheek	128	824.2	33.21	2.01	34.0	0.587	1.199	0.704
1	GSM850/Voice	Left Cheek	251	848.8	33.32	1.04	34.0	0.784	1.169	0.916
	GSM850/Voice	Left Tilted	190	836.6	33.39	-1.24	34.0	0.621	1.151	0.715
	GSM1900/Voice	Right Cheek	810	1909.8	30.01	2.71	30.5	0.398	1.119	0.445
	GSM1900/Voice	Right Tilted	810	1909.8	30.01	-1.14	30.5	0.696	1.119	0.779
	GSM1900/Voice	Left Cheek	810	1909.8	30.01	-1.02	30.5	0.546	1.119	0.611
2	GSM1900/Voice	Left Tilted	810	1909.8	30.01	1.80	30.5	0.859	1.119	0.961
	GSM1900/Voice	Left Tilted	810	1909.8	30.01	0.19	30.5	0.856	1.119	0.958
	GSM1900/Voice	Left Tilted	512	1850.2	29.81	-2.54	30.5	0.841	1.172	0.986
	GSM1900/Voice	Left Tilted	661	1880.0	29.95	-1.85	30.5	0.753	1.135	0.855
ANSI / IEEE C95.1 – SAFETY LIMIT					1.6 W/kg (mW/g)					
Spatial Peak					Averaged over 1g					
Uncontrolled Exposure/General Population										

➤ WCDMA Head SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Variation (%)	Tune-Up Limit (dBm)	Meas. SAR _{1g} (W/kg)	Scaling Factor	Reported SAR _{1g} (W/kg)
	Band V/RMC	Right Cheek	4233	846.6	23.99	0.28	24.5	0.484	1.125	0.545
	Band V/RMC	Right Tilted	4233	846.6	23.99	-2.31	24.5	0.334	1.125	0.376
3	Band V/RMC	Left Cheek	4233	846.6	23.99	-1.61	24.5	0.708	1.125	0.797
	Band V/RMC	Left Tilted	4233	846.6	23.99	2.35	24.5	0.480	1.125	0.540
	Band II/RMC	Right Cheek	9538	1907.6	22.93	-0.32	23.5	0.365	1.140	0.416
	Band II/RMC	Right Tilted	9538	1907.6	22.93	0.57	23.5	0.563	1.140	0.642
	Band II/RMC	Left Cheek	9538	1907.6	22.93	-3.89	23.5	0.527	1.140	0.601
4	Band II/RMC	Left Tilted	9538	1907.6	22.93	-1.12	23.5	0.650	1.140	0.741
ANSI / IEEE C95.1 – SAFETY LIMIT					1.6 W/kg (mW/g)					
Spatial Peak					Averaged over 1g					
Uncontrolled Exposure/General Population										

➤ FDD-LTE Band 2(20MHz) QPSK Head SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Variation (%)	Tune-Up Limit (dBm)	Meas. SAR _{1g} (W/kg)	Scaling Factor	Reported SAR _{1g} (W/kg)
	Band2/1RB#99	Right Cheek	19100	1900.0	22.73	-1.08	23.0	0.225	1.064	0.239
	Band2/1RB#99	Right Tilted	19100	1900.0	22.73	2.00	23.0	0.472	1.064	0.502
	Band2/1RB#99	Left Cheek	19100	1900.0	22.73	-0.03	23.0	0.396	1.064	0.421
5	Band2/1RB#99	Left Tilted	19100	1900.0	22.73	1.09	23.0	0.545	1.064	0.580
	Band2/50%RB#49	Right Cheek	19100	1900.0	21.37	-1.55	22.0	0.210	1.156	0.243
	Band2/50%RB#49	Right Tilted	19100	1900.0	21.37	0.73	22.0	0.425	1.156	0.491
	Band2/50%RB#49	Left Cheek	19100	1900.0	21.37	1.99	22.0	0.384	1.156	0.444
	Band2/50%RB#49	Left Tilted	19100	1900.0	21.37	-1.74	22.0	0.541	1.156	0.625
ANSI / IEEE C95.1 – SAFETY LIMIT					1.6 W/kg (mW/g)					
Spatial Peak					Averaged over 1g					
Uncontrolled Exposure/General Population										

➤ FDD-LTE Band 4(20MHz) QPSK Head SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Variation (%)	Tune-Up Limit (dBm)	Meas. SAR _{1g} (W/kg)	Scaling Factor	Reported SAR _{1g} (W/kg)
	Band4/1RB#0	Right Cheek	20050	1720.0	22.78	-0.87	23.0	0.215	1.052	0.226

	Band4/1RB#0	Right Tilted	20050	1720.0	22.78	0.20	23.0	0.351	1.052	0.369
	Band4/1RB#0	Left Cheek	20050	1720.0	22.78	0.49	23.0	0.241	1.052	0.254
6	Band4/1RB#0	Left Tilted	20050	1720.0	22.78	-2.98	23.0	0.376	1.052	0.396
	Band4/50%RB#0	Right Cheek	20300	1745.0	21.37	2.52	22.0	0.206	1.156	0.238
	Band4/50%RB#0	Right Tilted	20300	1745.0	21.37	1.81	22.0	0.337	1.156	0.390
	Band4/50%RB#0	Left Cheek	20300	1745.0	21.37	-2.45	22.0	0.230	1.156	0.266
	Band4/50%RB#0	Left Tilted	20300	1745.0	21.37	-0.28	22.0	0.355	1.156	0.410
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							1.6 W/kg (mW/g) Averaged over 1g			

➤ FDD-LTE Band 5(10MHz) QPSK Head SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Variation (%)	Tune-Up Limit (dBm)	Meas. SAR _{1g} (W/kg)	Scaling Factor	Reported SAR _{1g} (W/kg)
	Band5/1RB#49	Right Cheek	20600	844.0	23.84	2.80	24.5	0.446	1.164	0.519
	Band5/1RB#49	Right Tilted	20600	844.0	23.84	2.13	24.5	0.251	1.164	0.292
7	Band5/1RB#49	Left Cheek	20600	844.0	23.84	-0.60	24.5	0.628	1.164	0.731
	Band5/1RB#49	Left Tilted	20600	844.0	23.84	-0.58	24.5	0.441	1.164	0.513
	Band5/50%RB#12	Right Cheek	20600	844.0	22.61	-1.30	23.0	0.372	1.094	0.407
	Band5/50%RB#12	Right Tilted	20600	844.0	22.61	-2.78	23.0	0.215	1.094	0.235
	Band5/50%RB#12	Left Cheek	20600	844.0	22.61	-1.07	23.0	0.534	1.094	0.584
	Band5/50%RB#12	Left Tilted	20600	844.0	22.61	-2.81	23.0	0.361	1.094	0.395
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							1.6 W/kg (mW/g) Averaged over 1g			

➤ FDD-LTE Band 7(20MHz) QPSK Head SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Variation (%)	Tune-Up Limit (dBm)	Meas. SAR _{1g} (W/kg)	Scaling Factor	Reported SAR _{1g} (W/kg)
	Band7/1RB#99	Right Cheek	20850	2510.0	23.20	-0.89	23.5	0.142	1.072	0.152
	Band7/1RB#99	Right Tilted	20850	2510.0	23.20	1.11	23.5	0.154	1.072	0.165
	Band7/1RB#99	Left Cheek	20850	2510.0	23.20	0.87	23.5	0.252	1.072	0.270
8	Band7/1RB#99	Left Tilted	20850	2510.0	23.20	0.73	23.5	0.291	1.072	0.312
	Band7/50%RB#24	Right Cheek	20850	2510.0	21.99	1.65	22.5	0.122	1.125	0.137
	Band7/50%RB#24	Right Tilted	20850	2510.0	21.99	-1.12	22.5	0.156	1.125	0.176
	Band7/50%RB#24	Left Cheek	20850	2510.0	21.99	1.74	22.5	0.232	1.125	0.261
	Band7/50%RB#24	Left Tilted	20850	2510.0	21.99	2.62	22.5	0.276	1.125	0.311
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							1.6 W/kg (mW/g) Averaged over 1g			

➤ TDD-LTE Band 41(20MHz) QPSK Head SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Variation (%)	Tune-Up Limit (dBm)	Meas. SAR _{1g} (W/kg)	Scaling Factor	D.C Factor	Reported SAR _{1g} (W/kg)
	Band41/1RB#99	Right Cheek	41140	2645.0	23.97	-3.00	24.5	0.089	1.130	1.008	0.101
	Band41/1RB#99	Right Tilted	41140	2645.0	23.97	1.14	24.5	0.126	1.130	1.008	0.144
	Band41/1RB#99	Left Cheek	41140	2645.0	23.97	-2.28	24.5	0.177	1.130	1.008	0.202
9	Band41/1RB#99	Left Tilted	41140	2645.0	23.97	3.10	24.5	0.233	1.130	1.008	0.265
	Band41/50%RB#49	Right Cheek	41140	2645.0	22.75	-1.44	23.0	0.075	1.059	1.008	0.080
	Band41/50%RB#49	Right Tilted	41140	2645.0	22.75	2.09	23.0	0.098	1.059	1.008	0.105
	Band41/50%RB#49	Left Cheek	41140	2645.0	22.75	2.95	23.0	0.115	1.059	1.008	0.123
	Band41/50%RB#49	Left Tilted	41140	2645.0	22.75	-1.92	23.0	0.174	1.059	1.008	0.186
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					1.6 W/kg (mW/g) Averaged over 1g						

➤ WLAN 2.4 GHz Head SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Variation (%)	Tune-Up Limit (dBm)	Meas. SAR _{1g} (W/kg)	Scaling Factor	D.C Factor	Reported SAR _{1g} (W/kg)
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					(dBm)	(%)	(dBm)	(W/kg)			(W/kg)
10	2.4GHz/802.11b	Right Cheek	11	2462	16.07	-0.66	16.5	0.606	1.104	1.01	0.676
	2.4GHz/802.11b	Right Tilted	11	2462	16.07	-2.14	16.5	0.512	1.104	1.01	0.571
	2.4GHz/802.11b	Left Cheek	11	2462	16.07	-2.39	16.5	0.284	1.104	1.01	0.317
	2.4GHz/802.11b	Left Tilted	11	2462	16.07	0.21	16.5	0.217	1.104	1.01	0.242
ANSI / IEEE C95.1 – SAFETY LIMIT					1.6 W/kg (mW/g)						
Spatial Peak					Averaged over 1g						
Uncontrolled Exposure/General Population											

Note:

1. Per KDB 447498 D01v06, for each exposure position, if the highest output power channel Reported SAR ≤ 0.8 W/kg, other channels SAR testing is not necessary.
2. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required when the measured SAR is ≥ 0.8 W/kg.
3. Per KDB 941225 D05v02r05, 100% RB allocation SAR measurement is not required when the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg.
4. Per KDB 248227 D01v02r02, for 802.11b DSSS , when the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in that exposure configuration.
5. Per KDB 248227 D01v02r02, OFDM SAR is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg. Cuz the maximum output power specified for OFDM and DSSS are 28.18mW(14.5dBm) and 44.67mW(16.5dBm), the scaled SAR would be $0.676 \times (28.18/44.67) = 0.426$ W/Kg < 1.2 W/kg, therefore, SAR is not required for OFDM.
6. According to KDB 865664 D02v01r02, SAR plot is required for the highest measured SAR in each exposure configuration, wireless mode and frequency band combination.

15.2 Standalone Body SAR

➤ GSM Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Variation (%)	Tune-Up Limit (dBm)	Meas. SAR _{1g} (W/kg)	Scaling Factor	Reported SAR _{1g} (W/kg)
	GPRS850/2 slots	Front	190	836.6	31.04	0.60	31.5	0.115	1.112	0.128
11	GPRS850/2 slots	Back	190	836.6	31.04	1.46	31.5	0.222	1.112	0.247
	GPRS1900/3 slots	Front	512	1850.2	26.38	-0.31	27.0	0.395	1.153	0.455
12	GPRS1900/3 slots	Back	512	1850.2	26.38	-4.45	27.0	0.785	1.153	0.905
	GPRS1900/3 slots	Back	661	1880.0	26.18	2.29	27.0	0.711	1.208	0.859
	GPRS1900/3 slots	Back	810	1909.8	25.96	-2.10	27.0	0.638	1.271	0.811
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					1.6 W/kg (mW/g) Averaged over 1g					

➤ WCDMA Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Variation (%)	Tune-Up Limit (dBm)	Meas. SAR _{1g} (W/kg)	Scaling Factor	Reported SAR _{1g} (W/kg)
	Band V/RMC	Front	4233	846.6	23.99	0.43	24.5	0.175	1.125	0.197
13	Band V/RMC	Back	4233	846.6	23.99	1.00	24.5	0.346	1.125	0.389
	Band II/RMC	Front	9538	1907.6	22.93	0.93	23.5	0.195	1.140	0.222
14	Band II/RMC	Back	9538	1907.6	22.93	-0.13	23.5	0.270	1.140	0.308
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					1.6 W/kg (mW/g) Averaged over 1g					

➤ FDD-LTE Band 2(20MHz) QPSK Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Variation (%)	Tune-Up Limit (dBm)	Meas. SAR _{1g} (W/kg)	Scaling Factor	Reported SAR _{1g} (W/kg)
	Band2/1RB#99	Front	19100	1900.0	22.73	-0.22	23.0	0.144	1.064	0.153
15	Band2/1RB#99	Back	19100	1900.0	22.73	2.82	23.0	0.215	1.064	0.229
	Band2/50%RB#49	Front	19100	1900.0	21.37	-2.58	22.0	0.112	1.156	0.129
	Band2/50%RB#49	Back	19100	1900.0	21.37	2.09	22.0	0.195	1.156	0.225
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					1.6 W/kg (mW/g) Averaged over 1g					

➤ FDD-LTE Band 4(20MHz) QPSK Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Variation (%)	Tune-Up Limit (dBm)	Meas. SAR _{1g} (W/kg)	Scaling Factor	Reported SAR _{1g} (W/kg)
	Band4/1RB#0	Front	20050	1720.0	22.78	0.67	23.0	0.125	1.052	0.132
16	Band4/1RB#0	Back	20050	1720.0	22.78	-2.56	23.0	0.171	1.052	0.180
	Band4/50%RB#0	Front	20300	1745.0	21.37	-1.85	22.0	0.115	1.156	0.133
	Band4/50%RB#0	Back	20300	1745.0	21.37	-0.60	22.0	0.156	1.156	0.180
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					1.6 W/kg (mW/g) Averaged over 1g					

➤ FDD-LTE Band 5(10MHz) QPSK Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Variation (%)	Tune-Up Limit (dBm)	Meas. SAR _{1g} (W/kg)	Scaling Factor	Reported SAR _{1g} (W/kg)
	Band5/1RB#49	Front	20600	844.0	23.84	1.18	24.5	0.161	1.164	0.187
17	Band5/1RB#49	Back	20600	844.0	23.84	-2.69	24.5	0.315	1.164	0.367
	Band5/50%RB#12	Front	20600	844.0	22.61	-0.59	23.0	0.142	1.094	0.155
	Band5/50%RB#12	Back	20600	844.0	22.61	-2.63	23.0	0.252	1.094	0.276
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak					1.6 W/kg (mW/g) Averaged over 1g					

Uncontrolled Exposure/General Population

➤ FDD-LTE Band 7(20MHz) QPSK Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Variation (%)	Tune-Up Limit (dBm)	Meas. SAR _{1g} (W/kg)	Scaling Factor	Reported SAR _{1g} (W/kg)
	Band7/1RB#99	Front	20850	2510.0	23.20	-0.12	23.5	0.075	1.072	0.080
18	Band7/1RB#99	Back	20850	2510.0	23.20	1.99	23.5	0.088	1.072	0.094
	Band7/50%RB#24	Front	20850	2510.0	21.99	1.65	22.5	0.069	1.125	0.078
	Band7/50%RB#24	Back	20850	2510.0	21.99	-1.62	22.5	0.081	1.125	0.091
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					1.6 W/kg (mW/g) Averaged over 1g					

➤ TDD-LTE Band 41(20MHz) QPSK Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Variation (%)	Tune-Up Limit (dBm)	Meas. SAR _{1g} (W/kg)	Scaling Factor	D.C Factor	Reported SAR _{1g} (W/kg)
	Band41/1RB#99	Front	41140	2645.0	23.97	1.60	24.5	0.033	1.130	1.008	0.038
19	Band41/1RB#99	Back	41140	2645.0	23.97	0.62	24.5	0.036	1.130	1.008	0.041
	Band41/50%RB#49	Front	41140	2645.0	22.75	-0.28	23.0	0.030	1.059	1.008	0.032
	Band41/50%RB#49	Back	41140	2645.0	22.75	1.03	23.0	0.032	1.059	1.008	0.034
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					1.6 W/kg (mW/g) Averaged over 1g						

➤ WLAN 2.4 GHz Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Variation (%)	Tune-Up Limit (dBm)	Meas. SAR _{1g} (W/kg)	Scaling Factor	D.C Factor	Reported SAR _{1g} (W/kg)
	2.4GHz/802.11b	Front	11	2462	16.07	-2.52	16.5	0.168	1.104	1.01	0.187
20	2.4GHz/802.11b	Back	11	2462	16.07	0.16	16.5	0.281	1.104	1.01	0.313
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					1.6 W/kg (mW/g) Averaged over 1g						

Note:

- Body-worn SAR testing was performed at 10mm separation, and this distance is determined by the handset manufacturer that there will be body-worn accessories that users may acquire at the time of equipment certification, to enable users to purchase aftermarket body-worn accessories with the required minimum separation.
- Per KDB 941225 D06v02r01, when the same wireless modes and device transmission configurations are required for testing body-worn accessories and hotspot mode, it is not necessary to test body-worn accessory SAR for the same device orientation if the test separation distance for hotspot mode is more conservative than that used for body-worn accessories.
- Body-worn exposure conditions are intended to voice call operations, therefore GSM voice call is selected to be tested.
- Per KDB 648474 D04v01r03, when the *Reported* SAR for a body-worn accessory measured without a headset connected to the handset is ≤ 1.2 W/kg, SAR testing with a headset connected to the handset is not required.
- The WLAN SAR perform the front and back position, due considered the simultaneous SAR for body-worn.
- Per KDB 447498 D01v06, for each exposure position, if the highest output channel Reported SAR ≤ 0.8 W/kg, other channels SAR testing is not necessary.
- Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required when the measured SAR is ≥ 0.8 W/kg.
- Per KDB 941225 D05v02r05, 100% RB allocation SAR measurement is not required when the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg.
- According to KDB 865664 D02v01r02, SAR plot is required for the highest measured SAR in each exposure configuration, wireless mode and frequency band combination.

15.3 Body SAR in Hotspot Mode

➤ GSM Body SAR in Hotspot mode

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Variation (%)	Tune-Up Limit (dBm)	Meas. SAR _{1g} (W/kg)	Scaling Factor	Reported SAR _{1g} (W/kg)
	GPRS850/2 slots	Front	190	836.6	31.04	0.60	31.5	0.115	1.112	0.128
11	GPRS850/2 slots	Back	190	836.6	31.04	1.46	31.5	0.222	1.112	0.247
	GPRS850/2 slots	Right	190	836.6	31.04	-0.50	31.5	0.022	1.112	0.024
	GPRS850/2 slots	Top	190	836.6	31.04	1.03	31.5	0.137	1.112	0.152
	GPRS1900/3 slots	Front	512	1850.2	26.38	-0.31	27.0	0.395	1.153	0.455
	GPRS1900/3 slots	Back	512	1850.2	26.38	-4.45	27.0	0.785	1.153	0.905
	GPRS1900/3 slots	Back	661	1880.0	26.18	2.29	27.0	0.711	1.208	0.859
	GPRS1900/3 slots	Back	810	1909.8	25.96	-2.10	27.0	0.638	1.271	0.811
	GPRS1900/3 slots	Right	512	1850.2	26.38	-1.71	27.0	0.035	1.153	0.040
21	GPRS1900/3 slots	Top	512	1850.2	26.38	1.93	27.0	1.017	1.153	1.173
	GPRS1900/3 slots	Top	512	1850.2	26.38	2.32	27.0	0.995	1.153	1.147
	GPRS1900/3 slots	Top	661	1880.0	26.18	1.35	27.0	0.921	1.208	1.113
	GPRS1900/3 slots	Top	810	1909.8	25.96	-2.18	27.0	0.822	1.271	1.045
ANSI / IEEE C95.1 – SAFETY LIMIT					1.6 W/kg (mW/g)					
Spatial Peak					Averaged over 1g					
Uncontrolled Exposure/General Population										

➤ WCDMA Body SAR in Hotspot mode

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Variation (%)	Tune-Up Limit (dBm)	Meas. SAR _{1g} (W/kg)	Scaling Factor	Reported SAR _{1g} (W/kg)
	Band V/RMC	Front	4233	846.6	23.99	0.43	24.5	0.175	1.125	0.197
13	Band V/RMC	Back	4233	846.6	23.99	1.00	24.5	0.346	1.125	0.389
	Band V/RMC	Right	4233	846.6	23.99	-1.75	24.5	0.026	1.125	0.029
	Band V/RMC	Top	4233	846.6	23.99	1.99	24.5	0.230	1.125	0.259
	Band II/RMC	Front	9538	1907.6	22.93	0.93	23.5	0.195	1.140	0.222
	Band II/RMC	Back	9538	1907.6	22.93	-1.13	23.5	0.270	1.140	0.308
	Band II/RMC	Right	9538	1907.6	22.93	-0.70	23.5	0.011	1.140	0.013
22	Band II/RMC	Top	9538	1907.6	22.93	-0.59	23.5	0.337	1.140	0.384
ANSI / IEEE C95.1 – SAFETY LIMIT					1.6 W/kg (mW/g)					
Spatial Peak					Averaged over 1g					
Uncontrolled Exposure/General Population										

➤ FDD-LTE Band 2(20MHz) QPSK Body SAR in Hotspot mode

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Variation (%)	Tune-Up Limit (dBm)	Meas. SAR _{1g} (W/kg)	Scaling Factor	Reported SAR _{1g} (W/kg)
	Band2/1RB#99	Front	19100	1900.0	22.73	-0.22	23.0	0.144	1.064	0.153
	Band2/1RB#99	Back	19100	1900.0	22.73	2.82	23.0	0.215	1.064	0.229
	Band2/1RB#99	Right	19100	1900.0	22.73	-0.39	23.0	0.018	1.064	0.019
23	Band2/1RB#99	Top	19100	1900.0	22.73	-1.36	23.0	0.321	1.064	0.342
	Band2/50%RB#49	Front	19100	1900.0	21.37	-2.58	22.0	0.112	1.156	0.129
	Band2/50%RB#49	Back	19100	1900.0	21.37	2.09	22.0	0.195	1.156	0.225
	Band2/50%RB#49	Right	19100	1900.0	21.37	0.20	22.0	0.015	1.156	0.017
	Band2/50%RB#49	Top	19100	1900.0	21.37	-2.76	22.0	0.301	1.156	0.348
ANSI / IEEE C95.1 – SAFETY LIMIT					1.6 W/kg (mW/g)					
Spatial Peak					Averaged over 1g					
Uncontrolled Exposure/General Population										

➤ FDD-LTE Band 4(20MHz) QPSK Body SAR in Hotspot mode

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Variation (%)	Tune-Up Limit (dBm)	Meas. SAR _{1g} (W/kg)	Scaling Factor	Reported SAR _{1g} (W/kg)
	Band4/1RB#0	Front	20050	1720.0	22.78	0.67	23.0	0.125	1.052	0.132
	Band4/1RB#0	Back	20050	1720.0	22.78	-2.56	23.0	0.171	1.052	0.180
	Band4/1RB#0	Right	20050	1720.0	22.78	1.57	23.0	0.012	1.052	0.013

24	Band4/1RB#0	Top	20050	1720.0	22.78	-1.62	23.0	0.234	1.052	0.246
	Band4/50%RB#0	Front	20300	1745.0	21.37	-1.85	22.0	0.115	1.156	0.133
	Band4/50%RB#0	Back	20300	1745.0	21.37	-0.60	22.0	0.156	1.156	0.180
	Band4/50%RB#0	Right	20300	1745.0	21.37	2.19	22.0	0.010	1.156	0.012
	Band4/50%RB#0	Top	20300	1745.0	21.37	-0.96	22.0	0.210	1.156	0.243
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							1.6 W/kg (mW/g) Averaged over 1g			

➤ FDD-LTE Band 5(10MHz) QPSK Body SAR in Hotspot mode

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Variation (%)	Tune-Up Limit (dBm)	Meas. SAR _{1g} (W/kg)	Scaling Factor	Reported SAR _{1g} (W/kg)
	Band5/1RB#49	Front	20600	844.0	23.84	1.18	24.5	0.161	1.164	0.187
17	Band5/1RB#49	Back	20600	844.0	23.84	-2.69	24.5	0.315	1.164	0.367
	Band5/1RB#49	Right	20600	844.0	23.84	0.31	24.5	0.139	1.164	0.162
	Band5/1RB#49	Top	20600	844.0	23.84	0.70	24.5	0.200	1.164	0.233
	Band5/50%RB#12	Front	20600	844.0	22.61	-0.59	23.0	0.142	1.094	0.155
	Band5/50%RB#12	Back	20600	844.0	22.61	-2.63	23.0	0.252	1.094	0.276
	Band5/50%RB#12	Right	20600	844.0	22.61	-0.58	23.0	0.116	1.094	0.127
	Band5/50%RB#12	Top	20600	844.0	22.61	0.77	23.0	0.162	1.094	0.177
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							1.6 W/kg (mW/g) Averaged over 1g			

➤ FDD-LTE Band 7(20MHz) QPSK Body SAR in Hotspot mode

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Variation (%)	Tune-Up Limit (dBm)	Meas. SAR _{1g} (W/kg)	Scaling Factor	Reported SAR _{1g} (W/kg)
	Band7/1RB#99	Front	20850	2510.0	23.20	-0.12	23.5	0.075	1.072	0.080
	Band7/1RB#99	Back	20850	2510.0	23.20	1.99	23.5	0.088	1.072	0.094
	Band7/1RB#99	Right	20850	2510.0	23.20	-1.70	23.5	0.021	1.072	0.023
25	Band7/1RB#99	Top	20850	2510.0	23.20	-0.11	23.5	0.166	1.072	0.178
	Band7/50%RB#24	Front	20850	2510.0	21.99	1.65	22.5	0.069	1.125	0.078
	Band7/50%RB#24	Back	20850	2510.0	21.99	-1.62	22.5	0.081	1.125	0.091
	Band7/50%RB#24	Right	20850	2510.0	21.99	-0.71	22.5	0.020	1.125	0.023
	Band7/50%RB#24	Top	20850	2510.0	21.99	-1.80	22.5	0.165	1.125	0.186
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							1.6 W/kg (mW/g) Averaged over 1g			

➤ TDD-LTE Band 41(20MHz) QPSK Body SAR in Hotspot mode

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Variation (%)	Tune-Up Limit (dBm)	Meas. SAR _{1g} (W/kg)	Scaling Factor	D.C Factor	Reported SAR _{1g} (W/kg)
	Band41/1RB#99	Front	41140	2645.0	23.97	1.60	24.5	0.033	1.130	1.008	0.038
	Band41/1RB#99	Back	41140	2645.0	23.97	0.62	24.5	0.036	1.130	1.008	0.041
	Band41/1RB#99	Right	41140	2645.0	23.97	-1.92	24.5	0.010	1.130	1.008	0.011
26	Band41/1RB#99	Top	41140	2645.0	23.97	2.63	24.5	0.118	1.130	1.008	0.134
	Band41/50%RB#49	Front	41140	2645.0	22.75	-0.28	23.0	0.030	1.059	1.008	0.032
	Band41/50%RB#49	Back	41140	2645.0	22.75	1.03	23.0	0.032	1.059	1.008	0.034
	Band41/50%RB#49	Right	41140	2645.0	22.75	-0.44	23.0	0.006	1.059	1.008	0.006
	Band41/50%RB#49	Top	41140	2645.0	22.75	-1.01	23.0	0.089	1.059	1.008	0.095
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					1.6 W/kg (mW/g) Averaged over 1g						

➤ WLAN 2.4GHz Body SAR in Hotspot mode

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Variation (%)	Tune-Up Limit (dBm)	Meas. SAR _{1g} (W/kg)	Scaling Factor	D.C Factor	Reported SAR _{1g} (W/kg)
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	2.4GHz/802.11b	Front	11	2462	16.07	-2.52	16.5	0.168	1.104	1.01	0.187
20	2.4GHz/802.11b	Back	11	2462	16.07	0.16	16.5	0.281	1.104	1.01	0.313
	2.4GHz/802.11b	Left	11	2462	16.07	-0.49	16.5	0.085	1.104	1.01	0.095
	2.4GHz/802.11b	Top	11	2462	16.07	2.30	16.5	0.094	1.104	1.01	0.105
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					1.6 W/kg (mW/g) Averaged over 1g						

Note:

- Per KDB 447498 D01v06, for each exposure position, if the highest output channel Reported SAR ≤ 0.8 W/kg, other channels SAR testing is not necessary.
- Additional WLAN SAR testing was performed for simultaneous transmission analysis.
- For Hotspot SAR testing, per KDB 941225 D06v02r01, for EUT dimension ≥ 9 cm*5cm, the test distance is 10mm. SAR must be measured for all surfaces and sides with a transmitting antenna located within 2.5cm from that surface or edge.
- Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. If HSDPA output power is < 0.25 dB higher than RMC 12.2kbps, or Reported SAR with RMC 12.2kbps setting is ≤ 1.2 W/kg, HSDPA SAR evaluation can be excluded.
- Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required when the measured SAR is ≥ 0.8 W/kg.
- Per KDB 648474 D04v01r03, when the Reported SAR for a body-worn accessory measured without a headset connected to the handset is > 1.2 W/kg, SAR testing with a headset connected to the handset is required.
- Per KDB 941225 D05v02r05, 100% RB allocation SAR measurement is not required when the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel.
- According to KDB 865664 D02v01r02, SAR plot is required for the highest measured SAR in each exposure configuration, wireless mode and frequency band combination.
- Highlight part of test data means repeated test.

15.4 Repeated SAR measurement

Band/ Mode	Test Position	CH.	Freq. (MHz)	Measured SAR (W/kg)				
				Original	1 st Repeated		2 nd Repeated	
					Value	Ratio	Value	Ratio
GSM1900/Voice	Left Tilted	810	1909.8	0.859	0.856	1.00	/	/
GPRS1900/3 slots	Top	512	1850.2	1.017	0.995	1.02	/	/
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population				1.6 W/kg (mW/g) Averaged over 1g				

Note:

- Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥ 0.8 W/kg
- Per KDB 865664 D01v01r04, if the ratio of *original* and *repeated* is ≤ 1.2 and the measured SAR < 1.45 W/kg, only one repeated measurement is required.

15.5 Multi-Band Simultaneous Transmission Considerations

➤ Simultaneous Transmission Capabilities

According to FCC KDB Publication 447498 D01v06, transmitters are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds. Possible transmission paths for the EUT are shown in below Figure and are color-coded to indicate communication modes which share the same path. Modes which share the same transmission path cannot transmit simultaneously with one another.



Fig.15.1 Simultaneous Transmission Paths

➤ Simultaneous Transmission Procedures

This device contains transmitters that may operate simultaneously. Therefore simultaneous transmission analysis is required. Per FCC KDB 447498 D01v06, simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is ≤ 1.6 W/kg. When standalone SAR is not required to be measured, per FCC KDB 447498 D01v06 4.3.2), the following equation must be used to estimate the standalone 1g SAR for simultaneous transmission assessment involving that transmitter.

$$\text{Estimated SAR} = \frac{\sqrt{f(\text{GHz})}}{7.5} \cdot \frac{\text{Max. power of channel, mW}}{\text{Min. Separation Distance, mm}}$$

Mode	Max. tune-up Power (dBm)	Exposure Position	Head	Body	Hotspot
		Test Distance (mm)	0	10	10
Bluetooth	9.5	Estimated SAR (W/kg)	0.370	0.185	0.185

Note:

- When the minimum *test separation distance* is < 5 mm, a distance of 5 mm according is applied to determine estimated SAR.

➤ Multi-Band simultaneous Transmission Consideration

Simultaneous Transmission Consideration	Position	Applicable Combination
	Head	WWAN (Voice) + WLAN 2.4 GHz
		WWAN (Voice) + Bluetooth
	Body	WWAN (Voice) + WLAN 2.4 GHz
		WWAN (Voice) + Bluetooth
	Hotspot	WWAN (Data) + WLAN 2.4 GHz
		WWAN (Data) + Bluetooth

Note:

- WLAN 2.4GHz Band and Bluetooth share the same antenna, and cannot transmit simultaneously.
- GSM/WCDMA/LTE shares the same antenna, and cannot transmit simultaneously.
- The Report SAR summation is calculated based on the same configuration and test position.
- Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
 - Scalar SAR summation < 1.6 W/kg.
 - $SPLSR = (SAR_1 + SAR_2)^{1.5} / (\text{min. separation distance, mm})$, and the peak separation distance is determined from the square root of $[(x_1 - x_2)^2 + (y_1 - y_2)^2 + (z_1 - z_2)^2]$, where (x_1, y_1, z_1) and (x_2, y_2, z_2) are the coordinates of the extrapolated peak SAR locations in the zoom scan If $SPLSR \leq 0.04$, simultaneously transmission SAR measurement is not necessary
 - Simultaneously transmission SAR measurement, and the Reported multi-band SAR < 1.6 W/kg

15.6 SAR Simultaneous Transmission Analysis

➤ Head Simultaneous Transmission

WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	WLAN SAR _{1g} (W/kg)	Σ SAR (W/kg)	WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	Bluetooth Estimated SAR _{1g} (W/kg)	Σ SAR (W/kg)
GSM 850	Right Cheek	0.643	0.676	1.319	GSM 850	Right Cheek	0.643	0.370	1.013
	Right Tilted	0.521	0.571	1.092		Right Tilted	0.521	0.370	0.891
	Left Cheek	0.897	0.317	1.214		Left Cheek	0.897	0.370	1.267
	Left Tilted	0.704	0.242	0.946		Left Tilted	0.704	0.370	1.074

WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	WLAN SAR _{1g} (W/kg)	Σ SAR (W/kg)	WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	Bluetooth Estimated SAR _{1g} (W/kg)	Σ SAR (W/kg)
GSM 1900	Right Cheek	0.445	0.676	1.121	GSM 1900	Right Cheek	0.445	0.370	0.815
	Right Tilted	0.779	0.571	1.350		Right Tilted	0.779	0.370	1.149
	Left Cheek	0.611	0.317	0.928		Left Cheek	0.611	0.370	0.981
	Left Tilted	0.986	0.242	1.228		Left Tilted	0.986	0.370	1.356

WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	WLAN SAR _{1g} (W/kg)	Σ SAR (W/kg)	WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	Bluetooth Estimated SAR _{1g} (W/kg)	Σ SAR (W/kg)
WCDMA Band V	Right Cheek	0.545	0.676	1.221	WCDMA Band V	Right Cheek	0.545	0.370	0.915
	Right Tilted	0.376	0.571	0.947		Right Tilted	0.376	0.370	0.746
	Left Cheek	0.797	0.317	1.114		Left Cheek	0.797	0.370	1.167
	Left Tilted	0.540	0.242	0.782		Left Tilted	0.540	0.370	0.910

WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	WLAN SAR _{1g} (W/kg)	Σ SAR (W/kg)	WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	Bluetooth Estimated SAR _{1g} (W/kg)	Σ SAR (W/kg)
WCDMA Band II	Right Cheek	0.416	0.676	1.092	WCDMA Band II	Right Cheek	0.416	0.370	0.786
	Right Tilted	0.642	0.571	1.213		Right Tilted	0.642	0.370	1.012
	Left Cheek	0.601	0.317	0.918		Left Cheek	0.601	0.370	0.971
	Left Tilted	0.741	0.242	0.983		Left Tilted	0.741	0.370	1.111

WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	WLAN SAR _{1g} (W/kg)	Σ SAR (W/kg)	WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	Bluetooth Estimated SAR _{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 2	Right Cheek	0.243	0.676	0.919	LTE Band 2	Right Cheek	0.243	0.370	0.613
	Right Tilted	0.502	0.571	1.073		Right Tilted	0.502	0.370	0.872
	Left Cheek	0.444	0.317	0.761		Left Cheek	0.444	0.370	0.814
	Left Tilted	0.625	0.242	0.867		Left Tilted	0.625	0.370	0.995

WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	WLAN SAR _{1g} (W/kg)	Σ SAR (W/kg)		WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	Bluetooth Estimated SAR _{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 4	Right Cheek	0.238	0.676	0.914		LTE Band 4	Right Cheek	0.238	0.370	0.608
	Right Tilted	0.390	0.571	0.961			Right Tilted	0.390	0.370	0.760
	Left Cheek	0.266	0.317	0.583			Left Cheek	0.266	0.370	0.636
	Left Tilted	0.410	0.242	0.652			Left Tilted	0.410	0.370	0.780

WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	WLAN SAR _{1g} (W/kg)	Σ SAR (W/kg)		WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	Bluetooth Estimated SAR _{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 5	Right Cheek	0.519	0.676	1.195		LTE Band 5	Right Cheek	0.519	0.370	0.889
	Right Tilted	0.292	0.571	0.863			Right Tilted	0.292	0.370	0.662
	Left Cheek	0.731	0.317	1.048			Left Cheek	0.731	0.370	1.101
	Left Tilted	0.513	0.242	0.755			Left Tilted	0.513	0.370	0.883

WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	WLAN SAR _{1g} (W/kg)	Σ SAR (W/kg)		WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	Bluetooth Estimated SAR _{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 7	Right Cheek	0.152	0.676	0.828		LTE Band 7	Right Cheek	0.152	0.370	0.522
	Right Tilted	0.176	0.571	0.747			Right Tilted	0.176	0.370	0.546
	Left Cheek	0.270	0.317	0.587			Left Cheek	0.270	0.370	0.640
	Left Tilted	0.312	0.242	0.554			Left Tilted	0.312	0.370	0.682

WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	WLAN SAR _{1g} (W/kg)	Σ SAR (W/kg)		WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	Bluetooth Estimated SAR _{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 41	Right Cheek	0.101	0.676	0.777		LTE Band 41	Right Cheek	0.101	0.370	0.471
	Right Tilted	0.144	0.571	0.715			Right Tilted	0.144	0.370	0.514
	Left Cheek	0.202	0.317	0.519			Left Cheek	0.202	0.370	0.572
	Left Tilted	0.265	0.242	0.507			Left Tilted	0.265	0.370	0.635

➤ **Body worn Simultaneous Transmission**

WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	WLAN SAR _{1g} (W/kg)	Σ SAR (W/kg)		WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	Bluetooth Estimated SAR _{1g} (W/kg)	Σ SAR (W/kg)
GSM 850	Front	0.128	0.187	0.315		GSM 850	Front	0.128	0.185	0.313
	Back	0.247	0.313	0.560			Back	0.247	0.185	0.432

WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	WLAN SAR _{1g} (W/kg)	Σ SAR (W/kg)		WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	Bluetooth Estimated SAR _{1g} (W/kg)	Σ SAR (W/kg)
GSM 1900	Front	0.455	0.187	0.642		GSM 1900	Front	0.455	0.185	0.640
	Back	0.905	0.313	1.218			Back	0.905	0.185	1.090

WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	WLAN SAR _{1g} (W/kg)	Σ SAR (W/kg)		WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	Bluetooth Estimated SAR _{1g} (W/kg)	Σ SAR (W/kg)
WCDMA Band V	Front	0.197	0.187	0.384		WCDMA Band V	Front	0.197	0.185	0.382
	Back	0.389	0.313	0.702			Back	0.389	0.185	0.574

WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	WLAN SAR _{1g} (W/kg)	Σ SAR (W/kg)		WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	Bluetooth Estimated SAR _{1g} (W/kg)	Σ SAR (W/kg)
WCDMA Band II	Front	0.222	0.187	0.409		WCDMA Band II	Front	0.222	0.185	0.407
	Back	0.308	0.313	0.621			Back	0.308	0.185	0.493

WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	WLAN SAR _{1g} (W/kg)	Σ SAR (W/kg)		WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	Bluetooth Estimated SAR _{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 2	Front	0.153	0.187	0.340		LTE Band 2	Front	0.153	0.185	0.338
	Back	0.229	0.313	0.542			Back	0.229	0.185	0.414

WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	WLAN SAR _{1g} (W/kg)	Σ SAR (W/kg)		WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	Bluetooth Estimated SAR _{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 4	Front	0.133	0.187	0.320		LTE Band 4	Front	0.133	0.185	0.318
	Back	0.180	0.313	0.493			Back	0.180	0.185	0.365

WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	WLAN SAR _{1g} (W/kg)	Σ SAR (W/kg)		WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	Bluetooth Estimated SAR _{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 5	Front	0.187	0.187	0.374		LTE Band 5	Front	0.187	0.185	0.372
	Back	0.367	0.313	0.680			Back	0.367	0.185	0.552

WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	WLAN SAR _{1g} (W/kg)	Σ SAR (W/kg)		WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	Bluetooth Estimated SAR _{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 7	Front	0.080	0.187	0.267		LTE Band 7	Front	0.080	0.185	0.265
	Back	0.094	0.313	0.407			Back	0.094	0.185	0.279

WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	WLAN SAR _{1g} (W/kg)	Σ SAR (W/kg)	WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	Bluetooth Estimated SAR _{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 41	Front	0.038	0.187	0.225	LTE Band 41	Front	0.038	0.185	0.223
	Back	0.041	0.313	0.354		Back	0.041	0.185	0.226

➤ Hotspot mode Simultaneous Transmission

WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	WLAN SAR _{1g} (W/kg)	Σ SAR (W/kg)	WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	Bluetooth Estimated SAR _{1g} (W/kg)	Σ SAR (W/kg)
GSM 850	Front	0.128	0.187	0.315	GSM 850	Front	0.128	0.185	0.313
	Back	0.247	0.313	0.560		Back	0.247	0.185	0.432
	Left	/	0.095	0.095		Left	/	0.185	0.185
	Right	0.024	/	0.024		Right	0.024	/	0.024
	Top	0.152	0.105	0.257		Top	0.152	0.185	0.337
	Bottom	/	/	/		Bottom	/	/	/

WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	WLAN SAR _{1g} (W/kg)	Σ SAR (W/kg)	WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	Bluetooth Estimated SAR _{1g} (W/kg)	Σ SAR (W/kg)
GSM 1900	Front	0.455	0.187	0.642	GSM 1900	Front	0.455	0.185	0.640
	Back	0.905	0.313	1.218		Back	0.905	0.185	1.090
	Left	/	0.095	0.095		Left	/	0.185	0.185
	Right	0.040	/	0.040		Right	0.040	/	0.040
	Top	1.173	0.105	1.278		Top	1.173	0.185	1.358
	Bottom	/	/	/		Bottom	/	/	/

WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	WLAN SAR _{1g} (W/kg)	Σ SAR (W/kg)	WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	Bluetooth Estimated SAR _{1g} (W/kg)	Σ SAR (W/kg)
WCDMA Band V	Front	0.197	0.187	0.384	WCDMA Band V	Front	0.197	0.185	0.382
	Back	0.389	0.313	0.702		Back	0.389	0.185	0.574
	Left	/	0.095	0.095		Left	/	0.185	0.185
	Right	0.029	/	0.029		Right	0.029	/	0.029
	Top	0.259	0.105	0.364		Top	0.259	0.185	0.444
	Bottom	/	/	/		Bottom	/	/	/

WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	WLAN SAR _{1g} (W/kg)	Σ SAR (W/kg)	WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	Bluetooth Estimated SAR _{1g} (W/kg)	Σ SAR (W/kg)
WCDMA Band II	Front	0.222	0.187	0.409	WCDMA Band II	Front	0.222	0.185	0.407
	Back	0.308	0.313	0.621		Back	0.308	0.185	0.493
	Left	/	0.095	0.095		Left	/	0.185	0.185
	Right	0.013	/	0.013		Right	0.013	/	0.013
	Top	0.384	0.105	0.489		Top	0.384	0.185	0.569
	Bottom	/	/	/		Bottom	/	/	/

WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	WLAN SAR _{1g} (W/kg)	Σ SAR (W/kg)	WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	Bluetooth Estimated SAR _{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 2	Front	0.153	0.187	0.340	LTE Band 2	Front	0.153	0.185	0.338
	Back	0.229	0.313	0.542		Back	0.229	0.185	0.414
	Left	/	0.095	0.095		Left	/	0.185	0.185
	Right	0.019	/	0.019		Right	0.019	/	0.019
	Top	0.348	0.105	0.453		Top	0.348	0.185	0.533
	Bottom	/	/	/		Bottom	/	/	/

WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	WLAN SAR _{1g} (W/kg)	Σ SAR (W/kg)	WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	Bluetooth Estimated SAR _{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 4	Front	0.133	0.187	0.320	LTE Band 4	Front	0.133	0.185	0.318
	Back	0.180	0.313	0.493		Back	0.180	0.185	0.365
	Left	/	0.095	0.095		Left	/	0.185	0.185
	Right	0.013	/	0.013		Right	0.013	/	0.013
	Top	0.246	0.105	0.351		Top	0.246	0.185	0.431
	Bottom	/	/	/		Bottom	/	/	/

WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	WLAN SAR _{1g} (W/kg)	Σ SAR (W/kg)	WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	Bluetooth Estimated SAR _{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 5	Front	0.187	0.187	0.374	LTE Band 5	Front	0.187	0.185	0.372
	Back	0.367	0.313	0.680		Back	0.367	0.185	0.552
	Left	/	0.095	0.095		Left	/	0.185	0.185
	Right	0.162	/	0.162		Right	0.162	/	0.162
	Top	0.233	0.105	0.338		Top	0.233	0.185	0.418
	Bottom	/	/	/		Bottom	/	/	/

WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	WLAN SAR _{1g} (W/kg)	Σ SAR (W/kg)	WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	Bluetooth Estimated SAR _{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 7	Front	0.080	0.187	0.267	LTE Band 7	Front	0.080	0.185	0.265
	Back	0.094	0.313	0.407		Back	0.094	0.185	0.279
	Left	/	0.095	0.095		Left	/	0.185	0.185
	Right	0.023	/	0.023		Right	0.023	/	0.023
	Top	0.186	0.105	0.291		Top	0.186	0.185	0.371
	Bottom	/	/	/		Bottom	/	/	/

WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	WLAN SAR _{1g} (W/kg)	Σ SAR (W/kg)	WWAN Mode	Position	WWAN SAR _{1g} (W/kg)	Bluetooth Estimated SAR _{1g} (W/kg)	Σ SAR (W/kg)
LTE Band 41	Front	0.038	0.187	0.225	LTE Band 41	Front	0.038	0.185	0.223
	Back	0.041	0.313	0.354		Back	0.041	0.185	0.226
	Left	/	0.095	0.095		Left	/	0.185	0.185
	Right	0.011	/	0.011		Right	0.011	/	0.011
	Top	0.134	0.105	0.239		Top	0.134	0.185	0.319
	Bottom	/	/	/		Bottom	/	/	/

➤ Simultaneous Transmission Conclusion

The above numerical summed SAR results for all the case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v06.

15.7 Measurement Uncertainty

Per KDB865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval. The equivalent ratio (1.5/1.6) is applied to extremity and occupational exposure conditions.

16 Reference

- [1]. FCC 47 CFR Part 2 “Frequency Allocations and Radio Treaty Matters; General Rules and Regulations”
- [2]. ANSI/IEEE Std. C95.1-1992, “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz”, September 1992
- [3]. IEEE Std. 1528-2013, “Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, September 2013
- [4]. OpenSAR V5 Software User Manual
- [5]. FCC KDB 248227 D01 v02r02, “SAR GUIDANCE FOR IEEE 802.11 (Wi-Fi) TRANSMITTERS”, October 2015
- [6]. FCC KDB 447498 D01 v06, “RF EXPOSURE PROCEDURES AND EQUIPMENT AUTHORIZATION POLICIES FOR MOBILE AND PORTABLE DEVICES”, October 2015
- [7]. FCC KDB 648474 D04 v01r03, “SAR EVALUATION CONSIDERATIONS FOR WIRELESS HANDSETS”, October 2015
- [8]. FCC KDB 941225 D01 v03r01, “3G SAR MEASUREMENT PROCEDURES”, October 2015
- [9]. FCC KDB 941225 D05 v02r05, “SAR EVALUATION CONSIDERATIONS FOR LTE DEVICES”, Dec 2015
- [10]. FCC KDB 941225 D03 v01, “Recommended SAR Test Reduction Procedures for GSM / GPRS / EDGE”, December 2008
- [11]. FCC KDB 941225 D06 v02r01, “SAR EVALUATION PROCEDURES FOR PORTABLE DEVICES WITH WIRELESS ROUTER CAPABILITIES”, October 2015
- [12]. FCC KDB 865664 D01 v01r04, “SAR MEASUREMENT REQUIREMENTS FOR 100 MHz TO 6 GHz”, August 2015

Appendix A: Plots of SAR System Check

System check at 835 MHz

Date of measurement: 2/9/2021

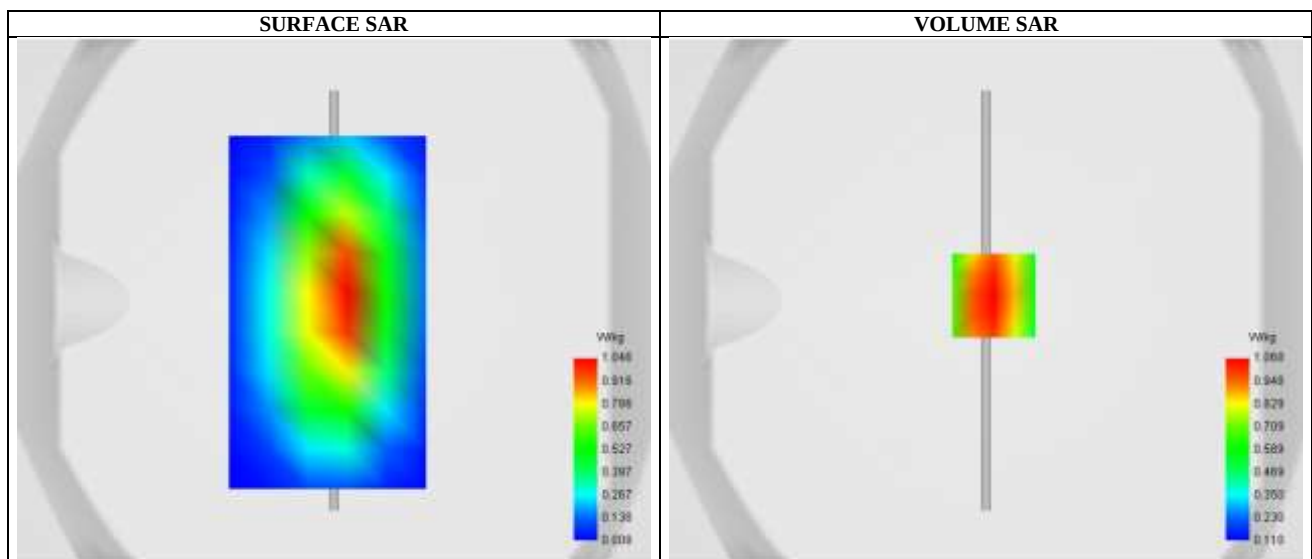
A. Experimental conditions.

Probe	SN 18/21 EPG0354
ConvF	1.68
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW835
Channels	Middle
Signal	CW (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	835.000000
Relative permittivity (real part)	40.853194
Conductivity (S/m)	0.919205

C. SAR Surface and Volume

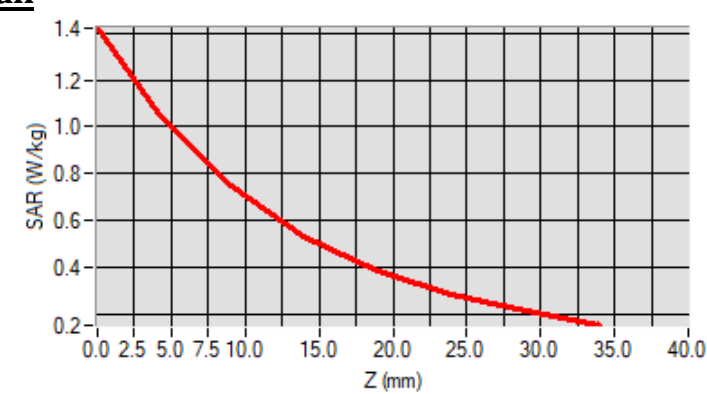


Maximum location: X=3.00, Y=2.00 ; SAR Peak: 1.43 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.650644
SAR 1g (W/Kg)	1.007918
Variation (%)	-2.080000

E. Z Axis Scan



System check at 1750 MHz

Date of measurement: 10/9/2021

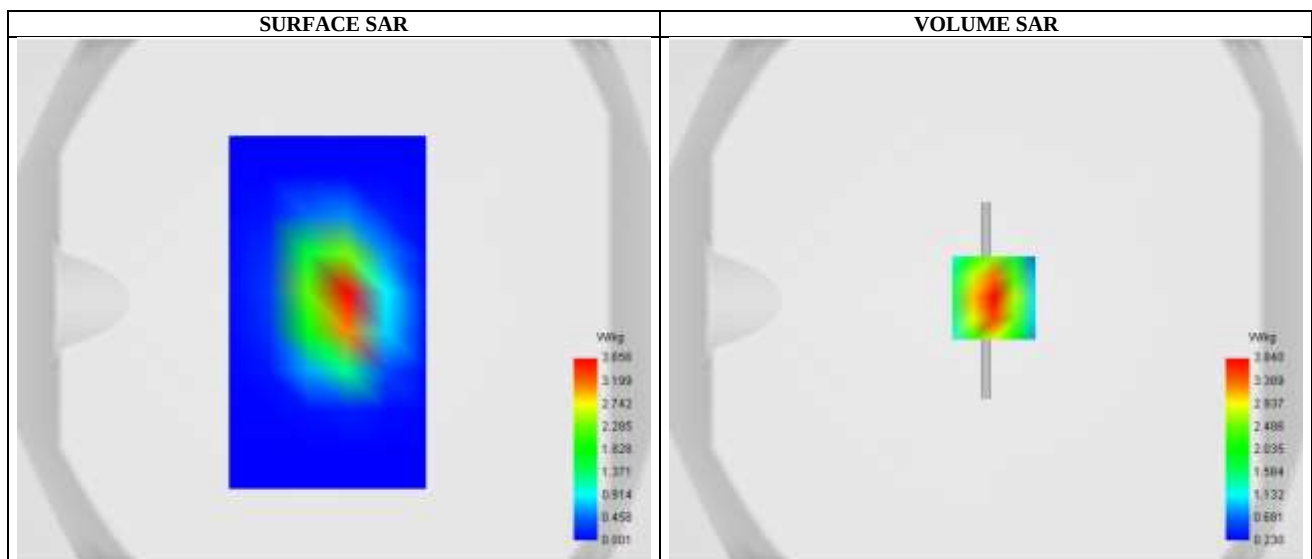
A. Experimental conditions.

Probe	SN 18/21 EPG0354
ConvF	2.07
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW1750
Channels	Middle
Signal	CW (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	1750.000000
Relative permittivity (real part)	40.191254
Conductivity (S/m)	1.373257

C. SAR Surface and Volume

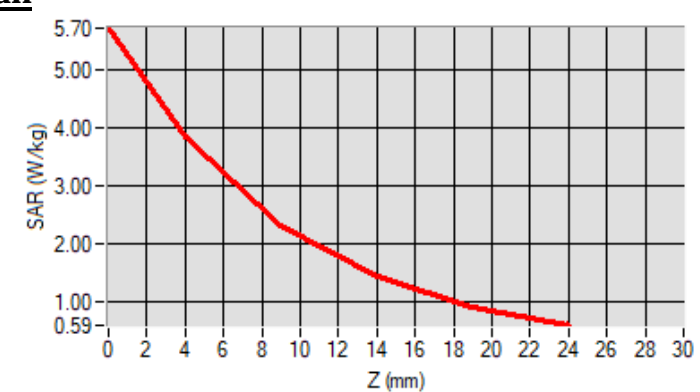


Maximum location: X=3.00, Y=1.00 ; SAR Peak: 5.73 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	1.986334
SAR 1g (W/Kg)	3.568638
Variation (%)	-1.010000

E. Z Axis Scan



System check at 1900 MHz

Date of measurement: 10/9/2021

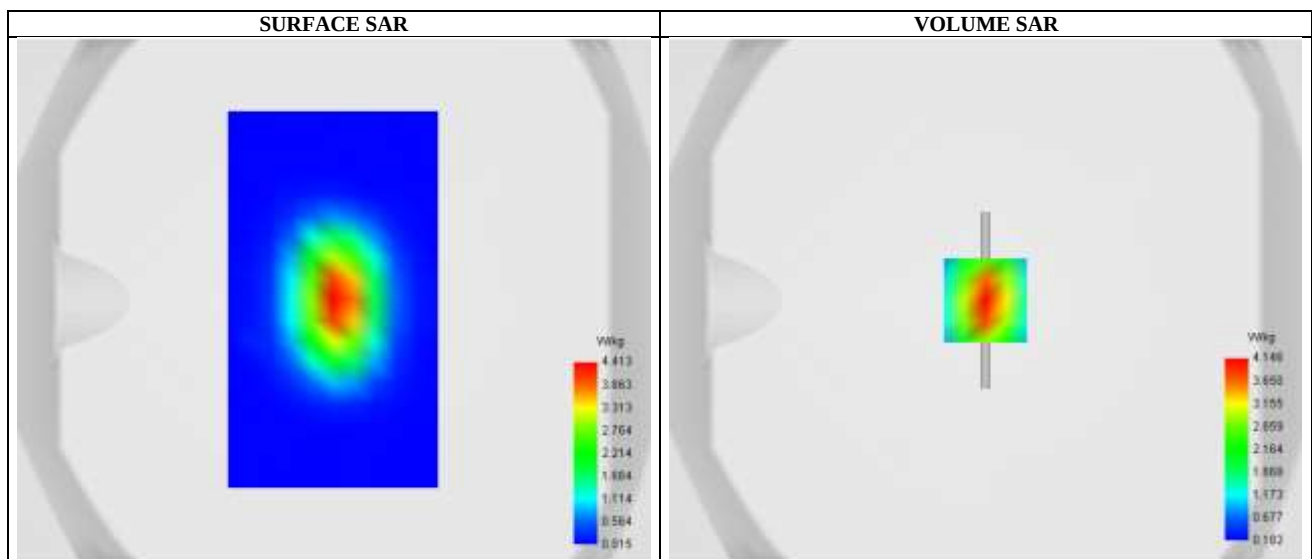
A. Experimental conditions.

Probe	SN 18/21 EPG0354
ConvF	2.14
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW1900
Channels	Middle
Signal	CW (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	1900.000000
Relative permittivity (real part)	39.752096
Conductivity (S/m)	1.409745

C. SAR Surface and Volume

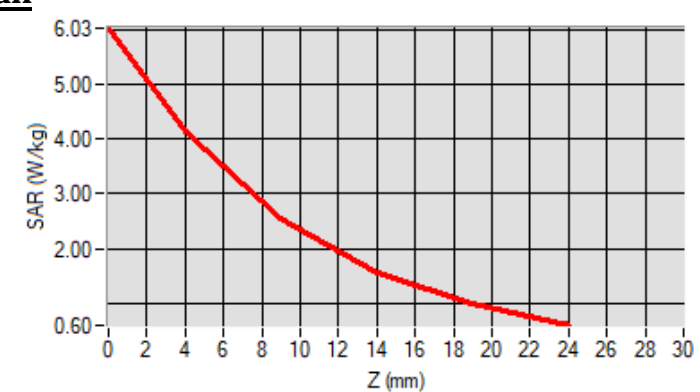


Maximum location: X=0.00, Y=0.00; SAR Peak: 6.03 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	2.064109
SAR 1g (W/Kg)	3.901591
Variation (%)	3.410001

E. Z Axis Scan



System check at 2450 MHz

Date of measurement: 1/9/2021

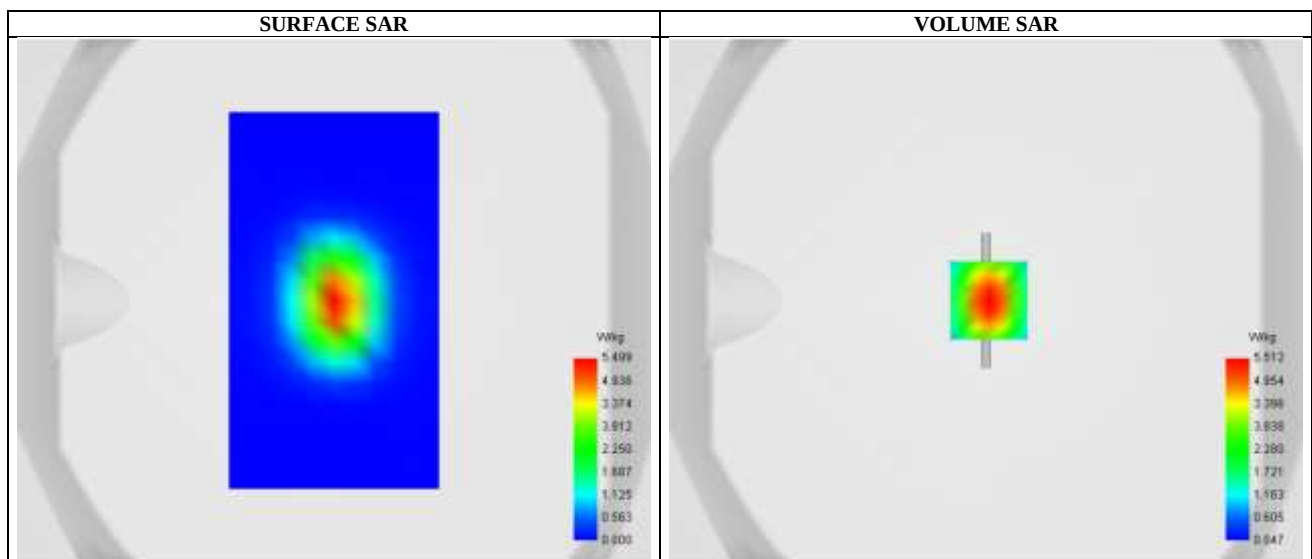
A. Experimental conditions.

Probe	SN 18/21 EPG0354
ConvF	2.23
Area Scan	surf_sam_plan.txt
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW2450
Channels	Middle
Signal	CW (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	2450.000000
Relative permittivity (real part)	39.911083
Conductivity (S/m)	1.790731

C. SAR Surface and Volume

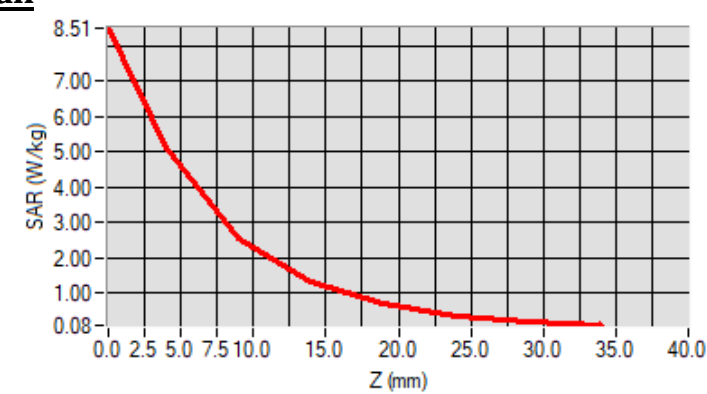


Maximum location: X=1.00, Y=-1.00; SAR Peak: 8.75 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	2.392853
SAR 1g (W/Kg)	5.405281
Variation (%)	-3.280001

E. Z Axis Scan



System check at 2600 MHz

Date of measurement: 9/9/2021

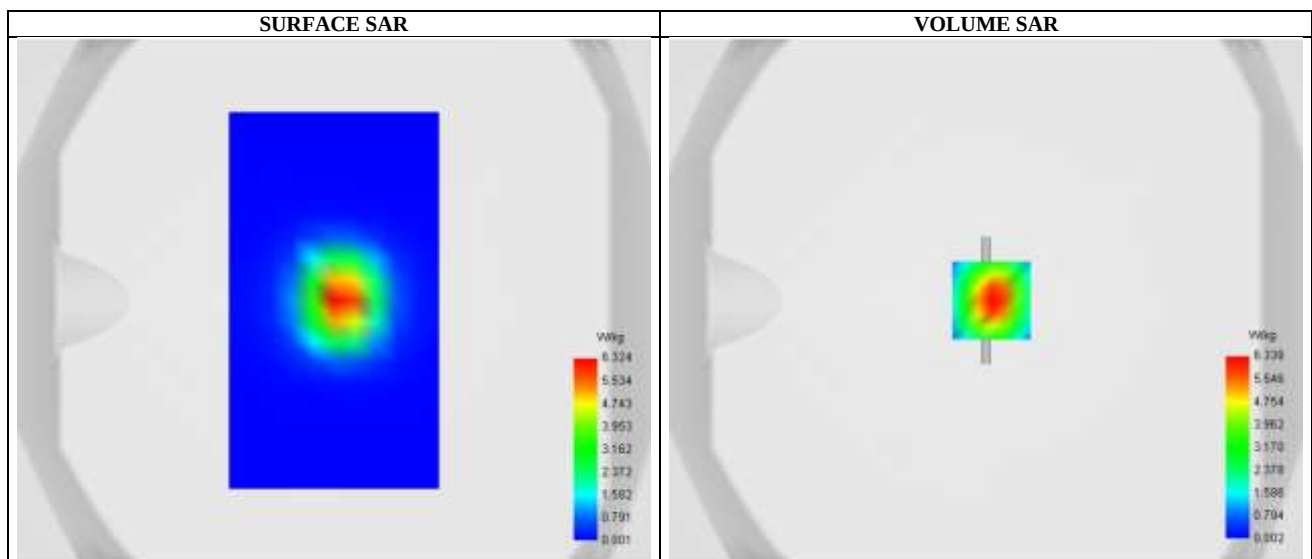
A. Experimental conditions.

Probe	SN 18/21 EPG0354
ConvF	2.15
Area Scan	surf_sam_plan.txt
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW2600
Channels	Middle
Signal	CW (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	2600.000000
Relative permittivity (real part)	38.769025
Conductivity (S/m)	1.984829

C. SAR Surface and Volume

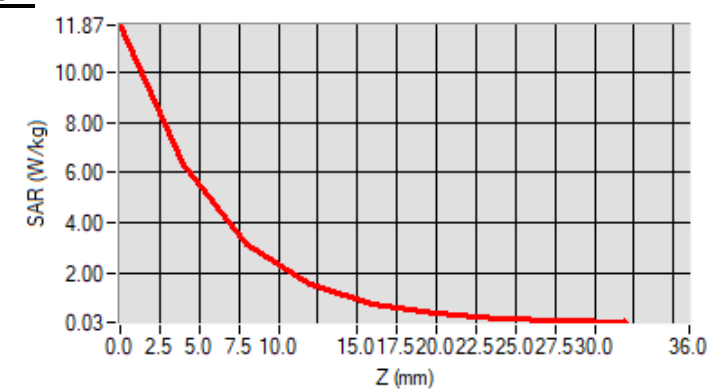


Maximum location: X=1.00, Y=0.00; SAR Peak: 11.82 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	2.318561
SAR 1g (W/Kg)	5.768694
Variation (%)	1.240001

E. Z Axis Scan



Appendix B: Plots of SAR Test Data

SAR Measurement at GSM850 (Cheek, Left)

Date of measurement: 2/9/2021

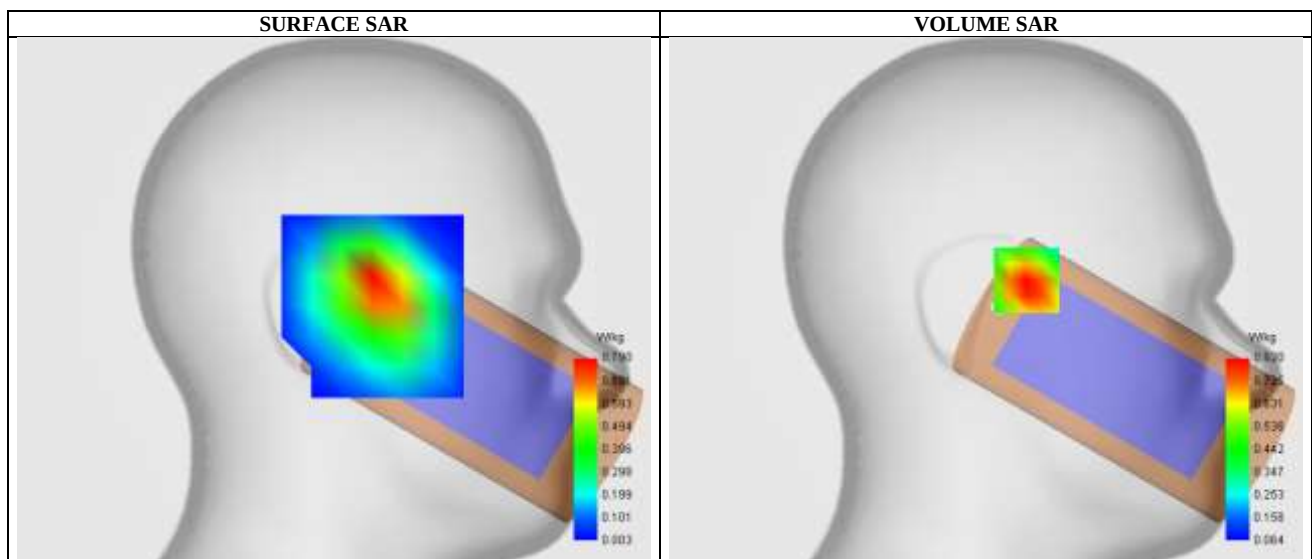
A. Experimental conditions.

Probe	SN 18/21 EPG0354
ConvF	1.68
Area Scan	dx=15mm dy=15mm
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Left head
Device Position	Cheek
Band	GSM850
Channels	High
Signal	TDMA (Crest factor: 8.0)

B. Permittivity

Frequency (MHz)	848.799988
Relative permittivity (real part)	41.815109
Conductivity (S/m)	0.942707

C. SAR Surface and Volume

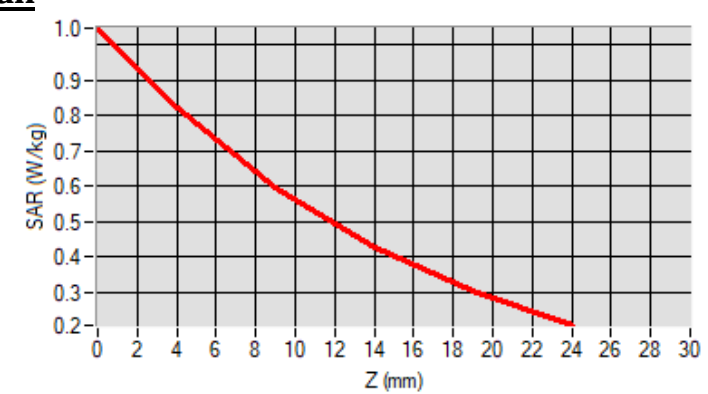


Maximum location: X=-20.00, Y=10.00 ; SAR Peak: 1.06 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.527174
SAR 1g (W/Kg)	0.783755
Variation (%)	1.040000

E. Z Axis Scan



SAR Measurement at GSM1900 (Tilt, Left)

Date of measurement: 10/9/2021

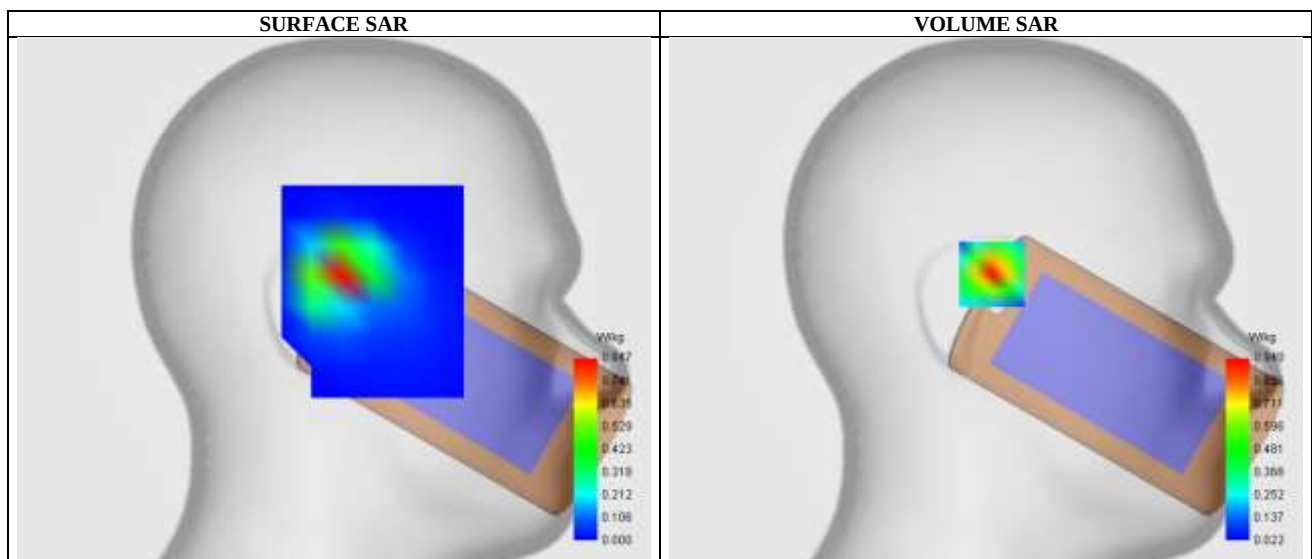
A. Experimental conditions.

Probe	SN 18/21 EPG0354
ConvF	2.14
Area Scan	dx=15mm dy=15mm
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Left head
Device Position	Tilt
Band	GSM1900
Channels	High
Signal	TDMA (Crest factor: 8.0)

B. Permittivity

Frequency (MHz)	1909.800049
Relative permittivity (real part)	39.735810
Conductivity (S/m)	1.417229

C. SAR Surface and Volume

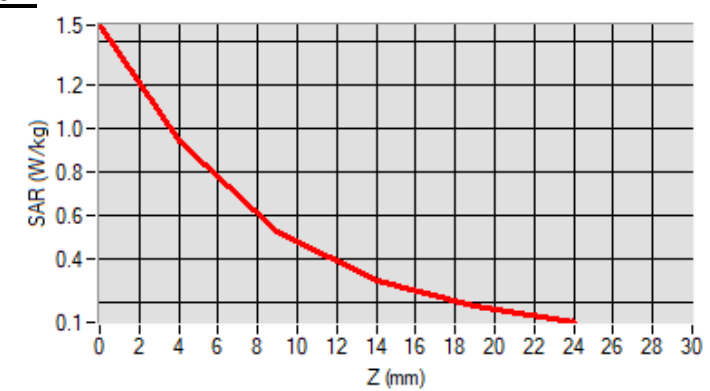


Maximum location: X=-3.00, Y=13.00 ; SAR Peak: 1.48 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.433960
SAR 1g (W/Kg)	0.859159
Variation (%)	1.800001

E. Z Axis Scan



SAR Measurement at Band5_WCDMA850 (Cheek, Left)

Date of measurement: 2/9/2021

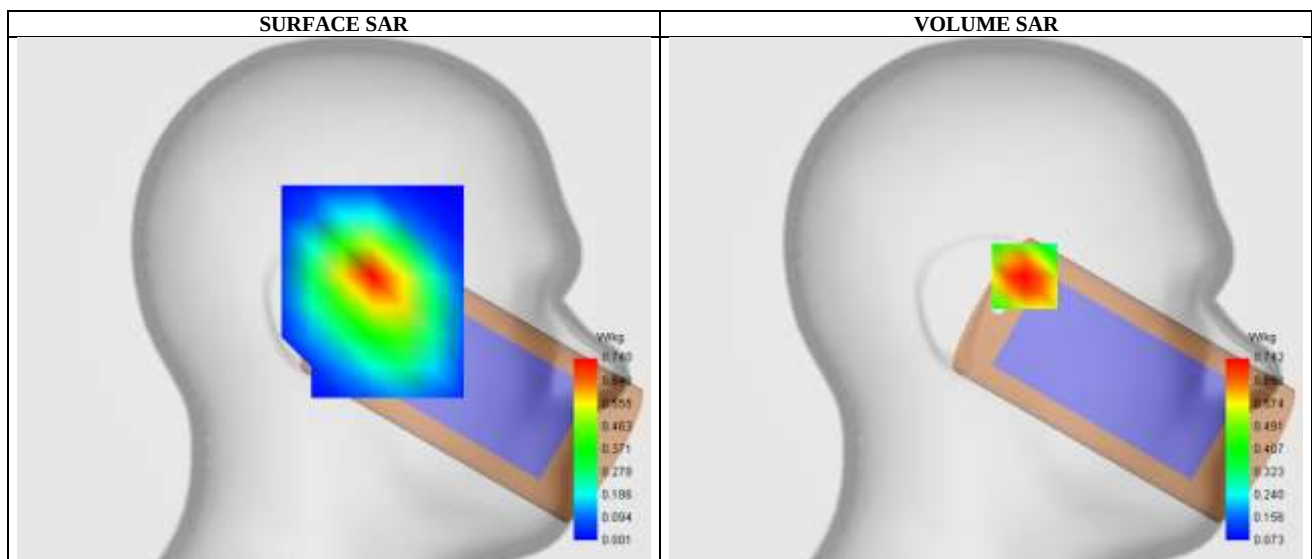
A. Experimental conditions.

Probe	SN 18/21 EPG0354
ConvF	1.68
Area Scan	dx=15mm dy=15mm
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Left head
Device Position	Cheek
Band	Band5_WCDMA850
Channels	High
Signal	WCDMA (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	846.599976
Relative permittivity (real part)	40.819732
Conductivity (S/m)	0.937409

C. SAR Surface and Volume

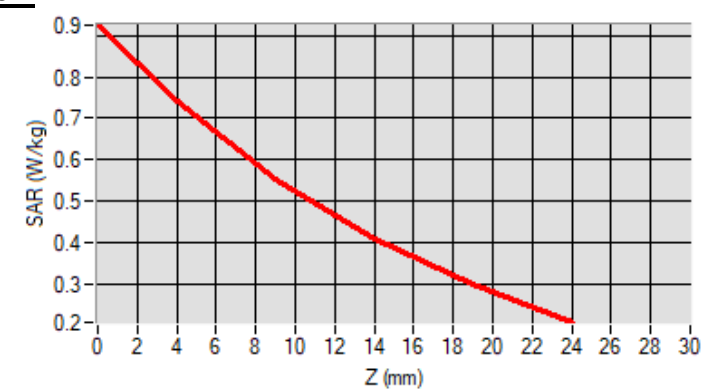


Maximum location: X=-19.00, Y=12.00 ; SAR Peak: 0.94 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.490816
SAR 1g (W/Kg)	0.707771
Variation (%)	-1.610000

E. Z Axis Scan



SAR Measurement at Band2_WCDMA1900 (Tilt, Left)

Date of measurement: 10/9/2021

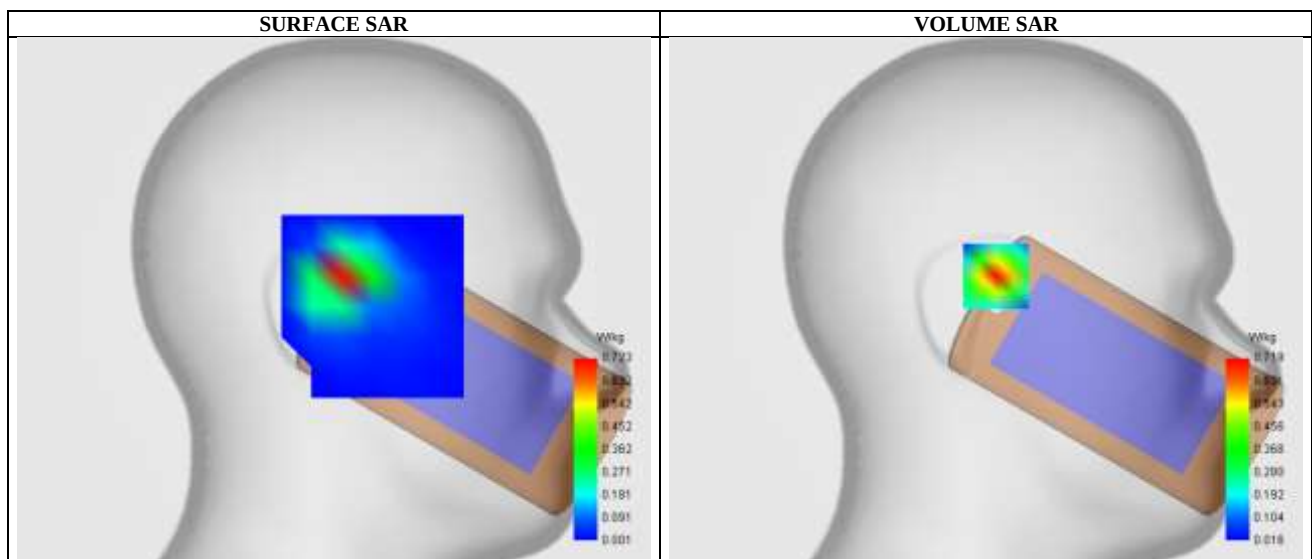
A. Experimental conditions.

Probe	SN 18/21 EPG0354
ConvF	2.14
Area Scan	dx=15mm dy=15mm
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Left head
Device Position	Tilt
Band	Band2_WCDMA1900
Channels	High
Signal	WCDMA (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	1907.599976
Relative permittivity (real part)	39.741316
Conductivity (S/m)	1.407210

C. SAR Surface and Volume

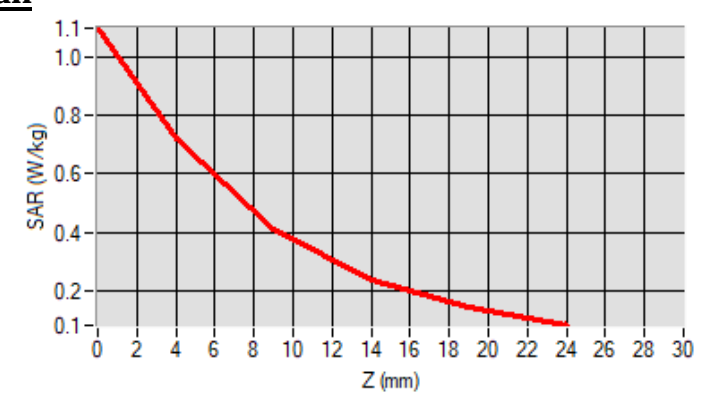


Maximum location: X=-5.00, Y=12.00 ; SAR Peak: 1.10 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.329044
SAR 1g (W/Kg)	0.649982
Variation (%)	-1.120000

E. Z Axis Scan



SAR Measurement at LTE band 2 (Tilt, Left)

Date of measurement: 11/9/2021

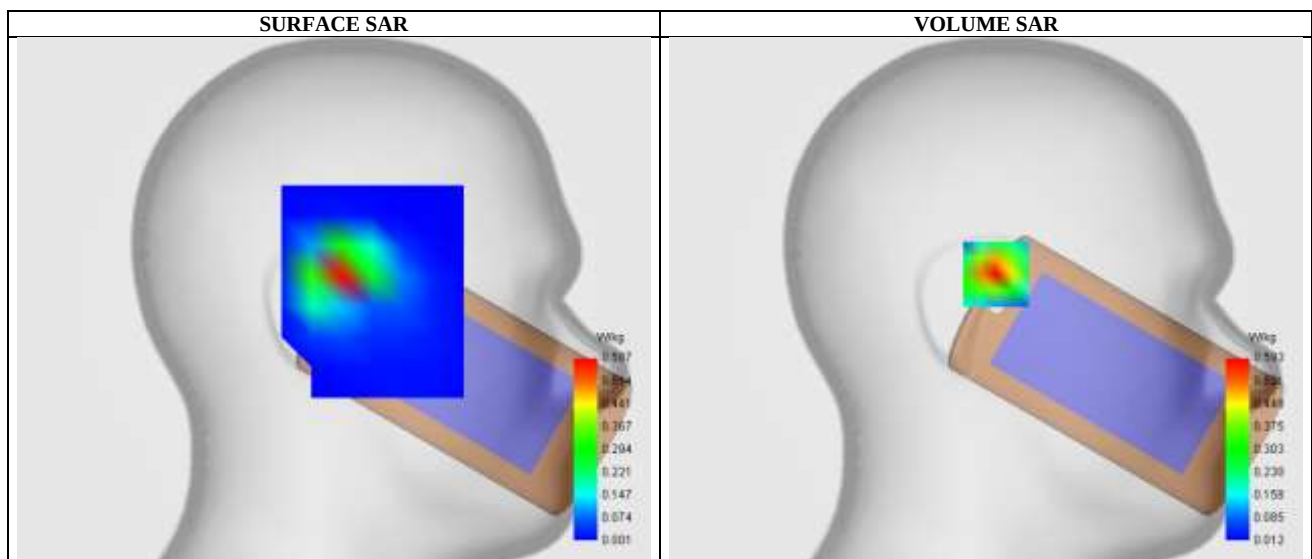
A. Experimental conditions.

Probe	SN 18/21 EPG0354
ConvF	2.14
Area Scan	dx=15mm dy=15mm
Zoom Scan	5x5x7, dx=8mm dy=8mm dz=5mm, Complete
Phantom	Left head
Device Position	Tilt
Band	LTE band 2
Channels	High
Signal	LTE (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	1900.000000
Relative permittivity (real part)	39.752096
Conductivity (S/m)	1.409745

C. SAR Surface and Volume

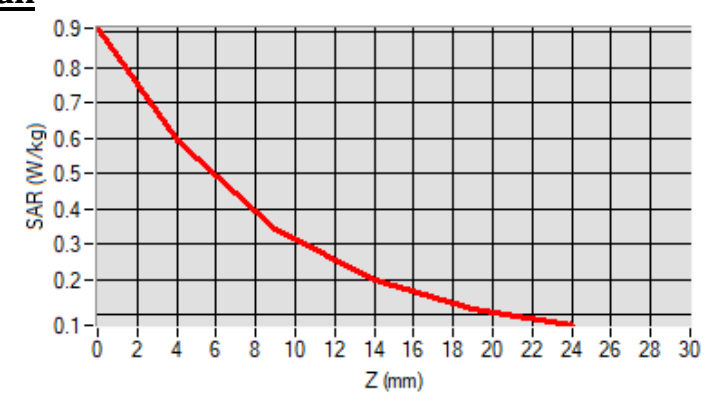


Maximum location: X=-5.00, Y=13.00 ; SAR Peak: 0.92 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.279609
SAR 1g (W/Kg)	0.544725
Variation (%)	1.090000

E. Z Axis Scan



SAR Measurement at LTE band 4 (Tilt, Left)

Date of measurement: 10/9/2021

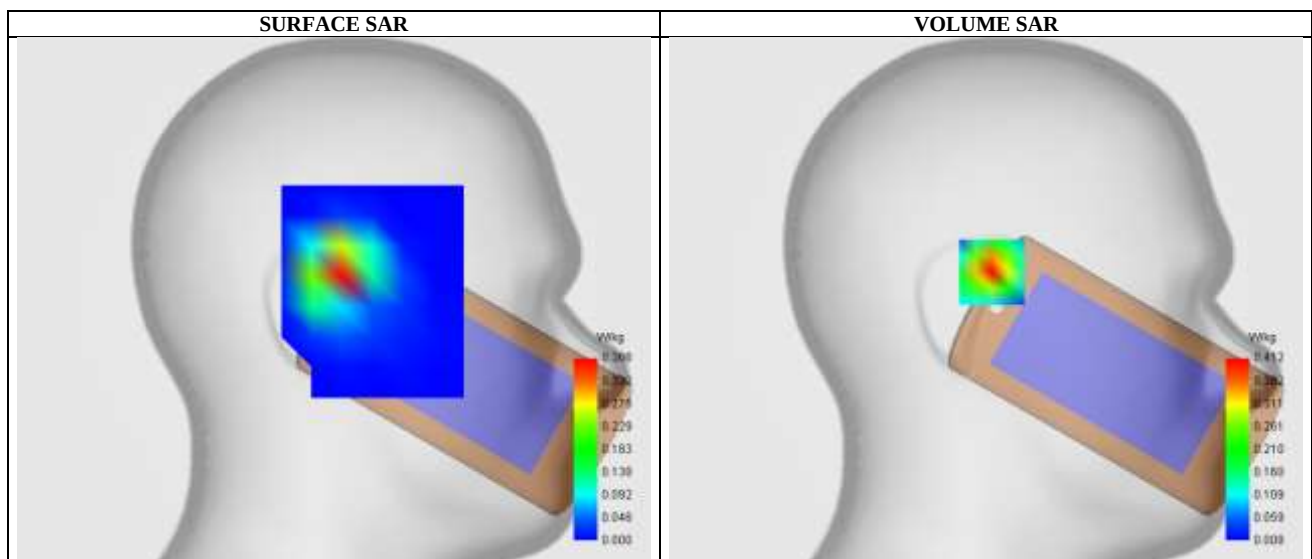
A. Experimental conditions.

Probe	SN 18/21 EPG0354
ConvF	2.07
Area Scan	dx=15mm dy=15mm
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Left head
Device Position	Tilt
Band	LTE band 4
Channels	Low
Signal	LTE (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	1720.000000
Relative permittivity (real part)	40.274191
Conductivity (S/m)	1.350338

C. SAR Surface and Volume

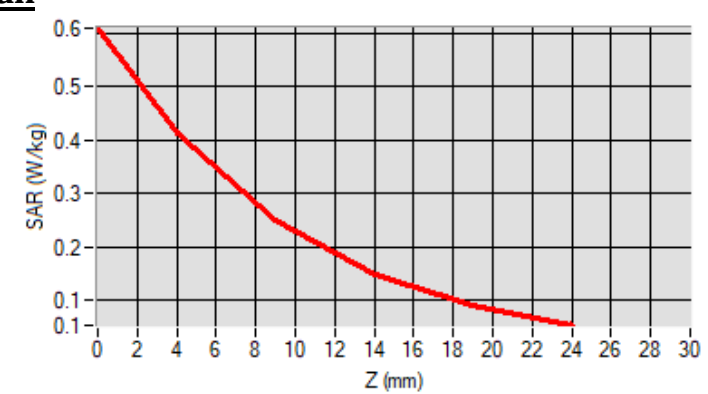


Maximum location: X=-3.00, Y=14.00 ; SAR Peak: 0.61 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.197207
SAR 1g (W/Kg)	0.376182
Variation (%)	-2.980000

E. Z Axis Scan



SAR Measurement at LTE band 5 (Cheek, Left)

Date of measurement: 2/9/2021

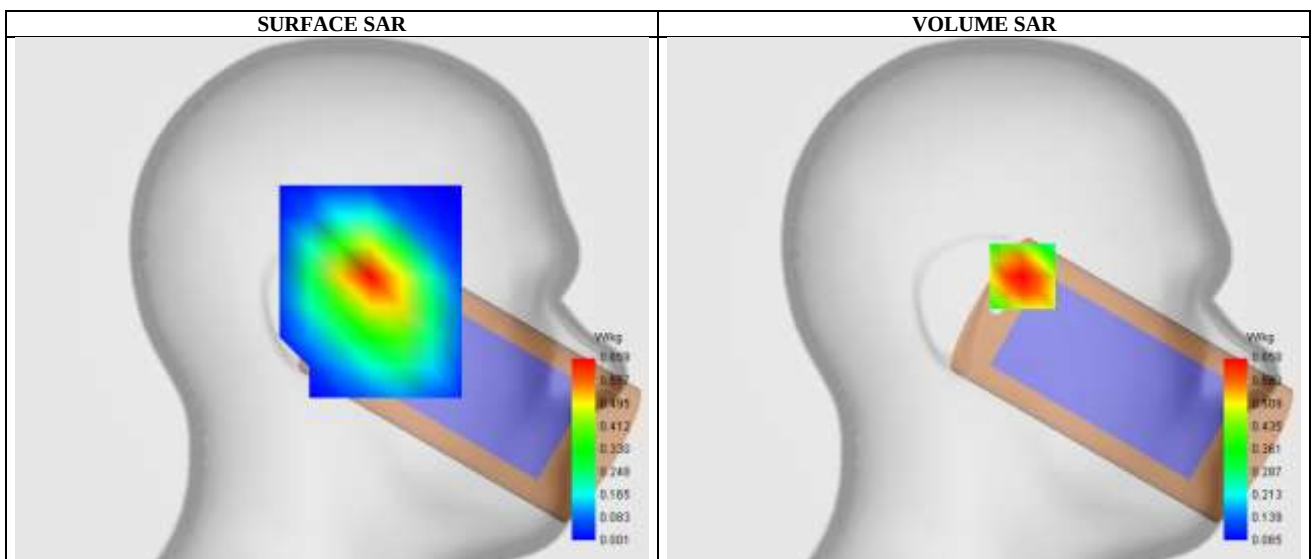
A. Experimental conditions.

Probe	SN 18/21 EPG0354
ConvF	1.68
Area Scan	dx=15mm dy=15mm
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Left head
Device Position	Cheek
Band	LTE band 5
Channels	High
Signal	LTE (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	844.000000
Relative permittivity (real part)	40.829720
Conductivity (S/m)	0.939724

C. SAR Surface and Volume

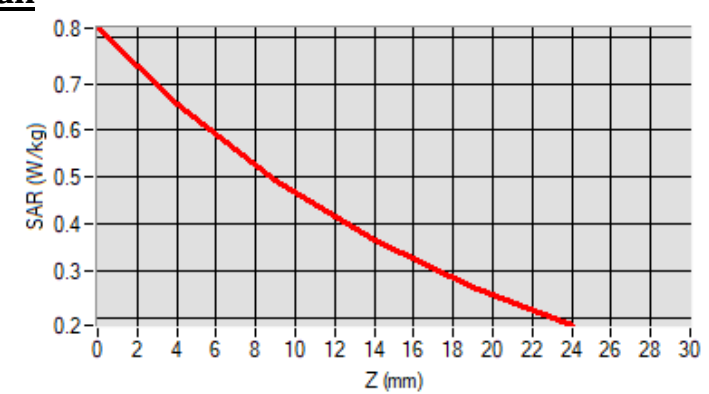


Maximum location: X=-19.00, Y=12.00 ; SAR Peak: 0.83 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.436472
SAR 1g (W/Kg)	0.628223
Variation (%)	-0.600000

E. Z Axis Scan



SAR Measurement at LTE band 7 (Tilt, Left)

Date of measurement: 9/9/2021

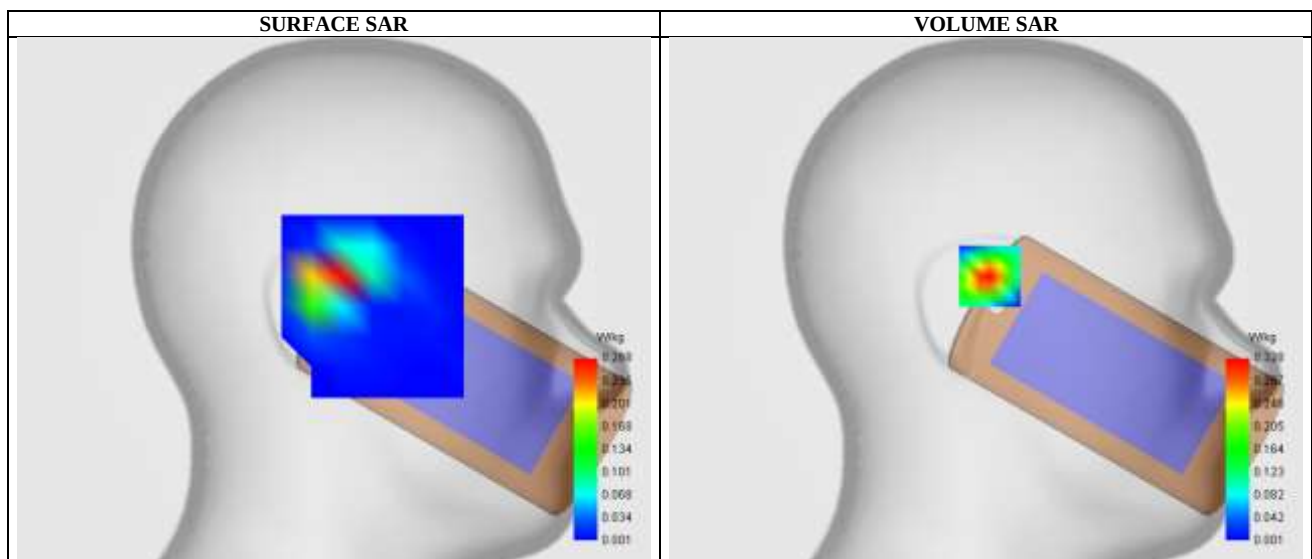
A. Experimental conditions.

Probe	SN 18/21 EPG0354
ConvF	2.15
Area Scan	dx=12mm dy=12mm
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5mm,Complete
Phantom	Left head
Device Position	Tilt
Band	LTE band 7
Channels	Low
Signal	LTE (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	2510.000000
Relative permittivity (real part)	38.928059
conductivity (S/m)	1.899403

C. SAR Surface and Volume

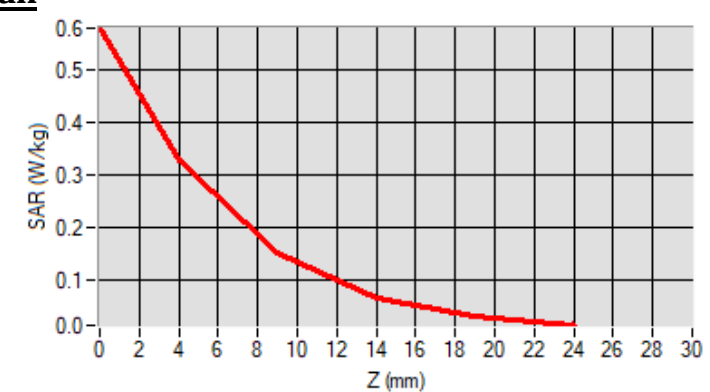


Maximum location: X=-2.00, Y=12.00 ; SAR Peak: 0.58 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.129014
SAR 1g (W/Kg)	0.291418
Variation (%)	0.729999

E. Z Axis Scan



SAR Measurement at LTE band 41 (Tilt, Left)

Date of measurement: 9/9/2021

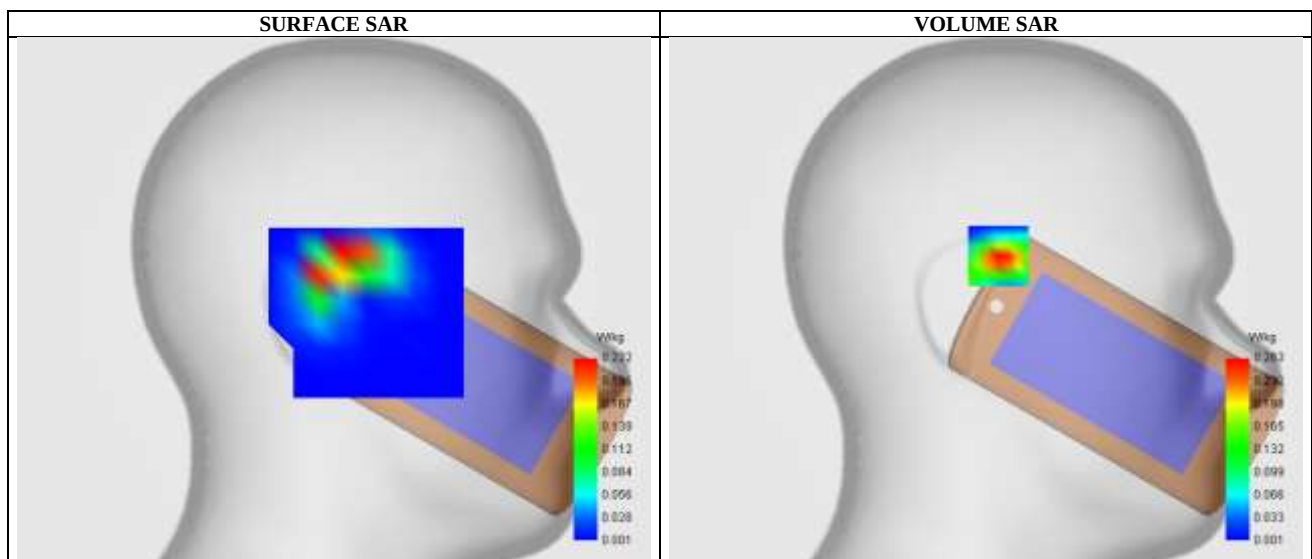
A. Experimental conditions.

Probe	SN 18/21 EPG0354
ConvF	2.15
Area Scan	dx=12mm dy=12mm
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5mm,Complete
Phantom	Left head
Device Position	Tilt
Band	LTE band 41
Channels	High
Signal	LTE (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	2645.000000
Relative permittivity (real part)	38.662085
Conductivity (S/m)	2.013817

C. SAR Surface and Volume

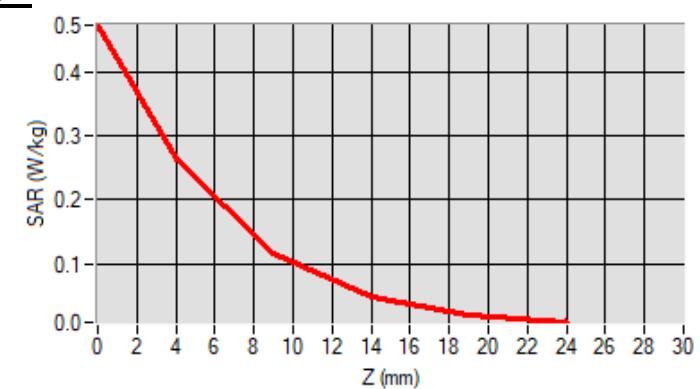


Maximum location: X=-6.00, Y=22.00 ; SAR Peak: 0.48 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.097798
SAR 1g (W/Kg)	0.233087
Variation (%)	3.100000

E. Z Axis Scan



SAR Measurement at IEEE 802.11b ISM (Cheek, Right)

Date of measurement: 2/9/2021

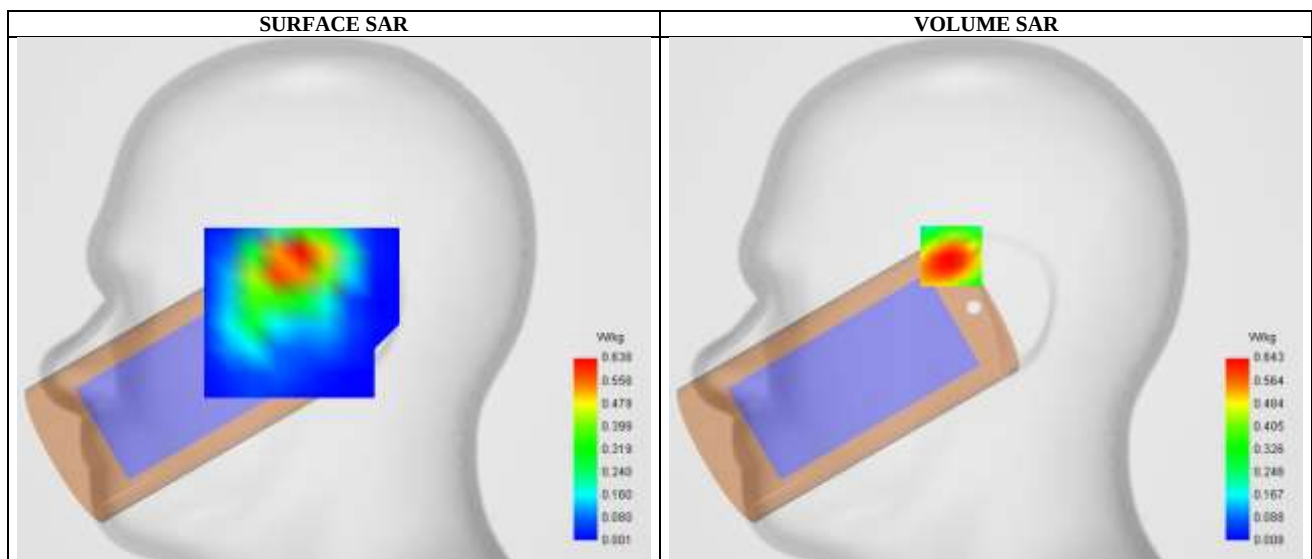
A. Experimental conditions.

Probe	SN 18/21 EPG0354
ConvF	2.23
Area Scan	dx=12mm dy=12mm
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5mm, Complete
Phantom	Right head
Device Position	Cheek
Band	IEEE 802.11b ISM
Channels	High
Signal	IEEE802.b (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	2462.000000
Relative permittivity (real part)	39.885239
Conductivity (S/m)	1.812032

C. SAR Surface and Volume

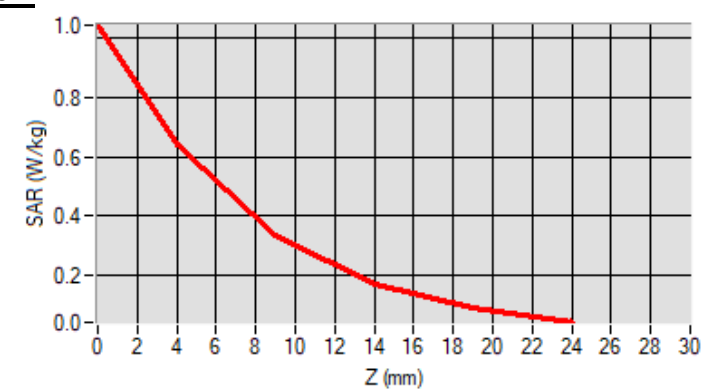


Maximum location: X=-17.00, Y=22.00 ; SAR Peak: 1.05 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.326355
SAR 1g (W/Kg)	0.605891
Variation (%)	-0.660000

E. Z Axis Scan



SAR Measurement at CUSTOM (GPRS8502Txslot) (Body, Validation Plane)

Date of measurement: 2/9/2021

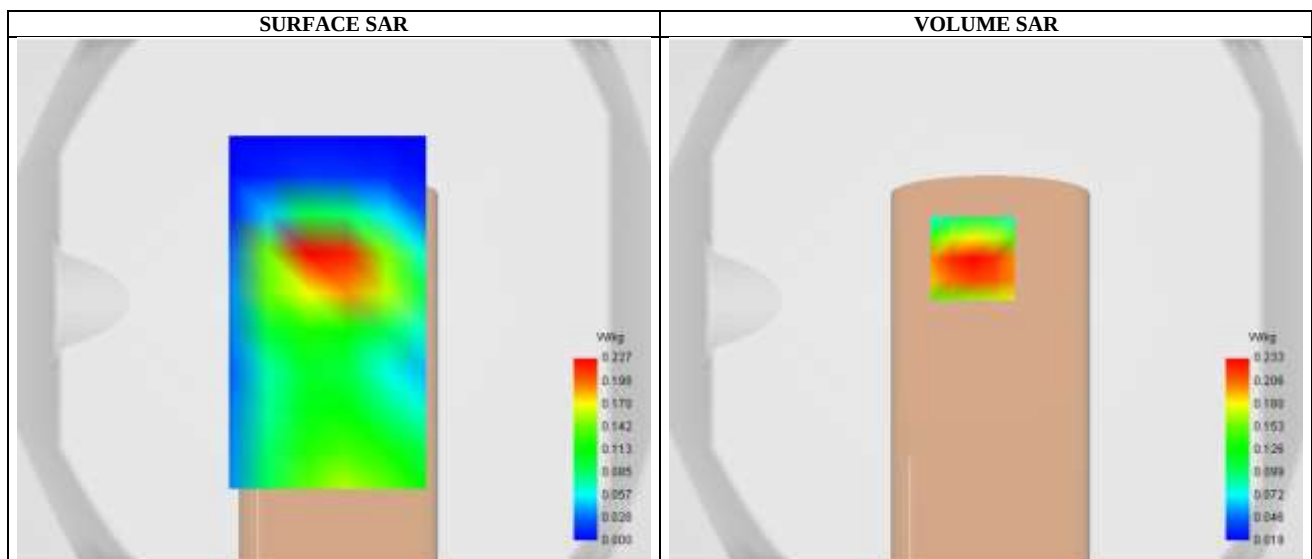
A. Experimental conditions.

Probe	SN 18/21 EPG0354
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	GSM850
Channels	Middle
Signal	TDMA (Crest factor: 4.1)

B. Permittivity

Frequency (MHz)	836.599976
Relative permittivity (real part)	40.847094
Conductivity (S/m)	0.916221

C. SAR Surface and Volume

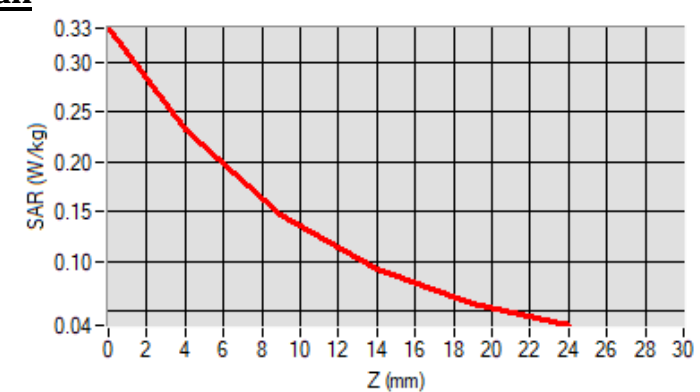


Maximum location: X=-5.00, Y=16.00 ; SAR Peak: 0.34 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.136115
SAR 1g (W/Kg)	0.221936
Variation (%)	1.460000

E. Z Axis Scan



SAR Measurement at CUSTOM (GPRS19003Txslot) (Body, Validation Plane)

Date of measurement: 10/9/2021

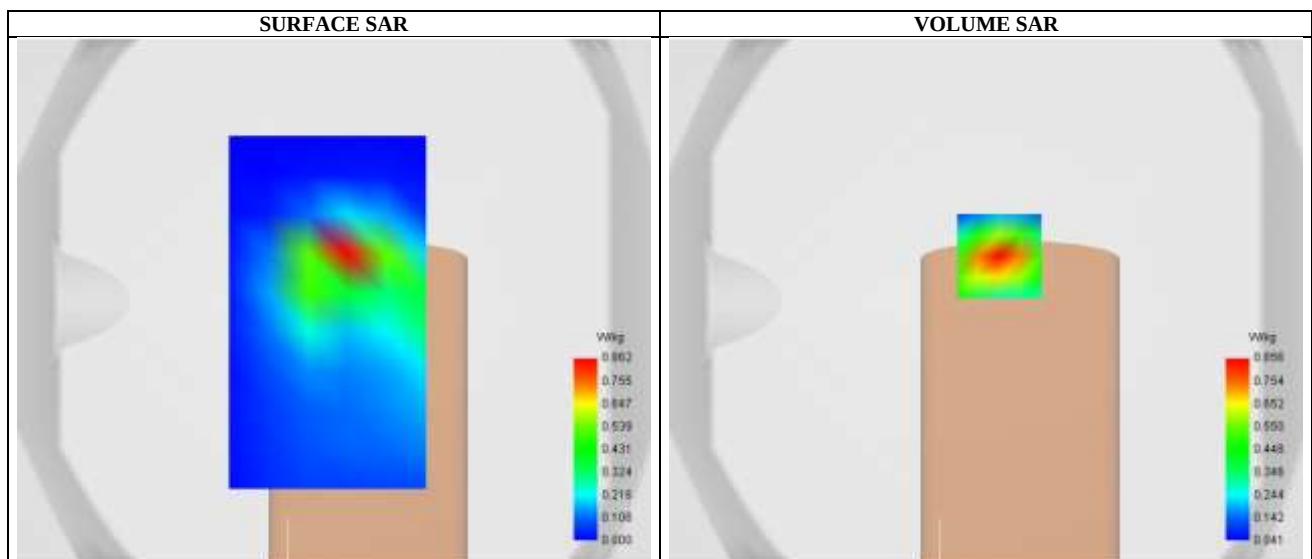
A. Experimental conditions.

Probe	SN 18/21 EPG0354
ConvF	2.14
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	GSM1900
Channels	Low
Signal	TDMA (Crest factor: 2.8)

B. Permittivity

Frequency (MHz)	1850.199951
Relative permittivity (real part)	39.850954
Conductivity (S/m)	1.392116

C. SAR Surface and Volume

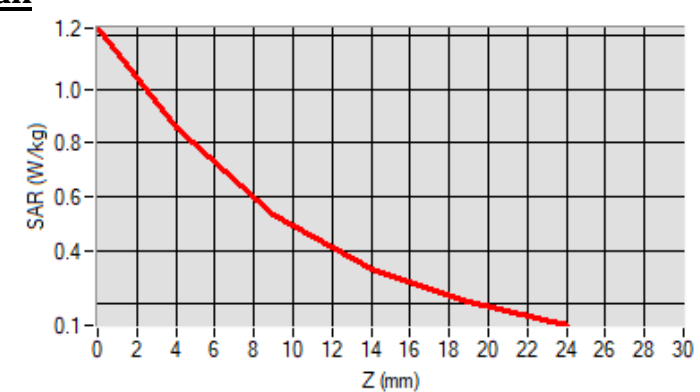


Maximum location: X=5.00, Y=17.00 ; SAR Peak: 1.23 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.427293
SAR 1g (W/Kg)	0.785323
Variation (%)	-4.450000

E. Z Axis Scan



SAR Measurement at Band5_WCDMA850 (Body, Validation Plane)

Date of measurement: 2/9/2021

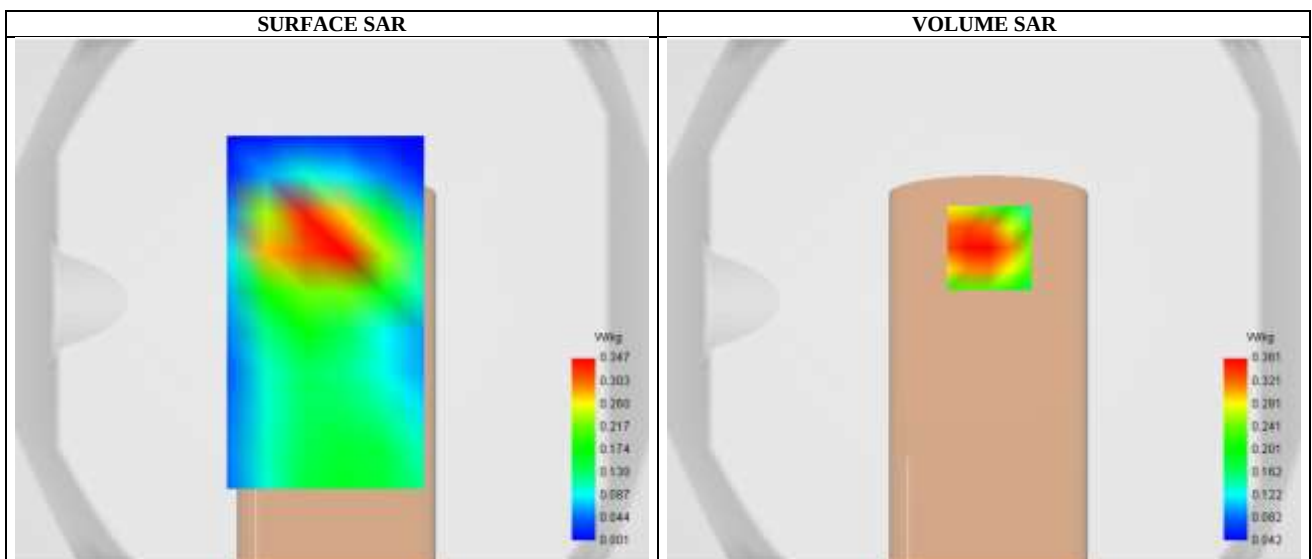
A. Experimental conditions.

Probe	SN 18/21 EPG0354
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	Band5_WCDMA850
Channels	High
Signal	WCDMA (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	846.599976
Relative permittivity (real part)	40.819732
Conductivity (S/m)	0.937409

C. SAR Surface and Volume

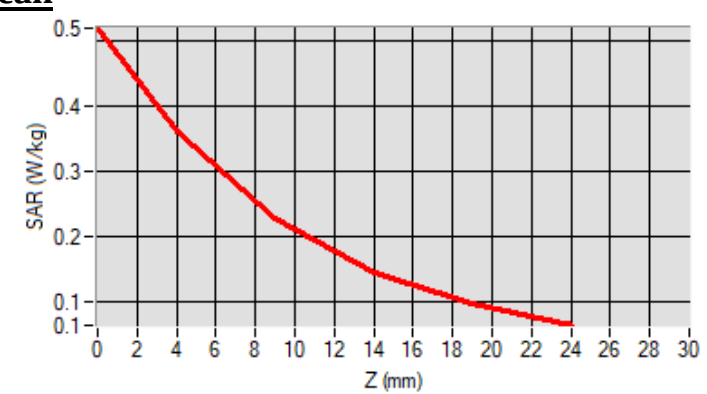


Maximum location: X=2.00, Y=20.00 ; SAR Peak: 0.53 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.216928
SAR 1g (W/Kg)	0.346459
Variation (%)	1.000001

E. Z Axis Scan



SAR Measurement at Band2_WCDMA1900 (Body, Validation Plane)

Date of measurement: 10/9/2021

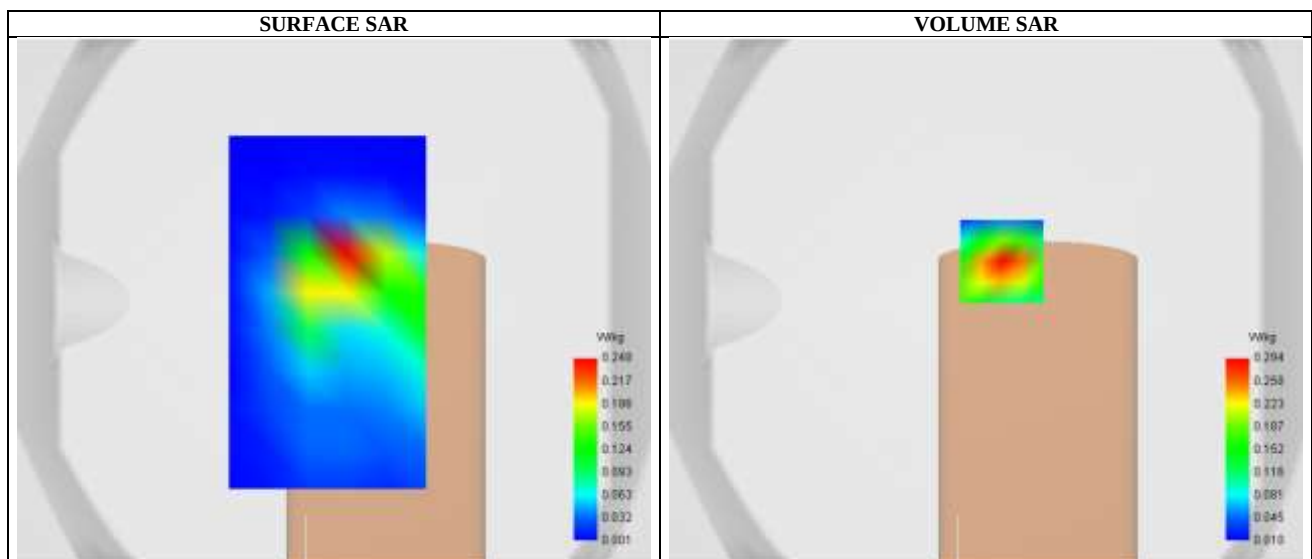
A. Experimental conditions.

Probe	SN 18/21 EPG0354
ConvF	2.14
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	Band2_WCDMA1900
Channels	High
Signal	WCDMA (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	1907.599976
Relative permittivity (real part)	39.741316
Conductivity (S/m)	1.407210

C. SAR Surface and Volume

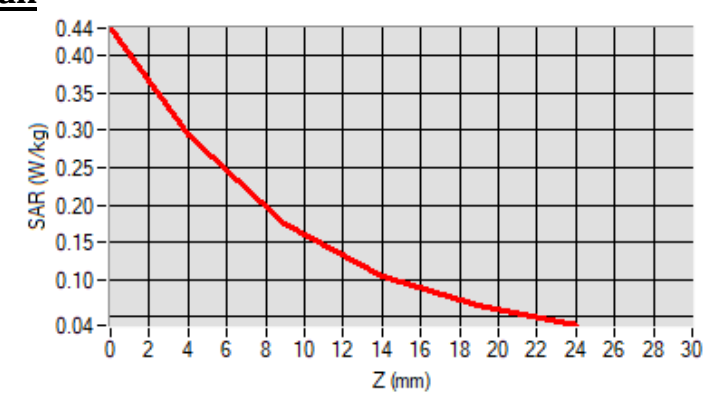


Maximum location: X=6.00, Y=15.00 ; SAR Peak: 0.44 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.143014
SAR 1g (W/Kg)	0.269621
Variation (%)	-1.130000

E. Z Axis Scan



SAR Measurement at LTE band 2 (Body, Validation Plane)

Date of measurement: 11/9/2021

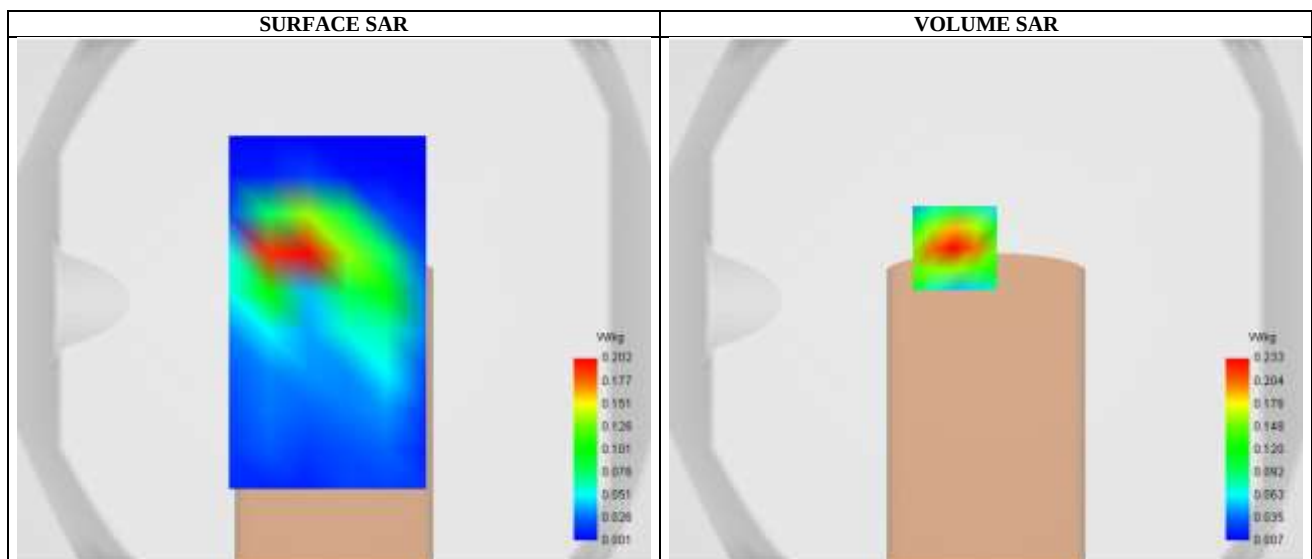
A. Experimental conditions.

Probe	SN 18/21 EPG0354
ConvF	2.14
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 2
Channels	High
Signal	LTE (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	1900.000000
Relative permittivity (real part)	39.752096
Conductivity (S/m)	1.409745

C. SAR Surface and Volume

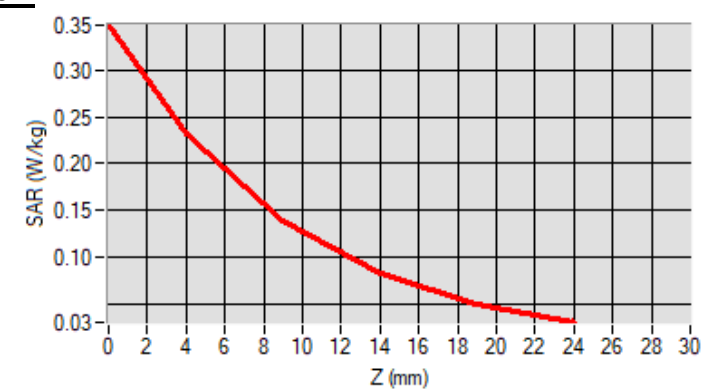


Maximum location: X=-12.00, Y=20.00 ; SAR Peak: 0.35 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.115579
SAR 1g (W/Kg)	0.214772
Variation (%)	2.820000

E. Z Axis Scan



SAR Measurement at LTE band 4 (Body, Validation Plane)

Date of measurement: 10/9/2021

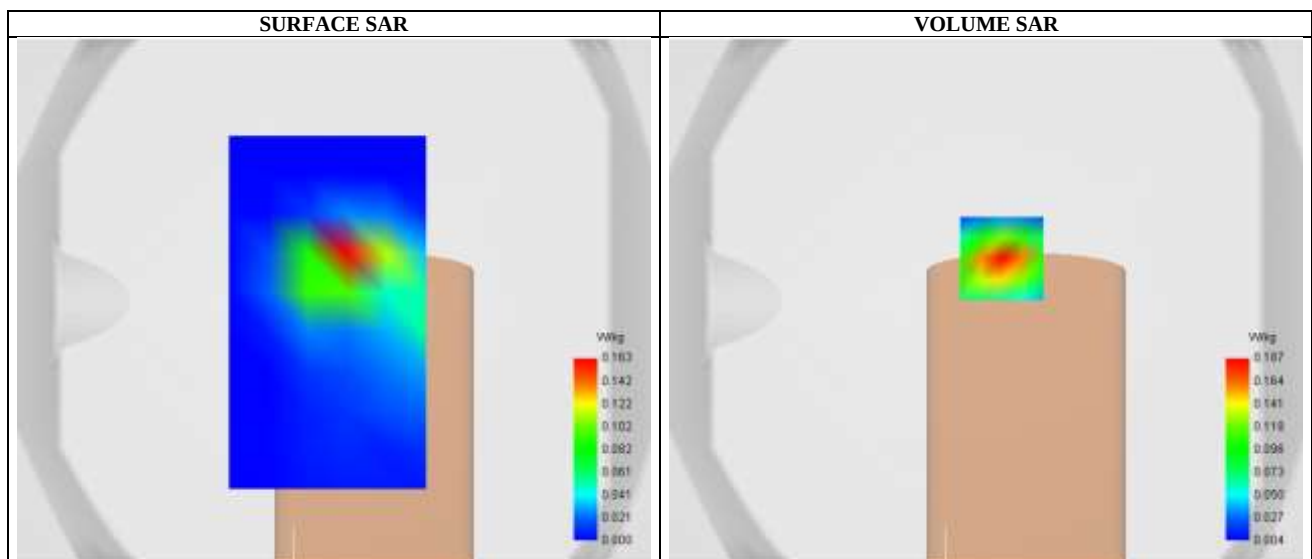
A. Experimental conditions.

Probe	SN 18/21 EPG0354
ConvF	2.07
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 4
Channels	Low
Signal	LTE (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	1720.000000
Relative permittivity (real part)	40.274191
Conductivity (S/m)	1.350338

C. SAR Surface and Volume

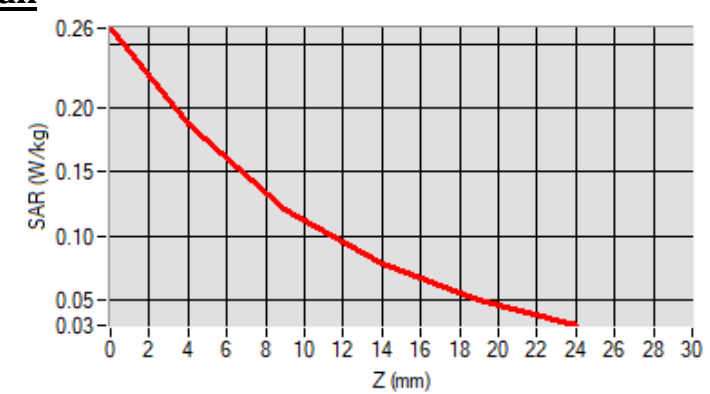


Maximum location: X=6.00, Y=16.00 ; SAR Peak: 0.26 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.093314
SAR 1g (W/Kg)	0.171296
Variation (%)	-2.560001

E. Z Axis Scan



SAR Measurement at LTE band 5 (Body, Validation Plane)

Date of measurement: 2/9/2021

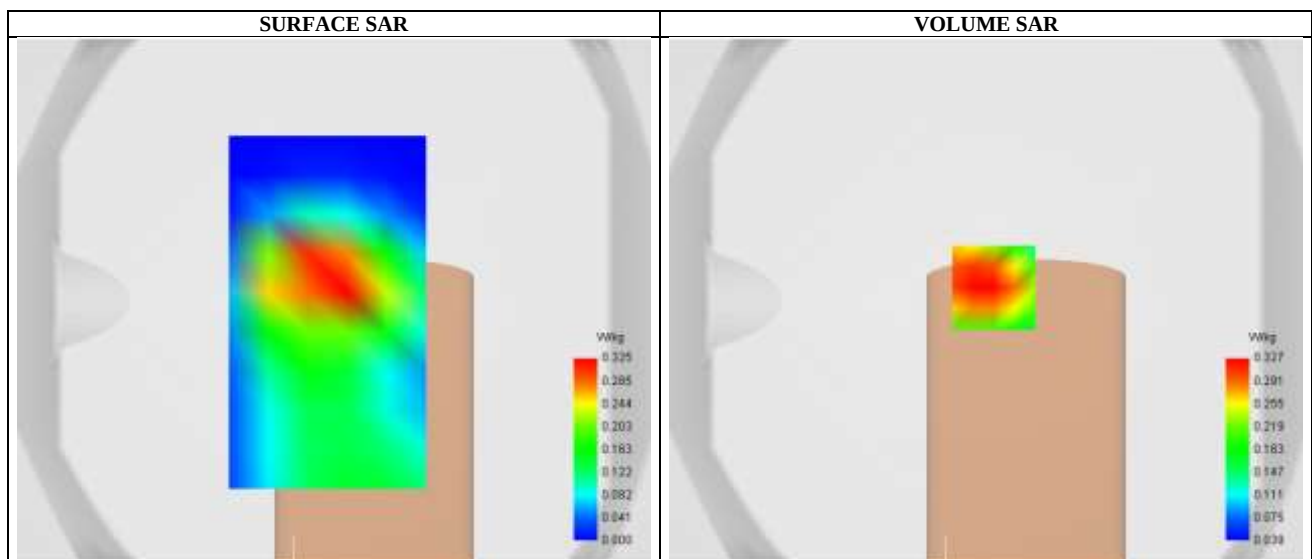
A. Experimental conditions.

Probe	SN 18/21 EPG0354
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 5
Channels	High
Signal	LTE (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	844.000000
Relative permittivity (real part)	40.829720
conductivity (S/m)	0.939724

C. SAR Surface and Volume

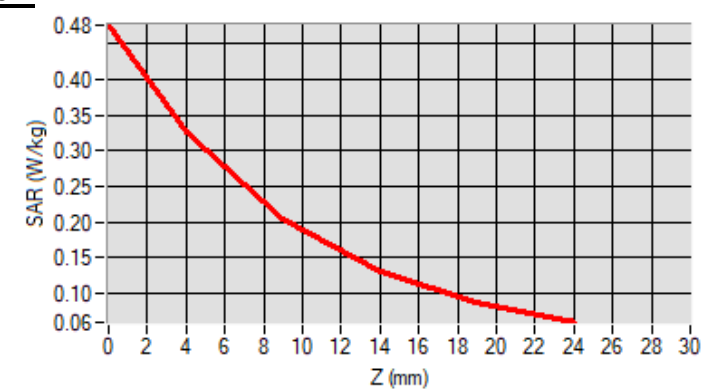


Maximum location: X=3.00, Y=5.00 ; SAR Peak: 0.48 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.197457
SAR 1g (W/Kg)	0.314796
Variation (%)	-2.690000

E. Z Axis Scan



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

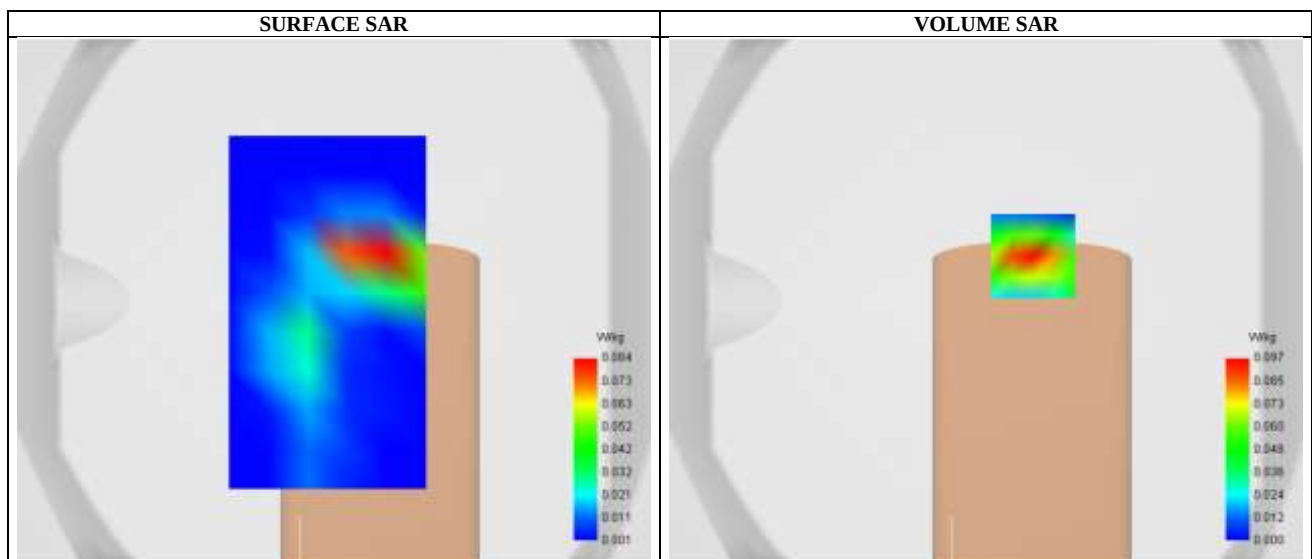
Date of measurement: 9/9/2021

A. Experimental conditions.

Probe	SN 18/21 EPG0354
ConvF	2.15
Area Scan	surf_sam_plan.txt
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 7
Channels	Low
Signal	LTE (Crest factor: 1.0)

B. Permittivity

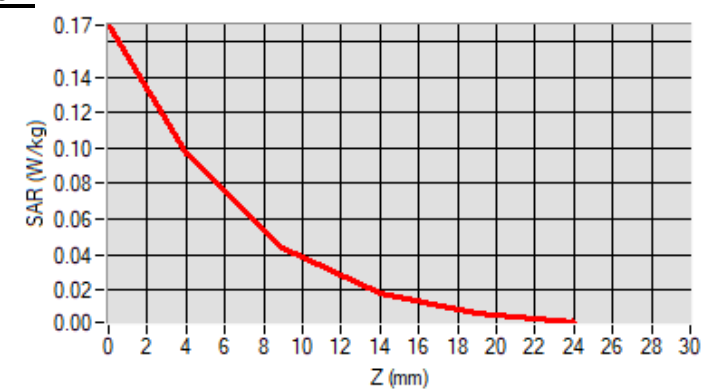
Frequency (MHz)	2510.000000
Relative permittivity (real part)	38.928059
Conductivity (S/m)	1.899403

C. SAR Surface and Volume

Maximum location: X=18.00, Y=17.00 ; SAR Peak: 0.17 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.039029
SAR 1g (W/Kg)	0.088331
Variation (%)	1.990000

E. Z Axis Scan

SAR Measurement at LTE band 41 (Body, Validation Plane)

Date of measurement: 9/9/2021

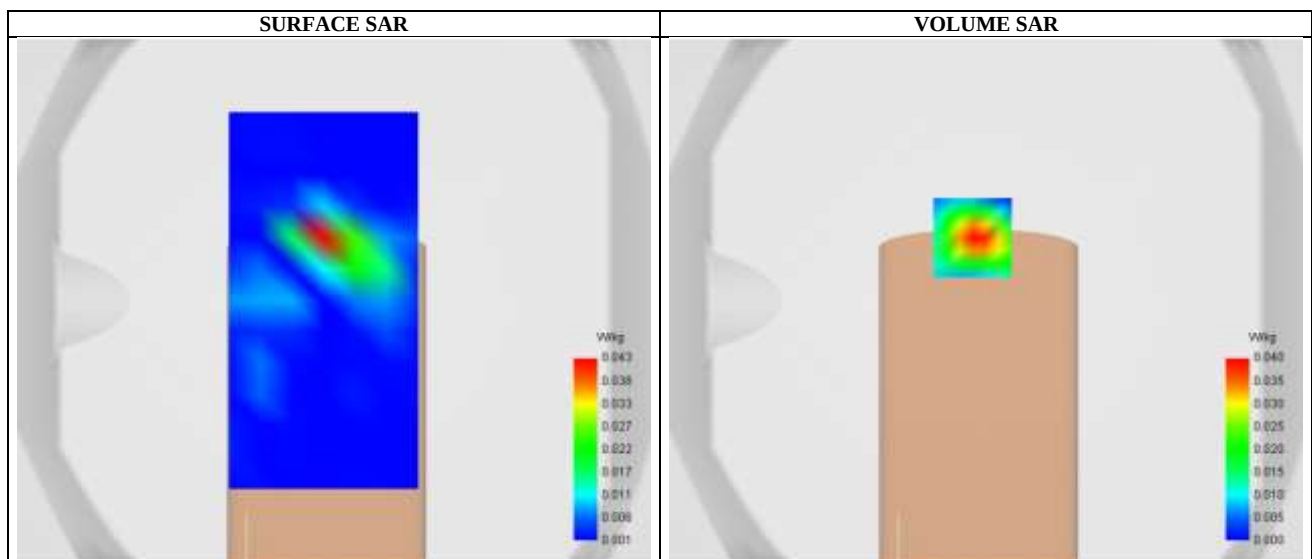
A. Experimental conditions.

Probe	SN 18/21 EPG0354
ConvF	2.15
Area Scan	surf_sam_plan.txt
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 41
Channels	High
Signal	LTE (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	2645.000000
Relative permittivity (real part)	38.662085
Conductivity (S/m)	2.013817

C. SAR Surface and Volume

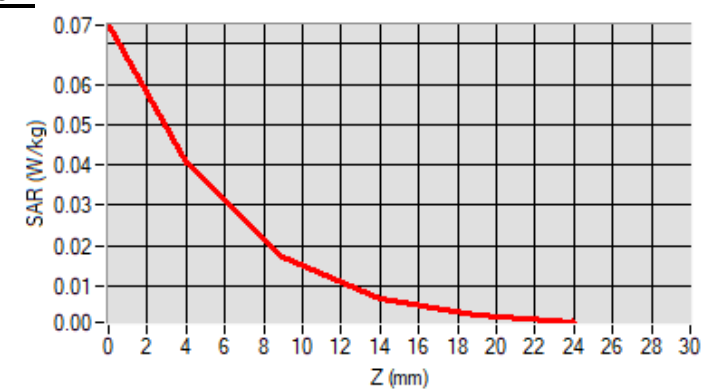


Maximum location: X=-5.00, Y=24.00 ; SAR Peak: 0.07 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.014873
SAR 1g (W/Kg)	0.036236
Variation (%)	0.620000

E. Z Axis Scan



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

Date of measurement: 2/9/2021

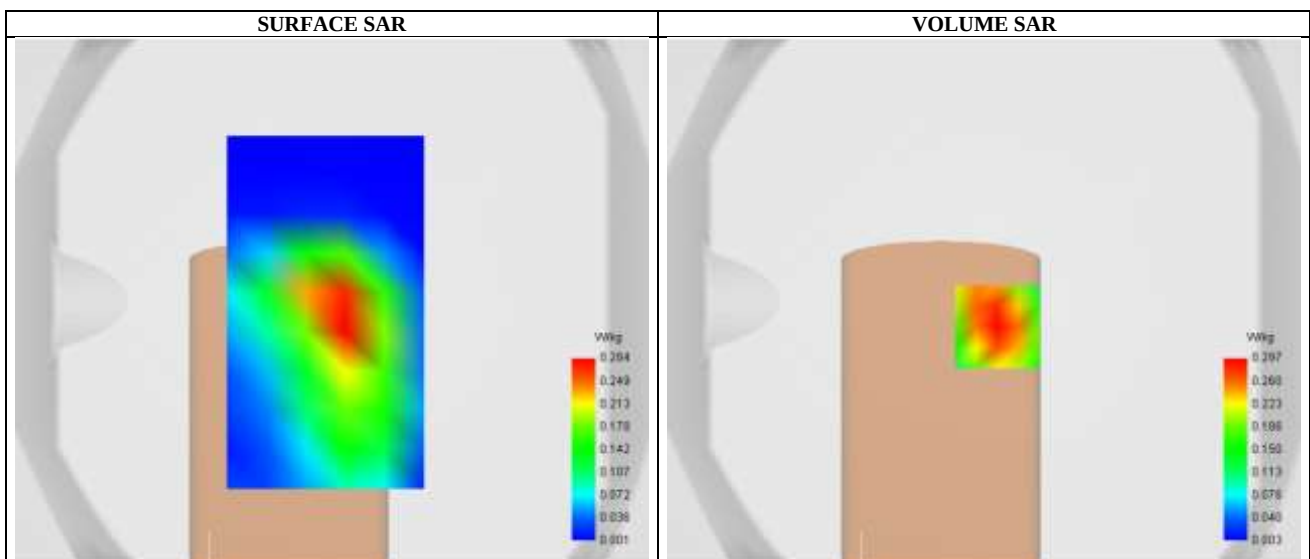
A. Experimental conditions.

Probe	SN 18/21 EPG0354
ConvF	2.23
Area Scan	surf_sam_plan.txt
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5mm, Complete
Phantom	Validation plane
Device Position	Body
Band	IEEE 802.11b ISM
Channels	High
Signal	IEEE802.b (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	2462.000000
Relative permittivity (real part)	39.885239
Conductivity (S/m)	1.812032

C. SAR Surface and Volume

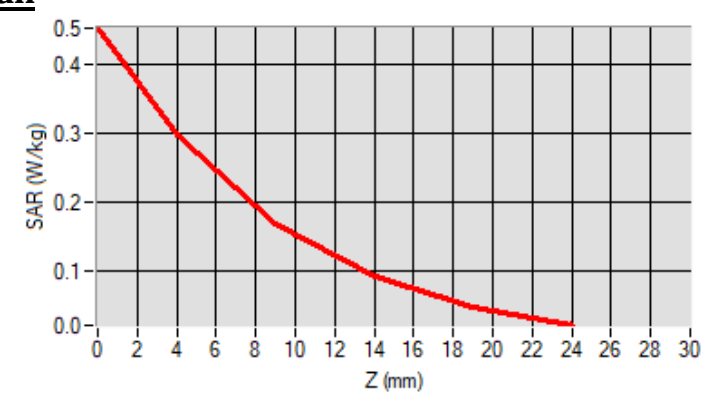


Maximum location: X=5.00, Y=-10.00 ; SAR Peak: 0.47 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.152974
SAR 1g (W/Kg)	0.280903
Variation (%)	0.160000

E. Z Axis Scan



SAR Measurement at CUSTOM (GPRS19003Txslot) (Body, Validation Plane)

Date of measurement: 10/9/2021

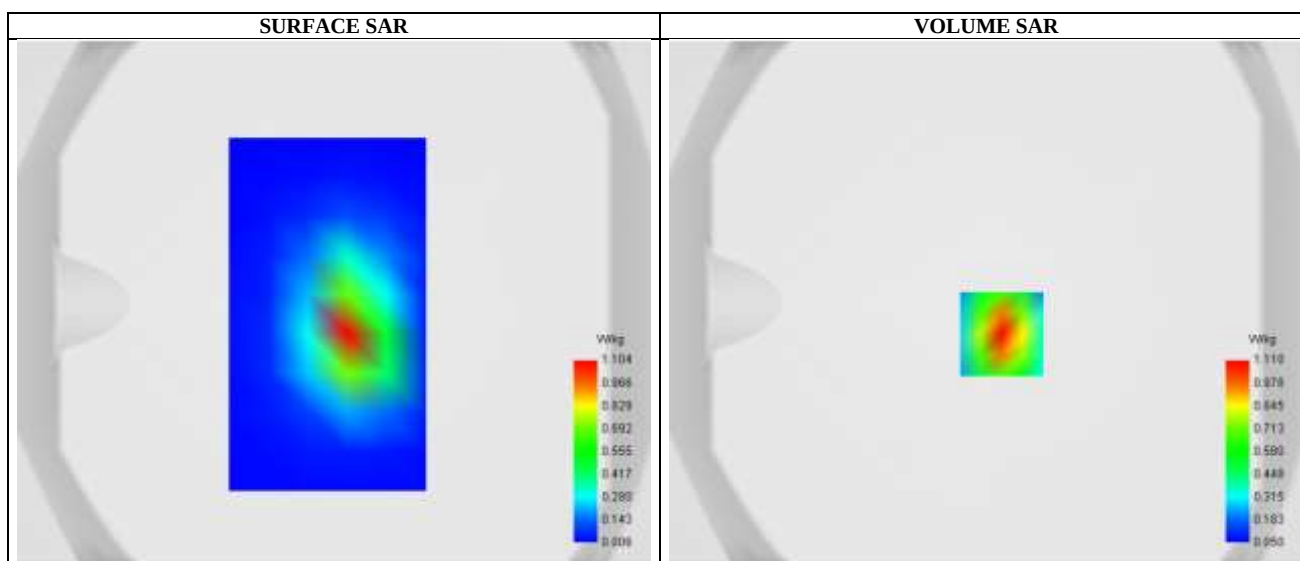
A. Experimental conditions.

Probe	SN 18/21 EPG0354
ConvF	2.14
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	GSM1900
Channels	Low
Signal	TDMA (Crest factor: 2.8)

B. Permittivity

Frequency (MHz)	1850.199951
Relative permittivity (real part)	39.850954
Conductivity (S/m)	1.392116

C. SAR Surface and Volume

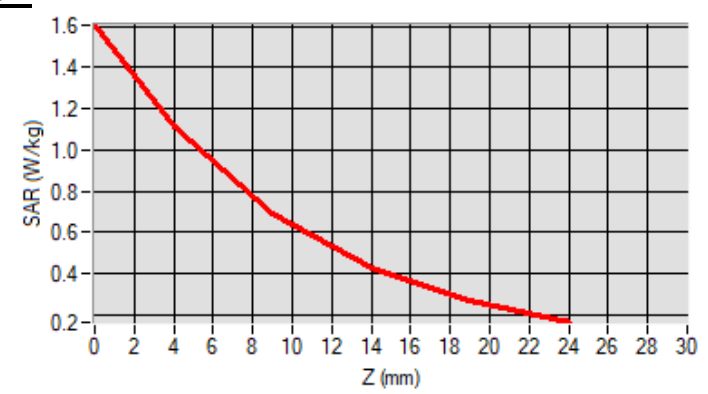


Maximum location: X=6.00, Y=-12.00 ; SAR Peak: 1.60 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.556180
SAR 1g (W/Kg)	1.017408
Variation (%)	1.930000

E. Z Axis Scan



SAR Measurement at Band2_WCDMA1900 (Body, Validation Plane)

Date of measurement: 10/9/2021

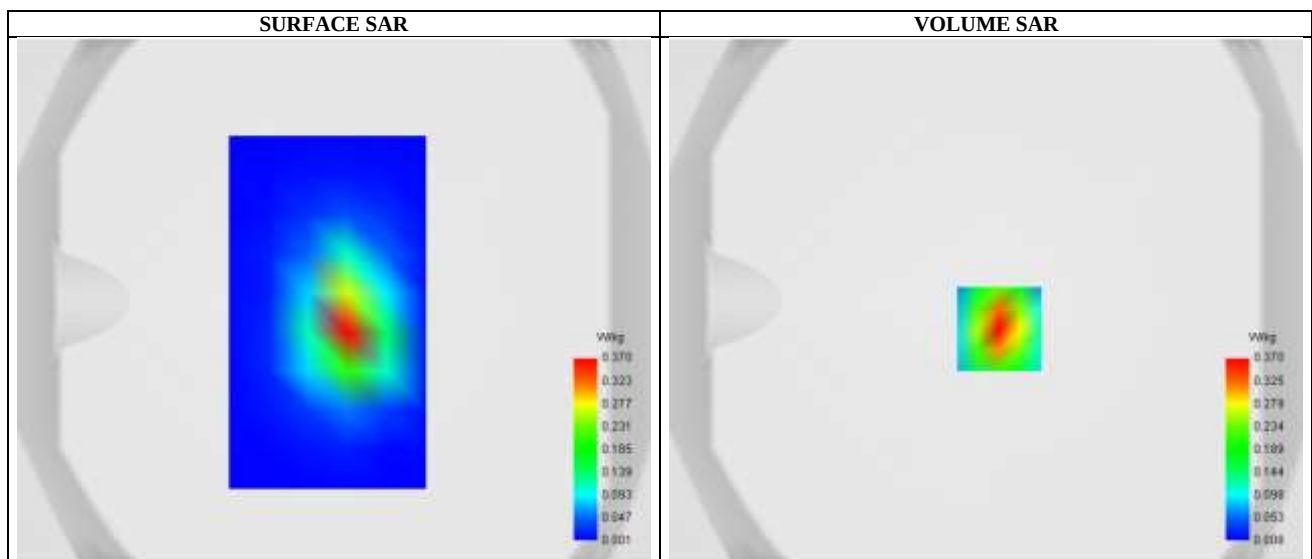
A. Experimental conditions.

Probe	SN 18/21 EPG0354
ConvF	2.14
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	Band2_WCDMA1900
Channels	High
Signal	WCDMA (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	1907.599976
Relative permittivity (real part)	39.741316
Conductivity (S/m)	1.407210

C. SAR Surface and Volume

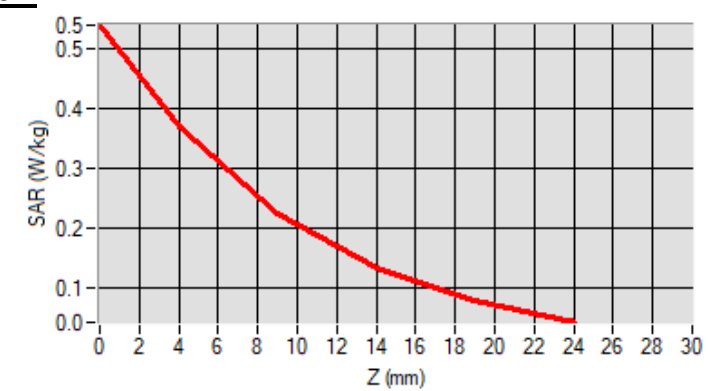


Maximum location: X=5.00, Y=-11.00 ; SAR Peak: 0.54 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.178917
SAR 1g (W/Kg)	0.337224
Variation (%)	-0.590000

E. Z Axis Scan



SAR Measurement at LTE band 2 (Body, Validation Plane)

Date of measurement: 11/9/2021

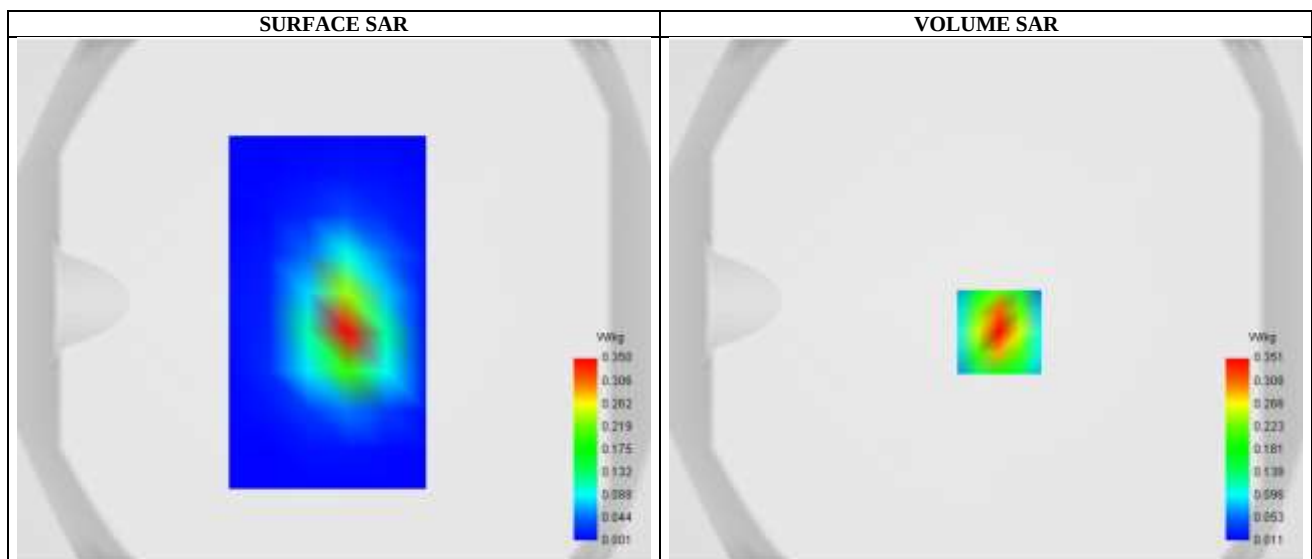
A. Experimental conditions.

Probe	SN 18/21 EPG0354
ConvF	2.14
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 2
Channels	High
Signal	LTE (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	1900.000000
Relative permittivity (real part)	39.752096
Conductivity (S/m)	1.409745

C. SAR Surface and Volume

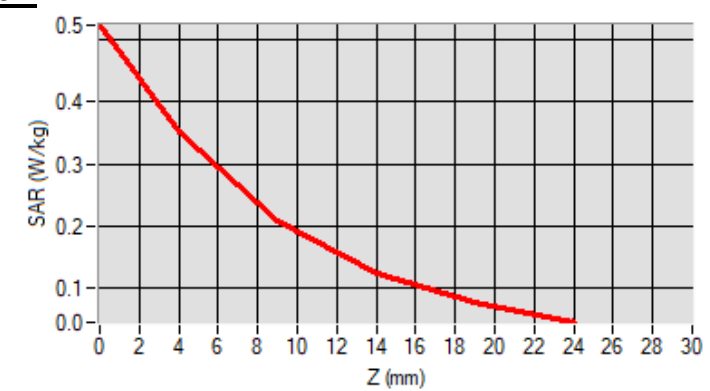


Maximum location: X=5.00, Y=-12.00 ; SAR Peak: 0.52 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.168312
SAR 1g (W/Kg)	0.320789
Variation (%)	-1.360001

E. Z Axis Scan



SAR Measurement at LTE band 4 (Body, Validation Plane)

Date of measurement: 10/9/2021

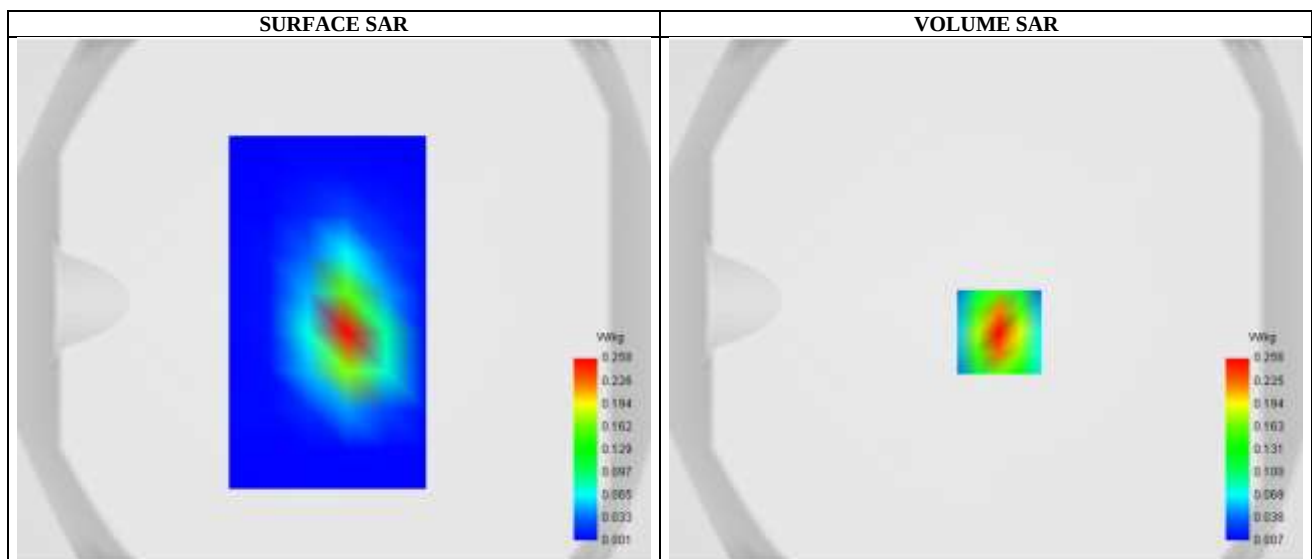
A. Experimental conditions.

Probe	SN 18/21 EPG0354
ConvF	2.07
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 4
Channels	Low
Signal	LTE (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	1720.000000
Relative permittivity (real part)	40.274191
Conductivity (S/m)	1.350338

C. SAR Surface and Volume



Maximum location: X=5.00, Y=-12.00 ; SAR Peak: 0.37 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.125399
SAR 1g (W/Kg)	0.234103
Variation (%)	-1.620000

E. Z Axis Scan

