

TEST REPORT

Report No.: BCTC2309050581-7E

Applicant: Shenzhen FreeYond Technology Co Ltd

Product Name: Tablet

Model/Type
reference: A5

Tested Date: 2023-10-16 to 2023-10-17

Issued Date: 2023-11-07

Shenzhen BCTC Testing Co., Ltd.



FCC ID: 2A8FE-A5

Product Name: Tablet

Trademark: N/A

Model/Type Ref.: A5

Applicant: Shenzhen FreeYond Technology Co Ltd

Address: Unit 203,Block A,Tengfei Industrial Building , No.6 Taohua Road ,Futian Bonded Area ,Shenzhen ,Guangdong, China

Manufacturer: Shenzhen FreeYond Technology Co Ltd

Address: Unit 203,Block A,Tengfei Industrial Building , No.6 Taohua Road ,Futian Bonded Area ,Shenzhen ,Guangdong, China

Prepared By: Shenzhen BCTC Testing Co., Ltd.

Address: 1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng , Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China

Sample Received Date: 2023-10-16

Sample tested Date: 2023-10-16 to 2023-10-17

Issue Date: 2023-11-07

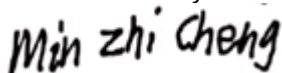
SAR Max. Values is: 1.200 W/kg (1g) for Body

Test Standards: IEEE Std C95.1, 2019/ IEEE Std 1528™-2013/FCC Part 2.1093

Test Results: PASS

Remark: This is SAR test report

Tested by:



Min Zhi Cheng/ Project Handler

Approved by:



Zero Zhou/ Reviewer

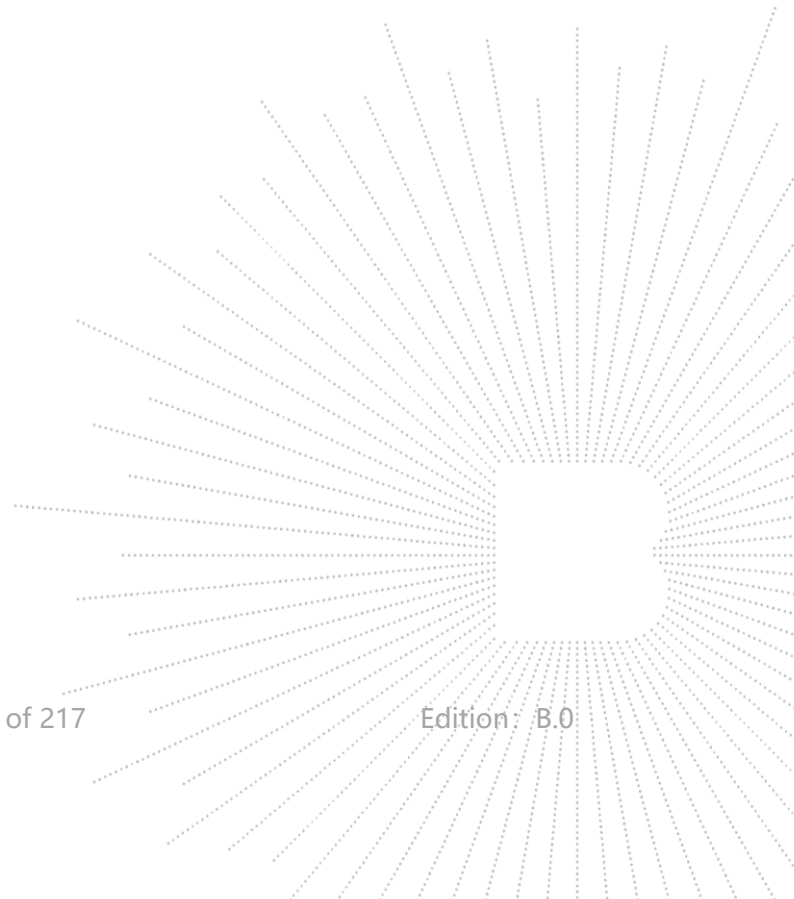
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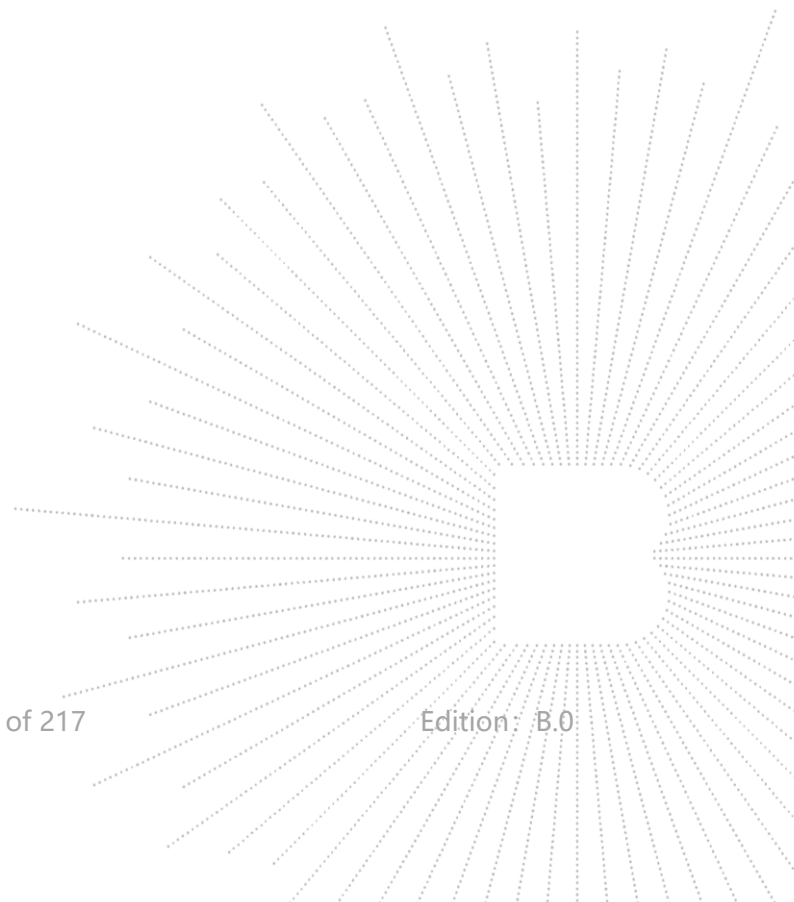
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(Note: N/A Means Not Applicable)



1. Version

Report No.	Issue Date	Description	Approved
BCTC2309050581-7E	2023-11-07	Original	Valid



2. Test Standards

IEEE Std C95.1-2019: IEEE Standard for Safety Levels with Respect to Human Exposure to Electric, Magnetic, and Electromagnetic Fields, 0 Hz to 300 GHz. It specifies the maximum exposure limit of 1.6 W/kg as averaged over any 1 gram of tissue for portable devices being used within 20 cm of the user in the uncontrolled environment.

IEEE Std 1528™-2013: IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques.

FCC Part 2.1093 Radiofrequency Radiation Exposure Evaluation: Portable Devices

KDB 447498 D01 General RF Exposure Guidance v06: Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies

KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04: SAR Measurement Requirements for 100 MHz to 6 GHz

KDB 865664 D02 RF Exposure Reporting v01r02: RF Exposure Compliance Reporting and Documentation Considerations

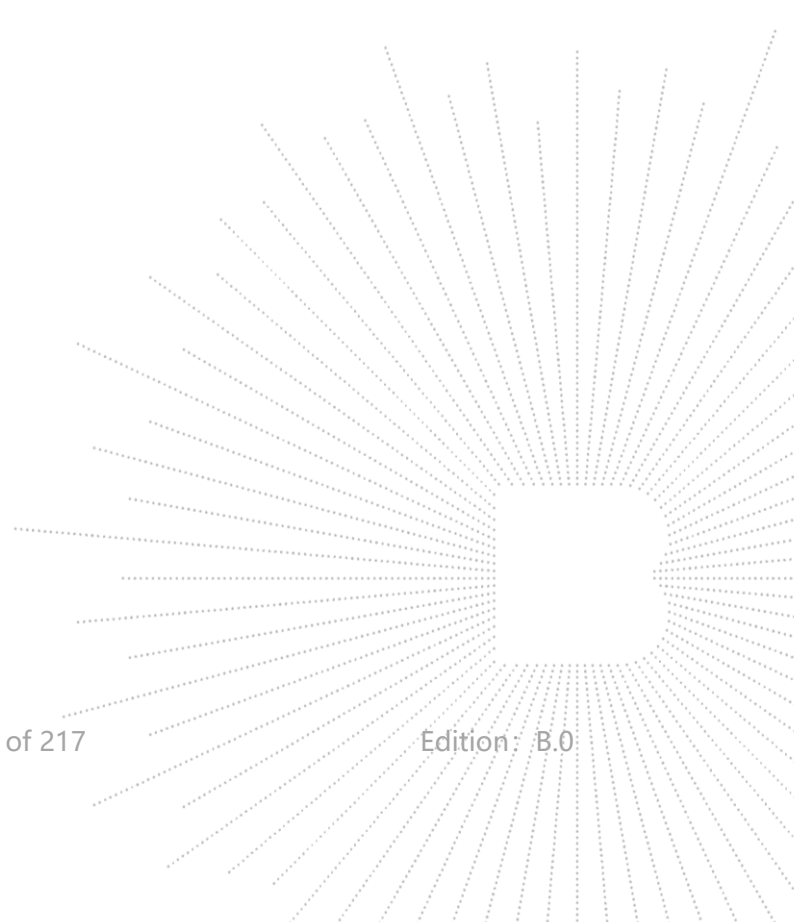
KDB 248227 D01 802.11 Wi-Fi SAR v02r02: SAR GUIDANCE FOR IEEE 802.11 (Wi-Fi) TRANSMITTERS

KDB 941225 D01 3G SAR Procedures: 3G SAR MEAUREMENT PROCEDURES

KDB 941225 D05 SAR for LTE Devices: SAR EVALUATION CONSIDERATIONS FOR LTE DEVICES

KDB 941225 D06 Hotspot Mode v02r01: SAR EVALUATION PROCEDURES FOR PORTABLE DEVICES WITH WIRELESS ROUTER CAPABILITIES

KDB 648474 D04 Handset SAR v01r03: SAR EVALUATION CONSIDERATIONS FOR WIRELESS HANDSETS

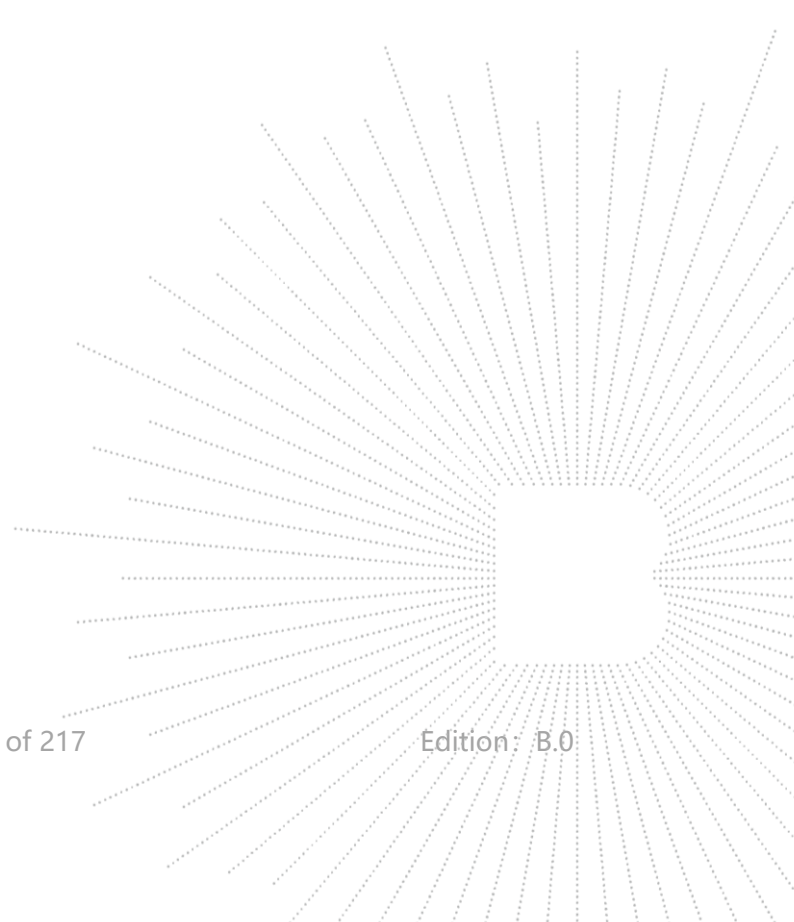


3. Test Summary

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

Frequency Band	Report SAR1g (W/kg)	SAR1g Limit (W/kg)
	Body (0mm Gap)	
GSM	1.110	1.6
WCDMA	1.200	1.6
LTE	1.165	1.6
WLAN 2.4G	0.339	1.6
WLAN 5.1G	0.349	1.6
WLAN 5.8G	0.362	1.6
Simultaneous Transmission	1.539	1.6

The device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-2019, and had been tested in accordance with the measurement methods and procedure specified in IEEE 1528-2013.

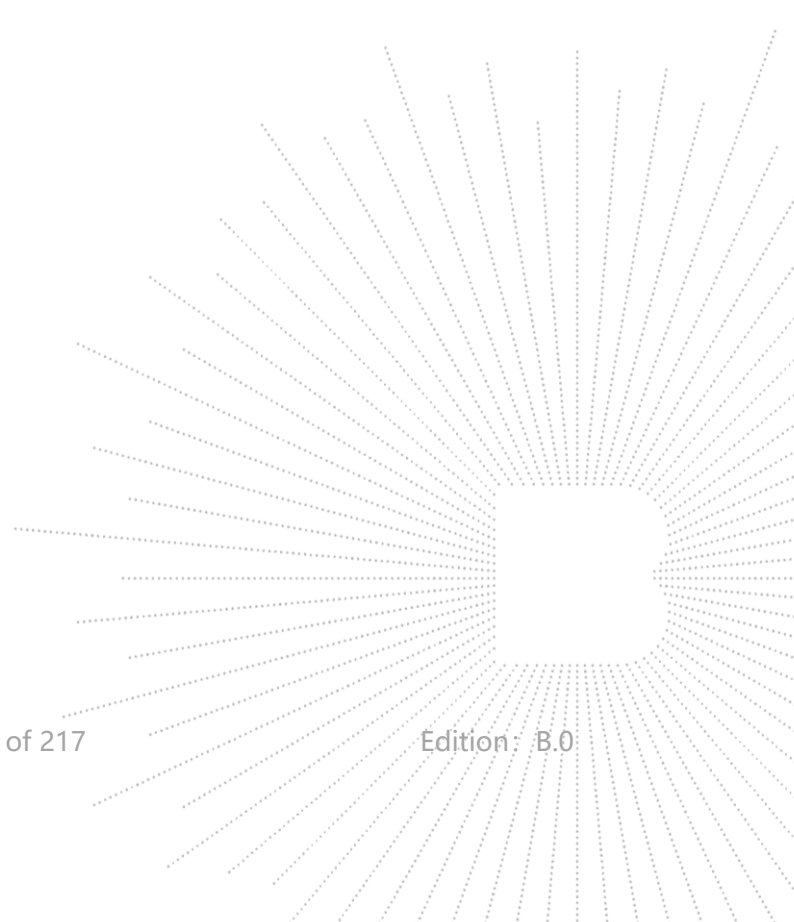


4. SAR Limits

EXPOSURE LIMITS	FCC Limit (1g Tissue)	
	SAR (W/kg)	
	(General Population / Uncontrolled Exposure Environment)	(Occupational / Controlled Exposure Environment)
Spatial Average(averaged over the whole body)	0.08	0.4
Spatial Peak(averaged over any 1 g of tissue)	1.6	8.0
Spatial Peak(hands/wrists/ feet/anklesaveraged over 10 g)	4.0	20.0

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

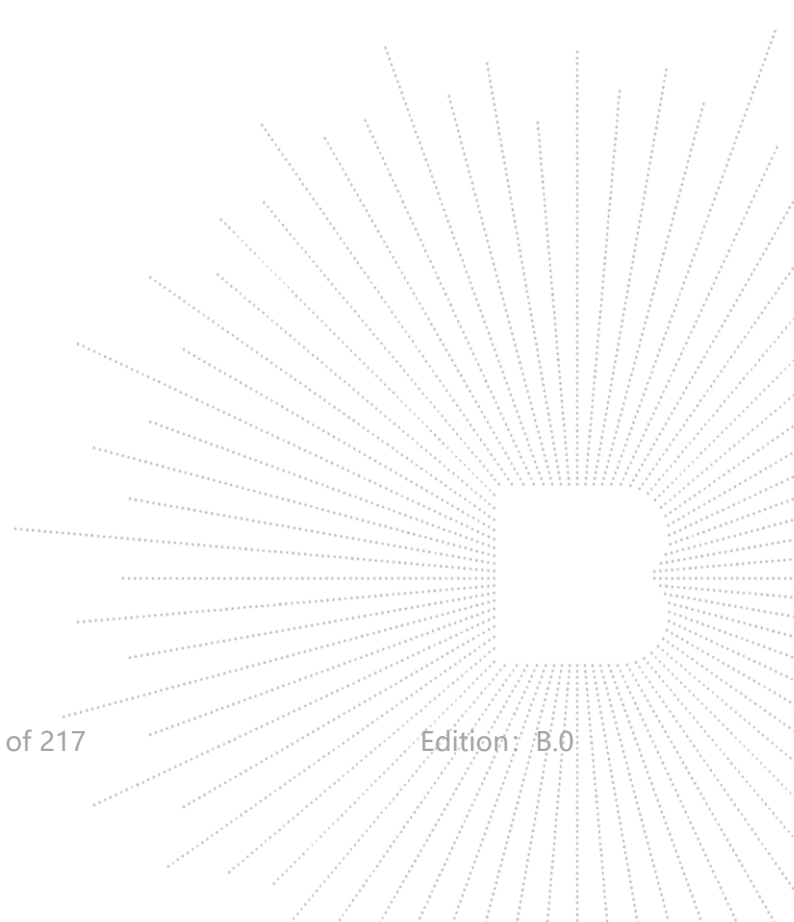
Occupational/Controlled Environments are defined as locations where there is exposure that may be incurred by people who are aware of the potential for exposure (i.e. as a result of employment or occupation).



5. Measurement Uncertainty

Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg and the measured 10-g SAR within a frequency band is < 3.75 W/kg. The expanded SAR measurement uncertainty must be $\leq 30\%$, for a confidence interval of $k=2$. If these conditions are met, extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval.

Therefore, the measurement uncertainty is not required.



6. Product Information and Test Setup

6.1 Product Information

Model/Type Ref.:	A5
Model differences:	N/A
Hardware Version:	N/A
Software Version:	N/A
Ratings:	AC 100-240,50/60Hz
Adapter:	Model: YQ002-Z Input:AC100-240V,50/60Hz,0.5A Output:DC5V,3.0A ;9V,2.22A;12V,1.67A
Battery:	DC3.8V,8000mAh/30.4Wh

Bluetooth

Operation Frequency:	2402-2480MHz
Bluetooth Version:	N/A
Type of Modulation:	GFSK, $\pi/4$ DQPSK, 8DPSK
Number Of Channel	79CH
Antenna installation:	Internal antenna
Antenna Gain:	-0.91 dBi

BLE

Operation Frequency:	Bluetooth: 2402-2480MHz
Bluetooth Version:	N/A
Type of Modulation:	Bluetooth: GFSK,1Mbps,2Mbps
Number Of Channel	40channel
Antenna installation:	Internal antenna
Antenna Gain:	-0.91 dBi

2,3G

Operation Frequency:	GSM 850: TX: 824~849MHz; RX: 869~894MHz; GSM 1900: TX:1850~1910MHz; RX:1930~1990MHz; WCDMA Band II: TX: 1852.40~1907.60MHz; Rx: 1932.60~1987.40MHz; WCDMA Band V: TX: 826.40~846.60MHz; RX: 871.40~ 891.60MHz;
Type of Modulation:	GSM with GMSK,8PSK Modulation WCDMA Mode with BPSK Modulation
Antenna installation:	Internal antenna
Antenna Gain:	GSM850: -1.26dBi GSM1900: 2.80 dBi WCDMA Band II: 2.80 dBi WCDMA Band V: -1.26 dBi

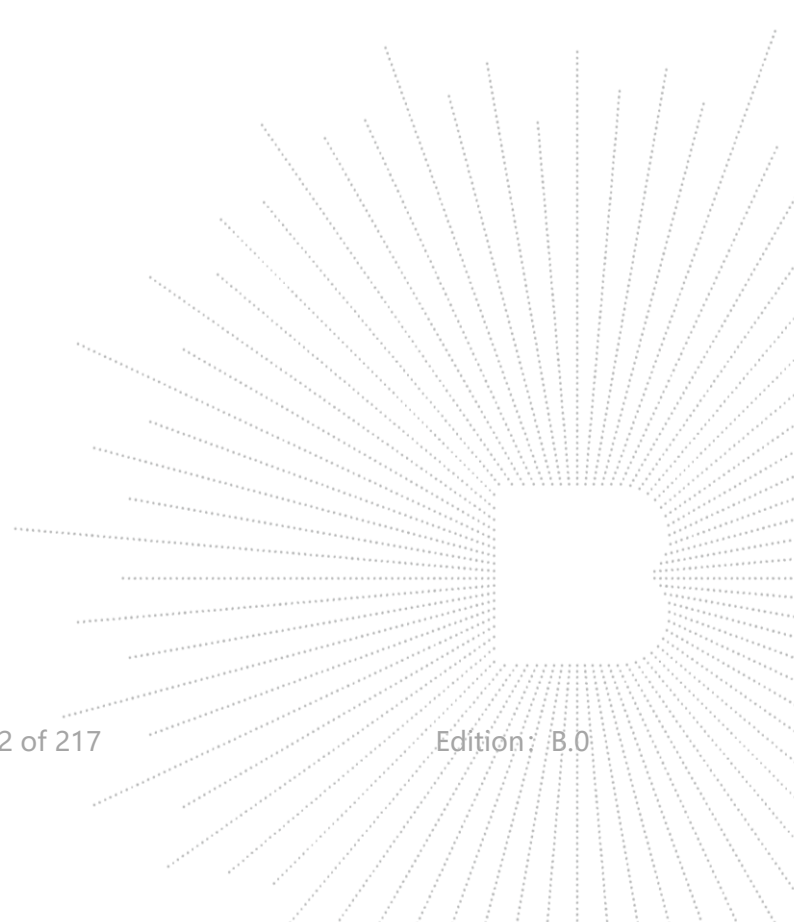
4G

Tx Frequency:	LTE Band 7: 2500MHz-2570MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 17: 704MHz-716MHz LTE Band 38: 2570 MHz -2620 MHz LTE Band 41: 2496MHz ~ 2690MHz LTE Band 66: 1710 MHz -1780 MHz
Rx Frequency:	LTE Band 7: 2620MHz-2690MHz LTE Band 12: 729 MHz ~ 746 MHz LTE Band 17: 734MHz-746MHz LTE Band 38: 2570 MHz -2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 66: 2110 MHz -2180 MHz
Bandwidth:	LTE Band 7: 5MHz /10MHz /15MHz /20MHz LTE Band 12: 1.4MHz /3MHz /5MHz /10MHz LTE Band 17: 5MHz /10MHz LTE Band 38: 5MHz /10MHz /15MHz /20MHz LTE Band 41: 5MHz /10MHz /15MHz /20MHz LTE Band 66: 1.4MHz /3MHz /5MHz /10MHz /15MHz /20MHz
Type of Modulation:	QPSK/16QAM
Antenna Type:	Internal Antenna
Antenna Gain:	LTE Band 7: 0.45 dBi LTE Band 12: -4.79dBi LTE Band 17: -4.79 dBi LTE Band 38: 0.64 dBi LTE Band 41: 0.64 dBi LTE Band 66: -0.91 dBi

WLAN

WIFI2.4G	
Operation Frequency:	802.11b/g/n20MHz:2412~2462MHz
Type of Modulation:	DSSS with DBPSK/DQPSK/CCK for 802.11b; OFDM with BPSK/QPSK/16QAM/64QAM for 802.11g/n;
Number Of Channel	11 channels for 802.11b/g/n(HT20);
Antenna Type:	Internal Antenna
Antenna Gain:	-0.91 dBi

WIFI 5G	
Operation Frequency:	5180-5240MHz for 802.11a/n/ac(HT20); 5190-5230MHz for 802.11n/ac(HT40)0; 5210MHz for 802.11 ac80; 5745-5825 MHz for 802.11a/n/ac(HT20); 5755-5795 MHz for 802.11n/ac(HT40); 5775MHz for 802.11 ac80
Data Rate	802.11a:54/48/36/24/18/12/9/6Mbps 802.11n:up to 300 Mbps 802.11ac:up to 867 Mbps
Type of Modulation:	OFDM with BPSK/QPSK/16QAM/64QAM for 802.11a/n OFDM with BPSK/QPSK/16QAM/64QAM/256QAM for 802.11ac
Number Of Channel	4 channels for 802.11a/n20 in the 5180-5240MHz band ; 2 channels for 802.11 n40 in the 5190-5230MHz band ; 1 channels for 802.11 ac80 in the 5210MHz band ; 5 channels for 802.11a/n20 in the 5745-5825MHz band ; 2 channels for 802.11 n40 in the 5755-5795MHz band ; 1 channels for 802.11 ac80 in the 5775MHz band
Antenna Type:	Internal Antenna
Antenna Gain:	WIFI5.1G:-0.70 dBi WIFI5.8G:-0.70dBi



6.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.

6.3 Support Equipment

Cable of Product

No.	Cable Type	Quantity	Provider	Length (m)	Shielded	Note
1	--	--	Applicant	---	Yes/No	--
2	--	--	BCTC	--	Yes/No	--

No.	Device Type	Brand	Model	Series No.	Note
1.	---	---	---	---	---
2.	--	--	--	--	--

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

6.4 Test Environment

1. Normal Test Conditions:

Humidity(%):	35-75
Atmospheric Pressure(kPa):	95-105
Temperature(°C):	18-25

2. Extreme Test Conditions:

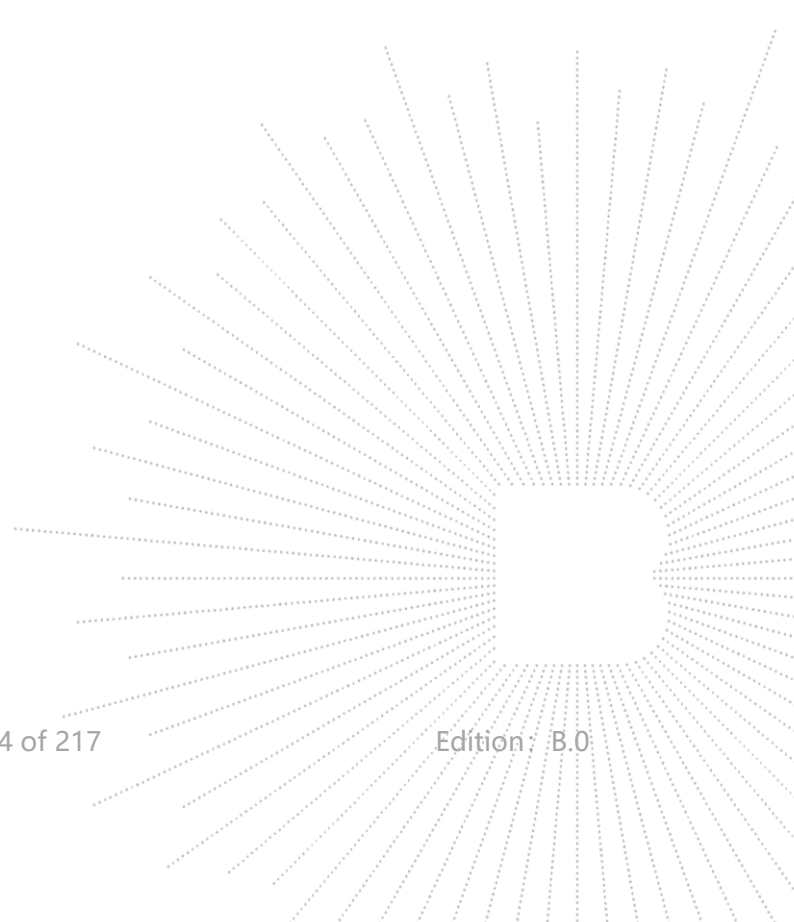
N/A

7. Test Facility and Test Instrument Used

7.1 Test Facility

All measurement facilities used to collect the measurement data are located at Shenzhen BCTC Testing Co., Ltd. Address: 1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

FCC Test Firm Registration Number: 712850
A2LA certificate registration number is: CN1212
ISED Registered No.: 23583
ISED CAB identifier: CN0017



7.2 Test Instrument Used

Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
PC	DELL	\	\	N/A	N/A
SAR Measurement system	SATIMO	\	\	N/A	N/A
Signal Generator	Keysight	83711B	US37100131	Aug. 29, 2023	Aug. 28, 2024
Multimeter	Keithley	1160271	\	Nov. 10, 2022	Nov 09, 2023
S-parameter Network Analyzer	R&S	ZVB 8	101353	Dec. 07, 2022	Dec. 06, 2023
Wideband Radio Communication Tester	R&S	CMW500	\	Nov. 10, 2022	Nov 09, 2023
E SAR PROBE 6GHz	MVG	SSE2	2623-EPGO-420	July 18, 2023	July 17, 2024
DIPOLE 750	SATIMO	SID750	SN 47/21 DIP 2G450-620	Nov. 25, 2021	Nov. 24, 2024
DIPOLE 835	SATIMO	SID835	SN 47/21 DIP 2G450-621	Nov. 25, 2021	Nov. 24, 2024
DIPOLE 1800	SATIMO	SID 1800	SN 47/21 DIP 1G800-623	Nov. 25, 2021	Nov. 24, 2024
DIPOLE 1900	SATIMO	SID 1900	SN 47/21 DIP 2G100-624	Nov. 25, 2021	Nov. 24, 2024
DIPOLE 2450	SATIMO	SID 2450	SN 47/21 DIP 2G450-627	Nov. 25, 2021	Nov. 24, 2024
DIPOLE 2600	SATIMO	SID 2600	SN 47/21 DIP 2G600-628	Nov. 25, 2021	Nov. 24, 2024
DIPOLE 5000	SATIMO	SID5000	SN 47/21 DIP 2G450-629	Nov. 25, 2021	Nov. 24, 2024
COMOSAR OPENCoaxial Probe	SATIMO	\	\	Nov. 18, 2022	Nov. 17, 2023
SAR Locator	SATIMO	\	\	Nov. 18, 2022	Nov. 17, 2023
Communication Antenna	SATIMO	\	\	Nov. 18, 2022	Nov. 17, 2023
FEATURE PHONEPOSITIONING DEVICE	SATIMO	\	\	N/A	N/A
DUMMY PROBE	SATIMO	\	\	N/A	N/A
SAM Phantom	MVG	\	SN 13/09 SAM68	N/A	N/A
Liquid measurement Kit	HP	85033D	3423A08186	N/A	N/A
Power meter	Agilent	E4419	\	May 15, 2023	May 14, 2024
Power meter	Agilent	E4419	\	May 15, 2023	May 14, 2024
Power sensor	Agilent	E9300A	\	May 15, 2023	May 14, 2024
Power sensor	Agilent	E9300A	\	May 15, 2023	May 14, 2024
Directional Coupler	Krytar 158020	131467	\	Nov. 10, 2022	Nov 09, 2023

Note:

Per KDB865664D01 requirements for dipole calibration, the test laboratory has adopted three year extended calibration interval. Each measured dipole is expected to evaluate with following criteria at least on annual interval.

1. There is no physical damage on the dipole;
2. System check with specific dipole is within 10% of calibrated values;
3. The most recent return-loss results, measured at least annually, deviates by no more than 20% from the previous measurement;
4. The most recent measurement of the real or imaginary parts of the impedance, measured at least annually is within 5Ω from the previous measurement.

Network analyzer probe calibration against air, distilled water and a shorting block performed before measuring liquid parameters.

8. Specific Absorption Rate (SAR)

8.1 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.

8.2 SAR Definition

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

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

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

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

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

Where: C is the specific heat capacity, δT is the temperature rise and δt is the exposure duration, or related to the

electrical field in the tissue by

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

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

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

9. SAR Measurement System

9.1 The Measurement System

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

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

The following figure shows the system.



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

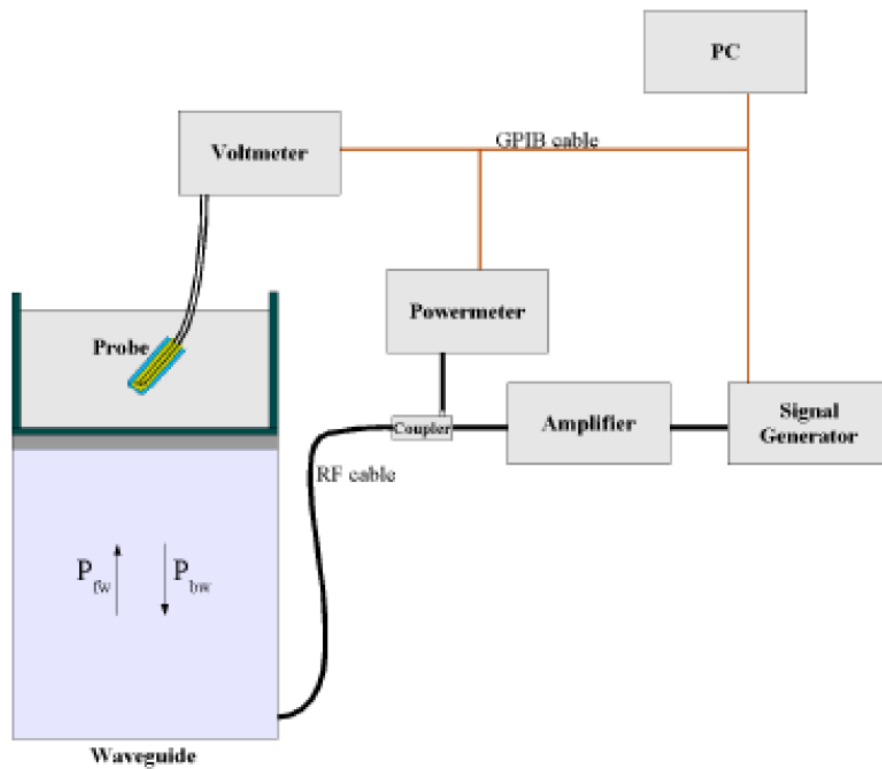
9.2 Probe

For the measurements the Specific Dosimetric E-Field Probe SN 46/21 EPGO362 with following specifications is used

- Dynamic range: 0.01-100 W/kg
- Tip Diameter : 5 mm
- Distance between probe tip and sensor center: 2.10mm
- Distance between sensor center and the inner phantom surface: 4 mm (repeatability better than +/- 1mm)
- Probe linearity: <0.25 dB
- Axial Isotropy: <0.25 dB
- Spherical Isotropy: <0.50 dB
- Calibration range: 835 to 2500MHz for head & body simulating liquid.

Angle between probe axis (evaluation axis) and surface normal line: less than 30°

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



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

Where :

P_{fw} = Forward Power

P_{bw} = Backward Power

a and b = Waveguide dimensions

l = Skin depth

Keithley configuration:

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

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

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

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

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

where DCP is the diode compression point in mV.

9.3 Probe Calibration Process

Dosimetric Assessment Procedure

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

Free Space Assessment Procedure

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

Temperature Assessment Procedure

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

Where:

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

Δt = exposure time (30 seconds),

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

ΔT = temperature increase due to RF exposure.

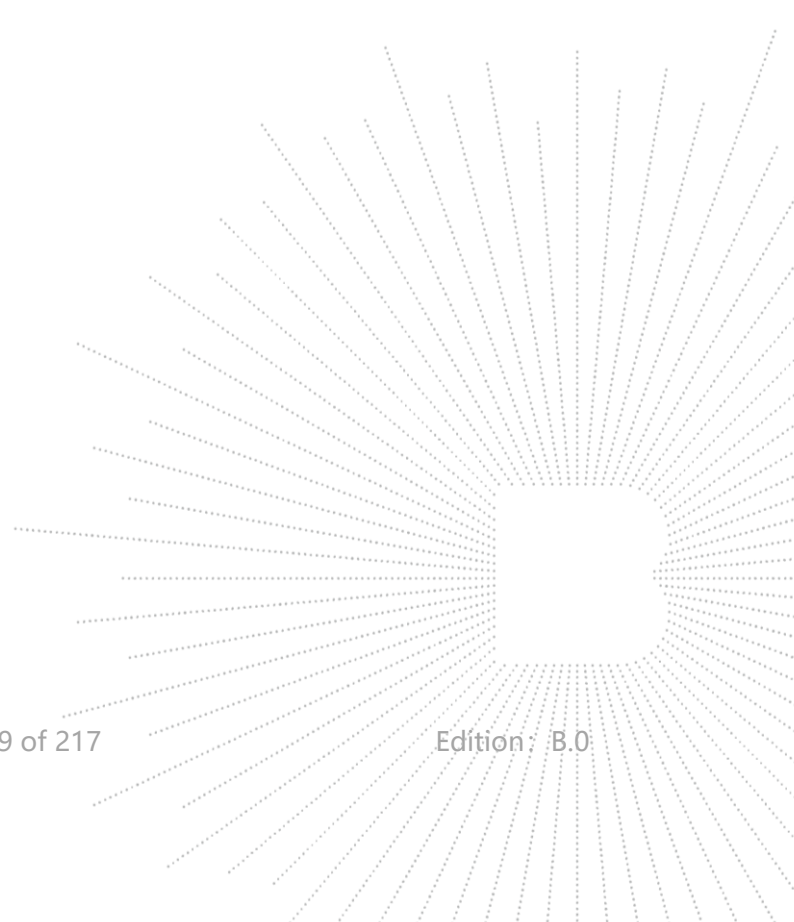
SAR is proportional to $\Delta T/\Delta t$, the initial rate of tissue heating, before thermal diffusion takes place. The electric field in the simulated tissue can be used to estimate SAR by equating the thermally derived SAR to that with the E- field component.

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

Where:

σ = simulated tissue conductivity,

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

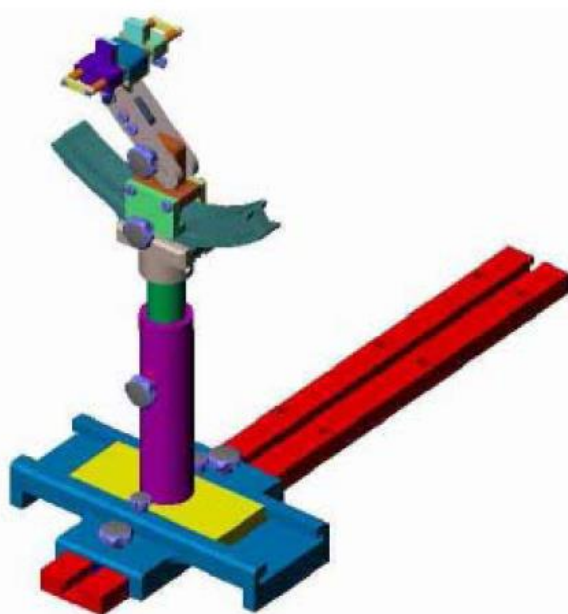


9.4 Phantom

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

9.5 Device Holder

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



System Material	Permittivity	Loss Tangent
Delrin	3.7	0.005

10. Tissue Simulating Liquids

10.1 Composition of Tissue Simulating Liquid

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



Liquid Height for Body SAR

The Composition of Tissue Simulating Liquid

Frequency (MHz)	Water (%)	Salt (%)	1,2-Propane diol (%)	HEC (%)	Preventol (%)	DGBE (%)
Head/Body						
835	40.3	1.4	57.9	0.2	0.2	0
900	40.3	1.4	57.9	0.2	0.2	0
1800-2000	55.2	0.3	0	0	0	44.5
2450	55.0	0.1	0	0	0	44.9
2600	54.9	0.1	0	0	0	45.0

Frequency (MHz)	Water (%)	Hexyl Carbitol (%)	Triton X-100 (%)
Head/Body			
5000-6000	65.52	17.24	17.24

10.2 Limit

The head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 in P1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. Other head and body tissue parameters that have not been specified in P1528 are derived from the tissue dielectric parameters

computed from the 4-Cole-Cole equations described in Reference [12] and extrapolated according to the head parameters specified in P1528.

Target Frequency (MHz)	Head	
	Conductivity (σ)	Permittivity (ϵ_r)
150	0.76	52.3
300	0.87	45.3
450	0.87	43.5
750	0.89	41.9
835	0.90	41.5
900	0.97	41.5
915	0.98	41.5
1450	1.20	40.5
1610	1.29	40.3
1800-2000	1.40	40.0
2450	1.80	39.2
2600	1.96	39.0
3000	2.40	38.5
5200	4.66	36.0
5400	4.86	35.8
5600	5.07	35.5
5800	5.27	35.3

10.3 Tissue Calibration Result

The dielectric parameters of the liquids were verified prior to the SAR evaluation using an R&S ZVB 8. Dielectric Probe Kit and an Agilent Network Analyzer.

Calibration Result for Dielectric Parameters of Tissue Simulating Liquid

Frequency(MHz)	Liquid	Target Conductivity (σ)	Target Permittivity (ϵ_r)	Measured Conductivity (σ)	Measured Permittivity (ϵ_r)	Delta (σ)%	Delta (ϵ_r)%	Limit (%)	Temp. TSL (°C)	Date
750	Head	0.89	41.9	0.902	42.505	1.35	1.44	±5	22.7	16/10/2023
835	Head	0.90	41.5	0.868	40.608	-3.56	-2.15	±5	22.7	16/10/2023
1800	Head	1.40	40.0	1.446	38.656	3.29	-3.36	±5	22.7	16/10/2023
1900	Head	1.40	40.0	1.369	39.083	-2.21	-2.29	±5	22.7	16/10/2023
2450	Head	1.80	39.20	1.789	40.006	-0.61	2.06	±5	22.7	16/10/2023
2600	Head	1.96	39.0	1.993	39.595	1.68	1.53	±5	22.7	16/10/2023
5200	Head	4.66	36.0	4.551	36.295	-2.34	0.82	±5	22.7	16/10/2023
5800	Head	5.27	35.3	5.355	35.797	1.61	1.41	±5	22.7	16/10/2023

Remark:

1. The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within $\pm 2^\circ\text{C}$ of the temperature when the tissue parameters are characterized.
2. The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements. The parameters should be re-measured after each 3 – 4 days of use; or earlier if the dielectric parameters can become out of tolerance; for example, when the parameters are marginal at the beginning of the measurement series.

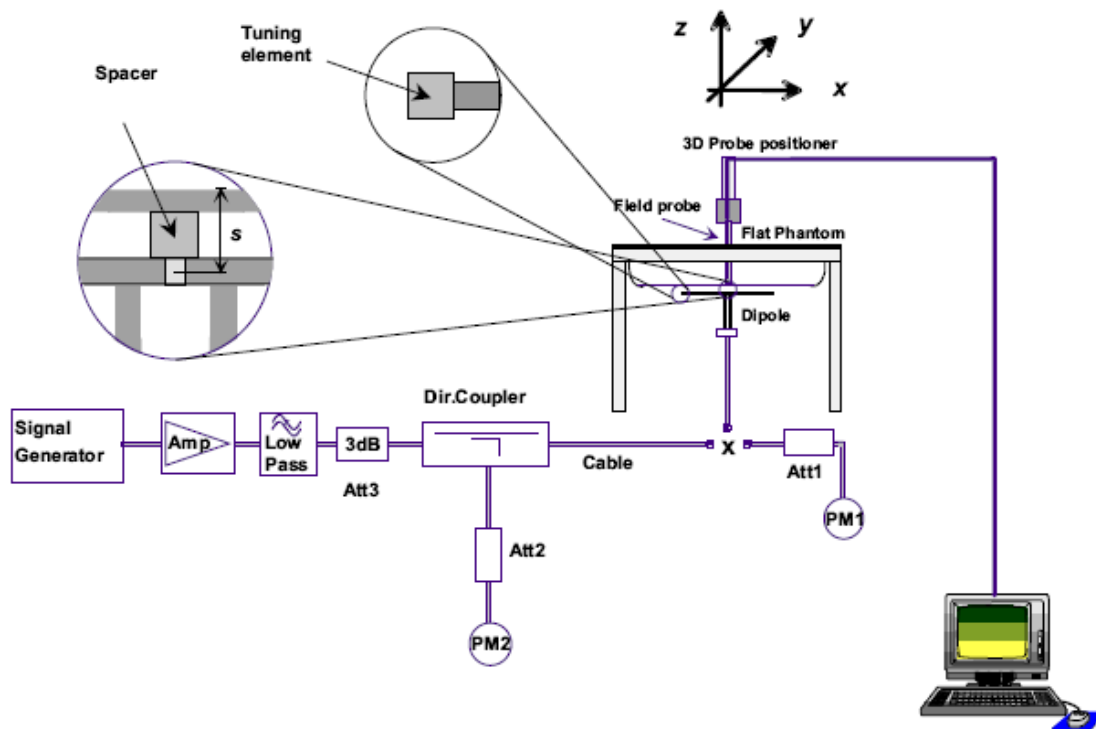
11. System Check

11.1 Purpose of System Performance Check

At the device test frequencies. System check verifies the measurement repeatability of a SAR system before compliance testing and is not a validation of all system specifications. The latter is not required for testing a device but is mandatory before the system is deployed. The system check detects possible short-term drift and unacceptable measurement errors or uncertainties in the system.

11.2 System Setup

In the simplified setup for system evaluation, the EUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave which comes from a signal generator at frequency 600MHz-6000MHz. 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 output power on dipole port must be calibrated to 20 dBm (100 mW) before dipole is connected.



System Verification Setup Block Diagram



Setup Photo of Dipole Antenna

11.3 Validation Results

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

Frequency (MHz)	Power	Measured SAR _{1g} (W/Kg)	Normalize to 1 Watt	Drift (%)	1W Target	Difference Percentage (%)	Limit (%)	Liquid Temp	Date
					SAR _{1g} (W/Kg)				
750	250mW	2.134	8.535	-2.420	8.58	-0.524	±10	22.7	16/10/2023
835	250mW	2.422	9.686	-3.055	10.01	-3.237	±10	22.7	16/10/2023
1800	250mW	10.005	40.021	2.444	39.74	0.707	±10	22.7	16/10/2023
1900	250mW	10.592	42.366	1.624	41.26	2.681	±10	22.7	16/10/2023
2450	250mW	13.399	53.597	-0.869	55.16	-2.834	±10	22.7	16/10/2023
2600	250mW	13.780	55.121	1.301	56.5	-2.441	±10	22.7	16/10/2023
5200	250mW	18.499	73.994	1.487	76.41	-3.162	±10	22.7	16/10/2023
5800	250mW	18.970	75.879	-2.617	76.49	-0.799	±10	22.7	16/10/2023

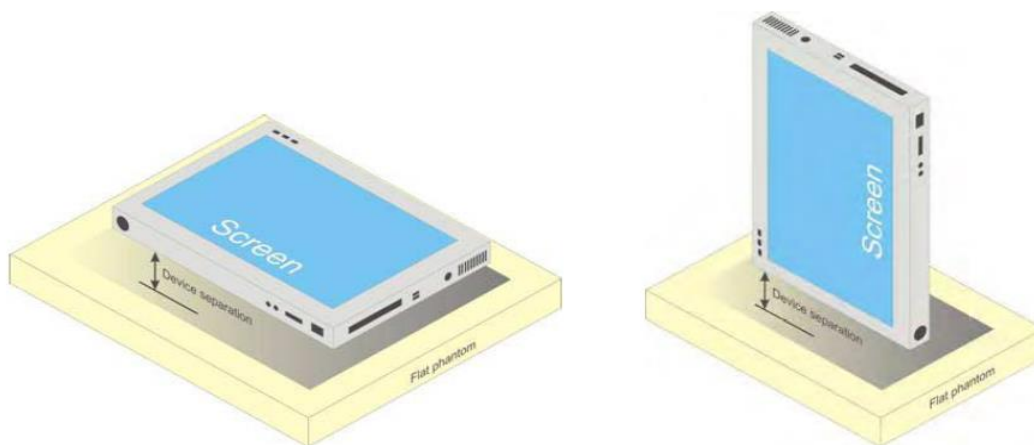
12. EUT Testing Position

Body Position

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

The example shows a tablet form factor portable computer for which SAR should be separately assessed with

- a). each surface and
- b). the separation distances



Tablet form factor portable computer

13. SAR Measurement Procedures

13.1 Measurement Procedures

The measurement procedures are as follows:

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

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

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

13.2 Spatial Peak SAR Evaluation

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

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

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

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

13.3 Area & Zoom Scan Procedures

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

			≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5 mm $\pm$ 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2)$ mm $\pm$ 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location			30° $\pm$ 1°	20° $\pm$ 1°
Maximum area scan spatial resolution: Δx_{Area} , Δy_{Area}			≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
			When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\leq$ 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	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$ mm	
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 IEEE Std 1528-2013 for details.				
* When zoom scan is required and the <i>reported</i> SAR from the <i>area scan based 1-g SAR estimation</i> procedures of KDB Publication 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.				

13.4 Volume Scan Procedures

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

13.5 SAR Averaged Methods

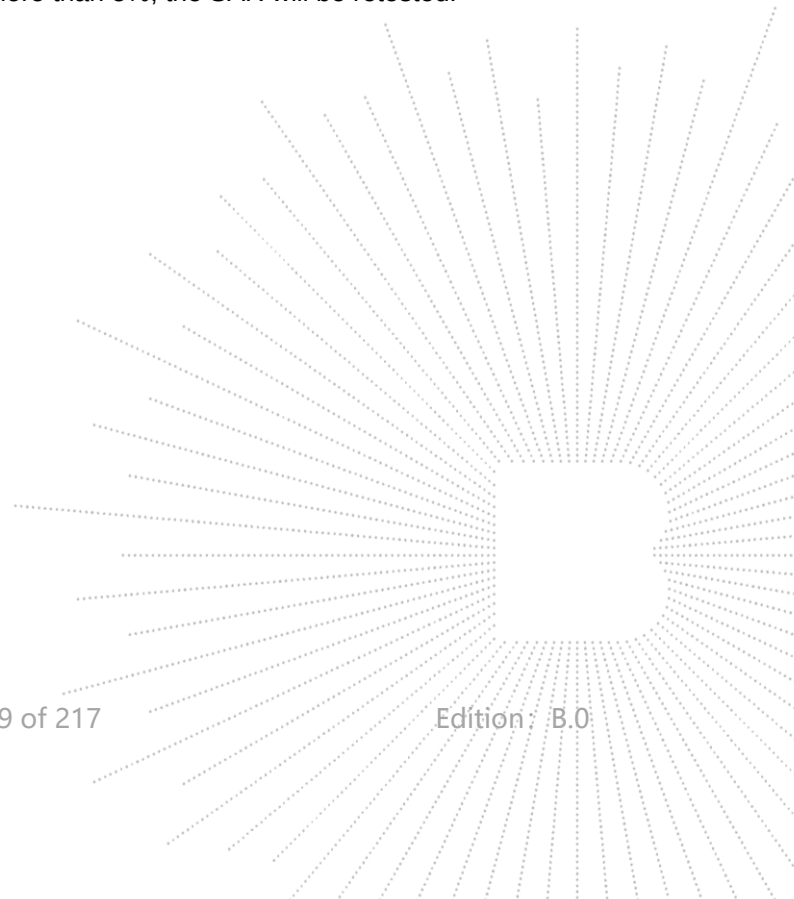
The local SAR inside the phantom is measured using small dipole sensing elements inside a probe body. The probe tip must not be in contact with the phantom surface in order to minimize measurements errors, but the highest local SAR will occur at the surface of the phantom.

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

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

13.6 Power Drift Monitoring

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



14. SAR Test Result

14.1 Conducted RF Output Power

According KDB 447498 D01 General RF Exposure Guidance v06 Section 4.1 2) states that “Unless it is specified differently in the published RF exposure KDB procedures, these requirements also apply to test reduction and test exclusion considerations. Time-averaged maximum conducted output power applies to SAR and, as required by § 2.1091(c), time-averaged ERP applies to MPE. When an antenna port is not available on the device to support conducted power measurement, such as FRS and certain Part 15 transmitters with built-in integral antennas, the maximum output power allowed for production units should be used to determine RF exposure test exclusion and compliance.”

The Tune-up limit already includes component tolerance. KDB 447498 sec.4.1.(d) at the maximum rated output power and within the tune-up tolerance range specified for the product, but not more than 2 dB lower than the maximum tune-up tolerance limit.

<GSM>

General Note:

1. Per KDB 447498 D01, the maximum output power channel is used for SAR testing and for further SAR test reduction.
2. Per KDB 941225 D01, SAR test reduction for GPRS and EDGE modes is determined by the source-based time-averaged output power specified for production units, including tune-up tolerance. The data mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions.
3. Per October 2013 TCB Workshop: When the maximum frame-averaged powers levels are within 0.25 dB of each other, test the configuration with the most number of time slots.

Conducted power measurement results

GSM - Burst Average Power (dBm)								
Band	GSM850			Tune-up	GSM1900			Tune-up
Channel	128	190	251		512	661	810	
Frequency (MHz)	824.2	836.6	848.8		1850.2	1880	1909.8	
GSM	32.51	32.67	32.55	33.0	28.53	28.88	28.73	29.5

GSM - Source-Based Time-Average Power (dBm)						
Band	GSM850			GSM1900		
Channel	128	190	251	512	661	810
Frequency (MHz)	824.2	836.6	848.8	1850.2	1880	1909.8
GSM	23.51	23.67	23.55	19.53	19.88	19.73

Notes: Per KDB 941225 D01, SAR is not required for EDGE (8PSK) mode because the maximum output power and tune-up limit is $\leq 1/4$ dB higher than GPRS/EDGE (GMSK) or the adjusted SAR of the highest reported SAR of GPRS/EDGE (GMSK) is ≤ 1.2 W/kg.

<W-CDMA>

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 E5515C 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 C.10.1.4: β values for transmitter characteristics tests with HS-DPCCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note 1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (Note 4)	15/15 (Note 4)	64	12/15 (Note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5
Note 1: Δ_{ACK}, Δ_{NACK} and $\Delta_{CQI} = 30/15$ with $\beta_{HS} = 30/15 * \beta_c$. Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, Δ_{ACK} and $\Delta_{NACK} = 30/15$ with $\beta_{HS} = 30/15 * \beta_c$, and $\Delta_{CQI} = 24/15$ with $\beta_{HS} = 24/15 * \beta_c$. Note 3: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{HS}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases. Note 4: 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 signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$.							

Setup Configuration

HSUPA Setup Configuration:

- a. The EUT was connected to Base Station R&S 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 C.11.1.3: β values for transmitter characteristics tests with HS-DPCCH and E-DCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (Note 1)	β_{ec}	β_{ed} (Note 5) (Note 6)	β_{ed} (SF)	β_{ed} (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 6)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/225	1309/225	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 (Note 4)	15/15 (Note 4)	64	15/15 (Note 4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

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

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 signalled 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 signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 14/15$ and $\beta_d = 15/15$.

Note 5: In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.

Note 6: β_{ed} can not be set directly, it is set by Absolute Grant Value.

General Note

1. Per KDB 941225 D01, RMC 12.2kbps setting is used to evaluate SAR. If AMR 12.2kbps power is < 0.25dB higher than RMC 12.2kbps, SAR tests with AMR 12.2kbps can be excluded.
2. By design, AMR and HSDPA/HSUPA RF power will not be larger than RMC 12.2kbps, detailed information is included in Tune-up Procure exhibit.
3. It is expected by the manufacturer that MPR for some HSDPA/HSUPA subtests may differ from the specification of 3GPP, according to the chipset implementation in this model. The implementation and expected deviation are detailed in tune-up procedure exhibit.

Conducted power measurement results

Band	WCDMA Band II				WCDMA Band V			
Channel	9262	9400	9538	Tune-up	4132	4182	4233	Tune-up
Frequency (MHz)	1852.4	1880.0	1907.6		826.4	836.4	846.6	
RMC 12.2K	22.16	22.40	22.25	23.0	22.55	22.49	22.56	23.0
HSDPA Subtest-1	21.01	21.56	21.14	22.0	22.54	22.63	22.74	23.0
HSDPA Subtest-2	20.69	21.27	20.82		22.28	22.38	22.47	
HSDPA Subtest-3	20.31	20.77	20.53		21.91	22.03	22.12	
HSDPA Subtest-4	20.10	20.63	20.24		21.98	21.98	21.96	
HSUPA Subtest-1	20.85	21.36	20.91	22.0	22.41	22.53	22.69	23.0
HSUPA Subtest-2	20.93	21.52	21.09		22.54	22.67	22.64	
HSUPA Subtest-3	20.71	21.08	20.67		22.06	22.45	22.52	
HSUPA Subtest-4	20.87	21.54	21.11		22.48	22.69	22.69	
HSUPA Subtest-5	20.74	21.25	20.84		22.31	22.41	22.41	

Note:

1. Per KDB 941225 D01 v03, the 12.2kbps RMC mode was selected for SAR testing (the primary mode).
2. When the maximum output power and tune-up tolerance specified for production units in a secondary mode is $\leq 1/4$ dB higher than the primary mode (RMC12.2kbps) or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

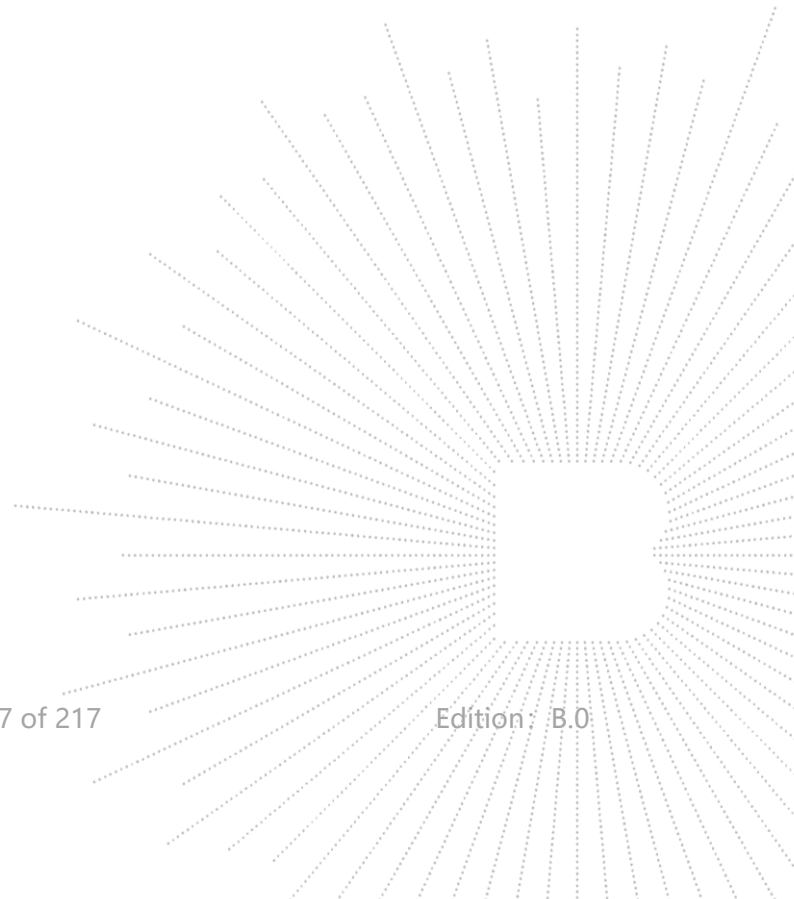
LTE QPSK configuration has the highest maximum average output power per 3GPP standard.

Band	Bandwidth (MHz)	UL Channel	RB Size	RB Position	Modulation	Power (dBm)
Band7	5	20775	1	#0	QPSK	21.97
Band7	5	20775	1	#Mid	QPSK	22.00
Band7	5	20775	1	#Max	QPSK	21.94
Band7	5	20775	12	#0	QPSK	21.17
Band7	5	20775	12	#Mid	QPSK	21.33
Band7	5	20775	12	#Max	QPSK	21.25
Band7	5	20775	25	#0	QPSK	21.23
Band7	5	20775	1	#0	16QAM	21.19
Band7	5	20775	1	#Mid	16QAM	21.22
Band7	5	20775	1	#Max	16QAM	21.27
Band7	5	20775	12	#0	16QAM	20.25
Band7	5	20775	12	#Mid	16QAM	20.38
Band7	5	20775	12	#Max	16QAM	20.31
Band7	5	20775	25	#0	16QAM	20.38
Band7	5	21100	1	#0	QPSK	22.05
Band7	5	21100	1	#Mid	QPSK	22.06
Band7	5	21100	1	#Max	QPSK	22.20
Band7	5	21100	12	#0	QPSK	21.13
Band7	5	21100	12	#Mid	QPSK	21.24
Band7	5	21100	12	#Max	QPSK	21.23
Band7	5	21100	25	#0	QPSK	21.13
Band7	5	21100	1	#0	16QAM	21.17
Band7	5	21100	1	#Mid	16QAM	21.18
Band7	5	21100	1	#Max	16QAM	21.30
Band7	5	21100	12	#0	16QAM	20.15
Band7	5	21100	12	#Mid	16QAM	20.19
Band7	5	21100	12	#Max	16QAM	20.27
Band7	5	21100	25	#0	16QAM	20.43
Band7	5	21425	1	#0	QPSK	21.90
Band7	5	21425	1	#Mid	QPSK	21.88
Band7	5	21425	1	#Max	QPSK	21.91
Band7	5	21425	12	#0	QPSK	20.96
Band7	5	21425	12	#Mid	QPSK	20.95
Band7	5	21425	12	#Max	QPSK	20.92
Band7	5	21425	25	#0	QPSK	20.97
Band7	5	21425	1	#0	16QAM	20.66
Band7	5	21425	1	#Mid	16QAM	20.62
Band7	5	21425	1	#Max	16QAM	20.74
Band7	5	21425	12	#0	16QAM	19.92
Band7	5	21425	12	#Mid	16QAM	19.84
Band7	5	21425	12	#Max	16QAM	19.86
Band7	5	21425	25	#0	16QAM	19.95
Band7	10	20800	1	#0	QPSK	22.11
Band7	10	20800	1	#Mid	QPSK	22.13
Band7	10	20800	1	#Max	QPSK	22.17
Band7	10	20800	25	#0	QPSK	21.24
Band7	10	20800	25	#Mid	QPSK	21.35
Band7	10	20800	25	#Max	QPSK	21.27
Band7	10	20800	50	#0	QPSK	21.25
Band7	10	20800	1	#0	16QAM	22.17

Band7	10	20800	1	#Mid	16QAM	22.20
Band7	10	20800	1	#Max	16QAM	22.22
Band7	10	20800	25	#0	16QAM	20.28
Band7	10	20800	25	#Mid	16QAM	20.34
Band7	10	20800	25	#Max	16QAM	20.29
Band7	10	20800	50	#0	16QAM	20.39
Band7	10	21100	1	#0	QPSK	22.15
Band7	10	21100	1	#Mid	QPSK	22.18
Band7	10	21100	1	#Max	QPSK	22.21
Band7	10	21100	25	#0	QPSK	21.14
Band7	10	21100	25	#Mid	QPSK	21.19
Band7	10	21100	25	#Max	QPSK	21.29
Band7	10	21100	50	#0	QPSK	21.04
Band7	10	21100	1	#0	16QAM	21.23
Band7	10	21100	1	#Mid	16QAM	21.30
Band7	10	21100	1	#Max	16QAM	21.33
Band7	10	21100	25	#0	16QAM	20.30
Band7	10	21100	25	#Mid	16QAM	20.36
Band7	10	21100	25	#Max	16QAM	20.44
Band7	10	21100	50	#0	16QAM	20.34
Band7	10	21400	1	#0	QPSK	22.00
Band7	10	21400	1	#Mid	QPSK	21.95
Band7	10	21400	1	#Max	QPSK	21.98
Band7	10	21400	25	#0	QPSK	20.88
Band7	10	21400	25	#Mid	QPSK	20.96
Band7	10	21400	25	#Max	QPSK	20.87
Band7	10	21400	50	#0	QPSK	21.00
Band7	10	21400	1	#0	16QAM	21.09
Band7	10	21400	1	#Mid	16QAM	21.02
Band7	10	21400	1	#Max	16QAM	21.01
Band7	10	21400	25	#0	16QAM	20.17
Band7	10	21400	25	#Mid	16QAM	20.11
Band7	10	21400	25	#Max	16QAM	20.04
Band7	10	21400	50	#0	16QAM	19.97
Band7	15	20825	1	#0	QPSK	22.05
Band7	15	20825	1	#Mid	QPSK	22.06
Band7	15	20825	1	#Max	QPSK	22.08
Band7	15	20825	36	#0	QPSK	21.21
Band7	15	20825	36	#Mid	QPSK	21.25
Band7	15	20825	36	#Max	QPSK	21.24
Band7	15	20825	75	#0	QPSK	21.18
Band7	15	20825	1	#0	16QAM	22.21
Band7	15	20825	1	#Mid	16QAM	22.21
Band7	15	20825	1	#Max	16QAM	22.30
Band7	15	20825	36	#0	16QAM	20.42
Band7	15	20825	36	#Mid	16QAM	20.36
Band7	15	20825	36	#Max	16QAM	20.33
Band7	15	20825	75	#0	16QAM	20.36
Band7	15	21100	1	#0	QPSK	22.13
Band7	15	21100	1	#Mid	QPSK	22.10
Band7	15	21100	1	#Max	QPSK	22.14
Band7	15	21100	36	#0	QPSK	21.10
Band7	15	21100	36	#Mid	QPSK	21.21
Band7	15	21100	36	#Max	QPSK	21.15
Band7	15	21100	75	#0	QPSK	21.22
Band7	15	21100	1	#0	16QAM	21.21
Band7	15	21100	1	#Mid	16QAM	21.26

Band7	15	21100	1	#Max	16QAM	21.33
Band7	15	21100	36	#0	16QAM	20.35
Band7	15	21100	36	#Mid	16QAM	20.34
Band7	15	21100	36	#Max	16QAM	20.42
Band7	15	21100	75	#0	16QAM	20.23
Band7	15	21375	1	#0	QPSK	22.12
Band7	15	21375	1	#Mid	QPSK	21.99
Band7	15	21375	1	#Max	QPSK	22.05
Band7	15	21375	36	#0	QPSK	21.09
Band7	15	21375	36	#Mid	QPSK	20.96
Band7	15	21375	36	#Max	QPSK	20.92
Band7	15	21375	75	#0	QPSK	20.88
Band7	15	21375	1	#0	16QAM	21.95
Band7	15	21375	1	#Mid	16QAM	21.94
Band7	15	21375	1	#Max	16QAM	21.96
Band7	15	21375	36	#0	16QAM	20.15
Band7	15	21375	36	#Mid	16QAM	19.99
Band7	15	21375	36	#Max	16QAM	20.05
Band7	15	21375	75	#0	16QAM	20.06
Band7	20	20850	1	#0	QPSK	22.25
Band7	20	20850	1	#Mid	QPSK	22.22
Band7	20	20850	1	#Max	QPSK	22.19
Band7	20	20850	50	#0	QPSK	21.30
Band7	20	20850	50	#Mid	QPSK	21.27
Band7	20	20850	50	#Max	QPSK	21.27
Band7	20	20850	100	#0	QPSK	21.20
Band7	20	20850	1	#0	16QAM	21.40
Band7	20	20850	1	#Mid	16QAM	21.46
Band7	20	20850	1	#Max	16QAM	21.50
Band7	20	20850	50	#0	16QAM	20.48
Band7	20	20850	50	#Mid	16QAM	20.43
Band7	20	20850	50	#Max	16QAM	20.39
Band7	20	20850	100	#0	16QAM	20.29
Band7	20	21100	1	#0	QPSK	22.42
Band7	20	21100	1	#Mid	QPSK	22.53
Band7	20	21100	1	#Max	QPSK	22.58
Band7	20	21100	50	#0	QPSK	21.16
Band7	20	21100	50	#Mid	QPSK	21.15
Band7	20	21100	50	#Max	QPSK	21.14
Band7	20	21100	100	#0	QPSK	21.24
Band7	20	21100	1	#0	16QAM	21.21
Band7	20	21100	1	#Mid	16QAM	21.26
Band7	20	21100	1	#Max	16QAM	21.39
Band7	20	21100	50	#0	16QAM	20.31
Band7	20	21100	50	#Mid	16QAM	20.32
Band7	20	21100	50	#Max	16QAM	20.42
Band7	20	21100	100	#0	16QAM	20.23
Band7	20	21350	1	#0	QPSK	22.14
Band7	20	21350	1	#Mid	QPSK	22.08
Band7	20	21350	1	#Max	QPSK	21.96
Band7	20	21350	50	#0	QPSK	21.03
Band7	20	21350	50	#Mid	QPSK	20.99
Band7	20	21350	50	#Max	QPSK	20.82
Band7	20	21350	100	#0	QPSK	21.12
Band7	20	21350	1	#0	16QAM	21.46
Band7	20	21350	1	#Mid	16QAM	21.41
Band7	20	21350	1	#Max	16QAM	21.45

Band7	20	21350	50	#0	16QAM	20.19
Band7	20	21350	50	#Mid	16QAM	20.15
Band7	20	21350	50	#Max	16QAM	20.12
Band7	20	21350	100	#0	16QAM	20.05



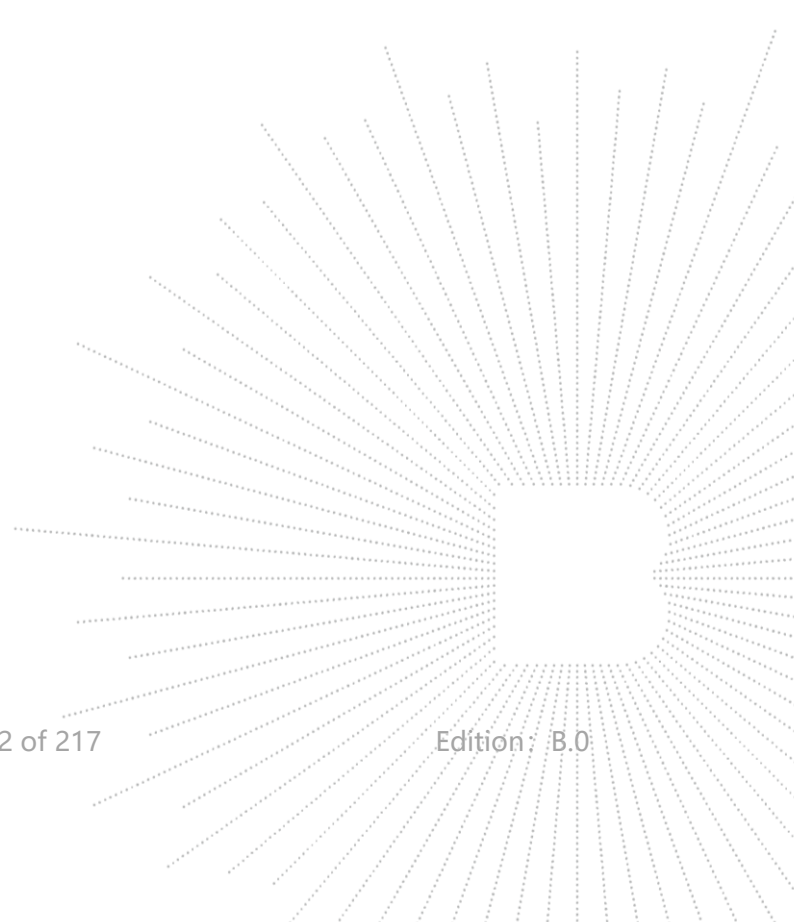
Band	Bandwidth (MHz)	UL Channel	RB Size	RB Position	Modulation	Power (dBm)
Band12	1.4	23017	1	#0	QPSK	22.38
Band12	1.4	23017	1	#Mid	QPSK	22.40
Band12	1.4	23017	1	#Max	QPSK	22.38
Band12	1.4	23017	3	#0	QPSK	22.26
Band12	1.4	23017	3	#Mid	QPSK	22.36
Band12	1.4	23017	3	#Max	QPSK	22.34
Band12	1.4	23017	6	#0	QPSK	21.40
Band12	1.4	23017	1	#0	16QAM	22.26
Band12	1.4	23017	1	#Mid	16QAM	22.24
Band12	1.4	23017	1	#Max	16QAM	22.24
Band12	1.4	23017	3	#0	16QAM	21.43
Band12	1.4	23017	3	#Mid	16QAM	21.48
Band12	1.4	23017	3	#Max	16QAM	21.43
Band12	1.4	23017	6	#0	16QAM	20.77
Band12	1.4	23095	1	#0	QPSK	22.26
Band12	1.4	23095	1	#Mid	QPSK	22.23
Band12	1.4	23095	1	#Max	QPSK	22.29
Band12	1.4	23095	3	#0	QPSK	22.20
Band12	1.4	23095	3	#Mid	QPSK	22.19
Band12	1.4	23095	3	#Max	QPSK	22.24
Band12	1.4	23095	6	#0	QPSK	21.20
Band12	1.4	23095	1	#0	16QAM	21.95
Band12	1.4	23095	1	#Mid	16QAM	21.87
Band12	1.4	23095	1	#Max	16QAM	21.88
Band12	1.4	23095	3	#0	16QAM	21.23
Band12	1.4	23095	3	#Mid	16QAM	21.23
Band12	1.4	23095	3	#Max	16QAM	21.20
Band12	1.4	23095	6	#0	16QAM	20.11
Band12	1.4	23173	1	#0	QPSK	22.20
Band12	1.4	23173	1	#Mid	QPSK	22.25
Band12	1.4	23173	1	#Max	QPSK	22.25
Band12	1.4	23173	3	#0	QPSK	22.24
Band12	1.4	23173	3	#Mid	QPSK	22.27
Band12	1.4	23173	3	#Max	QPSK	22.30
Band12	1.4	23173	6	#0	QPSK	21.34
Band12	1.4	23173	1	#0	16QAM	22.01
Band12	1.4	23173	1	#Mid	16QAM	22.18
Band12	1.4	23173	1	#Max	16QAM	22.17
Band12	1.4	23173	3	#0	16QAM	21.57
Band12	1.4	23173	3	#Mid	16QAM	21.63
Band12	1.4	23173	3	#Max	16QAM	21.54
Band12	1.4	23173	6	#0	16QAM	20.49
Band12	3	23025	1	#0	QPSK	22.27
Band12	3	23025	1	#Mid	QPSK	22.27
Band12	3	23025	1	#Max	QPSK	22.30
Band12	3	23025	8	#0	QPSK	21.20
Band12	3	23025	8	#Mid	QPSK	21.33
Band12	3	23025	8	#Max	QPSK	21.32
Band12	3	23025	15	#0	QPSK	21.29
Band12	3	23025	1	#0	16QAM	22.15
Band12	3	23025	1	#Mid	16QAM	22.06
Band12	3	23025	1	#Max	16QAM	22.20
Band12	3	23025	8	#0	16QAM	20.59
Band12	3	23025	8	#Mid	16QAM	20.58
Band12	3	23025	8	#Max	16QAM	20.22

Band12	3	23025	15	#0	16QAM	20.75
Band12	3	23095	1	#0	QPSK	22.29
Band12	3	23095	1	#Mid	QPSK	22.26
Band12	3	23095	1	#Max	QPSK	22.27
Band12	3	23095	8	#0	QPSK	21.25
Band12	3	23095	8	#Mid	QPSK	21.25
Band12	3	23095	8	#Max	QPSK	21.26
Band12	3	23095	15	#0	QPSK	21.33
Band12	3	23095	1	#0	16QAM	21.88
Band12	3	23095	1	#Mid	16QAM	21.87
Band12	3	23095	1	#Max	16QAM	21.95
Band12	3	23095	8	#0	16QAM	20.84
Band12	3	23095	8	#Mid	16QAM	20.44
Band12	3	23095	8	#Max	16QAM	20.34
Band12	3	23095	15	#0	16QAM	20.22
Band12	3	23165	1	#0	QPSK	22.22
Band12	3	23165	1	#Mid	QPSK	22.26
Band12	3	23165	1	#Max	QPSK	22.29
Band12	3	23165	8	#0	QPSK	21.28
Band12	3	23165	8	#Mid	QPSK	21.23
Band12	3	23165	8	#Max	QPSK	21.34
Band12	3	23165	15	#0	QPSK	21.33
Band12	3	23165	1	#0	16QAM	22.11
Band12	3	23165	1	#Mid	16QAM	22.09
Band12	3	23165	1	#Max	16QAM	22.20
Band12	3	23165	8	#0	16QAM	20.14
Band12	3	23165	8	#Mid	16QAM	20.21
Band12	3	23165	8	#Max	16QAM	20.36
Band12	3	23165	15	#0	16QAM	20.20
Band12	5	23035	1	#0	QPSK	22.15
Band12	5	23035	1	#Mid	QPSK	22.23
Band12	5	23035	1	#Max	QPSK	22.13
Band12	5	23035	12	#0	QPSK	21.34
Band12	5	23035	12	#Mid	QPSK	21.35
Band12	5	23035	12	#Max	QPSK	21.33
Band12	5	23035	25	#0	QPSK	21.39
Band12	5	23035	1	#0	16QAM	21.32
Band12	5	23035	1	#Mid	16QAM	21.39
Band12	5	23035	1	#Max	16QAM	21.34
Band12	5	23035	12	#0	16QAM	20.58
Band12	5	23035	12	#Mid	16QAM	20.24
Band12	5	23035	12	#Max	16QAM	20.20
Band12	5	23035	25	#0	16QAM	20.29
Band12	5	23095	1	#0	QPSK	22.21
Band12	5	23095	1	#Mid	QPSK	22.23
Band12	5	23095	1	#Max	QPSK	22.20
Band12	5	23095	12	#0	QPSK	21.17
Band12	5	23095	12	#Mid	QPSK	21.23
Band12	5	23095	12	#Max	QPSK	21.12
Band12	5	23095	25	#0	QPSK	21.26
Band12	5	23095	1	#0	16QAM	20.93
Band12	5	23095	1	#Mid	16QAM	20.93
Band12	5	23095	1	#Max	16QAM	21.01
Band12	5	23095	12	#0	16QAM	20.51
Band12	5	23095	12	#Mid	16QAM	20.14
Band12	5	23095	12	#Max	16QAM	20.07
Band12	5	23095	25	#0	16QAM	20.29

Band12	5	23155	1	#0	QPSK	22.27
Band12	5	23155	1	#Mid	QPSK	22.14
Band12	5	23155	1	#Max	QPSK	22.21
Band12	5	23155	12	#0	QPSK	21.37
Band12	5	23155	12	#Mid	QPSK	21.31
Band12	5	23155	12	#Max	QPSK	21.26
Band12	5	23155	25	#0	QPSK	21.31
Band12	5	23155	1	#0	16QAM	21.21
Band12	5	23155	1	#Mid	16QAM	21.15
Band12	5	23155	1	#Max	16QAM	21.31
Band12	5	23155	12	#0	16QAM	20.24
Band12	5	23155	12	#Mid	16QAM	20.20
Band12	5	23155	12	#Max	16QAM	20.16
Band12	5	23155	25	#0	16QAM	20.19
Band12	10	23060	1	#0	QPSK	22.35
Band12	10	23060	1	#Mid	QPSK	22.30
Band12	10	23060	1	#Max	QPSK	22.27
Band12	10	23060	25	#0	QPSK	21.42
Band12	10	23060	25	#Mid	QPSK	21.36
Band12	10	23060	25	#Max	QPSK	21.24
Band12	10	23060	50	#0	QPSK	21.33
Band12	10	23060	1	#0	16QAM	22.05
Band12	10	23060	1	#Mid	16QAM	22.99
Band12	10	23060	1	#Max	16QAM	22.13
Band12	10	23060	25	#0	16QAM	20.31
Band12	10	23060	25	#Mid	16QAM	20.23
Band12	10	23060	25	#Max	16QAM	20.68
Band12	10	23060	50	#0	16QAM	20.25
Band12	10	23095	1	#0	QPSK	22.44
Band12	10	23095	1	#Mid	QPSK	22.51
Band12	10	23095	1	#Max	QPSK	22.53
Band12	10	23095	25	#0	QPSK	21.26
Band12	10	23095	25	#Mid	QPSK	21.23
Band12	10	23095	25	#Max	QPSK	21.24
Band12	10	23095	50	#0	QPSK	21.26
Band12	10	23095	1	#0	16QAM	22.02
Band12	10	23095	1	#Mid	16QAM	21.97
Band12	10	23095	1	#Max	16QAM	22.07
Band12	10	23095	25	#0	16QAM	20.74
Band12	10	23095	25	#Mid	16QAM	20.19
Band12	10	23095	25	#Max	16QAM	20.29
Band12	10	23095	50	#0	16QAM	20.30
Band12	10	23130	1	#0	QPSK	22.32
Band12	10	23130	1	#Mid	QPSK	22.32
Band12	10	23130	1	#Max	QPSK	22.39
Band12	10	23130	25	#0	QPSK	21.24
Band12	10	23130	25	#Mid	QPSK	21.27
Band12	10	23130	25	#Max	QPSK	21.36
Band12	10	23130	50	#0	QPSK	21.16
Band12	10	23130	1	#0	16QAM	21.15
Band12	10	23130	1	#Mid	16QAM	21.13
Band12	10	23130	1	#Max	16QAM	21.21
Band12	10	23130	25	#0	16QAM	20.22
Band12	10	23130	25	#Mid	16QAM	20.22
Band12	10	23130	25	#Max	16QAM	20.31
Band12	10	23130	50	#0	16QAM	20.21

Band	Bandwidth (MHz)	UL Channel	RB Size	RB Position	Modulation	Power (dBm)
Band17	5	23755	1	#0	QPSK	22.15
Band17	5	23755	1	#Mid	QPSK	22.17
Band17	5	23755	1	#Max	QPSK	22.17
Band17	5	23755	12	#0	QPSK	21.27
Band17	5	23755	12	#Mid	QPSK	21.16
Band17	5	23755	12	#Max	QPSK	21.27
Band17	5	23755	25	#0	QPSK	21.27
Band17	5	23755	1	#0	16QAM	20.91
Band17	5	23755	1	#Mid	16QAM	21.47
Band17	5	23755	1	#Max	16QAM	21.18
Band17	5	23755	12	#0	16QAM	20.50
Band17	5	23755	12	#Mid	16QAM	20.47
Band17	5	23755	12	#Max	16QAM	20.05
Band17	5	23755	25	#0	16QAM	20.64
Band17	5	23790	1	#0	QPSK	22.21
Band17	5	23790	1	#Mid	QPSK	22.13
Band17	5	23790	1	#Max	QPSK	22.14
Band17	5	23790	12	#0	QPSK	21.23
Band17	5	23790	12	#Mid	QPSK	21.21
Band17	5	23790	12	#Max	QPSK	21.36
Band17	5	23790	25	#0	QPSK	21.22
Band17	5	23790	1	#0	16QAM	21.20
Band17	5	23790	1	#Mid	16QAM	21.21
Band17	5	23790	1	#Max	16QAM	21.28
Band17	5	23790	12	#0	16QAM	20.21
Band17	5	23790	12	#Mid	16QAM	20.20
Band17	5	23790	12	#Max	16QAM	20.28
Band17	5	23790	25	#0	16QAM	20.20
Band17	5	23825	1	#0	QPSK	22.31
Band17	5	23825	1	#Mid	QPSK	22.22
Band17	5	23825	1	#Max	QPSK	22.16
Band17	5	23825	12	#0	QPSK	21.41
Band17	5	23825	12	#Mid	QPSK	21.21
Band17	5	23825	12	#Max	QPSK	21.28
Band17	5	23825	25	#0	QPSK	21.29
Band17	5	23825	1	#0	16QAM	21.50
Band17	5	23825	1	#Mid	16QAM	21.36
Band17	5	23825	1	#Max	16QAM	21.48
Band17	5	23825	12	#0	16QAM	20.23
Band17	5	23825	12	#Mid	16QAM	20.17
Band17	5	23825	12	#Max	16QAM	20.13
Band17	5	23825	25	#0	16QAM	20.40
Band17	10	23780	1	#0	QPSK	22.33
Band17	10	23780	1	#Mid	QPSK	22.27
Band17	10	23780	1	#Max	QPSK	22.34
Band17	10	23780	25	#0	QPSK	21.22
Band17	10	23780	25	#Mid	QPSK	21.20
Band17	10	23780	25	#Max	QPSK	21.48
Band17	10	23780	50	#0	QPSK	21.20
Band17	10	23780	1	#0	16QAM	22.23
Band17	10	23780	1	#Mid	16QAM	22.20
Band17	10	23780	1	#Max	16QAM	22.25
Band17	10	23780	25	#0	16QAM	22.56
Band17	10	23780	25	#Mid	16QAM	20.12

Band17	10	23780	25	#Max	16QAM	20.27
Band17	10	23780	50	#0	16QAM	20.24
Band17	10	23790	1	#0	QPSK	22.42
Band17	10	23790	1	#Mid	QPSK	22.40
Band17	10	23790	1	#Max	QPSK	22.40
Band17	10	23790	25	#0	QPSK	21.24
Band17	10	23790	25	#Mid	QPSK	21.22
Band17	10	23790	25	#Max	QPSK	21.38
Band17	10	23790	50	#0	QPSK	21.29
Band17	10	23790	1	#0	16QAM	21.19
Band17	10	23790	1	#Mid	16QAM	21.25
Band17	10	23790	1	#Max	16QAM	21.25
Band17	10	23790	25	#0	16QAM	20.28
Band17	10	23790	25	#Mid	16QAM	20.31
Band17	10	23790	25	#Max	16QAM	20.42
Band17	10	23790	50	#0	16QAM	20.29
Band17	10	23800	1	#0	QPSK	22.32
Band17	10	23800	1	#Mid	QPSK	22.33
Band17	10	23800	1	#Max	QPSK	22.40
Band17	10	23800	25	#0	QPSK	21.24
Band17	10	23800	25	#Mid	QPSK	21.27
Band17	10	23800	25	#Max	QPSK	21.36
Band17	10	23800	50	#0	QPSK	21.16
Band17	10	23800	1	#0	16QAM	21.14
Band17	10	23800	1	#Mid	16QAM	21.14
Band17	10	23800	1	#Max	16QAM	21.24
Band17	10	23800	25	#0	16QAM	20.21
Band17	10	23800	25	#Mid	16QAM	20.21
Band17	10	23800	25	#Max	16QAM	20.30
Band17	10	23800	50	#0	16QAM	20.19



Band	Bandwidth (MHz)	UL Channel	RB Size	RB Position	Modulation	Power (dBm)
Band38	5	37775	1	#0	QPSK	22.44
Band38	5	37775	1	#Mid	QPSK	22.32
Band38	5	37775	1	#Max	QPSK	22.40
Band38	5	37775	12	#0	QPSK	21.63
Band38	5	37775	12	#Mid	QPSK	21.62
Band38	5	37775	12	#Max	QPSK	21.51
Band38	5	37775	25	#0	QPSK	21.51
Band38	5	37775	1	#0	16QAM	21.96
Band38	5	37775	1	#Mid	16QAM	22.00
Band38	5	37775	1	#Max	16QAM	22.02
Band38	5	37775	12	#0	16QAM	20.63
Band38	5	37775	12	#Mid	16QAM	20.67
Band38	5	37775	12	#Max	16QAM	20.67
Band38	5	37775	25	#0	16QAM	20.82
Band38	5	38000	1	#0	QPSK	22.52
Band38	5	38000	1	#Mid	QPSK	22.53
Band38	5	38000	1	#Max	QPSK	22.51
Band38	5	38000	12	#0	QPSK	21.57
Band38	5	38000	12	#Mid	QPSK	21.56
Band38	5	38000	12	#Max	QPSK	21.50
Band38	5	38000	25	#0	QPSK	21.55
Band38	5	38000	1	#0	16QAM	21.68
Band38	5	38000	1	#Mid	16QAM	21.55
Band38	5	38000	1	#Max	16QAM	21.63
Band38	5	38000	12	#0	16QAM	20.47
Band38	5	38000	12	#Mid	16QAM	20.36
Band38	5	38000	12	#Max	16QAM	20.32
Band38	5	38000	25	#0	16QAM	20.78
Band38	5	38225	1	#0	QPSK	22.32
Band38	5	38225	1	#Mid	QPSK	22.39
Band38	5	38225	1	#Max	QPSK	22.50
Band38	5	38225	12	#0	QPSK	21.41
Band38	5	38225	12	#Mid	QPSK	21.37
Band38	5	38225	12	#Max	QPSK	21.40
Band38	5	38225	25	#0	QPSK	21.44
Band38	5	38225	1	#0	16QAM	21.38
Band38	5	38225	1	#Mid	16QAM	21.36
Band38	5	38225	1	#Max	16QAM	21.39
Band38	5	38225	12	#0	16QAM	20.54
Band38	5	38225	12	#Mid	16QAM	20.52
Band38	5	38225	12	#Max	16QAM	20.52
Band38	5	38225	25	#0	16QAM	20.58
Band38	10	37800	1	#0	QPSK	22.54
Band38	10	37800	1	#Mid	QPSK	22.58
Band38	10	37800	1	#Max	QPSK	22.74
Band38	10	37800	25	#0	QPSK	21.56
Band38	10	37800	25	#Mid	QPSK	21.56
Band38	10	37800	25	#Max	QPSK	21.70
Band38	10	37800	50	#0	QPSK	21.28
Band38	10	37800	1	#0	16QAM	22.67
Band38	10	37800	1	#Mid	16QAM	22.84
Band38	10	37800	1	#Max	16QAM	22.81
Band38	10	37800	25	#0	16QAM	20.85
Band38	10	37800	25	#Mid	16QAM	20.85
Band38	10	37800	25	#Max	16QAM	20.95

Band38	10	37800	50	#0	16QAM	20.24
Band38	10	38000	1	#0	QPSK	22.77
Band38	10	38000	1	#Mid	QPSK	22.75
Band38	10	38000	1	#Max	QPSK	22.78
Band38	10	38000	25	#0	QPSK	21.46
Band38	10	38000	25	#Mid	QPSK	21.46
Band38	10	38000	25	#Max	QPSK	21.58
Band38	10	38000	50	#0	QPSK	21.15
Band38	10	38000	1	#0	16QAM	21.80
Band38	10	38000	1	#Mid	16QAM	21.68
Band38	10	38000	1	#Max	16QAM	21.61
Band38	10	38000	25	#0	16QAM	20.80
Band38	10	38000	25	#Mid	16QAM	20.81
Band38	10	38000	25	#Max	16QAM	20.72
Band38	10	38000	50	#0	16QAM	20.38
Band38	10	38200	1	#0	QPSK	22.26
Band38	10	38200	1	#Mid	QPSK	22.21
Band38	10	38200	1	#Max	QPSK	22.33
Band38	10	38200	25	#0	QPSK	21.33
Band38	10	38200	25	#Mid	QPSK	21.35
Band38	10	38200	25	#Max	QPSK	21.44
Band38	10	38200	50	#0	QPSK	21.04
Band38	10	38200	1	#0	16QAM	21.83
Band38	10	38200	1	#Mid	16QAM	21.78
Band38	10	38200	1	#Max	16QAM	22.25
Band38	10	38200	25	#0	16QAM	20.55
Band38	10	38200	25	#Mid	16QAM	20.61
Band38	10	38200	25	#Max	16QAM	20.66
Band38	10	38200	50	#0	16QAM	20.19
Band38	15	37825	1	#0	QPSK	22.47
Band38	15	37825	1	#Mid	QPSK	22.60
Band38	15	37825	1	#Max	QPSK	22.54
Band38	15	37825	36	#0	QPSK	21.63
Band38	15	37825	36	#Mid	QPSK	21.62
Band38	15	37825	36	#Max	QPSK	21.62
Band38	15	37825	75	#0	QPSK	21.19
Band38	15	37825	1	#0	16QAM	22.69
Band38	15	37825	1	#Mid	16QAM	22.70
Band38	15	37825	1	#Max	16QAM	22.85
Band38	15	37825	36	#0	16QAM	20.62
Band38	15	37825	36	#Mid	16QAM	20.72
Band38	15	37825	36	#Max	16QAM	20.69
Band38	15	37825	75	#0	16QAM	20.41
Band38	15	38000	1	#0	QPSK	22.88
Band38	15	38000	1	#Mid	QPSK	22.73
Band38	15	38000	1	#Max	QPSK	22.62
Band38	15	38000	36	#0	QPSK	21.55
Band38	15	38000	36	#Mid	QPSK	21.50
Band38	15	38000	36	#Max	QPSK	21.46
Band38	15	38000	75	#0	QPSK	21.07
Band38	15	38000	1	#0	16QAM	21.79
Band38	15	38000	1	#Mid	16QAM	21.70
Band38	15	38000	1	#Max	16QAM	21.68
Band38	15	38000	36	#0	16QAM	20.73
Band38	15	38000	36	#Mid	16QAM	20.63
Band38	15	38000	36	#Max	16QAM	20.65
Band38	15	38000	75	#0	16QAM	20.38

Band38	15	38175	1	#0	QPSK	22.40
Band38	15	38175	1	#Mid	QPSK	22.43
Band38	15	38175	1	#Max	QPSK	22.50
Band38	15	38175	36	#0	QPSK	21.29
Band38	15	38175	36	#Mid	QPSK	21.40
Band38	15	38175	36	#Max	QPSK	21.42
Band38	15	38175	75	#0	QPSK	21.03
Band38	15	38175	1	#0	16QAM	21.70
Band38	15	38175	1	#Mid	16QAM	21.65
Band38	15	38175	1	#Max	16QAM	21.70
Band38	15	38175	36	#0	16QAM	20.48
Band38	15	38175	36	#Mid	16QAM	20.47
Band38	15	38175	36	#Max	16QAM	20.55
Band38	15	38175	75	#0	16QAM	20.24
Band38	20	37850	1	#0	QPSK	22.52
Band38	20	37850	1	#Mid	QPSK	22.57
Band38	20	37850	1	#Max	QPSK	22.60
Band38	20	37850	50	#0	QPSK	21.64
Band38	20	37850	50	#Mid	QPSK	21.58
Band38	20	37850	50	#Max	QPSK	21.62
Band38	20	37850	100	#0	QPSK	21.17
Band38	20	37850	1	#0	16QAM	21.49
Band38	20	37850	1	#Mid	16QAM	21.64
Band38	20	37850	1	#Max	16QAM	21.59
Band38	20	37850	50	#0	16QAM	20.81
Band38	20	37850	50	#Mid	16QAM	20.89
Band38	20	37850	50	#Max	16QAM	20.95
Band38	20	37850	100	#0	16QAM	20.34
Band38	20	38000	1	#0	QPSK	22.30
Band38	20	38000	1	#Mid	QPSK	22.28
Band38	20	38000	1	#Max	QPSK	22.17
Band38	20	38000	50	#0	QPSK	21.58
Band38	20	38000	50	#Mid	QPSK	21.50
Band38	20	38000	50	#Max	QPSK	21.51
Band38	20	38000	100	#0	QPSK	21.12
Band38	20	38000	1	#0	16QAM	22.26
Band38	20	38000	1	#Mid	16QAM	21.94
Band38	20	38000	1	#Max	16QAM	22.18
Band38	20	38000	50	#0	16QAM	20.61
Band38	20	38000	50	#Mid	16QAM	20.50
Band38	20	38000	50	#Max	16QAM	20.50
Band38	20	38000	100	#0	16QAM	20.29
Band38	20	38150	1	#0	QPSK	22.39
Band38	20	38150	1	#Mid	QPSK	22.39
Band38	20	38150	1	#Max	QPSK	22.52
Band38	20	38150	50	#0	QPSK	21.35
Band38	20	38150	50	#Mid	QPSK	21.28
Band38	20	38150	50	#Max	QPSK	21.41
Band38	20	38150	100	#0	QPSK	21.06
Band38	20	38150	1	#0	16QAM	21.81
Band38	20	38150	1	#Mid	16QAM	21.31
Band38	20	38150	1	#Max	16QAM	21.64
Band38	20	38150	50	#0	16QAM	20.59
Band38	20	38150	50	#Mid	16QAM	20.47
Band38	20	38150	50	#Max	16QAM	20.64
Band38	20	38150	100	#0	16QAM	20.10

Band	Bandwidth (MHz)	UL Channel	RB Size	RB Position	Modulation	Power (dBm)
Band41	5	40065	1	#0	QPSK	22.75
Band41	5	40065	1	#Mid	QPSK	22.89
Band41	5	40065	1	#Max	QPSK	22.95
Band41	5	40065	12	#0	QPSK	21.72
Band41	5	40065	12	#Mid	QPSK	21.87
Band41	5	40065	12	#Max	QPSK	21.77
Band41	5	40065	25	#0	QPSK	21.90
Band41	5	40065	1	#0	16QAM	21.42
Band41	5	40065	1	#Mid	16QAM	21.61
Band41	5	40065	1	#Max	16QAM	21.55
Band41	5	40065	12	#0	16QAM	20.82
Band41	5	40065	12	#Mid	16QAM	20.91
Band41	5	40065	12	#Max	16QAM	20.91
Band41	5	40065	25	#0	16QAM	21.22
Band41	5	40640	1	#0	QPSK	22.59
Band41	5	40640	1	#Mid	QPSK	22.60
Band41	5	40640	1	#Max	QPSK	22.59
Band41	5	40640	12	#0	QPSK	21.71
Band41	5	40640	12	#Mid	QPSK	21.67
Band41	5	40640	12	#Max	QPSK	21.50
Band41	5	40640	25	#0	QPSK	21.57
Band41	5	40640	1	#0	16QAM	21.60
Band41	5	40640	1	#Mid	16QAM	21.48
Band41	5	40640	1	#Max	16QAM	21.49
Band41	5	40640	12	#0	16QAM	20.80
Band41	5	40640	12	#Mid	16QAM	20.78
Band41	5	40640	12	#Max	16QAM	20.62
Band41	5	40640	25	#0	16QAM	20.70
Band41	5	41215	1	#0	QPSK	22.14
Band41	5	41215	1	#Mid	QPSK	22.20
Band41	5	41215	1	#Max	QPSK	22.11
Band41	5	41215	12	#0	QPSK	21.33
Band41	5	41215	12	#Mid	QPSK	21.26
Band41	5	41215	12	#Max	QPSK	21.22
Band41	5	41215	25	#0	QPSK	21.28
Band41	5	41215	1	#0	16QAM	21.18
Band41	5	41215	1	#Mid	16QAM	21.06
Band41	5	41215	1	#Max	16QAM	21.02
Band41	5	41215	12	#0	16QAM	20.61
Band41	5	41215	12	#Mid	16QAM	20.47
Band41	5	41215	12	#Max	16QAM	20.50
Band41	5	41215	25	#0	16QAM	20.42
Band41	10	40090	1	#0	QPSK	22.64
Band41	10	40090	1	#Mid	QPSK	22.72
Band41	10	40090	1	#Max	QPSK	22.79
Band41	10	40090	25	#0	QPSK	21.87
Band41	10	40090	25	#Mid	QPSK	21.85
Band41	10	40090	25	#Max	QPSK	21.84
Band41	10	40090	50	#0	QPSK	21.52
Band41	10	40090	1	#0	16QAM	22.56
Band41	10	40090	1	#Mid	16QAM	22.72
Band41	10	40090	1	#Max	16QAM	22.81
Band41	10	40090	25	#0	16QAM	21.23
Band41	10	40090	25	#Mid	16QAM	21.12
Band41	10	40090	25	#Max	16QAM	21.22

Band41	10	40090	50	#0	16QAM	20.57
Band41	10	40640	1	#0	QPSK	22.76
Band41	10	40640	1	#Mid	QPSK	22.71
Band41	10	40640	1	#Max	QPSK	22.80
Band41	10	40640	25	#0	QPSK	21.59
Band41	10	40640	25	#Mid	QPSK	21.62
Band41	10	40640	25	#Max	QPSK	21.56
Band41	10	40640	50	#0	QPSK	21.33
Band41	10	40640	1	#0	16QAM	21.53
Band41	10	40640	1	#Mid	16QAM	21.47
Band41	10	40640	1	#Max	16QAM	21.39
Band41	10	40640	25	#0	16QAM	20.87
Band41	10	40640	25	#Mid	16QAM	20.86
Band41	10	40640	25	#Max	16QAM	20.80
Band41	10	40640	50	#0	16QAM	20.47
Band41	10	41190	1	#0	QPSK	22.30
Band41	10	41190	1	#Mid	QPSK	22.27
Band41	10	41190	1	#Max	QPSK	22.21
Band41	10	41190	25	#0	QPSK	21.39
Band41	10	41190	25	#Mid	QPSK	21.33
Band41	10	41190	25	#Max	QPSK	21.38
Band41	10	41190	50	#0	QPSK	20.83
Band41	10	41190	1	#0	16QAM	21.87
Band41	10	41190	1	#Mid	16QAM	21.71
Band41	10	41190	1	#Max	16QAM	21.76
Band41	10	41190	25	#0	16QAM	20.58
Band41	10	41190	25	#Mid	16QAM	20.54
Band41	10	41190	25	#Max	16QAM	20.59
Band41	10	41190	50	#0	16QAM	20.10
Band41	15	40115	1	#0	QPSK	22.53
Band41	15	40115	1	#Mid	QPSK	22.72
Band41	15	40115	1	#Max	QPSK	22.65
Band41	15	40115	36	#0	QPSK	21.89
Band41	15	40115	36	#Mid	QPSK	21.79
Band41	15	40115	36	#Max	QPSK	21.84
Band41	15	40115	75	#0	QPSK	21.42
Band41	15	40115	1	#0	16QAM	22.62
Band41	15	40115	1	#Mid	16QAM	22.73
Band41	15	40115	1	#Max	16QAM	22.72
Band41	15	40115	36	#0	16QAM	20.96
Band41	15	40115	36	#Mid	16QAM	20.98
Band41	15	40115	36	#Max	16QAM	20.97
Band41	15	40115	75	#0	16QAM	20.69
Band41	15	40640	1	#0	QPSK	22.87
Band41	15	40640	1	#Mid	QPSK	22.74
Band41	15	40640	1	#Max	QPSK	22.61
Band41	15	40640	36	#0	QPSK	21.65
Band41	15	40640	36	#Mid	QPSK	21.55
Band41	15	40640	36	#Max	QPSK	21.48
Band41	15	40640	75	#0	QPSK	21.18
Band41	15	40640	1	#0	16QAM	21.55
Band41	15	40640	1	#Mid	16QAM	21.42
Band41	15	40640	1	#Max	16QAM	21.30
Band41	15	40640	36	#0	16QAM	20.92
Band41	15	40640	36	#Mid	16QAM	20.78
Band41	15	40640	36	#Max	16QAM	20.75
Band41	15	40640	75	#0	16QAM	20.56

Band41	15	41165	1	#0	QPSK	22.51
Band41	15	41165	1	#Mid	QPSK	22.27
Band41	15	41165	1	#Max	QPSK	22.33
Band41	15	41165	36	#0	QPSK	21.40
Band41	15	41165	36	#Mid	QPSK	21.42
Band41	15	41165	36	#Max	QPSK	21.25
Band41	15	41165	75	#0	QPSK	20.93
Band41	15	41165	1	#0	16QAM	21.81
Band41	15	41165	1	#Mid	16QAM	21.76
Band41	15	41165	1	#Max	16QAM	21.62
Band41	15	41165	36	#0	16QAM	20.71
Band41	15	41165	36	#Mid	16QAM	20.60
Band41	15	41165	36	#Max	16QAM	20.60
Band41	15	41165	75	#0	16QAM	20.17
Band41	20	40140	1	#0	QPSK	22.67
Band41	20	40140	1	#Mid	QPSK	22.96
Band41	20	40140	1	#Max	QPSK	22.78
Band41	20	40140	50	#0	QPSK	21.86
Band41	20	40140	50	#Mid	QPSK	21.84
Band41	20	40140	50	#Max	QPSK	21.90
Band41	20	40140	100	#0	QPSK	21.43
Band41	20	40140	1	#0	16QAM	21.39
Band41	20	40140	1	#Mid	16QAM	21.55
Band41	20	40140	1	#Max	16QAM	21.48
Band41	20	40140	50	#0	16QAM	21.08
Band41	20	40140	50	#Mid	16QAM	21.00
Band41	20	40140	50	#Max	16QAM	21.13
Band41	20	40140	100	#0	16QAM	20.55
Band41	20	40640	1	#0	QPSK	22.76
Band41	20	40640	1	#Mid	QPSK	22.68
Band41	20	40640	1	#Max	QPSK	22.58
Band41	20	40640	50	#0	QPSK	21.77
Band41	20	40640	50	#Mid	QPSK	21.58
Band41	20	40640	50	#Max	QPSK	21.57
Band41	20	40640	100	#0	QPSK	21.21
Band41	20	40640	1	#0	16QAM	21.47
Band41	20	40640	1	#Mid	16QAM	21.22
Band41	20	40640	1	#Max	16QAM	21.27
Band41	20	40640	50	#0	16QAM	20.76
Band41	20	40640	50	#Mid	16QAM	20.69
Band41	20	40640	50	#Max	16QAM	20.58
Band41	20	40640	100	#0	16QAM	20.48
Band41	20	41140	1	#0	QPSK	22.69
Band41	20	41140	1	#Mid	QPSK	22.46
Band41	20	41140	1	#Max	QPSK	22.45
Band41	20	41140	50	#0	QPSK	21.55
Band41	20	41140	50	#Mid	QPSK	21.38
Band41	20	41140	50	#Max	QPSK	21.33
Band41	20	41140	100	#0	QPSK	20.99
Band41	20	41140	1	#0	16QAM	21.92
Band41	20	41140	1	#Mid	16QAM	21.03
Band41	20	41140	1	#Max	16QAM	20.78
Band41	20	41140	50	#0	16QAM	20.82
Band41	20	41140	50	#Mid	16QAM	20.59
Band41	20	41140	50	#Max	16QAM	20.60
Band41	20	41140	100	#0	16QAM	20.20

Band	Bandwidth (MHz)	UL Channel	RB Size	RB Position	Modulation	Power (dBm)
Band66	1.4	131979	1	#0	QPSK	22.45
Band66	1.4	131979	1	#Mid	QPSK	22.49
Band66	1.4	131979	1	#Max	QPSK	22.47
Band66	1.4	131979	3	#0	QPSK	22.38
Band66	1.4	131979	3	#Mid	QPSK	22.43
Band66	1.4	131979	3	#Max	QPSK	22.37
Band66	1.4	131979	6	#0	QPSK	21.44
Band66	1.4	131979	1	#0	16QAM	22.37
Band66	1.4	131979	1	#Mid	16QAM	22.37
Band66	1.4	131979	1	#Max	16QAM	22.31
Band66	1.4	131979	3	#0	16QAM	21.56
Band66	1.4	131979	3	#Mid	16QAM	21.61
Band66	1.4	131979	3	#Max	16QAM	21.55
Band66	1.4	131979	6	#0	16QAM	20.56
Band66	1.4	132322	1	#0	QPSK	22.23
Band66	1.4	132322	1	#Mid	QPSK	22.24
Band66	1.4	132322	1	#Max	QPSK	22.23
Band66	1.4	132322	3	#0	QPSK	22.31
Band66	1.4	132322	3	#Mid	QPSK	22.37
Band66	1.4	132322	3	#Max	QPSK	22.33
Band66	1.4	132322	6	#0	QPSK	21.39
Band66	1.4	132322	1	#0	16QAM	21.95
Band66	1.4	132322	1	#Mid	16QAM	21.94
Band66	1.4	132322	1	#Max	16QAM	21.94
Band66	1.4	132322	3	#0	16QAM	21.81
Band66	1.4	132322	3	#Mid	16QAM	21.78
Band66	1.4	132322	3	#Max	16QAM	21.75
Band66	1.4	132322	6	#0	16QAM	20.39
Band66	1.4	132665	1	#0	QPSK	22.29
Band66	1.4	132665	1	#Mid	QPSK	22.41
Band66	1.4	132665	1	#Max	QPSK	22.36
Band66	1.4	132665	3	#0	QPSK	22.26
Band66	1.4	132665	3	#Mid	QPSK	22.30
Band66	1.4	132665	3	#Max	QPSK	22.29
Band66	1.4	132665	6	#0	QPSK	21.45
Band66	1.4	132665	1	#0	16QAM	21.64
Band66	1.4	132665	1	#Mid	16QAM	21.66
Band66	1.4	132665	1	#Max	16QAM	21.63
Band66	1.4	132665	3	#0	16QAM	21.76
Band66	1.4	132665	3	#Mid	16QAM	21.81
Band66	1.4	132665	3	#Max	16QAM	21.75
Band66	1.4	132665	6	#0	16QAM	20.64
Band66	3	131987	1	#0	QPSK	22.22
Band66	3	131987	1	#Mid	QPSK	22.25
Band66	3	131987	1	#Max	QPSK	22.28
Band66	3	131987	8	#0	QPSK	21.42
Band66	3	131987	8	#Mid	QPSK	21.33
Band66	3	131987	8	#Max	QPSK	21.42
Band66	3	131987	15	#0	QPSK	21.42
Band66	3	131987	1	#0	16QAM	22.45
Band66	3	131987	1	#Mid	16QAM	22.45
Band66	3	131987	1	#Max	16QAM	22.53
Band66	3	131987	8	#0	16QAM	20.34
Band66	3	131987	8	#Mid	16QAM	20.34
Band66	3	131987	8	#Max	16QAM	20.36

Band66	3	131987	15	#0	16QAM	20.55
Band66	3	132322	1	#0	QPSK	22.23
Band66	3	132322	1	#Mid	QPSK	22.19
Band66	3	132322	1	#Max	QPSK	22.26
Band66	3	132322	8	#0	QPSK	21.39
Band66	3	132322	8	#Mid	QPSK	21.46
Band66	3	132322	8	#Max	QPSK	21.46
Band66	3	132322	15	#0	QPSK	21.32
Band66	3	132322	1	#0	16QAM	21.97
Band66	3	132322	1	#Mid	16QAM	21.92
Band66	3	132322	1	#Max	16QAM	21.89
Band66	3	132322	8	#0	16QAM	20.66
Band66	3	132322	8	#Mid	16QAM	20.74
Band66	3	132322	8	#Max	16QAM	20.68
Band66	3	132322	15	#0	16QAM	20.54
Band66	3	132657	1	#0	QPSK	22.32
Band66	3	132657	1	#Mid	QPSK	22.41
Band66	3	132657	1	#Max	QPSK	22.36
Band66	3	132657	8	#0	QPSK	21.43
Band66	3	132657	8	#Mid	QPSK	21.36
Band66	3	132657	8	#Max	QPSK	21.33
Band66	3	132657	15	#0	QPSK	21.35
Band66	3	132657	1	#0	16QAM	21.72
Band66	3	132657	1	#Mid	16QAM	21.64
Band66	3	132657	1	#Max	16QAM	21.65
Band66	3	132657	8	#0	16QAM	20.53
Band66	3	132657	8	#Mid	16QAM	20.44
Band66	3	132657	8	#Max	16QAM	20.50
Band66	3	132657	15	#0	16QAM	20.50
Band66	5	131997	1	#0	QPSK	22.30
Band66	5	131997	1	#Mid	QPSK	22.29
Band66	5	131997	1	#Max	QPSK	22.33
Band66	5	131997	12	#0	QPSK	21.33
Band66	5	131997	12	#Mid	QPSK	21.48
Band66	5	131997	12	#Max	QPSK	21.35
Band66	5	131997	25	#0	QPSK	21.35
Band66	5	131997	1	#0	16QAM	21.54
Band66	5	131997	1	#Mid	16QAM	21.60
Band66	5	131997	1	#Max	16QAM	21.59
Band66	5	131997	12	#0	16QAM	20.35
Band66	5	131997	12	#Mid	16QAM	20.38
Band66	5	131997	12	#Max	16QAM	20.39
Band66	5	131997	25	#0	16QAM	20.49
Band66	5	132322	1	#0	QPSK	22.38
Band66	5	132322	1	#Mid	QPSK	22.38
Band66	5	132322	1	#Max	QPSK	22.39
Band66	5	132322	12	#0	QPSK	21.47
Band66	5	132322	12	#Mid	QPSK	21.34
Band66	5	132322	12	#Max	QPSK	21.39
Band66	5	132322	25	#0	QPSK	21.35
Band66	5	132322	1	#0	16QAM	21.37
Band66	5	132322	1	#Mid	16QAM	21.50
Band66	5	132322	1	#Max	16QAM	21.53
Band66	5	132322	12	#0	16QAM	20.33
Band66	5	132322	12	#Mid	16QAM	20.31
Band66	5	132322	12	#Max	16QAM	20.34
Band66	5	132322	25	#0	16QAM	20.52

Band66	5	132647	1	#0	QPSK	22.34
Band66	5	132647	1	#Mid	QPSK	22.30
Band66	5	132647	1	#Max	QPSK	22.29
Band66	5	132647	12	#0	QPSK	21.45
Band66	5	132647	12	#Mid	QPSK	21.29
Band66	5	132647	12	#Max	QPSK	21.38
Band66	5	132647	25	#0	QPSK	21.44
Band66	5	132647	1	#0	16QAM	21.33
Band66	5	132647	1	#Mid	16QAM	21.36
Band66	5	132647	1	#Max	16QAM	21.32
Band66	5	132647	12	#0	16QAM	20.46
Band66	5	132647	12	#Mid	16QAM	20.42
Band66	5	132647	12	#Max	16QAM	20.39
Band66	5	132647	25	#0	16QAM	20.46
Band66	10	132022	1	#0	QPSK	22.33
Band66	10	132022	1	#Mid	QPSK	22.38
Band66	10	132022	1	#Max	QPSK	22.50
Band66	10	132022	25	#0	QPSK	21.38
Band66	10	132022	25	#Mid	QPSK	21.48
Band66	10	132022	25	#Max	QPSK	21.51
Band66	10	132022	50	#0	QPSK	21.38
Band66	10	132022	1	#0	16QAM	22.56
Band66	10	132022	1	#Mid	16QAM	22.60
Band66	10	132022	1	#Max	16QAM	22.66
Band66	10	132022	25	#0	16QAM	20.53
Band66	10	132022	25	#Mid	16QAM	20.53
Band66	10	132022	25	#Max	16QAM	20.57
Band66	10	132022	50	#0	16QAM	20.56
Band66	10	132322	1	#0	QPSK	22.47
Band66	10	132322	1	#Mid	QPSK	22.42
Band66	10	132322	1	#Max	QPSK	22.47
Band66	10	132322	25	#0	QPSK	21.36
Band66	10	132322	25	#Mid	QPSK	21.37
Band66	10	132322	25	#Max	QPSK	21.35
Band66	10	132322	50	#0	QPSK	21.33
Band66	10	132322	1	#0	16QAM	21.30
Band66	10	132322	1	#Mid	16QAM	21.36
Band66	10	132322	1	#Max	16QAM	21.41
Band66	10	132322	25	#0	16QAM	20.53
Band66	10	132322	25	#Mid	16QAM	20.53
Band66	10	132322	25	#Max	16QAM	20.51
Band66	10	132322	50	#0	16QAM	20.55
Band66	10	132622	1	#0	QPSK	22.49
Band66	10	132622	1	#Mid	QPSK	22.41
Band66	10	132622	1	#Max	QPSK	22.46
Band66	10	132622	25	#0	QPSK	21.44
Band66	10	132622	25	#Mid	QPSK	21.31
Band66	10	132622	25	#Max	QPSK	21.33
Band66	10	132622	50	#0	QPSK	21.39
Band66	10	132622	1	#0	16QAM	21.33
Band66	10	132622	1	#Mid	16QAM	21.36
Band66	10	132622	1	#Max	16QAM	21.36
Band66	10	132622	25	#0	16QAM	20.52
Band66	10	132622	25	#Mid	16QAM	20.46
Band66	10	132622	25	#Max	16QAM	20.46
Band66	10	132622	50	#0	16QAM	20.52
Band66	15	132047	1	#0	QPSK	22.30

Band66	15	132047	1	#Mid	QPSK	22.40
Band66	15	132047	1	#Max	QPSK	22.39
Band66	15	132047	36	#0	QPSK	21.40
Band66	15	132047	36	#Mid	QPSK	21.36
Band66	15	132047	36	#Max	QPSK	21.42
Band66	15	132047	75	#0	QPSK	21.36
Band66	15	132047	1	#0	16QAM	22.49
Band66	15	132047	1	#Mid	16QAM	22.52
Band66	15	132047	1	#Max	16QAM	22.58
Band66	15	132047	36	#0	16QAM	20.47
Band66	15	132047	36	#Mid	16QAM	20.55
Band66	15	132047	36	#Max	16QAM	20.53
Band66	15	132047	75	#0	16QAM	20.54
Band66	15	132322	1	#0	QPSK	22.51
Band66	15	132322	1	#Mid	QPSK	22.45
Band66	15	132322	1	#Max	QPSK	22.45
Band66	15	132322	36	#0	QPSK	21.46
Band66	15	132322	36	#Mid	QPSK	21.28
Band66	15	132322	36	#Max	QPSK	21.43
Band66	15	132322	75	#0	QPSK	21.43
Band66	15	132322	1	#0	16QAM	22.08
Band66	15	132322	1	#Mid	16QAM	22.02
Band66	15	132322	1	#Max	16QAM	21.97
Band66	15	132322	36	#0	16QAM	20.55
Band66	15	132322	36	#Mid	16QAM	20.63
Band66	15	132322	36	#Max	16QAM	20.67
Band66	15	132322	75	#0	16QAM	20.49
Band66	15	132597	1	#0	QPSK	22.39
Band66	15	132597	1	#Mid	QPSK	22.37
Band66	15	132597	1	#Max	QPSK	22.34
Band66	15	132597	36	#0	QPSK	21.35
Band66	15	132597	36	#Mid	QPSK	21.26
Band66	15	132597	36	#Max	QPSK	21.39
Band66	15	132597	75	#0	QPSK	21.37
Band66	15	132597	1	#0	16QAM	22.12
Band66	15	132597	1	#Mid	16QAM	22.03
Band66	15	132597	1	#Max	16QAM	22.08
Band66	15	132597	36	#0	16QAM	20.47
Band66	15	132597	36	#Mid	16QAM	20.43
Band66	15	132597	36	#Max	16QAM	20.51
Band66	15	132597	75	#0	16QAM	20.47
Band66	20	132072	1	#0	QPSK	22.41
Band66	20	132072	1	#Mid	QPSK	22.53
Band66	20	132072	1	#Max	QPSK	22.46
Band66	20	132072	50	#0	QPSK	21.39
Band66	20	132072	50	#Mid	QPSK	21.53
Band66	20	132072	50	#Max	QPSK	21.38
Band66	20	132072	100	#0	QPSK	21.46
Band66	20	132072	1	#0	16QAM	21.02
Band66	20	132072	1	#Mid	16QAM	21.23
Band66	20	132072	1	#Max	16QAM	21.18
Band66	20	132072	50	#0	16QAM	20.54
Band66	20	132072	50	#Mid	16QAM	20.71
Band66	20	132072	50	#Max	16QAM	20.60
Band66	20	132072	100	#0	16QAM	20.64
Band66	20	132322	1	#0	QPSK	22.49
Band66	20	132322	1	#Mid	QPSK	22.49

Band66	20	132322	1	#Max	QPSK	22.54
Band66	20	132322	50	#0	QPSK	21.36
Band66	20	132322	50	#Mid	QPSK	21.69
Band66	20	132322	50	#Max	QPSK	21.44
Band66	20	132322	100	#0	QPSK	21.43
Band66	20	132322	1	#0	16QAM	21.44
Band66	20	132322	1	#Mid	16QAM	21.58
Band66	20	132322	1	#Max	16QAM	21.56
Band66	20	132322	50	#0	16QAM	20.54
Band66	20	132322	50	#Mid	16QAM	20.48
Band66	20	132322	50	#Max	16QAM	20.47
Band66	20	132322	100	#0	16QAM	20.46
Band66	20	132572	1	#0	QPSK	22.54
Band66	20	132572	1	#Mid	QPSK	22.58
Band66	20	132572	1	#Max	QPSK	22.55
Band66	20	132572	50	#0	QPSK	21.44
Band66	20	132572	50	#Mid	QPSK	21.36
Band66	20	132572	50	#Max	QPSK	21.41
Band66	20	132572	100	#0	QPSK	21.32
Band66	20	132572	1	#0	16QAM	21.33
Band66	20	132572	1	#Mid	16QAM	21.33
Band66	20	132572	1	#Max	16QAM	21.40
Band66	20	132572	50	#0	16QAM	20.44
Band66	20	132572	50	#Mid	16QAM	20.50
Band66	20	132572	50	#Max	16QAM	20.48
Band66	20	132572	100	#0	16QAM	20.47

Note:

1. When the same transmission mode configurations have the same maximum output power on the same channel for the 802.11 b/g/n modes, the channel in the lower order/sequence 802.11 mode (i.e. g, n) is selected. Therefore the SAR measurements performed for the 802.11b modes, as the lowest order modulation, cover 802.11g/n modes.

2. SAR is not required for the following 2.4 GHz OFDM conditions as 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.

3. Per KDB 248227 D01 v02r02, For 802.11b DSSS SAR measurements, when the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration. When the reported SAR is > 0.8 W/kg, SAR is required for that exposure configuration using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.

Bluetooth			
Modulation	Frequency (MHz)	Output Power (dBm)	Tune-up power (dBm)
1-DH5	2402	5.04	6.0
	2441	5.08	
	2480	5.70	
2-DH5	2402	5.03	6.5
	2441	5.16	
	2480	5.96	
3-DH5	2402	5.30	6.0
	2441	4.55	
	2480	4.08	

BLE			
Mode	Frequency	Maximum Conducted Output Power	Tune-up power
	(MHz)	(dBm)	(dBm)
GFSK BLE 1M	2402	0.39	0.5
	2440	-0.04	
	2480	-2.07	
GFSK BLE 2M	2402	0.16	0.5
	2440	0.20	
	2480	-2.28	

Note:

Per KDB 447498 D01v06, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

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

≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR

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

Bluetooth Turn up Power (dBm)	Bluetooth Turn up Power (mW)	Separation Distance (mm)	Frequency (GHz)	Result	Exclusion Thresholds
6.5	4.47	5	2.48	1.41	7.5

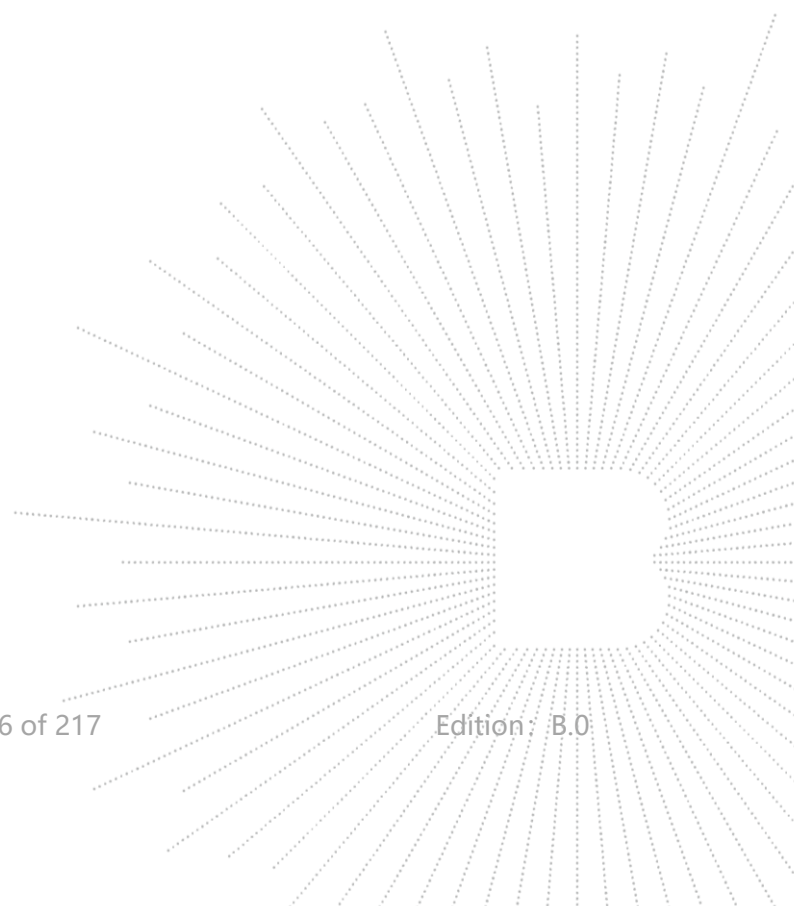
Per KDB 447498 D01v06, when the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

According to the calculation results in the table above, BT SAR does not need to be tested.

WLAN 2.4G			
Mode	Frequency	Maximum Conducted Output Power	Tune-up power
	(MHz)	(dBm)	(dBm)
b	2412	16.89	17.5
	2437	16.47	
	2462	16.10	
g	2412	16.53	17.5
	2437	16.86	
	2462	16.77	
n20	2412	16.33	17.5
	2437	16.71	
	2462	16.90	

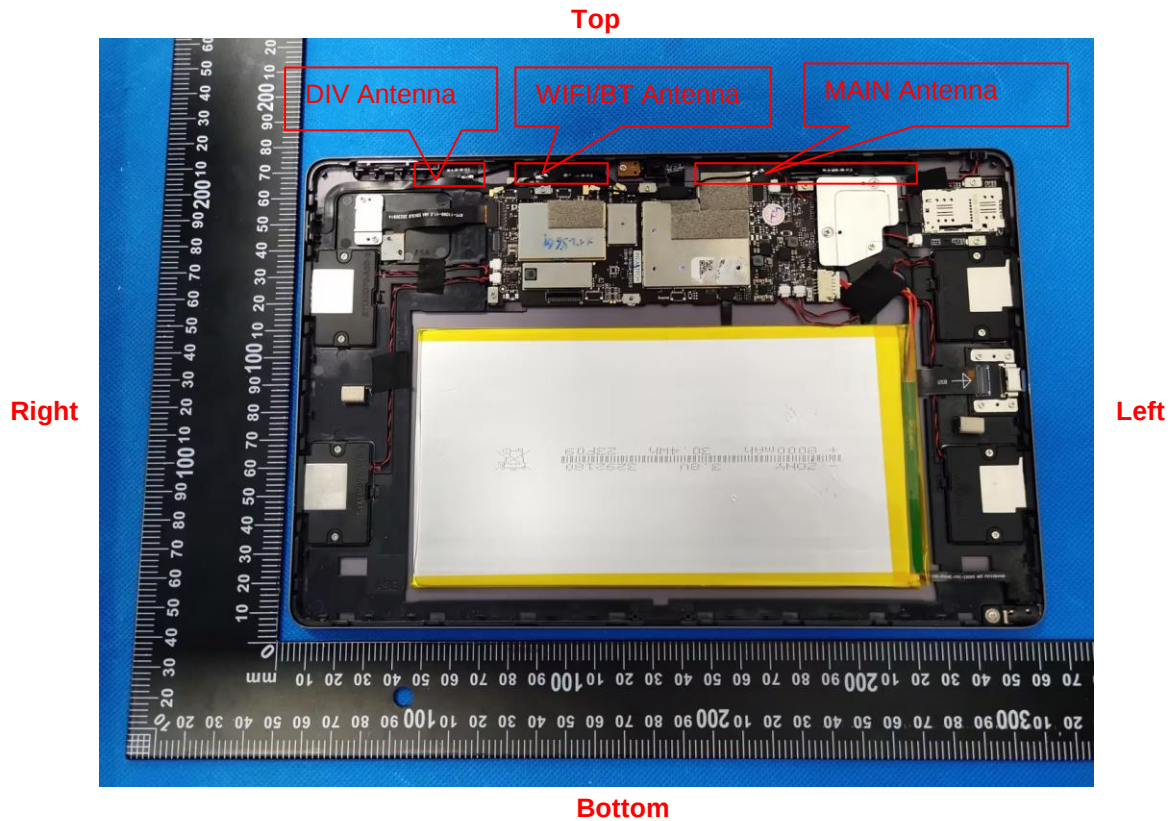
WLAN 5.1G			
Mode	Frequency	Maximum Conducted Output Power	Tune-up power
	(MHz)	(dBm)	(dBm)
a	5180	11.47	12.0
	5200	11.07	
	5240	10.79	
n20	5180	11.84	12.5
	5200	11.18	
	5240	11.26	
n40	5190	12.03	12.5
	5230	11.61	
ac20	5180	11.73	12.0
	5200	11.55	
	5240	11.26	
ac40	5190	12.24	12.5
	5230	11.6	
ac80	5210	11.04	11.5

WLAN 5.8G			
Mode	Frequency	Maximum Conducted Output Power	Tune-up power
	(MHz)	(dBm)	(dBm)
a	5745	10.48	11.0
	5785	9.65	
	5825	9.27	
n20	5745	10.55	11.0
	5785	9.64	
	5825	9.33	
n40	5755	10.58	11.0
	5795	10.07	
ac20	5745	10.38	11.0
	5785	9.7	
	5825	9.38	
ac40	5755	10.56	11.0
	5795	10.05	
ac80	5775	9.34	10.0



14.2 Transmit Antennas and SAR Measurement Position

EUT Antenna Location:



Antennas	Support Band
WWAN	GSM 850/1900+WCDMA Band 2/5+LTE Band 2/4/7 T/RX
BT/WIFI	BT+2.4G WIFI +5G WIFI

Distance of The Antenna to the EUT surface and edge (mm)						
Antennas	Front	Back	Top Side	Bottom Side	Left Side	Right Side
WWAN	<25	<25	<25	160	33	144
BT/WIFI	<25	<25	<25	160	141	74

EUT Testing Location Evaluation:

Positions for SAR tests; Hotspot mode						
Antennas	Front	Back	Top Side	Bottom Side	Left Side	Right Side
WWAN	Yes	Yes	Yes	No	No	No
BT/WIFI	Yes	Yes	Yes	No	No	No

Note:

- According to the KDB 941225 D06 Hot Spot SAR v02, the edges with less than 25 mm distance to the antennas need to be tested for SAR.

14.3 Measured and Reported (Scaled) SAR Results

The calculated SAR is obtained by the following formula:

1. Reported SAR for WWAN=Measured SAR * Tune-up Scaling factor
2. Reported SAR for WLAN and Bluetooth=Measured SAR * Tune-up Scaling factor * Duty Cycle Scaling factor
3. Duty Cycle Scaling factor=1/ Duty Cycle (%)

KDB 447498 D01 General RF Exposure Guidance:

Testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:

- ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
- ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
- ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz

KDB 648474 D04 Handset SAR v01r03:

1. When the *reported* SAR for a body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest *reported* SAR configuration for that wireless mode and frequency band should be repeated for the body-worn accessory with a headset attached to the handset.
2. when the separation distance required for body-worn accessory testing is larger than or equal to that tested for hotspot mode, using the same wireless mode test configuration for voice and data, such as UMTS, LTE and Wi-Fi, and for the same surface of the phone, the hotspot mode SAR data may be used to support body-worn accessory SAR compliance for that particular configuration (surface)
3. For Smart phones with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm, when hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg.

KDB 941225 D01 3G SAR Procedures:

When the maximum output power and tune-up tolerance specified for production units in a secondary mode is $\leq 1/4$ dB higher than the primary mode (RMC12.2kbps) or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.

KDB 941225 D05 SAR for LTE Devices:

1. Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB, and 50% RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel.
2. When the reported SAR is > 0.8 W/kg, testing for other Channels is performed at the highest output power level for 1RB, and 50% RB configuration for that channel.
3. Testing for 100% RB configuration is performed at the highest output power level for 100% RB configuration across the Low, Mid and High Channel when the highest reported SAR for 1 RB and 50% RB are > 0.8 W/kg. Testing for the remaining required channels is not needed because the reported SAR for 100% RB Allocation < 1.45 W/kg.
4. SAR measurement is not required for the 16QAM and 64QAM. When the highest maximum output power for 16QAM and 64QAM is $\leq 1/2$ dB higher than the QPSK or when the reported SAR for the QPSK configuration is ≤ 1.45 W/kg.
5. Testing for the other channel bandwidths is not required because the reported SAR for the highest channel bandwidth is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of the highest channel bandwidth.

KDB 248227 D01 802.11 Wi-Fi SAR

SAR test reduction for 802.11 Wi-Fi transmission mode configurations are considered separately for DSSS and OFDM. An initial test position is determined to reduce the number of tests required for certain exposure configurations with multiple test positions. An initial test configuration is determined for each frequency band and aggregated band according to maximum output power, channel bandwidth, wireless mode configurations and other operating parameters to streamline the measurement requirements.

For 2.4 GHz 802.11b DSSS, either the initial test position procedure for multiple exposure test positions or the DSSS procedure for fixed exposure position is applied; these are mutually exclusive. For 2.4 GHz and 5 GHz OFDM configurations, the initial test configuration is applied to measure SAR using either the initial test position procedure for multiple exposure test position configurations or the initial test configuration procedures for fixed exposure test conditions.

DSSS and OFDM configurations are considered separately according to the required SAR procedures. SAR is measured in the initial test position using the 802.11 transmission mode configuration required by the DSSS procedure or initial test configuration and subsequent test configuration(s) according to the OFDM procedures.¹⁶ The initial test position procedure is described in the following:

- a) When the *reported* SAR of the initial test position is ≤ 0.4 W/kg, further SAR measurement is not required for the other (remaining) test positions in that exposure configuration and 802.11 transmission mode combinations within the frequency band or aggregated band. SAR is also not required for that exposure configuration in the subsequent test configuration(s).
- b) When the *reported* SAR of the initial test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest extrapolated or estimated 1-g SAR conditions determined by area scans or next closest/smallest test separation distance and maximum RF coupling test positions based on manufacturer justification, on the highest maximum output power channel, until the *reported* SAR is ≤ 0.8 W/kg or all required test positions (left, right, touch, tilt or subsequent surfaces and edges) are tested.
- c) For all positions/configurations tested using the initial test position and subsequent test positions, when the *reported* SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the *reported* SAR is ≤ 1.2 W/kg or all required channels are tested.

Additional power measurements may be required for this step, which should be limited to those necessary for identifying the subsequent highest output power channels.

When the specified maximum output power is the same for both UNII 1 and UNII 2A, begin SAR measurements in UNII 2A with the channel with the highest measured output power. If the reported SAR for UNII 2A is ≤ 1.2 W/kg, SAR is not required for UNII 1; otherwise treat the remaining bands separately and test them independently for SAR.

When the specified maximum output power is different between UNII 1 and UNII 2A, begin SAR with the band that has the higher specified maximum output. If the highest reported SAR for the band with the highest specified power is ≤ 1.2 W/kg, testing for the band with the lower specified output power is not required; otherwise test the remaining bands independently for SAR

TCB workshop April 2015:

SAR test exclusion can be applied for testing overlapping LTE bands as follows:

- a) The maximum output power, including tolerance, for the smaller band must be less than the larger band to qualify for the SAR test exclusion.
- b) The channel bandwidth and other operating parameters for the smaller band must be fully supported by the larger band.

LTE Band 17 (704-716 MHz) is covered by LTE Band 12 (699-716 MHz)

GSM 850											
RF Exposure Conditions	Dist. (mm)	Mode	Test Position	CH.	Freq. (MHz)	Output Power (dBm)			SAR1g (W/kg)		Plot No.
						Meas.	Turn-up	Scaling Factor	Meas.	Scaled	
Body	0	GSM	Front	190	836.6	32.67	33.0	1.079	0.332	0.358	
		GSM	Back	190	836.6	32.67	33.0	1.079	0.332	0.358	
		GSM	Top Side	190	836.6	32.67	33.0	1.079	0.308	0.332	
		GSM	Back	128	824.2	32.51	33.0	1.119	0.317	0.355	
		GSM	Back	251	848.8	32.55	33.0	1.109	0.323	0.358	1

GSM 1900											
RF Exposure Conditions	Dist. (mm)	Mode	Test Position	CH.	Freq. (MHz)	Output Power (dBm)			SAR1g (W/kg)		Plot No.
						Meas.	Turn-up	Scaling Factor	Meas.	Scaled	
Body	0	GSM	Front	661	1880	28.88	29.5	1.153	0.570	0.657	
		GSM	Back	661	1880	28.88	29.5	1.153	0.824	0.950	
		GSM	Top Side	661	1880	28.88	29.5	1.153	0.962	1.110	2
		GSM	Top Side	512	1850.2	28.53	29.5	1.250	0.858	1.073	
		GSM	Top Side	810	1909.8	28.73	29.5	1.194	0.923	1.102	

WCDMA Band II											
RF Exposure Conditions	Dist. (mm)	Mode	Test Position	CH.	Freq. (MHz)	Output Power (dBm)			SAR1g (W/kg)		Plot No.
						Meas.	Turn-up	Scaling Factor	Meas.	Scaled	
Head	0	RMC*	Front	9400	1880.0	22.40	23.0	1.148	0.431	0.495	
		RMC*	Back	9400	1880.0	22.40	23.0	1.148	0.713	0.819	
		RMC*	Top Side	9400	1880.0	22.40	23.0	1.148	0.735	0.844	
		RMC*	Top Face	9262	1852.4	22.16	23.0	1.213	0.896	1.087	3
		RMC*	Top Face	9538	1907.6	22.25	23.0	1.189	0.690	0.820	

WCDMA Band V											
RF Exposure Conditions	Dist. (mm)	Mode	Test Position	CH.	Freq. (MHz)	Output Power (dBm)			SAR1g (W/kg)		Plot No.
						Meas.	Turn-up	Scaling Factor	Meas.	Scaled	
Body	0	RMC*	Front	4233	846.6	22.56	23.0	1.107	0.904	1.000	
		RMC*	Back	4233	846.6	22.56	23.0	1.107	0.785	0.869	
		RMC*	Top Side	4233	846.6	22.56	23.0	1.107	0.878	0.972	
		RMC*	Front	4132	826.4	22.55	23.0	1.109	1.082	1.200	4
		RMC*	Front	4182	836.4	22.49	23.0	1.125	0.596	0.670	

FDD-LTE Band 7 (20MHz Bandwidth)											
RF Exposure Conditions	Dist. (mm)	Mode	Test Position	CH.	Freq. (MHz)	Output Power (dBm)			SAR1g (W/kg)		Plot No.
						Meas.	Turn-up	Scaling Factor	Meas.	Scaled	
Body	0	QPSK,1RB	Front	21100	2535	22.58	23.0	1.102	0.466	0.513	5
		QPSK,1RB	Back	21100	2535	22.58	23.0	1.102	0.526	0.579	
		QPSK,1RB	Top Side	21100	2535	22.58	23.0	1.102	0.785	0.865	
		QPSK,1RB	Top Side	20850	2510	22.25	23.0	1.189	0.809	0.961	
		QPSK,1RB	Top Side	21350	2560	22.13	23.0	1.222	0.792	0.968	
		QPSK,50%RB	Front	21100	2535	22.58	23.0	1.102	0.351	0.387	
		QPSK,50%RB	Back	21100	2535	22.58	23.0	1.102	0.501	0.552	
		QPSK,50%RB	Top Side	21100	2535	22.58	23.0	1.102	0.623	0.686	
		QPSK,50%RB	Top Side	20850	2510	22.25	23.0	1.189	0.620	0.737	
		QPSK,50%RB	Top Side	21350	2560	22.13	23.0	1.222	0.721	0.881	
		QPSK,100%RB	Top Side	21100	2535	22.58	23.0	1.102	0.325	0.358	

FDD-LTE Band 12 (20MHz Bandwidth)											
RF Exposure Conditions	Dist. (mm)	Mode	Test Position	CH.	Freq. (MHz)	Output Power (dBm)			SAR1g (W/kg)		Plot No.
						Meas.	Turn-up	Scaling Factor	Meas.	Scaled	
Body	0	QPSK,1RB	Front	23095	711	22.39	23.0	1.151	0.419	0.482	6
		QPSK,1RB	Back	23095	711	22.39	23.0	1.151	0.798	0.918	
		QPSK,1RB	Top Side	23095	711	22.39	23.0	1.151	0.823	0.947	
		QPSK,1RB	Top Side	23060	704	22.35	23.0	1.161	0.861	1.000	
		QPSK,1RB	Top Side	23130	707.5	22.29	23.0	1.178	0.989	1.165	
		QPSK,50%RB	Front	23095	711	22.39	23.0	1.151	0.389	0.448	
		QPSK,50%RB	Back	23095	711	22.39	23.0	1.151	0.730	0.840	
		QPSK,50%RB	Top Side	23095	711	22.39	23.0	1.151	0.782	0.900	
		QPSK,50%RB	Top Side	23060	704	22.35	23.0	1.161	0.635	0.738	
		QPSK,50%RB	Top Side	23130	707.5	22.29	23.0	1.178	0.604	0.711	
		QPSK,100%RB	Top Side	23095	711	22.39	23.0	1.151	0.461	0.531	

FDD-LTE Band 17 (10MHz Bandwidth)											
RF Exposure Conditions	Dist. (mm)	Mode	Test Position	CH.	Freq. (MHz)	Output Power (dBm)			SAR1g (W/kg)		Plot No.
						Meas.	Turn-up	Scaling Factor	Meas.	Scaled	
Body	0	QPSK,1RB	Front	23790	710	22.42	23.0	1.143	0.931	1.064	7
		QPSK,1RB	Back	23790	710	22.42	23.0	1.143	0.777	0.888	
		QPSK,1RB	Top Side	23790	710	22.42	23.0	1.143	1.003	1.146	
		QPSK,1RB	Top Side	23780	709	22.34	23.0	1.164	0.942	1.097	
		QPSK,1RB	Top Side	23800	711	22.40	23.0	1.148	1.006	1.155	
		QPSK,50%RB	Front	23790	710	22.42	23.0	1.143	0.717	0.819	
		QPSK,50%RB	Back	23790	710	22.42	23.0	1.143	0.517	0.591	
		QPSK,50%RB	Top Side	23790	710	22.42	23.0	1.143	0.687	0.785	
		QPSK,50%RB	Top Side	23780	709	22.34	23.0	1.164	0.813	0.946	
		QPSK,50%RB	Top Side	23800	711	22.40	23.0	1.148	0.636	0.730	
		QPSK,100%RB	Top Side	23790	710	22.42	23.0	1.143	0.533	0.609	

FDD-LTE Band 38 (20MHz Bandwidth)											
RF Exposure Conditions	Dist. (mm)	Mode	Test Position	CH.	Freq. (MHz)	Output Power (dBm)			SAR1g (W/kg)		Plot No.
						Meas.	Turn-up	Scaling Factor	Meas.	Scaled	
Body	0	QPSK,1RB	Front	38000	2595	22.78	23.5	1.180	0.192	0.227	8
		QPSK,1RB	Back	38000	2595	22.78	23.5	1.180	0.302	0.356	
		QPSK,1RB	Top Side	38000	2595	22.78	23.5	1.180	0.475	0.561	
		QPSK,1RB	Top Side	37850	2580	22.60	23.5	1.230	0.507	0.624	
		QPSK,1RB	Top Side	38150	2610	22.52	23.5	1.253	0.433	0.543	
		QPSK,50%RB	Front	38000	2595	22.78	23.5	1.180	0.191	0.225	
		QPSK,50%RB	Back	38000	2595	22.78	23.5	1.180	0.255	0.301	
		QPSK,50%RB	Top Side	38000	2595	22.78	23.5	1.180	0.371	0.438	
		QPSK,50%RB	Top Side	37850	2580	22.60	23.5	1.230	0.369	0.454	
		QPSK,50%RB	Top Side	38150	2610	22.52	23.5	1.253	0.390	0.489	

FDD-LTE Band 41 (20MHz Bandwidth)											
RF Exposure Conditions	Dist. (mm)	Mode	Test Position	CH.	Freq. (MHz)	Output Power (dBm)			SAR1g (W/kg)		Plot No.
						Meas.	Turn-up	Scaling Factor	Meas.	Scaled	
Body	0	QPSK,1RB	Front	40620	2593	22.87	23.5	1.156	0.244	0.282	9
		QPSK,1RB	Back	40620	2593	22.87	23.5	1.156	0.330	0.382	
		QPSK,1RB	Top Side	40620	2593	22.87	23.5	1.156	0.443	0.512	
		QPSK,1RB	Top Side	39750	2506	22.76	23.5	1.186	0.325	0.385	
		QPSK,1RB	Top Side	41490	2680	22.79	23.5	1.178	0.374	0.440	
		QPSK,50%RB	Front	40620	2593	22.87	23.5	1.156	0.164	0.190	
		QPSK,50%RB	Back	40620	2593	22.87	23.5	1.156	0.289	0.334	
		QPSK,50%RB	Top Side	40620	2593	22.87	23.5	1.156	0.343	0.397	
		QPSK,50%RB	Top Side	39750	2506	22.76	23.5	1.186	0.301	0.357	
		QPSK,50%RB	Top Side	41490	2680	22.79	23.5	1.178	0.289	0.340	

FDD-LTE Band 66 (20MHz Bandwidth)											
RF Exposure Conditions	Dist. (mm)	Mode	Test Position	CH.	Freq. (MHz)	Output Power (dBm)			SAR1g (W/kg)		Plot No.
						Meas.	Turn-up	Scaling Factor	Meas.	Scaled	
Body	0	QPSK,1RB	Front	132572	1770	22.58	23.0	1.102	0.309	0.340	
		QPSK,1RB	Back	132572	1770	22.58	23.0	1.102	0.544	0.599	
		QPSK,1RB	Top Side	132572	1770	22.58	23.0	1.102	0.637	0.702	
		QPSK,1RB	Top Side	132072	1720	22.53	23.0	1.114	0.720	0.802	10
		QPSK,1RB	Top Side	172322	1745	22.54	23.0	1.112	0.667	0.742	
		QPSK,50%RB	Front	132572	1770	22.58	23.0	1.102	0.251	0.276	
		QPSK,50%RB	Back	132572	1770	22.58	23.0	1.102	0.286	0.315	
		QPSK,50%RB	Top Side	132572	1770	22.58	23.0	1.102	0.471	0.519	
		QPSK,50%RB	Top Side	132072	1720	22.53	23.0	1.114	0.664	0.740	
		QPSK,50%RB	Top Side	172322	1745	22.54	23.0	1.112	0.430	0.478	

WIFI 2.4G												
RF Exposure Conditions	Dist. (mm)	Mode	Test Position	CH.	Freq. (MHz)	Duty Cycle (%)	Output Power (dBm)	Turn up (dBm)	Turn-up Scaling Factor	SAR1g (W/kg)		Plot No.
										Meas.	Scaled	
Body	0	n20	Front	1	2412	100	16.90	17.5	1.148	0.243	0.279	
		n20	Back	1	2412	100	16.90	17.5	1.148	0.210	0.241	
		n20	Top Side	1	2412	100	16.90	17.5	1.148	0.295	0.339	11
		n20	Top Side	6	2437	100	16.33	17.5	1.309	0.174	0.228	
		n20	Top Side	12	2462	100	16.71	17.5	1.199	0.185	0.222	

WIFI 5.1G												
RF Exposure Conditions	Dist. (mm)	Mode	Test Position	CH.	Freq. (MHz)	Duty Cycle (%)	Output Power (dBm)	Turn up (dBm)	Turn-up Scaling Factor	SAR1g (W/kg)		Plot No.
										Meas.	Scaled	
Body	0	ac40	Front	38	5190	100	12.24	12.5	1.062	0.329	0.349	12
		ac40	Back	38	5190	100	12.24	12.5	1.062	0.265	0.281	
		ac40	Top Side	38	5190	100	12.24	12.5	1.062	0.323	0.343	
		ac40	Front	46	5230	100	11.60	12.5	1.230	0.213	0.262	

WIFI 5.8G												
RF Exposure Conditions	Dist. (mm)	Mode	Test Position	CH.	Freq. (MHz)	Duty Cycle (%)	Output Power (dBm)	Turn up (dBm)	Turn-up Scaling Factor	SAR1g (W/kg)		Plot No.
										Meas.	Scaled	
Body	0	n40	Front	151	5755	100	10.58	11.0	1.102	0.329	0.362	13
		n40	Back	151	5755	100	10.58	11.0	1.102	0.313	0.345	
		n40	Top Side	151	5755	100	10.58	11.0	1.102	0.310	0.341	
		n40	Front	159	5795	100	10.07	11.0	1.239	0.253	0.313	

Remark:

1. The value with the bold is the maximum SAR Value of each test band.
2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels SAR tests are not necessary.

14.4 SAR Measurement Variability

According to KDB865664, Repeated measurements are required only when the measured SAR is ≥ 0.80 W/kg. If the measured SAR value of the initial repeated measurement is < 1.45 W/kg with $\leq 20\%$ variation, only one repeated measurement is required to reaffirm that the results are not expected to have substantial variations, which may introduce significant compliance concerns. A second repeated measurement is required only if the measured result for the initial repeated measurement is within 10% of the SAR limit and vary by more than 20%, which are often related to device and measurement setup difficulties. The following procedures are applied to determine if repeated measurements are required. The same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.¹⁹ The repeated measurement results must be clearly identified in the SAR report. All measured SAR, including the repeated results, must be considered to determine compliance and for reporting according to KDB 690783. Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.

- 1) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
- 2) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg ($\sim 10\%$ from the 1-g SAR limit).
- 3) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .
- 4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20

Test Mode	Frequency Band (MHz)	RF Exposure Configuration	Test Position	Repeated SAR (yes/no)	Highest Measured SAR1-g (W/Kg)	First Repeated	
						Measured SAR1-g (W/Kg)	Largest to Smallest SAR Ratio
GSM 1900	1880	Body	Back	yes	1.110	1.070	1.037
WCDMA Band II	1852.4	Body	Back	yes	1.087	1.017	1.069
WCDMA Band V	826.4	Body	Back	yes	1.200	1.141	1.052
FDD-LTE Band 7	2560	Body	Back	yes	0.968	0.934	1.036
FDD-LTE Band 12	707.5	Body	Back	yes	1.165	1.088	1.071
FDD-LTE Band 17	710	Body	Back	yes	1.146	1.105	1.037
FDD-LTE Band 66	1720	Body	Back	yes	0.802	0.773	1.038

14.5 Simultaneous Transmission Evaluation

Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneous transmitting antenna.

Application Simultaneous Transmission information:

No.	Configurations	Body SAR
1	WWAN + WIFI 2.4G	Yes
2	WWAN + WIFI 5G	Yes
3	WWAN + Bluetooth	Yes
4	WIFI 2.4G + WIFI 5G	No
5	WIFI + Bluetooth	No

Remark:

- Wi-Fi 2.4GHz and Wi-Fi 5GHz cannot transmit simultaneously.
- Wi-Fi and Bluetooth are the same antenna and cannot be sent at the same time.
- According to the KDB 447498 D01 v06, when standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:

- $(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm}) \cdot [\sqrt{f(\text{GHz})} / x] \text{ W/kg}$ for test separation distances $\leq 50 \text{ mm}$;
where $x = 7.5$ for 1-g SAR, and $x = 18.75$ for 10-g SAR.
- 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distances is $> 50 \text{ mm}$

Estimated stand alone SAR						
Communication system	Frequency (MHz)	Maximum Power (dBm)	Maximum Power (mW)	Separation Distance (mm)	X	Estimated SAR1-g (W/kg)
Bluetooth*	2480	5.5	3.55	5	7.5	0.188
Bluetooth*	2480	5.5	3.55	10	7.5	0.038

Note:

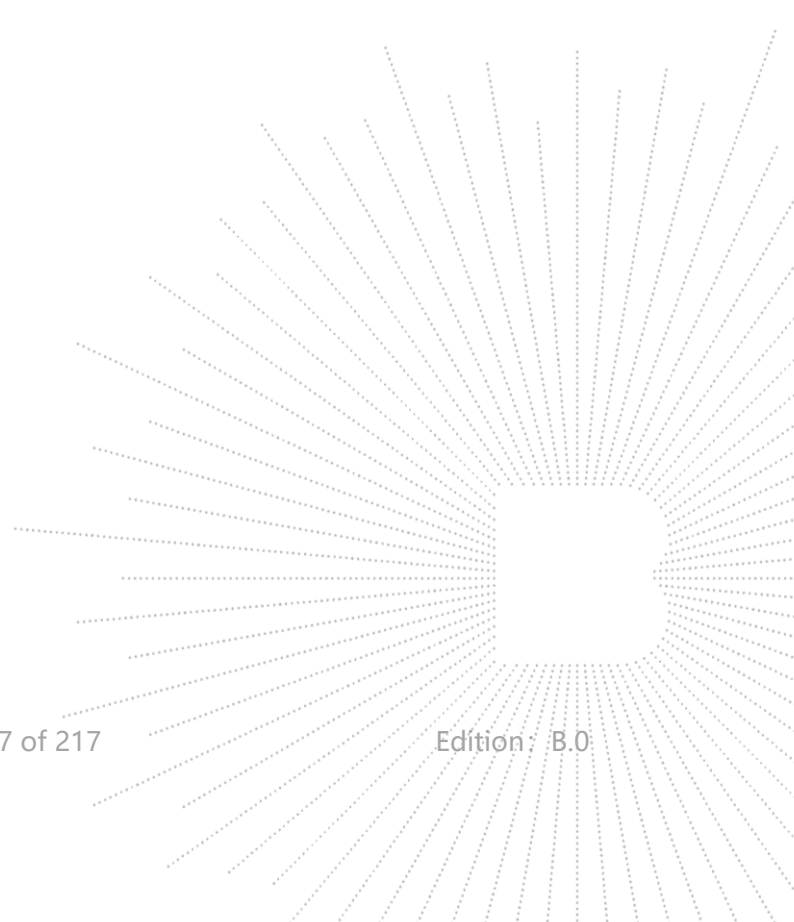
- Bluetooth*- Including Lower power Bluetooth
- Maximum average power including tune-up tolerance;
- When the minimum test separation distance is $< 5 \text{ mm}$, a distance of 5 mm is applied to determine SAR test exclusion

4. Per FCC KD B447498 D01, simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g SAR for all the transmitting antenna in a specific a physical test configuration is $\leq 1.6 \text{ W/Kg}$. When the sum is greater than the SAR limit, SAR test exclusion is determined by the SAR to peak location separation ratio.

$$\text{Ratio} = \frac{(\text{SAR}_1 + \text{SAR}_2)^{1.5}}{(\text{peak location separation, mm})} < 0.04$$

5. Simultaneous transmission of maximum SAR sum calculation.

RF Exposure Conditions	Test Position	Standalone SAR (W/kg)			Summed SAR W/kg)	
		1	2	3	1+2	1+3
		WWAN	Wi-Fi	BT		
Body	Front	1.200	0.339	0.188	1.539	1.388
	Back	0.950	0.349	0.188	1.299	1.138
	Top Side	1.165	0.362	0.188	1.527	1.353



15. Test Plots

15.1 System Performance Check

System check at 750 MHz

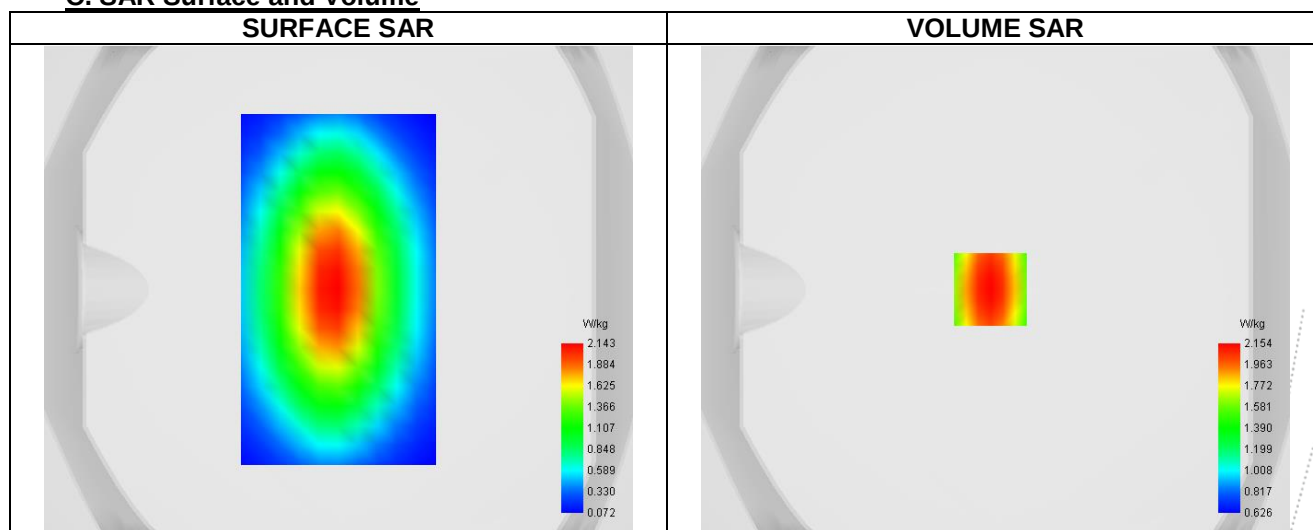
A. Experimental conditions.

Probe	SN 26/23 EPG0420
ConvF	0.80
Area Scan	surf_sam_plan.txt
Zoom Scan	7x7x8,dx=5mm dy=5mm dz=4mm
Phantom	Validation plane
Device Position	Dipole
Band	CW750
Channels	Middle
Signal	CW (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	750.000
Relative permittivity (real part)	42.505
Relative permittivity (imaginary part)	21.354
Conductivity (S/m)	0.902

C. SAR Surface and Volume



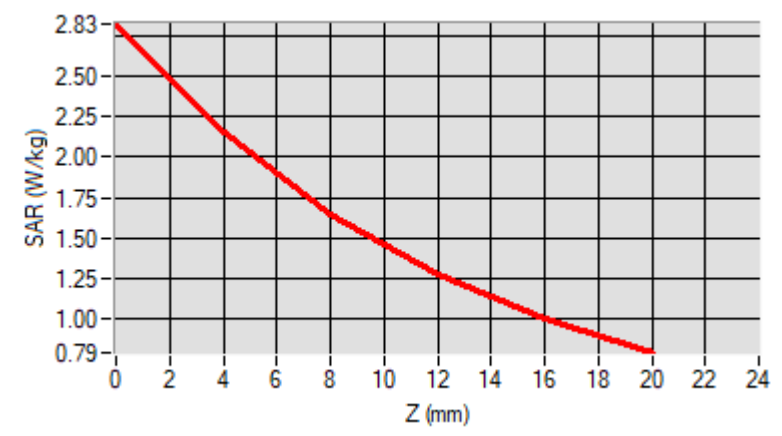
Maximum location: X=-2.00, Y=0.00 ; SAR Peak: 4.96 W/kg

D. SAR 1g & 10g

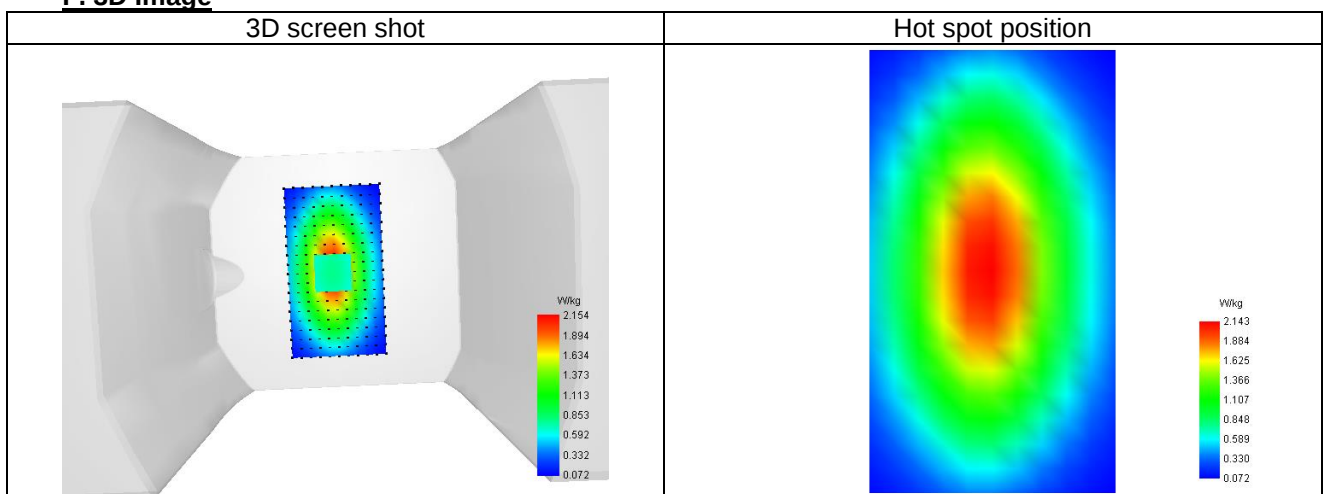
SAR 10g (W/Kg)	0.953
SAR 1g (W/Kg)	2.134
Variation (%)	-2.420
Horizontal validation criteria: minimum distance (mm)	0.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	0.000000

E. Z Axis Scan

Z (mm)	0.00	4.00	8.00	12.00	16.00
SAR (W/Kg)	2.832	2.176	1.674	1.285	1.064



F. 3D Image



System check at 835 MHz

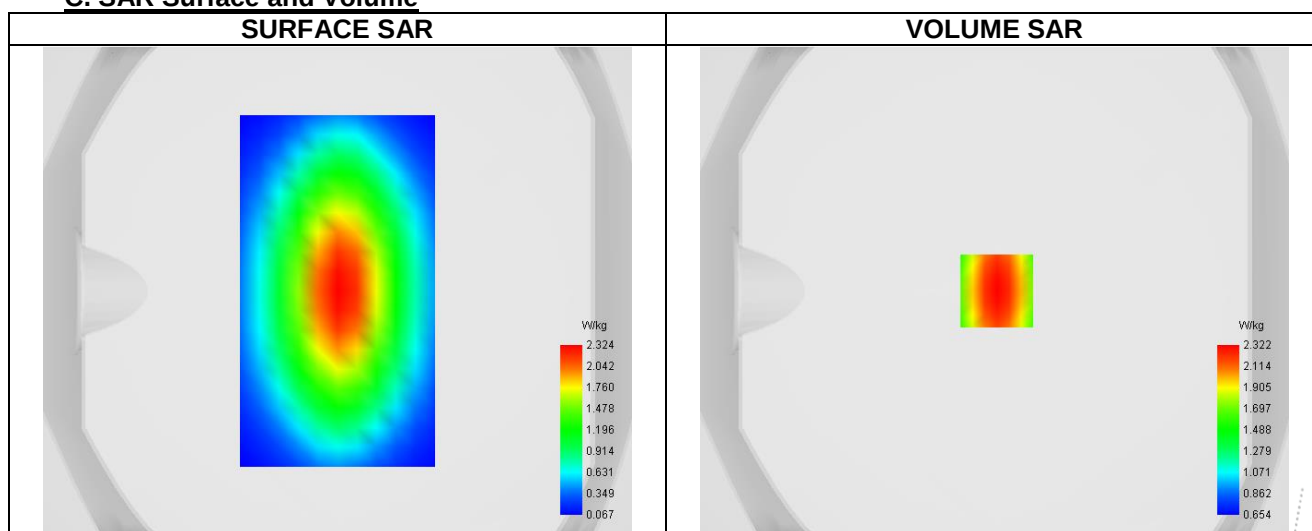
A. Experimental conditions.

Probe	SN 26/23 EPGO420
ConvF	0.81
Area Scan	surf_sam_plan.txt
Zoom Scan	7x7x8,dx=5mm dy=5mm dz=4mm
Phantom	Validation plane
Device Position	Dipole
Band	CW835
Channels	Middle
Signal	CW (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	835.000
Relative permittivity (real part)	40.608
Relative permittivity (imaginary part)	20.910
Conductivity (S/m)	0.868

C. SAR Surface and Volume



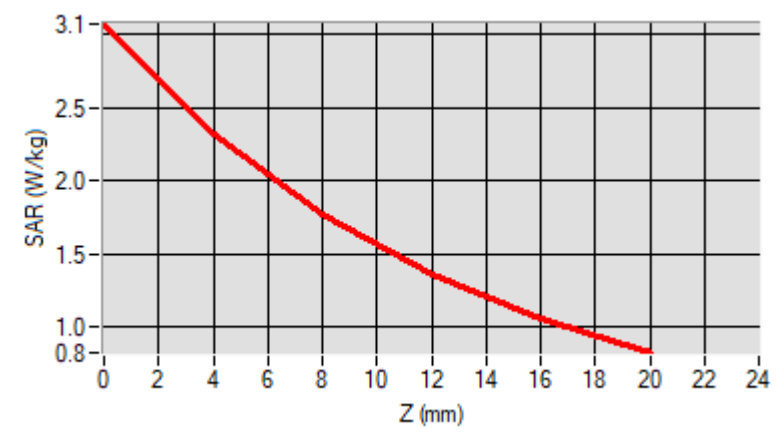
Maximum location: X=1.00, Y=0.00 ; SAR Peak: 5.68 W/kg

D. SAR 1g & 10g

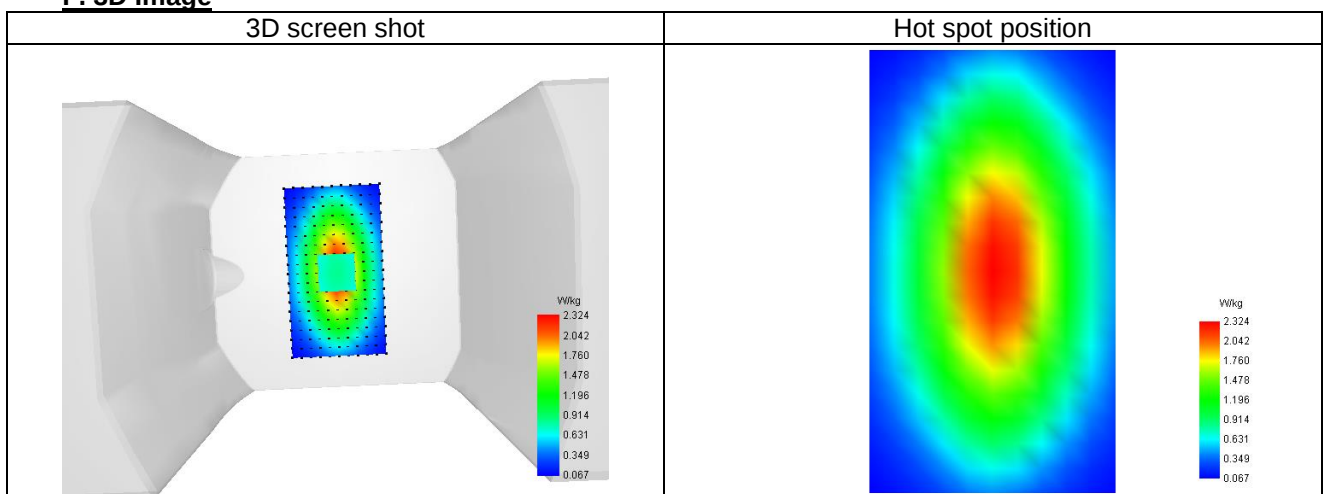
SAR 10g (W/Kg)	1750
SAR 1g (W/Kg)	2.422
Variation (%)	-3.055
Horizontal validation criteria: minimum distance (mm)	0.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	0.000000

E. Z Axis Scan

Z (mm)	0.00	4.00	8.00	12.00	16.00
SAR (W/Kg)	3.108	2.344	1.786	1.395	1.109



F. 3D Image



System check at 1800 MHz

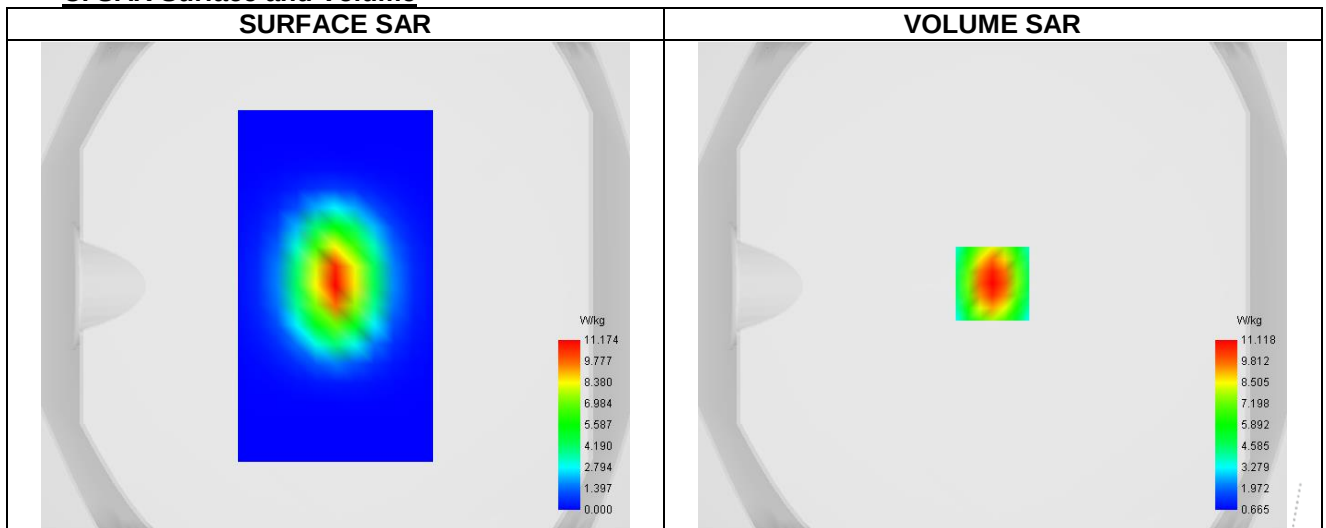
A. Experimental conditions.

Probe	SN 26/23 EPGO420
ConvF	0.96
Area Scan	surf_sam_plan.txt
Zoom Scan	7x7x8,dx=5mm dy=5mm dz=4mm
Phantom	Validation plane
Device Position	Dipole
Band	CW1800
Channels	Middle
Signal	CW (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	1800.000
Relative permittivity (real part)	38.656
Relative permittivity (imaginary part)	15.186
Conductivity (S/m)	1.446

C. SAR Surface and Volume



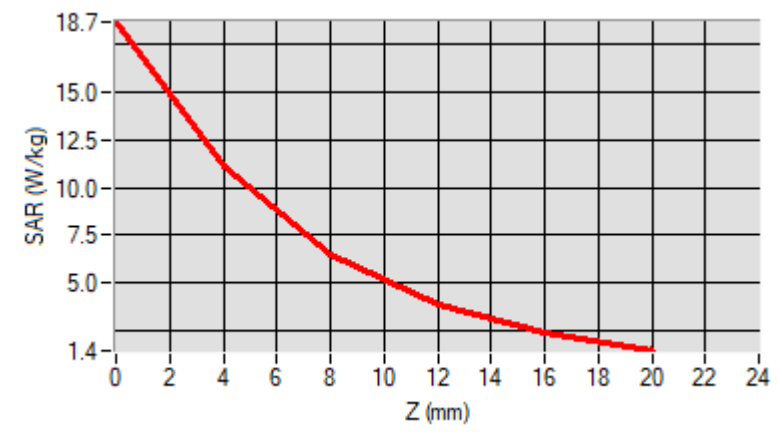
Maximum location: X=0.00, Y=1.00 ; SAR Peak: 22.78 W/kg

D. SAR 1g & 10g

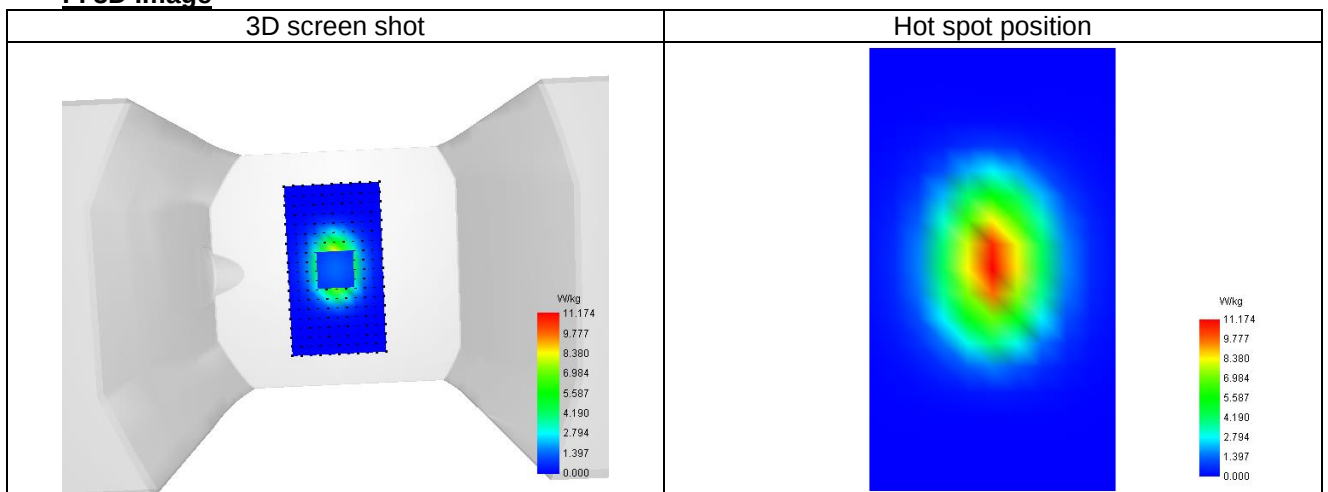
SAR 10g (W/Kg)	4.591
SAR 1g (W/Kg)	10.005
Variation (%)	2.444
Horizontal validation criteria: minimum distance (mm)	0.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	0.000000

E. Z Axis Scan

Z (mm)	0.00	4.00	8.00	12.00	16.00
SAR (W/Kg)	18.71+	11.234	6.561	3.924	2.453



F. 3D Image



System check at 1900 MHz

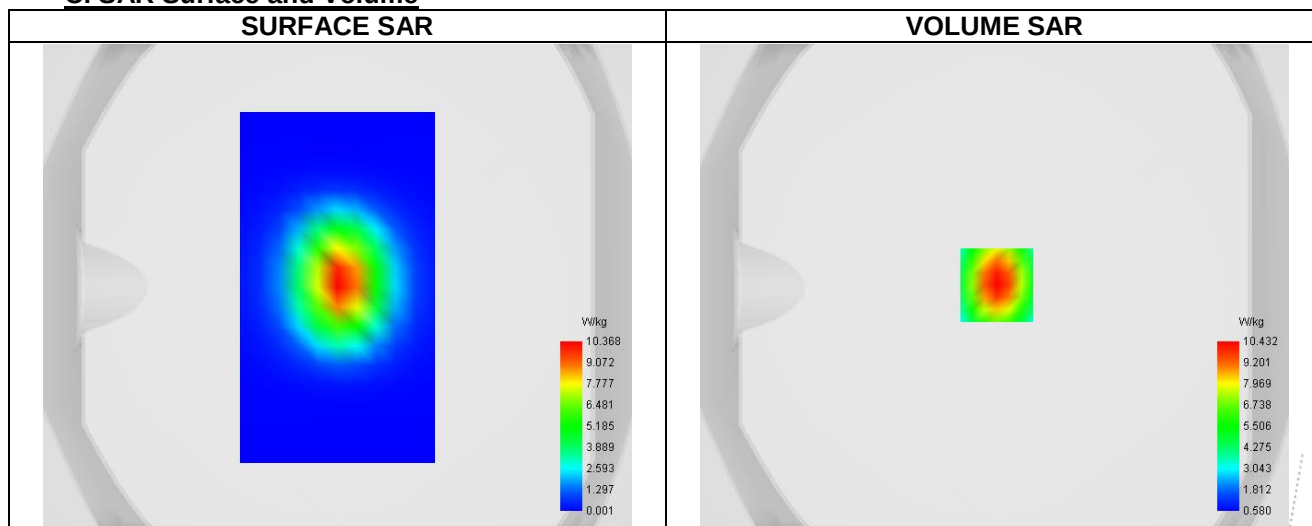
A. Experimental conditions.

Probe	SN 26/23 EPGO420
ConvF	1.04
Area Scan	surf_sam_plan.txt
Zoom Scan	7x7x8,dx=5mm dy=5mm dz=4mm
Phantom	Validation plane
Device Position	Dipole
Band	CW1900
Channels	Middle
Signal	CW (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	1900.000
Relative permittivity (real part)	39.083
Relative permittivity (imaginary part)	12.866
Conductivity (S/m)	1.369

C. SAR Surface and Volume



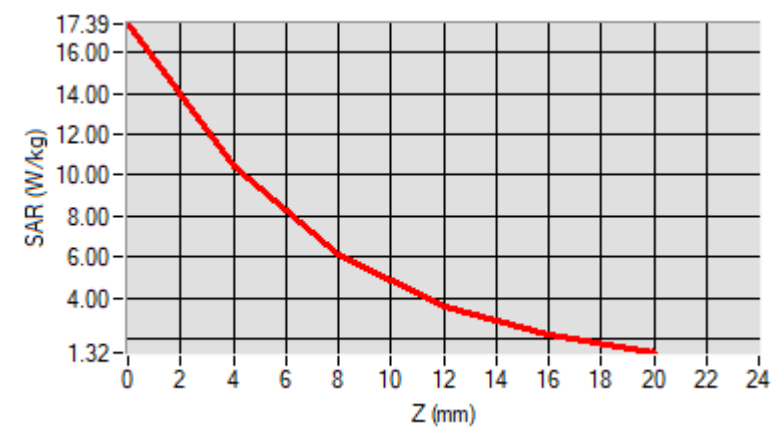
Maximum location: X=1.00, Y=1.00 ; SAR Peak: 22.54 W/kg

D. SAR 1g & 10g

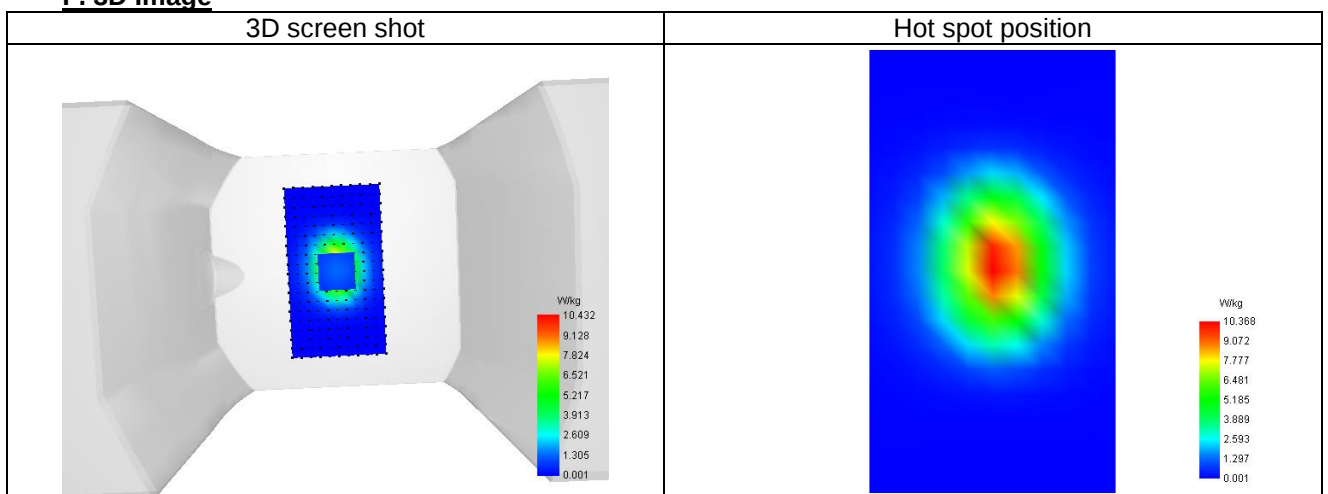
SAR 10g (W/Kg)	4.834
SAR 1g (W/Kg)	10.592
Variation (%)	1.624
Horizontal validation criteria: minimum distance (mm)	0.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	0.000000

E. Z Axis Scan

Z (mm)	0.00	4.00	8.00	12.00	16.00
SAR (W/Kg)	17.387	10.484	6.206	3.672	2.184



F. 3D Image



System check at 2450 MHz

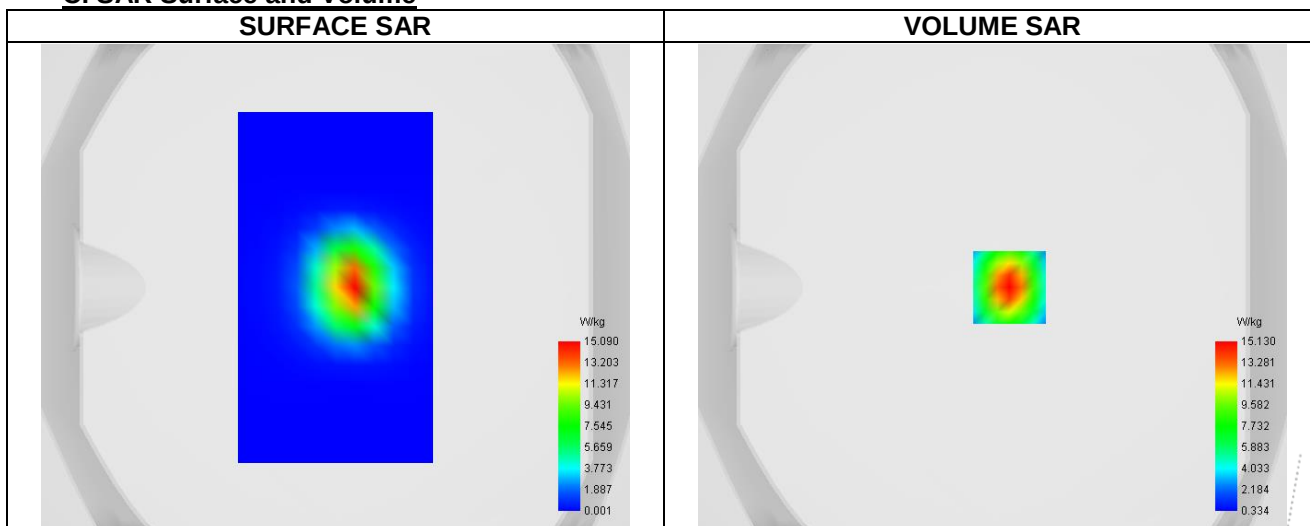
A. Experimental conditions.

Probe	SN 26/23 EPGO420
ConvF	1.11
Area Scan	surf_sam_plan.txt
Zoom Scan	7x7x8,dx=5mm dy=5mm dz=4mm
Phantom	Validation plane
Device Position	Dipole
Band	CW2450
Channels	Middle
Signal	CW (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	2450.000
Relative permittivity (real part)	40.006
Relative permittivity (imaginary part)	13.242
Conductivity (S/m)	1.789

C. SAR Surface and Volume



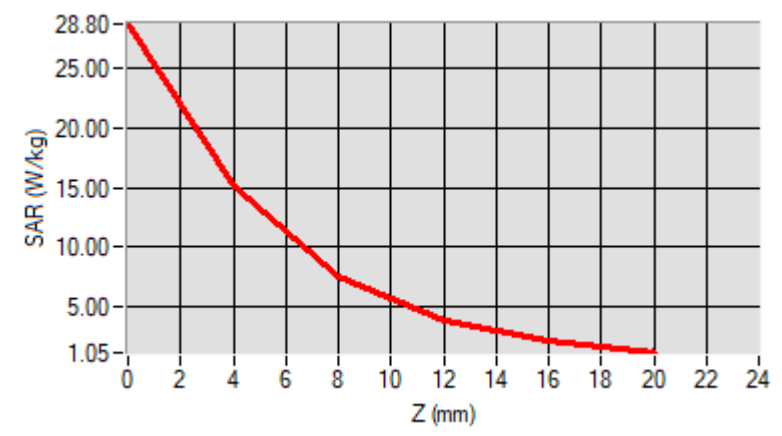
Maximum location: X=7.00, Y=0.00 ; SAR Peak: 29.42 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	5.330
SAR 1g (W/Kg)	13.399
Variation (%)	-0.869
Horizontal validation criteria: minimum distance (mm)	0.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	0.000000

E. Z Axis Scan

Z (mm)	0.00	4.00	8.00	12.00	16.00
SAR (W/Kg)	28.802	15.018	7.416	3.658	1.912



F. 3D Image

