FCC SAR TEST REPORT

Application No.:	KSCR2112000375AT
FCC ID:	2A6NLGT500AF
Applicant:	GT500AF USA INC.
Address of Applicant:	8000 Warren Parkway,suite 100,Frisco,TX,75034
Manufacturer:	GT500AF INTERNATIONAL TRADING Ltd.
Address of Manufacturer:	Flat-B 8/F Chong Gming Building 72 Cheung Sha Wan Road,Koowloon,Hong Kong
Factory:	GT500AF INTERNATIONAL TRADING Ltd.
Address of Factory:	Flat-B 8/F Chong Gming Building 72 Cheung Sha Wan Road,Koowloon,Hong Kong
Product Name:	LTE MiFi
Model No.(EUT):	GT500AF
Trade mark:	Getcom.AI
Standard(s) :	FCC 47CFR §2.1093
Date of Receipt:	2021-12-20
Date of Test:	2022-01-08 to 2022-01-08; 2022-03-17 to 2022-03-18
Date of Issue:	2022-03-27
Test Result:	**Pass***

* In the configuration tested, the EUT complied with the standards specified above.

Eric Lin

Laboratory Manager

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REVISION HISTORY

Revision Record			
Version	**Description**	**Date**	**Remark**
00	Original	2022-03-27	/

Authorized for issue by:				
		Richard. Kong **Richard.Kong/ Project Engineer**		
		Eric Lin **Eric.Lin/Reviewer**		

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TEST SUMMARY

Frequency Band	Maximum Reported SAR(W/kg) 1-g
	Body
WI-FI (2.4GHz)	0.02
WI-FI (5GHz)	0.23
WCDMA Band II	0.44
WCDMA Band IV	0.33
WCDMA Band V	0.19
LTE Band 2	0.43
LTE Band 4	0.36
LTE Band 5	0.30
LTE Band 12	0.20
LTE Band 13	0.21
LTE Band 14	0.16
LTE Band 66	0.16
LTE Band 71	0.15
SAR Limited(W/kg)	1.6
Maximum Simultaneous Transmission SAR (W/kg) 1-g	
Scenario	Body
Sum SAR	0.49
SPLSR	/
SPLSR Limited	0.04

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1 General Information

1.1 General Description of EUT

Device Type :	Portable device			
Exposure Category:	uncontrolled environment / general population			
Product Phase:	Production unit			
SN:	8719326299754			
Hardware Version:	GT500AF-H2			
Software Version:	GT500AF-V1.2			
Antenna Type:	FPC Antenna			
Antenna Gain:	WiFi Antenna	Band	Antenna 1	Antenna 2
		2.4G	0.70dBi	0.58dBi
		5G	1.94dBi	2.66dBi
	LTE/WCDMA	Band	Main Antenna	AUX Antenna
		B2/B4/66	3.51dBi	4.59
		B5	-3.27dBi	-1.86
		B12/B13/B14/B71	1.33dBi	0.27
Device Operating Configurations :				
Modulation Mode:	WCDMA: QPSK,16QAM(HSPA+);LTE:QPSK,16QAM; WIFI: CCK, DSSS, OFDM			
Power Class:	3,tested with power control “all 1”(WCDMA Band II/IV/V)			
	3, tested with power control Max Power(LTE Band 2/4/5/12/13/14/66/71)			
Frequency Bands:	Band	Tx (MHz)	Rx (MHz)	
	WCDMA Band II	1850-1910	1930-1990	
	WCDMA Band IV	1710-1755	2110- 2155	
	WCDMA Band V	824-849	869-894	
	LTE Band 2	1850-1910	1930-1990	
	LTE Band 4	1710-1755	2110- 2155	
	LTE Band 5	824-849	869-894	
	LTE Band 12	699-716	729-746	
	LTE Band 13	777-787	746-756	
	LTE Band 14	788-798	758-768	
	LTE Band 66	1710-1780	2110-2180	
	LTE Band 71	663-698	617-652	
	WIFI 2.4G	2412-2462	2412-2462	
	WIFI 5G	5745-5825	5745-5825	
Battery Information:	Model:	GT500AF-B01		
	Normal Voltage :	3.7V		
	Rated capacity :	2200mAh		
	Manufacturer:	Suzhou Story Network Technology Co., Ltd.		

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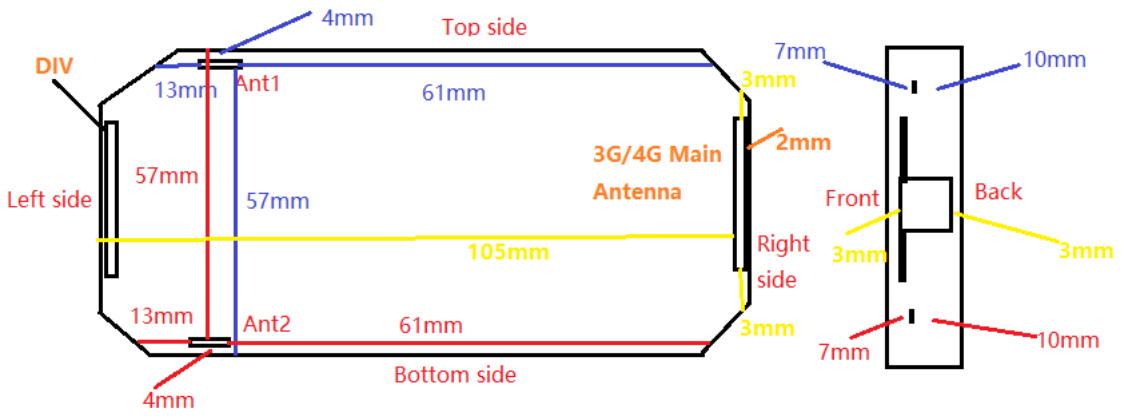
1.1.1 DUT Antenna Locations(Front View)



Note: The test device is an Hotspot device. The display diagonal dimension is 52.0mm and the overall diagonal dimension of this device is 123.0mm.

length and width=11.5cm*6.5cm

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1.2 Test Specification

Identity	Document Title
FCC 47CFR §2.1093	Radio frequency Radiation Exposure Evaluation: Portable Devices
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
IEEE 1528-2013	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
KDB 248227 D01 v02r02	SAR GUIDANCE FOR IEEE 802.11 (Wi-Fi) TRANSMITTERS
KDB447498 D04 v01	RF Exposure Procedures and Equipment Authorization Policies for Mobile and Portable Devices
KDB 865664 D01 v01r04	SAR Measurement Requirements for 100 MHz to 6 GHz
KDB 865664 D02 v01r02	RF Exposure Compliance Reporting and Documentation Considerations
KDB 941225 D01 v03r01	3G SAR MEAUREMENT PROCEDURES
KDB 941225 D05 v02r05	SAR EVALUATION CONSIDERATIONS FOR LTE DEVICES
KDB 941225 D06 v02r01	SAR EVALUATION PROCEDURES FOR PORTABLE DEVICES WITH WIRELESS ROUTER CAPABILITIES

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1.3 RF exposure limits

Human Exposure	Uncontrolled Environment General Population	Controlled Environment Occupational
Spatial Peak SAR* (Brain*Trunk)	1.60 W/kg	8.00 W/kg
Spatial Average SAR** (Whole Body)	0.08 W/kg	0.40 W/kg
Spatial Peak SAR*** (Hands/Feet/Ankle/Wrist)	4.00 W/kg	20.00 W/kg

Notes:

* The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time

** The Spatial Average value of the SAR averaged over the whole body.

*** The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

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

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

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1.4 Test Location

Company:	Compliance Certification Services (Kunshan) Inc.
Address:	No.10 Weiye Rd., Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China
Post code:	215300
Telephone:	86-512-57355888
Fax:	86-512-57370818

1.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L4354)**

CNAS has accredited Compliance Certification Services (Kunshan) Inc. to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **A2LA (Certificate No. 2541.01)**

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

- **FCC –Designation Number: CN1172**

Compliance Certification Services (Kunshan) Inc. has been recognized as an accredited testing laboratory.

Designation Number: CN1172.

- **ISED (CAB identifier: CN0072)**

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory

CAB Identifier: CN0072.

- **VCCI (Member No.: 1938)**

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: : R-20134, R-11600,C-11707, T-11499, G-10216 respectively.

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2 Laboratory Environment

Temperature	Min. = 18°C, Max. = 25 °C
Relative humidity	Min. = 30%, Max. = 70%
Ground system resistance	< 0.5 Ω
Ambient noise is checked and found very low and in compliance with requirement of standards. Reflection of surrounding objects is minimized and in compliance with requirement of standards.	

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3 SAR Measurements System Configuration

3.1 The SAR Measurement System

This SAR Measurement System uses a Computer-controlled 3-D stepper motor system (SPEAG DASY5 professional system). A E-field probe is used to determine the internal electric fields. The SAR can be obtained from the equation SAR= σ (|Ei|2)/ ρ where σ and ρ are the conductivity and mass density of the tissue-Simulate.

The DASY5 system for performing compliance tests consists of the following items:

A standard high precision 6-axis robot (Stabile RX family) with controller, teach pendant and software .An arm extension for accommodation the data acquisition electronics (DAE).

A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.

A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.

The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.

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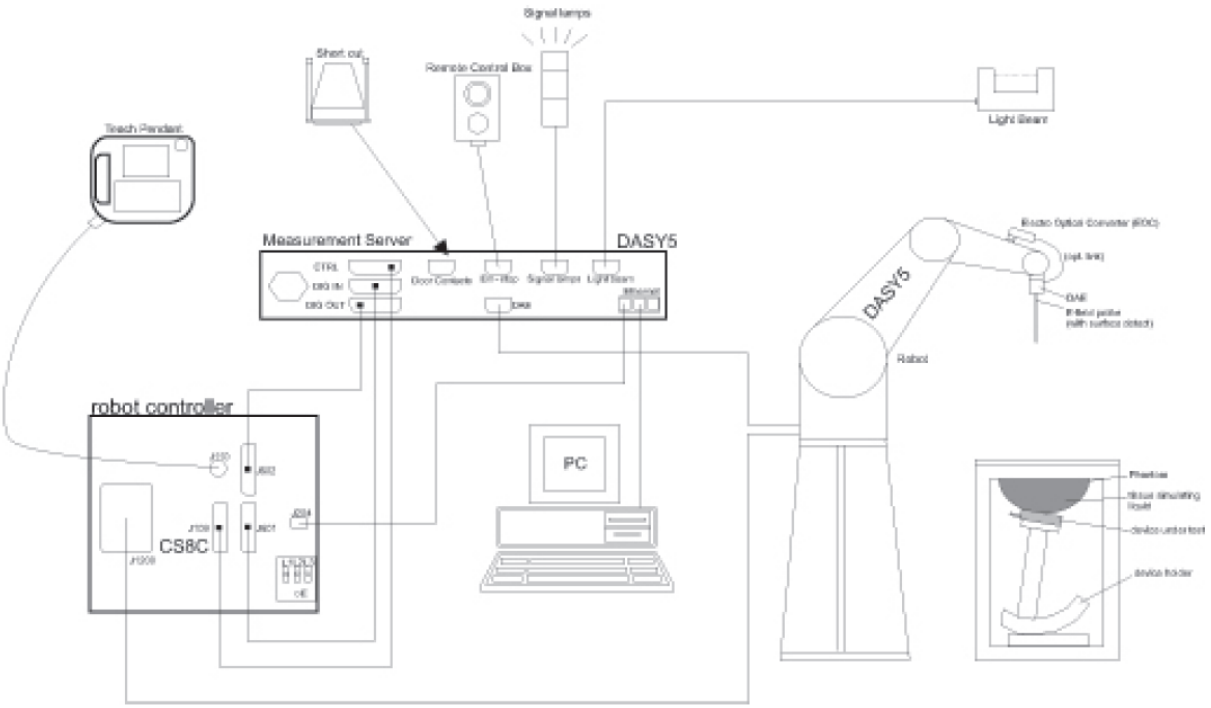

F-1. SAR Measurement System Configuration

- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows 7.
- DASY5 software.
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom enabling testing left-hand, right-hand and Body Worn usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- Validation dipole kits allowing to validat the proper functioning of the system.

3.2 Isotropic E-field Probe EX3DV4

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	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available.
Frequency	10 MHz to > 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in TSL (rotation around probe axis) ± 0.5 dB in TSL (rotation normal to probe axis)
Dynamic Range	10 µW/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 µW/g)
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields); the only probe that enables compliance testing for frequencies up to 6 GHz with precision of better 30%.
Compatibility	DASY3, DASY4, DASY52 SAR and higher, EASY4/MRI

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3.3 Data Acquisition Electronics (DAE)

Model	DAE4	
Construction	Signal amplifier, multiplexer, A/D converter and control logic. Serial optical link for communication with DASY4/5 embedded system (fully remote controlled). Two step probe touch detector for mechanical surface detection and emergency robot stop.	
Measurement Range	-100 to +300 mV (16 bit resolution and two range settings: 4mV,400mV)	
Input Offset Voltage	< 5μV (with auto zero)	
Input Bias Current	< 50 f A	
Dimensions	60 x 60 x 68 mm	

3.4 SAM Twin Phantom

Material	Vinylester, glass fiber reinforced (VE-GF)	
Liquid Compatibility	Compatible with all SPEAG tissue simulating liquids (incl. DGBE type)	
Shell Thickness	2 ± 0.2 mm (6 ± 0.2 mm at ear point)	
Dimensions **(incl. Wooden Support)**	Length: 1000 mm Width: 500 mm Height: adjustable feet	
Filling Volume	approx. 25 liters	
Wooden Support	SPEAG standard phantom table	

The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 and IEC 62209-1. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot.

Twin SAM V5.0 has the same shell geometry and is manufactured from the same material as Twin SAM V4.0, but has reinforced top structure.

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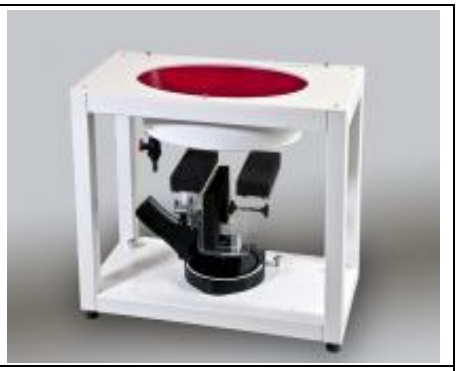
3.5 ELI Phantom

Material	Vinylester, glass fiber reinforced (VE-GF)	
Liquid Compatibility	Compatible with all SPEAG tissue simulating liquids (incl. DGBE type)	
Shell Thickness	2.0 ± 0.2 mm (bottom plate)	
Dimensions	Major axis: 600 mm Minor axis: 400 mm	
Filling Volume	approx. 30 liters	
Wooden Support	SPEAG standard phantom table	

Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles.

ELI V5.0 has the same shell geometry and is manufactured from the same material as ELI4, but has reinforced top structure.

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3.6 Device Holder for Transmitters

F-2. **Device Holder for Transmitters**

- The DASY device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation centres for both scales are the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.

- The DASY device holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity ε=3 and loss tangent δ=0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

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3.7 Measurement procedure

3.7.1 Scanning procedure

Step 1: Power reference measurement

The “reference” and “drift” measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure.

Step 2: *Area scan*

The SAR distribution at the exposed side of the head was measured at a distance of 4mm from the inner surface of the shell. The area covered the entire dimension of the head and the horizontal grid spacing was 15mm*15mm or 12mm*12mm or 10mm*10mm.Based on the area scan data, the area of the maximum absorption was determined by spline interpolation.

Step 3: *Zoom scan*

Around this point, a volume of 30mm*30mm*30mm (fine resolution volume scan, zoom scan) was assessed by measuring 5x5x7 points (≤2GHz) and 7x7x7 points (≥2GHz). On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:

The data at the surface was extrapolated, since the centre of the dipoles is 2.0mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.2mm. (This can be variable. Refer to the probe specification).The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip. The maximum interpolated value was searched with a straight-forward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1g or 10g) were computed using the 3D-Spline interpolation algorithm. The volume was integrated with the trapezoidal algorithm. One thousand points were interpolated to calculate the average. All neighbouring volumes were evaluated until no neighboring volume with a higher average value was found.

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

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			≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location			30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}			≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
			When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.

* When zoom scan is required and the *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

Step 4: Power reference measurement (drift)

The Power Drift Measurement job measures the field at the same location as the most recent power reference measurement job within the same procedure, and with the same settings. The indicated drift is mainly the variation of the DUT's output power and should vary max. ± 5 %

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3.7.2 Data Storage

The DASY software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension ".DAE3". The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated. The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [m W/g], [m W/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

3.7.3 Data Evaluation by SEMCAD

The SEMCAD software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

Probe parameters: - Sensitivity Normi, ai0, ai1, ai2
- Conversion factor ConvFi
- Diode compression point Dcpi
Device parameters: - Frequency f
- Crest factor cf
Media parameters: - Conductivity ε
- Density ρ

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY components. In the direct measuring mode of the multimeter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics.

If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

$$V_i = U_i + U_i^2 \cdot cf / dcp_i$$

With Vi = compensated signal of channel i (i = x, y, z)
Ui = input signal of channel i (i = x, y, z)

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cf = crest factor of exciting field (DASY parameter)
dcp i = diode compression point (DASY parameter)

From the compensated input signals the primary field data for each channel can be evaluated:

E-field probes:

$$E_i = (V_i / Norm_i \cdot ConvF)^{1/2}$$

H-field probes:

$$H_i = (V_i)^{1/2} \cdot (a_{i0} + a_{i1} f + a_{i2} f^2) / f$$

With Vi = compensated signal of channel i (i = x, y, z)
Normi = sensor sensitivity of channel I (i = x, y, z)
[mV/(V/m)2] for E-field Probes
ConvF = sensitivity enhancement in solution
aij = sensor sensitivity factors for H-field probes
f = carrier frequency [GHz]
Ei = electric field strength of channel i in V/m
Hi = magnetic field strength of channel i in A/m

The RSS value of the field components gives the total field strength (Hermitian magnitude):

$$E_{tot} = (E_x^2 + E_Y^2 + E_z^2)^{1/2}$$

The primary field data are used to calculate the derived field units.

$$SAR = (Etot^2 \cdot \sigma) / (\varepsilon \cdot 1000)$$

With SAR = local specific absorption rate in mW/g
Etot = total field strength in V/m
σ= conductivity in [mho/m] or [Siemens/m]
ε= equivalent tissue density in g/cm3

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid. The power flow density is calculated assuming the excitation field to be a free space field.

$$P_{pwe} = E_{tot}^2{}_2 / 3770 \quad \text{or} \quad P_{pwe} = H_{tot}^2 \cdot 37.7$$

with Ppwe = equivalent power density of a plane wave in mW/cm2
Etot = total electric field strength in V/m
Htot = total magnetic field strength in A/m

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4 SAR measurement variability and uncertainty

4.1 SAR measurement variability

Per KDB865664 D01 SAR measurement 100 MHz to 6 GHz v01r04, SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. The additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.

2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.

3) 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 (~ 10% from the 1-g SAR limit).

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.

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.

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4.2 SAR measurement uncertainty

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

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5 Description of Test Position

5.1 The Body Test Position

A hotspot mode enabled device can provide wireless internet access to nearby Wi-Fi devices by routing the traffic through an available WWAN connection. This is different from the Wi-Fi access point hotspots that route Wi-Fi traffic through wired connections. The Wi-Fi and WWAN transmitters used for hotspot mode are usually built-in within the device, such as battery-operated personal wireless routers and wireless handsets.

The SAR test separation distance for hotspot mode is determined according to device form factor. When the overall length and width of a device is > 9 cm x 5 cm (~3.5” x 2”), a test separation distance of 10 mm is required for hotspot mode SAR measurements. A test separation distance of 5 mm or less is required for smaller devices. The smaller test distance is established by the operating configurations and exposure conditions of a device in next to body use configurations. The combination of test distance and 1-g SAR measurements required for near-body exposure also supports hand-held exposure; therefore, separate 10-g extremity SAR evaluation is not necessary.

The surface of the generic device (or the surface of the carry accessory holding the DUT) pointing towards the flat phantom shall be parallel to the surface of the phantom.

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6 SAR System Verification Procedure

6.1 Tissue Simulate Liquid

6.1.1 Recipes for Tissue Simulate Liquid

The bellowing tables give the recipes for tissue simulating liquids to be used in different frequency bands：

Ingredients (% by weight)	Frequency (MHz)									
	450		835		915		1900		2450	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	38.56	51.16	41.45	52.4	41.05	56.0	54.9	40.4	62.7	73.2
Salt (NaCl)	3.95	1.49	1.45	1.4	1.35	0.76	0.18	0.5	0.5	0.04
Sugar	56.32	46.78	56.0	45.0	56.5	41.76	0.0	58.0	0.0	0.0
HEC	0.98	0.52	1.0	1.0	1.0	1.21	0.0	1.0	0.0	0.0
Bactericide	0.19	0.05	0.1	0.1	0.1	0.27	0.0	0.1	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.8	0.0
DGBE	0.0	0.0	0.0	0.0	0.0	0.0	44.92	0.0	0.0	26.7
Dielectric Constant	43.42	58.0	42.54	56.1	42.0	56.8	39.9	54.0	39.8	52.5
Conductivity (S/m)	0.85	0.83	0.91	0.95	1.0	1.07	1.42	1.45	1.88	1.78
HSL5GHz is composed of the following ingredients： Water：50-65% Mineral oil：10-30% Emulsifiers：8-25% Sodium salt：0-1.5%										
MSL5GHz is composed of the following ingredients： Water：64-78% Mineral oil：11-18% Emulsifiers：9-15% Sodium salt：2-3%										

Table 1： Recipe of Tissue Simulate Liquid

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6.1.2 Test Liquids Confirmation

Simulated tissue liquid parameter confirmation

The dielectric parameters were checked prior to assessment using the SPEAG DAK3.5 dielectric probe kit. The dielectric parameters measured are reported in each correspondent section.

IEEE SCC-34/SC-2 P1528 recommended tissue dielectric parameters

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 and extrapolated according to the head parameters specified in P1528

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

(ε_r = relative permittivity, σ = conductivity and ρ = 1000 kg/m^3)

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6.1.3 Measurement for Tissue Simulate Liquid

The dielectric properties for this Tissue Simulate Liquids were measured by using the SPEAG DAK3.5 dielectric probe kit in conjunction with Agilent E5071B Network Analyzer (300 KHz-8500 MHz). The Conductivity (σ) and Permittivity (ρ) are listed in bellow table. For the SAR measurement given in this report. The temperature variation of the Tissue Simulate Liquids was 22±2°C.

Tissue Type	Measured Frequency (MHz)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Liquid Temp. (℃)	Date
2450 Head	2450	1.782	39.422	1.80	39.20	-1.00	0.57	±5	22.1	2022/01/08
5750 Head	5750	5.315	34.649	5.22	35.35	1.82	-1.98	±5	22.0	2022/01/08
750 Head	750	0.879	42.786	0.89	41.90	-1.24	2.11	±5	22.1	2022/03/17
835 Head	835	0.909	40.668	0.90	41.50	1.00	-2.00	±5	22.1	2022/03/17
1800 Head	1800	1.348	38.467	1.40	40.00	-3.71	-3.83	±5	22.2	2022/03/17
1900 Head	1900	1.414	40.568	1.40	40.00	1.00	1.42	±5	22.1	2022/03/18

6.2 SAR System Check

The microwave circuit arrangement for system check is sketched in bellow figure. The daily system accuracy verification occurs within the flat section of the SAM phantom. A SAR measurement was performed to see if the measured SAR was within +/- 10% from the target SAR values. The tests were conducted on the same days as the measurement of the EUT. The obtained results from the system accuracy verification are displayed in the following table. During the tests, the ambient temperature of the laboratory was in the range 22±2°C, the relative humidity was in the range 60% and the liquid depth above the ear reference points was above 15 cm in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.

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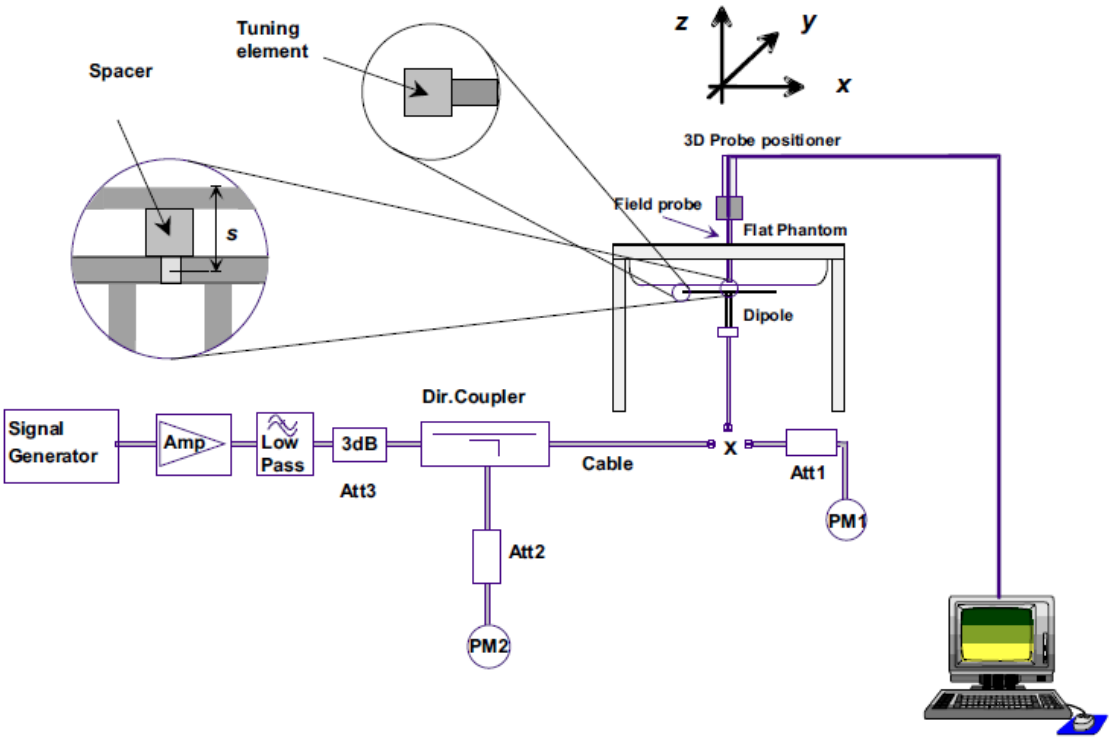

F-3. the microwave circuit arrangement used for SAR system verification

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6.2.1 Justification for Extended SAR Dipole Calibrations

1) Referring to KDB865664 D01 requirements for dipole calibration, instead of the typical annual calibration recommended by measurement standards, longer calibration intervals of up to three years may be considered when it is demonstrated that the SAR target, impedance and return loss of a dipole have remain stable according to the following requirements. Each measured dipole is expected to evaluate with the following criteria at least on annual interval in Appendix C.

a) There is no physical damage on the dipole;

b) System check with specific dipole is within 10% of calibrated value;

c) Return-loss is within 10% of calibrated measurement;

d) Impedance is within 5Ω from the previous measurement.

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

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6.2.2 Summary System Check Result(s)

Validation Kit		Measured SAR 250mW	Measured SAR 250mW	Measured SAR (normalized to 1w)	Measured SAR (normalized to 1w)	Target SAR (normalized to 1w) (±10%)	Target SAR (normalized to 1w) (±10%)	Liquid Temp. (℃)	Measured Date
		1g (W/kg)	10g (W/kg)	1g (W/kg)	10g (W/kg)	1-g(W/kg)	10-g(W/kg)		
D2450V2	Head	13.1	6.03	52.4	24.12	53 (47.70~58.30)	24.6 (22.14~27.60)	22.1	2022/1/8
D750V2	Head	2.22	1.47	8.88	5.88	8.58 (7.72~9.44)	5.59 (5.03~6.15)	22.1	2022/3/17
D835V2	Head	2.38	1.53	9.52	6.12	9.41 (8.47~10.35)	6.25 (5.63~6.88)	22.1	2022/3/17
D1800V2	Head	9.34	4.83	37.36	19.32	38.4 (34.56~42.24)	20.2 (18.18~22.22)	22.2	2022/3/17
D1900V2	Head	9.52	4.95	38.08	19.8	39.7 (35.73~43.67)	20.5 (18.45~22.55)	22.3	2022/3/18
Validation Kit		**Measured SAR 100mW**	**Measured SAR 100mW**	**Measured SAR (normalized to 1w)**	**Measured SAR (normalized to 1w)**	**Target SAR (normalized to 1w) (±10%)**	**Target SAR (normalized to 1w) (±10%)**	**Liquid Temp. (℃)**	**Measured Date**
		1g (W/kg)	**10g (W/kg)**	**1g (W/kg)**	**10g (W/kg)**	**1-g(W/kg)**	**10-g(W/kg)**		
D5GV2	Head 5.75G	7.96	2.28	79.6	22.8	78.9 (71.01~86.79)	22.7 (20.43~24.97)	22.1	2022/1/8

6.2.3 Detailed System Check Results

Please see the Appendix A

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6.2.4 System Valitation

Per FCC KDB 865664 D02, SAR system verification is required to confirm measurement accuracy. The SAR systems (including SAR probes, system components and software versions) used for this device were validated against its performance specifications prior to the SAR measurements. Reference dipoles are used with the required tissue-equivalent media for system validation, according to the procedures outlined in FCC KDB 865664 D01 and IEEE 1528-2013.Since SAR probe calibrations are frequency dependent, each probe calibration point must be validated at a frequency within the valid frequency range of the probe calibration point, using the system that normally operates with the probe for routine SAR measurements and according to the required tissue-equivalent media.

a tabulated summary of the system validation status, measurement frequencies, SAR probes, calibrated signal type(s) and tissue dielectric parameters has been included.

Table of SAR System validation summary:

Frequency (MHz)	Date	Probe SN	Probe Type	Probe CAL Point		PERM (εr)	COND (σ)	CW Validation			MOD.Validation		
								Sensitivity	Probe Linarity	Probe Isotropy	Modulation	Duty. Factore	PAR
750	2021/7/14	3798	EX3DV4	750	Head	41.66	0.89	PASS	PASS	PASS	N/A	N/A	N/A
835	2021/7/14	3798	EX3DV4	835	Head	42.11	0.91	PASS	PASS	PASS	GMSK	PASS	N/A
1800	2021/7/14	3798	EX3DV4	1750	Head	40.20	1.39	PASS	PASS	PASS	N/A	N/A	N/A
1900	2021/7/14	3798	EX3DV4	1900	Head	40.58	1.37	PASS	PASS	PASS	GMSK	PASS	N/A
2450	2021/7/14	3798	EX3DV4	2450	Head	40.16	1.83	PASS	PASS	PASS	OFDM	PASS	N/A
2600	2021/7/14	3798	EX3DV4	2600	Head	38.59	1.98	PASS	PASS	PASS	TDD	PASS	N/A
5250	2021/7/14	3798	EX3DV4	5250	Head	36.01	4.72	PASS	PASS	PASS	OFDM	PASS	N/A
5600	2021/7/14	3798	EX3DV4	5600	Head	35.06	5.11	PASS	PASS	PASS	OFDM	PASS	N/A
5750	2021/7/14	3798	EX3DV4	5750	Head	34.70	5.28	PASS	PASS	PASS	OFDM	PASS	N/A

NOTE: While the probes have been calibrated for both CW and modulated signals, all measurements were performed using communication systems calibrated for CW signals only. Modulations in the table above represent test configurations for which the measurement system has been validated per FCC KDB Publication 865664D01 for scenarios when CW probe calibrations are used with other signal types. SAR systems were validated for modulated signals with a periodic duty cycle, such as GMSK, or with a high peak to average ratio (>5dB), such as OFDM according to KDB 865664.

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7 Test Configuration

7.1 Operation Configurations

7.1.1 WCDMA Test Configuration

1）. Output Power Verification

Maximum output power is verified on the high, middle and low channels according to procedures described in section 5.2 of 3GPP TS 34.121, using the appropriate RMC or AMR with TPC (transmit power control) set to all "1's" for WCDMA/HSDPA or by applying the required inner loop power control procedures to maintain maximum output power while HSUPA is active. Results for all applicable physical channel configurations (DPCCH, DPDCHn and spreading codes, HSDPA, HSPA) are required in the SAR report. All configurations that are not supported by the handset or cannot be measured due to technical or equipment limitations must be clearly identified.

2）. Head SAR

SAR for next to the ear head exposure is measured using a 12.2 kbps RMC with TPC bits configured to all "1's". The 3G SAR test reduction procedure is applied to AMR configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for 12.2 kbps AMR in 3.4 kbps SRB (signaling radio bearer) using the highest reported SAR configuration in 12.2 kbps RMC for head exposure

3）. Body SAR

SAR for body configurations is measured using a 12.2 kbps RMC with TPC bits configured to all "1's". The 3G SAR test reduction procedure is applied to other spreading codes and multiple DPDCHn configurations supported by the handset with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured using an applicable RMC configuration with the corresponding spreaing code or DPDCHn, for the highest reported body-worn accessory exposure SAR configuration in 12.2 kbps RMC. When more than 2 DPDCHn are supported by the handset, it may be necessary to configure additional DPDCHn using FTM (Factory Test Mode) or other chipset based test approaches with parameters similar to those used in 384 kbps and 768 kbps RMC.

4）. HSDPA / HSUPA / DC-HSDPA

RMC 12.2kbps setting is used to evaluate SAR. If the maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA is ≤ ¼ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA

a) HSDPA

HSDPA is configured according to the applicable UE category of a test device. The number of HS-DSCH/HS-PDSCHs, HARQ processes, minimum inter-TTI interval, transport block sizes and RV coding sequence are defined by the H-set. To maintain a consistent test configuration and stable transmission conditions, QPSK is used in the H-set for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 4 ms and a CQI repetition factor of 2 to maintain a constant rate of active CQI slots. DPCCH and DPDCH gain factors(βc, βd), and HS-DPCCH power offset parameters (ΔACK, ΔNACK, ΔCQI) are set according to values indicated in

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the following table The CQI value is determined by the UE category, transport block size, number of HS-PDSCHs and modulation used in the H-set.

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Sub-test	βc	Bd	βd(SF)	βc/βd	βhs	CM(dB)	MPR (dB)
1	2/15	15/15	64	2/15	4/15	0.0	0
2	12/15(3)	15/15(3)	64	12/15(3)	24/15	1.0	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

Note1: △ACK, △NACK and △CQI= 8 Ahs = βhs/βc=30/15 βhs=30/15*βc

Note2: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 5.13.1.A,and HSDPA EVM with phase discontinuity in clause 5.13.1AA, △ACK and △NACK= 8 (Ahs=30/15) with βhs=30/15*βc,and △CQI= 7 (Ahs=24/15) with βhs=24/15*βc.

Note3: CM=1 forβc/βd =12/15, βhs/βc=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.

The measurements were performed with a Fixed Reference Channel (FRC) and H-Set 1 QPSK.

Parameter	Value
Nominal average inf. bit rate	534 kbit/s
Inter-TTI Distance	3 TTI"s
Number of HARQ Processes	2 Processes
Information Bit Payload	3202 Bits
MAC-d PDU size	336 Bits
Number Code Blocks	1 Block
Binary Channel Bits Per TTI	4800 Bits
Total Available SMLs in UE	19200 SMLs
Number of SMLs per HARQ Process	9600 SMLs
Coding Rate	0.67
Number of Physical Channel Codes	5

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HS-DSCH Category	Maximum HS-DSCH Codes Received	Minimum Inter-TTI Interval	MaximumH S-DSCH Transport BlockBits/HS-DSCH TTI	Total Soft Channel Bits
1	5	3	7298	19200
2	5	3	7298	28800
3	5	2	7298	28800
4	5	2	7298	38400
5	5	1	7298	57600
6	5	1	7298	67200
7	10	1	14411	115200
8	10	1	14411	134400
9	15	1	25251	172800
10	15	1	27952	172800
11	5	2	3630	14400
12	5	1	3630	28800
13	15	1	34800	259200
14	15	1	42196	259200
15	15	1	23370	345600
16	15	1	27952	345600

b) HSUPA

Due to inner loop power control requirements in HSUPA, a commercial communication test set should be used for the output power and SAR tests. The 12.2 kbps RMC, FRC H-set 1 and E-DCH configurations for HSUPA should be configured according to the values indicated below as well as other applicable procedures described in the „WCDMA Handset" and „Release 5 HSUPA Data Device" sections of 3G device.

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

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

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

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

UE E-DCH Category	Maximum E-DCH Codes Transmitted	Number of HARQ Processes	E-DCH TTI(ms)	Minimum Speading Factor	Maximum E-DCH Transport Block Bits	Max Rate (Mbps)
1	1	4	10	4	7110	0.7296
2	2	8	2	4	2798	1.4592
	2	4	10	4	14484	
3	2	4	10	4	14484	1.4592
4	2	8	2	2	5772	2.9185
	2	4	10	2	20000	2.00
5	2	4	10	2	20000	2.00
6 (No DPDCH)	4	8	10	2SF2&2SF4	11484	5.76
	4	4	2		20000	2.00
7 (No DPDCH)	4	8	2	2SF2&2SF4	22996	?
	4	4	10		20000	?

NOTE: When 4 codes are transmitted in parallel, two codes shall be transmitted with SF2 and two with SF4.UE categories 1 to 6 support QPSK only. UE category 7 supports QPSK and 16QAM.(TS25.306-7.3.0).

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7.1.2 LTE Test Configuration

Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluating SAR. The R&S CMW500 was used for LTE output power measurements and SAR testing. Max power control was used so the UE transmits with maximum output power during SAR testing. SAR must be measured with the maximum TTI (transmit time interval) supported by the device in each LTE configuration.

TDD LTE test consideration

For Time-Division Duplex (TDD) systems, SAR must be tested using a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by the defined 3GPP LTE TDD configurations.

SAR was tested with the highest transmission duty factor (63.33%) using Uplink-downlink configuration 0 and Special subframe configuration 7.

LTE TDD Band support 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations and Table 4.2-1 for Special subframe configurations.

Frame structure type 2:

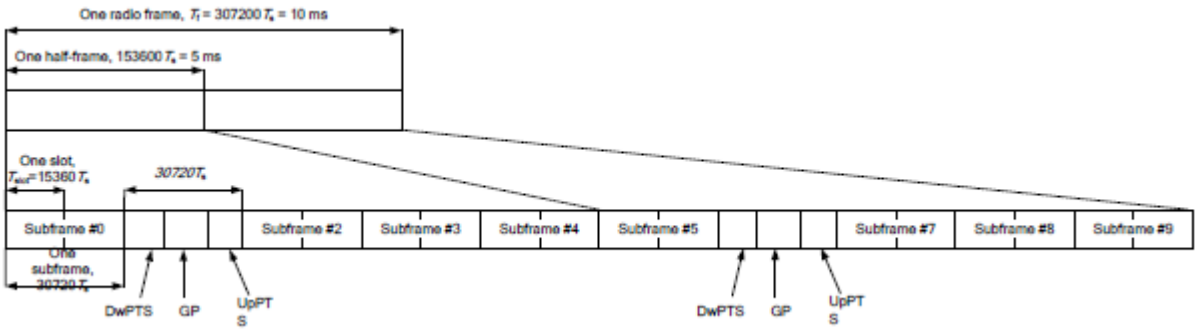

Table 4.2-1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS).

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

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Table 4.2-2: Uplink-downlink configurations.

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

Calculated Duty Cycle=[Extended cyclic prefix in uplink x (Ts) x # of S + # of U]/10ms

Uplink- Downlink Configuration	Downlink-to-Uplink Switch-point Periodicity	Subframe Number										Calculated Duty Cycle (%)
		0	1	2	3	4	5	6	7	8	9	
0	5 ms	D	S	U	U	U	D	S	U	U	U	63.33
1	5 ms	D	S	U	U	D	D	S	U	U	D	43.33
2	5 ms	D	S	U	D	D	D	S	U	D	D	23.33
3	10 ms	D	S	U	U	U	D	D	D	D	D	31.67
4	10 ms	D	S	U	U	D	D	D	D	D	D	21.67
5	10 ms	D	S	U	D	D	D	D	D	D	D	11.67
6	5 ms	D	S	U	U	U	D	S	U	U	D	53.33

A) Spectrum Plots for RB Configurations

A properly configured base station simulator was used for SAR tests and power measurements. Therefore, spectrum plots for RB configurations were not required to be included in this report.

B) MPR

MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.

Modulation	Channel bandwidth / Transmission bandwidth (N_{RB})						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

C) A-MPR

A-MPR (Additional MPR) has been disabled for all SAR tests by setting NS=01 on the base station simulator.

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D) Largest channel bandwidth standalone SAR test requirements

1) QPSK with 1 RB allocation

Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel. When the measured SAR is ≤ 1.0 W/kg, testing of the remaining RB offset configurations and required test channels is not required for 1 RB allocation; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel. When the measured SAR of a required test channel is > 1.80 W/kg, SAR is required for all three RB offset configurations for that required test channel.

2) QPSK with 50% RB allocation

For QPSK with 50% RB allocation, SAR is only required measure for the worst case of 1RB allocation used the highest maximum output power.

3) QPSK with 100% RB allocation

For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest measured SAR for 1 RB and 50% RB allocation in 1) and 2) are ≤ 1.0 W/kg. Otherwise, SAR is measured for the highest output power channel and if the measured SAR is > 1.80 W/kg, the remaining required test channels must also be tested.

4) Higher order modulations

For each modulation besides QPSK; e.g., 16-QAM, 64-QAM, apply the QPSK procedures in above sections to determine the QAM configurations that may need SAR measurement. For each configuration identified as required for testing, SAR is required only when the highest maximum output power for the configuration in the higher order modulation is > ½ dB higher than the same configuration in QPSK or when the measured SAR for the QPSK configuration is > 1.80 W/kg.

E) Other channel bandwidth standalone SAR test requirements

For the other channel bandwidths used by the device in a frequency band, apply all the procedures required for the largest channel bandwidth in section A) to determine the channels and RB configurations that need SAR testing and only measure SAR when the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is > ½ dB higher than the equivalent channel configurations in the largest channel bandwidth configuration or the measured SAR of a configuration for the largest channel bandwidth is > 1.80 W/kg.

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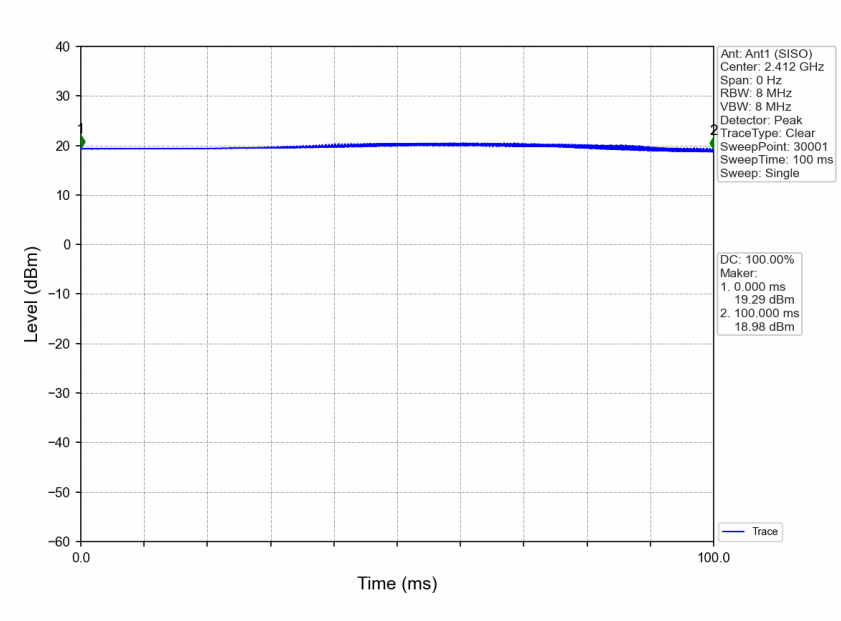
7.1.3 Wi-Fi Test Configuration

A Wi-Fi device must be configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools for SAR measurement.

7.1.3.1 Duty cycle

1) 2.4GHz Wi-Fi 802.11b:

WI-FI1 802.11b 11M: Duty cycle=100%



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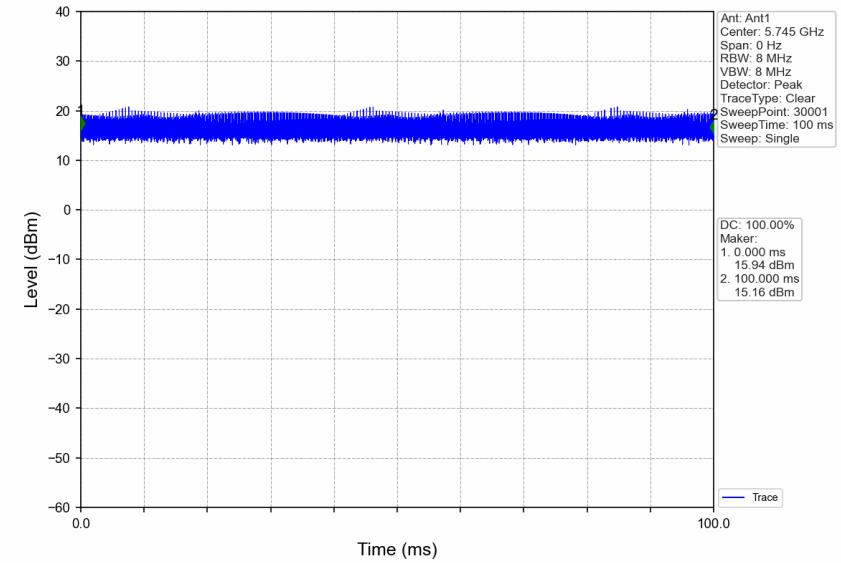
WIFI 5GHz duty cycle= 100%



7.1.3.2 Initial Test Position SAR Test Reduction Procedure

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. The initial test position procedure is described in the following:

1）. 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).

2）. 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.

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

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7.1.3.3 Initial Test Configuration Procedures

An initial test configuration is determined for OFDM transmission modes according to the channel bandwidth, modulation and data rate combination(s) with the highest maximum output power specified for production units in each standalone and aggregated frequency band. SAR is measured using the highest measured maximum output power channel. For configurations with the same specified or measured maximum output power, additional transmission mode and test channel selection procedures are required. SAR test reduction for subsequent highest output test channels is determined according to *reported* SAR of the initial test configuration.

For next to the ear, hotspot mode and UMC mini-tablet exposure configurations where multiple test positions are required, the initial test position procedure is applied to minimize the number of test positions required for SAR measurement using the initial test configuration transmission mode. For fixed exposure conditions that do not have multiple SAR test positions, SAR is measured in the transmission mode determined by the initial test configuration.

When the *reported* SAR of the initial test configuration is > 0.8 W/kg, SAR measurement is required for subsequent next highest measured output power channel(s) in the initial test configuration until *reported* SAR is ≤ 1.2 W/kg or all required channels are tested.

7.1.3.4 Subsequent Test Configuration Procedures

SAR measurement requirements for the remaining 802.11 transmission mode configurations that have not been tested in the initial test configuration are determined separately for each standalone and aggregated frequency band, in each exposure condition, according to the maximum output power specified for production units. The initial test position procedure is applied to next to the ear, UMPC mini-tablet and hotspot mode configurations. When the same maximum output power is specified for multiple transmission modes, additional power measurements may be required to determine if SAR measurements are required for subsequent highest output power channels in a subsequent test configuration. The subsequent test configuration and SAR measurement procedures are described in the following.

1）. When SAR test exclusion provisions of KDB Publication 447498 are applicable and SAR measurement is not required for the initial test configuration, SAR is also not required for the next highest maximum output power transmission mode subsequent test configuration(s) in that frequency band or aggregated band and exposure configuration.

2）. When the highest *reported* SAR for the initial test configuration (when applicable, include subsequent highest output channels), according to the initial test position or fixed exposure position requirements, is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for that subsequent test configuration.

3）. The number of channels in the initial test configuration and subsequent test configuration can be different due to differences in channel bandwidth. When SAR measurement is required for a subsequent test configuration and the channel bandwidth is smaller than that in the initial test configuration, all channels in the subsequent test configuration that overlap with the larger bandwidth channel tested in the initial test configuration should be used to determine the highest maximum output power channel. This step requires additional power measurement to identify the highest maximum output power channel in the subsequent test configuration to determine SAR test reduction.

a) SAR should first be measured for the channel with highest measured output power in the subsequent test configuration.

b) SAR for subsequent highest measured maximum output power channels in the subsequent test configuration is required only when the *reported* SAR of the preceding higher maximum output power channel(s) in the subsequent test configuration is > 1.2 W/kg or until all required channels are tested. i) For channels with the same measured maximum output power, SAR should be measured using the

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channel closest to the center frequency of the larger channel bandwidth channel in the initial test configuration.

4）. SAR measurements for the remaining highest specified maximum output power OFDM transmission mode configurations that have not been tested in the initial test configuration (highest maximum output) or subsequent test configuration(s) (subsequent next highest maximum output power) is determined by recursively applying the subsequent test configuration procedures in this section to the remaining configurations according to the following:

a) replace “subsequent test configuration” with “next subsequent test configuration” (i.e., subsequent next highest specified maximum output power configuration)
b) replace “initial test configuration” with “all tested higher output power configurations”

7.1.3.5 2.4 GHz Wi-Fi SAR Procedures

Separate SAR procedures are applied to DSSS and OFDM configurations in the 2.4 GHz band to simplify DSSS test requirements. For 802.11b DSSS SAR measurements, DSSS SAR procedure applies to fixed exposure test position and initial test position procedure applies to multiple exposure test positions. When SAR measurement is required for an OFDM configuration, the initial test configuration, subsequent test configuration and initial test position procedures are applied. The SAR test exclusion requirements for 802.11g/n OFDM configurations are described in following.

- **802.11b DSSS SAR Test Requirements**

SAR is measured for 2.4 GHz 802.11b DSSS using either a fixed test position or, when applicable, the initial test position procedure. SAR test reduction is determined according to the following:

1）. 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.
2）. 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.

- **2.4 GHz 802.11g/n OFDM SAR Test Exclusion Requirements**

When SAR measurement is required for 2.4 GHz 802.11g/n OFDM configurations, the measurement and test reduction procedures for OFDM are applied (section 5.3, including sub-sections). SAR is not required for the following 2.4 GHz OFDM conditions.

1）. When KDB Publication 447498 SAR test exclusion applies to the OFDM configuration.
2）. When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

- **SAR Test Requirements for OFDM configurations**

When SAR measurement is required for 802.11 g/n OFDM configurations, each standalone and frequency aggregated band is considered separately for SAR test reduction. In applying the initial test configuration and subsequent test configuration procedures, the 802.11 transmission configuration with the highest specified maximum output power and the channel within a test configuration with the highest measured maximum output power should be clearly distinguished to apply the procedures.

7.1.3.6 5GHz WiFi SAR Procedures

- **U-NII-1 and U-NII-2A Bands**

For devices that operate in only one of the U-NII-1 and U-NII-2A bands, the normally required SAR procedures for OFDM configurations are applied. For devices that operate in both U-NII bands using the same transmitter and antenna(s), SAR test reduction is determined according to the following：

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1) When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, both bands are tested independently for SAR.
2) When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration; otherwise, both bands are tested independently for SAR.
3) The two U-NII bands may be aggregated to support a 160 MHz channel on channel number 50. Without additional testing, the maximum output power for this is limited to the lower of the maximum output power certified for the two bands. When SAR measurement is required for at least one of the bands and the highest reported SAR adjusted by the ratio of specified maximum output power of aggregated to standalone band is > 1.2 W/kg, SAR is required for the 160 MHz channel. This procedure does not apply to an aggregated band with maximum output higher than the standalone band(s); the aggregated band must be tested independently for SAR. SAR is not required when the 160 MHz channel is operating at a reduced maximum power and also qualifies for SAR test exclusion.

- **U-NII-2C and U-NII-3 Bands**

The frequency range covered by these bands is 380 MHz (5.47 - 5.85 GHz), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements. when Terminal Doppler Weather Radar (TDWR) restriction applies, all channels that operate at 5.60 – 5.65 GHz must be included to apply the SAR test reduction and measurement procedures.
When the same transmitter and antenna(s) are used for U-NII-2C band and U-NII-3 band or 5.8 GHz band of § 15.247, the bands may be aggregated to enable additional channels with 20, 40 or 80 MHz bandwidth to span across the band gap, as illustrated in Appendix B. The maximum output power for the additional band gap channels is limited to the lower of those certified for the bands. Unless band gap channels are permanently disabled, they must be considered for SAR testing. The frequency range covered by these bands is 380 MHz (5.47 – 5.85 GHz), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements. To maintain SAR measurement accuracy and to facilitate test reduction, the channels in U-NII-2C band above 5.65 GHz may be grouped with the 5.8 GHz channels in U-NII-3 or § 15.247 band to enable two SAR probe calibration frequency points to cover the bands, including the band gap channels. When band gap channels are supported and the bands are not aggregated for SAR testing, band gap channels must be considered independently in each band according to the normally required OFDM SAR measurement and probe calibration frequency points requirements.

- **OFDM Transmission Mode SAR Test Configuration and Channel Selection Requirements**

The initial test configuration for 5 GHz OFDM transmission modes is determined by the 802.11 configuratio with the highest maximum output power specified for production units, including tune-up tolerance, in each standalone and aggregated frequency band. SAR for the initial test configuration is measured using the highest maximum output power channel determined by the default power measurement procedures. When multiple configurations in a frequency band have the same specified maximum output power, the initial test configuration is determined according to the following steps applied sequentially.

1) The largest channel bandwidth configuration is selected among the multiple configurations with the same specified maximum output power.
2) If multiple configurations have the same specified maximum output power and largest channel bandwidth, the lowest order modulation among the largest channel bandwidth configurations is selected.
3) If multiple configurations have the same specified maximum output power, largest channel bandwidth and

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lowest order modulation, the lowest data rate configuration among these configurations is selected.

4) When multiple transmission modes (802.11a/g/n/ac) have the same specified maximum output power, largest channel bandwidth, lowest order modulation and lowest data rate, the lowest order 802.11 mode is selected; i.e., 802.11a is chosen over 802.11n then 802.11ac or 802.11g is chosen over 802.11n. After an initial test configuration is determined, if multiple test channels have the same measured maximum output power, the channel chosen for SAR measurement is determined according to the following. These channel selection procedures apply to both the initial test configuration and subsequent test configuration(s), with respect to the default power measurement procedures or additional power measurements required for further SAR test reduction. The same procedures also apply to subsequent highest output power channel(s) selection.
   a) The channel closest to mid-band frequency is selected for SAR measurement.
   b) For channels with equal separation from mid-band frequency; for example, high and low channels or two mid-band channels, the higher frequency (number) channel is selected for SAR measurement.

- **SAR Test Requirements for OFDM configurations**

When SAR measurement is required for 802.11 a/n/ac OFDM configurations, each standalone and frequency aggregated band is considered separately for SAR test reduction. When the same transmitter and antenna(s) are used for U-NII-1 and U-NII-2A bands, additional SAR test reduction applies. When band gap channels between U-NII-2C band and 5.8 GHz U-NII-3 or §15.247 band are supported, the highest maximum output power transmission mode configuration and maximum output power channel across the bands must be used to determine SAR test reduction, according to the initial test configuration and subsequent test configuration requirements. In applying the initial test configuration and subsequent test configuration procedures, the 802.11 transmission configuration with the highest specified maximum output power and the channel within a test configuration with the highest measured maximum output power should be clearly distinguished to apply the procedures.

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8 Test Result

8.1 Measurement of RF Conducted Power

8.1.1 Conducted Power Of WIFI

Mode	Channel	Frequency (MHz)	Data Rate(Mbps)	Average Power (dBm) Ant 1	Tune up	Average Power (dBm) Ant 2	Tune up	Average Power (dBm) MIMO	Tune up
802.11b	1	2412	1	18.1	18.5	17.12	18	/	/
	6	2437		17.78	18.5	16.68	18	/	/
	11	2462		17.31	18.5	17.01	18	/	/
802.11g	1	2412	6	17.22	18	16.87	17.5	/	/
	6	2437		17.12	18	16.36	17.5	/	/
	11	2462		16.49	18	16.92	17.5	/	/
802.11n HT20	1	2412	MCS0	14.65	15	13.47	15	17.11	18
	6	2437		14.32	15	13.97	15	17.16	18
	11	2462		13.76	15	14.4	15	17.1	18
802.11n HT40	3	2422	MCS0	14.75	15	14.3	15	17.54	18
	6	2437		14.37	15	14.23	15	17.31	18
	9	2452		13.9	15	14.22	15	17.07	18

5GHz	mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Average Power (dBm) Ant 1	Tune up	Average Power (dBm) Ant 2	Tune up	Average Power (dBm) MIMO	Tune up
802.11a	U-NII-3	149	5745	6	11.08	12	11.42	12	/	/
		157	5785		10.88	12	10.9	12	/	/
		165	5825		10.48	12	10.93	12	/	/
5GHz	mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Average Power (dBm)	Tune up	Average Power (dBm)	Tune up	Average Power (dBm)	Tune up
802.11n(HT20)	U-NII-3	149	5745	MCS0	11.44	12	13.56	14	15.64	16
		157	5785		11.61	12	13.1	14	15.43	16
		165	5825		11.4	12	13.46	14	15.56	16
5GHz	mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Average Power (dBm)	Tune up	Average Power (dBm)	Tune up	Average Power (dBm)	Tune up
802.11n(HT40)	U-NII-3	151	5755	MCS0	11.09	12	16.38	17	17.51	18
		159	5795		11.24	12	15.76	17	17.07	18
5GHz	mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Average Power (dBm)	Tune up	Average Power (dBm)	Tune up	Average Power (dBm)	Tune up

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802.11ac(VHT20)	U-NII-3	149	5745	MCS0	11.48	12	15.05	16	16.63	17
		157	5785		10.45	12	14.47	16	15.92	17
		165	5825		10.01	12	14.6	16	15.9	17
5GHz	mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Average Power (dBm)	Tune up	Average Power (dBm)	Tune up	Average Power (dBm)	Tune up
802.11ac(VHT40)	U-NII-3	151	5755	MCS0	10.5	11	8.06	9	12.46	13
		159	5795		10.06	11	7.89	9	12.12	13
5GHz	mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Average Power (dBm)	Tune up	Average Power (dBm)	Tune up	Average Power (dBm)	Tune up
802.11ac(VHT80)	U-NII-3	155	5775	MCS0	10.06	11	15.62	16	16.69	17

Note:

a) Power must be measured at each transmit antenna port according to the DSSS and OFDM transmission configurations in each standalone and aggregated frequency band.

b) Power measurement is required for the transmission mode configuration with the highest maximum output power specified for production units.

1) When the same highest maximum output power specification applies to multiple transmission modes, the largest channel bandwidth configuration with the lowest order modulation and lowest data rate is measured.

2) When the same highest maximum output power is specified for multiple largest channel bandwidth configurations with the same lowest order modulation or lowest order modulation and lowest data rate, power measurement is required for all equivalent 802.11 configurations with the same maximum output power.

c) For each transmission mode configuration, power must be measured for the highest and lowest channels; and at the mid-band channel(s) when there are at least 3 channels. For configurations with multiple mid-band channels, due to an even number of channels, both channels should be measured.

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8.1.2 Conducted Power Of WCDMA

WCDMA Band II					
Average Conducted Power(dBm)					
Channel		9262	9400	9538	Tune up
WCDMA	12.2kbps RMC	23.19	23.05	23.04	24
HSDPA	Subtest 1	22.26	22.11	22	23
	Subtest 2	22.2	22.07	22	23
	Subtest 3	21.71	21.59	21.53	22
	Subtest 4	21.72	21.6	21.54	22
HSUPA	Subtest 1	22.26	22.15	22.05	23
	Subtest 2	21.67	21.62	21.61	22
	Subtest 3	22.21	22.08	22.02	23
	Subtest 4	22.31	22.18	22.13	23
	Subtest 5	22.2	22.07	22.02	23

WCDMA Band IV					
Average Conducted Power(dBm)					
Channel		1312	1412	1513	Tune up
WCDMA	12.2kbps RMC	23.46	23.35	**23.37**	24
HSDPA	Subtest 1	22.46	22.31	22.3	23
	Subtest 2	22.5	22.31	22.38	23
	Subtest 3	21.92	21.83	21.91	23
	Subtest 4	21.91	21.81	21.9	23
HSUPA	Subtest 1	22.22	22.27	22.21	23
	Subtest 2	21.95	21.81	21.91	23
	Subtest 3	22.51	22.4	22.37	23
	Subtest 4	22.53	22.38	22.37	23
	Subtest 5	22.5	22.31	22.39	23

WCDMA Band V					
Average Conducted Power(dBm)					
Channel		4132	4182	4233	Tune up
WCDMA	12.2kbps RMC	23.21	**23.19**	23.19	24
HSDPA	Subtest 1	22.16	22.22	22.27	23
	Subtest 2	22.24	22.23	22.22	23
	Subtest 3	21.7	21.62	21.76	23
	Subtest 4	21.67	21.68	21.75	23
HSUPA	Subtest 1	22.15	22.24	22.23	23
	Subtest 2	21.72	21.7	21.76	23
	Subtest 3	22.2	22.2	22.19	23

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	Subtest 4	22.22	22.28	22.26	23
	Subtest 5	22.17	22.24	22.23	23

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8.1.3 Conducted Power Of LTE

LTE Band 2				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel 18607	Channel 18900	Channel 19193	Tune up
1.4MHz	QPSK	1	0	23.37	23.41	22.99	24
		1	2	23.41	23.79	22.99	24
		1	5	23.33	23.26	22.91	24
		3	0	23.35	23.29	23.12	24
		3	2	23.18	23.09	23.21	24
		3	3	23.37	23.26	22.9	24
		6	0	22.23	22.49	22.07	23
	16QAM	1	0	22.36	22.91	22.68	23
		1	2	22.41	22.94	23	24
		1	5	22.2	22.95	23.02	24
		3	0	22.33	22.19	22.16	23
		3	2	22.42	22.16	22.07	23
		3	3	22.31	22.29	22.06	23
		6	0	21.36	21.29	21.3	22
Bandwidth	Modulation	RB size	RB offset	Channel 18615	Channel 18900	Channel 19185	Tune up
3MHz	QPSK	1	0	23.39	23.45	23.02	24
		1	7	23.44	23.84	23.03	24
		1	14	23.36	23.31	22.95	24
		8	0	22.45	22.41	22.25	23
		8	4	22.3	22.19	22.33	23
		8	7	22.47	22.37	22	23
		15	0	22.26	22.53	22.1	23
	16QAM	1	0	22.39	22.93	22.71	23
		1	7	22.44	22.99	23.04	23.5
		1	14	22.22	22.99	23.05	23.5
		8	0	21.44	21.32	21.28	23
		8	4	21.53	21.29	21.19	22
		8	7	21.41	21.41	21.19	22
		15	0	21.39	21.33	21.33	22
Bandwidth	Modulation	RB size	RB offset	Channel 18625	Channel 18900	Channel 19175	Tune up
5MHz	QPSK	1	0	23.36	23.43	22.98	24
		1	13	23.42	23.8	23	24

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		1	24	23.33	23.26	22.91	24
		12	0	22.42	22.36	22.21	23
		12	6	22.28	22.15	22.28	23
		12	13	22.45	22.35	21.96	23
		25	0	22.24	22.52	22.08	23
	16QAM	1	0	22.36	22.89	22.68	23
		1	13	22.41	22.97	23.01	23.5
		1	24	22.19	22.97	23.01	23.5
		12	0	21.42	21.28	21.25	22
		12	6	21.5	21.24	21.15	22
		12	13	21.38	21.36	21.15	22
		25	0	21.37	21.29	21.28	22
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				18650	18900	19150	
10MHz	QPSK	1	0	23.38	23.44	23.01	24
		1	25	23.45	23.85	23.04	24
		1	49	23.35	23.3	22.94	24
		25	0	22.45	22.41	22.25	23
		25	13	22.31	22.2	22.32	23
		25	25	22.47	22.39	22.01	23
		50	0	22.32	22.54	22.12	23
	16QAM	1	0	22.38	22.92	22.7	23.5
		1	25	22.44	23.01	23.04	23.5
		1	49	22.22	22.99	23.04	23.5
		25	0	21.45	21.33	21.29	22
		25	13	21.52	21.28	21.18	22
		25	25	21.41	21.41	21.19	22
		50	0	21.41	21.34	21.32	22
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				18675	18900	19125	
15MHz	QPSK	1	0	23.37	23.4	22.99	24
		1	38	23.43	23.84	23.01	24
		1	74	23.32	23.25	22.9	24
		36	0	22.43	22.37	22.22	23
		36	18	22.28	22.15	22.28	23
		36	39	22.44	22.36	21.97	23
		75	0	22.3	22.5	22.07	23
	16QAM	1	0	22.33	22.9	22.68	23.5
		1	38	22.42	22.98	23.02	23.5
		1	74	22.19	22.95	23.01	23.5
		36	0	21.42	21.31	21.26	22
		36	18	21.49	21.23	21.14	22

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		36	39	21.39	21.37	21.16	22
		75	0	21.37	21.29	21.28	22
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				18700	18900	19100	
20MHz	QPSK	1	0	23.34	23.36	22.96	24
		1	50	23.42	**23.8**	22.99	24
		1	99	23.3	23.24	22.87	24
		50	0	**22.4**	22.32	22.18	23
		50	25	22.26	22.11	22.25	23
		50	50	22.4	22.31	21.93	23
		100	0	22.27	22.45	22.03	23
	16QAM	1	0	22.31	22.86	22.63	23.5
		1	50	22.38	22.96	22.98	23.5
		1	99	22.17	22.92	22.99	23.5
		50	0	21.39	21.27	21.23	22
		50	25	21.46	21.21	21.11	22
		50	50	21.36	21.32	21.12	22
		100	0	21.35	21.25	21.25	22

LTE Band 4				**Conducted Power(dBm)**			
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				19957	20175	20393	
1.4MHz	QPSK	1	0	23.55	23.2	23.42	24
		1	2	23.44	23.53	23.46	24
		1	5	23.2	23.54	23.68	24
		3	0	23.32	23.22	23.55	24
		3	2	23.28	23.33	23.4	24
		3	3	23.31	23.42	23.39	24
		6	0	22.3	22.4	22.64	23.5
	16QAM	1	0	22.45	22.25	23.27	23.5
		1	2	22.52	22.79	23.15	23.5
		1	5	22.38	22.98	23.37	23.5
		3	0	22.23	22.32	22.43	23
		3	2	22.32	22.39	22.26	23
		3	3	22.39	22.47	22.47	23
		6	0	21.34	21.48	21.68	22
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				19965	20175	20385	
3MHz	QPSK	1	0	23.57	23.24	23.45	24
		1	7	23.47	23.58	23.5	24
		1	14	23.23	23.59	23.72	24

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		8	0	22.42	22.34	22.68	23
		8	4	22.4	22.43	22.52	23
		8	7	22.41	22.53	22.49	23
		15	0	22.33	22.44	22.67	23
	16QAM	1	0	22.48	22.27	23.3	23.5
		1	7	22.55	22.84	23.19	23.5
		1	14	22.4	23.02	23.4	23.5
		8	0	21.34	21.45	21.55	22
		8	4	21.43	21.52	21.38	22
		8	7	21.49	21.59	21.6	22
		15	0	21.37	21.52	21.71	22
Bandwidth	Modulation	RB size	RB offset	Channel 19975	Channel 20175	Channel 20375	Tune up
5MHz	QPSK	1	0	23.54	23.22	23.41	24
		1	13	23.45	23.54	23.47	24
		1	24	23.2	23.54	23.68	24
		12	0	22.39	22.29	22.64	23
		12	6	22.38	22.39	22.47	23
		12	13	22.39	22.51	22.45	23
		25	0	22.31	22.43	22.65	23
	16QAM	1	0	22.45	22.23	23.27	23.5
		1	13	22.52	22.82	23.16	23.5
		1	24	22.37	23	23.36	23.5
		12	0	21.32	21.41	21.52	22
		12	6	21.4	21.47	21.34	22
		12	13	21.46	21.54	21.56	22
		25	0	21.35	21.48	21.66	22
Bandwidth	Modulation	RB size	RB offset	Channel 20000	Channel 20175	Channel 20350	Tune up
10MHz	QPSK	1	0	23.56	23.23	23.44	24
		1	25	23.48	23.59	23.51	24
		1	49	23.22	23.58	23.71	24
		25	0	22.42	22.34	22.68	23
		25	13	22.41	22.44	22.51	23
		25	25	22.41	22.55	22.5	23
		50	0	22.39	22.45	22.69	23
	16QAM	1	0	22.47	22.26	23.29	23.5
		1	25	22.55	22.86	23.19	23.5
		1	49	22.4	23.02	23.39	23.5
		25	0	21.35	21.46	21.56	22
		25	13	21.42	21.51	21.37	22
		25	25	21.49	21.59	21.6	22

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		50	0	21.38	21.53	21.7	22
Bandwidth	Modulation	RB size	RB offset	Channel 20025	Channel 20175	Channel 20325	Tune up
15MHz	QPSK	1	0	23.55	23.19	23.42	24
		1	38	23.46	23.58	23.48	24
		1	74	23.19	23.53	23.67	24
		36	0	22.4	22.3	22.65	23
		36	18	22.38	22.39	22.47	23
		36	39	22.38	22.52	22.46	23
		75	0	22.37	22.41	22.64	23
	16QAM	1	0	22.42	22.24	23.27	23.5
		1	38	22.53	22.83	23.17	23.5
		1	74	22.37	22.98	23.36	23.5
		36	0	21.32	21.44	21.53	22
		36	18	21.39	21.46	21.33	22
		36	39	21.47	21.55	21.57	22
		75	0	21.35	21.48	21.66	22
Bandwidth	Modulation	RB size	RB offset	Channel 20050	Channel 20175	Channel 20300	Tune up
20MHz	QPSK	1	0	23.52	23.15	23.39	24
		1	50	23.45	23.54	23.46	24
		1	99	23.17	23.52	**23.64**	24
		50	0	22.37	22.25	22.61	23
		50	25	22.36	22.35	22.44	23
		50	50	22.35	22.47	22.42	23
		100	0	22.34	22.36	22.6	23
	16QAM	1	0	22.4	22.2	23.22	23.5
		1	50	22.49	22.81	23.13	23.5
		1	99	22.35	22.95	23.64	23.5
		50	0	21.29	21.4	21.5	22
		50	25	21.36	21.44	21.3	22
		50	50	21.44	21.5	21.53	22
		100	0	21.33	21.44	21.63	22

LTE Band 5				**Conducted Power(dBm)**			
Bandwidth	Modulation	RB size	RB offset	Channel 20407	Channel 20525	Channel 20643	Tune up
1.4MHz	QPSK	1	0	23.81	23.90	23.80	25
		1	2	23.88	23.90	24.01	25
		1	5	23.97	23.90	23.77	25
		3	0	23.67	23.70	23.75	25

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		3	2	23.67	23.74	23.78	25
		3	3	23.82	23.78	23.77	25
		6	0	22.80	22.89	22.87	24
	16QAM	1	0	23.44	23.11	22.82	24
		1	2	23.14	23.38	22.67	24
		1	5	23.25	23.04	22.66	24
		3	0	22.60	22.69	22.77	23
		3	2	22.78	22.63	22.60	23
		3	3	22.80	22.66	22.55	23
		6	0	21.68	21.75	21.71	22
Bandwidth	Modulation	RB size	RB offset	Channel 20415	Channel 20525	Channel 20635	Tune up
3MHz	QPSK	1	0	23.83	23.94	23.83	25
		1	7	23.91	23.95	24.05	25
		1	14	24.00	23.95	23.81	25
		8	0	22.77	22.82	22.88	24
		8	4	22.79	22.84	22.90	24
		8	7	22.92	22.89	22.87	24
		15	0	22.83	22.93	22.90	24
	16QAM	1	0	23.47	23.13	22.85	24
		1	7	23.17	23.43	22.71	24
		1	14	23.27	23.08	22.69	24
		8	0	21.71	21.82	21.89	22.5
		8	4	21.89	21.76	21.72	22.5
		8	7	21.90	21.78	21.68	22.5
		15	0	21.71	21.79	21.74	22.5
Bandwidth	Modulation	RB size	RB offset	Channel 20425	Channel 20525	Channel 20625	Tune up
5MHz	QPSK	1	0	23.81	23.89	23.80	25
		1	13	23.90	23.95	24.03	25
		1	24	23.96	23.89	23.76	25
		12	0	22.75	22.78	22.85	24
		12	6	22.77	22.80	22.85	24
		12	13	22.89	22.88	22.84	24
		25	0	22.87	22.90	22.87	24
	16QAM	1	0	23.41	23.10	22.82	24
		1	13	23.15	23.42	22.69	24
		1	24	23.24	23.04	22.65	24
		12	0	21.69	21.81	21.87	22.5
		12	6	21.85	21.70	21.67	22.5
		12	13	21.88	21.74	21.65	22.5
		25	0	21.69	21.75	21.69	22.5

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Bandwidth	Modulation	RB size	RB offset	Channel 20450	Channel 20525	Channel 20600	Tune up
10MHz	QPSK	1	0	23.78	23.85	23.77	25
		1	25	23.89	23.91	**24.01**	25
		1	49	23.94	23.88	23.73	25
		25	0	22.72	22.73	22.81	24
		25	13	22.75	22.76	22.82	24
		25	25	22.86	22.83	22.80	24
		50	0	22.84	22.85	22.83	24
	16QAM	1	0	23.39	23.06	22.77	24
		1	25	23.11	23.40	22.65	24
		1	49	23.22	23.01	22.63	24
		25	0	21.66	21.77	21.84	22.5
		25	13	21.82	21.68	21.64	22.5
		25	25	21.85	21.69	21.61	22.5
		50	0	21.67	21.71	21.66	22.5

LTE FDD Band 12				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel 23017	Channel 23095	Channel 23173	Tune up
1.4MHz	QPSK	1	0	23.63	23.64	23.61	24.5
		1	2	23.67	23.57	23.69	24.5
		1	5	23.61	23.5	23.7	24.5
		3	0	23.5	23.54	23.63	24.5
		3	2	23.45	23.5	23.54	24.5
		3	3	23.66	23.62	23.63	24.5
		6	0	22.61	22.57	22.65	24
	16QAM	1	0	22.95	22.18	22.93	24
		1	2	22.94	22.55	23.2	24
		1	5	22.76	22.36	22.86	24
		3	0	22.58	22.6	22.74	24
		3	2	22.52	22.5	22.51	24
		3	3	22.52	22.58	22.46	24
		6	0	21.71	21.63	21.84	23
Bandwidth	Modulation	RB size	RB offset	Channel 23025	Channel 23095	Channel 23165	Tune up
3MHz	QPSK	1	0	23.65	23.68	23.64	24.5
		1	7	23.7	23.62	23.73	24.5
		1	14	23.64	23.55	23.74	24.5

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		8	0	22.6	22.66	22.76	24
		8	4	22.57	22.6	22.66	24
		8	7	22.76	22.73	22.73	24
		15	0	22.64	22.61	22.68	24
	16QAM	1	0	22.98	22.2	22.99	24
		1	7	22.97	22.6	23.24	24
		1	14	22.78	22.4	22.89	24
		8	0	21.69	21.73	21.86	23
		8	4	21.63	21.63	21.63	23
		8	7	21.62	21.7	21.59	23
		15	0	21.74	21.67	21.87	23
Bandwidth	Modulation	RB size	RB offset	Channel 23035	Channel 23095	Channel 23155	Tune up
5MHz	QPSK	1	0	23.63	23.63	23.61	24.5
		1	13	23.69	23.62	23.71	24.5
		1	24	23.6	23.49	23.69	24.5
		12	0	22.58	22.62	22.73	24
		12	6	22.55	22.56	22.61	24
		12	13	22.73	22.72	22.7	24
		25	0	22.68	22.58	22.65	24
	16QAM	1	0	22.92	22.17	22.96	24
		1	13	22.95	22.59	23.22	24
		1	24	22.75	22.36	22.85	24
		12	0	21.67	21.72	21.84	23
		12	6	21.59	21.57	21.58	23
		12	13	21.6	21.66	21.56	23
		25	0	21.72	21.63	21.82	23
Bandwidth	Modulation	RB size	RB offset	Channel 23060	Channel 23095	Channel 23130	Tune up
10MHz	QPSK	1	0	23.6	23.59	**23.58**	24.5
		1	25	23.68	23.58	23.69	24.5
		1	49	23.58	23.48	23.66	24.5
		25	0	22.55	22.57	22.69	24
		25	13	22.53	22.52	22.58	24
		25	25	22.7	22.67	22.66	24
		50	0	22.65	22.53	22.61	24
	16QAM	1	0	22.9	22.13	22.91	24
		1	25	22.91	22.57	23.18	24
		1	49	22.73	22.33	22.83	24
		25	0	21.64	21.68	21.81	23
		25	13	21.56	21.55	21.55	23
		25	25	21.57	21.61	21.52	23

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		50	0	21.7	21.59	21.79	23

LTE FDD Band 13				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel 23205	Channel 23230	Channel 23255	Tune up
5MHz	QPSK	1	0	23.72	23.63	23.78	24.5
		1	13	23.79	23.68	23.77	24.5
		1	24	23.58	23.69	23.65	24.5
		12	0	22.87	22.77	22.82	24
		12	6	22.85	22.8	22.86	24
		12	13	22.75	22.82	22.83	24
		25	0	22.81	22.74	22.8	24
	16QAM	1	0	23.06	22.41	22.6	24
		1	13	23.14	22.45	22.35	24
		1	24	23.03	22.16	22.43	24
		12	0	21.5	21.52	21.68	23
		12	6	21.63	21.75	21.65	23
		12	13	21.76	21.6	21.57	23
		25	0	21.74	21.96	21.62	23
Bandwidth	Modulation	RB size	RB offset	/	Channel 23230	/	Tune up
10MHz	QPSK	1	0	/	23.76	/	24.5
		1	25	/	**23.85**	/	24.5
		1	49	/	23.71	/	24.5
		25	0	/	22.87	/	24
		25	13	/	22.79	/	24
		25	25	/	22.88	/	24
		50	0	/	22.74	/	24
	16QAM	1	0	/	23.11	/	24
		1	25	/	23.41	/	24
		1	49	/	22.94	/	24
		25	0	/	21.78	/	23
		25	13	/	21.83	/	23
		25	25	/	21.88	/	23
		50	0	/	21.82	/	23

LTE FDD Band 14				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel 23305	Channel 23330	Channel 23355	Tune up

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5MHz	QPSK	1	0	23.81	23.59	23.59	24.5
		1	13	23.64	23.84	23.75	24.5
		1	24	23.68	23.88	23.9	24.5
		12	0	22.83	22.83	22.75	24
		12	6	22.77	22.8	22.71	24
		12	13	22.82	22.85	22.77	24
		25	0	22.89	22.76	22.73	24
	16QAM	1	0	22.5	22.47	22.42	24
		1	13	22.38	22.61	22.54	24
		1	24	22.21	22.57	22.22	24
		12	0	21.65	21.68	21.74	23
		12	6	21.84	21.59	21.85	23
		12	13	21.67	21.5	21.65	23
		25	0	21.77	21.73	21.69	23
Bandwidth	Modulation	RB size	RB offset		Channel		Tune up
				/	23330	/	
10MHz	QPSK	1	0	/	23.73	/	24.5
		1	25	/	23.85	/	24.5
		1	49	/	23.53	/	24.5
		25	0	/	22.84	/	24
		25	13	/	22.78	/	24
		25	25	/	22.82	/	24
		50	0	/	22.83	/	24
	16QAM	1	0	/	22.7	/	24
		1	25	/	23.38	/	24
		1	49	/	22.85	/	24
		25	0	/	21.64	/	23
		25	13	/	21.8	/	23
		25	25	/	21.76	/	23
		50	0	/	21.77	/	23

LTE FDD Band 66				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				19957	20175	20393	
1.4MHz	QPSK	1	0	23.42	23.57	23.56	24.5
		1	2	23.3	23.76	23.57	24.5
		1	5	23.37	23.64	23.45	24.5
		3	0	23.47	23.58	23.26	24
		3	2	23.35	23.75	23.33	24
		3	3	23.59	23.55	23.36	24
		6	0	22.51	22.73	22.34	24

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	16QAM	1	0	22.84	22.38	22.2	24
		1	2	22.43	22.76	22.57	24
		1	5	22.57	22.42	22.22	24
		3	0	22.53	22.57	22.27	23
		3	2	22.32	22.76	22.43	23
		3	3	22.69	22.62	22.45	23
		6	0	21.65	21.84	21.45	23
Bandwidth	Modulation	RB size	RB offset	Channel 19965	Channel 20175	Channel 20385	Tune up
3MHz	QPSK	1	0	23.44	23.61	23.59	24.5
		1	7	23.33	23.81	23.61	24.5
		1	14	23.4	23.69	23.49	24.5
		8	0	22.57	22.7	22.39	24
		8	4	22.47	22.85	22.45	24
		8	7	22.69	22.66	22.46	24
		15	0	22.54	22.77	22.37	24
	16QAM	1	0	22.87	22.4	22.23	24
		1	7	22.46	22.81	22.61	24
		1	14	22.59	22.46	22.25	24
		8	0	21.64	21.7	21.39	23
		8	4	21.43	21.89	21.55	23
		8	7	21.79	21.74	21.58	23
		15	0	21.68	21.88	21.48	23
Bandwidth	Modulation	RB size	RB offset	Channel 19975	Channel 20175	Channel 20375	Tune up
5MHz	QPSK	1	0	23.41	23.59	23.55	24.5
		1	13	23.31	23.77	23.58	24.5
		1	24	23.37	23.64	23.45	24.5
		12	0	22.54	22.65	22.35	24
		12	6	22.45	22.81	22.4	24
		12	13	22.67	22.64	22.42	24
		25	0	22.52	22.76	22.35	24
	16QAM	1	0	22.84	22.36	22.2	24
		1	13	22.43	22.79	22.58	24
		1	24	22.56	22.44	22.21	24
		12	0	21.62	21.66	21.36	23
		12	6	21.4	21.84	21.51	23
		12	13	21.76	21.69	21.54	23
		25	0	21.66	21.84	21.43	23
Bandwidth	Modulation	RB size	RB offset	Channel 20000	Channel 20175	Channel 20350	Tune up
10MHz	QPSK	1	0	23.43	23.6	23.58	24.5

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		1	25	23.34	23.82	23.62	24.5
		1	49	23.39	23.68	23.48	24.5
		25	0	22.57	22.7	22.39	24
		25	13	22.48	22.86	22.44	24
		25	25	22.69	22.68	22.47	24
		50	0	22.6	22.78	22.39	24
	16QAM	1	0	22.86	22.39	22.22	24
		1	25	22.46	22.83	22.61	24
		1	49	22.59	22.46	22.24	24
		25	0	21.65	21.71	21.4	23
		25	13	21.42	21.88	21.54	23
		25	25	21.79	21.74	21.58	23
		50	0	21.69	21.89	21.47	23
Bandwidth	Modulation	RB size	RB offset	Channel 20025	Channel 20175	Channel 20325	Tune up
15MHz	QPSK	1	0	23.42	23.56	23.56	24.5
		1	38	23.32	23.81	23.59	24.5
		1	74	23.36	23.63	23.44	24.5
		36	0	22.55	22.66	22.36	24
		36	18	22.45	22.81	22.4	24
		36	39	22.66	22.65	22.43	24
		75	0	22.58	22.74	22.34	24
	16QAM	1	0	22.81	22.37	22.2	24
		1	38	22.44	22.8	22.59	24
		1	74	22.56	22.42	22.21	24
		36	0	21.62	21.69	21.37	23
		36	18	21.39	21.83	21.5	23
		36	39	21.77	21.7	21.55	23
		75	0	21.66	21.84	21.43	23
Bandwidth	Modulation	RB size	RB offset	Channel 132072	Channel 132322	Channel 132572	Tune up
20MHz	QPSK	1	0	23.39	23.52	23.53	24.5
		1	50	23.31	23.77	23.57	24.5
		1	99	23.34	23.62	23.41	24.5
		50	0	22.52	22.61	22.32	24
		50	25	22.43	22.44	22.37	24
		50	50	22.63	22.6	22.39	24
		100	0	22.55	22.69	22.3	24
	16QAM	1	0	22.79	22.33	22.15	24
		1	50	22.4	22.78	22.55	24
		1	99	22.54	22.39	22.19	24
		50	0	21.59	21.65	21.34	23

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		50	25	21.36	21.81	21.47	23
		50	50	21.74	21.65	21.51	23
		100	0	21.64	21.8	21.4	23

LTE FDD Band 71				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel 133147	Channel 133297	Channel 133447	Tune up
5MHz	QPSK	1	0	23.15	23.23	22.96	24
		1	13	23.44	23.23	23.08	24
		1	24	23.25	23.06	23.07	24
		12	0	22.15	22.33	22.29	23
		12	6	22.2	22.19	22.2	23
		12	13	22.38	22.36	22.33	23
		25	0	22.17	22.4	22.2	23
	16QAM	1	0	22.08	22.64	22.9	23.5
		1	13	22.2	22.85	22.91	23.5
		1	24	22.22	22.43	22.78	23.5
		12	0	21.29	21.23	21.07	23
		12	6	21.25	21.28	21.26	23
		12	13	21.38	21.23	21.13	23
		25	0	21.32	21.5	21.31	23
Bandwidth	Modulation	RB size	RB offset	Channel 133172	Channel 133297	Channel 133422	Tune up
10MHz	QPSK	1	0	23.17	23.24	22.99	24
		1	25	23.47	23.28	23.12	24
		1	49	23.27	23.1	23.1	24
		25	0	22.18	22.38	22.33	23
		25	13	22.23	22.24	22.25	23
		25	25	22.4	22.4	22.38	23
		50	0	22.25	22.42	22.24	23
	16QAM	1	0	22.1	22.67	22.92	23.5
		1	25	22.23	22.89	22.94	23.5
		1	49	22.25	22.45	22.81	23.5
		25	0	21.32	21.28	21.11	23
		25	13	21.27	21.32	21.29	23
		25	25	21.41	21.28	21.17	23
		50	0	21.35	21.55	21.35	23
Bandwidth	Modulation	RB size	RB offset	Channel 133197	Channel 133297	Channel 133397	Tune up
15MHz	QPSK	1	0	23.16	23.01	22.97	24
		1	38	23.45	23.11	23.09	24

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		1	74	23.24	23.09	23.06	24
		36	0	22.16	22.25	23.3	23
		36	18	22.2	22.21	22.21	23
		36	39	22.37	22.13	22.34	23
		75	0	22.23	22.11	22.19	23
	16QAM	1	0	22.05	22.07	22.9	23.5
		1	38	22.21	22.09	22.92	23.5
		1	74	22.22	22.22	22.78	23.5
		36	0	21.29	21.25	21.08	23
		36	18	21.24	21.2	21.25	23
		36	39	21.39	21.12	21.14	23
		75	0	21.32	21.11	21.31	23
Bandwidth	Modulation	RB size	RB offset	Channel 133222	Channel 133322	Channel 133372	Tune up
20MHz	QPSK	1	0	23.13	23.16	22.94	24
		1	50	23.44	23.23	23.07	24
		1	99	23.22	23.04	23.03	24
		50	0	22.13	22.29	22.26	23
		50	25	22.18	22.15	22.18	23
		50	50	22.34	22.32	22.3	23
		100	0	22.2	22.33	22.15	23
	16QAM	1	0	22.03	22.61	22.85	23.5
		1	50	22.17	22.84	22.88	23.5
		1	99	22.2	22.38	22.76	23.5
		50	0	21.26	21.22	21.05	23
		50	25	21.21	21.25	21.22	23
		50	50	21.36	21.19	21.1	23
		100	0	21.3	21.46	21.28	23

8.2 Stand-alone SAR test evaluation

The following SAR test exclusion Thresholds based on KDB 447498 D04 Interim General RF Exposure Guidance v01 Appendix B B.4

Freq.Band	Antenna	Frequency (MHz)	Position	Max Power (dBm)	Max Power (mW)	Antenna to user (mm)	Exclusion Power (mW)	Exclusion (Yes/No)
WIFI 2.4G	Ant1	2462	Front side	18.5	70.8	7	5.2	No
			Back side	18.5	70.8	10	10.2	No
			Left side	18.5	70.8	13	16.8	No
			Right side	18.5	70.8	61	319.3	Yes

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			Top side	18.5	70.8	4	2.7	No
			Bottom side	18.5	70.8	57	280.7	Yes
WIFI 2.4G	Ant2	2462	Front side	18	63.1	7	5.2	No
			Back side	18	63.1	10	10.2	No
			Left side	18	63.1	13	16.8	No
			Right side	18	63.1	61	319.3	Yes
			Top side	18	63.1	57	280.7	Yes
			Bottom side	18	63.1	4	2.7	No
WIFI 5G	Ant1	5850	Front side	12	15.8	7	2.8	No
			Back side	12	15.8	10	5.8	No
			Left side	12	15.8	13	10.1	No
			Right side	12	15.8	61	255.5	Yes
			Top side	12	15.8	4	1.4	No
			Bottom side	12	15.8	57	221.7	Yes
WIFI 5G	Ant2	5850	Front side	17	50.1	7	2.8	No
			Back side	17	50.1	10	5.8	No
			Left side	17	50.1	13	10.1	No
			Right side	17	50.1	61	255.5	Yes
			Top side	17	50.1	57	221.7	Yes
			Bottom side	17	50.1	4	1.4	No
WCDMA Band II	Main	1910	Front side	24	251.2	3	3.3	No
			Back side	24	251.2	3	3.3	No
			Left side	24	251.2	105	930.1	Yes
			Right side	24	251.2	2	3.3	No
			Top side	24	251.2	3	3.3	No
			Bottom side	24	251.2	3	3.3	No
WCDMA Band IV	Main	1755	Front side	24	251.2	3	3.6	No
			Back side	24	251.2	3	3.6	No
			Left side	24	251.2	105	941.2	Yes
			Right side	24	251.2	2	3.6	No
			Top side	24	251.2	3	3.6	No
			Bottom side	24	251.2	3	3.6	No
WCDMA Band V	Main	849	Front side	24	251.2	3	9.0	No
			Back side	24	251.2	3	9.0	No
			Left side	24	251.2	105	691.5	Yes
			Right side	24	251.2	2	9.0	No
			Top side	24	251.2	3	9.0	No

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			Bottom side	24	251.2	3	9.0	No
LTE Band 2	Main	1910	Front side	24	251.2	3	3.3	No
			Back side	24	251.2	3	3.3	No
			Left side	24	251.2	105	930.1	Yes
			Right side	24	251.2	2	3.3	No
			Top side	24	251.2	3	3.3	No
			Bottom side	24	251.2	3	3.3	No
LTE Band 4	Main	1755	Front side	24	251.2	3	3.6	No
			Back side	24	251.2	3	3.6	No
			Left side	24	251.2	105	941.2	Yes
			Right side	24	251.2	2	3.6	No
			Top side	24	251.2	3	3.6	No
			Bottom side	24	251.2	3	3.6	No
LTE Band 5	Main	849	Front side	25	316.2	3	9.0	No
			Back side	25	316.2	3	9.0	No
			Left side	25	316.2	105	691.5	Yes
			Right side	25	316.2	2	9.0	No
			Top side	25	316.2	3	9.0	No
			Bottom side	25	316.2	3	9.0	No
LTE Band 12	Main	716	Front side	24.5	281.8	3	11.5	No
			Back side	24.5	281.8	3	11.5	No
			Left side	24.5	281.8	105	626.4	Yes
			Right side	24.5	281.8	2	11.5	No
			Top side	24.5	281.8	3	11.5	No
			Bottom side	24.5	281.8	3	11.5	No
LTE Band 13	Main	787	Front side	24.5	281.8	3	10	No
			Back side	24.5	281.8	3	10	No
			Left side	24.5	281.8	105	661.8	Yes
			Right side	24.5	281.8	2	10	No
			Top side	24.5	281.8	3	10	No
			Bottom side	24.5	281.8	3	10	No
LTE Band 14	Main	798	Front side	24.5	281.8	3	9.9	No
			Back side	24.5	281.8	3	9.9	No
			Left side	24.5	281.8	105	667.1	Yes
			Right side	24.5	281.8	2	9.9	No
			Top side	24.5	281.8	3	9.9	No
			Bottom side	24.5	281.8	3	9.9	No

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LTE Band 66	Main	1780	Front side	24.5	281.8	3	3.5	No
			Back side	24.5	281.8	3	3.5	No
			Left side	24.5	281.8	105	939.1	Yes
			Right side	24.5	281.8	2	3.5	No
			Top side	24.5	281.8	3	3.5	No
			Bottom side	24.5	281.8	3	3.5	No
LTE Band 71	Main	698	Front side	24	251.2	3	11.9	No
			Back side	24	251.2	3	11.9	No
			Left side	24	251.2	105	617.2	Yes
			Right side	24	251.2	2	11.9	No
			Top side	24	251.2	3	11.9	No
			Bottom side	24	251.2	3	11.9	No

Note:

1. Maximum power is the source-based time-average power and represents the maximum RF output power among production units
2. Per KDB 447498 D04, for larger devices, the test separation distance of adjacent edge configuration is determined by the closest separation between the antenna and the user.
3. Per KDB 447498 D04, standalone SAR test exclusion threshold is applied; If the distance of the antenna to the user is < 5mm, 5mm is used to determine SAR exclusion threshold
4. Per KDB 447498 D04, the 1-g and 10-g SAR test exclusion thresholds for 300 MHz to 6 GHz

This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive). Pth is given by Formula (B.2).

$$P_{\text{th}}\ (\text{mW}) = ERP_{20\ \text{cm}}\ (\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases} \qquad (\text{B.1})$$

$$P_{\text{th}}\ (\text{mW}) = \begin{cases} ERP_{20\ \text{cm}}(d/20\ \text{cm})^x & d \le 20\ \text{cm} \\ ERP_{20\ \text{cm}} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases} \qquad (\text{B.2})$$

where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\ \text{cm}}\sqrt{f}}\right)$$

and f is in GHz, d is the separation distance (cm), and $ERP_{20\text{cm}}$ is per Formula (B.1).
The example values shown in Table B.2 are for illustration only.

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Table B.2—Example Power Thresholds (mW)

Frequency (MHz)	Distance (mm)										
		5	10	15	20	25	30	35	40	45	50
	300	39	65	88	110	129	148	166	184	201	217
	450	22	44	67	89	112	135	158	180	203	226
	835	9	25	44	66	90	116	145	175	207	240
	1900	3	12	26	44	66	92	122	157	195	236
	2450	3	10	22	38	59	83	111	143	179	219
	3600	2	8	18	32	49	71	96	125	158	195
	5800	1	6	14	25	40	58	80	106	136	169

8.3 Measurement of SAR Data

Note:

1) The maximum Scaled SAR value is marked in bold. Graph Results refer to Appendix B

2) Per FCC KDB Publication 447498 D04, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg (2.0W/kg for 10g) then testing at the other channels is not required for such test configuration(s).

WiFi 2.4G:

1) When the highest reported SAR for the initial test configuration is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, SAR test for the other 802.11 modes are not required.

WiFi 5G:

1) When the highest reported SAR for the initial test configuration is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, SAR test for the other 802.11 modes are not required.

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8.3.1 SAR Result Of WiFi 2.4G

Test position	Test mode	Test Ch./Freq.	Duty Cycle	Duty Cycle Scaled factor	SAR (W/kg) 1-g	SAR (W/kg) 10-g	Power drift (dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg) 1-g	Liquid Temp.	SAR limit (W/kg)
Body Test data With Ant 1(10mm)													
Front side	802.11b	1/2412	100%	1	0.010	0.005	0.04	18.1	18.50	1.096	0.011	22.0	1.6
Back side	802.11b	1/2412	100%	1	0.006	0.004	0.06	18.1	18.50	1.096	0.007	22.0	1.6
Left side	802.11b	1/2412	100%	1	0.003	0.001	-0.04	18.1	18.50	1.096	0.003	22.0	1.6
Top side	802.11b	1/2412	100%	1	0.014	0.074	0.02	18.1	18.50	1.096	**0.015**	22.0	1.6
Body Test data With Ant 2(10mm)													
Front side	802.11b	1/2412	100%	1	0.011	0.006	-0.12	17.12	18.00	1.225	0.013	22.0	1.6
Back side	802.11b	1/2412	100%	1	0.007	0.003	0.07	17.12	18.00	1.225	0.009	22.0	1.6
Left side	802.11b	1/2412	100%	1	0.006	0.004	0.05	17.12	18.00	1.225	0.007	22.0	1.6
Bottom side	802.11b	1/2412	100%	1	0.013	0.007	-0.09	17.12	18.00	1.225	**0.016**	22.0	1.6
Body Test data With Ant MIMO(10mm)													
Front side	802.11n HT40	3/2422	100%	1	0.010	0.003	0.05	17.54	18.00	1.112	0.011	22.0	1.6
Back side	802.11n HT40	3/2422	100%	1	0.005	0.002	0.04	17.54	18.00	1.112	0.006	22.0	1.6
Left side	802.11n HT40	3/2422	100%	1	0.006	0.003	-0.15	17.54	18.00	1.112	0.007	22.0	1.6
Top side	802.11n HT40	3/2422	100%	1	0.008	0.002	0.03	17.54	18.00	1.112	0.009	22.0	1.6
Bottom side	802.11n HT40	3/2422	100%	1	0.012	0.005	0.05	17.54	18.00	1.112	**0.013**	22.0	1.6

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8.3.2 SAR Result Of WiFi 5G

Test position	Test mode	Test Ch./Freq.	Duty Cycle	Duty Cycle Scaled factor	SAR (W/kg) 1-g	SAR (W/kg) 10-g	Power drift (dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg) 1-g	Liquid Temp.	SAR limit (W/kg) 1-g
Body Test data With Ant 1(10mm)													
Front side	802.11n (HT40)	159/5795	100%	1	0.062	0.026	0.03	11.24	12.00	1.191	0.074	22.0	1.6
Back side	802.11n (HT40)	159/5795	100%	1	0.036	0.015	0.07	11.24	12.00	1.191	0.043	22.0	1.6
Left side	802.11n (HT40)	159/5795	100%	1	0.008	0.001	0.03	11.24	12.00	1.191	0.010	22.0	1.6
Top side	802.11n (HT40)	159/5795	100%	1	0.177	0.064	-0.03	11.24	12.00	1.191	**0.211**	22.0	1.6
Body Test data With Ant 2(10mm)													
Front side	802.11n (HT40)	151/5755	100%	1	0.121	0.047	0.03	16.38	17.00	1.153	0.140	22.0	1.6
Back side	802.11n (HT40)	151/5755	100%	1	0.063	0.026	0.01	16.38	17.00	1.153	0.073	22.0	1.6
Left side	802.11n (HT40)	151/5755	100%	1	0.004	0.001	0.09	16.38	17.00	1.153	0.005	22.0	1.6
Bottom side	802.11n (HT40)	151/5755	100%	1	0.198	0.071	-0.03	16.38	17.00	1.153	**0.228**	22.0	1.6
Body Test data With MIMO (10mm)													
Front side	802.11n (HT40)	151/5755	100%	1	0.105	0.033	0.06	17.51	18.00	1.119	0.118	22.0	1.6
Back side	802.11n (HT40)	151/5755	100%	1	0.044	0.021	-0.15	17.51	18.00	1.119	0.049	22.0	1.6
Left side	802.11n (HT40)	151/5755	100%	1	0.003	0.001	-0.11	17.51	18.00	1.119	0.003	22.0	1.6
Top side	802.11n (HT40)	151/5755	100%	1	0.163	0.062	0.05	17.51	18.00	1.119	0.182	22.0	1.6
Bottom side	802.11n (HT40)	151/5755	100%	1	0.168	0.048	0.09	17.51	18.00	1.119	**0.188**	22.0	1.6

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8.3.1 SAR Result Of WCDMA Band II

Test position	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	SAR (W/kg) 10-g	Power Drift (dB)	Conducted Power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg) 1-g	Liquid Temp	SAR limit (W/kg)
Body Test data 10mm												
Front side	RMC	9262/1852.4	1:1	0.288	0.143	-0.09	23.19	24	1.205	0.347	22.3	1.6
Back side	RMC	9262/1852.4	1:1	0.327	0.155	0.07	23.19	24	1.205	0.394	22.3	1.6
Right side	RMC	9262/1852.4	1:1	0.361	0.174	-0.02	23.19	24	1.205	**0.435**	22.3	1.6
Top side	RMC	9262/1852.4	1:1	0.136	0.078	0.01	23.19	24	1.205	0.164	22.3	1.6
Bottom side	RMC	9262/1852.4	1:1	0.095	0.052	0.03	23.19	24	1.205	0.114	22.3	1.6

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8.3.2 SAR Result Of WCDMA Band IV

Test position	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	SAR (W/kg) 10-g	Power Drift (dB)	Conducted Power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg) 1-g	Liquid Temp	SAR limit (W/kg)
Body Test data 10mm												
Front side	RMC	1312/1712.4	1:1	0.234	0.104	0.15	23.46	24	1.132	0.265	22.2	1.6
Back side	RMC	1312/1712.4	1:1	0.267	0.112	0.12	23.46	24	1.132	0.303	22.2	1.6
Right side	RMC	1312/1712.4	1:1	0.295	0.127	0.07	23.46	24	1.132	**0.334**	22.2	1.6
Top side	RMC	1312/1712.4	1:1	0.110	0.056	-0.05	23.46	24	1.132	0.125	22.2	1.6
Bottom side	RMC	1312/1712.4	1:1	0.076	0.036	0.03	23.46	24	1.132	0.087	22.2	1.6

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8.3.3 SAR Result Of WCDMA Band V

Test position	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	SAR (W/kg) 10-g	Power Drift (dB)	Conducted Power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg) 1-g	Liquid Temp	SAR limit (W/kg)
Body Test data 10mm												
Front side	RMC	4132/826.4	1:1	0.129	0.078	0.13	23.21	24	1.199	0.155	22.1	1.6
Back side	RMC	4132/826.4	1:1	0.148	0.085	-0.14	23.21	24	1.199	0.177	22.1	1.6
Right side	RMC	4132/826.4	1:1	0.162	0.095	-0.16	23.21	24	1.199	**0.194**	22.1	1.6
Top side	RMC	4132/826.4	1:1	0.061	0.042	-0.07	23.21	24	1.199	0.073	22.1	1.6
Bottom side	RMC	4132/826.4	1:1	0.042	0.027	0.05	23.21	24	1.199	0.051	22.1	1.6

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8.3.4 SAR Result Of LTE Band 2

Test position	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	SAR (W/kg) 10-g	Power Drift (dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg) 1-g	Liquid Temp.	SAR limit (W/kg)
Body Test data 10mm												
Front side	20M_QPSK 1RB_50	18900/1880	1:1	0.329	0.172	0.01	23.8	24	1.047	0.344	22.3	1.6
Back side	20M_QPSK 1RB_50	18900/1880	1:1	0.375	0.185	0.1	23.8	24	1.047	0.392	22.3	1.6
Right side	20M_QPSK 1RB_50	18900/1880	1:1	0.414	0.210	-0.09	23.8	24	1.047	**0.434**	22.3	1.6
Top side	20M_QPSK 1RB_50	18900/1880	1:1	0.156	0.093	-0.04	23.8	24	1.047	0.163	22.3	1.6
Bottom side	20M_QPSK 1RB_50	18900/1880	1:1	0.107	0.062	0.06	23.8	24	1.047	0.112	22.3	1.6
Right side	20M_QPSK 50RB_0	18700/1860	1:1	0.324	0.167	0.01	22.4	23	1.148	0.372	22.3	1.6

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8.3.5 SAR Result Of LTE Band 4

Test position	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	SAR (W/kg) 10-g	Power Drift (dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg) 1-g	Liquid Temp.	SAR limit (W/kg)
Body Test data 10mm												
Front side	20M_QPSK 1RB_99	20300/1745	1:1	0.258	0.125	-0.1	23.64	24	1.086	0.280	22.2	1.6
Back side	20M_QPSK 1RB_99	20300/1745	1:1	0.275	0.142	-0.08	23.64	24	1.086	0.299	22.2	1.6
Right side	20M_QPSK 1RB_99	20300/1745	1:1	0.333	0.140	0.16	23.64	24	1.086	**0.362**	22.2	1.6
Top side	20M_QPSK 1RB_99	20300/1745	1:1	0.114	0.058	-0.13	23.64	24	1.086	0.124	22.2	1.6
Bottom side	20M_QPSK 1RB_99	20300/1745	1:1	0.082	0.023	0.02	23.64	24	1.086	0.089	22.2	1.6
Right side	20M_QPSK 50RB_0	20300/1745	1:1	0.254	0.113	-0.07	22.61	23	1.094	0.278	22.2	1.6

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8.3.6 SAR Result Of LTE Band 5

Test position	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	SAR (W/kg) 10-g	Power Drift (dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg) 1-g	Liquid Temp.	SAR limit (W/kg)
Body Test data 10mm												
Front side	10M_QPSK 1RB_25	20600/844	1:1	0.191	0.096	0.05	24.01	25	1.256	0.239	22.1	1.6
Back side	10M_QPSK 1RB_25	20600/844	1:1	0.226	0.094	-0.01	24.01	25	1.256	0.284	22.1	1.6
Right side	10M_QPSK 1RB_25	20600/844	1:1	0.237	0.115	0.11	24.01	25	1.256	**0.297**	22.1	1.6
Top side	10M_QPSK 1RB_25	20600/844	1:1	0.083	0.055	0.1	24.01	25	1.256	0.104	22.1	1.6
Bottom side	10M_QPSK 1RB_25	20600/844	1:1	0.066	0.023	0.06	24.01	25	1.256	0.083	22.1	1.6
Right side	10M_QPSK 25RB_25	20450/829	1:1	0.185	0.093	0.05	22.86	24	1.300	0.241	22.1	1.6

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8.3.7 SAR Result Of LTE Band 12

Test position	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	SAR (W/kg) 10-g	Power Drift (dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg) 1-g	Liquid Temp.	SAR limit (W/kg)
Body Test data 10mm												
Front side	10M_QPSK 1RB_25	23130/711	1:1	0.131	0.065	0.03	23.69	24.5	1.205	0.157	22.1	1.6
Back side	10M_QPSK 1RB_25	23130/711	1:1	0.149	0.080	0.04	23.69	24.5	1.205	0.180	22.1	1.6
Right side	10M_QPSK 1RB_25	23130/711	1:1	0.169	0.091	0.11	23.69	24.5	1.205	**0.203**	22.1	1.6
Top side	10M_QPSK 1RB_25	23130/711	1:1	0.052	0.039	0.08	23.69	24.5	1.205	0.062	22.1	1.6
Bottom side	10M_QPSK 1RB_25	23130/711	1:1	0.038	0.023	-0.06	23.69	24.5	1.205	0.046	22.1	1.6
Right side	10M_QPSK 25RB_25	23060/704	1:1	0.112	0.056	-0.12	22.7	24	1.349	0.151	22.1	1.6

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8.3.8 SAR Result Of LTE Band 13

Test position	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	SAR (W/kg) 10-g	Power Drift (dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg) 1-g	Liquid Temp.	SAR limit (W/kg)
Body Test data 10mm												
Front side	10M_QPSK 1RB_25	23230/782	1:1	0.151	0.080	-0.09	23.85	24.5	1.161	0.176	22.1	1.6
Back side	10M_QPSK 1RB_25	23230/782	1:1	0.168	0.085	-0.14	23.85	24.5	1.161	0.195	22.1	1.6
Right side	10M_QPSK 1RB_25	23230/782	1:1	0.183	0.089	-0.02	23.85	24.5	1.161	**0.213**	22.1	1.6
Top side	10M_QPSK 1RB_25	23230/782	1:1	0.073	0.038	0.01	23.85	24.5	1.161	0.085	22.1	1.6
Bottom side	10M_QPSK 1RB_25	23230/782	1:1	0.040	0.019	0.06	23.85	24.5	1.161	0.047	22.1	1.6
Right side	10M_QPSK 25RB_25	23230/782	1:1	0.139	0.072	0.06	22.88	24	1.294	0.180	22.1	1.6

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8.3.9 SAR Result Of LTE Band 14

Test position	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	SAR (W/kg) 10-g	Power Drift (dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg) 1-g	Liquid Temp.	SAR limit (W/kg)
Body Test data 10mm												
Front side	10M_QPSK 1RB_25	23330/793	1:1	0.114	0.063	0.15	23.85	24.5	1.161	0.132	22.1	1.6
Back side	10M_QPSK 1RB_25	23330/793	1:1	0.123	0.072	-0.01	23.85	24.5	1.161	0.143	22.1	1.6
Right side	10M_QPSK 1RB_25	23330/793	1:1	0.140	0.076	0.06	23.85	24.5	1.161	**0.163**	22.1	1.6
Top side	10M_QPSK 1RB_25	23330/793	1:1	0.045	0.024	-0.03	23.85	24.5	1.161	0.053	22.1	1.6
Bottom side	10M_QPSK 1RB_25	23330/793	1:1	0.036	0.020	0.17	23.85	24.5	1.161	0.042	22.1	1.6
Right side	10M_QPSK 25RB_0	23330/793	1:1	0.116	0.066	0.02	22.84	24	1.306	0.152	22.1	1.6

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8.3.10 SAR Result Of LTE Band 66

Test position	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	SAR (W/kg) 10-g	Power Drift (dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg) 1-g	Liquid Temp.	SAR limit (W/kg)
Body Test data 10mm												
Front side	20M_QPSK 1RB_50	132322/1745	1:1	0.104	0.048	0.12	23.77	24.5	1.183	0.124	22.1	1.6
Back side	20M_QPSK 1RB_50	132322/1745	1:1	0.126	0.055	0.08	23.77	24.5	1.183	0.149	22.1	1.6
Right side	20M_QPSK 1RB_50	132322/1745	1:1	0.131	0.064	-0.03	23.77	24.5	1.183	**0.155**	22.1	1.6
Top side	20M_QPSK 1RB_50	132322/1745	1:1	0.043	0.020	0.04	23.77	24.5	1.183	0.051	22.1	1.6
Bottom side	20M_QPSK 1RB_50	132572/1770	1:1	0.030	0.012	0.01	23.77	24.5	1.183	0.035	22.1	1.6
Right side	20M_QPSK 50RB_50	132072/1720	1:1	0.104	0.052	-0.03	22.63	24	1.371	0.143	22.1	1.6

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8.3.11 SAR Result Of LTE Band 71

Test position	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	SAR (W/kg) 10-g	Power Drift (dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg) 1-g	Liquid Temp.	SAR limit (W/kg)
Body Test data 10mm												
Front side	20M_QPSK 1RB_50	133222/673	1:1	0.107	0.057	0.08	23.44	24	1.138	0.121	22.1	1.6
Back side	20M_QPSK 1RB_50	133222/673	1:1	0.117	0.054	-0.04	23.44	24	1.138	0.134	22.1	1.6
Right side	20M_QPSK 1RB_50	133222/673	1:1	0.133	0.069	0.01	23.44	24	1.138	**0.152**	22.1	1.6
Top side	20M_QPSK 1RB_50	132322/1745	1:1	0.053	0.025	0.07	23.44	24	1.138	0.061	22.1	1.6
Bottom side	20M_QPSK 1RB_50	133222/673	1:1	0.035	0.014	-0.03	23.44	24	1.138	0.040	22.1	1.6
Right side	20M_QPSK 50RB_50	133222/673	1:1	0.112	0.051	-0.03	22.34	23	1.164	0.130	22.1	1.6

8.4 Multiple Transmitter Evaluation

8.4.1 Simultaneous SAR SAR test evaluation

Simultaneous Transmission

NO.	Simultaneous Transmission Configuration	Body
1	WWAN + WIFI 2.4G	Yes
2	WWAN + WIFI 5G	Yes
3	WIFI 2.4G + WIFI 5G	No

2) Simultaneous Transmission SAR Summation Scenario for head

WWAN Band	Exposure position	①MAX. WWAN SAR (W/kg)	②MAX. WLAN2.4G SAR (W/kg)	③MAX. WLAN 5G SAR (W/kg)	Summed SAR ①+②	Summed SAR ①+③	Volume scan
WCDMA Band II	Front side	0.347	0.013	0.14	0.360	**0.487**	NO

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	Back side	0.394	0.009	0.073	0.403	0.467	NO
	Right side	0.435	0	0	0.435	0.435	NO
	Left side	0	0.007	0.01	0.007	0.010	NO
	Top side	0.164	0.015	0.211	0.179	0.375	NO
	Bottom side	0.114	0.016	0.228	0.130	0.342	NO
WCDMA Band IV	Front side	0.265	0.013	0.14	0.278	0.405	NO
	Back side	0.303	0.009	0.073	0.312	0.376	NO
	Right side	0.334	0	0	0.334	0.334	NO
	Left side	0	0.007	0.01	0.007	0.010	NO
	Top side	0.125	0.015	0.211	0.140	0.336	NO
	Bottom side	0.087	0.016	0.228	0.103	0.315	NO
WCDMA Band V	Front side	0.155	0.013	0.14	0.168	0.295	NO
	Back side	0.177	0.009	0.073	0.186	0.250	NO
	Right side	0.194	0	0	0.194	0.194	NO
	Left side	0	0.007	0.01	0.007	0.010	NO
	Top side	0.073	0.015	0.211	0.088	0.284	NO
	Bottom side	0.051	0.016	0.228	0.067	0.279	NO
LTE Band 2	Front side	0.344	0.013	0.14	0.357	0.484	NO
	Back side	0.392	0.009	0.073	0.401	0.465	NO
	Right side	0.434	0	0	0.434	0.434	NO
	Left side	0	0.007	0.01	0.007	0.010	NO
	Top side	0.163	0.015	0.211	0.178	0.374	NO
	Bottom side	0.112	0.016	0.228	0.128	0.340	NO
LTE Band 4	Front side	0.28	0.013	0.14	0.293	0.420	NO
	Back side	0.299	0.009	0.073	0.308	0.372	NO
	Right side	0.362	0	0	0.362	0.362	NO
	Left side	0	0.007	0.01	0.007	0.010	NO
	Top side	0.124	0.015	0.211	0.139	0.335	NO
	Bottom side	0.089	0.016	0.228	0.105	0.317	NO

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LTE Band 5	Front side	0.239	0.013	0.14	0.252	0.379	NO
	Back side	0.284	0.009	0.073	0.293	0.357	NO
	Right side	0.297	0	0	0.297	0.297	NO
	Left side	0	0.007	0.01	0.007	0.010	NO
	Top side	0.104	0.015	0.211	0.119	0.315	NO
	Bottom side	0.083	0.016	0.228	0.099	0.311	NO
LTE Band 12	Front side	0.157	0.013	0.14	0.170	0.297	NO
	Back side	0.18	0.009	0.073	0.189	0.253	NO
	Right side	0.203	0	0	0.203	0.203	NO
	Left side	0	0.007	0.01	0.007	0.010	NO
	Top side	0.062	0.015	0.211	0.077	0.273	NO
	Bottom side	0.046	0.016	0.228	0.062	0.274	NO
LTE Band 13	Front side	0.176	0.013	0.14	0.189	0.316	NO
	Back side	0.195	0.009	0.073	0.204	0.268	NO
	Right side	0.213	0	0	0.213	0.213	NO
	Left side	0	0.007	0.01	0.007	0.010	NO
	Top side	0.085	0.015	0.211	0.100	0.296	NO
	Bottom side	0.047	0.016	0.228	0.063	0.275	NO
LTE Band 14	Front side	0.132	0.013	0.14	0.145	0.272	NO
	Back side	0.143	0.009	0.073	0.152	0.216	NO
	Right side	0.163	0	0	0.163	0.163	NO
	Left side	0	0.007	0.01	0.007	0.010	NO
	Top side	0.053	0.015	0.211	0.068	0.264	NO
	Bottom side	0.042	0.016	0.228	0.058	0.270	NO
LTE Band 66	Front side	0.124	0.013	0.14	0.137	0.264	NO
	Back side	0.149	0.009	0.073	0.158	0.222	NO
	Right side	0.155	0	0	0.155	0.155	NO
	Left side	0	0.007	0.01	0.007	0.010	NO
	Top side	0.051	0.015	0.211	0.066	0.262	NO

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	Bottom side	0.035	0.016	0.228	0.051	0.263	NO
LTE Band 71	Front side	0.121	0.013	0.14	0.134	0.261	NO
	Back side	0.134	0.009	0.073	0.143	0.207	NO
	Right side	0.152	0	0	0.152	0.152	NO
	Left side	0	0.007	0.01	0.007	0.010	NO
	Top side	0.061	0.015	0.211	0.076	0.272	NO
	Bottom side	0.04	0.016	0.228	0.056	0.268	NO

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9 Equipment list

Test Platform	SPEAG DASY5 Professional
Location	Compliance Certification Services (Kunshan) Inc.
Software Reference	DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Hardware Reference

	Equipment	Manufacturer	Model	Serial Number	Calibration Date	Due date of calibration
☒	P C	HP	Core(rm)3.16G	CZCO48171H	N/A	N/A
☒	Signal Generator	Agilent	N5182A	MY50142015	2021/09/24	2022/09/23
☒	S-Parameter Network Analyzer	Agilent	E5071B	MY42301382	2022/02/20	2023/02/19
☒	DAK-3.5 probe	SPEAG	DAK-3.5	1102	N/A	N/A
☒	Power meter	Anritsu	ML2495A	1445010	2021/04/15	2022/04/14
☒	Power sensor	Anritsu	MA2411B	1339220	2021/04/15	2022/04/14
☒	DAE	SPEAG	DAE4	1245	2021/05/19	2022/05/18
☒	E-field PROBE	SPEAG	EX3DV4	3798	2021/05/31	2022/05/30
☒	Dipole	SPEAG	D750V3	1078	2021/06/21	2024/06/20
☒	Dipole	SPEAG	D835V2	4d114	2019/06/11	2022/06/10
☒	Dipole	SPEAG	D900V2	1d079	2019/06/13	2022/06/12
☒	Dipole	SPEAG	D1800V2	2d170	2019/06/11	2022/06/10
☒	Dipole	SPEAG	D2450V2	817	2019/06/10	2022/06/09
☒	Dipole	SPEAG	D5GV2	1095	2019/06/14	2022/06/10
☒	Electro Thermometer	DTM	DTM3000	3030	2021/10/17	2022/10/16
☒	Amplifier	Mini-circuits	ZVE-8G	110405	N/A	N/A
☒	Amplifier	Mini-circuits	ZHL-42	QA1331003	N/A	N/A
☒	3db ATTENUATOR	MINI	MCL BW-S3W5	0533	N/A	N/A
☒	DUMMY PROBE	SPEAG	DP_2	SPDP2001AA	N/A	N/A
☒	Dual Directional Coupler	Woken	20W couple	DOM2BHW1A1	N/A	N/A
☐	SAM PHANTOM (ELI4 v4.0)	SPEAG	QDOVA001BB	1102	N/A	N/A
☒	Twin SAM Phantom	SPEAG	QD000P40CD	1609	N/A	N/A
☒	ROBOT	SPEAG	TX60	F10/5E6AA1/A101	N/A	N/A
☒	ROBOT KRC	SPEAG	CS8C	F10/5E6AA1/C101	N/A	N/A
☒	LIQUID CALIBRATION KIT	ANTENNESSA	41/05 OCP9	00425167	N/A	N/A

Note: All the equipments are within the valid period when the tests are performed.

All measurement facilities used to collect the measurement data are located at

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10 Calibration certificate

Please see the Appendix C

11 Photographs

Please see the Appendix D

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Appendix A: Detailed System Check Results

The plots are showing as followings.

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Date: 2022/01/08

Test Laboratory: Compliance Certification Services (Kunshan) Inc.

System Performance Check-Head 2450MHz

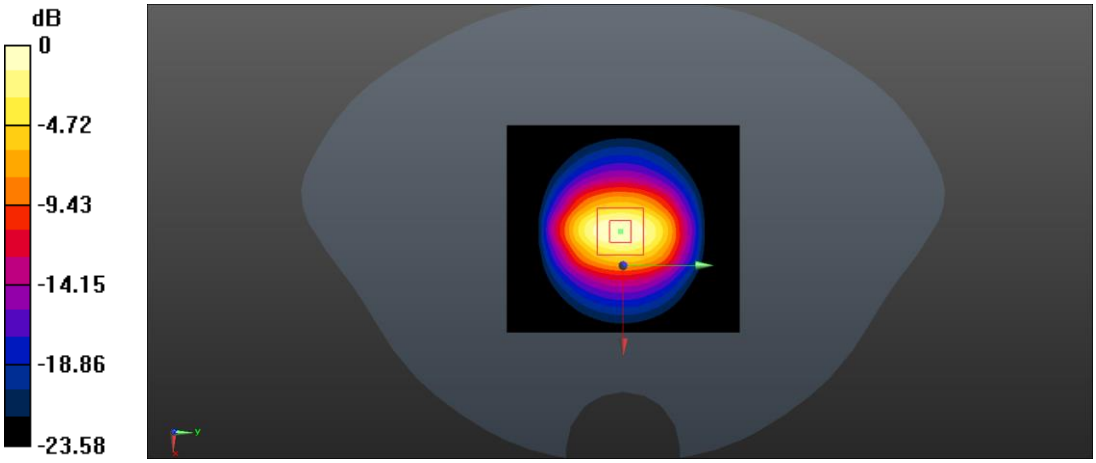
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 817

Communication System: UID 0, CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.782 S/m; ε_r = 39.422; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3798; ConvF(7.33, 7.33, 7.33); Calibrated: 2021/05/31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1245; Calibrated: 2021/05/19
- Phantom: Twin SAM Phantom; Type: QD 000 P40 CD; Serial: 1609
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

System Performance Check at Frequencies above 1 GHz/Pin=250 mW, dist=10mm (EX-Probe)/Area Scan (81x91x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 24.3 W/kg
System Performance Check at Frequencies above 1 GHz/Pin=250 mW, dist=10mm (EX-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 109.8 V/m; Power Drift = -0.07 dB; Peak SAR (extrapolated) = 29.3 W/kg
SAR(1 g) = 13.1 W/kg; SAR(10 g) = 6.03 W/kg
Maximum value of SAR (measured) = 23.4 W/kg



0 dB = 23.4 W/kg = 13.69 dBW/kg

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Test Laboratory: Compliance Certification Services (Kunshan) Inc.

SystemPerformanceCheck-5750Head

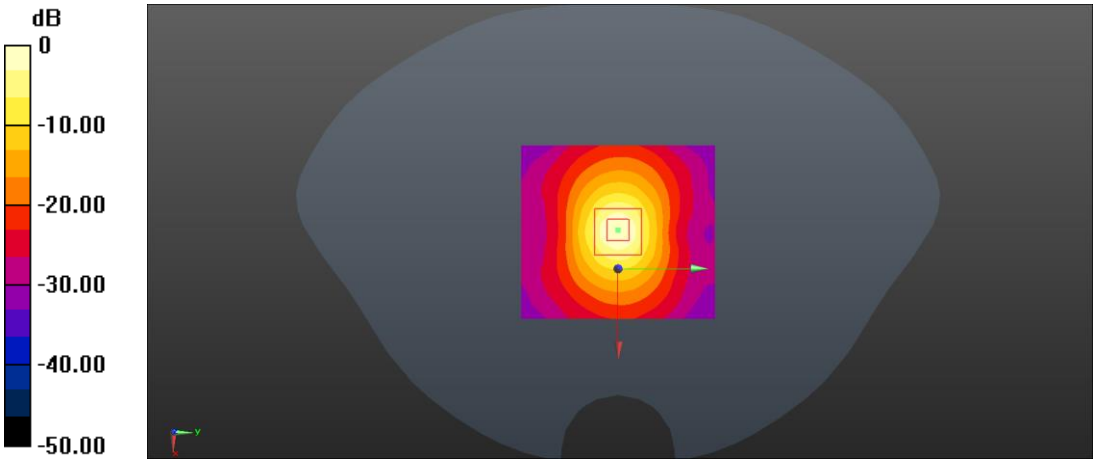
DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: 1095

Communication System: UID 0, CW (0); Frequency: 5750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5750 MHz; σ = 5.315 S/m; ε_r = 34.649; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3798; ConvF(4.6, 4.6, 4.6); Calibrated: 2021/05/31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1245; Calibrated: 2021/05/19
- Phantom: Twin SAM Phantom; Type: QD 000 P40 CD; Serial: 1609
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

System Performance Check with D5GHzV2 Dipole (graded grid)/d=10mm, Pin=100mW, f=5750 MHz/Area Scan (81x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 22.6 W/kg
System Performance Check with D5GHzV2 Dipole (graded grid)/d=10mm, Pin=100mW, f=5750 MHz/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 70.03 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 36.0 W/kg
SAR(1 g) = 7.96 W/kg; SAR(10 g) = 2.28 W/kg
Maximum value of SAR (measured) = 19.4 W/kg



0 dB = 19.4 W/kg = 12.88 dBW/kg

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Test Laboratory: Compliance Certification Services (Kunshan) Inc.

System Performance Check-Head 750MHz

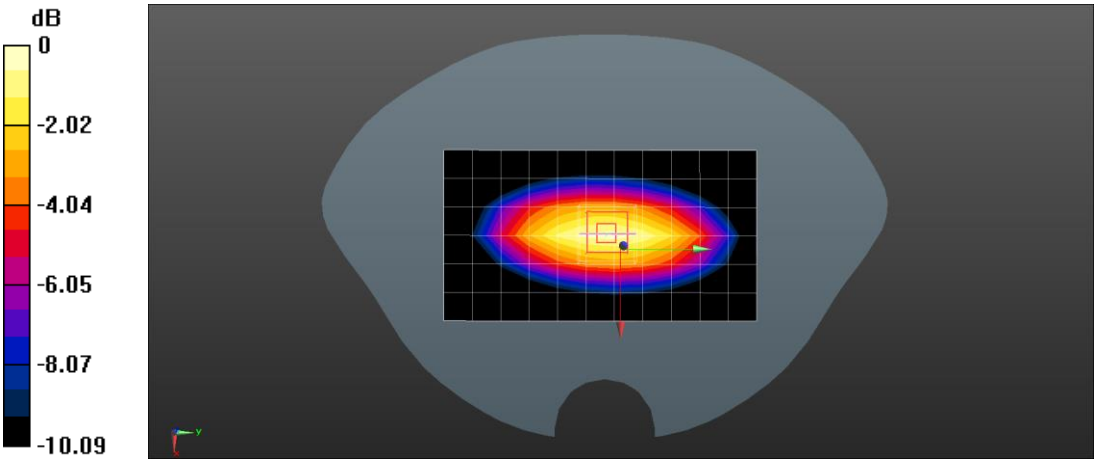
DUT: Dipole 750 MHz; Type: D750V3; Serial: 1078

Communication System: UID 0, CW (0); Frequency: 750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 750 MHz; σ = 0.879 S/m; ε_r = 42.786; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3798; ConvF(9.78, 9.78, 9.78); Calibrated: 2021/05/31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1245; Calibrated: 2021/05/19
- Phantom: Twin SAM Phantom; Type: QD 000 P40 CD; Serial: 1609
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

System Performance Check at Frequencies Low 1 GHz/d=15mm, Pin=250 mW, dist=3.0mm (EX-Probe)/Area Scan (7x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.61 W/kg
System Performance Check at Frequencies Low 1 GHz/d=15mm, Pin=250 mW, dist=3.0mm (EX-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 58.73 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 3.26 W/kg
SAR(1 g) = 2.22 W/kg; SAR(10 g) = 1.47 W/kg
Maximum value of SAR (measured) = 2.79 W/kg



0 dB = 2.79 W/kg = 4.46 dBW/kg

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Test Laboratory: Compliance Certification Services (Kunshan) Inc.

System Performance Check-Head D835

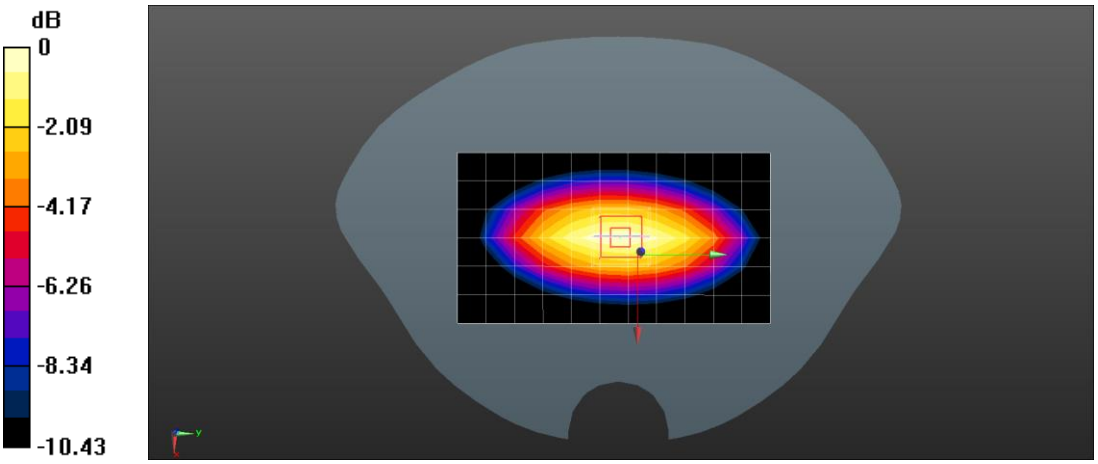
DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: D835V2 - SN4d114

Communication System: UID 0, CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.909 S/m; ε_r = 40.668; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3798; ConvF(9.52, 9.52, 9.52); Calibrated: 2021/05/31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1245; Calibrated: 2021/05/19
- Phantom: Twin SAM Phantom; Type: QD 000 P40 CD; Serial: 1609
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

System Performance Check at Frequencies Low 1 GHz/d=15mm, Pin=250 mW, dist=3.0mm (EX-Probe)/Area Scan (7x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.36 W/kg
System Performance Check at Frequencies Low 1 GHz/d=15mm, Pin=250 mW, dist=3.0mm (EX-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 52.33 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 2.82 W/kg
SAR(1 g) = 2.38 W/kg; SAR(10 g) = 1.53 W/kg
Maximum value of SAR (measured) = 2.38 W/kg



0 dB = 2.38 W/kg = 3.77 dBW/kg

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Date: 2022/03/17

Test Laboratory: Compliance Certification Services (Kunshan) Inc.

System Performance Check-Head D1800

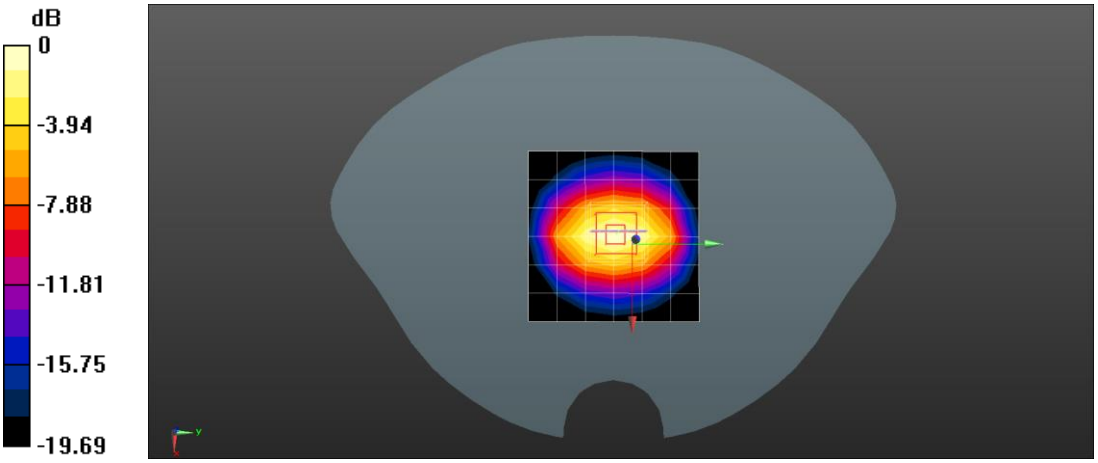
DUT: Dipole 1800 MHz D1800V2; Type: D1800V2; Serial: D1800V2 - SN:2d170

Communication System: UID 0, CW (0); Frequency: 1750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1750 MHz; σ = 1.348 S/m; ε_r = 38.467; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3798; ConvF(8.22, 8.22, 8.22); Calibrated: 2021/05/31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1245; Calibrated: 2021/05/19
- Phantom: Twin SAM Phantom; Type: QD 000 P40 CD; Serial: 1609
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

System Performance Check at Frequencies above 1 GHz/d=10mm, Pin=250 mW,(EX-Probe)/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 11.6 W/kg
System Performance Check at Frequencies above 1 GHz/d=10mm, Pin=250 mW,(EX-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.80 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 18.3 W/kg
SAR(1 g) = 9.34 W/kg; SAR(10 g) = 4.83 W/kg



0 dB = 11.6 W/kg = 10.64 dBW/kg

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Date: 2022/03/18

Test Laboratory: Compliance Certification Services (Kunshan) Inc.

System Performance Check-Head D1900

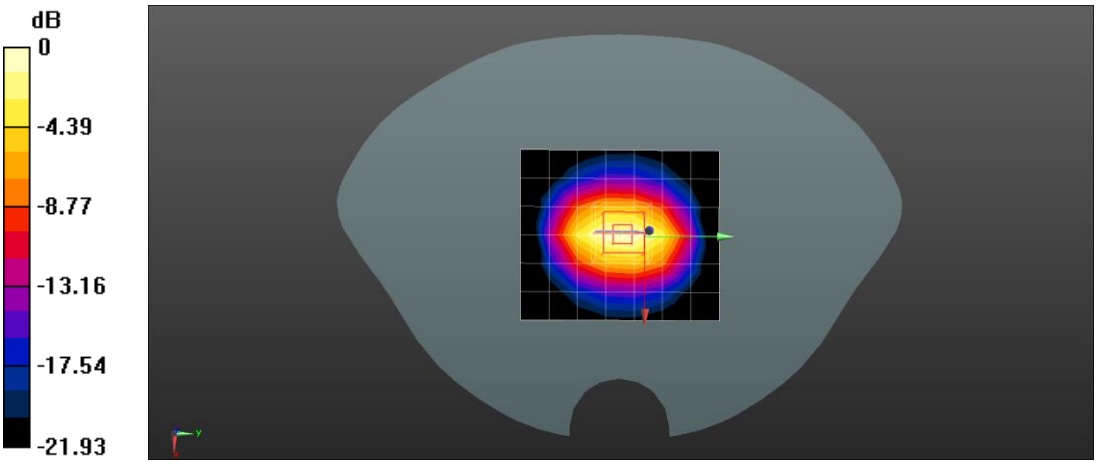
DUT: Dipole 1900 MHz D1900V2; Type: D1900V2; Serial: 5d136

Communication System: UID 0, CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.414 S/m; ε_r = 40.564; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3798; ConvF(7.89, 7.89, 7.89); Calibrated: 2021/05/31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1245; Calibrated: 2021/05/19
- Phantom: Twin SAM Phantom; Type: QD 000 P40 CD; Serial: 1609
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

System Performance Check at Frequencies above 1 GHz/Pin=250 mW, dist=10mm (EX-Probe)/Area Scan (7x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 13.4 W/kg
System Performance Check at Frequencies above 1 GHz/Pin=250 mW, dist=10mm (EX-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 103.1 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 20.3 W/kg
SAR(1 g) = 9.52 W/kg; SAR(10 g) = 4.95 W/kg
Maximum value of SAR (measured) = 14.6 W/kg



0 dB = 14.6 W/kg = 11.64 dBW/kg

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Appendix B: Detailed Test Results

The plots of worse case are showing as followings.

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Test Laboratory: Compliance Certification Services (Kunshan) Inc.

WLAN2.4GHz 802.11b Bottom side 10mm Ch1

DUT: LTE MiFi; Type: GT500AF

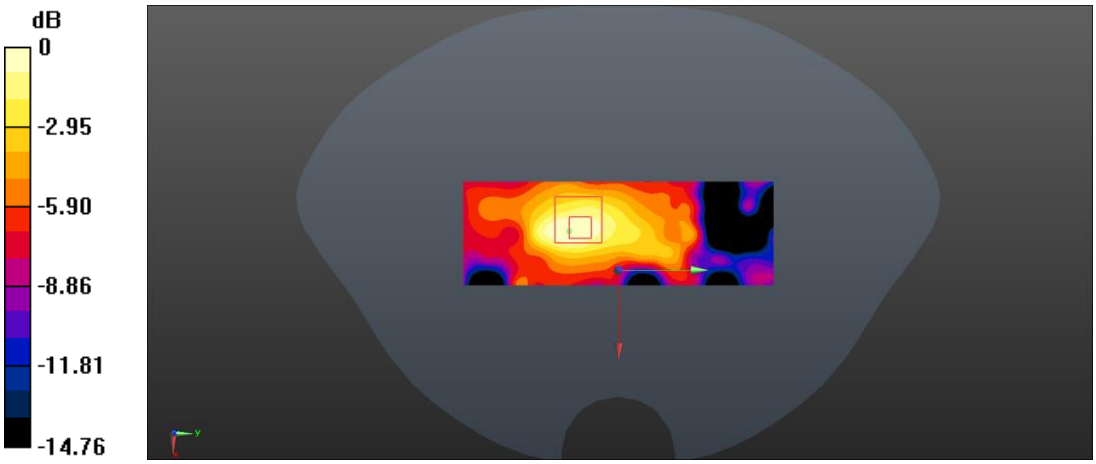
Communication System: UID 0, WiFi (0); Frequency: 2412 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2412 MHz; σ = 1.747 S/m; ε_r = 39.58; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3798; ConvF(7.33, 7.33, 7.33); Calibrated: 2021/05/31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1245; Calibrated: 2021/05/19
- Phantom: Twin SAM Phantom; Type: QD 000 P40 CD; Serial: 1609
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (41x121x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.0233 W/kg

Configuration/Body/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.746 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.0340 W/kg
SAR(1 g) = 0.013 W/kg; SAR(10 g) = 0.00721 W/kg
Maximum value of SAR (measured) = 0.0202 W/kg



0 dB = 0.0202 W/kg = -16.95 dBW/kg

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Date: 2022/01/08

Test Laboratory: Compliance Certification Services (Kunshan) Inc.

WLAN2.4GHz 802.11b Top side 10mm Ch1

DUT: LTE MiFi; Type: GT500AF

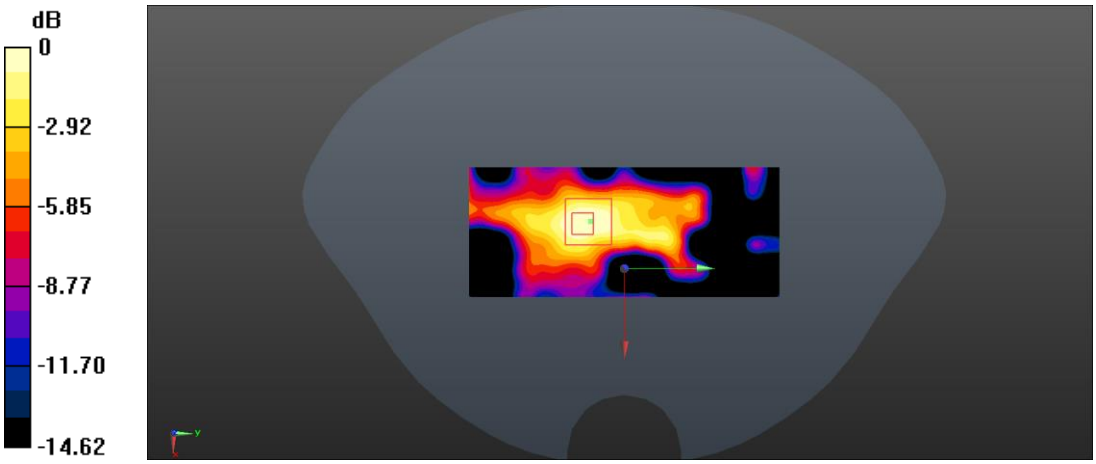
Communication System: UID 0, WiFi (0); Frequency: 2412 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2412 MHz; σ = 1.747 S/m; ε_r = 39.58; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3798; ConvF(7.33, 7.33, 7.33); Calibrated: 2021/05/31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1245; Calibrated: 2021/05/19
- Phantom: Twin SAM Phantom; Type: QD 000 P40 CD; Serial: 1609
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (51x121x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.0234 W/kg

Configuration/Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.667 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.0270 W/kg
SAR(1 g) = 0.014 W/kg; SAR(10 g) = 0.00736 W/kg
Maximum value of SAR (measured) = 0.0205 W/kg



0 dB = 0.0205 W/kg = -16.88 dBW/kg

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Date: 2022/01/08

Test Laboratory: Compliance Certification Services (Kunshan) Inc.

WLAN5GHz 802.11n(HT40) Bottom side 10mm Ch151

DUT: LTE MiFi; Type: GT500AF

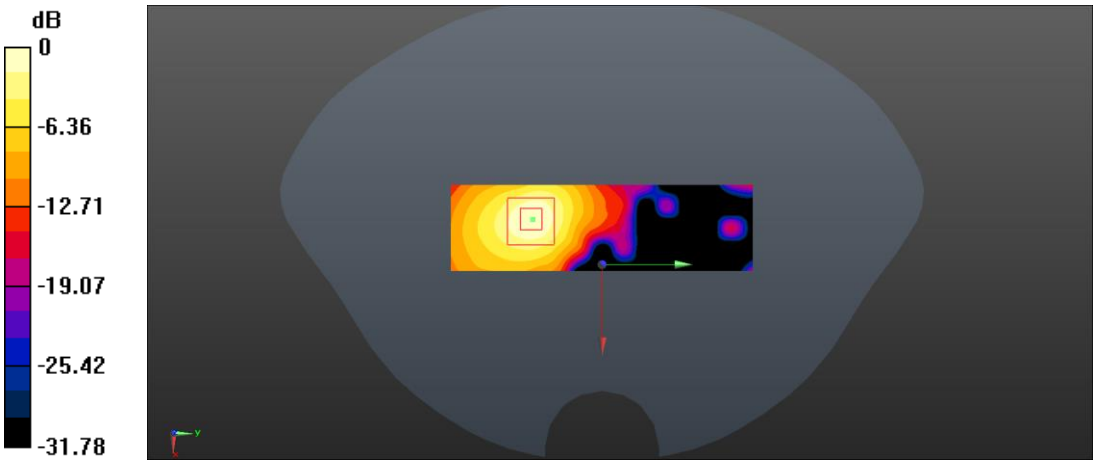
Communication System: UID 0, WiFi (0); Frequency: 5755 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5755 MHz; σ = 5.327 S/m; ε_r = 34.704; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3798; ConvF(4.6, 4.6, 4.6); Calibrated: 2021/05/31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1245; Calibrated: 2021/05/19
- Phantom: Twin SAM Phantom; Type: QD 000 P40 CD; Serial: 1609
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (41x141x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.474 W/kg

Configuration/Body/Zoom Scan (9x9x16)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 2.623 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.872 W/kg
SAR(1 g) = 0.198 W/kg; SAR(10 g) = 0.071 W/kg
Maximum value of SAR (measured) = 0.463 W/kg



0 dB = 0.463 W/kg = -3.34 dBW/kg

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Date: 2022/01/08

Test Laboratory: Compliance Certification Services (Kunshan) Inc.

WLAN5GHz 802.11n(HT40) Top side 10mm Ch159

DUT: LTE MiFi; Type: GT500AF

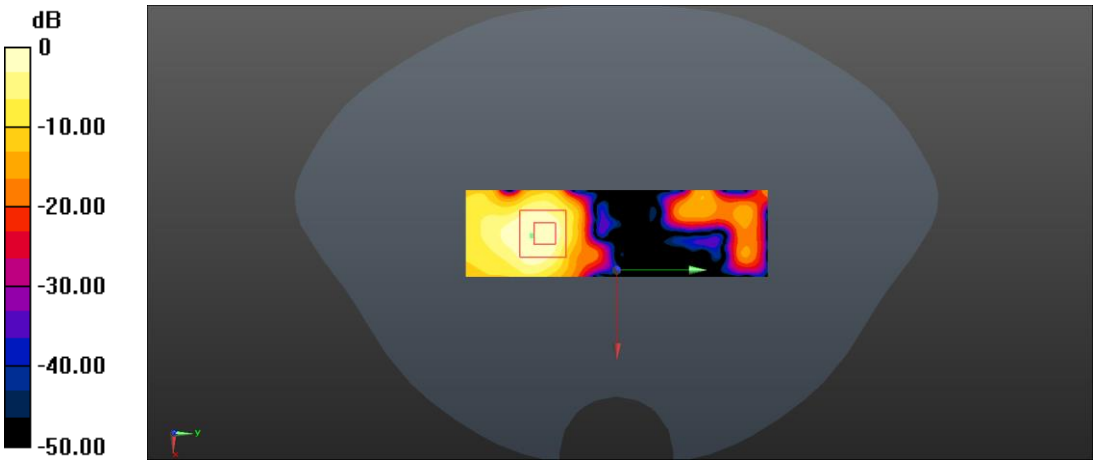
Communication System: UID 0, WiFi (0); Frequency: 5795 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5795 MHz; σ = 5.249 S/m; ε_r = 34.567; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3798; ConvF(4.6, 4.6, 4.6); Calibrated: 2021/05/31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1245; Calibrated: 2021/05/19
- Phantom: Twin SAM Phantom; Type: QD 000 P40 CD; Serial: 1609
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (41x141x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.20 W/kg

Configuration/Body/Zoom Scan (9x10x16)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.787 W/kg
SAR(1 g) = 0.177 W/kg; SAR(10 g) = 0.064 W/kg
Maximum value of SAR (measured) = 0.427 W/kg



0 dB = 0.427 W/kg = -3.70 dBW/kg

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Test Laboratory: Compliance Certification Services (Kunshan) Inc.

WCDMA Band II RMC Right side Ch9262

DUT: LTE MiFi; Type: GT500AF

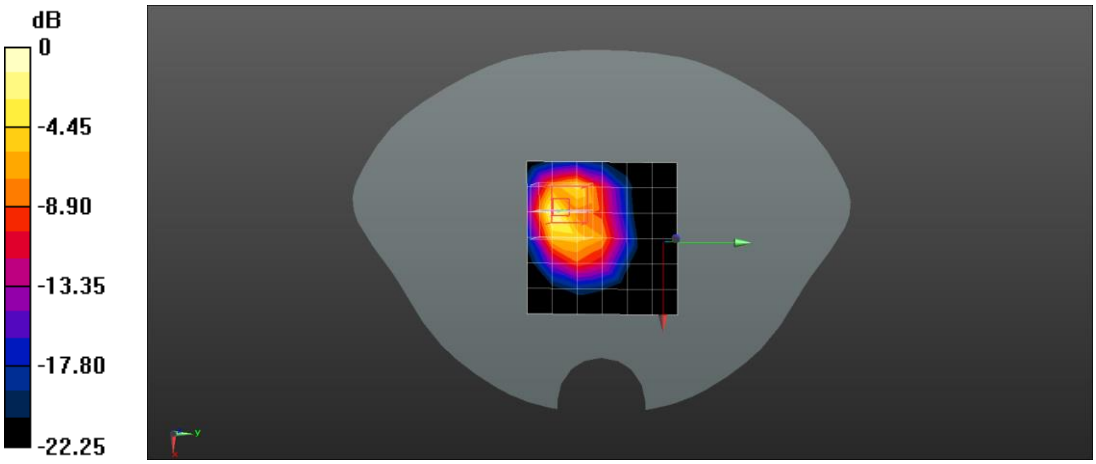
Communication System: UID 0, WCDMA / UMTS (0); Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.396 S/m; ε_r = 40.768; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3798; ConvF(7.89, 7.89, 7.89); Calibrated: 2021/05/31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1245; Calibrated: 2021/05/19
- Phantom: Twin SAM Phantom; Type: QD 000 P40 CD; Serial: 1609
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.859 W/kg

Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.42 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.17 W/kg
SAR(1 g) = 0.361 W/kg; SAR(10 g) = 0.174 W/kg
Maximum value of SAR (measured) = 1.03 W/kg



0 dB = 1.03 W/kg = 0.13 dBW/kg

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Date: 2022/03/17

Test Laboratory: Compliance Certification Services (Kunshan) Inc.

WCDMA Band IV RMC Right side Ch1312

DUT: LTE MiFi; Type: GT500AF

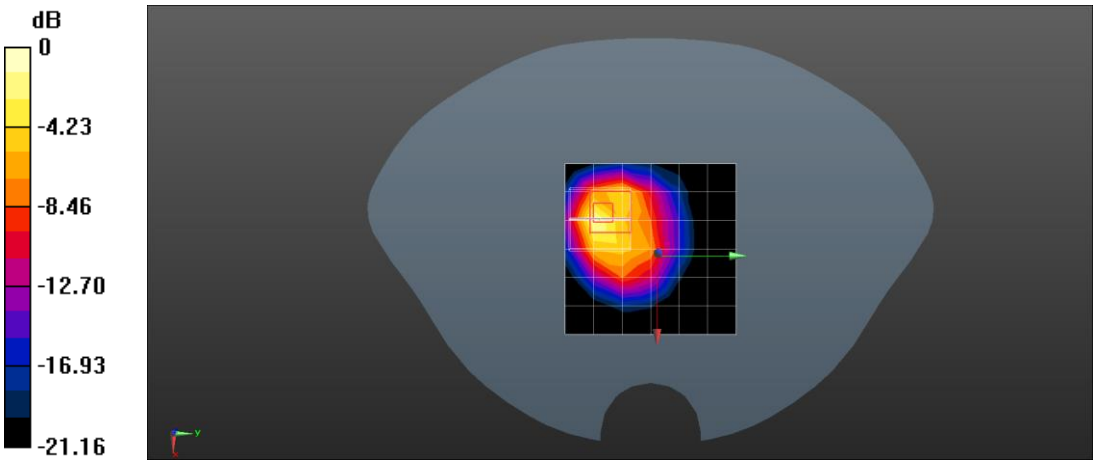
Communication System: UID 0, WCDMA / UMTS (0); Frequency: 1712.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1712.4 MHz; σ = 1.292 S/m; ε_r = 38.613; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3798; ConvF(8.22, 8.22, 8.22); Calibrated: 2021/05/31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1245; Calibrated: 2021/05/19
- Phantom: Twin SAM Phantom; Type: QD 000 P40 CD; Serial: 1609
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.811 W/kg

Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.11 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 2.61 W/kg
SAR(1 g) = 0.295 W/kg; SAR(10 g) = 0.127 W/kg
Maximum value of SAR (measured) = 0.858 W/kg



0 dB = 0.858 W/kg = -0.67 dBW/kg

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Date: 2022/03/17

Test Laboratory: Compliance Certification Services (Kunshan) Inc.

WCDMA Band V RMC Right side Ch4132

DUT: LTE MiFi; Type: GT500AF

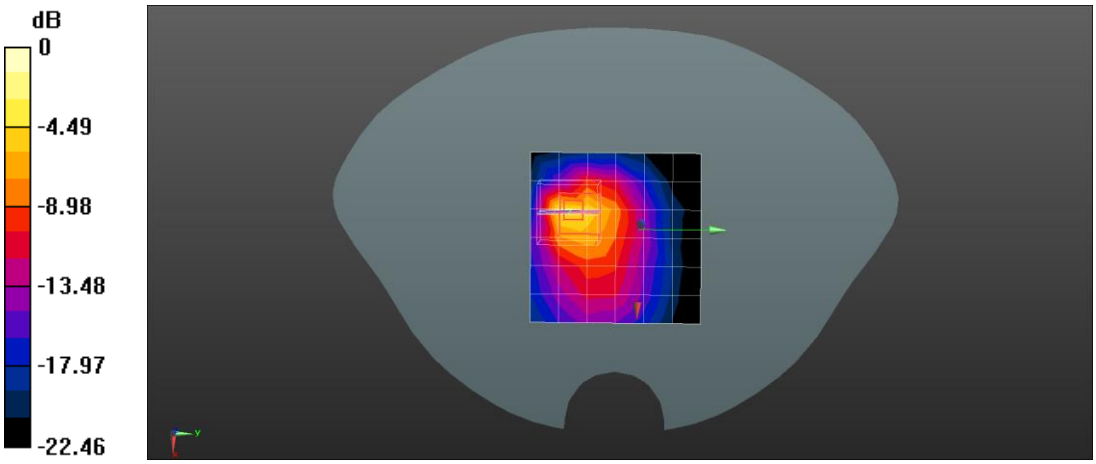
Communication System: UID 0, WCDMA / UMTS (0); Frequency: 826.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 826.4 MHz; σ = 0.899 S/m; ε_r = 40.791; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3798; ConvF(9.52, 9.52, 9.52); Calibrated: 2021/05/31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1245; Calibrated: 2021/05/19
- Phantom: Twin SAM Phantom; Type: QD 000 P40 CD; Serial: 1609
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.221 W/kg

Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.35 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 0.822 W/kg
SAR(1 g) = 0.162 W/kg; SAR(10 g) = 0.095 W/kg
Maximum value of SAR (measured) = 0.528 W/kg



0 dB = 0.528 W/kg = -2.77 dBW/kg

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Date: 2022/03/18

Test Laboratory: Compliance Certification Services (Kunshan) Inc.

LTE Band 2 20M QPSK 1RB50 Right side Ch18900

DUT: LTE MiFi; Type: GT500AF

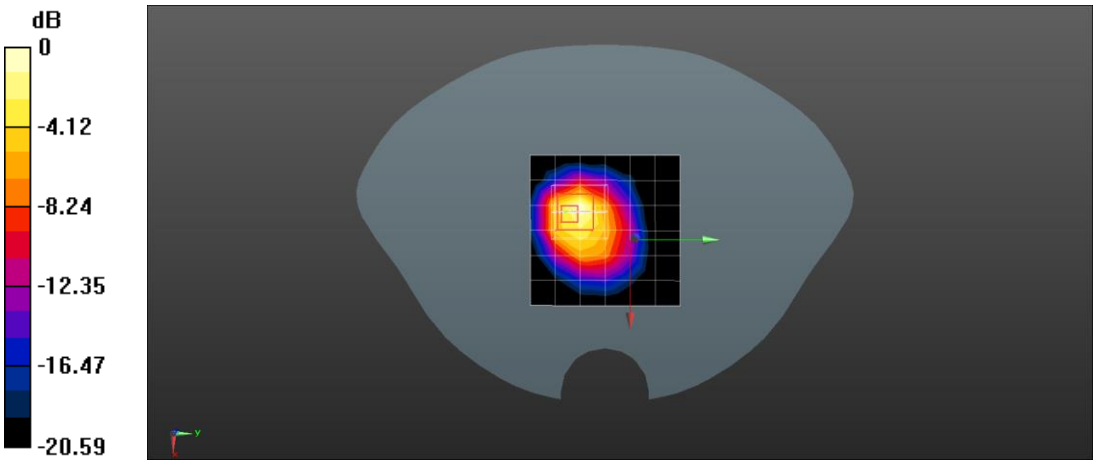
Communication System: UID 0, FDD_LTE (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.406 S/m; ε_r = 40.647; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3798; ConvF(7.89, 7.89, 7.89); Calibrated: 2021/05/31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1245; Calibrated: 2021/05/19
- Phantom: Twin SAM Phantom; Type: QD 000 P40 CD; Serial: 1609
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.873 W/kg

Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.43 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 1.25 W/kg
SAR(1 g) = 0.414 W/kg; SAR(10 g) = 0.210 W/kg
Maximum value of SAR (measured) =0.895 W/kg



0 dB = 0.895 W/kg = -0.48 dBW/kg

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Date: 2022/03/17

Test Laboratory: Compliance Certification Services (Kunshan) Inc.

LTE Band 4 20M QPSK 1RB99 Right side Ch20300

DUT: LTE MiFi; Type: GT500AF

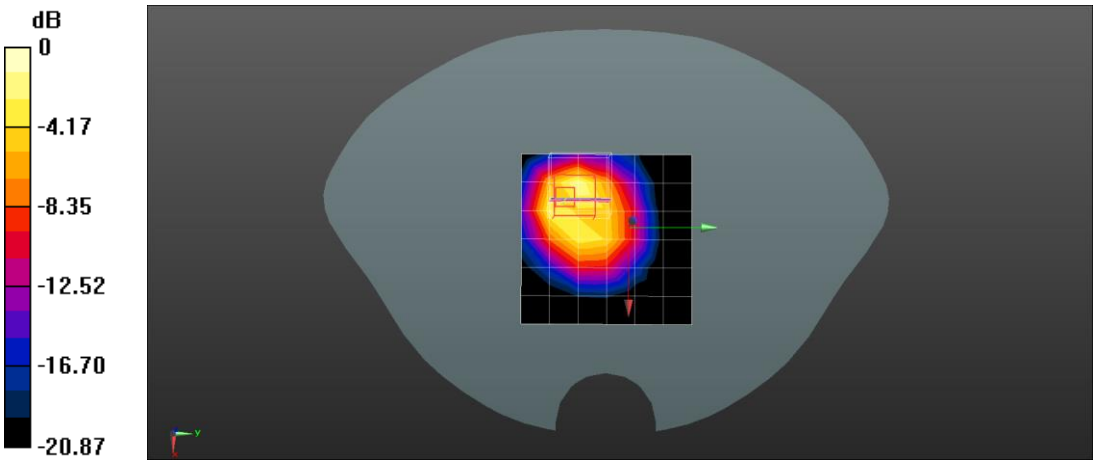
Communication System: UID 0, FDD_LTE (0); Frequency: 1745 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1745 MHz; σ = 1.322 S/m; ε_r = 38.517; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3798; ConvF(8.22, 8.22, 8.22); Calibrated: 2021/05/31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1245; Calibrated: 2021/05/19
- Phantom: Twin SAM Phantom; Type: QD 000 P40 CD; Serial: 1609
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.05 W/kg

Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.27 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 1.20 W/kg
SAR(1 g) = 0.333 W/kg; SAR(10 g) = 0.140 W/kg
Maximum value of SAR (measured) = 1.10 W/kg



0 dB = 1.10 W/kg = 0.41 dBW/kg

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Date: 2022/03/17

Test Laboratory: Compliance Certification Services (Kunshan) Inc.

LTE Band 5 10M QPSK 1RB25 Right side Ch20600

DUT: LTE MiFi; Type: GT500AF

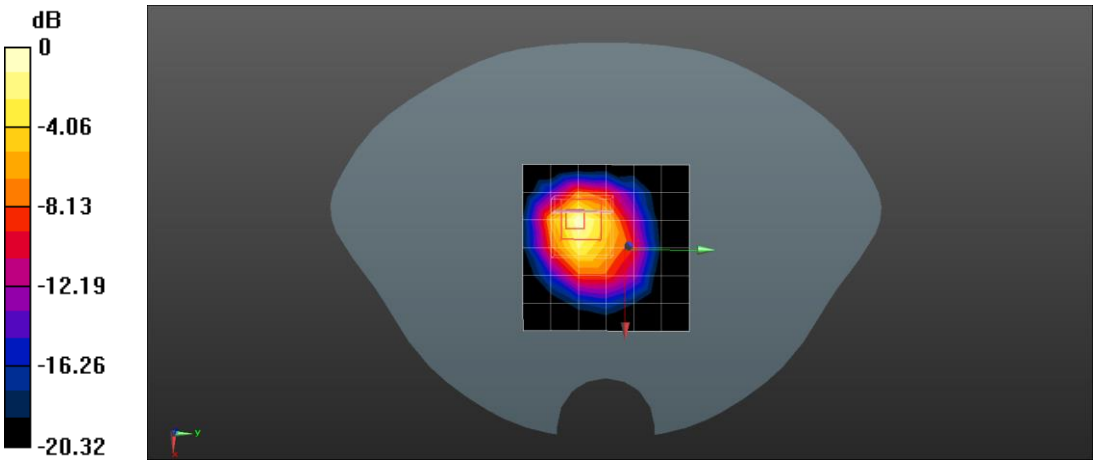
Communication System: UID 0, FDD_LTE (0); Frequency: 844 MHz;Duty Cycle: 1:1
Medium parameters used: f = 844 MHz; σ = 0.917 S/m; ε_r = 40.546; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3798; ConvF(9.52, 9.52, 9.52); Calibrated: 2021/05/31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1245; Calibrated: 2021/05/19
- Phantom: Twin SAM Phantom; Type: QD 000 P40 CD; Serial: 1609
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.656 W/kg

Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.87 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 1.58 W/kg
SAR(1 g) = 0.237 W/kg; SAR(10 g) = 0.115 W/kg
Maximum value of SAR (measured) = 0.820 W/kg



0 dB = 0.820 W/kg = -0.86 dBW/kg

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Date: 2022/03/17

Test Laboratory: Compliance Certification Services (Kunshan) Inc.

LTE Band 12 10M QPSK 1RB25 Right side Ch23130

DUT: LTE MiFi; Type: GT500AF

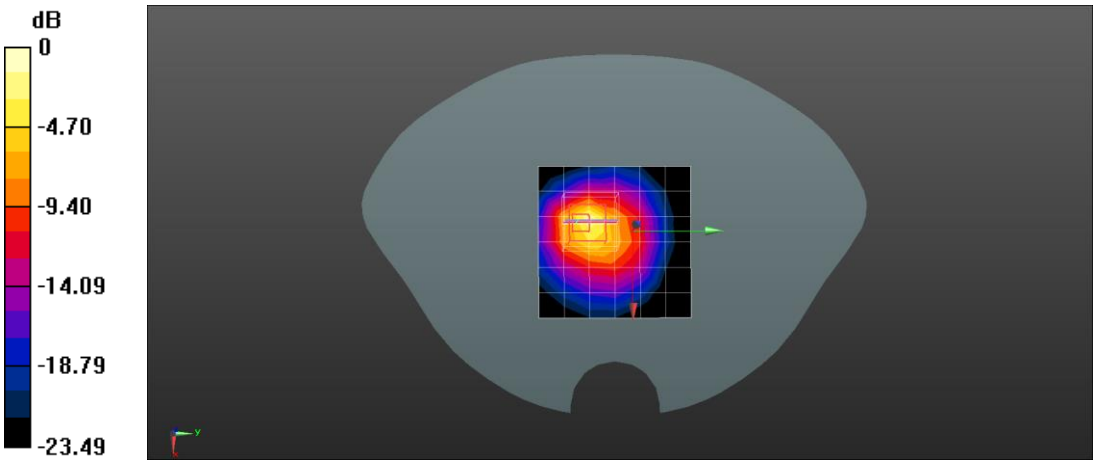
Communication System: UID 0, FDD_LTE (0); Frequency: 711 MHz;Duty Cycle: 1:1
Medium parameters used: f = 711 MHz; σ = 0.829 S/m; ε_r = 43.316; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3798; ConvF(9.78, 9.78, 9.78); Calibrated: 2021/05/31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1245; Calibrated: 2021/05/19
- Phantom: Twin SAM Phantom; Type: QD 000 P40 CD; Serial: 1609
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.473 W/kg

Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.60 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 0.891 W/kg
SAR(1 g) = 0.169 W/kg; SAR(10 g) = 0.091 W/kg
Maximum value of SAR (measured) = 0.625 W/kg



0 dB = 0.625 W/kg = -2.04 dBW/kg

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Date: 2022/03/17

Test Laboratory: Compliance Certification Services (Kunshan) Inc.

LTE Band 13 10M QPSK 1RB25 Right side Ch23230

DUT: LTE MiFi; Type: GT500AF

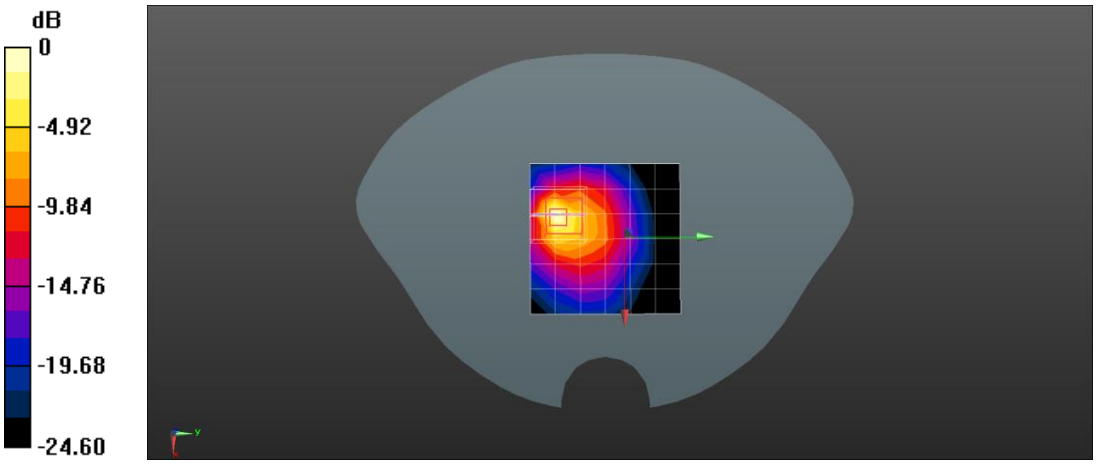
Communication System: UID 0, FDD_LTE (0); Frequency: 782 MHz;Duty Cycle: 1:1
Medium parameters used: f = 782 MHz; σ = 0.911 S/m; ε_r = 42.087; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3798; ConvF(9.78, 9.78, 9.78); Calibrated: 2021/05/31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1245; Calibrated: 2021/05/19
- Phantom: Twin SAM Phantom; Type: QD 000 P40 CD; Serial: 1609
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.343 W/kg

Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.14 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.06 W/kg
SAR(1 g) = 0.183 W/kg; SAR(10 g) = 0.089 W/kg
Maximum value of SAR (measured) = 0.525 W/kg



0 dB = 0.525 W/kg = -2.77 dBW/kg

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Date: 2022/03/17

Test Laboratory: Compliance Certification Services (Kunshan) Inc.

LTE Band 14 10M QPSK 1RB25 Right side Ch23330

DUT: LTE MiFi; Type: GT500AF

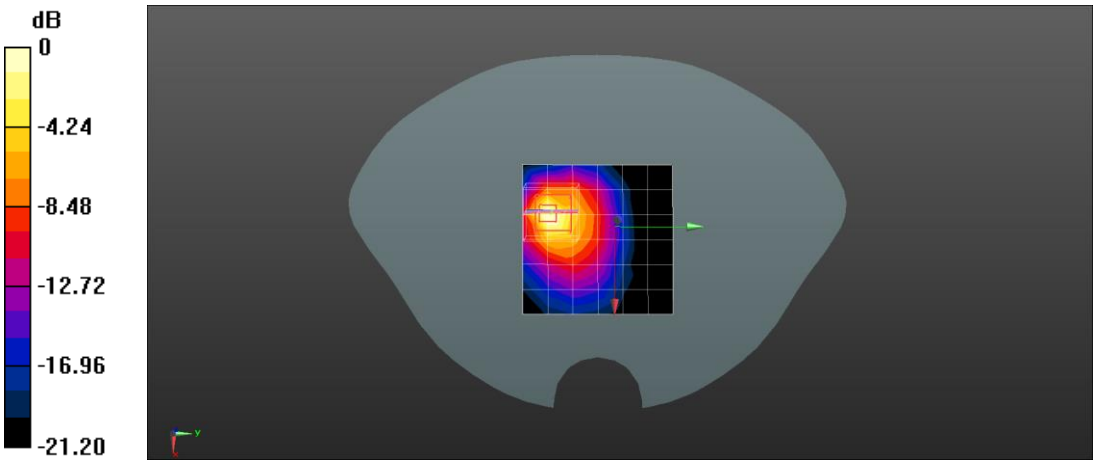
Communication System: UID 0, FDD_LTE (0); Frequency: 793 MHz;Duty Cycle: 1:1
Medium parameters used: f = 793 MHz; σ = 0.918 S/m; ε_r = 42.587; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3798; ConvF(9.78, 9.78, 9.78); Calibrated: 2021/05/31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1245; Calibrated: 2021/05/19
- Phantom: Twin SAM Phantom; Type: QD 000 P40 CD; Serial: 1609
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.587 W/kg

Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.404 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.766 W/kg
SAR(1 g) = 0.140 W/kg; SAR(10 g) = 0.076 W/kg
Maximum value of SAR (measured) = 0.405 W/kg



0 dB = 0.405 W/kg = -3.93 dBW/kg

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Date: 2022/03/17

Test Laboratory: Compliance Certification Services (Kunshan) Inc.

LTE Band 66 20M QPSK 1RB50 Right side Ch132322

DUT: LTE MiFi; Type: GT500AF

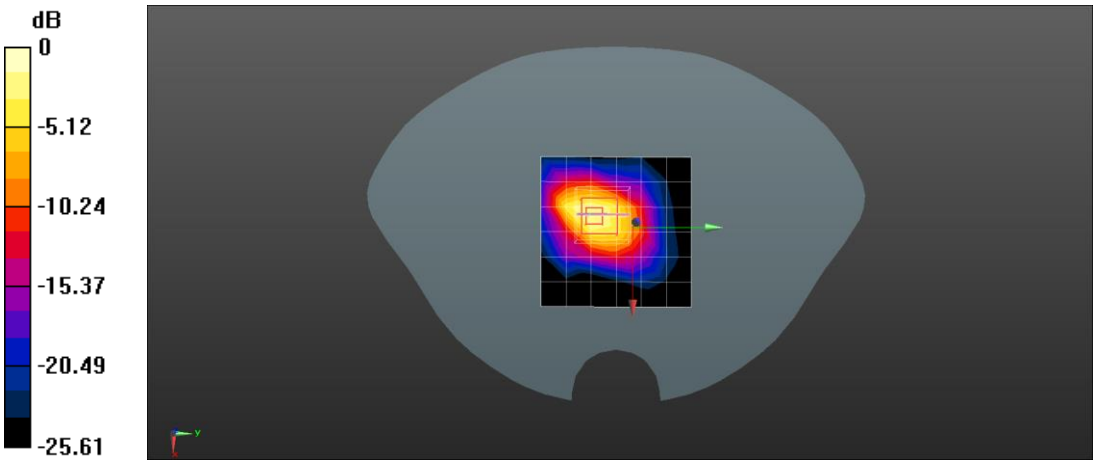
Communication System: UID 0, FDD_LTE (0); Frequency: 1745 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1745 MHz; σ = 1.322 S/m; ε_r = 38.517; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3798; ConvF(8.22, 8.22, 8.22); Calibrated: 2021/05/31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1245; Calibrated: 2021/05/19
- Phantom: Twin SAM Phantom; Type: QD 000 P40 CD; Serial: 1609
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.311 W/kg

Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 28.46 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.664 W/kg
SAR(1 g) = 0.131 W/kg; SAR(10 g) = 0.064 W/kg
Maximum value of SAR (measured) = 0.577 W/kg



0 dB = 0.577 W/kg = -2.39 dBW/kg

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Date: 2022/03/17

Test Laboratory: Compliance Certification Services (Kunshan) Inc.

LTE Band 71 20M QPSK 1RB50 Right side Ch133222

DUT: LTE MiFi; Type: GT500AF

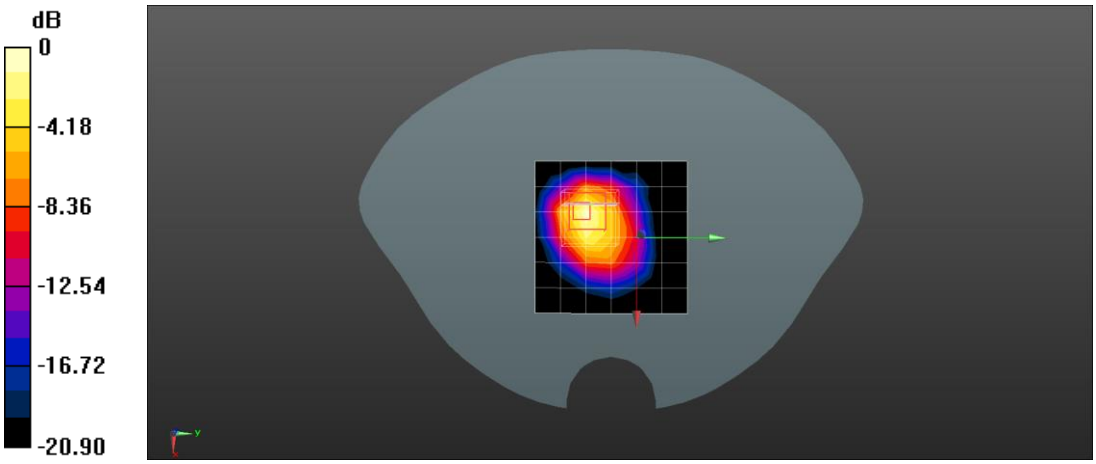
Communication System: UID 0, TDD_LTE (0); Frequency: 673 MHz;Duty Cycle: 1:1.57943
Medium parameters used: f = 673 MHz; σ = 0.801 S/m; ε_r = 43.81; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3798; ConvF(9.78, 9.78, 9.78); Calibrated: 2021/05/31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1245; Calibrated: 2021/05/19
- Phantom: Twin SAM Phantom; Type: QD 000 P40 CD; Serial: 1609
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Configuration/Body/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.305 W/kg

Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.46 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.653 W/kg
SAR(1 g) = 0.133 W/kg; SAR(10 g) = 0.069 W/kg
Maximum value of SAR (measured) = 0.469 W/kg



0 dB = 0.469 W/kg = -3.29 dBW/kg

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Appendix C: Calibration certificate

Appendix D: Photographs

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