

Report No.: SEWM2204000032RG01

Rev.: 01

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FCC SAR TEST REPORT

Application No.: SEWM2204000032RG
 Applicant: Binatone Electronics International Ltd.
 Manufacturer: Binatone Telecom Plc.
 Product Name: Kids Samrt Phone
 Model No.(EUT): MIMO PHONE
 Trade Mark: 
 FCC ID: VLJ-7568HP
 Standards: FCC 47CFR §2.1093
 Date of Receipt: 2022-04-18
 Date of Test: 2022-04-20 to 2022-06-13
 Date of Issue: 2022-06-14
 Test conclusion: **PASS ***

* In the configuration tested, the EUT detailed in this report complied with the standards specified above.

Authorized Signature:


 Pantu Sun

Wireless Laboratory Manager



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REVISION HISTORY

Report Number	Revision	Description	Issue Date
SEWM2204000032RG01	01	Original	2022-06-14



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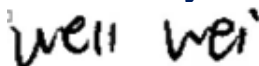
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TEST SUMMARY

Frequency Band	Maximum Reported SAR(W/kg)		
	Head	Body-worn	Hotspot
WCDMA Band II	0.17	0.63	0.63
WCDMA Band IV	0.12	0.51	0.51
WCDMA Band V	<0.10	0.14	0.14
LTE Band 2	0.15	0.63	0.63
LTE Band 7	0.53	1.28	1.28
LTE Band 12/17	<0.10	0.39	0.39
LTE Band 13	0.31	0.34	0.34
LTE Band 26	0.11	0.16	0.16
LTE Band 41	0.36	1.27	1.27
LTE Band 4/66	0.11	0.53	0.53
Wi-Fi (2.4GHz)	<0.10	0.94	0.94
BT	<0.10	<0.10	<0.10
SAR Limited(W/kg)	1.6		
Maximum Simultaneous Transmission SAR (W/kg)			
Scenario	Head	Body-worn	Hotspot
Sum SAR	0.59	1.57	1.57
SPLSR	N/A	0.04	0.04
SPLSR Limited	0.04		
Note:			
1) The Simultaneous transmission SAR is the same test position of the WWAN antenna + WiFi/BT antenna.			

Reviewed by



Well Wei

Prepared by



Nature Shen



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1 General Information

1.1 Details of Client

Applicant:	Binatone Electronics International Ltd.
Address:	25/F, Guangdong Investment Tower, 148 Connaught Road Central, Sheung Wan, Hong Kong.
Manufacturer:	Binatone Telecom Plc.
Address:	1 Apsley Way London NW2 7HF, United Kingdom

1.2 Test Location

Company:	SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd.
Address:	South of No. 6 Plant, No. 1, Runsheng Road, Suzhou Industrial Park, Suzhou Area, China (Jiangsu) Pilot Free Trade Zone
Post code:	215000
Test Engineer:	Nature Shen, KING-P li



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1.3 Test Facility

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

• **A2LA (Certificate No. 6336.01)**

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1.4 General Description of EUT

Device Type :	portable device		
Exposure Category:	uncontrolled environment / general population		
Product Name:	Kids Samrt Phone		
Model No.(EUT):	MIMO PHONE		
Trade Mark:			
FCC ID:	VLJ-7568HP		
Product Phase:	Identical Prototype		
IMEI:	868792030292455/868792030292471		
Hardware Version:	MiMo-P_MB_V2.1		
Software Version:	MIMOPHONE_2.1.0_us		
Antenna Type:	PIFA antenna		
Device Operating Configurations :			
Modulation Mode:	WCDMA: QPSK LTE: QPSK,16QAM; WIFI: DSSS,OFDM; BT: GFSK, $\pi/4$ DQPSK,8DPSK		
Power Class:	3, tested with power control “all 1”(WCDMA Band) 3, tested with power control Max Power(LTE Band)		
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 7	2500~2570	2620~2690
	LTE Band 12	699~716	729~746
	LTE Band 13	777~787	746~756
	LTE Band 17	704~716	734~746
	LTE Band 26	814~849	859~894
	LTE Band 41	2545~2655	2545~2655
	LTE Band 66	1710~1780	2110~2200
	Bluetooth	2402~2480	2402~2480
	Wi-Fi 2.4G	2412~2462	2412~2462
RF Cable:	☒ Provided by the aplicant ☐ Provided by the laboratory		
Battery Information:	Model:	DC794558	
	Normal Voltage:	DC3.8V	
	Rated capacity:	2500mAh	
	Manufacturer:	Dong Guan Ding Chen New Energy Co.,Ltd.	



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1.4.1 DUT Antenna Locations(Back View)



Note:

- 1) Div Antenna does not support transmitter function.
- 2) The test device is a smart phone. The overall diagonal dimension of this device is 132mm.

According to the distance between LTE/WDMA/WIFI&BT antennas and the sides of the EUT we can draw the conclusion that:

EUT Sides for SAR Testing							
Mode	Exposure Condition	Front	Back	Left	Right	Top	Bottom
Main Ant	Hotspot	Yes	Yes	Yes	Yes	No	Yes
WIFI 2.4G/BT	Hotspot	Yes	Yes	Yes	No	Yes	No

Table 1: EUT Sides for SAR Testing

Note:

- 1) When the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested.



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1.5 Test Specification

Identity	Document Title
FCC 47CFR §2.1093	Radiofrequency Radiation Exposure Evaluation: Portable Devices
ANSI/IEEE C95.1-1992	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz – 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 941225 D01	3G SAR Measurement Procedures v03r01
KDB 941225 D05	SAR for LTE Devices v02r05
KDB 941225 D06	Hotspot Mode SAR v02r01
KDB 248227 D01	SAR Guidance for IEEE 802 11 Wi-Fi SAR v02r02
KDB 648474 D04	Handset SAR v01r03
KDB 447498 D01	General RF Exposure Guidance v06
KDB 865664 D01	SAR Measurement 100 MHz to 6 GHz v01r04
KDB 865664 D02	RF Exposure Reporting v01r02
KDB 690783 D01	SAR Listings on Grants v01r03



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1.6 RF exposure limits

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

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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2 Laboratory Environment

Temperature	Min. = 18°C, Max. = 25 °C
Relative humidity	Min. = 30%, Max. = 70%
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.	

Table 2: The Ambient Conditions



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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 $SAR = \sigma (|E|^2) / \rho$ where σ and ρ are the conductivity and mass density of the tissue-Simulate.

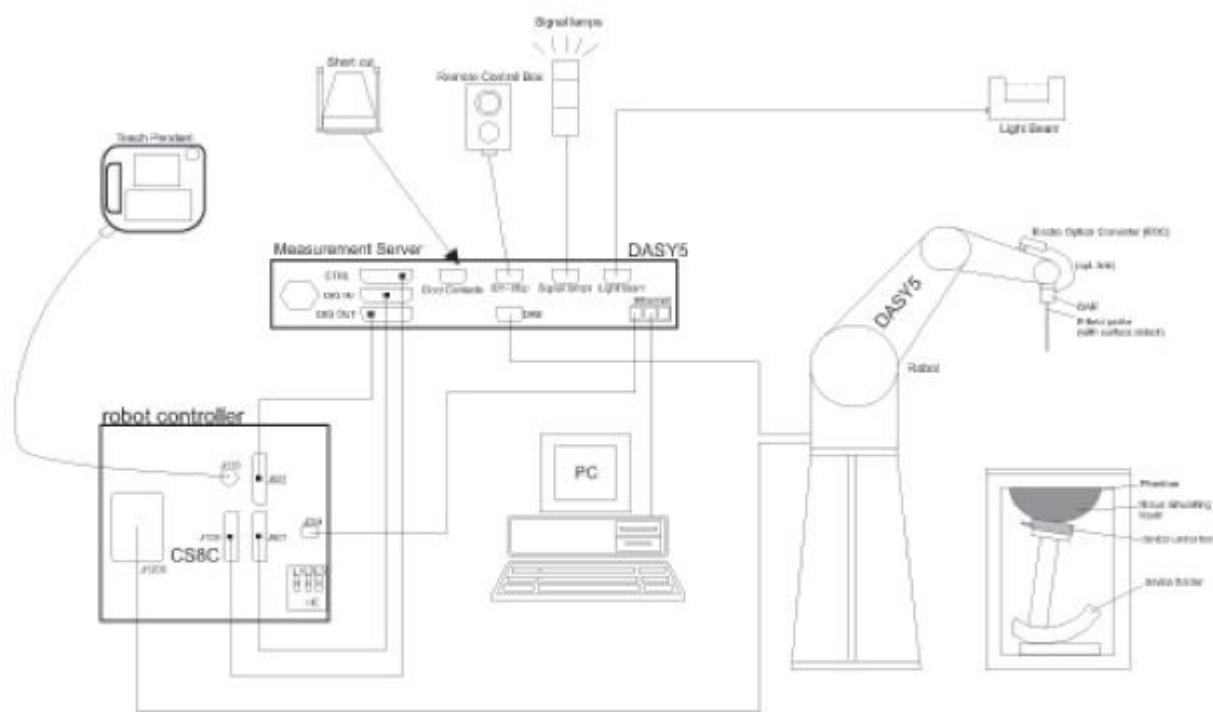
The DASY5 system for performing compliance tests consists of the following items:

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.



F-1. SAR Measurement System Configuration

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- 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 validating the proper functioning of the system.

3.2 Isotropic E-field Probe EX3DV4

	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 μ W/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μ W/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



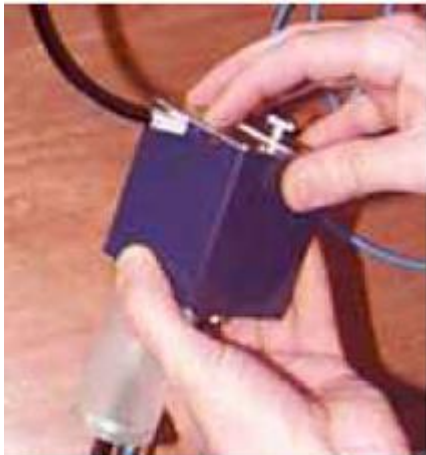
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3.3 Data Acquisition Electronics (DAE)

Model	DAE	
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.

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 $\epsilon=3$ and loss tangent $\delta=0.02$. 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.

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 32mm*32mm*30mm ($f \leq 2\text{GHz}$), 30mm*30mm*30mm (f for 2-3GHz) and 24mm*24mm*22mm (f for 5-6GHz) was assessed by measuring 5x5x7 points ($f \leq 2\text{GHz}$), 7x7x7 points (f for 2-3GHz) and 7x7x12 points (f for 5-6GHz). 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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		$\leq 3 \text{ GHz}$	$> 3 \text{ GHz}$
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface		$5 \pm 1 \text{ mm}$	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5 \text{ mm}$
Maximum probe angle from probe axis to phantom surface normal at the measurement location		$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
Maximum area scan spatial resolution: $\Delta x_{\text{Area}}, \Delta y_{\text{Area}}$		$\leq 2 \text{ GHz: } \leq 15 \text{ mm}$ $2 - 3 \text{ GHz: } \leq 12 \text{ mm}$	$3 - 4 \text{ GHz: } \leq 12 \text{ mm}$ $4 - 6 \text{ GHz: } \leq 10 \text{ mm}$
		When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\leq$ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan spatial resolution: $\Delta x_{\text{Zoom}}, \Delta y_{\text{Zoom}}$		$\leq 2 \text{ GHz: } \leq 8 \text{ mm}$ $2 - 3 \text{ GHz: } \leq 5 \text{ mm}^*$	$3 - 4 \text{ GHz: } \leq 5 \text{ mm}^*$ $4 - 6 \text{ GHz: } \leq 4 \text{ mm}^*$
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{\text{Zoom}}(n)$	$\leq 5 \text{ mm}$	$3 - 4 \text{ GHz: } \leq 4 \text{ mm}$ $4 - 5 \text{ GHz: } \leq 3 \text{ mm}$ $5 - 6 \text{ GHz: } \leq 2 \text{ mm}$
	graded grid $\Delta z_{\text{Zoom}}(1)$: between 1 st two points closest to phantom surface	$\leq 4 \text{ mm}$	$3 - 4 \text{ GHz: } \leq 3 \text{ mm}$ $4 - 5 \text{ GHz: } \leq 2.5 \text{ mm}$ $5 - 6 \text{ GHz: } \leq 2 \text{ mm}$
	$\Delta z_{\text{Zoom}}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{\text{Zoom}}(n-1)$	
Minimum zoom scan volume	x, y, z	$\geq 30 \text{ mm}$	$3 - 4 \text{ GHz: } \geq 28 \text{ mm}$ $4 - 5 \text{ GHz: } \geq 25 \text{ mm}$ $5 - 6 \text{ GHz: } \geq 22 \text{ mm}$

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. $\pm 5\%$



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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 ".DAE4". 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:

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

With V_i = compensated signal of channel i ($i = x, y, z$)

U_i = input signal of channel i ($i = x, y, z$)

cf = crest factor of exciting field (DASY parameter)

dcpi = diode compression point (DASY parameter)

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

E-field probes:

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



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H-field probes:

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

With V_i = 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

a_{ij} = sensor sensitivity factors for H-field probes

f = carrier frequency [GHz]

E_i = electric field strength of channel i in V/m

H_i = 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.

$$SAR = (E_{tot}^2 \cdot \sigma) / (\epsilon \cdot 1000)$$

with SAR = local specific absorption rate in mW/g

E_{tot} = 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.

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

with P_{pwe} = equivalent power density of a plane wave in mW/cm²

E_{tot} = total electric field strength in V/m

H_{tot} = 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 ($\sim 10\%$ 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.

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

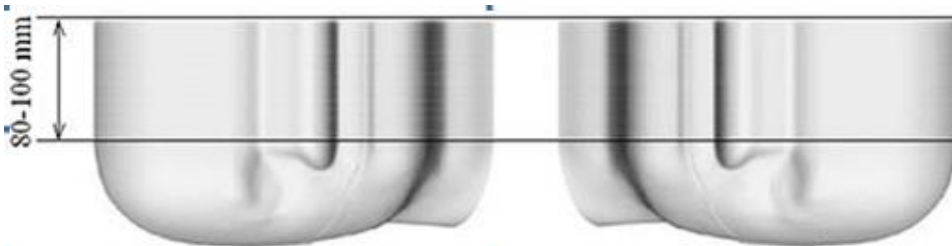
5.1 Head Exposure Condition

5.1.1 SAM Phantom Shape

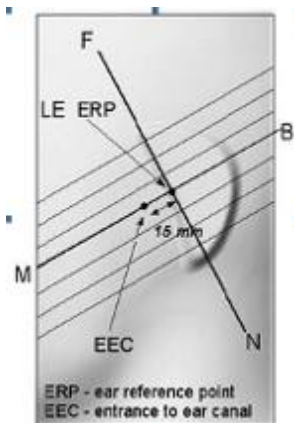


F-3. Front, back, and side views of SAM (model for the phantom shell). Full-head model is for illustration purposes only-procedures in this recommended practice are intended primarily for the phantom setup.

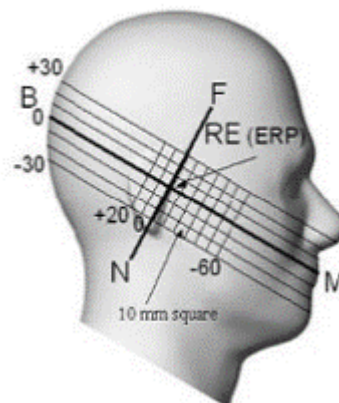
Note: The centre strip including the nose region has a different thickness tolerance.



F-4. Sagittally bisected phantom with extended perimeter (shown placed on its side as used for SAR measurements)

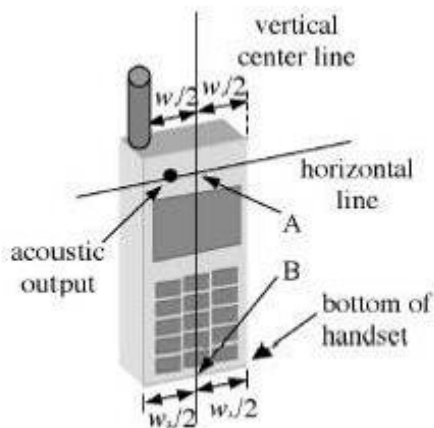


F-5. Close-up side view of phantom, showing the ear region, N-F and B-M lines, and seven cross-sectional plane locations

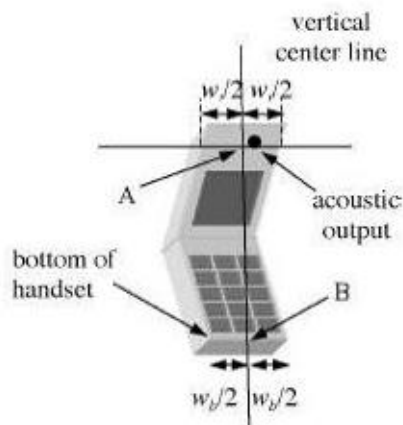


F-6. Side view of the phantom showing relevant markings and seven cross-sectional plane locations

5.1.2 EUT constructions



F-7. Handset vertical and horizontal reference lines—"fixed case"



F-8. Handset vertical and horizontal reference lines—"clam-shell case"

5.1.3 Definition of the "cheek" position

- Position the device with the vertical centre line of the body of the device and the horizontal line crossing the centre of the ear piece in a plane parallel to the sagittal plane of the phantom ("initial position"). While maintaining the device in this plane, align the vertical centre line with the reference plane containing the three ear and mouth reference points (M, RE and LE) and align the centre of the ear piece with the line RE-LE.
- Translate the mobile phone box towards the phantom with the ear piece aligned with the line LE-RE until telephone touches the ear. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the box until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost.



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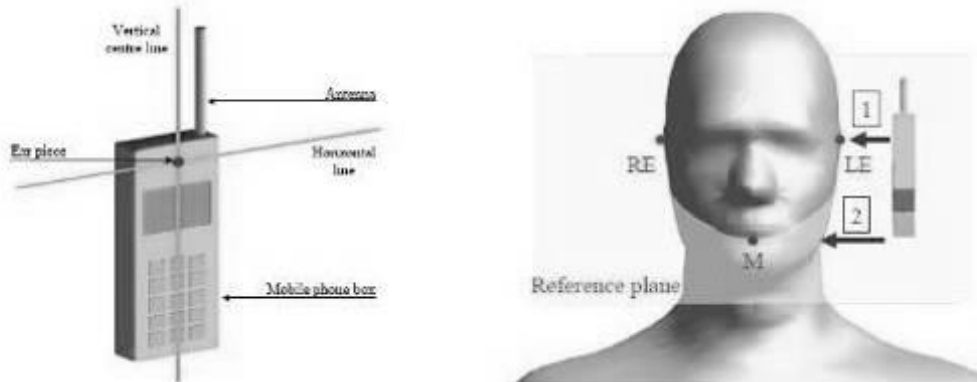
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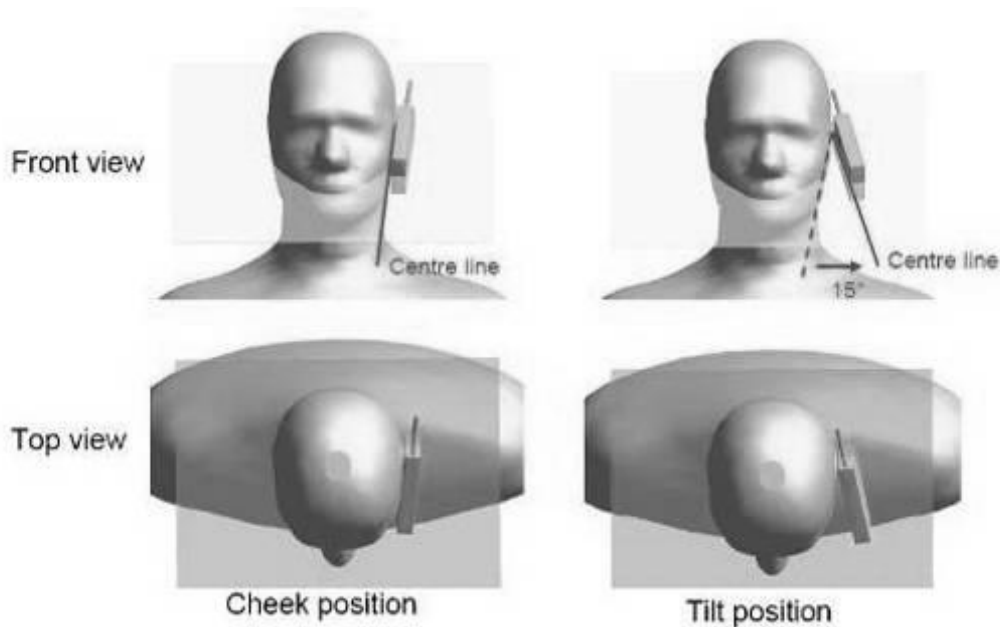
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5.1.4 Definition of the “tilted” position

- Position the device in the “cheek” position described above;
- While maintaining the device in the reference plane described above and pivoting against the ear, move it outward away from the mouth by an angle of 15 degrees or until contact with the ear is lost.



F-9. Definition of the reference lines and points, on the phone and on the phantom and initial position



F-10. “Cheek” and “tilt” positions of the mobile phone on the left side

5.2 Body Exposure Condition

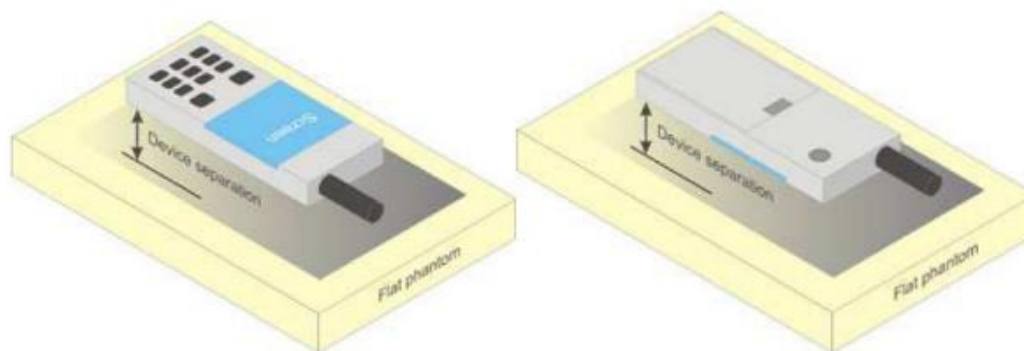
5.2.1 Body-worn accessory exposure conditions

Body-worn operating configurations should be tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in normal use configurations.

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration. Per FCC KDB Publication 648474 D04, Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB Publication 447498 D04 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is $> 1.2 \text{ W/kg}$, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

Body-worn accessories may not always be supplied or available as options for some devices intended to be authorized for body-worn use. In this case, a test configuration with a separation distance between the back of the device and the flat phantom is used. Test position spacing was documented. Transmitters that are designed to operate in front of a person's face, as in push-to-talk configurations, are tested for SAR compliance with the front of the device positioned to face the flat phantom in head fluid. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessories, including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.



F-11. Test positions for body-worn devices



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5.2.2 Wireless Router exposure conditions

Some battery-operated handsets have the capability to transmit and receive user data through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06 where SAR test considerations for handsets ($L \times W \geq 9 \text{ cm} \times 5 \text{ cm}$) are based on a composite test separation distance of 10 mm from the front, back and edges of the device containing transmitting antennas within 2.5 cm of their edges, determined from general mixed use conditions for this type of devices. For devices with form factors smaller than $9 \text{ cm} \times 5 \text{ cm}$, a test separation distance of 5 mm is required.



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6 SAR System Verification Procedure

6.1 Tissue Simulate Liquid

6.1.1 Recipes for Tissue Simulate Liquid

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

Ingredients (% by weight)	Frequency (MHz)				
	450	700-900	1750-2000	2300-2500	2500-2700
Water	38.56	40.30	55.24	55.00	54.92
Salt (NaCl)	3.95	1.38	0.31	0.2	0.23
Sucrose	56.32	57.90	0	0	0
HEC	0.98	0.24	0	0	0
Bactericide	0.19	0.18	0	0	0
Tween	0	0	44.45	44.80	44.85
Salt: 99+% Pure Sodium Chloride Water: De-ionized, 16 MΩ ⁺ resistivity Tween: Polyoxyethylene (20) sorbitan monolaurate Sucrose: 98+% Pure Sucrose HEC: Hydroxyethyl Cellulose					
HSL5GHz is composed of the following ingredients: Water: 50-65% Mineral oil: 10-30% Emulsifiers: 8-25% Sodium salt: 0-1.5%					

Table 3: Recipe of Tissue Simulate Liquid



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6.1.2 Measurement for Tissue Simulate Liquid

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 $22 \pm 2^\circ\text{C}$.

Tissue Type	Measured Frequency (MHz)	Target Tissue ($\pm 5\%$)		Measured Tissue		Liquid Temp.($^\circ\text{C}$)	Measured Date
		ϵ_r	$\sigma(\text{S/m})$	ϵ_r	$\sigma(\text{S/m})$		
750 Head	750	41.9 (39.81~44)	0.89 (0.85~0.94)	40.547	0.903	22.0	2022/4/23
750 Head	750	41.9 (39.81~44)	0.89 (0.85~0.94)	41.649	0.895	22.1	2022/6/13
835 Head	835	41.5 (39.43~43.58)	0.90 (0.86~0.95)	41.734	0.900	22.5	2022/4/20
1750 Head	1750	40.1 (38.10~42.11)	1.37 (1.30~1.44)	39.171	1.371	22.5	2022/4/22
1900 Head	1900	40.0 (38.00~42.00)	1.40 (1.33~1.47)	40.385	1.375	22.1	2022/4/21
2450 Head	2450	39.20 (37.24~41.16)	1.80 (1.71~1.89)	39.743	1.802	22.5	2022/4/26
2600 Head	2600	39.0 (37.05~40.95)	1.96 (1.86~2.06)	38.007	1.970	22.3	2022/4/24

Table 4: Measurement result of Tissue electric parameters



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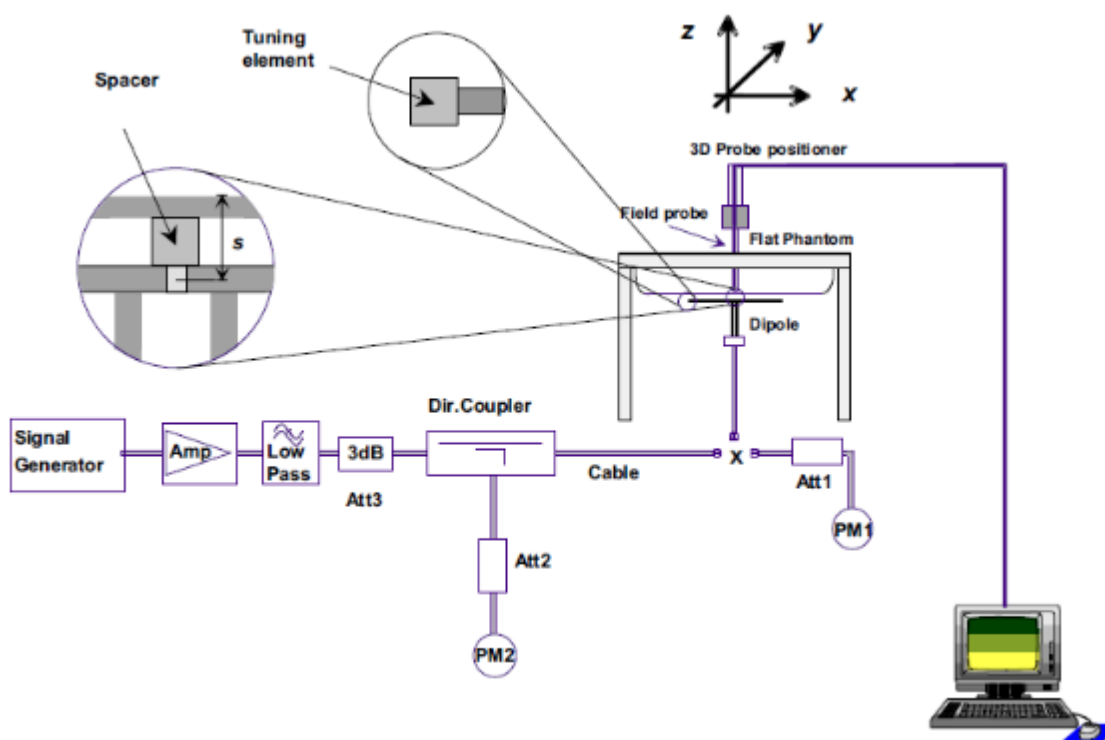
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6.2 SAR System Check

The microwave circuit arrangement for system Check is sketched in F-12. 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 $\pm 10\%$ 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 (A power level of 250mW (below 3GHz) or 100mW (3-6GHz) was input to the dipole antenna). During the tests, the ambient temperature of the laboratory was in the range $22\pm 2^{\circ}\text{C}$, the relative humidity was in the range 60% and the liquid depth above the ear reference points was above $15\pm 0.5\text{ cm}$ 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.



F-12. the microwave circuit arrangement used for SAR system check



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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. (°C)	Measured Date
		1g (W/kg)	10g (W/kg)	1g (W/kg)	10g (W/kg)	1-g(W/kg)	10-g(W/kg)		
D750V3	Head	2.01	1.32	8.04	5.28	8.48 (7.63~9.33)	5.56 (5.00~6.12)	22.0	2022/4/23
D750V3	Head	1.99	1.30	7.96	5.20	8.48 (7.63~9.33)	5.56 (5.00~6.12)	22.1	2022/6/13
D835V2	Head	2.27	1.48	9.08	5.92	9.52 (8.57~10.47)	6.17 (5.55~6.79)	22.5	2022/4/20
D1750V2	Head	8.38	4.42	33.52	17.68	35.3 (31.77~38.83)	18.7 (16.83~20.57)	22.5	2022/4/22
D1900V2	Head	9.42	4.82	37.68	19.28	39.7 (35.73~43.67)	20.3 (18.27~22.33)	22.1	2022/4/21
D2450V2	Head	12.80	6.10	51.20	24.40	52.2 (46.98~57.42)	24.5 (22.05~26.95)	22.5	2022/4/26
D2600V2	Head	14.00	6.17	56.00	24.68	57.1 (51.39~62.81)	25.4 (22.86~27.94)	22.3	2022/4/24

Table 5: SAR System Check Result

6.2.3 Detailed System Check Results

Please see the Appendix A



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7 Test Configuration

7.1 3G SAR Test Reduction Procedure

According to KDB 941225D01, in the following procedures, the mode tested for SAR is referred to as the primary mode. The equivalent modes considered for SAR test reduction are denoted as secondary modes. Both primary and secondary modes must be in the same frequency band. When the maximum output power and tune-up tolerance specified for production units in a secondary mode is $\leq \frac{1}{4}$ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode. This is referred to as the 3G SAR test reduction procedure in the following SAR test guidance, where the primary mode is identified in the applicable wireless mode test procedures and the secondary mode is wireless mode being considered for SAR test reduction by that procedure. When the 3G SAR test reduction procedure is not satisfied, it is identified as "otherwise" in the applicable procedures; SAR measurement is required for the secondary mode.

7.2 Operation Configurations

7.2.1 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 (DPCH, 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 spreading 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

According to KDB 941225 D01v03, 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 $\leq \frac{1}{4}$ 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



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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(β_c , β_d), and HS-DPCCH power offset parameters (Δ_{ACK} , Δ_{NACK} , Δ_{CQI}) are set according to values indicated in 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.

Sub-test	β_c	β_d	$\beta_d(SF)$	β_c/β_d	β_{hs}	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: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 8$ Ahs = $\beta_{hs}/\beta_c = 30/15$ $\beta_{hs} = 30/15 * \beta_c$
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, Δ_{ACK} and $\Delta_{NACK} = 8$ (Ahs=30/15) with $\beta_{hs} = 30/15 * \beta_c$, and $\Delta_{CQI} = 7$ (Ahs=24/15) with $\beta_{hs} = 24/15 * \beta_c$.
Note3: CM=1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

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

Table 6: settings of required H-Set 1 QPSK acc. to 3GPP 34.121



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HS-DSCH Category	Maximum HS-DSCH Codes Received	Minimum Inter-TTI Interval	Maximum HS-DSCH Transport Block Bits/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

Table 7: HSDPA UE category

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 ¹⁾	β_c ²⁾	β_d ³⁾	β_d (SF) ⁴⁾	β_o/β_d ⁵⁾	β_{hs} ⁶⁾	β_{ec} ⁷⁾	β_{ed} ⁸⁾	β_c (SF) ⁹⁾	β_{ed} (code) ¹⁰⁾	CM ¹¹⁾ (dB) ¹²⁾	MP R ¹³⁾ (dB) ¹⁴⁾	AG ¹⁵⁾ Inde x ¹⁶⁾	E- TFC I ¹⁷⁾
1 ¹⁾	11/15 ⁽³⁾	15/15 ⁽³⁾	64 ⁴⁾	11/15 ⁽³⁾	22/15 ⁶⁾	209/225 ⁷⁾	1039/225 ⁸⁾	4 ⁹⁾	1 ¹⁰⁾	1.0 ¹¹⁾	0.0 ¹²⁾	20 ¹³⁾	75 ¹⁴⁾
2 ¹⁾	6/15 ²⁾	15/15 ³⁾	64 ⁴⁾	6/15 ⁵⁾	12/15 ⁶⁾	12/15 ⁷⁾	94/75 ⁸⁾	4 ⁹⁾	1 ¹⁰⁾	3.0 ¹¹⁾	2.0 ¹²⁾	12 ¹³⁾	67 ¹⁴⁾
3 ¹⁾	15/15 ²⁾	9/15 ³⁾	64 ⁴⁾	15/9 ⁵⁾	30/15 ⁶⁾	30/15 ⁷⁾	$\beta_{ed1}: 47/15$ $\beta_{ed2}: 47/15$	4 ⁹⁾	2 ¹⁰⁾	2.0 ¹¹⁾	1.0 ¹²⁾	15 ¹³⁾	92 ¹⁴⁾
4 ¹⁾	2/15 ²⁾	15/15 ³⁾	64 ⁴⁾	2/15 ⁵⁾	4/15 ⁶⁾	2/15 ⁷⁾	56/75 ⁸⁾	4 ⁹⁾	1 ¹⁰⁾	3.0 ¹¹⁾	2.0 ¹²⁾	17 ¹³⁾	71 ¹⁴⁾
5 ¹⁾	15/15 ⁽⁴⁾	15/15 ⁽⁴⁾	64 ⁴⁾	15/15 ⁽⁴⁾	30/15 ⁶⁾	24/15 ⁷⁾	134/15 ⁸⁾	4 ⁹⁾	1 ¹⁰⁾	1.0 ¹¹⁾	0.0 ¹²⁾	21 ¹³⁾	81 ¹⁴⁾
Note 1: ΔACK, $\Delta NACK$ and $\Delta CQI = 8$ $A_{hs} = \beta_{hs}/\beta_c = 30/15$ $\beta_{hs} = 30/15 * \beta_c$ Note 2: CM = 1 for $\beta_o/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference¹⁵⁾ Note 3: For subtest 1 the β_o/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 $\beta_d = 15/15$¹⁶⁾ Note 4: For subtest 5 the β_o/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 $\beta_d = 15/15$¹⁶⁾ Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g¹⁷⁾ Note 6: β_{ed} can not be set directly; it is set by Absolute Grant Value.¹⁸⁾													

Table 8: Subtests for UMTS Release 6 HSUPA

UE E-DCH Category	Maximum E-DCH Codes Transmitted	Number of HARQ Processes	E-DCH TTI(ms)	Minimum Spreading 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	
5	2	4	10	2	20000	2.00
6 (No DPDCH)	4	8	10	2SF2&2SF	11484	5.76
	4	4	2	4	20000	2.00
7 (No DPDCH)	4	8	2	2SF2&2SF	22996	?
	4	4	10	4	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).						

Table 9: HSUPA UE category



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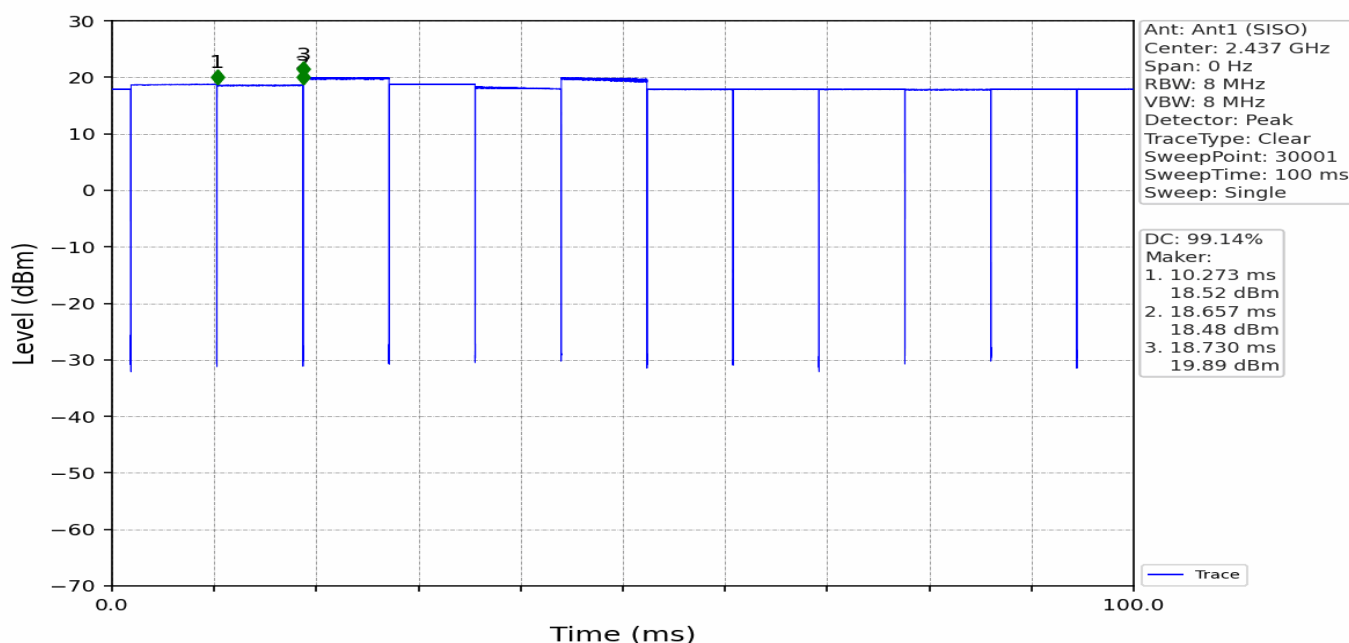
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7.2.2 WiFi Test Configuration

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.

7.2.2.1 Duty cycle

Wi-Fi 2.4GHz 802.11b: Duty cycle=99.14%



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7.2.2.2 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.

7.2.2.3 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.

7.2.2.4 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.



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- 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 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"



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7.2.2.5 2.4 GHz WiFi 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.



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7.2.3 LTE Test Configuration

LTE modes were tested according to FCC KDB 941225 D05 publication. Please see notes after the tabulated SAR data for required test configurations. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluating SAR [4]. The Anritsu MT8820C 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.

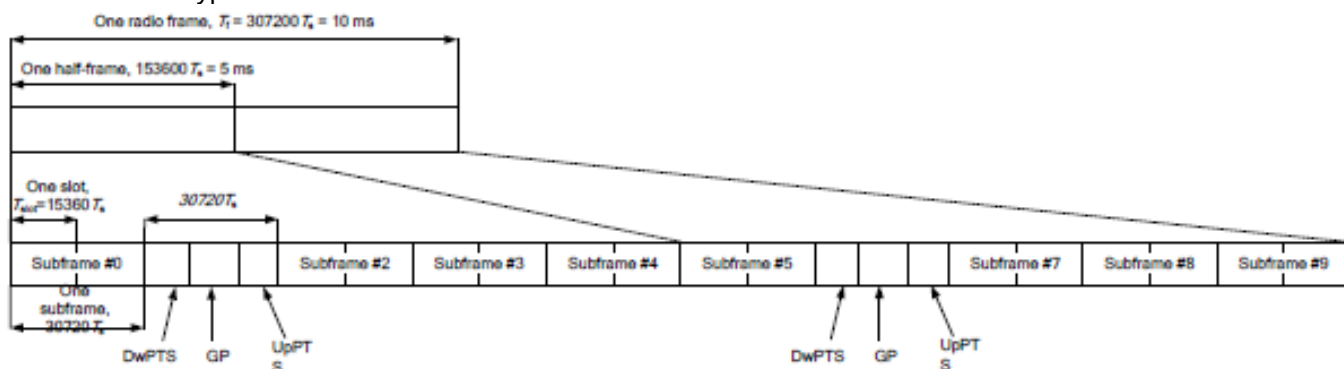
TDD LTE test consideration

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:



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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	4384.Ts	5120.Ts	7680.Ts	4384.Ts	5120.Ts
5	6592.Ts			20480.Ts		
6	19760.Ts			23040.Ts		
7	21952.Ts			25600.Ts		
8	24144.Ts			-	-	-
9	13168.Ts			-	-	-

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



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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
64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3

C) A-MPR

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

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 reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required for 1 RB allocation; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel. When the reported SAR of a required test channel is > 1.45 W/kg, SAR is required for all three RB offset configurations for that required test channel.

2) QPSK with 50% RB allocation

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

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 reported SAR for 1 RB and 50% RB allocation in 1) and 2) are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.

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 reported SAR for the QPSK configuration is > 1.45 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 reported SAR of a configuration for the largest channel bandwidth is > 1.45 W/kg.



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8 Test Result

8.1 Measurement of RF conducted Power

8.1.1 Conducted Power of WCDMA

WCDMA Band II					
Average Conducted Power(dBm)					
Channel		9262	9400	9538	Tune up
WCDMA	12.2kbps RMC	21.32	21.35	21.22	23.00
	12.2kbps AMR	21.11	21.15	21.07	23.00
HSDPA	Subtest 1	20.94	20.96	20.49	21.00
	Subtest 2	20.94	20.95	20.50	21.00
	Subtest 3	20.93	20.95	20.48	21.00
	Subtest 4	20.93	20.94	20.46	21.00
HSUPA	Subtest 1	18.53	18.99	18.12	19.00
	Subtest 2	18.46	18.53	18.08	19.00
	Subtest 3	18.78	18.98	18.35	19.00
	Subtest 4	18.76	18.80	18.10	19.00
	Subtest 5	18.57	18.67	18.32	19.00

WCDMA Band IV					
Average Conducted Power(dBm)					
Channel		1312	1412	1513	Tune up
WCDMA	12.2kbps RMC	21.78	21.89	21.98	23.00
	12.2kbps AMR	21.61	21.72	21.80	23.00
HSDPA	Subtest 1	20.26	21.28	20.22	22.00
	Subtest 2	20.27	21.29	20.22	22.00
	Subtest 3	20.28	21.29	20.23	22.00
	Subtest 4	20.24	21.25	20.20	22.00
HSUPA	Subtest 1	18.84	19.45	18.03	20.00
	Subtest 2	18.67	19.20	18.03	20.00
	Subtest 3	18.78	18.92	18.70	20.00
	Subtest 4	18.29	18.96	18.21	20.00
	Subtest 5	18.09	19.24	18.02	20.00

WCDMA Band V					
Average Conducted Power(dBm)					
Channel		4132	4182	4233	Tune up
WCDMA	12.2kbps RMC	22.59	22.59	22.57	23.00
	12.2kbps AMR	22.43	22.44	22.41	23.00
HSDPA	Subtest 1	22.03	21.16	21.01	23.00
	Subtest 2	22.04	21.19	21.04	23.00
	Subtest 3	22.05	21.18	21.03	23.00
	Subtest 4	22.04	21.16	21.05	23.00
HSUPA	Subtest 1	19.93	19.21	19.83	21.00
	Subtest 2	19.73	19.22	19.56	21.00
	Subtest 3	19.72	19.04	19.61	21.00
	Subtest 4	19.72	19.08	19.06	21.00
	Subtest 5	19.96	19.08	19.10	21.00



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8.1.2 Conducted Power of LTE

LTE Band 2				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				18607	18900	19193	
1.4MHz	QPSK	1	0	21.81	21.86	21.72	23.00
		1	2	21.91	21.86	21.80	23.00
		1	5	21.94	21.84	21.77	23.00
		3	0	21.10	21.14	21.00	23.00
		3	2	21.12	21.03	21.01	23.00
		3	3	21.18	21.11	21.05	23.00
		6	0	20.90	20.88	20.68	22.00
	16QAM	1	0	21.16	21.07	20.89	22.00
		1	2	21.09	21.09	20.90	22.00
		1	5	21.13	21.04	20.89	22.00
		3	0	21.10	21.01	20.68	22.00
		3	2	21.13	21.04	20.67	22.00
		3	3	21.06	21.02	20.63	22.00
		6	0	20.12	19.97	19.80	21.00
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				18615	18900	19185	
3MHz	QPSK	1	0	21.91	21.84	21.70	23.00
		1	7	21.85	21.83	21.80	23.00
		1	14	21.83	21.83	21.79	23.00
		8	0	20.82	20.83	20.79	22.00
		8	4	20.86	20.83	20.78	22.00
		8	7	20.85	20.97	20.78	22.00
		15	0	20.83	20.96	20.77	22.00
	16QAM	1	0	20.82	20.96	20.77	22.00
		1	7	20.82	20.96	20.77	22.00
		1	14	20.83	20.96	20.76	22.00
		8	0	20.24	20.36	20.16	21.00
		8	4	20.33	20.36	20.16	21.00
		8	7	20.26	20.36	20.16	21.00
		15	0	19.94	19.96	19.76	21.00
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				18625	18900	19175	
5MHz	QPSK	1	0	21.78	21.81	21.83	23.00
		1	13	21.79	21.82	21.81	23.00
		1	24	21.78	21.72	21.80	23.00
		12	0	20.87	20.93	20.89	22.00
		12	6	20.84	20.88	20.87	22.00
		12	13	20.90	20.85	20.73	22.00
		25	0	20.80	20.85	20.83	22.00
	16QAM	1	0	20.03	20.88	20.90	22.00
		1	13	20.00	20.87	20.91	22.00
		1	24	20.15	20.89	20.90	22.00
		12	0	19.91	19.97	19.92	21.00
		12	6	19.92	19.89	19.86	21.00
		12	13	19.89	19.87	19.88	21.00
		25	0	19.99	19.94	19.89	21.00



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Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				18650	18900	19150	
10MHz	QPSK	1	0	21.90	21.92	21.89	23.00
		1	25	21.88	21.92	21.80	23.00
		1	49	21.82	21.82	21.79	23.00
		25	0	20.89	20.93	20.77	22.00
		25	13	20.94	20.81	20.75	22.00
		25	25	20.93	20.93	20.79	22.00
		50	0	20.88	20.90	20.70	22.00
	16QAM	1	0	21.34	20.42	21.02	22.00
		1	25	21.36	20.42	21.02	22.00
		1	49	21.27	20.41	20.91	22.00
		25	0	19.91	20.01	19.99	21.00
		25	13	19.96	20.03	19.90	21.00
		25	25	19.93	20.04	19.93	21.00
		50	0	19.93	19.91	19.81	21.00
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				18675	18900	19125	
15MHz	QPSK	1	0	21.92	22.01	21.97	23.00
		1	38	21.82	21.88	21.86	23.00
		1	74	21.85	21.84	21.78	23.00
		36	0	20.98	20.88	20.85	22.00
		36	18	20.97	20.82	20.82	22.00
		36	39	20.91	20.86	20.85	22.00
		75	0	20.93	20.82	20.74	22.00
	16QAM	1	0	21.34	21.24	21.05	22.00
		1	38	21.31	21.26	20.99	22.00
		1	74	21.28	21.24	20.93	22.00
		36	0	19.96	19.90	19.97	21.00
		36	18	19.93	19.96	20.00	21.00
		36	39	19.92	19.89	19.96	21.00
		75	0	19.91	19.96	19.98	21.00
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				18700	18900	19100	
20MHz	QPSK	1	0	21.94	22.06	21.86	23.00
		1	50	21.87	21.95	21.84	23.00
		1	99	21.84	21.99	21.71	23.00
		50	0	20.98	20.99	20.91	22.00
		50	25	20.90	21.04	20.88	22.00
		50	50	20.95	20.80	20.73	22.00
		100	0	20.85	20.82	20.81	22.00
	16QAM	1	0	20.88	21.80	21.31	22.00
		1	50	20.86	21.75	21.23	22.00
		1	99	20.79	21.75	21.16	22.00
		50	0	20.08	19.97	20.01	21.00
		50	25	20.06	20.01	19.94	21.00
		50	50	20.05	19.90	19.93	21.00
		100	0	19.95	20.02	19.88	21.00



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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	21.37	21.36	21.69	22.50
		1	2	21.43	21.50	21.51	22.50
		1	5	21.44	21.56	21.55	22.50
		3	0	21.41	21.48	21.59	22.50
		3	2	21.44	21.56	21.62	22.50
		3	3	21.40	21.49	21.60	22.50
		6	0	20.46	20.56	20.49	21.50
	16QAM	1	0	20.55	20.65	20.92	21.50
		1	2	20.54	20.69	20.89	21.50
		1	5	20.59	20.74	20.90	21.50
		3	0	20.29	20.71	20.09	21.50
		3	2	20.22	20.75	20.07	21.50
		3	3	20.21	20.73	20.10	21.50
		6	0	19.39	19.94	19.56	20.50
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				19965	20175	20385	
3MHz	QPSK	1	0	21.39	21.48	21.45	22.50
		1	7	21.38	21.46	21.43	22.50
		1	14	21.34	21.47	21.41	22.50
		8	0	20.42	20.46	20.42	21.50
		8	4	20.43	20.46	20.59	21.50
		8	7	20.34	20.46	20.59	21.50
		15	0	20.42	20.46	20.59	21.50
	16QAM	1	0	20.33	20.46	20.49	21.50
		1	7	20.40	20.46	20.51	21.50
		1	14	20.38	20.46	20.47	21.50
		8	0	19.87	19.95	19.80	20.50
		8	4	19.85	19.96	19.73	20.50
		8	7	19.84	19.96	19.70	20.50
		15	0	19.33	19.46	19.49	20.50
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				19975	20175	20375	
5MHz	QPSK	1	0	21.41	21.37	21.53	22.50
		1	13	21.34	21.42	21.50	22.50
		1	24	21.42	21.40	21.53	22.50
		12	0	20.38	20.46	20.62	21.50
		12	6	20.44	20.52	20.53	21.50
		12	13	20.43	20.54	20.54	21.50
		25	0	20.42	20.50	20.60	21.50
	16QAM	1	0	19.59	20.46	20.55	21.50
		1	13	19.54	20.51	20.55	21.50
		1	24	19.55	20.42	20.55	21.50
		12	0	19.46	19.40	19.52	20.50
		12	6	19.48	19.60	19.64	20.50
		12	13	19.45	19.66	19.68	20.50
		25	0	19.53	19.68	19.56	20.50



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Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20000	20175	20350	
10MHz	QPSK	1	0	21.36	21.55	21.49	22.50
		1	25	21.37	21.47	21.42	22.50
		1	49	21.36	21.46	21.53	22.50
		25	0	20.41	20.53	20.56	21.50
		25	13	20.39	20.46	20.65	21.50
		25	25	20.51	20.41	20.50	21.50
		50	0	20.41	20.55	20.51	21.50
	16QAM	1	0	20.58	20.05	20.79	21.50
		1	25	20.57	20.03	20.73	21.50
		1	49	20.58	20.01	20.74	21.50
		25	0	19.50	19.60	19.48	20.50
		25	13	19.49	19.77	19.53	20.50
		25	25	19.46	19.77	19.52	20.50
		50	0	19.48	19.66	19.52	20.50
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20025	20175	20325	
15MHz	QPSK	1	0	21.41	21.47	21.41	22.50
		1	38	21.37	21.43	21.52	22.50
		1	74	21.41	21.41	21.47	22.50
		36	0	20.37	20.42	20.54	21.50
		36	18	20.50	20.50	20.40	21.50
		36	39	20.41	20.56	20.64	21.50
		75	0	20.47	20.47	20.49	21.50
	16QAM	1	0	20.62	20.89	21.15	21.50
		1	38	20.60	20.86	21.11	21.50
		1	74	20.64	20.79	21.15	21.50
		36	0	19.58	19.48	19.71	20.50
		36	18	19.56	19.68	19.54	20.50
		36	39	19.63	19.54	19.60	20.50
		75	0	19.50	19.76	19.64	20.50
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20050	20175	20300	
20MHz	QPSK	1	0	21.56	21.57	21.45	22.50
		1	50	21.48	21.55	21.54	22.50
		1	99	21.53	21.62	21.43	22.50
		50	0	20.42	20.50	20.45	21.50
		50	25	20.50	20.44	20.58	21.50
		50	50	20.49	20.49	20.41	21.50
		100	0	20.42	20.50	20.61	21.50
	16QAM	1	0	20.33	20.33	21.07	21.50
		1	50	20.32	20.32	21.12	21.50
		1	99	20.36	20.36	21.06	21.50
		50	0	19.58	19.58	19.63	20.50
		50	25	19.64	19.64	19.69	20.50
		50	50	19.59	19.59	19.70	20.50
		100	0	19.55	19.55	19.59	20.50



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LTE Band 7				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20775	21100	21425	
5MHz	QPSK	1	0	21.02	21.01	21.21	22.00
		1	13	21.04	21.00	21.17	22.00
		1	24	21.24	20.93	21.22	22.00
		12	0	20.27	20.24	20.22	21.00
		12	6	20.27	20.22	20.31	21.00
		12	13	20.16	20.14	20.18	21.00
		25	0	20.16	20.33	20.16	21.00
	16QAM	1	0	19.61	20.22	20.23	21.00
		1	13	19.56	20.34	20.26	21.00
		1	24	19.50	20.23	20.33	21.00
		12	0	19.37	19.24	19.30	20.00
		12	6	19.37	19.24	19.31	20.00
		12	13	19.32	19.29	19.39	20.00
		25	0	19.48	19.36	19.28	20.00
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20800	21100	21400	
10MHz	QPSK	1	0	21.16	21.40	21.08	22.00
		1	25	21.08	21.43	21.12	22.00
		1	49	21.11	21.40	21.12	22.00
		25	0	20.17	20.13	20.18	21.00
		25	13	20.25	20.29	20.07	21.00
		25	25	20.19	20.21	20.11	21.00
		50	0	20.14	20.21	20.24	21.00
	16QAM	1	0	20.44	19.83	20.51	21.00
		1	25	20.43	19.82	20.51	21.00
		1	49	20.38	19.78	20.55	21.00
		25	0	19.41	19.36	19.33	20.00
		25	13	19.41	19.40	19.34	20.00
		25	25	19.36	19.43	19.41	20.00
		50	0	19.44	19.35	19.32	20.00



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Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20825	21100	21375	
15MHz	QPSK	1	0	21.29	21.33	21.19	22.00
		1	38	21.19	21.35	21.24	22.00
		1	74	21.25	21.30	21.20	22.00
		36	0	20.15	20.11	20.24	21.00
		36	18	20.20	20.32	20.30	21.00
		36	39	20.26	20.29	20.11	21.00
		75	0	20.32	20.26	20.31	21.00
	16QAM	1	0	20.55	20.76	20.74	21.00
		1	38	20.48	20.68	20.68	21.00
		1	74	20.52	20.59	20.72	21.00
		36	0	19.56	19.26	19.37	20.00
		36	18	19.45	19.41	19.35	20.00
		36	39	19.49	19.39	19.38	20.00
		75	0	19.30	19.38	19.36	20.00
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20850	21100	21350	
20MHz	QPSK	1	0	21.35	21.52	21.33	22.00
		1	50	21.30	21.52	21.22	22.00
		1	99	21.34	21.51	21.30	22.00
		50	0	20.21	20.24	20.20	21.00
		50	25	20.27	20.28	20.22	21.00
		50	50	20.36	20.29	20.24	21.00
		100	0	20.16	20.32	20.21	21.00
	16QAM	1	0	19.97	20.52	20.00	21.00
		1	50	19.99	20.53	19.96	21.00
		1	99	19.87	20.48	19.99	21.00
		50	0	19.40	19.19	19.37	20.00
		50	25	19.34	19.30	19.29	20.00
		50	50	19.49	19.29	19.37	20.00
		100	0	19.30	19.38	19.23	20.00



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LTE Band 12				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				23017	23095	23173	
1.4MHz	QPSK	1	0	22.82	22.65	22.80	23.50
		1	2	22.81	22.61	22.79	23.50
		1	5	22.76	22.81	22.81	23.50
		3	0	22.64	22.75	22.62	23.50
		3	2	22.60	22.81	22.69	23.50
		3	3	22.57	22.78	22.70	23.50
		6	0	21.77	21.66	21.56	22.50
	16QAM	1	0	21.41	21.74	21.23	22.50
		1	2	21.39	21.92	21.17	22.50
		1	5	21.37	21.90	21.18	22.50
		3	0	21.54	21.63	21.27	22.50
		3	2	21.54	21.63	21.26	22.50
		3	3	21.52	21.71	21.29	22.50
		6	0	20.91	21.01	20.82	21.50
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				23025	23095	23165	
3MHz	QPSK	1	0	22.62	22.75	22.69	23.50
		1	7	22.56	22.76	22.73	23.50
		1	14	22.73	22.64	22.69	23.50
		8	0	21.81	21.62	21.64	22.50
		8	4	21.93	21.61	21.52	22.50
		8	7	21.70	21.60	21.61	22.50
		15	0	21.83	21.68	21.48	22.50
	16QAM	1	0	22.27	21.94	21.38	22.50
		1	7	22.21	22.05	21.32	22.50
		1	14	22.15	21.98	21.36	22.50
		8	0	20.92	21.09	20.86	21.50
		8	4	20.94	21.09	21.04	21.50
		8	7	21.00	21.11	20.92	21.50
		15	0	20.87	20.89	20.83	21.50



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Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				23035	23095	23155	
5MHz	QPSK	1	0	22.68	22.61	22.69	23.50
		1	13	22.72	22.51	22.51	23.50
		1	24	22.69	22.54	22.71	23.50
		12	0	21.82	21.56	21.74	22.50
		12	6	21.82	21.68	21.51	22.50
		12	13	21.67	21.53	21.56	22.50
		25	0	21.80	21.57	21.51	22.50
	16QAM	1	0	20.98	21.46	21.72	22.50
		1	13	20.75	21.59	21.62	22.50
		1	24	20.79	21.56	21.62	22.50
		12	0	20.91	20.78	20.63	21.50
		12	6	20.93	20.82	20.84	21.50
		12	13	20.90	20.76	20.88	21.50
		25	0	20.94	20.86	20.82	21.50
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				23060	23095	23130	
10MHz	QPSK	1	0	22.59	22.69	21.56	23.50
		1	25	22.53	22.83	22.82	23.50
		1	49	22.64	22.59	22.75	23.50
		25	0	21.87	21.88	21.58	22.50
		25	13	21.68	21.63	21.68	22.50
		25	25	21.68	21.54	21.49	22.50
		50	0	21.62	21.72	21.58	22.50
	16QAM	1	0	21.84	22.40	21.23	22.50
		1	25	21.68	22.25	21.24	22.50
		1	49	21.62	22.45	21.24	22.50
		25	0	20.90	20.87	21.02	21.50
		25	13	20.64	20.90	21.01	21.50
		25	25	20.81	20.89	20.96	21.50
		50	0	20.70	20.93	20.92	21.50



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LTE FDD Band 13				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				23205	23230	23255	
5MHz	QPSK	1	0	20.91	20.89	21.08	23.00
		1	13	20.87	20.95	21.05	23.00
		1	24	20.96	20.90	21.19	23.00
		12	0	20.11	19.91	20.02	22.00
		12	6	19.98	20.18	20.20	22.00
		12	13	20.00	19.92	20.10	22.00
	16QAM	25	0	19.98	20.01	20.03	22.00
		1	0	21.08	19.83	19.98	22.00
		1	13	21.05	19.91	20.05	22.00
		1	24	21.19	19.91	20.22	22.00
		12	0	20.02	18.94	19.12	21.00
		12	6	20.20	19.39	19.23	21.00
		12	13	20.10	19.12	19.47	21.00
		25	0	20.03	19.37	19.23	23.00
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
10MHz	QPSK	1	0	/	23230	/	23.00
		1	25	/	21.11	/	23.00
		1	49	/	21.08	/	23.00
		25	0	/	19.99	/	22.00
		25	13	/	20.01	/	22.00
		25	25	/	19.91	/	22.00
	16QAM	50	0	/	19.97	/	22.00
		1	0	/	20.05	/	22.00
		1	25	/	20.09	/	22.00
		1	49	/	20.23	/	22.00
		25	0	/	19.08	/	21.00
		25	13	/	19.38	/	21.00
		25	25	/	19.12	/	21.00
		50	0	/	19.36	/	21.00

LTE Band 17				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				23755	23790	23825	
5MHz	QPSK	1	0	22.68	22.79	22.56	23.50
		1	13	22.64	22.69	22.56	23.50
		1	24	22.73	22.72	22.53	23.50
		12	0	21.67	21.58	21.50	22.50
		12	6	21.64	21.62	21.58	22.50
		12	13	21.60	21.78	21.61	22.50
	16QAM	25	0	21.64	21.56	21.58	22.50
		1	0	21.63	20.77	21.57	22.50
		1	13	21.46	20.71	21.56	22.50
		1	24	21.60	20.93	21.56	22.50
		12	0	20.83	20.80	20.55	21.50
		12	6	20.85	20.81	20.55	21.50



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		12	13	20.86	20.62	20.55	21.50
		25	0	20.83	20.90	20.54	21.50
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				23780	23790	23800	
10MHz	QPSK	1	0	21.59	21.65	22.82	23.50
		1	25	21.63	21.62	22.77	23.50
		1	49	21.61	21.62	22.80	23.50
		25	0	21.59	21.61	21.68	22.50
		25	13	21.58	21.61	21.64	22.50
		25	25	21.57	21.60	21.64	22.50
		50	0	21.56	21.62	21.54	22.50
	16QAM	1	0	21.55	21.30	21.21	22.50
		1	25	21.55	21.31	21.32	22.50
		1	49	21.55	21.21	21.21	22.50
		25	0	20.54	20.84	21.03	21.50
		25	13	20.58	20.94	21.02	21.50
		25	25	20.68	20.77	20.92	21.50
		50	0	20.69	20.86	20.96	21.50



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LTE Band 26				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				26697	26865	27033	
1.4MHz	QPSK	1	0	23.50	23.28	23.09	24.00
		1	2	23.34	23.05	23.27	24.00
		1	5	23.35	23.05	23.11	24.00
		3	0	23.48	23.32	23.22	24.00
		3	2	23.38	23.23	23.20	24.00
		3	3	23.39	23.17	23.23	24.00
		6	0	22.40	22.12	22.03	23.00
	16QAM	1	0	22.79	22.66	22.48	23.00
		1	2	22.30	22.20	22.08	23.00
		1	5	22.14	21.84	22.10	23.00
		3	0	22.42	22.21	22.14	23.00
		3	2	22.42	22.28	22.26	23.00
		3	3	22.34	22.16	22.01	23.00
		6	0	21.59	21.45	21.28	22.00
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				26705	26865	27025	
3MHz	QPSK	1	0	23.46	23.16	23.07	24.00
		1	7	23.40	23.25	23.35	24.00
		1	14	23.34	23.12	22.15	24.00
		8	0	22.54	22.37	22.10	23.00
		8	4	22.39	22.13	22.13	23.00
		8	7	22.41	22.17	22.16	23.00
		15	0	22.52	22.41	22.07	23.00
	16QAM	1	0	22.35	22.20	22.40	23.00
		1	7	22.39	22.24	22.07	23.00
		1	14	22.53	22.27	21.84	23.00
		8	0	21.72	21.48	21.42	22.00
		8	4	21.73	21.52	21.33	22.00
		8	7	21.57	21.28	21.42	22.00
		15	0	21.61	21.51	21.26	22.00
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				26715	26865	27015	
5MHz	QPSK	1	0	23.56	23.44	23.21	24.00
		1	13	23.41	23.18	22.14	24.00
		1	24	23.18	23.03	23.14	24.00
		12	0	22.45	22.21	22.19	23.00
		12	6	22.55	22.40	22.19	23.00
		12	13	22.30	22.14	22.11	23.00
		25	0	22.37	22.25	22.14	23.00
	16QAM	1	0	22.40	22.26	22.12	23.00
		1	13	22.42	22.16	22.14	23.00
		1	24	21.60	21.48	22.06	23.00
		12	0	21.46	21.16	21.15	22.00
		12	6	21.48	21.23	21.21	22.00
		12	13	21.33	21.13	21.25	22.00
		25	0	21.40	21.24	21.30	22.00



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Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				26750	26865	26990	
10MHz	QPSK	1	0	23.41	23.29	23.25	24.00
		1	25	23.33	23.21	23.13	24.00
		1	49	23.47	23.31	22.99	24.00
		25	0	22.54	22.42	22.37	23.00
		25	13	22.37	22.12	22.23	23.00
		25	25	22.43	22.19	22.28	23.00
		50	0	22.41	22.19	22.23	23.00
	16QAM	1	0	22.87	22.64	22.48	23.00
		1	25	22.50	22.37	21.74	23.00
		1	49	21.89	21.73	22.12	23.00
		25	0	21.58	21.35	21.49	22.00
		25	13	21.55	21.28	21.32	22.00
		25	25	21.59	21.32	21.34	22.00
		50	0	21.47	21.35	21.28	22.00
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				26765	26865	26965	
15MHz	QPSK	1	0	23.75	23.76	23.58	24.00
		1	38	23.68	23.48	23.39	24.00
		1	74	23.56	23.46	23.21	24.00
		36	0	22.89	22.90	22.42	23.00
		36	18	22.60	22.41	22.39	23.00
		36	39	22.53	22.26	22.41	23.00
		75	0	22.59	22.34	22.47	23.00
	16QAM	1	0	22.09	21.83	22.70	23.00
		1	38	21.93	21.82	22.44	23.00
		1	74	21.85	21.69	22.34	23.00
		36	0	21.86	21.67	21.72	22.00
		36	18	21.82	21.61	21.68	22.00
		36	39	21.78	21.63	21.50	22.00
		75	0	21.80	21.50	21.64	22.00



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LTE Band 41				Conducted Power(dBm)				
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Channel	Tune up
				40165	40485	40805	41215	
5MHz	QPSK	1	0	21.82	21.45	21.03	20.91	22.50
		1	13	21.82	21.46	21.04	20.75	22.50
		1	24	21.81	21.40	21.03	20.97	22.50
		12	0	20.88	20.61	20.11	19.90	21.50
		12	6	20.99	20.52	20.12	19.94	21.50
		12	13	20.83	20.48	20.09	19.89	21.50
		25	0	20.77	20.50	20.14	19.74	21.50
	16QAM	1	0	20.79	20.96	20.28	19.74	21.50
		1	13	20.47	20.91	20.19	19.56	21.50
		1	24	20.77	20.94	20.24	19.59	21.50
		12	0	20.00	19.36	18.68	18.88	20.50
		12	6	19.91	19.38	18.61	18.97	20.50
		12	13	20.06	19.38	18.61	18.86	20.50
		25	0	19.90	19.62	18.93	19.03	20.50
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Channel	Tune up
				40190	40490	40790	41190	
10MHz	QPSK	1	0	21.84	21.60	21.10	20.94	22.50
		1	25	21.81	21.49	21.05	20.90	22.50
		1	49	21.81	21.54	21.01	20.89	22.50
		25	0	20.83	20.61	20.09	19.92	21.50
		25	13	20.75	20.64	20.16	19.87	21.50
		25	25	20.79	20.58	20.03	19.78	21.50
		50	0	20.83	20.57	20.09	19.93	21.50
	16QAM	1	0	20.77	20.71	20.38	20.00	21.50
		1	25	20.93	20.50	20.15	19.90	21.50
		1	49	20.69	20.58	20.11	20.30	21.50
		25	0	19.91	19.88	19.44	19.03	20.50
		25	13	19.94	19.87	19.47	19.14	20.50
		25	25	19.95	19.78	19.40	19.22	20.50
		50	0	19.94	19.47	19.10	18.99	20.50



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Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Channel	Tune up
				40215	40495	40785	41165	
15MHz	QPSK	1	0	21.01	21.68	21.42	21.14	22.50
		1	38	21.83	21.68	21.17	20.88	22.50
		1	74	21.81	21.48	21.12	20.86	22.50
		36	0	20.83	20.66	20.32	19.91	21.50
		36	18	20.88	20.64	20.16	19.93	21.50
		36	39	20.82	20.59	20.24	19.81	21.50
		75	0	20.92	20.53	20.14	19.78	21.50
	16QAM	1	0	20.77	20.61	20.49	20.47	21.50
		1	38	20.61	20.48	20.33	20.48	21.50
		1	74	20.40	20.27	20.14	20.37	21.50
		36	0	19.73	19.58	19.38	18.97	20.50
		36	18	19.75	19.61	19.44	18.95	20.50
		36	39	19.78	19.59	19.43	18.98	20.50
		75	0	19.67	19.51	19.40	19.03	20.50
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Channel	Tune up
				40240	40500	40770	41140	
20MHz	QPSK	1	0	21.86	21.70	21.17	20.84	22.50
		1	50	21.77	21.63	21.13	20.64	22.50
		1	99	21.75	21.57	21.04	20.52	22.50
		50	0	20.88	20.59	20.10	20.03	21.50
		50	25	20.78	20.50	20.04	19.91	21.50
		50	50	20.69	20.59	20.15	19.78	21.50
		100	0	20.82	20.62	20.12	19.88	21.50
	16QAM	1	0	21.69	21.32	21.10	20.71	22.00
		1	50	21.29	21.02	20.50	20.71	22.00
		1	99	21.61	21.39	20.96	20.85	22.00
		50	0	20.11	19.92	19.41	19.05	20.50
		50	25	20.01	19.81	19.33	19.07	20.50
		50	50	20.05	19.75	19.33	19.01	20.50
		100	0	19.93	19.73	19.19	19.00	20.50



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LTE Band 66				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				131979	132322	132665	
1.4MHz	QPSK	1	0	21.39	21.48	21.58	22.50
		1	2	21.43	21.45	21.53	22.50
		1	5	21.42	21.31	21.52	22.50
		3	0	20.33	20.44	20.63	21.50
		3	1	20.36	20.48	20.62	21.50
		3	3	20.30	20.39	20.62	21.50
		6	0	20.23	20.38	20.61	21.50
	16QAM	1	0	20.29	19.98	20.61	21.50
		1	2	20.36	19.94	20.60	21.50
		1	5	20.32	19.93	20.60	21.50
		3	0	20.06	19.97	20.10	20.50
		3	1	20.18	20.01	20.10	20.50
		3	3	20.03	20.00	20.09	20.50
		6	0	19.30	19.57	20.09	20.50
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				131987	132322	132657	
3MHz	QPSK	1	0	21.21	21.50	21.59	22.50
		1	7	21.21	21.47	21.56	22.50
		1	14	21.28	21.50	21.55	22.50
		8	0	20.32	20.41	20.54	21.50
		8	4	20.33	20.41	20.61	21.50
		8	7	20.30	20.33	20.62	21.50
		15	0	20.30	20.37	20.58	21.50
	16QAM	1	0	20.06	20.38	21.31	21.50
		1	7	20.11	20.36	21.36	21.50
		1	14	20.09	20.38	21.30	21.50
		8	0	19.40	19.59	19.80	20.50
		8	4	19.36	19.59	19.76	20.50
		8	7	19.38	19.64	19.75	20.50
		15	0	19.29	19.39	19.68	20.50
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				131997	132322	132647	
5MHz	QPSK	1	0	21.29	21.37	21.57	22.50
		1	13	21.24	21.44	21.55	22.50
		1	24	21.27	21.44	21.55	22.50
		12	0	20.33	20.44	20.55	21.50
		12	6	20.31	20.44	20.54	21.50
		12	13	20.30	20.44	20.54	21.50
		25	0	20.29	20.45	20.54	21.50
	16QAM	1	0	20.28	20.44	20.54	21.50
		1	13	20.28	20.44	20.53	21.50
		1	24	20.27	20.44	20.53	21.50
		12	0	19.77	19.94	20.03	20.50
		12	6	19.76	19.94	20.04	20.50
		12	13	19.76	19.94	20.04	20.50
		25	0	19.76	19.94	20.04	20.50



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Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				132022	132322	132622	
10MHz	QPSK	1	0	21.21	21.61	21.65	22.50
		1	25	21.32	21.55	21.65	22.50
		1	49	21.32	21.65	21.65	22.50
		25	0	20.26	20.43	20.57	21.50
		25	13	20.22	20.44	20.60	21.50
		25	25	20.24	20.35	20.63	21.50
		50	0	20.24	20.40	20.60	21.50
	16QAM	1	0	20.05	19.82	20.71	21.50
		1	25	20.13	19.84	20.62	21.50
		1	49	20.10	19.88	20.57	21.50
		25	0	19.32	19.42	19.72	20.50
		25	13	19.33	19.43	19.72	20.50
		25	25	19.35	19.46	19.75	20.50
		50	0	19.40	19.40	19.65	20.50
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				132047	132322	132597	
15MHz	QPSK	1	0	21.26	21.62	21.67	22.50
		1	38	21.30	21.66	21.65	22.50
		1	74	21.28	21.56	21.64	22.50
		36	0	20.27	20.40	20.60	21.50
		36	18	20.29	20.50	20.56	21.50
		36	39	20.32	20.34	20.61	21.50
		75	0	20.33	20.51	20.64	21.50
	16QAM	1	0	20.11	20.42	20.64	21.50
		1	38	20.07	20.43	20.67	21.50
		1	74	20.08	20.42	20.68	21.50
		36	0	19.39	19.54	19.70	20.50
		36	18	19.47	19.54	19.69	20.50
		36	39	19.48	19.54	19.69	20.50
		75	0	19.41	19.52	19.59	20.50
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				132072	132322	132572	
20MHz	QPSK	1	0	21.35	21.54	21.53	22.50
		1	50	21.31	21.56	21.60	22.50
		1	99	21.39	21.67	21.58	22.50
		50	0	20.35	20.43	20.62	21.50
		50	25	20.30	20.32	20.61	21.50
		50	50	20.34	20.50	20.55	21.50
		100	0	20.38	20.42	20.59	21.50
	16QAM	1	0	20.06	20.27	20.60	21.50
		1	50	20.09	20.31	20.58	21.50
		1	99	20.10	20.27	20.64	21.50
		50	0	19.42	19.47	19.74	20.50
		50	25	19.42	19.41	19.68	20.50
		50	50	19.45	19.43	19.75	20.50
		100	0	19.36	19.43	19.59	20.50



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8.1.3 Conducted Power of WIFI

Wi-Fi	Average Power (dBm) for Data Rates (Mbps)			SAR Test
	Channel	1	Tune up	
2450MHz	1	14.14	15.50	Yes
	6	15.15	15.50	Yes
	11	14.57	15.50	Yes
802.11g	Channel	6	Tune up	SAR Test
	1	14.43	15.50	No
	6	15.05	15.50	No
	11	14.71	15.50	No
802.11n HT20	Channel	6.5	Tune up	SAR Test
	1	14.23	15.00	No
	6	14.12	15.00	No
	11	14.36	15.00	No

Note:

- Power must be measured at each transmit antenna port according to the DSSS and OFDM transmission configurations in each standalone and aggregated frequency band.
- Power measurement is required for the transmission mode configuration with the highest maximum output power specified for production units.
 - 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.
 - 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.
- 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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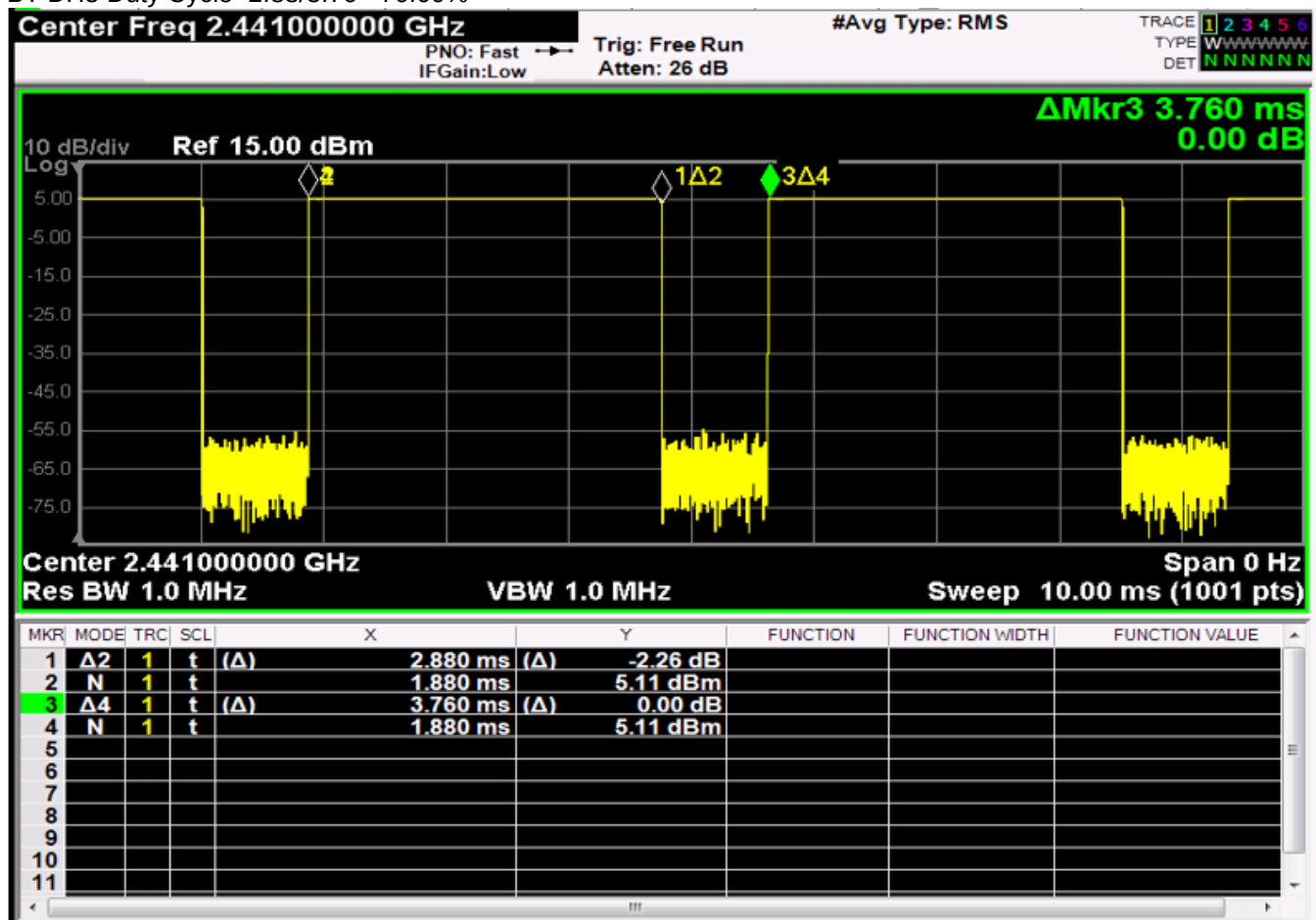
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8.1.4 Conducted Power of BT

BT DH5 Duty Cycle=2.88/3.76 =76.60%



BT		Average Conducted Power(dBm)			Tune up (dBm)
Band	Channel	0	39	78	
BT	GFSK	2.28	2.93	2.89	3.00
	π/4DQPSK	2.31	3.57	3.55	4.00
	8DPSK	2.55	3.96	3.87	4.00
Band	Channel	0	19	39	Tune up (dBm)
BLE	GFSK	-4.40	-3.06	-3.24	-1.00

Note:

1)The conducted power of BT is measured with RMS detector.



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8.2 Measurement of SAR Data

Note:

- 1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix B.
- 2) Per KDB447498 D01, testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:
 - $\leq 0.8\text{W/kg}$ for 1-g or 2.0W/kg for 10-g respectively, when the transmission band is $\leq 100\text{MHz}$.
 - $\leq 0.6\text{ W/kg}$ or 1.5 W/kg , for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz.
 - $\leq 0.4\text{ W/kg}$ or 1.0 W/kg , for 1-g or 10-g respectively, when the transmission band is $\geq 200\text{ MHz}$.
- 3) According to TCB workshop October,2014 RF Exposure Procedures Update(Overlapping LTE Bands), When the supported frequency range of an LTE Band falls completely within an LTE band with a larger transmission frequency range, both LTE bands have the same target power (or the band with the larger transmission frequency range has a higher target power), and both LTE bands share the same transmission path and signal characteristics, SAR was only assessed for the band with the larger transmission frequency range. For This device, LTE band 4/17 SAR test was covered by Band 66/12.
- 4) For LTE B12/B17/B26 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

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 $\leq 1.2\text{ W/kg}$, SAR test for the other 802.11 modes are not required.



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8.2.1 SAR Result of WCDMA Band II

Test position	Test mode	Test ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power drift (dB)	Conducted Power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp.(°C)
Head Test Data										
Left cheek	RMC	9400/1880	1:1	0.038	0.11	21.35	23.00	1.462	0.056	22.1
Left tilted	RMC	9400/1880	1:1	0.022	0.13	21.35	23.00	1.462	0.032	22.1
Right cheek	RMC	9400/1880	1:1	0.059	0.02	21.35	23.00	1.462	0.086	22.1
Right tilted	RMC	9400/1880	1:1	0.028	0.17	21.35	23.00	1.462	0.040	22.1
Right cheek	RMC	9262/1852.4	1:1	0.084	0.08	21.32	23.00	1.472	0.123	22.1
Right cheek	RMC	9538/1907.6	1:1	0.113	0.05	21.22	23.00	1.507	0.170	22.1
Body worn Test data(Separate 10mm)										
Front side	RMC	9400/1880	1:1	0.084	0.12	21.35	23.00	1.462	0.123	22.1
Back side	RMC	9400/1880	1:1	0.431	0.03	21.35	23.00	1.462	0.630	22.1
Back side	RMC	9262/1852.4	1:1	0.372	0.12	21.32	23.00	1.472	0.548	22.1
Back side	RMC	9538/1907.6	1:1	0.414	0.04	21.22	23.00	1.507	0.624	22.1
Hotspot Test data(Separate 10mm)										
Front side	RMC	9400/1880	1:1	0.084	0.12	21.35	23.00	1.462	0.123	22.1
Back side	RMC	9400/1880	1:1	0.431	0.03	21.35	23.00	1.462	0.630	22.1
Left side	RMC	9400/1880	1:1	0.028	0.11	21.35	23.00	1.462	0.040	22.1
Right side	RMC	9400/1880	1:1	0.366	0.02	21.35	23.00	1.462	0.535	22.1
Bottom side	RMC	9400/1880	1:1	0.101	0.18	21.35	23.00	1.462	0.148	22.1
Back side	RMC	9262/1852.4	1:1	0.372	0.12	21.32	23.00	1.472	0.548	22.1
Back side	RMC	9538/1907.6	1:1	0.414	0.04	21.22	23.00	1.507	0.624	22.1

Table 10: SAR of WCDMA Band II for Head and Body.



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8.2.2 SAR Result of WCDMA Band IV

Test position	Test mode	Test ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power drift (dB)	Conducted Power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp.(℃)
Head Test Data										
Left cheek	RMC	1412/1732.4	1:1	0.031	0.19	21.89	23.00	1.291	0.040	22.5
Left tilted	RMC	1412/1732.4	1:1	0.022	0.03	21.89	23.00	1.291	0.028	22.5
Right cheek	RMC	1412/1732.4	1:1	0.093	0.17	21.89	23.00	1.291	0.119	22.5
Right tilted	RMC	1412/1732.4	1:1	0.030	0.13	21.89	23.00	1.291	0.039	22.5
Right cheek	RMC	1312/1712.4	1:1	0.091	0.12	21.78	23.00	1.324	0.120	22.5
Right cheek	RMC	1513/1752.6	1:1	0.094	0.14	21.98	23.00	1.265	0.119	22.5
Body worn Test data(Separate 10mm)										
Front side	RMC	1412/1732.4	1:1	0.062	0.01	21.89	23.00	1.291	0.080	22.5
Back side	RMC	1412/1732.4	1:1	0.392	0.16	21.89	23.00	1.291	0.506	22.5
Back side	RMC	1312/1712.4	1:1	0.376	0.05	21.78	23.00	1.324	0.498	22.5
Back side	RMC	1513/1752.6	1:1	0.373	0.01	21.98	23.00	1.265	0.472	22.5
Hotspot Test data(Separate 10mm)										
Front side	RMC	1412/1732.4	1:1	0.062	0.01	21.89	23.00	1.291	0.080	22.5
Back side	RMC	1412/1732.4	1:1	0.392	0.16	21.89	23.00	1.291	0.506	22.5
Left side	RMC	1412/1732.4	1:1	0.016	0.01	21.89	23.00	1.291	0.020	22.5
Right side	RMC	1412/1732.4	1:1	0.211	0.13	21.89	23.00	1.291	0.272	22.5
Bottom side	RMC	1412/1732.4	1:1	0.083	0.05	21.89	23.00	1.291	0.107	22.5
Back side	RMC	1312/1712.4	1:1	0.376	0.05	21.78	23.00	1.324	0.498	22.5
Back side	RMC	1513/1752.6	1:1	0.373	0.01	21.98	23.00	1.265	0.472	22.5

Table 11: SAR of WCDMA Band IV for Head and Body.



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8.2.1 SAR Result of WCDMA Band V

Test position	Test mode	Test ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power drift (dB)	Conducted Power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp.(°C)
Head Test Data										
Left cheek	RMC	4182/836.4	1:1	0.034	0.18	22.59	23.00	1.099	0.038	22.5
Left tilted	RMC	4182/836.4	1:1	0.031	0.12	22.59	23.00	1.099	0.035	22.5
Right cheek	RMC	4182/836.4	1:1	0.037	0.01	22.59	23.00	1.099	0.040	22.5
Right tilted	RMC	4182/836.4	1:1	0.032	0.00	22.59	23.00	1.099	0.035	22.5
Right cheek	RMC	4132/826.4	1:1	0.056	0.05	22.59	23.00	1.099	0.061	22.5
Right cheek	RMC	4233/846.6	1:1	0.031	0.15	22.57	23.00	1.104	0.034	22.5
Body worn Test data(Separate 10mm)										
Front side	RMC	4182/836.4	1:1	0.047	0.17	22.59	23.00	1.099	0.051	22.5
Back side	RMC	4182/836.4	1:1	0.116	0.01	22.59	23.00	1.099	0.127	22.5
Back side	RMC	4132/826.4	1:1	0.130	-0.01	22.59	23.00	1.099	0.143	22.5
Back side	RMC	4233/846.6	1:1	0.105	0.11	22.57	23.00	1.104	0.116	22.5
Hotspot Test data(Separate 10mm)										
Front side	RMC	4182/836.4	1:1	0.047	0.17	22.59	23.00	1.099	0.051	22.5
Back side	RMC	4182/836.4	1:1	0.116	0.01	22.59	23.00	1.099	0.127	22.5
Left side	RMC	4182/836.4	1:1	0.103	0.18	22.59	23.00	1.099	0.113	22.5
Right side	RMC	4182/836.4	1:1	0.088	0.03	22.59	23.00	1.099	0.097	22.5
Bottom side	RMC	4182/836.4	1:1	0.051	0.11	22.59	23.00	1.099	0.056	22.5
Back side	RMC	4132/826.4	1:1	0.130	-0.01	22.59	23.00	1.099	0.143	22.5
Back side	RMC	4233/846.6	1:1	0.105	0.11	22.57	23.00	1.104	0.116	22.5

Table 12: SAR of WDMA Band V for Head and Body.



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8.2.2 SAR Result of LTE Band 2

Test position	BW.	Test mode	Test ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power drift (dB)	Conducted Power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp.(°C)
Head Test Data(1RB)											
Left cheek	20	QPSK 1_0	18900/1880	1:1	0.053	0.01	22.06	23.00	1.242	0.066	22.1
Left tilted	20	QPSK 1_0	18900/1880	1:1	0.024	0.02	22.06	23.00	1.242	0.029	22.1
Right cheek	20	QPSK 1_0	18900/1880	1:1	0.080	0.13	22.06	23.00	1.242	0.099	22.1
Right tilted	20	QPSK 1_0	18900/1880	1:1	0.031	0.18	22.06	23.00	1.242	0.039	22.1
Right cheek	20	QPSK 1_0	18700/1860	1:1	0.086	0.09	21.94	23.00	1.276	0.110	22.1
Right cheek	20	QPSK 1_0	19100/1900	1:1	0.113	0.02	21.86	23.00	1.300	0.147	22.1
Head Test Data(50%RB)											
Left cheek	20	QPSK 50_25	18900/1880	1:1	0.047	0.05	21.04	22.00	1.247	0.058	22.1
Left tilted	20	QPSK 50_25	18900/1880	1:1	0.019	0.04	21.04	22.00	1.247	0.024	22.1
Right cheek	20	QPSK 50_25	18900/1880	1:1	0.065	0.11	21.04	22.00	1.247	0.081	22.1
Right tilted	20	QPSK 50_25	18900/1880	1:1	0.027	0.09	21.04	22.00	1.247	0.033	22.1
Body worn Test data(Separate 10mm 1RB)											
Front side	20	QPSK 1_0	18900/1880	1:1	0.108	0.11	22.06	23.00	1.242	0.134	22.1
Back side	20	QPSK 1_0	18900/1880	1:1	0.503	0.19	22.06	23.00	1.242	0.625	22.1
Back side	20	QPSK 1_0	18700/1860	1:1	0.361	-0.01	21.94	23.00	1.276	0.461	22.1
Back side	20	QPSK 1_0	19100/1900	1:1	0.437	0.06	21.86	23.00	1.300	0.568	22.1
Body worn Test data(Separate 10mm 50RB)											
Front side	20	QPSK 50_25	18900/1880	1:1	0.072	0.02	21.04	22.00	1.247	0.090	22.1
Back side	20	QPSK 50_25	18900/1880	1:1	0.311	0.03	21.04	22.00	1.247	0.388	22.1
Hotspot Test data(Separate 10mm 1RB)											
Front side	20	QPSK 1_0	18900/1880	1:1	0.108	0.11	22.06	23.00	1.242	0.134	22.1
Back side	20	QPSK 1_0	18900/1880	1:1	0.503	0.19	22.06	23.00	1.242	0.625	22.1
Left side	20	QPSK 1_0	18900/1880	1:1	0.038	0.01	22.06	23.00	1.242	0.047	22.1
Right side	20	QPSK 1_0	18900/1880	1:1	0.431	0.02	22.06	23.00	1.242	0.535	22.1
Bottom side	20	QPSK 1_0	18900/1880	1:1	0.131	0.03	22.06	23.00	1.242	0.163	22.1
Back side	20	QPSK 1_0	18700/1860	1:1	0.361	-0.01	21.94	23.00	1.276	0.461	22.1
Back side	20	QPSK 1_0	19100/1900	1:1	0.437	0.06	21.86	23.00	1.300	0.568	22.1
Hotspot Test data(Separate 10mm 50%RB)											
Front side	20	QPSK 50_25	18900/1880	1:1	0.072	0.02	21.04	22.00	1.247	0.090	22.1
Back side	20	QPSK 50_25	18900/1880	1:1	0.311	0.03	21.04	22.00	1.247	0.388	22.1
Left side	20	QPSK 50_25	18900/1880	1:1	0.028	-0.01	21.04	22.00	1.247	0.035	22.1
Right side	20	QPSK 50_25	18900/1880	1:1	0.213	0.11	21.04	22.00	1.247	0.266	22.1
Bottom side	20	QPSK 50_25	18900/1880	1:1	0.096	0.01	21.04	22.00	1.247	0.120	22.1

Table 13: SAR of LTE Band 2 for Head and Body.



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8.2.3 SAR Result of LTE Band 7

Test position	BW.	Test mode	Test ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power drift (dB)	Conducted Power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp.(°C)
Head Test Data(1RB)											
Left cheek	20	QPSK 1_0	21100/2535	1:1	0.311	-0.14	21.52	22.00	1.117	0.347	22.3
Left tilted	20	QPSK 1_0	21100/2535	1:1	0.159	0.03	21.52	22.00	1.117	0.178	22.3
Right cheek	20	QPSK 1_0	21100/2535	1:1	0.415	-0.08	21.52	22.00	1.117	0.463	22.3
Right tilted	20	QPSK 1_0	21100/2535	1:1	0.112	0.02	21.52	22.00	1.117	0.125	22.3
Right cheek	20	QPSK 1_0	20850/2510	1:1	0.456	-0.12	21.35	22.00	1.161	0.530	22.3
Right cheek	20	QPSK 1_0	21350/2560	1:1	0.439	0.05	21.33	22.00	1.167	0.512	22.3
Head Test Data(50%RB)											
Left cheek	20	QPSK 50_50	20850/2510	1:1	0.239	0.07	20.36	21.00	1.159	0.277	22.3
Left tilted	20	QPSK 50_50	20850/2510	1:1	0.126	0.08	20.36	21.00	1.159	0.146	22.3
Right cheek	20	QPSK 50_50	20850/2510	1:1	0.349	0.01	20.36	21.00	1.159	0.404	22.3
Right tilted	20	QPSK 50_50	20850/2510	1:1	0.091	0.12	20.36	21.00	1.159	0.105	22.3
Body worn Test data(Separate 10mm 1RB)											
Front side	20	QPSK 1_0	21100/2535	1:1	0.178	0.11	21.52	22.00	1.117	0.199	22.3
Back side	20	QPSK 1_0	21100/2535	1:1	1.070	0.19	21.52	22.00	1.117	1.195	22.3
Back side	20	QPSK 1_0	20850/2510	1:1	0.999	0.08	21.35	22.00	1.161	1.160	22.3
Back side	20	QPSK 1_0	21350/2560	1:1	1.100	0.19	21.33	22.00	1.167	1.283	22.3
Back side-Repeat	20	QPSK 1_0	21350/2560	1:1	1.040	0.02	21.33	22.00	1.167	1.213	22.3
Back side-Headset	20	QPSK 1_0	21350/2560	1:1	0.999	0.11	21.33	22.00	1.167	1.166	22.3
Body worn Test data(Separate 10mm 50RB)											
Front side	20	QPSK 50_50	20850/2510	1:1	0.174	0.05	20.36	21.00	1.159	0.202	22.3
Back side	20	QPSK 50_50	20850/2510	1:1	0.766	0.06	20.36	21.00	1.159	0.888	22.3
Back side	20	QPSK 50_50	21100/2535	1:1	0.761	0.01	20.29	21.00	1.178	0.896	22.3
Back side	20	QPSK 50_50	21350/2560	1:1	0.775	0.07	20.24	21.00	1.191	0.923	22.3
Body worn Test data(100RB)											
Back side	20	QPSK 100RB_0	21100/2535	1:1	1.020	0.14	20.32	21.00	1.169	1.193	22.3
Hotspot Test data(Separate 10mm 1RB)											
Front side	20	QPSK 1_0	21100/2535	1:1	0.178	0.11	21.52	22.00	1.117	0.199	22.3
Back side	20	QPSK 1_0	21100/2535	1:1	1.070	0.19	21.52	22.00	1.117	1.195	22.3
Left side	20	QPSK 1_0	21100/2535	1:1	0.043	0.11	21.52	22.00	1.117	0.048	22.3
Right side	20	QPSK 1_0	21100/2535	1:1	0.667	0.11	21.52	22.00	1.117	0.745	22.3
Bottom side	20	QPSK 1_0	21100/2535	1:1	0.200	0.01	21.52	22.00	1.117	0.223	22.3
Back side	20	QPSK 1_0	20850/2510	1:1	0.999	0.08	21.35	22.00	1.161	1.160	22.3
Back side	20	QPSK 1_0	21350/2560	1:1	1.100	0.19	21.33	22.00	1.167	1.283	22.3
Back side-Repeat	20	QPSK 1_0	21350/2560	1:1	1.040	0.02	21.33	22.00	1.167	1.213	22.3
Hotspot Test data(Separate 10mm 50%RB)											
Front side	20	QPSK 50_50	20850/2510	1:1	0.174	0.05	20.36	21.00	1.159	0.202	22.3
Back side	20	QPSK 50_50	20850/2510	1:1	0.766	0.06	20.36	21.00	1.159	0.888	22.3
Left side	20	QPSK 50_50	20850/2510	1:1	0.043	0.04	20.36	21.00	1.159	0.050	22.3
Right side	20	QPSK 50_50	20850/2510	1:1	0.476	0.02	20.36	21.00	1.159	0.552	22.3
Bottom side	20	QPSK 50_50	20850/2510	1:1	0.139	0.04	20.36	21.00	1.159	0.161	22.3
Back side	20	QPSK 50_50	21100/2535	1:1	0.761	0.01	20.29	21.00	1.178	0.896	22.3
Back side	20	QPSK 50_50	21350/2560	1:1	0.775	0.07	20.24	21.00	1.191	0.923	22.3
Hotspot Test data (100%RB)											
Back side	20	QPSK 100RB_0	21100/2535	1:1	1.020	0.14	20.32	21.00	1.169	1.193	22.3

Table 14: SAR of LTE Band 7 for Head and Body.



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Test Position	Channel/ Frequency	Measured SAR (1g)	1 st Repeated	Ratio	2 nd Repeated	3 rd Repeated
	(MHz)		SAR (1g)		SAR (1g)	SAR (1g)
Back side	21350/2560	1.100	1.040	1.058	N/A	N/A

Note: 1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
 2) A second repeated measurement was performed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg ($\sim 10\%$ from the 1-g SAR limit).
 3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .
 4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg



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8.2.4 SAR Result of LTE Band 12

Test position	BW.	Test mode	Test ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power drift (dB)	Conducted Power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp.(°C)
Head Test Data(1RB)											
Left cheek	10	QPSK 1_25	23095/707.5	1:1	0.053	0.13	22.83	23.50	1.167	0.062	22.0
Left tilted	10	QPSK 1_25	23095/707.5	1:1	0.031	0.01	22.83	23.50	1.167	0.036	22.0
Right cheek	10	QPSK 1_25	23095/707.5	1:1	0.035	0.14	22.83	23.50	1.167	0.041	22.0
Right tilted	10	QPSK 1_25	23095/707.5	1:1	0.023	0.02	22.83	23.50	1.167	0.026	22.0
Head Test Data(50%RB)											
Left cheek	10	QPSK 25_0	23095/707.5	1:1	0.037	0.12	21.88	22.50	1.153	0.043	22.0
Left tilted	10	QPSK 25_0	23095/707.5	1:1	0.024	-0.06	21.88	22.50	1.153	0.028	22.0
Right cheek	10	QPSK 25_0	23095/707.5	1:1	0.036	0.14	21.88	22.50	1.153	0.042	22.0
Right tilted	10	QPSK 25_0	23095/707.5	1:1	0.025	0.15	21.88	22.50	1.153	0.029	22.0
Body worn Test data(Separate 10mm 1RB)											
Front side	10	QPSK 1_25	23095/707.5	1:1	0.034	0.02	22.83	23.50	1.167	0.039	22.0
Back side	10	QPSK 1_25	23095/707.5	1:1	0.337	-0.02	22.83	23.50	1.167	0.393	22.0
Body worn Test data(Separate 10mm 50RB)											
Front side	10	QPSK 25_0	23095/707.5	1:1	0.041	-0.05	21.88	22.50	1.153	0.047	22.0
Back side	10	QPSK 25_0	23095/707.5	1:1	0.205	-0.04	21.88	22.50	1.153	0.236	22.0
Hotspot Test data(Separate 10mm 1RB)											
Front side	10	QPSK 1_25	23095/707.5	1:1	0.034	0.02	22.83	23.50	1.167	0.039	22.0
Back side	10	QPSK 1_25	23095/707.5	1:1	0.337	-0.02	22.83	23.50	1.167	0.393	22.0
Left side	10	QPSK 1_25	23095/707.5	1:1	0.079	0.05	22.83	23.50	1.167	0.092	22.0
Right side	10	QPSK 1_25	23095/707.5	1:1	0.155	0.03	22.83	23.50	1.167	0.181	22.0
Bottom side	10	QPSK 1_25	23095/707.5	1:1	0.020	0.11	22.83	23.50	1.167	0.023	22.0
Hotspot Test data(Separate 10mm 50%RB)											
Front side	10	QPSK 25_0	23095/707.5	1:1	0.041	-0.05	21.88	22.50	1.153	0.047	22.0
Back side	10	QPSK 25_0	23095/707.5	1:1	0.205	-0.04	21.88	22.50	1.153	0.236	22.0
Left side	10	QPSK 25_0	23095/707.5	1:1	0.061	0.07	21.88	22.50	1.153	0.071	22.0
Right side	10	QPSK 25_0	23095/707.5	1:1	0.112	0.09	21.88	22.50	1.153	0.129	22.0
Bottom side	10	QPSK 25_0	23095/707.5	1:1	0.015	0.04	21.88	22.50	1.153	0.017	22.0

Table 15: SAR of LTE Band 12 for Head and Body.



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8.2.1 SAR Result of LTE Band 13

Test position	BW.	Test mode	Test ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power drift (dB)	Conducted Power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp.(°C)
Head Test Data(1RB)											
Left cheek	10	QPSK 1_25	23230/782	1:1	0.199	0.02	21.11	23.00	1.545	0.308	22.1
Left tilted	10	QPSK 1_25	23230/782	1:1	0.157	0.05	21.11	23.00	1.545	0.243	22.1
Right cheek	10	QPSK 1_25	23230/782	1:1	0.171	-0.09	21.11	23.00	1.545	0.264	22.1
Right tilted	10	QPSK 1_25	23230/782	1:1	0.162	0.06	21.11	23.00	1.545	0.250	22.1
Head Test Data(50%RB)											
Left cheek	10	QPSK 25_13	23230/782	1:1	0.164	0.05	20.01	22.00	1.581	0.259	22.1
Left tilted	10	QPSK 25_13	23230/782	1:1	0.147	-0.11	20.01	22.00	1.581	0.232	22.1
Right cheek	10	QPSK 25_13	23230/782	1:1	0.156	0.01	20.01	22.00	1.581	0.247	22.1
Right tilted	10	QPSK 25_13	23230/782	1:1	0.143	0.08	20.01	22.00	1.581	0.226	22.1
Hotspot Test data(Separate 10mm 1RB)											
Front side	10	QPSK 1_25	23230/782	1:1	0.195	0.13	21.11	23.00	1.545	0.301	22.1
Back side	10	QPSK 1_25	23230/782	1:1	0.221	0.07	21.11	23.00	1.545	0.342	22.1
Left side	10	QPSK 1_25	23230/782	1:1	0.178	0.02	21.11	23.00	1.545	0.275	22.1
Top side	10	QPSK 1_25	23230/782	1:1	0.151	-0.09	21.11	23.00	1.545	0.233	22.1
Bottom side	10	QPSK 1_25	23230/782	1:1	0.053	0.08	21.11	23.00	1.545	0.082	22.1
Hotspot Test data(Separate 10mm 50%RB)											
Front side	10	QPSK 25_13	23230/782	1:1	0.174	0.03	20.01	22.00	1.581	0.275	22.1
Back side	10	QPSK 25_13	23230/782	1:1	0.212	0.01	20.01	22.00	1.581	0.335	22.1
Left side	10	QPSK 25_13	23230/782	1:1	0.174	-0.03	20.01	22.00	1.581	0.275	22.1
Top side	10	QPSK 25_13	23230/782	1:1	0.138	-0.11	20.01	22.00	1.581	0.218	22.1
Bottom side	10	QPSK 25_13	23230/782	1:1	0.049	0.14	20.01	22.00	1.581	0.077	22.1

Table 16: SAR of LTE Band 13 for Head and Body.



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8.2.2 SAR Result of LTE Band 26

Test position	BW.	Test mode	Test ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power drift (dB)	Conducted Power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp.(°C)
Head Test Data(1RB)											
Left cheek	15	QPSK 1_0	26865/831.5	1:1	0.106	-0.15	23.76	24.00	1.057	0.112	22.5
Left tilted	15	QPSK 1_0	26865/831.5	1:1	0.085	0.11	23.76	24.00	1.057	0.090	22.5
Right cheek	15	QPSK 1_0	26865/831.5	1:1	0.073	0.13	23.76	24.00	1.057	0.077	22.5
Right tilted	15	QPSK 1_0	26865/831.5	1:1	0.099	0.01	23.76	24.00	1.057	0.104	22.5
Head Test Data(50%RB)											
Left cheek	15	QPSK 36_0	26865/831.5	1:1	0.053	0.13	22.90	23.00	1.023	0.054	22.5
Left tilted	15	QPSK 36_0	26865/831.5	1:1	0.048	0.11	22.90	23.00	1.023	0.049	22.5
Right cheek	15	QPSK 36_0	26865/831.5	1:1	0.039	0.13	22.90	23.00	1.023	0.040	22.5
Right tilted	15	QPSK 36_0	26865/831.5	1:1	0.044	0.15	22.90	23.00	1.023	0.045	22.5
Body worn Test data(Separate 10mm 1RB)											
Front side	15	QPSK 1_0	26865/831.5	1:1	0.087	0.01	23.76	24.00	1.057	0.091	22.5
Back side	15	QPSK 1_0	26865/831.5	1:1	0.149	0.01	23.76	24.00	1.057	0.157	22.5
Body worn Test data(Separate 10mm 50RB)											
Front side	15	QPSK 36_0	26865/831.5	1:1	0.080	0.16	22.90	23.00	1.023	0.082	22.5
Back side	15	QPSK 36_0	26865/831.5	1:1	0.127	0.05	22.90	23.00	1.023	0.130	22.5
Hotspot Test data(Separate 10mm 1RB)											
Front side	15	QPSK 1_0	26865/831.5	1:1	0.087	0.01	23.76	24.00	1.057	0.091	22.5
Back side	15	QPSK 1_0	26865/831.5	1:1	0.149	0.01	23.76	24.00	1.057	0.157	22.5
Left side	15	QPSK 1_0	26865/831.5	1:1	0.139	0.08	23.76	24.00	1.057	0.147	22.5
Right side	15	QPSK 1_0	26865/831.5	1:1	0.076	0.05	23.76	24.00	1.057	0.080	22.5
Bottom side	15	QPSK 1_0	26865/831.5	1:1	0.017	0.19	23.76	24.00	1.057	0.018	22.5
Hotspot Test data(Separate 10mm 50%RB)											
Front side	15	QPSK 36_0	26865/831.5	1:1	0.080	0.16	22.90	23.00	1.023	0.082	22.5
Back side	15	QPSK 36_0	26865/831.5	1:1	0.127	0.05	22.90	23.00	1.023	0.130	22.5
Left side	15	QPSK 36_0	26865/831.5	1:1	0.097	0.09	22.90	23.00	1.023	0.099	22.5
Right side	15	QPSK 36_0	26865/831.5	1:1	0.059	-0.01	22.90	23.00	1.023	0.060	22.5
Bottom side	15	QPSK 36_0	26865/831.5	1:1	0.018	0.01	22.90	23.00	1.023	0.019	22.5

Table 17: SAR of LTE Band 26 for Head and Body.



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8.2.3 SAR Result of LTE Band 41

Test position	BW.	Test mode	Test ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power drift (dB)	Conducted Power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp.(°C)
Head Test Data(1RB)											
Left cheek	20	QPSK 1_0	40240/2555	1:1.58	0.214	0.03	21.86	22.50	1.159	0.248	22.3
Left tilted	20	QPSK 1_0	40240/2555	1:1.58	0.081	0.06	21.86	22.50	1.159	0.093	22.3
Right cheek	20	QPSK 1_0	40240/2555	1:1.58	0.242	0.02	21.86	22.50	1.159	0.280	22.3
Right tilted	20	QPSK 1_0	40240/2555	1:1.58	0.063	0.17	21.86	22.50	1.159	0.073	22.3
Right cheek	20	QPSK 1_0	40500/2581	1:1.58	0.287	0.14	21.70	22.50	1.202	0.345	22.3
Right cheek	20	QPSK 1_0	40770/2608	1:1.58	0.261	0.08	21.17	22.50	1.358	0.355	22.3
Right cheek	20	QPSK 1_0	41140/2645	1:1.58	0.241	0.03	20.84	22.50	1.466	0.353	22.3
Head Test Data(50%RB)											
Left cheek	20	QPSK 50_0	40240/2555	1:1.58	0.164	0.06	20.88	21.50	1.153	0.189	22.3
Left tilted	20	QPSK 50_0	40240/2555	1:1.58	0.062	0.15	20.88	21.50	1.153	0.072	22.3
Right cheek	20	QPSK 50_0	40240/2555	1:1.58	0.276	0.03	20.88	21.50	1.153	0.318	22.3
Right tilted	20	QPSK 50_0	40240/2555	1:1.58	0.050	0.19	20.88	21.50	1.153	0.058	22.3
Body worn Test data(Separate 10mm 1RB)											
Front side	20	QPSK 1_0	40240/2555	1:1.58	0.120	0.18	21.86	22.50	1.159	0.139	22.3
Back side	20	QPSK 1_0	40240/2555	1:1.58	0.719	0.05	21.86	22.50	1.159	0.833	22.3
Back side	20	QPSK 1_0	40500/2581	1:1.58	0.725	0.07	21.70	22.50	1.202	0.872	22.3
Back side	20	QPSK 1_0	40770/2608	1:1.58	0.779	0.04	21.17	22.50	1.358	1.058	22.3
Back side	20	QPSK 1_0	41140/2645	1:1.58	0.867	0.09	20.84	22.50	1.466	1.271	22.3
Back side-Repeat	20	QPSK 1_0	41140/2645	1:1.58	0.826	0.09	20.84	22.50	1.466	1.211	22.3
Back side-Headset	20	QPSK 1_0	41140/2645	1:1.58	0.863	0.17	20.84	22.50	1.466	1.265	22.3
Body worn Test data(Separate 10mm 50RB)											
Front side	20	QPSK 50_0	40240/2555	1:1.58	0.118	0.09	20.88	21.50	1.153	0.136	22.3
Back side	20	QPSK 50_0	40240/2555	1:1.58	0.504	0.01	20.88	21.50	1.153	0.581	22.3
Body worn Test data(100RB)											
Back side	20	QPSK 100RB_0	40240/2555	1:1.58	0.681	0.07	20.82	21.50	1.169	0.796	22.3
Hotspot Test data(Separate 10mm 1RB)											
Front side	20	QPSK 1_0	40240/2555	1:1.58	0.120	0.18	21.86	22.50	1.159	0.139	22.3
Back side	20	QPSK 1_0	40240/2555	1:1.58	0.719	0.05	21.86	22.50	1.159	0.833	22.3
Left side	20	QPSK 1_0	40240/2555	1:1.58	0.031	0.01	21.86	22.50	1.159	0.035	22.3
Right side	20	QPSK 1_0	40240/2555	1:1.58	0.564	0.03	21.86	22.50	1.159	0.654	22.3
Bottom side	20	QPSK 1_0	40240/2555	1:1.58	0.130	0.15	21.86	22.50	1.159	0.151	22.3
Back side	20	QPSK 1_0	40500/2581	1:1.58	0.725	0.07	21.70	22.50	1.202	0.872	22.3
Back side	20	QPSK 1_0	40770/2608	1:1.58	0.779	0.04	21.17	22.50	1.358	1.058	22.3
Back side	20	QPSK 1_0	41140/2645	1:1.58	0.867	0.09	20.84	22.50	1.466	1.271	22.3
Back side-Repeat	20	QPSK 1_0	41140/2645	1:1.58	0.816	0.09	20.84	22.50	1.466	1.196	22.3
Right side	20	QPSK 1_0	40500/2581	1:1.58	0.581	0.06	21.70	22.50	1.202	0.699	22.3
Right side	20	QPSK 1_0	40770/2608	1:1.58	0.602	0.08	21.17	22.50	1.358	0.818	22.3
Right side	20	QPSK 1_0	41140/2645	1:1.58	0.635	-0.11	20.84	22.50	1.466	0.931	22.3
Hotspot Test data(Separate 10mm 50%RB)											
Front side	20	QPSK 50_0	40240/2555	1:1.58	0.118	0.09	20.88	21.50	1.153	0.136	22.3
Back side	20	QPSK 50_0	40240/2555	1:1.58	0.504	0.01	20.88	21.50	1.153	0.581	22.3
Left side	20	QPSK 50_0	40240/2555	1:1.58	0.028	-0.05	20.88	21.50	1.153	0.032	22.3
Right side	20	QPSK 50_0	40240/2555	1:1.58	0.435	0.02	20.88	21.50	1.153	0.502	22.3
Bottom side	20	QPSK 50_0	40240/2555	1:1.58	0.087	0.05	20.88	21.50	1.153	0.100	22.3



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Hotspot Test data (100%RB)											
Back side	20	QPSK 100RB 0	40240/2555	1:1.58	0.681	0.07	20.82	21.50	1.169	0.796	22.3

Table 18: SAR of LTE Band 41 for Head and Body.

Test Position	Channel/ Frequency	Measured SAR (1g)	1 st Repeated	Ratio	2 nd Repeated	3 rd Repeated
	(MHz)		SAR (1g)		SAR (1g)	SAR (1g)
Back side	41140/2645	0.867	0.816	1.063	N/A	N/A

Note: 1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.

2) A second repeated measurement was performed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg ($\sim 10\%$ from the 1-g SAR limit).

3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .

4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg



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8.2.4 SAR Result of LTE Band 66

Test position	BW.	Test mode	Test ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power drift (dB)	Conducted Power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp.(°C)
Head Test Data(1RB)											
Left cheek	20	QPSK 1_99	132322/1745	1:1	0.032	0.03	21.67	22.50	1.211	0.039	22.5
Left tilted	20	QPSK 1_99	132322/1745	1:1	0.020	0.01	21.67	22.50	1.211	0.024	22.5
Right cheek	20	QPSK 1_99	132322/1745	1:1	0.068	0.05	21.67	22.50	1.211	0.083	22.5
Right tilted	20	QPSK 1_99	132322/1745	1:1	0.027	0.14	21.67	22.50	1.211	0.033	22.5
Right cheek	20	QPSK 1_99	132072/1720	1:1	0.088	0.16	21.39	22.50	1.291	0.114	22.5
Right cheek	20	QPSK 1_99	132572/1770	1:1	0.086	0.11	21.58	22.50	1.236	0.107	22.5
Head Test Data(50%RB)											
Left cheek	20	QPSK 50_0	132572/1770	1:1	0.030	0.18	20.62	21.50	1.225	0.036	22.5
Left tilted	20	QPSK 50_0	132572/1770	1:1	0.019	0.14	20.62	21.50	1.225	0.023	22.5
Right cheek	20	QPSK 50_0	132572/1770	1:1	0.067	0.04	20.62	21.50	1.225	0.082	22.5
Right tilted	20	QPSK 50_0	132572/1770	1:1	0.031	0.08	20.62	21.50	1.225	0.038	22.5
Body worn Test data(Separate 10mm 1RB)											
Front side	20	QPSK 1_99	132322/1745	1:1	0.067	0.08	21.67	22.50	1.211	0.081	22.5
Back side	20	QPSK 1_99	132322/1745	1:1	0.440	0.12	21.67	22.50	1.211	0.533	22.5
Back side	20	QPSK 1_99	132072/1720	1:1	0.399	0.14	21.39	22.50	1.291	0.515	22.5
Back side	20	QPSK 1_99	132572/1770	1:1	0.335	0.19	21.58	22.50	1.236	0.414	22.5
Body worn Test data(Separate 10mm 50RB)											
Front side	20	QPSK 50_0	132572/1770	1:1	0.055	-0.15	20.62	21.50	1.225	0.067	22.5
Back side	20	QPSK 50_0	132572/1770	1:1	0.280	0.06	20.62	21.50	1.225	0.343	22.5
Hotspot Test data(Separate 10mm 1RB)											
Front side	20	QPSK 1_99	132322/1745	1:1	0.067	0.08	21.67	22.50	1.211	0.081	22.5
Back side	20	QPSK 1_99	132322/1745	1:1	0.440	0.12	21.67	22.50	1.211	0.533	22.5
Left side	20	QPSK 1_99	132322/1745	1:1	0.018	0.15	21.67	22.50	1.211	0.021	22.5
Right side	20	QPSK 1_99	132322/1745	1:1	0.247	0.01	21.67	22.50	1.211	0.299	22.5
Bottom side	20	QPSK 1_99	132322/1745	1:1	0.094	0.11	21.67	22.50	1.211	0.114	22.5
Back side	20	QPSK 1_99	132072/1720	1:1	0.399	0.14	21.39	22.50	1.291	0.515	22.5
Back side	20	QPSK 1_99	132572/1770	1:1	0.335	0.19	21.58	22.50	1.236	0.414	22.5
Hotspot Test data(Separate 10mm 50%RB)											
Front side	20	QPSK 50_0	132572/1770	1:1	0.055	-0.15	20.62	21.50	1.225	0.067	22.5
Back side	20	QPSK 50_0	132572/1770	1:1	0.280	0.06	20.62	21.50	1.225	0.343	22.5
Left side	20	QPSK 50_0	132572/1770	1:1	0.150	0.09	20.62	21.50	1.225	0.184	22.5
Right side	20	QPSK 50_0	132572/1770	1:1	0.175	0.12	20.62	21.50	1.225	0.214	22.5
Bottom side	20	QPSK 50_0	132572/1770	1:1	0.063	0.02	20.62	21.50	1.225	0.078	22.5

Table 19: SAR of LTE Band 66 for Head and Body.



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8.2.5 SAR Result of WIFI 2.4G

Test position	Test mode	Test ch./Freq.	Duty Cycle	Duty Cycle Scaled factor	SAR (W/kg) 1-g	Power drift (dB)	Conducted Power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp.(°C)
Head Test data											
Left cheek	802.11b	6/2437	99.14%	1.009	0.033	0.19	15.15	15.50	1.084	0.036	22.5
Left tilted	802.11b	6/2437	99.14%	1.009	0.037	0.08	15.15	15.50	1.084	0.041	22.5
Right cheek	802.11b	6/2437	99.14%	1.009	0.054	0.09	15.15	15.50	1.084	0.059	22.5
Right tilted	802.11b	6/2437	99.14%	1.009	0.061	0.16	15.15	15.50	1.084	0.067	22.5
Right tilted	802.11b	1/2412	99.14%	1.009	0.040	-0.02	14.14	15.50	1.368	0.055	22.5
Right tilted	802.11b	11/2462	99.14%	1.009	0.040	0.07	14.57	15.50	1.239	0.050	22.5
Body worn Test data (Separate 10mm)											
Front side	802.11b	6/2437	99.14%	1.009	0.028	0.09	15.15	15.50	1.084	0.031	22.5
Back side	802.11b	6/2437	99.14%	1.009	0.855	0.07	15.15	15.50	1.084	0.935	22.5
Back side-repeat	802.11b	6/2437	99.14%	1.009	0.748	0.02	15.15	15.50	1.084	0.818	22.5
Back side	802.11b	1/2412	99.14%	1.009	0.321	0.08	14.14	15.50	1.368	0.443	22.5
Back side	802.11b	11/2462	99.14%	1.009	0.470	0.02	14.57	15.50	1.239	0.587	22.5
Hotspot Test data (Separate 10mm)											
Front side	802.11b	6/2437	99.14%	1.009	0.028	0.09	15.15	15.50	1.084	0.031	22.5
Back side	802.11b	6/2437	99.14%	1.009	0.855	0.07	15.15	15.50	1.084	0.935	22.5
Back side-repeat	802.11b	6/2437	99.14%	1.009	0.748	0.02	15.15	15.50	1.084	0.818	22.5
Left side	802.11b	6/2437	99.00%	1.010	0.351	0.16	15.15	15.50	1.084	0.384	22.5
Top side	802.11b	6/2437	99.14%	1.009	0.033	-0.10	15.15	15.50	1.084	0.036	22.5
Back side	802.11b	1/2412	99.14%	1.009	0.321	0.08	14.14	15.50	1.368	0.443	22.5
Back side	802.11b	11/2462	99.14%	1.009	0.470	0.02	14.57	15.50	1.239	0.587	22.5

Table 20: SAR of WIFI 2.4G for Head and Body.

Note:

- 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.

Mode	Tune-up (dBm)	Tune-up (mw)	Highest Reported SAR1-g(W/kg)	Adjusted SAR1-g(W/kg)	SAR test
Head					
802.11b	15.50	11.90	0.067	/	Yes
802.11g	15.50	11.90	/	0.067	No
802.11n 20M	15.00	11.76	/	0.066	No
Body worn & Hotspot Test data(Separate 10mm)					
802.11b	15.50	11.90	0.935	/	Yes
802.11g	15.50	11.90	/	0.935	No
802.11n 20M	15.00	11.76	/	0.924	No

Test Position	Channel/ Frequency	Measured SAR (1g)	1 st Repeated	Ratio	2 nd Repeated	3 rd Repeated
	(MHz)		SAR (1g)		SAR (1g)	SAR (1g)
Back side	6/2437	0.855	0.748	1.143	N/A	N/A

Note: 1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.

2) A second repeated measurement was performed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg ($\sim 10\%$ from the 1-g SAR limit).

3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .

4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg



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8.2.6 SAR Result of BT

Test position	Test mode	Test ch./Freq.	Duty Cycle	Duty Cycle Scaled factor	SAR (W/kg) 1-g	Power drift (dB)	Conducted Power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp.(°C)
Head Test data											
Left cheek	3DH5	39/2441	76.60%	1.306	0.003	0.09	3.96	4.00	1.009	0.004	22.5
Left tilted	3DH5	39/2441	76.60%	1.306	0.003	0.04	3.96	4.00	1.009	0.003	22.5
Right cheek	3DH5	39/2441	76.60%	1.306	0.004	0.02	3.96	4.00	1.009	0.005	22.5
Right tilted	3DH5	39/2441	76.60%	1.306	0.002	0.09	3.96	4.00	1.009	0.003	22.5
Right cheek	3DH5	0/2402	76.60%	1.306	0.004	0.05	2.55	4.00	1.396	0.008	22.5
Right cheek	3DH5	78/2480	76.60%	1.306	0.003	-0.04	3.87	4.00	1.030	0.004	22.5
Body worn Test data (Separate 10mm)											
Front side	3DH5	39/2441	76.60%	1.306	0.002	0.09	3.96	4.00	1.009	0.003	22.5
Back side	3DH5	39/2441	76.60%	1.306	0.039	0.02	3.96	4.00	1.009	0.051	22.5
Back side	3DH5	0/2402	76.60%	1.306	0.031	0.09	2.55	4.00	1.396	0.057	22.5
Back side	3DH5	78/2480	76.60%	1.306	0.028	0.17	3.87	4.00	1.030	0.038	22.5
Hotspot Test data (Separate 10mm)											
Front side	3DH5	39/2441	76.60%	1.306	0.002	0.09	3.96	4.00	1.009	0.003	22.5
Back side	3DH5	39/2441	76.60%	1.306	0.039	0.02	3.96	4.00	1.009	0.051	22.5
Left side	3DH5	39/2441	76.6%	1.205	0.013	0.07	3.96	4.00	1.009	0.016	22.5
Top side	3DH5	39/2441	76.60%	1.306	0.002	-0.04	3.96	4.00	1.009	0.003	22.5
Back side	3DH5	0/2402	76.60%	1.306	0.031	0.09	2.55	4.00	1.396	0.057	22.5
Back side	3DH5	78/2480	76.60%	1.306	0.028	0.17	3.87	4.00	1.030	0.038	22.5

Table 21: SAR of BT for Head and Body.



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8.3 Multiple Transmitter Evaluation

8.3.1 Simultaneous SAR test evaluation

- Simultaneous Transmission Possibilities

NO	Simultaneous TX Combination	Head	Body-worn	Hotspot
1	WWAN+BT	Y	Y	Y
2	WWAN+WIFI 2.4G	Y	Y	Y
3	BT+WIFI 2.4G	N	N	N



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8.3.2 Simultaneous Transmission SAR Summation Scenario

Simultaneous Transmission SAR Summation Scenario for WLAN Head:

Test position		SARmax (W/kg)			Summed SAR	
		Main Ant	WiFi 2.4G	BT		
		1	2	3	1+2	1+3
WCDMA II	Left cheek	0.056	0.036	0.004	0.092	0.060
	Left tilted	0.032	0.041	0.003	0.073	0.035
	Right cheek	0.170	0.059	0.008	0.229	0.178
	Right tilted	0.040	0.067	0.003	0.107	0.043
WCDMA IV	Left cheek	0.040	0.036	0.004	0.076	0.044
	Left tilted	0.028	0.041	0.003	0.069	0.031
	Right cheek	0.120	0.059	0.008	0.179	0.128
	Right tilted	0.039	0.067	0.003	0.106	0.042
WCDMA V	Left cheek	0.038	0.036	0.004	0.074	0.042
	Left tilted	0.035	0.041	0.003	0.076	0.038
	Right cheek	0.061	0.059	0.008	0.120	0.069
	Right tilted	0.035	0.067	0.003	0.102	0.038
LTE Band 2	Left cheek	0.066	0.036	0.004	0.102	0.070
	Left tilted	0.029	0.041	0.003	0.070	0.032
	Right cheek	0.147	0.059	0.008	0.206	0.155
	Right tilted	0.039	0.067	0.003	0.106	0.042
LTE Band 7	Left cheek	0.347	0.036	0.004	0.383	0.351
	Left tilted	0.178	0.041	0.003	0.219	0.181
	Right cheek	0.530	0.059	0.008	0.589	0.538
	Right tilted	0.125	0.067	0.003	0.192	0.128
LTE Band 12	Left cheek	0.062	0.036	0.004	0.098	0.066
	Left tilted	0.036	0.041	0.003	0.077	0.039
	Right cheek	0.042	0.059	0.008	0.101	0.050
	Right tilted	0.029	0.067	0.003	0.096	0.032
LTE Band 13	Left cheek	0.308	0.036	0.004	0.344	0.312
	Left tilted	0.243	0.041	0.003	0.284	0.246
	Right cheek	0.264	0.059	0.008	0.323	0.272
	Right tilted	0.250	0.067	0.003	0.317	0.253
LTE Band 26	Left cheek	0.112	0.036	0.004	0.148	0.116
	Left tilted	0.090	0.041	0.003	0.131	0.093
	Right cheek	0.077	0.059	0.008	0.136	0.085
	Right tilted	0.104	0.067	0.003	0.171	0.107
LTE Band 41	Left cheek	0.248	0.036	0.004	0.284	0.252
	Left tilted	0.093	0.041	0.003	0.134	0.096
	Right cheek	0.355	0.059	0.008	0.414	0.363
	Right tilted	0.073	0.067	0.003	0.140	0.076
LTE Band 66	Left cheek	0.039	0.036	0.004	0.075	0.043
	Left tilted	0.024	0.041	0.003	0.065	0.027
	Right cheek	0.114	0.059	0.008	0.173	0.122
	Right tilted	0.038	0.067	0.003	0.105	0.041



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**Simultaneous Transmission SAR Summation Scenario for WLAN Body:
Body-worn:**

Test position		SARmax (W/kg)			Summed SAR			
		Main Ant	WiFi 2.4G	BT				
		1	2	3	1+2	SPLSR	Case No.	1+3
WCDMA II	Front side	0.123	0.032	0.003	0.155	/	/	0.123
	Back side	0.630	0.963	0.057	1.593	/	/	0.630
WCDMA IV	Front side	0.080	0.032	0.003	0.112	/	/	0.080
	Back side	0.506	0.963	0.057	1.469	/	/	0.506
WCDMA V	Front side	0.051	0.032	0.003	0.083	/	/	0.051
	Back side	0.143	0.963	0.057	1.106	/	/	0.143
LTE Band 2	Front side	0.134	0.032	0.003	0.166	/	/	0.134
	Back side	0.625	0.963	0.057	1.588	/	/	0.625
LTE Band 7	Front side	0.202	0.032	0.003	0.234	/	/	0.202
	Back side	1.283	0.963	0.057	2.246	0.040	1#	1.283
LTE Band 12	Front side	0.047	0.032	0.003	0.079	/	/	0.047
	Back side	0.393	0.963	0.057	1.356	/	/	0.393
LTE Band 26	Front side	0.091	0.032	0.003	0.123	/	/	0.091
	Back side	0.157	0.963	0.057	1.120	/	/	0.157
LTE Band 41	Front side	0.139	0.032	0.003	0.171	/	/	0.139
	Back side	1.271	0.963	0.057	2.234	0.040	2#	1.271
LTE Band 66	Front side	0.081	0.032	0.003	0.113	/	/	0.081
	Back side	0.533	0.963	0.057	1.496	/	/	0.533

Hotspot:

Test position		SARmax (W/kg)			Summed SAR			
		Main Ant	WiFi 2.4G	BT				
		1	2	3	1+2	SPLSR	Case No.	1+3
WCDMA II	Front side	0.123	0.031	0.003	0.154	/	/	0.126
	Back side	0.630	0.935	0.057	1.565	/	/	0.687
	Left side	0.040	0.384	0.016	0.424	/	/	0.056
	Right side	0.535	/	/	0.535	/	/	0.535
	Top side	/	0.036	0.003	0.036	/	/	0.003
	Bottom side	0.148	/	/	0.148	/	/	0.148
WCDMA IV	Front side	0.080	0.031	0.003	0.111	/	/	0.083
	Back side	0.506	0.935	0.057	1.441	/	/	0.563
	Left side	0.020	0.384	0.016	0.404	/	/	0.036
	Right side	0.272	/	/	0.272	/	/	0.272
	Top side	/	0.036	0.003	0.036	/	/	0.003
	Bottom side	0.107	/	/	0.107	/	/	0.107
WCDMA V	Front side	0.051	0.031	0.003	0.082	/	/	0.054
	Back side	0.143	0.935	0.057	1.078	/	/	0.200
	Left side	0.113	0.384	0.016	0.497	/	/	0.129
	Right side	0.097	/	/	0.097	/	/	0.097
	Top side	/	0.036	0.003	0.036	/	/	0.003
	Bottom side	0.056	/	/	0.056	/	/	0.056
LTE Band 2	Front side	0.134	0.031	0.003	0.165	/	/	0.137
	Back side	0.625	0.935	0.057	1.560	/	/	0.682
	Left side	0.047	0.384	0.016	0.431	/	/	0.063



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	Right side	0.535	/	/	0.535	/	/	0.535
	Top side	/	0.036	0.003	0.036	/	/	0.003
	Bottom side	0.163	/	/	0.163	/	/	0.163
LTE Band 7	Front side	0.202	0.031	0.003	0.233	/	/	0.205
	Back side	1.283	0.935	0.057	2.218	0.04	1#	1.340
	Left side	0.050	0.384	0.016	0.434	/	/	0.066
	Right side	0.745	/	/	0.745	/	/	0.745
	Top side	/	0.036	0.003	0.036	/	/	0.003
	Bottom side	0.223	/	/	0.223	/	/	0.223
LTE Band 12	Front side	0.047	0.031	0.003	0.078	/	/	0.050
	Back side	0.393	0.935	0.057	1.328	/	/	0.450
	Left side	0.092	0.384	0.016	0.476	/	/	0.108
	Right side	0.181	/	/	0.181	/	/	0.181
	Top side	/	0.036	0.003	0.036	/	/	0.003
	Bottom side	0.023	/	/	0.023	/	/	0.023
LTE Band 13	Front side	0.301	0.031	0.003	0.332			0.304
	Back side	0.342	0.935	0.057	1.277			0.399
	Left side	0.275	0.384	0.016	0.659			0.291
	Right side	0.233	/	/	0.233			0.233
	Top side	0.082	0.036	0.003	0.036			0.003
	Bottom side	0.301	/	/	0.082			0.082
LTE Band 26	Front side	0.091	0.031	0.003	0.122	/	/	0.094
	Back side	0.157	0.935	0.057	1.092	/	/	0.214
	Left side	0.147	0.384	0.016	0.531	/	/	0.163
	Right side	0.080	/	/	0.080	/	/	0.080
	Top side	/	0.036	0.003	0.036	/	/	0.003
	Bottom side	0.019	/	/	0.019	/	/	0.019
LTE Band 41	Front side	0.139	0.031	0.003	0.170	/	/	0.142
	Back side	1.271	0.935	0.057	2.206	0.04	2#	1.328
	Left side	0.035	0.384	0.016	0.419	/	/	0.051
	Right side	0.931	/	/	0.931	/	/	0.931
	Top side	/	0.036	0.003	0.036	/	/	0.003
	Bottom side	0.151	/	/	0.151	/	/	0.151
LTE Band 66	Front side	0.081	0.031	0.003	0.112	/	/	0.084
	Back side	0.533	0.935	0.057	1.468	/	/	0.590
	Left side	0.184	0.384	0.016	0.568	/	/	0.200
	Right side	0.299	/	/	0.299	/	/	0.299
	Top side	/	0.036	0.003	0.036	/	/	0.003
	Bottom side	0.114	/	/	0.114	/	/	0.114



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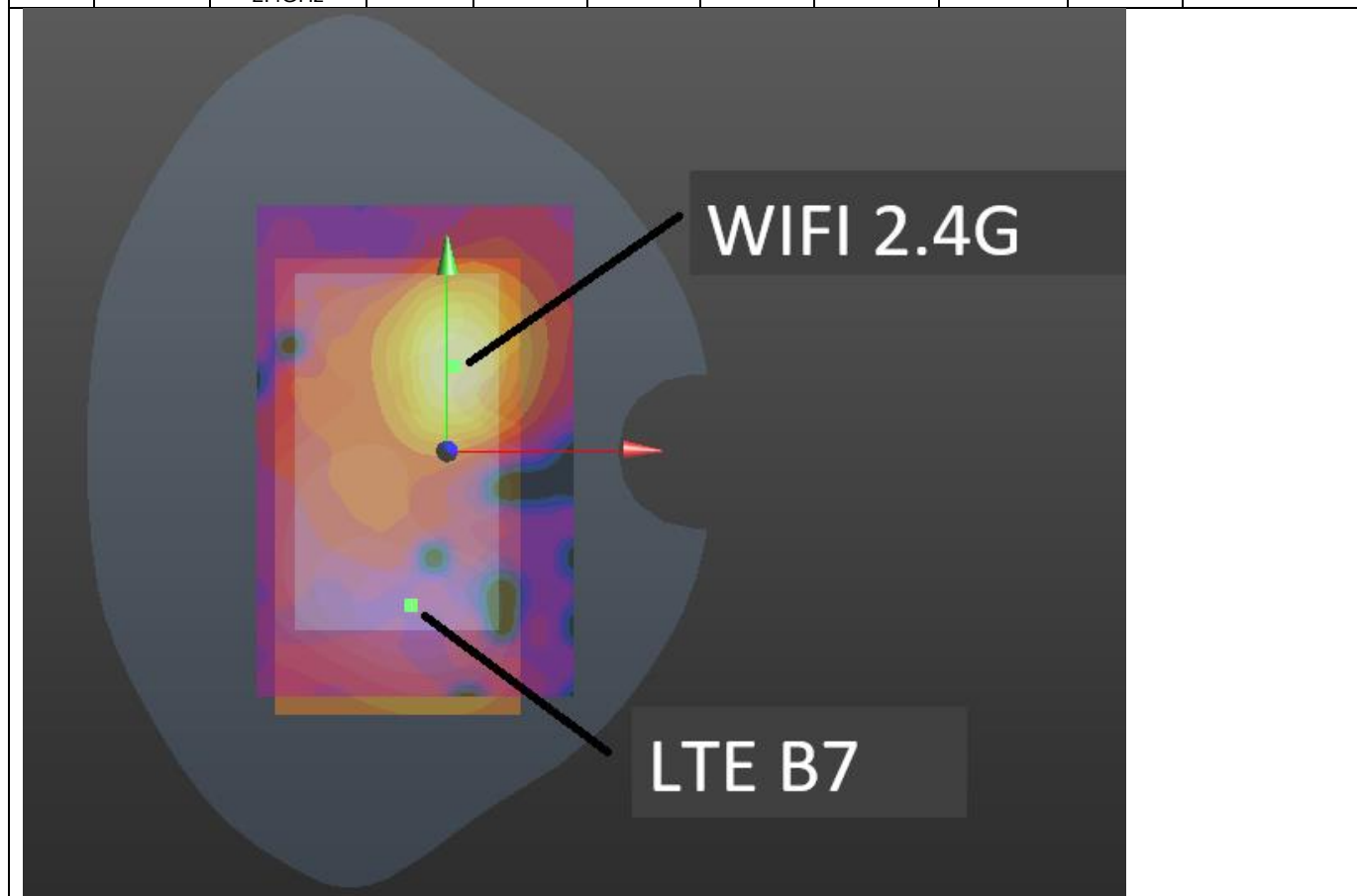
8.3.3 SPLSR Evaluation Analysis

According to KDB447498 D01v06, When the sum of SAR is larger than the limit, SAR test exclusion is determined by the SAR to peak location separation ratio(SPLSR).When the SAR to peak location ratio for each pair of antennas is $\leq 1\text{-g } 0.04$ and $10\text{-g } 0.10$, simultaneous SAR evaluation is not required. When SAR is measured for both antennas in the pair, the peak location separation distance is computed by the following formula:

$$\text{Distance}_{\text{Tx1-Tx2}} = R_i = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2 + (z_1 - z_2)^2}$$

$$\text{SPLS Ratio} = (\text{SAR}_1 + \text{SAR}_2)^{1.5} / R_i$$

Case No.	Position	Band	SAR (W/kg)	SAR peak location (cm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
				X	Y	Z				
1#	Back Side	LTE Band 7	1.283	5.8	-52.8	-1.51	83.868	2.218	0.039	Not Required
		WLAN 2.4GHz	0.935	20.2	29.8	-3.46				

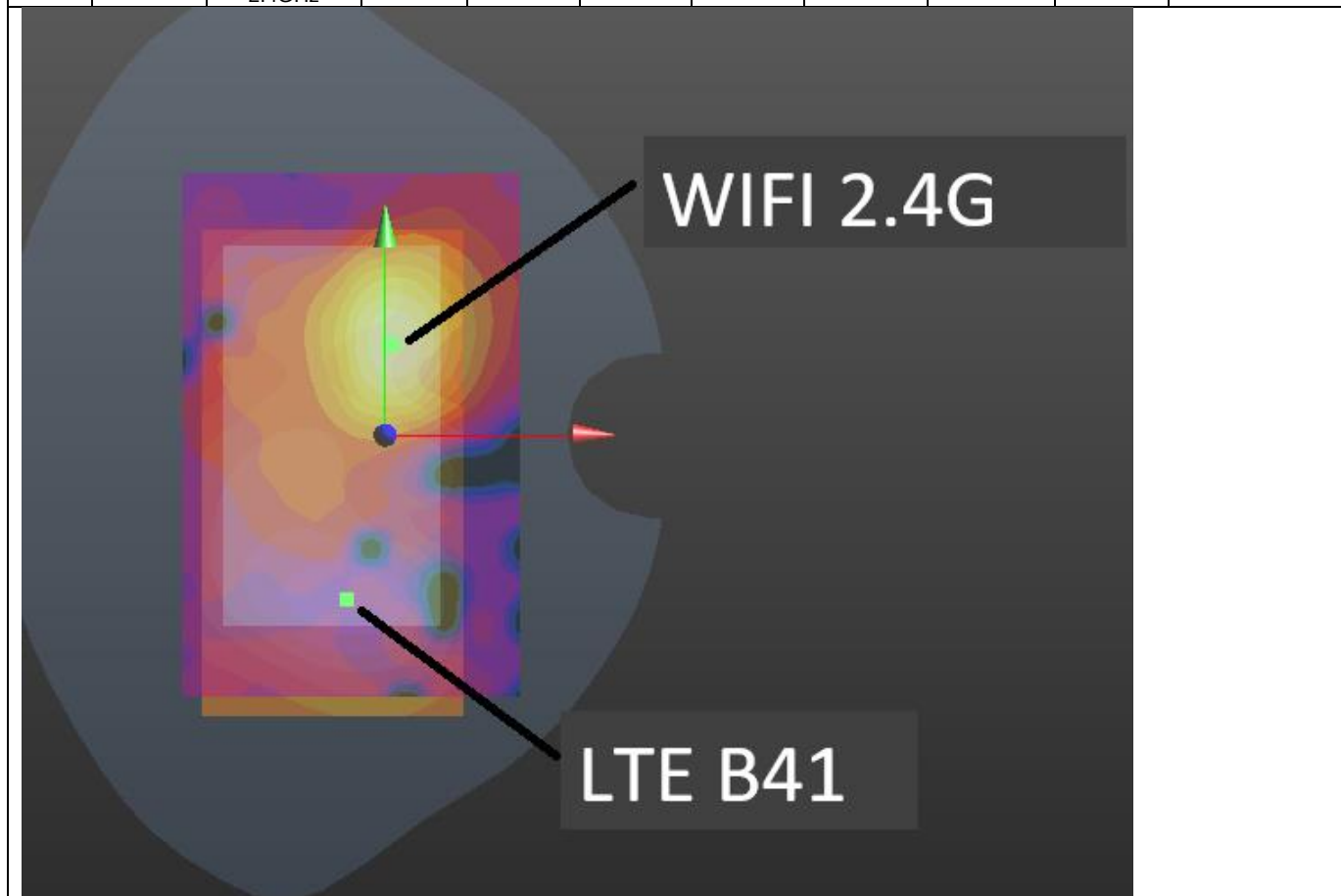


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Case No.	Position	Band	SAR (W/kg)	SAR peak location (cm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
				X	Y	Z				
2#	Left cheek	LTE Band 41	1.271	8.6	-52.8	-1.49	83.434	2.206	0.039	Not Required
		WLAN 2.4GHz	0.935	20.2	29.8	-3.46				



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9 Equipment list

Test Platform		SPEAG DASY5 Professional				
Description		SAR Test System (Frequency range 300MHz-6GHz)				
Software Reference		DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)				
Hardware Reference						
Equipment		Manufacturer	Model	Serial Number	Calibration Date	Due date of calibration
☒	Twin Phantom	SPEAG	SAM 2	1563	NCR	NCR
☒	Twin Phantom	SPEAG	SAM 5	1481	NCR	NCR
☒	DAE	SPEAG	DAE4	1324	2021-06-22	2022-06-21
☒	DAE	SPEAG	DAE4	1327	2021-11-05	2022-11-04
☒	E-Field Probe	SPEAG	EX3DV4	3982	2021-12-29	2022-12-28
☒	E-Field Probe	SPEAG	EX3DV4	7620	2021-08-24	2022-08-23
☒	Validation Kits	SPEAG	D750V3	1210	2021-09-08	2024-09-07
☒	Validation Kits	SPEAG	D835V2	4d256	2020-04-15	2023-04-14
☒	Validation Kits	SPEAG	D1750V2	1105	2020-08-29	2023-08-28
☒	Validation Kits	SPEAG	D1900V2	5d114	2020-08-27	2023-08-26
☒	Validation Kits	SPEAG	D2450V2	1038	2020-04-08	2023-04-07
☒	Validation Kits	SPEAG	D2600V2	1180	2021-05-12	2024-05-11
☒	Dielectric parameter probes	SPEAG	DAKS-3.5	0005	2021-07-15	2022-07-14
☒	Vector Network Analyzer and Vector Reflectometer	SPEAG	DAKS_VNA R140	0140913	2021-07-22	2022-07-21
☒	Universal Radio Communication Tester	R&S	CMW500	169633	2022-02-14	2023-02-13
☒	Radio Communication Analyzer	Anritsu	MT8820C	6201181442	2021-08-11	2022-08-10
☒	RF Bi-Directional Coupler	Agilent	86205-60001	MY31400031	NCR	NCR
☒	Signal Generator	R&S	SMB100A	182393	2022-02-15	2023-02-14
☒	Preamplifier	Qiji	YX28980933	202104001	NCR	NCR
☒	Power Meter	Aglient	E4419B	6843318103	2021-06-08	2022-06-07
☒	Power Sensor	Aglient	E9301A	MY41496508	2021-09-09	2022-09-08
☒	Power Sensor	Aglient	E9301H	MY41495605	2021-06-08	2022-06-07
☒	Attenuator	SHX	TS2-3dB	30704	NCR	NCR
☒	Coaxial low pass filter	Mini-Circuits	VLF-2500(+)	NA	NCR	NCR
☒	Coaxial low pass filter	Microlab Fxr	LA-F13	NA	NCR	NCR
☒	DC POWER SUPPLY	SAKO	SK1730SL5A	NA	NCR	NCR



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☒	Speed reading thermometer	LKM	DTM3000	SUW201-30-01	2021-10-09	2022-10-08
☒	Humidity and Temperature Indicator	MingGao	MingGao	NA	2021-06-16	2022-06-15

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

10 Calibration certificate

Please see the Appendix C

11 Photographs

Please see the Appendix D

Appendix A: Detailed System Check Results

Appendix B: Detailed Test Results

Appendix C: Calibration certificate

Appendix D: Photographs

---END---



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