FCC SAR Test Report

FCC ID: YY3 - 182010

Project No.	:	1904T064
Equipment	:	Tablet
Model Name	:	Algiz RT10
Applicant	:	Handheld Group AB
Address	:	Kinnegatan 17 A 531 33 Lidköping Sweden

Date of Receipt	:	Apr. 28, 2019
Date of Test	:	Apr. 29, 2019 ~ Jun. 17, 2019
Issued Date	:	Jun. 20, 2019
Tested by	:	BTL Inc.

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Herbort Liu

APPROVED BY : (Herbort Liu)

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Testing Laboratory
0659

Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

BTL's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, A2LA,TAF, or any agency of the U.S. Government.

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BTL's laboratory quality assurance procedures are in compliance with the **ISO/IEC 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

BTL is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

Please note that the measurement uncertainty is provided for informational purpose only and are not use in determining the Pass/Fail results.

Table of Contents

Table of Contents Page

REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue	Jun. 20, 2019

1. GENERAL SUMMARY

Equipment	Tablet
Model Name	Algiz RT10
Manufacturer	VVDN TECHNOLOGIES PVT. LTD.
Address	1st & 2nd Floor, Plot No. 441, SECTOR -8, IMT MANESAR, GURGAON HARYANA - 122050, INDIA
Standard(s)	**ANSI Std C95.1-1992** Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz - 300 GHz.(IEEE Std C95.1-1991) **IEEE Std 1528-2013** Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques **KDB447498 D01** General RF Exposure Guidance v06 **KDB248227 D01** 802. 11 Wi-Fi SAR v02r02 **KDB865664 D01** SAR measurement 100 MHz to 6 GHz v01r04 **KDB865664 D02** SAR Reporting v01r02 **KDB690783 D01** SAR Listings on Grants v01r03 **KDB616217 D04** SAR for laptop and tablets v01r02 **KDB941225 D01** 3G SAR Procedures v03r01 **KDB941225 D05** SAR for LTE Devices v02r05

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.
The test data, data evaluation, and equipment configuration contained in our test report (Ref No. BTL-FCC SAR-1-1904T064) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TAF according to the ISO/IEC 17025 quality assessment standard and technical standard(s).

2. RF EMISSIONS MEASUREMENT

2.1. TEST FACILITY

The test facilities used to collect the test data in this report is **SAR room** at the location of No. 68-1, Ln. 169, Sec.2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan.

2.2. MEASUREMENT UNCERTAINTY

Note: 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.

3. GENERAL INFORMATION

3.1. STATEMENT OF COMPLIANCE

Equipment Class	Band	Sensor Off Highest Body SAR-1g (W/kg)
PCE	GSM850	1.157
	GSM1900	1.312
	UMTS II	1.394
	UMTS V	1.073
	LTE 2	1.206
	LTE 4	1.044
	LTE 5	0.658
	LTE 12	1.107
	LTE 13	0.658
DTS	2.4G WLAN	1.346
DSS	Bluetooth	<0.001
U-NII	5.3G WLAN	1.198
	5.6G WLAN	1.383
	5.8G WLAN	1.341

Note:

1) The device is in compliance with Specific Absorption Rate(SAR)for general population uncontrolled exposure limits according to the FCC rule §2.1093, the ANSI C95.1:1992/IEEE C95.1:1991, the NCRP Report Number 86 for uncontrolled environment and had been tested in accordance with the measurement methods and procedures specified in IEEE Std 1528-2013 .

3.2. GENERAL DESCRIPTION OF EUT

<table>
<tr><td>Equipment</td><td colspan="3">Tablet</td></tr>
<tr><td>Model Name</td><td colspan="3">Algiz RT10</td></tr>
<tr><td>IMEI Code</td><td colspan="3">353593090000081</td></tr>
<tr><td>SN</td><td colspan="3">5057507</td></tr>
<tr><td>Modulation</td><td colspan="3">GSM(GMSK/8PSK),UMTS(QPSK),LTE(QPSK/16QAM),WiFi(DSSS/OFDM),BT(GFSK/ π /4-DQPSK/8-DPSK)</td></tr>
<tr><td rowspan="16">Operation Frequency Range(s)</td><td>Band</td><td>TX (MHz)</td><td>RX (MHz)</td></tr>
<tr><td>GSM850</td><td>824-849</td><td>869-894</td></tr>
<tr><td>GSM1900</td><td>1850-1910</td><td>1930-1990</td></tr>
<tr><td>UMTS Band 2</td><td>1850~1910</td><td>1930~1990</td></tr>
<tr><td>UMTS Band 5</td><td>824~849</td><td>869~894</td></tr>
<tr><td>LTE Band 2</td><td>1850~1910</td><td>1930~1990</td></tr>
<tr><td>LTE Band 4</td><td>1710~1755</td><td>2110~2155</td></tr>
<tr><td>LTE Band 5</td><td>824~849</td><td>869~894</td></tr>
<tr><td>LTE Band 12</td><td>699~716</td><td>729~746</td></tr>
<tr><td>LTE Band 13</td><td>777~787</td><td>746~756</td></tr>
<tr><td>Bluetooth</td><td colspan="2">2402-2480</td></tr>
<tr><td>2.4G WIFI</td><td colspan="2">2412-2462</td></tr>
<tr><td>5G U-NII-1</td><td colspan="2">5150-5250</td></tr>
<tr><td>5G U-NII-2A</td><td colspan="2">5250-5350</td></tr>
<tr><td>5G U-NII-2C</td><td colspan="2">5470-5725</td></tr>
<tr><td>5G U-NII-3</td><td colspan="2">5725-5850</td></tr>
<tr><td rowspan="17">Test Channels (low-mid-high):</td><td>Band</td><td colspan="2">Channel</td></tr>
<tr><td>GSM850</td><td colspan="2">128-190-251</td></tr>
<tr><td>GSM1900</td><td colspan="2">512-661-810</td></tr>
<tr><td>UMTS Band 2</td><td colspan="2">9262-9400-9538</td></tr>
<tr><td>UMTS Band 5</td><td colspan="2">4132-4182-4233</td></tr>
<tr><td>LTE Band 2 BW=20MHz</td><td colspan="2">18700-18900-19100</td></tr>
<tr><td>LTE Band 4 BW=20MHz</td><td colspan="2">20050-20175-20300</td></tr>
<tr><td>LTE Band 5 BW=10MHz</td><td colspan="2">20450-20525-20600</td></tr>
<tr><td>LTE Band 12 BW=10MHz</td><td colspan="2">23060-23095-23130</td></tr>
<tr><td>LTE Band 13 BW=10MHz</td><td colspan="2">23230</td></tr>
<tr><td>2.4G WIFI</td><td colspan="2">1-6-11</td></tr>
<tr><td>5G U-NII-1</td><td colspan="2">36-40-44-48</td></tr>
<tr><td>5G U-NII-2A</td><td colspan="2">52-56-60-64</td></tr>
<tr><td>5G U-NII-2C</td><td colspan="2">100-104-108-112-116-132-136-140</td></tr>
<tr><td>5G U-NII-3</td><td colspan="2">149-153-157-161-165</td></tr>
<tr><td>BT</td><td colspan="2">0-39-78</td></tr>
<tr><td>BLE</td><td colspan="2">0-19-39</td></tr>
</table>

Antenna Information					
Ant.	Brand	Model	Type	Band	Gain(dBi)
1	Pulse	WWAN: Pulse Part Number:SZ11025 WLAN: Pulse Part Number:SZ1102W	FPC	GSM850/UMTS B5 /LTE B5	-3
				GSM1900/UMTS B2 /LTE B2	1
				LTE B4	1
				LTE B12	-2.5
				LTE B13	0
				2.4G	1.5
				5G	3.8

3.3. LABORATORY ENVIRONMENT

Temperature	Min. = 18ºC, Max. = 25ºC
Relative humidity	Min. = 30%, Max. = 70%
Ground system resistance	< 0.5Ω
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.	

3.4. MAIN TEST INSTRUMENTS

Item	Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. Interval
1	Data Acquisition Electronics	Speag	DAE4	878	Dec. 12, 2018	1 Year
2	Data Acquisition Electronics	Speag	DAE4	917	Dec. 07, 2018	1 Year
3	E-field Probe	Speag	EX3DV4	3685	Mar. 25, 2019	1 Year
4	E-field Probe	Speag	EX3DV4	7346	Apr. 25, 2019	1 Year
5	System Validation Dipole	Speag	D750V3	1095	Jun. 05, 2018	3 Year
6	System Validation Dipole	Speag	D835V2	4d160	Jun. 05, 2018	3 Year
7	System Validation Dipole	Speag	D1750V2	1101	Jun. 07, 2018	3 Year
8	System Validation Dipole	Speag	D1900V2	5d179	Jun. 07, 2018	3 Year
9	System Validation Dipole	Speag	D2450V2	973	Sep. 21, 2018	3 Year
10	System Validation Dipole	Speag	D5GHzV2	1221	Sep. 28, 2018	3 Year
11	ELI4 Phantom	Speag	ELI4 Phantom V5.0	1240	N/A	N/A
12	8960 Series 10 Wireless Com Test set	Agilent	E5515E	MY53211053	Aug. 19, 2018	1 Year
13	Radio Communication Analver	Anritsu	MT8820C	6201525877	Aug. 19, 2018	1 Year
14	ENA Network Analyzer	Agilent	E5071C	MY46524658	Mar. 16, 2019	1 Year
15	EXA Spectrum Analyzer	Keysight	N9010A	MY54200240	Nov. 19, 2018	1 Year
16	Signal Generator	Agilent	N5182B	MY51350711	Dec. 06, 2018	1 Year
17	Power Meter	Anritsu	ML2495A	1128008	Dec. 06, 2018	1 Year
18	Power Sensor	Anritsu	MA2411B	1126001	Dec. 06, 2018	1 Year
19	Power Meter	Keysight	8990B	MY5100051	Aug. 17, 2018	1 Year
20	Power Sensor	Keysight	N1923A	MY58310005	Aug. 09, 2018	1 Year
21	Dielectric Probe Kit	Agilent	85070E	2593	N/A	N/A
22	Low pass filter	Mini-Circuits	SLP-2950+	M108294	N/A	N/A
23	Power Amplifier	Mini-Circuits	ZVE-2W-272+	N650001538	N/A	N/A
24	Power Amplifier	Mini-Circuits	ZVE-8G+	N628801631	N/A	N/A
25	Dielectric Probe Kit	Agilent	85070E	2593	N/A	N/A

Note:
1. “N/A” denotes no model name, serial No. or calibration specified.
2. * These test equipments have been recalibrated between the test periods. All these test equipments were within the valid period when the tests were performed.
3. 1) Per KDB865664 D01 requirements for dipole calibration, the test laboratory has adopted three-year extended calibration interval. 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) The most recent return-loss result , measured at least annually, deviates by no more than 20% from the previous measurement;
   d) The most recent measurement of the real or imaginary parts of the impedance, measured at least annually is within 5Ω from the previous measurement.

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

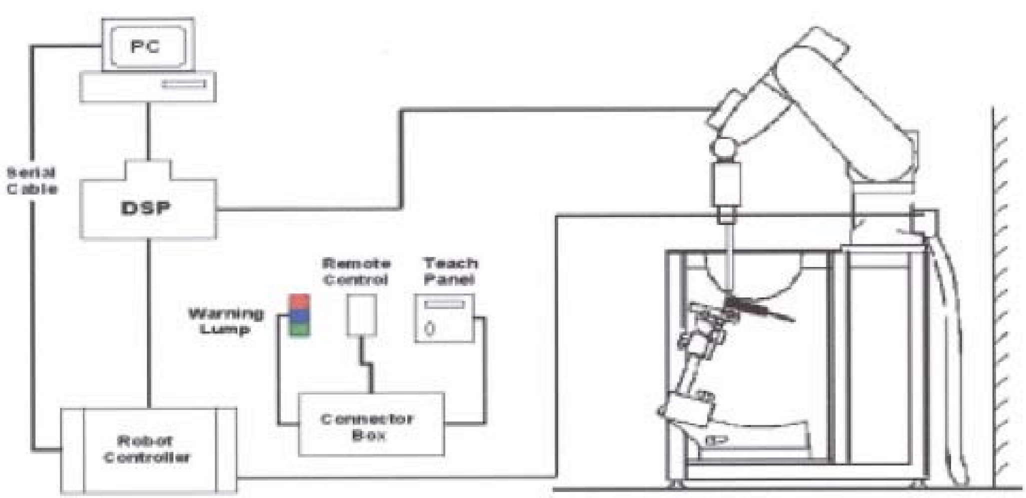
4. SAR MEASUREMENTS SYSTEM CONFIGURATION

4.1. SAR MEASUREMENT SET-UP

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

1. A standard high precision 6-axis robot (Stäubli RX family) with controller and software. An arm extension for accommodating the data acquisition electronics (DAE).
2. 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.
3. A data acquisition electronic (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.
4. A unit to operate the optical surface detector which is connected to the EOC.
5. The Electro-Optical Coupler (EOC) performs the conversion from the optical into a digital electric signal of the DAE. The EOC is connected to the DASY5 measurement server.
6. TheDASY5 measurement server, which performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation. A computer operating Windows.
7. DASY5 software and SEMCAD data evaluation software.
8. Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.
9. The generic twin phantom enabling the testing of left-hand and right-hand usage.
10. The device holder for handheld mobile phones.
11. Tissue simulating liquid mixed according to the given recipes.
12. System validation dipoles allowing to validate the proper functioning of the system.

4.1.1. TEST SETUP LAYOUT

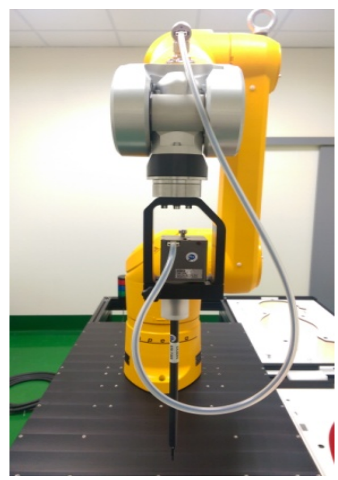


4.2. DASY5 E-FIELD PROBE SYSTEM

The SAR measurements were conducted with the dosimetric probe EX3DV4 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation.

4.2.1. EX3DV4 PROBE SPECIFICATION

Construction	Symmetrical design with triangular core Interleaved sensors 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 HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 μW/g to > 100 mW/g Linearity:± 0.2dB
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Distance from probe tip to dipole centers: 1.0 mm



EX3DV4 E-field Probe

4.2.2. E-FIELD PROBE CALIBRATION

Each probe is calibrated according to a dosimetric assessment procedure with accuracy better than ±10%. The spherical isotropy was evaluated and found to be better than ± 0.25dB. The sensitivity parameters (NormX, NormY, NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested.

The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies bellow 1 GHz, and in a wave guide above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees.

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

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

Where: Δt = Exposure time (30 seconds),

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

ΔT = Temperature increase due to RF exposure.

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

Where: σ = Simulated tissue conductivity,

ρ = Tissue density (kg/m3).

4.2.3. OTHER TEST EQUIPMENT

4.2.3.1. Device Holder for Transmitters

Construction: Simple but effective and easy-to-use extension for Mounting Device that facilitates the testing of larger devices (e.g., laptops, cameras, etc.) It is light weight and fits easily on the upper part of the Mounting Device in place of the phone positioner. The extension is fully compatible with the Twin SAM, ELI4and SAM v6.0Phantoms.
Material: POM, Acrylic glass, Foam

4.2.3.2 Phantom

Model	ELI4 Phantom	
Construction	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.	
Shell Thickness	2±0.1 mm	
Filling Volume	Approx. 30 liters	
Dimensions	Length: 600 mm ; Width: 190mm Height: adjustable feet	
Aailable	Special	

Model	Twin SAM	
Construction	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.	
Shell Thickness	2 ± 0.2 mm	
Filling Volume	Approx. 25 liters	
Dimensions	Length:1000mm; Width: 500mm Height: adjustable feet	
Aailable	Special	

4.2.4. SCANNING PROCEDURE

The DASY5 installation includes predefined files with recommended procedures for measurements and validation. They are read-only document files and destined as fully defined but unmeasured masks. All test positions (head or body-worn) are tested with the same configuration of test steps differing only in the grid definition for the different test positions.

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. The indicated drift is mainly the variation of the DUT’s output power and should vary max. ± 5 %.

The “surface check” measurement tests the optical surface detection system of the DASY5 system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above ± 0.1mm). To prevent wrong results tests are only executed when the liquid is free of air bubbles. The difference between the optical surface detection and the actual surface depends on the probe and is specified with each probe. (It does not depend on the surface reflectivity or the probe angle to the surface within ± 30°.)

- Area Scan

The “area scan” measures the SAR above the DUT or verification dipole on a parallel plane to the surface. It is used to locate the approximate location of the peak SAR with 2D spline interpolation. The robot performs a stepped movement along one grid axis while the local electrical field strength is measured by the probe. The probe is touching the surface of the SAM during acquisition of measurement values. The standard scan uses large grid spacing for faster measurement. Standard grid spacing for head measurements is 15 mm in x- and y- dimension(≤2GHz)，12 mm in x- and y- dimension(2-4 GHz) and 10mm in x- and y- dimension(4-6GHz). If a finer resolution is needed, the grid spacing can be reduced. Grid spacing and orientation have no influence on the SAR result. For special applications where the standard scan method does not find the peak SAR within the grid, e.g. mobile phones with flip cover, the grid can be adapted in orientation.

- Zoom Scan

A “zoom scan” measures the field in a volume around the 2D peak SAR value acquired in the previous “coarse” scan. This is a fine grid with maximum scan spatial resolution: Δx_{zoom}, $\Delta y_{zoom} \leq$ 2GHz -≤8mm, 2-4GHz -≤5 mm and 4-6 GHz-≤4mm; $\Delta z_{zoom} \leq$3GHz -≤5 mm, 3-4 GHz-≤4mm and 4-6GHz-≤2mm where the robot additionally moves the probe along the z-axis away from the bottom of the Phantom. DASY is also able to perform repeated zoom scans if more than 1 peak is found during area scan. In this document, the evaluated peak 1g and 10g averaged SAR values are shown in the 2D-graphics in Appendix B. Test results relevant for the specified standard (see chapter 1.4.)are shown in table form form in chapter 7.2.

A Z-axis scan measures the total SAR value at the x-and y-position of the maximum SAR value found during the cube scan. The probe is moved away in z-direction from the bottom of the SAM phantom in 2 mm steps. This measurement shows the continuity of the liquid and can - depending in the field strength – also show the liquid depth.

The following table summarizes the area scan and zoom scan resolutions per FCC KDB 865664D01:

Frequency	Maximun Area Scan resolution (Δx_{area}, Δy_{area})	Maximun Zoom Scan spatial resolution (Δx_{Zoom}, Δy_{Zoom})	Maximun Zoom Scan spatial resolution			Minimum zoom scan volume (x,y,z)
			Uniform Grid	Graded Grad		
			$\Delta z_{Zoom}(n)$	$\Delta z_{Zoom}(1)$*	$\Delta z_{Zoom}(n>1)$*	
≤2GHz	≤15mm	≤8mm	≤5mm	≤4mm	≤1.5*$\Delta z_{Zoom}(n-1)$	≥30mm
2-3GHz	≤12mm	≤5mm	≤5mm	≤4mm	≤1.5*$\Delta z_{Zoom}(n-1)$	≥30mm
3-4GHz	≤12mm	≤5mm	≤4mm	≤3mm	≤1.5*$\Delta z_{Zoom}(n-1)$	≥28mm
4-5GHz	≤10mm	≤4mm	≤3mm	≤2.5mm	≤1.5*$\Delta z_{Zoom}(n-1)$	≥25mm
5-6GHz	≤10mm	≤4mm	≤2mm	≤2mm	≤1.5*$\Delta z_{Zoom}(n-1)$	≥22mm

4.2.5. SPATIAL PEAK SAR EVALUATION

The spatial peak SAR - value for 1 and 10 g is evaluated after the Cube measurements have been done. The basis of the evaluation are the SAR values measured at the points of the fine cube grid consisting of 5 x 5 x 7 points(with 8mm horizontal resolution) or 7 x 7 x 7 points(with 5mm horizontal resolution) or 8 x 8 x 7 points(with 4mm horizontal resolution). The algorithm that finds the maximal averaged volume is separated into three different stages.

- The data between the dipole center of the probe and the surface of the phantom are extrapolated. This data cannot be measured since the center of the dipole is 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is about 1 mm (see probe calibration sheet). The extrapolated data from a cube measurement can be visualized by selecting “Graph Evaluated”.
- The maximum interpolated value is searched with a straight-forward algorithm. Around this maximum the SAR - values averaged over the spatial volumes (1g or 10 g) are computed using the 3d-spline interpolation algorithm. If the volume cannot be evaluated (i.e., if a part of the grid was cut off by the boundary of the measurement area) the evaluation will be started on the corners of the bottom plane of the cube.
- All neighboring volumes are evaluated until no neighboring volume with a higher average value is found.

Extrapolation

The extrapolation is based on a least square algorithm [W. Gander, Computer mathematic, p.168-180]. Through the points in the first 3 cm along the z-axis, polynomials of order four are calculated. These polynomials are then used to evaluate the points between the surface and the probe tip. The points, calculated from the surface, have a distance of 1 mm from each other.

Interpolation

The interpolation of the points is done with a 3d-Spline. The 3d-Spline is composed of three one-dimensional splines with the "Not a knot"-condition [W. Gander, Computer mathematic, p.141-150] (x, y and z -direction) [Numerical Recipes in C, Second Edition, p.123ff].

Volume Averaging

At First the size of the cube is calculated. Then the volume is integrated with the trapezoidal algorithm. 8000 points (20x20x20) are interpolated to calculate the average.

Advanced Extrapolation

DASY5 uses the advanced extrapolation option which is able to compensate boundary effects on E-field probes.

4.2.6. DATA STORAGE AND EVALUATION

4.2.6.1 Data Storage

The DASY5 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], [mW/g], [mW/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.

4.2.7. 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, a_{i0}, a_{i1}, a_{i2}
	Conversion factor	$ConvF_i$
	Diode compression point	Dcp_i
Device parameters:	Frequency	f
	Crest factor	cf
Media parameters:	Conductivity	·
	Density	·

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 DASY5 components. In the direct measuring mode of the multi meter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

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

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

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

With	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)
	dcp_i = diode compression point	(DASY parameter)

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

E-field probes: $E_i = (V_i \,/\, Norm_i \cdot ConvF\ )^{1/2}$

H-field probes: $H_i = (V_i)^{1/2} \cdot (a_{i0} + a_{i1} f + a_{i2} f^2) \,/\, f$

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

$Norm_i$ = sensor sensitivity of channel i (i = x, y, z)
[mV/(V/m)^2] for E-field Probes

ConvF = sensitivity enhancement in solution

aij = sensor sensitivity factors for H-field probes

f = carrier frequency [GHz]

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.

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

With SAR = local specific absorption rate in mW/g

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

= conductivity in [mho/m] or [Siemens/m]

= equivalent tissue density in g/cm^3

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/cm^2

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

H_{tot} = total magnetic field strength in A/m

5. SYSTEM VERIFICATION PROCEDURE

5.1. TISSUE VERIFICATION

The simulating liquids should be checked at the beginning of a series of SAR measurements to determine of the dielectic parameter are within the tolerances of the specified target values. The measured conductivity and relative permittivity should be within ± 5% of the target values.

The following materials are used for producing the tissue-equivalent materials.

Tissue Type	Bactericide	DGBE	HEC	NaCl	Sucrose	Triton X-100	Water	Diethylene Glycol Mono-hexylether
Head 750	0.2	-	0.2	1.5	56.0	-	42.1	-
Head 835	0.2	-	0.2	1.5	57.0	-	41.1	-
Head 900	0.2	-	0.2	1.4	58.0	-	40.2	-
Head 1750	-	47.0	-	0.4	-	-	52.6	-
Head 1900	-	44.5	-	0.2	-	-	55.3	-
Head 2450	-	45.0	-	0.1	-	-	54.9	-
Head 2600	-	45.1	-	0.1	-	-	54.8	-
H5G	-	-	-	-	-	17.2	65.5	17.3

Salt: 99+% Pure Sodium Chloride; Sugar: 98+% Pure Sucrose; Water: De-ionized, 16M + resistivity
HEC: Hydroxyethyl Cellulose; DGBE: 99+% Di(ethylene glycol) butyl ether,[2-(2-butoxyethoxy)ethanol]
Triton X-100(ultra pure): Polyethylene glycol mono [4-(1,1,3,3-tetramethylbutyl)phenyl]ether

Tissue Verification									
Tissue Type	Frequency (MHz)	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (εr)	Targeted Conductivity (σ)	Targeted Permittivity (εr)	Deviation Conductivity (σ) (%)	Deviation Permittivity (εr) (%)	Date
Head	750	22.3	0.899	42.071	0.89	41.9	1.01	0.41	Jun. 08, 2019
Head	835	22.2	0.902	42.995	0.90	41.5	0.22	3.60	Jun. 08, 2019
Head	1750	22.1	1.327	41.326	1.37	40.1	-3.14	3.06	Jun. 08, 2019
Head	1900	22.5	1.412	41.054	1.40	40.0	0.86	2.64	Apr. 29, 2019
Head	1900	22.2	1.414	41.293	1.40	40.0	1.00	3.23	Jun. 08, 2019
Head	2450	22.3	1.840	40.665	1.80	39.2	2.22	3.74	May. 29, 2019
Head	2450	22.2	1.841	40.753	1.80	39.2	2.28	3.96	Jun. 17, 2019
Head	5300	22.4	4.863	35.184	4.76	35.9	2.16	-1.99	Jun. 04, 2019
Head	5600	22.4	5.218	34.456	5.07	35.5	2.92	-2.94	Jun. 04, 2019
Head	5800	22.4	5.455	34.000	5.27	35.3	3.51	-3.68	Jun. 04, 2019

Note:
1)The dielectric parameters of the tissue-equivalent liquid should be measured under similar ambient conditions and within 2 °C of the conditions expected during the SAR evaluation to satisfy protocol requirements.
2)KDB 865664 was ensured to be applied for probe calibration frequencies greater than or equal to 50MHz of the EUT frequencies.

3)The above measured tissue parameters were used in the DASY software to perform interpolation via the DASY software to determine actual dielectric parameters at the test frequencies. The SAR test plots may slightly differ from the table above since the DASY rounds to three significant digits.

4) According to FCC TCB workshop April, 2019 RF Exposure Procedures Update(Effective February 19,2019, FCC has permitted the use of single head-tissue simulating liquid specified in IEC 62209- for all SAR tests.

5.2. SYSTEM CHECK

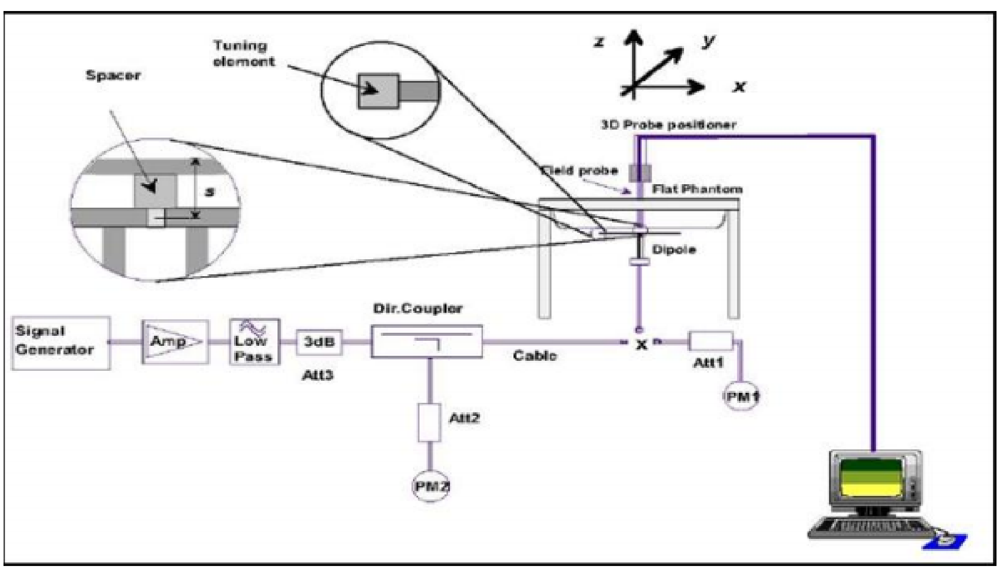
The system check is performed for verifying the accuracy of the complete measurement system and performance of the software. The system check is performed with tissue equivalent material according to IEEE P1528 (described above). The following table shows system check results for all frequency bands and tissue liquids used during the tests.

System Check	Date	Frequency (MHz)	Targeted SAR-1g (W/kg)	Measured SAR-1g (W/kg)	normalized SAR-1g (W/kg)	Deviation (%)	Dipole S/N
Head	Jun. 08, 2019	750	8.47	1.99	7.96	-6.02	1095
Head	Jun. 08, 2019	835	9.23	2.16	8.64	-6.39	4d160
Head	Jun. 08, 2019	1750	37.00	8.62	34.48	-6.81	1101
Head	Apr. 29, 2019	1900	39.50	10.10	40.40	2.28	5d179
Head	Jun. 08, 2019	1900	39.50	9.22	36.88	-6.63	5d179
Head	May. 29, 2019	2450	51.90	13.60	54.40	4.82	973
Head	Jun. 17, 2019	2450	51.90	12.90	51.60	-0.58	973
Head	Jun. 04, 2019	5300	79.00	7.79	77.90	-1.39	1221
Head	Jun. 04, 2019	5600	80.30	7.92	79.20	-1.37	1221
Head	Jun. 04, 2019	5800	76.90	7.55	75.50	-1.82	1221

5.3. SYSTEM CHECK PROCEDURE

The system check is performed by using a system check dipole which is positioned parallel to the planar part of the SAM phantom at the reference point. The distance of the dipole to the SAM phantom is determined by a plexiglass spacer. The dipole is connected to the signal source consisting of signal generator and amplifier via a directional coupler, N-connector cable and adaption to SMA. It is fed with a power of 250 mW(below 3GHz) or 100mW(3-6GHz). To adjust this power a power meter is used. The power sensor is connected to the cable before the system check to measure the power at this point and do adjustments at the signal generator. At the outputs of the directional coupler both return loss as well as forward power are controlled during the system check to make sure that emitted power at the dipole is kept constant. This can also be checked by the power drift measurement after the test.

System check results have to be equal or near the values determined during dipole calibration (target SAR in table above) with the relevant liquids and test system (±10 %).



6. SAR MEASUREMENT VARIABILITY AND UNCERTAINTY

6.1. SAR MEASUREMENT VARIABILITY

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

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

The same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.

The detailed repeated measurement results are shown in Section 8.2.

7. OPERATIONAL CONDITIONS DURING TEST

7.1. SAR TEST CONFIGURATION

7.1.1. GSM TEST CONFIGURATION

SAR tests for GSM850 and GSM1900, a communication link is set up with a base station by air link. Using 8960 Series the power lever is set to “5”and “0” in SAR of GSM850 and GSM1900. The tests in the band of GSM850 and GSM1900 are performed in the mode of GPRS/EGPRS function. Since the GPRS class is 12 for this EUT, it has at most 4 timeslots in uplink and at most 4 timeslots in downlink, the maximum total timeslot is 5. The EGPRS class is 12 for this EUT, it has at most 4 timeslots in uplink, and at most 4 timeslots in downlink, the maximum total timeslot is 5.

When SAR tests for EGPRS mode is necessary, GMSK modulation should be used to minimize SAR measurement error due to higher peak-to-average power (PAR) ratios inherent in 8-PSK.

According to specification 3GPP TS 51.010, the maximum power of the GSM can do the power reduction for the multi-slot.

The allowed power reduction in the multi-slot configuration is as following:

Number of timeslots in uplink assignment		Reduction of maximum output power (dB)		
Band	Time Slots	GPRS (GMSK)	EGPRS (GMSK)	EGPRS (8PSK)
GSM850	1 TX slot	0	0	0
	2 TX slots	1.5	1.5	1
	3 TX slots	3	3	3
	4 TX slots	4.5	4.5	4
GSM1900	1 TX slot	0	0	0
	2 TX slots	1.5	1.5	1
	3 TX slots	3	3	2
	4 TX slots	4.5	4.5	3

7.1.2.UMTS TEST CONFIGURATION

1. Output Power Verification

Maximum output power is verified on the High, Middle and Low channels according to the procedures description in section 5.2 of 3GPP TS 34.121,using the appropriate RMC or AMR with TPC(transmit power control) set to all “1s” for WCDMA/HSDPA or applying the required inner loop power control procedure to maintain maximum output power while HSUPA is active. Result for all applicable physical channel configurations(DPCCH,DPDCHn and spreading codes, HSDPA, HSPA)
Should be tabulated in the SAR report .All configuration that are not supported by the DUT or cannot be measured due to technical or equipment limitation should be clearly identified.

2. WCDMA

(1).Head SAR Measurements
SAR for Head exposure configurations in voice mode is measured using a 12.2 kbps RMC with TPC bits configured to all “1s”. SAR in AMR configurations is not required when the maximum average output of each RF channel for 12.2 kbps AMR is less than ¼ dB higher than that measured in 12.2 kbps RMC.Otherwise SAR is measured on the maximum output channel in 12.2 kbps AMR with 3.4kbps SRB(signalling radio bearer) using the exposure configuration that results in the highest SAR in12.2kbps RMC for that RF channel.

(2).Body SAR Measurements
SAR for body exposure configurations is measured using the 12.2 kbps RMC with the TPC bits configured to all “1s”. SAR for other spreading codes and multiple DPDCHn, when supported by the EUT, are not required when the maximum average outputs of each RF channel, for each spreading code and DPDCHn configuration, are less than ¼ dB higher than those measured in 12.2 kbps RMC.

3. HSDPA

SAR for body exposure configurations is measured according to the “Body SAR Measurements”” procedures of 3G device. In addition, body SAR is also measured for HSDPA when the maximum average outputs of each RF channel with HSDPA active is at ¼ dB higher than that measured without HSDPA using 12.2kbps RMC or the maximum SAR 12.2kbps RMC is above 75% of the SAR limit. Body SAR for HSDPA is measured using an FRC with H-Set 1 in Sub-test 1 and a 12.2kbps RMC configured in Test Loop Mode 1, using the highest body SAR configuration in 12.2 kbps RMC without HSDPA.
HSDPA should be configured according to UE category of a test device. The number of HS-DSCH/HS-PDSCHs, HAPRQ 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 condition, QPSK is used in the H-set for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 4ms with a CQI repetition factor of 2 to maintain a constant rate of active CQI slots. The β_c and$\beta_d$gain factors for DPCCH and DPDCH were set according to the values in the below table,$\beta_{hs}$for HS-DPCCH is set automatically to the correct value when ΔACK, ΔNACK, ΔCQI = 8. The variation of theβ_c /$\beta_d$ratio causes a power reduction at sub-tests 2 - 4.

Sub-test	β_c	β_d	β_d (SF)	β_c /β_d	β_{hs} (1)	CM(dB)(2)	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
Note 1: ΔACK, ΔNACK and ΔCQI = 8 $A_{hs} = \beta_{hs}/\beta_c = 30/15$ $\beta_{hs} = 30/15 * \beta_c$ Note 2 : CM=1 for β_c/β_d= 12/15, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH,DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases. Note 3 : For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1,TF1) to β_c = 11/15 and β_d = 15/15							

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

Settings of required H-Set 1 QPSK acc. to 3GPP 34.121

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

HSDPA UE category

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

4. HSUPA

SAR for Body exposure configurations is measured according to the "Body SAR Measurements" procedures of 3G device. When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤¼ 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 primary mode and the adjusted SAR is ≤ 1.2W/kg, SAR measurement is not required for the secondary mode.

Per KDB941225 D01, the 3G SAR test reduction procedures is applied to HSPA (HSUPA/HSDPA with RMC) body configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for HSPA using the HSPA body SAR procedures for the highest reported body exposure SAR configuration in 12.2 kbps RMC.

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 HSDPA should be configured according to the values indicated below as well as other applicable procedures described in the "WCDMA Handset" and „Release 5 HSDPA Data Device"sections of 3G device.

Subtests for WCDMA Release 6 HSUPA

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

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

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

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

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

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

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

HSUPA UE category

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

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

7.1.3. LTE TEST CONFIGURATION

SAR for LTE band exposure configurations is measured according to the procedures of KDB 941225 D05 SAR for LTE Devices. The CMW500 WideBand Radio Communication Tester was used for LTE output power measurements and SAR testing. Closed loop power control was used so the UE transmits with maximum output power during SAR testing.SAR test were performed with the same number of RB and RB offsets transmitting on all TTI frames(Maximum TTI)

1. Spectrum Plots for RB configurations

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

2. MPR

When MPR is implemented permanently within the UE, regardless of network requirements, only those RB configurations allowed by 3GPP for the channel bandwidth and modulation combinations may be tested with MPR active. Configurations with RB allocations less than the RB thresholds required by 3GPP must be tested without MPR.
The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101:

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

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

3. A-MPR

A-MPR(Additional MPR) has been disabled for all SAR tests by using Network Signalling Value of “NS_01”on the base station simulator.

4. LTE procedures for SAR testing

A) Largest channel bandwidth standalone SAR test requirements

i) 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.

ii) QPSK with 50% RB allocation

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

iii) 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 i) and ii) 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.

iv) 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.

B) 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.

7.1.4. WIFI TEST CONFIGURATION

For WLAN SAR testing, WLAN engineering testing software installed on the DUT can provide continuous transmitting RF signal.

2.4G

Mode	802.11b	802.11g	802.11n HT20	802.11n HT40
Duty cycle	100%			
Crest factor	1			

5G

Mode	802.11a	802.11n HT20	802.11n HT40	802.11ac VHT20	802.11ac VHT40	802.11ac VHT80
Duty cycle	100%					
Crest factor	1					

For WiFi SAR testing, a communication link is set up with the test mode software for WiFi mode test. During the test, at the each test frequency channel, the EUT is operated at the RF continuous emission mode. The RF signal utilized in SAR measurement has 100% duty cycle and its crest factor is 1. The test procedures in KDB 248227 D01 are applied.

7.1.4.1 2.4G SAR Test Requirements

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

7.1.4.2 5G SAR Test Requirements

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

For devices that operate in both U-NII-1 and U-NII-2A bands, when the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, both bands are tested independently for SAR. When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration; otherwise, both bands are tested independently for SAR.

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

The frequency range covered by these bands is 380 MHz (5.47 – 5.85 GHz), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements. When Terminal Doppler Weather Radar (TDWR) restriction applies, the channels at 5.60 – 5.65 GHz in U-NII-2C band must be disabled with acceptable mechanisms and documented in the equipment certification.

Unless band gap channels are permanently disabled, they must be considered for SAR testing. To maintain SAR measurement accuracy and to facilitate test reduction, the channels in U-NII-2C band above 5.65 GHz may be grouped with the 5.8 GHz channels in U-NII-3 or §15.247 band to enable two SAR probe calibration frequency points to cover the bands, including the band gap channels.11 When band gap channels are supported and the bands are not aggregated for SAR testing, band gap channels must be considered independently in each band according to the normally required OFDM SAR measurement and probe calibration frequency points requirements.

7.1.4.3 OFDM transmission mode and SAR test channel selection

For the 2.4GHz and 5GHz bands, when the same maximum output power was specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration with the largest channel bandwidth, lowest order modulation and lowest data rate. When the maximum output power of a channel is the same for equivalent OFDM configurations(for example 802.11a,802.11n and 802.11ac,or 802.11g and 802.11n,with the same channel bandwidth, modulation, and data rate, etc.),the lower order 802.11 mode(i.e.802.11a then 802.11n and 802.11ac,or 802.11g then 802.11n) is used for SAR measurement. When the maximum output power are the same for multiple test channels, either according to the default or additional power measurement requirements, SAR is measured using the channel closest to the middle of the frequency band or aggregated band. When there are multiple channels with the same maximum output power, SAR is measured using the higher number channel.

7.1.4.5 Initial test configuration procedure

For OFDM, in both 2.4G and 5GHz bands, an initial test configuration is determined for each frequency band and aggregated band, according to the transmission mode with the highest maximum output power specified for SAR measurements. When the same maximum output power is specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration(s) with the largest channel bandwidth, lowest order modulation, and lowest data rate. If the average RF output powers of the highest identical transmission modes are within 0.25 dB of each other, mid channel of the transmission mode with highest average RF output powers is the initial test channel. Otherwise, the channel of the transmission mode with the highest average RF output power will be the initial test configuration.
When the reported SAR is ≤ 0.8 W/kg, no additional measurements on other test channels are required. Otherwise, SAR is evaluated using the subsequent highest average RF output channel until the reported SAR result is ≤1.2 W/kg or all channels are measured. When there are multiple untested channels having the same subsequent highest average RF output power, the channel with higher frequency from the lowest 802.11 mode is considered for SAR measurement.

7.2.SAR SENSOR WORKING

When the sensor is active，the active distance as below：

ANT	Test Position	Active distance（mm）
PCB	Rear Face	10
	Top Side	10

The SAR power reduce as below：

Band	Sensor Off _ High Power	Sensor on _ Low Power	Reduce power（dBm)
	Max. Tune up Power (dBm)	Max. Tune up Power (dBm)	
GSM1900	28.5	24.5	4
LTE Band 4	24	20	4

Note:
1. The UMTS reduce power refers to the power of RMC12.2K.
2. The LTE reduce power refers to the power of QPSK/1RB
3. The sensor can only be triggered at the rear face and top side.

7.3.POWER REDUCTION BY PROXIMITY SENSOR

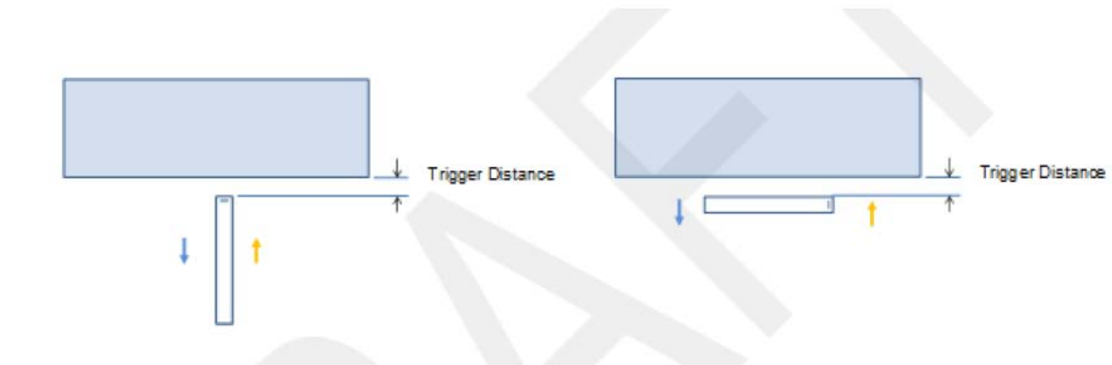
7.3.1 Proximity Sensor Triggering Distance

The bottom of the DUT was placed directly below the flat phantom. The DUT was moved toward the phantom in accordance with the steps outlined in KDB 616217 §6.2 to determine the trigger distance for enabling power reduction. The DUT was moved away from the phantom to determine the trigger distance for resuming full power.

The measurement was then repeated for the Rear surface.

The DUT featured a sound indicator on its player that showed the status of the proximity sensor (Triggered or not triggered). This was used to determine the status of the sensor during the proximity sensor assessment as monitoring the output power directly was not practical without affecting the measurement.

It was confirmed separately that the output power was altered according to the proximity sensor status indication. This was achieved by observing the proximity sensor status at the same time as monitoring the conducted power. Section 9 contains both the full and reduced conducted power measurements.



Proximity Sensor Trigger Distance Assessment
KDB 616219 §6.2, Edge 1

Proximity Sensor Trigger Distance Assessment
KDB 616219 §6.2, Rear

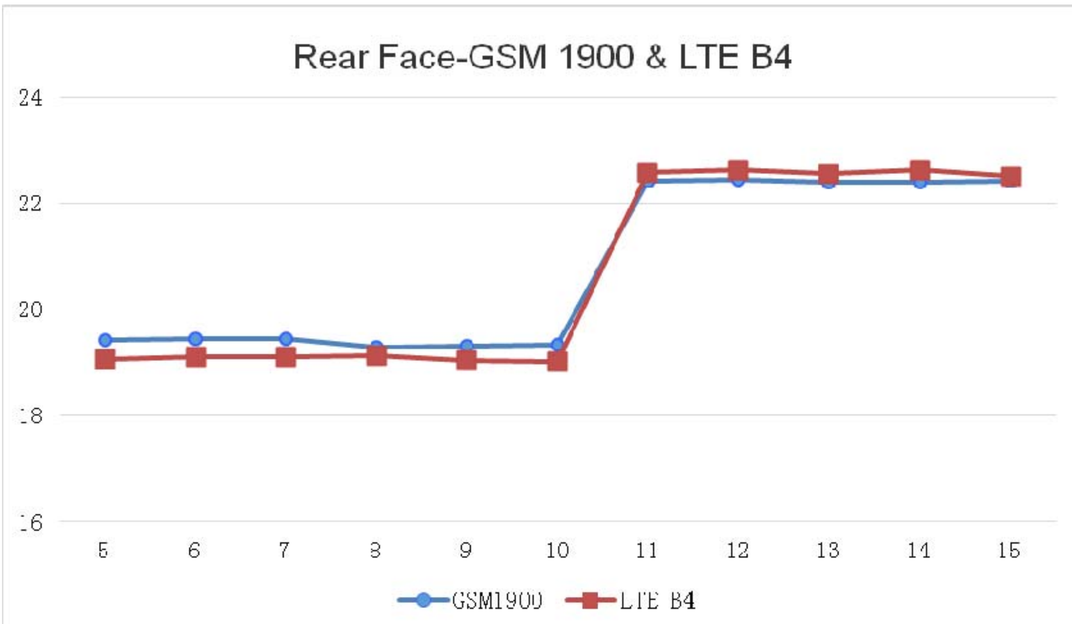
LEGEND

Direction of DUT travel for determination of power reduction triggering point

Direction of DUT travel for determination of full power resumption triggering point

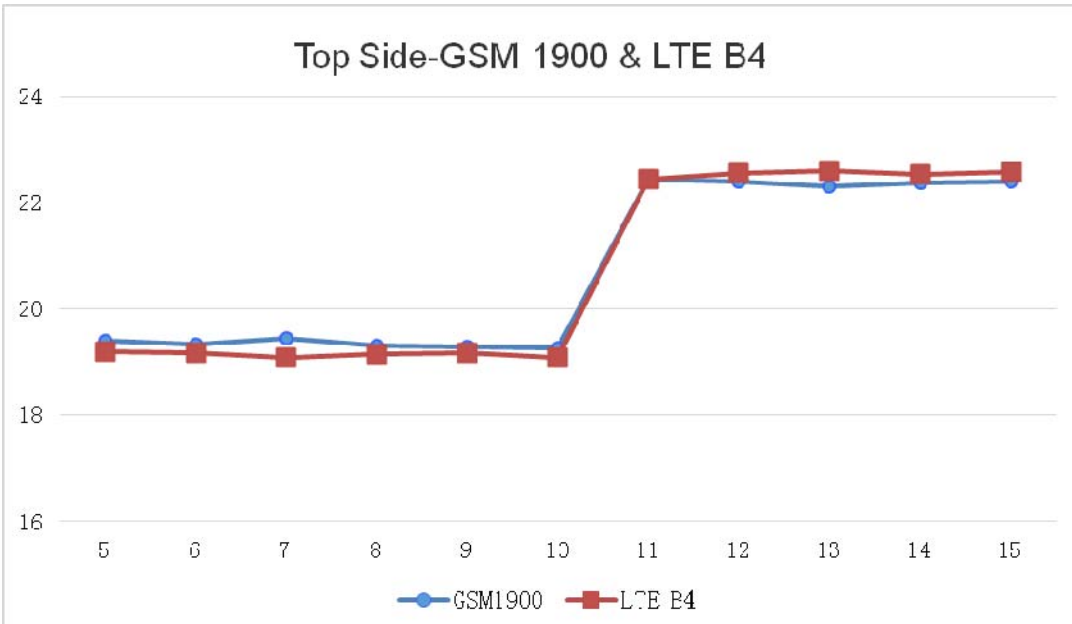
Proximity Sensor Triggering Distance Measurement Results

mode		distance(mm)										
		Rear Face										
		Sensor on						Sensor off				
		5	6	7	8	9	10	11	12	13	14	15
GSM	GSM1900	19.43	19.44	19.45	19.28	19.31	19.33	22.41	22.43	22.39	22.4	22.41
LTE	LTE B4	19.06	19.1	19.11	19.13	19.03	19.02	22.58	22.61	22.55	22.63	22.51



Proximity Sensor Triggering Distance Measurement Results

mode		distance(mm)										
		Top Side										
		Sensor on						Sensor off				
		5	6	7	8	9	10	11	12	13	14	15
GSM	GSM1900	19.43	19.44	19.45	19.28	19.31	19.33	22.41	22.43	22.39	22.4	22.41
LTE	LTE B4	19.06	19.1	19.11	19.13	19.03	19.02	22.58	22.61	22.55	22.63	22.51



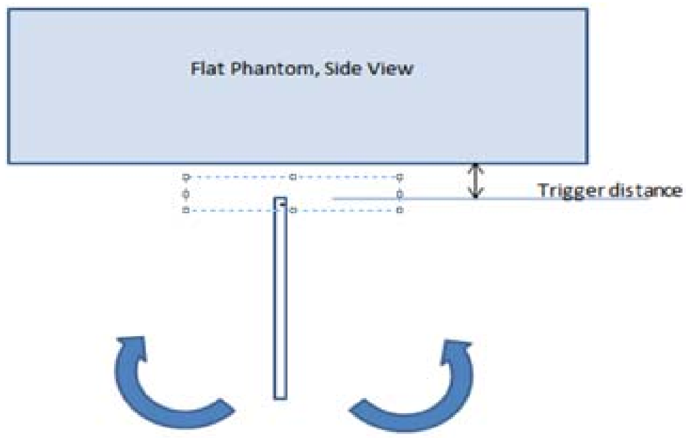
7.3.2. Proximity Sensor Coverage (KDB 616217 §6.3)

As there is no spatial offset between the antenna and the proximity sensor element, proximity sensor coverage did not need to be assessed.

7.3.3. Proximity Sensor Tilt Angle Assessment (KDB 616217 §6.4)

The DUT was positioned directly below the flat phantom at the minimum measured trigger distance with Bottom parallel to the base of the flat phantom for each band.

The EUT was rotated about Edge 1 for angles up to +/- 45°. If the output power increased during the rotation the DUT was moved 1mm toward the phantom and the rotation repeated. This procedure was repeated until the power remained reduced for all angles up to +/- 45°.



Proximity sensor tilt angle assessment (bottom)

able: Summary of Tablet Tilt Angle Influence to Proximity Sensor Triggering

Mode	Minimum distance at which power reduction was maintained over +/-45°		Power reduction status(ON/OFF)										
	Rear Face	Top Side	-45°	-35°	-25°	-15°	-5°	0°	5°	15°	25°	35°	45°
GSM1900	10mm	10mm	on	on	on	on	on	on	on	on	on	on	on
LTE B4	10mm	10mm	on	on	on	on	on	on	on	on	on	on	on

7.4. TEST POSITION

The overall diagonal dimension of the display section of a tablet is 21.1cm>20cm, per FCC KDB 616217, the back surface and edges of the tablet should be tested for SAR compliance with the Tablet touching the phantom. SAR evaluation for the front surface of tablet display screens is generally not necessary. The SAR Exclusion Threshold in KDB 447498 D01 can be applied to determine SAR test exclusion for adjacent edge configurations. The closest distance from the antenna to an adjacent tablet edge is used to determine if SAR testing is required for the adjacent edges, with the adjacent edge positioned adjacent the phantom and the edge containing the antenna positioned perpendicular to the phantom.

SAR test reduction and exclusion guidance

(1)The SAR exclusion threshold for distances<50mm is defined by the following equation:

$$\frac{\text{(max. power of channel, including tune-up tolerance, mW)}}{\text{(min. test separation distance, mm)}} \cdot \sqrt{\text{Frequency (GHz)}} \leq 3.0$$

When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

(2)The SAR exclusion threshold for distances>50mm is defined by the following equation, as illustrated in KDB 447498 D01 Appendix B:

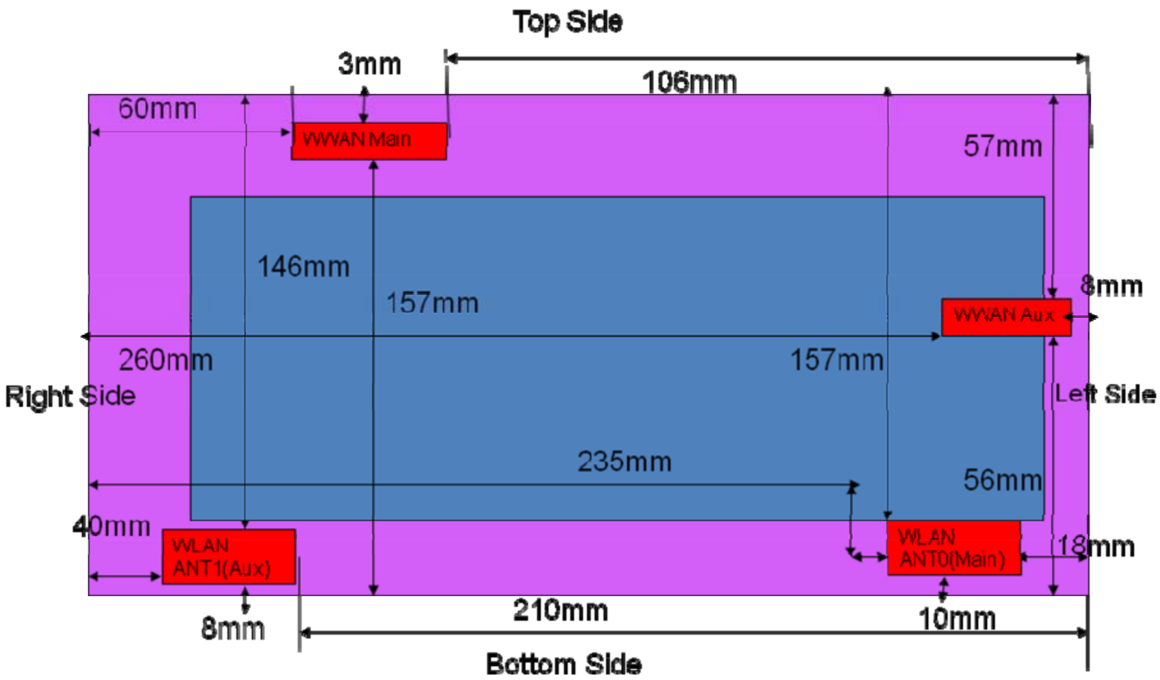
a) at 100 MHz to1500 MHz

[Power allowed at numeric Threshold at 50 mm in step 1) + (test separation distance - 50 mm) · (f $_{(MHz)}$/150)] mW

b) at >1500MHz and ≤6GHz

[Power allowed at numeric Threshold at 50 mm in step 1) + (test separation distance - 50 mm) ·10] mW

The location of the antenna inside EUT is as below.



<Rear View>

Antenna	Rear Face	Right Side	Left Side	Top Side	Bottom Side
WWAN	<5mm	60 mm	106 mm	3 mm	157mm
WLAN Main(Ant0)/BT	<5mm	235 mm	18 mm	157 mm	10 mm
WLAN Aux(Ant1)	<5mm	40 mm	210 mm	146 mm	8 mm

WWAN The distance <50mm

Mode	Position	Distance (mm)	Pmax (dBm)*	Pmax (mW)	f (GHz)	Calculation Result	SAR Exclusion threshold	Test Requirement (Yes/No)
GSM850	Rear Face	5	32.5	1778.28	0.8488	327.67	3	Yes
	Top Side	3	32.5	1778.28	0.8488	546.11	3	Yes
GSM1900	Rear Face	5	30	1000.00	0.9148	191.29	3	Yes
	Top Side	5	30	1000.00	0.9148	191.29	3	Yes
UMTS B2	Rear Face	5	24	251.19	1.9076	69.39	3	Yes
	Top Side	5	24	251.19	1.9076	69.39	3	Yes
UMTS B5	Rear Face	5	24	251.19	0.8466	46.22	3	Yes
	Top Side	5	24	251.19	0.8466	46.22	3	Yes
LTE B2	Rear Face	5	24	251.19	1.9	69.25	3	Yes
	Top Side	3	24	251.19	1.9	115.41	3	Yes
LTE B4	Rear Face	5	24	251.19	1.7450	66.36	3	Yes
	Top Side	3	24	251.19	1.7450	110.61	3	Yes
LTE B5	Rear Face	5	23	199.53	0.8440	36.66	3	Yes
	Top Side	3	23	199.53	0.8440	61.10	3	Yes
LTE B12	Rear Face	5	25	316.23	0.711	53.33	3	Yes
	Top Side	3	25	316.23	0.711	88.88	3	Yes
LTE B13	Rear Face	5	22.5	177.83	0.782	31.45	3	Yes
	Top Side	3	22.5	177.83	0.782	52.42	3	Yes

WLAN The distance <50mm

Mode	Position	Distance (mm)	Pmax (dBm)*	Pmax (mW)	f (GHz)	Calculation Result	SAR Exclusion threshold	Test Requirement (Yes/No)
BT	Rear	5	9	7.94	2.48	2.50	3	No
	Bottom	10	9	7.94	2.48	1.25	3	No
	Left	18	9	7.94	2.48	0.69	3	No
2.4G WiFi_Ant0	Rear	5	17	50.12	2.462	15.73	3	Yes
	Bottom	10	17	50.12	2.462	7.86	3	Yes
	Left	18	17	50.12	2.462	4.37	3	Yes
5.2G WiFi_Ant0	Rear	5	14	25.12	5.24	11.50	3	Yes
	Bottom	10	14	25.12	5.24	5.75	3	Yes
	Left	18	14	25.12	5.24	3.19	3	Yes
5.3G WiFi_Ant0	Rear	5	14.5	28.18	5.32	13.00	3	Yes
	Bottom	10	14.5	28.18	5.32	6.50	3	Yes
	Left	18	14.5	28.18	5.32	3.61	3	Yes
5.6G WiFi_Ant0	Rear	5	13	19.95	5.7	9.53	3	Yes
	Bottom	10	13	19.95	5.7	4.76	3	Yes
	Left	18	13	19.95	5.7	2.65	3	No
5.8G WiFi_Ant0	Rear	5	13	19.95	5.825	9.63	3	Yes
	Bottom	10	13	19.95	5.825	4.82	3	Yes
	Left	18	13	19.95	5.825	2.68	3	No
2.4G WiFi_Ant1	Rear	5	16.5	44.67	2.462	14.02	3	Yes
	Bottom	8	16.5	44.67	2.462	8.76	3	Yes
	Right	40	16.5	44.67	2.462	1.75	3	No
5.2G WiFi_Ant1	Rear	5	14	25.12	5.24	11.50	3	Yes
	Bottom	8	14	25.12	5.24	7.19	3	Yes
	Right	40	14	25.12	5.24	1.44	3	No
5.3G WiFi_Ant1	Rear	5	14.5	28.18	5.32	13.00	3	Yes
	Bottom	8	14.5	28.18	5.32	8.13	3	Yes
	Right	40	14.5	28.18	5.32	1.63	3	No
5.6G WiFi_Ant1	Rear	5	13	19.95	5.7	9.53	3	Yes
	Bottom	8	13	19.95	5.7	5.95	3	Yes
	Right	40	13	19.95	5.7	1.19	3	No
5.8G WiFi_Ant1	Rear	5	13	19.95	5.825	9.63	3	Yes
	Bottom	8	13	19.95	5.825	6.02	3	Yes
	Right	40	13	19.95	5.825	1.20	3	No

WWAN The distance >50mm

Mode	Position	Distance (mm)	Pmax (dBm)*	Pmax (mW)	f (GHz)	Calculation Result	SAR Exclusion threshold	Test Requirement (Yes/No)
GSM850	Left	106	32.5	1778.28	0.8488	162.81	479.70	Yes
	Right	60	32.5	1778.28	0.8488	162.81	219.40	Yes
	Bottom	157	32.5	1778.28	0.8488	162.81	768.29	Yes
GSM1900	Left	106	30	1000.00	1.9098	108.54	668.54	Yes
	Right	60	30	1000.00	1.9098	108.54	208.54	Yes
	Bottom	157	30	1000.00	1.9098	108.54	1178.54	No
UMTS B2	Left	106	24	251.19	1.9076	108.60	668.60	No
	Right	60	24	251.19	1.9076	108.60	208.60	Yes
	Bottom	157	24	251.19	1.9076	108.60	1178.60	No
UMTS B5	Left	106	24	251.19	0.8466	163.02	479.09	No
	Right	60	24	251.19	0.8466	163.02	219.46	Yes
	Bottom	157	24	251.19	0.8466	163.02	766.93	No
LTE B2	Left	106	24	251.19	1.9	108.82	668.82	No
	Right	60	24	251.19	1.9	108.82	208.82	Yes
	Bottom	157	24	251.19	1.9	108.82	1178.82	No
LTE B4	Left	106	24	251.19	1.745	113.55	673.55	No
	Right	60	24	251.19	1.745	113.55	213.55	Yes
	Bottom	157	24	251.19	1.745	113.55	1183.55	No
LTE B5	Left	106	23	199.53	0.844	163.28	478.37	No
	Right	60	23	199.53	0.844	163.28	219.54	No
	Bottom	157	23	199.53	0.844	163.28	765.33	No
LTE B12	Left	106	25	316.23	0.711	177.89	443.33	No
	Right	60	25	316.23	0.711	177.89	225.29	Yes
	Bottom	157	25	316.23	0.711	177.89	685.07	No
LTE B13	Left	106	22.5	177.83	0.782	169.62	461.57	No
	Right	60	22.5	177.83	0.782	169.62	221.76	No
	Bottom	157	22.5	177.83	0.782	169.62	727.45	No

WLAN The distance >50mm

Mode	Position	Distance (mm)	Pmax (dBm)*	Pmax (mW)	f (GHz)	Calculation Result	SAR Exclusion threshold	Test Requirement (Yes/No)
BT	Top	157	9	7.94	2.48	95.25	1165.25	No
	Right	235	9	7.94	2.48	95.25	1945.25	No
2.4G WiFi_Ant0	Top	157	17	50.12	2.462	95.60	1165.60	No
	Right	235	17	50.12	2.462	95.60	1945.60	No
5.2G WiFi_Ant0	Top	157	14	25.12	5.24	65.53	1135.53	No
	Right	235	14	25.12	5.24	65.53	1915.53	No
5.3G WiFi_Ant0	Top	157	14.5	28.18	5.32	65.03	1135.03	No
	Right	235	14.5	28.18	5.32	65.03	1915.03	No
5.6G WiFi_Ant0	Top	157	13	19.95	5.7	62.83	1132.83	No
	Right	235	13	19.95	5.7	62.83	1912.83	No
5.8G WiFi_Ant0	Top	157	13	19.95	5.825	62.15	1132.15	No
	Right	235	13	19.95	5.825	62.15	1912.15	No
2.4G WiFi_Ant1	Top	146	16.5	44.67	2.462	95.60	1055.60	No
	Left	210	16.5	44.67	2.462	95.60	1695.60	No
5.2G WiFi_Ant1	Top	146	14	25.12	5.24	65.53	1025.53	No
	Left	210	14	25.12	5.24	65.53	1665.53	No
5.3G WiFi_Ant1	Top	146	14.5	28.18	5.32	65.03	1025.03	No
	Left	210	14.5	28.18	5.32	65.03	1665.03	No
5.6G WiFi_Ant1	Top	146	13	19.95	5.7	62.83	1022.83	No
	Left	210	13	19.95	5.7	62.83	1662.83	No
5.8G WiFi_Ant1	Top	146	13	19.95	5.825	62.15	1022.15	No
	Left	210	13	19.95	5.825	62.15	1662.15	No

8. TEST RESULT

8.1. CONDUCTED POWER RESULTS

8.1.1. CONDUCTED POWER MEASUREMENTS OF GSM850

Full Power Mode(Sensor off)

GSM850		Tune-up	Max Burst Average Power (dBm)			Tune-up	Max Frame Average Power (dBm)		
			128CH	190CH	251CH		128CH	190CH	251CH
			824.2MHz	836.6MHz	848.8MHz		824.2MHz	836.6MHz	848.8MHz
GPRS (GMSK)	1 Tx Slot	32.50	32.01	32.11	31.92	23.31	22.82	22.92	22.73
	2 Tx Slots	32.00	31.41	31.58	31.37	25.87	25.28	25.45	25.24
	3 Tx Slots	31.50	30.85	31.01	30.81	27.08	26.43	26.59	26.39
	4 Tx Slots	31.00	30.31	30.58	30.25	27.82	27.13	**27.40**	27.07
EDGE (8PSK)	1 Tx Slot	28.50	28.31	28.42	28.29	19.31	19.12	19.23	19.10
	2 Tx Slots	28.00	27.79	27.88	27.73	21.87	21.66	21.75	21.60
	3 Tx Slots	27.50	27.26	27.36	27.18	23.08	22.84	22.94	22.76
	4 Tx Slots	27.00	26.65	26.81	26.61	23.82	23.47	23.63	23.43

Note:
1) The conducted power of GSM850 is measured with RMS detector.
2) Frame-averaged output power was calculated from the measured burst-averaged output power by converting the slot powers into linear units and calculating the energy over 8 time slots.
3) Per KDB941225 D01, the bolded GPRS4Tx mode was selected for SAR testing according to the highest frame –averaged output power table.
4) The frame-averaged power is linearly proportion to the slot number configured and it is linearly scaled the maximum burst-averaged power based on time slots. The calculated method is shown as below:
Frame-averaged power=10 x log(Burst-averaged power mW x Slot used/8)

8.1.2. CONDUCTED POWER MEASUREMENTS OF OF GSM1900

Full Power Mode(Sensor off)

GSM1900		Tune-up	Max Burst Average Power (dBm)			Tune-up	Max Frame Average Power (dBm)		
			512CH	661CH	810CH		512CH	661CH	810CH
			1850.2MHz	1880MHz	1909.8MHz		1850.2MHz	1880MHz	1909.8MHz
GPRS (GMSK)	1 Tx Slot	30.00	29.64	29.86	29.71	20.81	20.45	20.67	20.52
	2 Tx Slots	29.50	29.03	29.31	29.17	23.37	22.90	23.18	23.04
	3 Tx Slots	29.00	28.47	28.68	28.61	24.58	24.05	24.26	24.19
	4 Tx Slots	28.50	27.89	28.17	28.11	25.32	24.71	**24.99**	24.93
EDGE (8PSK)	1 Tx Slot	27.50	27.12	27.20	27.16	18.31	17.93	18.01	17.97
	2 Tx Slots	27.00	26.49	26.66	26.52	20.87	20.36	20.53	20.39
	3 Tx Slots	26.50	26.02	26.17	26.11	22.08	21.60	21.75	21.69
	4 Tx Slots	26.00	25.38	25.51	25.48	22.82	22.20	22.33	22.30

Power Mode(Sensor on)

GSM1900		Tune-up	Max Burst Average Power (dBm)			Tune-up	Max Frame Average Power (dBm)		
			512CH	661CH	810CH		512CH	661CH	810CH
			1850.2MHz	1880MHz	1909.8MHz		1850.2MHz	1880MHz	1909.8MHz
GPRS (GMSK)	1 Tx Slot	26.00	25.64	25.86	25.71	16.81	16.45	16.67	16.52
	2 Tx Slots	25.50	25.03	25.31	25.17	19.37	18.90	19.18	19.04
	3 Tx Slots	25.00	24.47	24.68	24.61	20.58	20.05	20.26	20.19
	4 Tx Slots	24.50	23.89	24.17	24.11	21.32	20.71	**20.99**	20.93
EDGE (8PSK)	1 Tx Slot	23.50	23.12	23.20	23.16	14.31	13.93	14.01	13.97
	2 Tx Slots	23.00	22.49	22.66	22.52	16.87	16.36	16.53	16.39
	3 Tx Slots	22.50	22.02	22.17	22.11	18.08	17.60	17.75	17.69
	4 Tx Slots	22.00	21.38	21.51	21.48	18.82	18.20	18.33	18.30

Note:
1) The conducted power of GSM1900 is measured with RMS detector.
2) Frame-averaged output power was calculated from the measured burst-averaged output power by converting the slot powers into linear units and calculating the energy over 8 time slots.
3) Per KDB941225 D01, the bolded GPRS4Tx mode was selected for SAR testing according to the highest frame –averaged output power table.
4) The frame-averaged power is linearly proportion to the slot number configured and it is linearly scaled the maximum burst-averaged power based on time slots. The calculated method is shown as below:
Frame-averaged power=10 x log(Burst-averaged power mW x Slot used/8)

8.1.3. CONDUCTED POWER MEASUREMENTS OF UMTS BAND

Full Power Mode(Sensor off)

Band	UMTS B2 Average Conducted Power(dBm)				UMTS B5 Average Conducted Power(dBm)			
Tx Channel	Max. Tune-up	9262	9400	9538	Max. Tune-up	4132	4182	4233
Rx Channel		9662	9800	9938		4357	4407	4458
Frequency(MHz)		1852.4	1880	1907.6		826.4	836.4	846.6
RMC 12.2K	24	23.43	23.53	22.60	24.00	23.27	23.51	23.40
HSDPA Subtest-1	23.50	23.35	23.45	22.19	23.50	23.21	23.45	23.34
HSDPA Subtest-2	23.50	23.31	23.31	22.10	23.50	23.18	23.42	23.31
HSDPA Subtest-3	23.50	22.92	23.02	21.76	23.00	22.74	22.98	22.87
HSDPA Subtest-4	23.00	22.88	22.98	21.72	23.00	22.67	22.91	22.80
HSUPA Subtest-1	23.50	23.31	23.40	22.14	23.50	23.14	23.32	23.27
HSUPA Subtest-2	21.50	21.15	21.35	20.21	21.50	21.07	21.28	21.21
HSUPA Subtest-3	22.50	22.42	22.34	21.24	22.50	22.12	22.30	22.25
HSUPA Subtest-4	21.50	21.21	21.41	20.26	21.50	21.03	21.19	21.17
HSUPA Subtest-5	23.50	23.24	23.32	22.12	23.50	23.11	23.29	23.24

HSPA+

Since 16QAM is not used for uplink, the uplink category and release is same as HSUPA,i.e,CAT6 Rel 6.Therefore,the RF conducted power is not measured.

Note:

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

2) Per KDB941225 D01, When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤¼ 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.

8.1.4. CONDUCTED POWER MEASUREMENTS OF LTE BAND

Full Power Mode(Sensor off)

LTE B2/BW=1.4M		Average Conducted Power(dBm)				LTE B2/BW=3M		Average Conducted Power(dBm)			
Modula -tion	RB Size/ Offset	Max. Tune-up	Channel/Frequency(MHz)			Modula -tion	RB Size/ Offset	Max. Tune-up	Channel/Frequency(MHz)		
			18607/ 1850.7	18900/ 1880	19193/ 1909.3				18615/ 1851.5	18900/ 1880	19185/ 1908.5
QPSK	1/0	23.00	22.31	22.50	22.22	QPSK	1/0	23.50	22.18	22.47	22.50
	1/2	23.00	22.36	22.47	22.32		1/7	23.50	22.54	23.06	22.44
	1/5	23.00	22.34	22.24	22.04		1/14	23.50	22.17	22.40	22.12
	3/0	22.50	22.18	22.27	22.31		8/0	22.00	21.16	21.18	21.52
	3/1	22.50	22.24	22.46	22.32		8/3	22.00	21.08	21.32	21.40
	3/3	22.50	22.18	22.37	22.25		8/7	22.00	21.11	21.14	21.33
	6/0	21.50	20.60	21.03	21.08		15/0	22.00	20.99	21.16	21.34
16QAM	1/0	22.00	21.20	21.78	21.55	16QAM	1/0	22.00	21.87	21.80	21.76
	1/2	22.00	21.72	21.92	21.59		1/7	23.00	22.62	22.65	21.69
	1/5	22.00	21.42	21.56	21.49		1/14	22.00	21.89	21.68	21.38
	3/0	21.50	21.24	21.46	21.23		8/0	21.00	20.12	20.36	20.15
	3/1	21.50	21.21	21.28	21.32		8/3	21.00	20.16	20.40	19.99
	3/3	21.50	21.28	21.22	21.24		8/7	21.00	20.14	20.30	20.33
	6/0	21.00	20.01	20.08	19.83		15/0	21.00	20.10	20.25	19.98
LTE B2/BW=5M		**Average Conducted Power(dBm)**				**LTE B2/BW=10M**		**Average Conducted Power(dBm)**			
Modula -tion	**RB Size/ Offset**	**Max. Tune-up**	**Channel/Frequency(MHz)**			**Modula -tion**	**RB Size/ Offset**	**Max. Tune-up**	**Channel/Frequency(MHz)**		
			18625/ 1852.5	**18900/ 1880**	**19175/ 1907.5**				**18650/ 1855**	**18900/ 1880**	**19150/ 1905**
QPSK	1/0	23.00	22.23	22.82	23.00	QPSK	1/0	23.50	22.61	22.75	23.18
	1/12	23.00	22.38	22.79	22.57		1/24	23.00	22.38	22.33	22.62
	1/24	23.00	22.32	22.46	22.03		1/49	23.00	22.09	22.51	21.99
	12/0	22.50	21.25	21.33	22.01		25/0	22.00	21.31	21.33	21.60
	12/6	22.50	21.15	21.17	21.17		25/12	22.00	21.13	21.25	21.77
	12/13	22.50	21.13	21.11	21.38		25/25	22.00	21.07	21.17	21.82
	25/0	22.00	21.10	21.24	21.81		50/0	22.00	21.19	21.37	21.64
16QAM	1/0	23.00	21.98	22.25	22.56	16QAM	1/0	23.50	23.37	22.75	23.37
	1/12	23.00	21.28	22.07	22.09		1/24	23.50	21.95	22.14	22.54
	1/24	23.00	21.67	21.82	21.52		1/49	23.00	21.81	22.31	21.26
	12/0	21.00	20.18	20.24	20.49		25/0	21.00	20.30	20.37	20.51
	12/6	21.00	20.20	20.22	20.08		25/12	21.00	20.02	20.24	20.77
	12/13	21.00	20.06	20.04	20.36		25/25	21.00	20.14	20.22	20.86
	25/0	21.00	20.11	20.18	20.89		50/0	21.00	20.13	20.23	20.64

LTE B2/BW=15M		Average Conducted Power(dBm)				LTE B2/BW=20M		Average Conducted Power(dBm)			
Modula -tion	RB Size/ Offset	Max. Tune-up	Channel/Frequency(MHz)			Modula -tion	RB Size/ Offset	Max. Tune-up	Channel/Frequency(MHz)		
			18675/ 1857.5	18900/ 1880	19125/ 1902.5				18700/ 1860	18900/ 1880	19100/ 1900
QPSK	1/0	23.50	23.37	23.12	23.49	QPSK	1/0	24.00	22.87	23.44	23.70
	1/37	23.00	22.82	22.34	22.99		1/50	23.00	21.95	22.08	22.28
	1/74	23.00	22.71	22.55	22.26		1/99	23.00	22.38	22.46	22.19
	36/0	22.00	21.53	21.44	21.62		50/0	22.50	21.32	21.63	22.26
	36/19	22.00	21.34	21.22	21.40		50/25	22.50	21.15	21.21	21.44
	36/39	22.00	21.27	21.26	21.49		50/50	22.50	20.99	21.46	21.77
	75/0	22.00	21.41	21.26	21.55		100/0	22.50	21.10	21.46	22.13
16QAM	1/0	23.50	22.46	22.78	23.10	16QAM	1/0	23.50	22.78	23.25	22.91
	1/37	23.50	21.71	21.71	23.23		1/50	23.00	21.63	21.34	22.31
	1/74	23.00	21.90	21.74	21.84		1/99	23.00	21.84	22.20	21.64
	36/0	21.00	20.48	20.40	20.59		50/0	21.00	20.59	20.61	20.83
	36/19	21.00	20.34	20.22	20.41		50/25	21.00	20.11	20.22	20.53
	36/39	21.00	20.26	20.23	20.69		50/50	21.00	20.12	20.22	20.50
	75/0	21.00	20.41	20.27	20.54		100/0	21.00	20.25	20.43	20.76

Full Power Mode(Sensor off)

LTE B4/BW=1.4M		Average Conducted Power(dBm)				LTE B4/BW=3M		Average Conducted Power(dBm)			
Modula -tion	RB Size/ Offset	Max. Tune-up	Channel/Frequency(MHz)			Modula -tion	RB Size/ Offset	Max. Tune-up	Channel/Frequency(MHz)		
			19957/ 1710.7	20175/ 1732.5	20393/ 1754.3				19965/ 1711.5	20175/ 1732.5	20385/ 1753.5
QPSK	1/0	23.00	22.45	22.40	22.67	QPSK	1/0	23.00	22.51	22.82	22.61
	1/2	23.00	22.61	22.69	22.43		1/7	23.00	22.82	22.91	22.82
	1/5	23.00	22.43	22.52	22.51		1/14	23.00	22.76	22.39	22.58
	3/0	23.00	22.61	22.44	22.63		8/0	22.00	21.45	21.62	21.59
	3/1	23.00	22.54	22.70	22.71		8/3	22.00	21.49	21.61	21.58
	3/3	23.00	22.56	22.61	22.49		8/7	22.00	21.41	21.55	21.48
	6/0	22.00	21.51	21.44	21.40		15/0	22.00	21.59	21.49	21.40
16QAM	1/0	23.00	21.81	21.69	21.32	16QAM	1/0	23.00	22.28	21.97	21.72
	1/2	23.00	22.18	21.41	22.05		1/7	23.00	22.78	22.07	22.72
	1/5	22.50	21.60	22.05	21.58		1/14	22.00	21.84	21.78	21.75
	3/0	22.00	21.61	21.34	21.75		8/0	21.00	20.54	20.52	20.61
	3/1	22.00	21.67	21.42	21.78		8/3	21.00	20.49	20.73	20.65
	3/3	22.00	21.41	21.23	21.45		8/7	21.00	20.45	20.51	20.33
	6/0	21.00	20.38	20.31	20.44		15/0	21.00	20.50	20.52	20.42

LTE B4/BW=5M		Average Conducted Power(dBm)				LTE B4/BW=10M		Average Conducted Power(dBm)			
Modula-tion	RB Size/ Offset	Max. Tune-up	Channel/Frequency(MHz)			Modula-tion	RB Size/ Offset	Max. Tune-up	Channel/Frequency(MHz)		
			19975/ 1712.5	20175/ 1732.5	20375/ 1752.5				20000/ 1715	20175/ 1732.5	20350/ 1750
QPSK	1/0	23.50	22.77	22.75	23.00	QPSK	1/0	23.50	23.04	22.53	22.70
	1/12	23.00	22.82	22.66	22.86		1/24	23.00	22.75	22.68	22.85
	1/24	23.00	22.72	22.53	22.52		1/49	23.00	22.64	22.44	22.57
	12/0	22.00	21.43	21.66	21.52		25/0	22.00	21.70	21.71	21.68
	12/6	22.00	21.42	21.52	21.47		25/12	22.00	21.62	21.54	21.49
	12/13	22.00	21.48	21.59	21.39		25/25	22.00	21.40	21.43	21.47
	25/0	22.00	21.59	21.45	21.65		50/0	22.00	21.56	21.57	21.43
16QAM	1/0	23.00	22.32	22.66	22.22	16QAM	1/0	23.00	22.62	22.53	22.42
	1/12	23.00	21.81	21.90	22.09		1/24	23.00	22.15	22.08	22.52
	1/24	22.50	21.85	21.54	21.96		1/49	22.50	22.25	21.67	22.22
	12/0	21.00	20.51	20.61	20.39		25/0	21.00	20.57	20.74	20.58
	12/6	21.00	20.45	20.51	20.62		25/12	21.00	20.56	20.56	20.50
	12/13	21.00	20.60	20.51	20.39		25/25	21.00	20.45	20.49	20.48
	25/0	21.00	20.51	20.62	20.69		50/0	21.00	20.43	20.48	20.56
LTE B4/BW=15M		Average Conducted Power(dBm)				LTE B4/BW=20M		Average Conducted Power(dBm)			
Modula-tion	RB Size/ Offset	Max. Tune-up	Channel/Frequency(MHz)			Modula-tion	RB Size/ Offset	Max. Tune-up	Channel/Frequency(MHz)		
			20025/ 1717.5	20175/ 1732.5	20325/ 1747.5				20050/ 1720	20175/ 1732.5	20300/ 1745
QPSK	1/0	23.50	23.36	23.41	23.34	QPSK	1/0	24.00	23.59	23.83	23.45
	1/37	23.00	22.65	22.93	22.68		1/50	23.00	22.43	22.68	22.61
	1/74	23.50	23.03	23.01	22.79		1/99	23.50	22.76	23.35	22.85
	36/0	22.50	21.74	22.04	21.97		50/0	22.50	22.08	22.40	21.95
	36/19	22.50	21.61	21.87	21.62		50/25	22.50	21.66	21.74	21.69
	36/39	22.50	21.69	21.83	21.60		50/50	22.50	21.69	21.91	21.85
	75/0	22.50	21.64	21.85	21.78		100/0	22.50	21.96	22.07	21.91
16QAM	1/0	23.50	23.03	22.81	22.96	16QAM	1/0	23.50	22.91	23.50	22.89
	1/37	22.50	21.63	21.62	22.30		1/50	22.00	21.86	21.88	21.87
	1/74	23.00	22.89	22.65	22.15		1/99	23.50	22.54	23.02	22.26
	36/0	21.50	20.69	21.01	20.92		50/0	21.50	20.96	21.33	21.16
	36/19	21.50	20.72	20.77	20.61		50/25	21.50	20.63	20.75	20.78
	36/39	21.50	20.48	20.67	20.69		50/50	21.50	20.73	20.95	20.88
	75/0	21.50	20.61	20.89	20.79		100/0	21.50	20.89	20.97	20.96

Power Mode(Sensor on)

LTE B4/BW=1.4M		Average Conducted Power(dBm)				LTE B4/BW=3M		Average Conducted Power(dBm)			
Modula -tion	RB Size/ Offset	Max. Tune-up	Channel/Frequency(MHz)			Modula -tion	RB Size/ Offset	Max. Tune-up	Channel/Frequency(MHz)		
			19957/ 1710.7	20175/ 1732.5	20393/ 1754.3				19965/ 1711.5	20175/ 1732.5	20385/ 1753.5
QPSK	1/0	19.00	18.45	18.40	18.67	QPSK	1/0	19.00	18.51	18.82	18.61
	1/2	19.00	18.61	18.69	18.43		1/7	19.00	18.82	18.91	18.82
	1/5	19.00	18.43	18.52	18.51		1/14	19.00	18.76	18.39	18.58
	3/0	19.00	18.61	18.44	18.63		8/0	18.00	17.45	17.62	17.59
	3/1	19.00	18.54	18.70	18.71		8/3	18.00	17.49	17.61	17.58
	3/3	19.00	18.56	18.61	18.49		8/7	18.00	17.41	17.55	17.48
	6/0	18.00	17.51	17.44	17.40		15/0	18.00	17.59	17.49	17.40
16QAM	1/0	19.00	17.81	17.69	17.32	16QAM	1/0	19.00	18.28	17.97	17.72
	1/2	19.00	18.18	17.41	18.05		1/7	19.00	18.78	18.07	18.72
	1/5	18.50	17.60	18.05	17.58		1/14	18.00	17.84	17.78	17.75
	3/0	18.00	17.61	17.34	17.75		8/0	17.00	16.54	16.52	16.61
	3/1	18.00	17.67	17.42	17.78		8/3	17.00	16.49	16.73	16.65
	3/3	18.00	17.41	17.23	17.45		8/7	17.00	16.45	16.51	16.33
	6/0	17.00	16.38	16.31	16.44		15/0	17.00	16.50	16.52	16.42
LTE B4/BW=5M		**Average Conducted Power(dBm)**				**LTE B4/BW=10M**		**Average Conducted Power(dBm)**			
Modula -tion	**RB Size/ Offset**	**Max. Tune-up**	**Channel/Frequency(MHz)**			**Modula -tion**	**RB Size/ Offset**	**Max. Tune-up**	**Channel/Frequency(MHz)**		
			19975/ 1712.5	**20175/ 1732.5**	**20375/ 1752.5**				**20000/ 1715**	**20175/ 1732.5**	**20350/ 1750**
QPSK	1/0	19.50	18.77	18.75	19.00	QPSK	1/0	19.50	19.04	18.53	18.70
	1/12	19.00	18.82	18.66	18.86		1/24	19.00	18.75	18.68	18.85
	1/24	19.00	18.72	18.53	18.52		1/49	19.00	18.64	18.44	18.57
	12/0	18.00	17.43	17.66	17.52		25/0	18.00	17.70	17.71	17.68
	12/6	18.00	17.42	17.52	17.47		25/12	18.00	17.62	17.54	17.49
	12/13	18.00	17.48	17.59	17.39		25/25	18.00	17.40	17.43	17.47
	25/0	18.00	17.59	17.45	17.65		50/0	18.00	17.56	17.57	17.43
16QAM	1/0	19.00	18.32	18.66	18.22	16QAM	1/0	19.00	18.62	18.53	18.42
	1/12	19.00	17.81	17.90	18.09		1/24	19.00	18.15	18.08	18.52
	1/24	18.50	17.85	17.54	17.96		1/49	18.50	18.25	17.67	18.22
	12/0	17.00	16.51	16.61	16.39		25/0	17.00	16.57	16.74	16.58
	12/6	17.00	16.45	16.51	16.62		25/12	17.00	16.56	16.56	16.50
	12/13	17.00	16.60	16.51	16.39		25/25	17.00	16.45	16.49	16.48
	25/0	17.00	16.51	16.62	16.69		50/0	17.00	16.43	16.48	16.56

LTE B4/BW=15M		Average Conducted Power(dBm)				LTE B4/BW=20M		Average Conducted Power(dBm)			
Modula -tion	RB Size/ Offset	Max. Tune-up	Channel/Frequency(MHz)			Modula -tion	RB Size/ Offset	Max. Tune-up	Channel/Frequency(MHz)		
			20025/ 1717.5	20175/ 1732.5	20325/ 1747.5				20050/ 1720	20175/ 1732.5	20300/ 1745
QPSK	1/0	19.50	19.36	19.41	19.34	QPSK	1/0	20.00	19.59	19.83	19.45
	1/37	19.00	18.65	18.93	18.68		1/50	19.00	18.43	18.68	18.61
	1/74	19.50	19.03	19.01	18.79		1/99	19.50	18.76	19.35	18.85
	36/0	18.50	17.74	18.04	17.97		50/0	18.50	18.08	18.40	17.95
	36/19	18.50	17.61	17.87	17.62		50/25	18.50	17.66	17.74	17.69
	36/39	18.50	17.69	17.83	17.60		50/50	18.50	17.69	17.91	17.85
	75/0	18.50	17.64	17.85	17.78		100/0	18.50	17.96	18.07	17.91
16QAM	1/0	19.50	19.03	18.81	18.96	16QAM	1/0	19.50	18.91	19.50	18.89
	1/37	18.50	17.63	17.62	18.30		1/50	18.00	17.86	17.88	17.87
	1/74	19.00	18.89	18.65	18.15		1/99	19.50	18.54	19.02	18.26
	36/0	17.50	16.69	17.01	16.92		50/0	17.50	16.96	17.33	17.16
	36/19	17.50	16.72	16.77	16.61		50/25	17.50	16.63	16.75	16.78
	36/39	17.50	16.48	16.67	16.69		50/50	17.50	16.73	16.95	16.88
	75/0	17.50	16.61	16.89	16.79		100/0	17.50	16.89	16.97	16.96

Full Power Mode(Sensor off)

LTE B5/BW=1.4M		Average Conducted Power(dBm)			
Modula -tion	RB Size/ Offset	Max. Tune-up	Channel/Frequency(MHz)		
			20407/ 824.7	20525/ 836.5	20643/ 848.3
QPSK	1/0	23.00	22.84	22.10	22.11
	1/2	23.00	22.38	22.41	22.16
	1/5	23.00	22.41	22.06	22.38
	3/0	22.50	22.31	22.04	22.23
	3/1	22.50	22.39	22.19	22.27
	3/3	22.50	22.27	21.99	22.19
	6/0	22.00	21.33	21.09	21.18
16QAM	1/0	22.50	21.46	21.18	21.50
	1/2	22.50	21.82	21.17	21.63
	1/5	22.50	21.56	21.05	21.61
	3/0	22.00	21.48	21.43	21.52
	3/1	22.00	21.67	21.19	21.38
	3/3	22.00	21.26	21.37	21.19
	6/0	21.00	20.40	20.13	20.10

LTE B5/BW=3M		Average Conducted Power(dBm)			
Modula -tion	RB Size/ Offset	Max. Tune-up	Channel/Frequency(MHz)		
			20415/ 825.5	20525/ 836.5	20635/ 847.5
QPSK	1/0	23.00	22.39	22.17	22.36
	1/7	23.00	22.79	22.53	22.34
	1/14	23.00	22.32	22.07	22.15
	8/0	22.00	21.42	20.97	21.18
	8/3	22.00	21.34	21.24	21.21
	8/7	22.00	21.37	21.05	21.16
	15/0	22.00	21.44	20.94	21.19
16QAM	1/0	22.50	21.47	21.23	22.09
	1/7	22.50	22.31	21.79	21.85
	1/14	22.50	21.21	21.49	21.47
	8/0	21.00	20.43	20.05	20.18
	8/3	21.00	20.38	20.07	20.15
	8/7	21.00	20.39	20.09	20.15
	15/0	21.00	20.53	19.99	20.15

LTE B5/BW=5M		Average Conducted Power(dBm)			
Modula -tion	RB Size/ Offset	Max. Tune-up	Channel/Frequency(MHz)		
			20425/ 826.5	20525/ 836.5	20625/ 846.5
QPSK	1/0	23.00	22.87	22.32	22.32
	1/12	23.00	22.66	22.57	22.35
	1/24	23.00	22.61	22.26	22.36
	12/0	22.00	21.54	21.21	21.20
	12/6	22.00	21.35	21.32	21.22
	12/13	22.00	21.27	21.14	21.28
	25/0	22.00	21.33	21.26	21.27
16QAM	1/0	22.50	22.42	21.90	22.25
	1/12	23.00	22.67	22.13	21.72
	1/24	22.50	22.27	21.91	21.79
	12/0	21.00	20.47	20.23	20.22
	12/6	21.00	20.30	20.33	20.24
	12/13	21.00	20.32	20.14	20.22
	25/0	21.00	20.41	20.13	20.19

LTE B5/BW=10M		Average Conducted Power(dBm)			
Modula -tion	RB Size/ Offset	Max. Tune-up	Channel/Frequency(MHz)		
			20450/ 829	20525/ 836.5	20600/ 844
QPSK	1/0	23.00	22.92	22.49	22.59
	1/24	23.00	22.63	22.52	22.65
	1/49	23.00	22.48	22.73	22.53
	25/0	22.00	21.39	21.26	21.48
	25/12	22.00	21.32	21.18	21.47
	25/25	22.00	21.29	21.21	21.30
	50/0	22.00	21.38	21.20	21.39
16QAM	1/0	22.50	22.46	22.27	22.09
	1/24	22.50	22.34	22.22	22.48
	1/49	22.50	22.15	22.16	22.43
	25/0	21.00	20.45	20.23	20.48
	25/12	21.00	20.37	20.25	20.54
	25/25	21.00	20.32	20.22	20.37
	50/0	21.00	20.27	20.18	20.32

Full Power Mode(Sensor off)

LTE B12/BW=1.4M		Average Conducted Power(dBm)				LTE B12/BW=3M		Average Conducted Power(dBm)			
Modula -tion	RB Size/ Offset	Max. Tune-up	Channel/Frequency(MHz)			Modula -tion	RB Size/ Offset	Max. Tune-up	Channel/Frequency(MHz)		
			23017/ 699.7	23095/ 707.5	23173/ 715.3				23025/ 700.5	23095/ 707.5	23165/ 714.5
QPSK	1/0	23.00	22.84	22.13	22.31	QPSK	1/0	24.00	23.62	23.84	23.58
	1/2	23.50	23.09	22.12	22.61		1/7	24.50	23.70	23.81	23.67
	1/5	23.00	22.54	22.41	22.33		1/14	24.50	23.65	23.61	24.10
	3/0	22.00	21.23	21.20	21.10		8/0	23.00	22.28	22.58	22.61
	3/1	22.00	21.05	21.25	21.33		8/3	23.00	22.29	22.58	22.75
	3/3	22.00	21.31	21.04	21.26		8/7	23.00	22.32	22.83	22.85
	6/0	22.00	21.05	21.07	21.82		15/0	23.00	22.15	22.34	22.38
16QAM	1/0	23.50	22.46	23.12	23.01	16QAM	1/0	24.00	22.80	22.56	23.05
	1/2	23.50	22.67	23.09	23.35		1/7	24.50	23.46	23.12	23.28
	1/5	23.50	22.79	23.00	23.32		1/14	23.00	22.45	22.88	22.78
	3/0	21.50	20.57	21.21	21.10		8/0	23.50	22.75	23.03	22.89
	3/1	21.50	20.97	20.86	21.16		8/3	23.50	22.83	23.05	22.87
	3/3	21.50	20.66	20.99	21.09		8/7	23.00	22.68	22.94	22.28
	6/0	21.50	21.05	21.02	20.89		15/0	22.00	21.28	21.43	21.57
LTE B12/BW=5M		Average Conducted Power(dBm)				LTE B12/BW=10M		Average Conducted Power(dBm)			
Modula -tion	RB Size/ Offset	Max. Tune-up	Channel/Frequency(MHz)			Modula -tion	RB Size/ Offset	Max. Tune-up	Channel/Frequency(MHz)		
			23035/ 701.5	23095/ 707.5	23155/ 713.5				23060/ 704	23095/ 707.5	23130/ 711
QPSK	1/0	24.00	23.63	23.84	23.89	QPSK	1/0	24.00	23.72	23.83	23.70
	1/12	24.50	23.64	23.88	24.41		1/24	25.00	24.76	24.10	24.13
	1/24	24.50	23.93	23.88	24.03		1/49	24.00	23.61	23.71	23.92
	12/0	22.50	22.26	22.40	22.38		25/0	24.00	23.57	23.72	23.56
	12/6	23.00	22.74	22.54	22.54		25/12	24.00	23.55	23.76	23.75
	12/13	23.00	22.48	22.70	22.80		25/25	24.00	23.50	23.67	23.81
	25/0	23.00	22.42	22.83	22.61		50/0	23.00	22.33	22.51	22.67
16QAM	1/0	24.00	23.59	23.85	23.30	16QAM	1/0	23.50	23.14	23.35	23.18
	1/12	24.50	24.10	24.07	23.75		1/24	24.50	23.79	23.29	24.08
	1/24	24.50	23.86	24.02	23.96		1/49	23.50	23.24	23.00	23.35
	12/0	22.00	21.80	21.54	21.75		25/0	22.00	21.49	21.75	21.71
	12/6	22.00	21.56	21.68	21.83		25/12	22.00	21.43	21.76	21.87
	12/13	22.50	21.59	21.87	22.01		25/25	22.00	21.47	21.99	21.67
	25/0	22.00	21.52	21.95	21.77		50/0	22.00	21.29	21.54	21.55

Full Power Mode(Sensor off)

LTE B13/BW=5M		Average Conducted Power(dBm)				LTE B13/BW=10M		Average Conducted Power(dBm)	
Modula-tion	RB Size/ Offset	Max. Tune-up	Channel/Frequency(MHz)			Modula-tion	RB Size/ Offset	Max. Tune-up	Channel/ Frequency (MHz)
			23205/ 779.5	23230/ 782	23255/ 784.5				23230/ 782
QPSK	1/0	21.50	20.08	21.02	20.95	QPSK	1/0	22.50	22.16
	1/12	22.00	21.93	21.28	21.04		1/24	21.50	21.15
	1/24	21.50	21.05	21.11	20.86		1/49	21.50	21.33
	12/0	21.00	20.86	20.16	19.94		25/0	21.00	20.97
	12/6	21.00	20.37	20.08	19.95		25/12	21.00	20.23
	12/13	21.00	20.07	19.96	19.93		25/25	21.00	20.16
	25/0	21.00	20.70	20.07	19.92		50/0	21.00	20.65
16QAM	1/0	21.50	19.77	21.33	20.66	16QAM	1/0	21.00	20.53
	1/12	22.00	21.91	21.48	21.11		1/24	21.50	21.16
	1/24	21.00	20.76	21.00	20.37		1/49	21.00	20.75
	12/0	20.00	19.54	19.08	19.06		25/0	20.00	19.93
	12/6	20.00	19.30	19.13	19.07		25/12	20.00	19.30
	12/13	20.00	19.07	19.18	18.95		25/25	20.00	19.22
	25/0	20.00	19.96	19.17	18.94		50/0	20.00	19.50

8.1.5. CONDUCTED POWER MEASUREMENTS OF BT

BT	Max. Tune up			Average Conducted Power (dBm)		
	CH0	CH39	CH78	CH0	CH39	CH78
DH5	7			6.52	6.98	6.76
3DH5	9	9	6.5	8.57	8.71	6.15

BT	Max. Tune up	Average Conducted Power (dBm)		
		CH0	CH19	CH39
BLE	2	1.10	1.42	1.52

Note:

The conducted power of BT is measured with RMS detector.

8.1.6. CONDUCTED POWER MEASUREMENTS OF WIFI 2.4G

SISO_ Ant0

Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Tune-up	Average Power (dBm)	SAR Test (Yes/No)
802.11b	1	2412	1	17.00	16.63	YES
	6	2437		17.00	15.92	YES
	11	2462		17.00	16.34	YES
802.11g	1	2412	6	13.50	13.04	NO
	6	2437		13.50	12.31	NO
	11	2462		13.50	12.96	NO
802.11n HT20	1	2412	6.5	5.50	3.79	NO
	6	2437		5.50	4.90	NO
	11	2462		5.50	5.06	NO
802.11n HT40	1	2412	13.5	0.00	-0.95	NO
	4	2427		0.00	-1.83	NO
	7	2442		0.00	-1.96	NO

Note:

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

2) Per KDB248227 D01, for WiFi 2.4GHz, the highest measured maximum output power Channel for DSSS modes(802.11b)was selected for SAR measurement. SAR for OFDM modes(2.4GHz 802.11g/n) was not required When the highest reported SAR for DSSS is adjusted by the ratio of OFDM modes(802.11g/n)to DSSS modes(802.11b)specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

SISO _Ant1

Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power (dBm)	SAR Test (Yes/No)
802.11b	1	2412	1	16.50	15.50	YES
	6	2437		16.60	16.47	YES
	11	2462		16.50	16.43	YES
802.11g	1	2412	6	13.50	13.07	NO
	6	2437		13.50	12.47	NO
	11	2462		13.50	12.96	NO
802.11n _HT20	1	2412	6.5	6.00	5.65	NO
	6	2437		6.00	4.57	NO
	11	2462		6.00	5.24	NO
802.11n_ HT40	1	2412	13.5	-1	-1.42	NO
	4	2427		-2	-2.1	NO
	7	2442		-1	-1.39	NO

MIMO_Ant0+1

Mode	Channel	Frequency(MHz)	Data Rate(Mbps)	ANT 0 Average Power(dBm)	ANT 1 Average Power(dBm)	Max. Tune up	Total Average Power(dBm)
802.11n _HT20	1	2412	13	4.82	4.80	8.00	7.82
	6	2437		4.76	4.71	8.00	7.75
	11	2462		5.17	5.12	8.50	8.16
802.11n_ HT40	1	2412	27	-1.22	-1.66	2.00	1.82
	4	2427		-1.96	-1.92	1.50	1.07
	7	2442		-1.54	-1.50	1.50	1.49

8.1.7. CONDUCTED POWER MEASUREMENTS OF WIFI 5G

SISO_ Ant0

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Tune-up	Average Power (dBm)	SAR Test (Yes/No)
5.2G	802.11a	36	5180	6	12.00	11.63	NO
		40	5200		12.00	11.69	NO
		44	5220		12.00	11.08	NO
		48	5240		12.00	11.13	NO
	802.11n HT20	36	5180	6.5	13.00	12.85	NO
		40	5200		13.50	13.20	NO
		44	5220		13.50	12.84	NO
		48	5240		14.50	13.50	NO
	802.11n HT40	38	5190	13.5	10.50	10.28	NO
		46	5230		11.50	11.24	NO
	802.11ac HT20	36	5260	6.5	13.00	12.96	NO
		40	5280		13.50	13.28	NO
		44	5300		13.50	12.92	NO
		48	5320		14.50	13.53	NO
	802.11ac HT40	38	5190	13.5	10.50	10.34	NO
		46	5230		11.50	11.38	NO
	802.11ac HT80	42	5210	29.3	10.50	10.34	NO

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Tune-up	Average Power (dBm)	SAR Test (Yes/No)
5.3G	802.11a	52	5260	6	12.00	11.06	NO
		56	5280		12.00	11.20	NO
		60	5300		12.00	11.34	NO
		64	5320		12.00	11.70	NO
	802.11n HT20	52	5260	6.5	14.50	14.02	NO
		56	5280		12.00	11.92	NO
		60	5300		12.00	11.84	NO
		64	5320		14.50	14.02	NO
	802.11n HT40	54	5270	13.5	12.00	11.48	NO
		62	5310		12.00	11.25	NO
	802.11ac HT20	52	5260	6.5	14.50	14.09	YES
		56	5280		12.00	11.99	YES
		60	5300		12.00	11.91	YES
		64	5320		14.50	14.10	YES
	802.11ac HT40	54	5270	13.5	12.00	11.55	NO
		62	5310		12.00	11.31	NO
	802.11ac HT80	58	5290	29.3	11.50	11.42	NO

Note:
When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration .

SISO_ Ant1

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Tune-up	Average Power (dBm)	SAR Test (Yes/No)
5.2G	802.11a	36	5180	6	11.50	11.35	NO
		40	5200		9.50	9.34	NO
		44	5220		9.50	9.26	NO
		48	5240		10.50	10.46	NO
	802.11n HT20	36	5180	6.5	13.00	13.07	NO
		40	5200		13.50	13.25	NO
		44	5220		13.50	12.17	NO
		48	5240		14.50	13.44	NO
	802.11n HT40	38	5190	13.5	10.50	10.28	NO
		46	5230		11.50	11.22	NO
	802.11ac HT20	36	5260	6.5	13.50	13.13	NO
		40	5280		13.50	13.27	NO
		44	5300		13.50	13.20	NO
		48	5320		14.50	13.53	NO
	802.11ac HT40	38	5190	13.5	10.50	10.33	NO
		46	5230		11.50	11.31	NO
	802.11ac HT80	42	5210	29.3	10.50	10.36	NO

SISO_ Ant1

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Tune-up	Average Power (dBm)	SAR Test (Yes/No)
5.3G	802.11a	52	5260	6	12.00	11.06	NO
		56	5280		12.00	11.20	NO
		60	5300		12.00	11.34	NO
		64	5320		12.00	11.70	NO
	802.11n HT20	52	5260	6.5	14.50	14.02	NO
		56	5280		12.00	11.92	NO
		60	5300		12.00	11.84	NO
		64	5320		14.50	14.02	NO
	802.11n HT40	54	5270	13.5	12.00	11.48	NO
		62	5310		12.00	11.25	NO
	802.11ac HT20	52	5260	6.5	14.50	14.09	YES
		56	5280		12.00	11.99	YES
		60	5300		12.00	11.91	YES
		64	5320		14.50	14.10	YES
	802.11ac HT40	54	5270	13.5	12.00	11.55	NO
		62	5310		12.00	11.31	NO
	802.11ac HT80	58	5290	29.3	11.50	11.42	NO

Note:

When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration .

SISO_ Ant0

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Tune-up	Average Power (dBm)	SAR Test (Yes/No)
5.6G	802.11a	100	5500	6	12.00	11.98	NO
		104	5520		12.00	11.91	NO
		108	5540		12.00	11.93	NO
		112	5560		12.50	12.36	NO
		116	5580		13.00	12.54	NO
		132	5660		13.00	12.51	NO
		136	5680		12.50	12.48	NO
		140	5700		13.00	12.75	NO
	802.11n HT20	100	5500	6.5	12.50	12.31	NO
		104	5520		12.50	12.18	NO
		108	5540		12.50	12.14	NO
		112	5560		12.50	12.17	NO
		116	5580		12.50	12.35	NO
		132	5660		12.50	12.31	NO
		136	5680		12.50	12.36	NO
		140	5700		13.00	12.68	NO
	802.11n HT40	102	5510	13.5	10.50	10.02	NO
		118	5590		12.50	12.07	NO
		134	5670		12.50	12.28	NO
	802.11ac HT20	100	5500	6.5	12.50	12.39	YES
		104	5520		12.50	12.25	YES
		108	5540		12.50	12.20	YES
		112	5560		12.50	12.19	YES
		116	5580		12.50	12.45	YES
		132	5660		12.50	12.38	YES
		136	5680		12.50	12.41	YES
		140	5700		13.00	12.73	YES
	802.11ac HT40	102	5510	13.5	10.50	10.07	NO
		134	5670		12.50	12.17	NO
	802.11ac HT80	106	5530	29.3	12.50	12.37	NO
		138	5690		9.50	9.05	NO

SISO_ Ant1

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Tune-up	Average Power (dBm)	SAR Test (Yes/No)
5.6G	802.11a	100	5500	6	12.00	11.56	NO
		104	5520		11.50	11.41	NO
		108	5540		11.50	11.33	NO
		112	5560		8.50	8.10	NO
		116	5580		8.50	8.23	NO
		132	5660		9.50	9.34	NO
		136	5680		10.00	9.57	NO
		140	5700		10.00	9.67	NO
	802.11n HT20	100	5500	6.5	12.50	12.27	NO
		104	5520		12.50	12.22	NO
		108	5540		12.50	12.19	NO
		112	5560		12.50	12.24	NO
		116	5580		12.50	12.39	NO
		132	5660		12.50	12.42	NO
		136	5680		12.50	12.35	NO
		140	5700		13.00	12.64	NO
	802.11n HT40	102	5510	13.5	10.50	10.02	NO
		118	5590		12.50	12.07	NO
		134	5670		12.50	12.28	NO
	802.11ac HT20	100	5500	6.5	12.50	12.34	YES
		104	5520		12.50	12.25	YES
		108	5540		12.50	12.20	YES
		112	5560		12.50	12.32	YES
		116	5580		12.50	12.49	YES
		132	5660		12.50	12.43	YES
		136	5680		12.50	12.40	YES
		140	5700		13.00	12.72	YES
	802.11ac HT40	102	5510	13.5	10.50	10.06	NO
		134	5670		12.50	12.15	NO
	802.11ac HT80	106	5530	29.3	12.50	12.34	NO
		138	5690		9.50	9.01	NO

SISO_ Ant0

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Tune-up	Average Power (dBm)	SAR Test (Yes/No)
5.8G	802.11a	149	5745	6	11.00	10.83	YES
		153	5765		10.50	10.07	YES
		157	5785		10.50	10.12	YES
		161	5805		10.50	10.10	YES
		165	5825		11.00	10.59	YES
	802.11n HT20	149	5745	6.5	10.50	9.94	NO
		153	5765		10.50	10.14	NO
		157	5785		10.50	10.02	NO
		161	5805		10.50	10.01	NO
		165	5825		10.50	10.11	NO
	802.11n HT40	151	5755	13.5	10.5	10.35	NO
		159	5795		10.5	10.21	NO
	802.11ac HT20	149	5745	6.5	10.50	10.02	NO
		153	5765		10.50	10.20	NO
		157	5785		10.50	10.11	NO
		161	5805		10.50	10.08	NO
		165	5825		10.50	10.19	NO
	802.11ac HT40	151	5755	13.5	10.50	10.40	NO
		159	5795		10.50	10.26	NO
	802.11ac HT80	155	5775	29.3	10.50	10.05	NO

SISO_ Ant1

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Tune-up	Average Power (dBm)	SAR Test (Yes/No)
5.8G	802.11a	149	5745	6	10.00	9.53	YES
		153	5765		10.00	9.42	YES
		157	5785		10.00	9.75	YES
		161	5805		10.00	9.44	YES
		165	5825		10.00	9.49	YES
	802.11n HT20	149	5745	6.5	9.50	9.38	NO
		153	5765		9.50	9.16	NO
		157	5785		9.50	9.31	NO
		161	5805		9.50	9.27	NO
		165	5825		9.50	9.11	NO
	802.11n HT40	151	5755	13.5	9.50	9.34	NO
		159	5795		9.50	9.30	NO
	802.11ac HT20	149	5745	6.5	9.50	9.42	NO
		153	5765		9.50	9.22	NO
		157	5785		9.50	9.36	NO
		161	5805		9.50	9.33	NO
		165	5825		9.50	9.16	NO
	802.11ac HT40	151	5755	13.5	9.50	9.41	NO
		159	5795		9.50	9.37	NO
	802.11ac HT80	155	5775	29.3	9.50	9.04	NO

MIMO_ Ant0+1

Band	Mode	Channel	Frequency(MHz)	Data Rate(Mbps)	ANT 1 Average Power(dBm)	ANT 2 Average Power(dBm)	Max. Tune-up	Total Average Power(dBm)
5.2G	802.11n HT20	36	5180	MCS8	13.04	12.94	17.00	16.00
		40	5200		11.64	11.61	17.00	14.64
		44	5220		13.42	13.34	17.00	16.39
		48	5240		13.51	13.45	17.00	16.49
	802.11n HT40	38	5190	MCS8	10.31	10.27	13.50	13.30
		46	5230		11.34	11.28	14.50	14.32
	802.11ac_VHT20	36	5180	NSS1-MCS0	13.08	13.02	17.00	16.06
		40	5200		11.70	11.65	15.00	14.69
		44	5220		13.50	13.41	17.00	16.47
		48	5240		13.56	13.49	17.00	16.54
	802.11ac_VHT40	38	5190	NSS1-MCS0	10.35	10.30	13.50	13.34
		46	5230		11.37	11.32	14.50	14.36
	802.11ac VHT80	42	5210	NSS1-MCS0	10.38	10.31	13.50	13.36

MIMO_ Ant0+1

Band	Mode	Channel	Frequency(MHz)	Data Rate(Mbps)	ANT 1 Average Power(dBm)	ANT 2 Average Power(dBm)	Max. Tune-up	Total Average Power(dBm)
5.3G	802.11n HT20	52	5260	MCS8	14.01	13.97	17.50	17.00
		56	5280		11.92	11.87	15.00	14.91
		60	5300		13.98	13.95	17.50	16.98
		64	5320		14.04	14.01	17.50	17.04
	802.11n HT40	54	5270	MCS8	11.51	11.47	14.50	14.50
		62	5310		11.81	11.74	15.00	14.79
	802.11ac_VHT20	52	5260	NSS1-MCS0	14.02	14.00	17.50	17.02
		56	5280		11.97	11.91	15.00	14.95
		60	5300		14.02	14.01	17.50	17.03
		64	5320		14.09	14.04	17.50	17.08
	802.11ac_VHT40	54	5270	NSS1-MCS0	11.56	11.51	15.00	14.55
		62	5310		11.85	11.79	15.00	14.83
	802.11ac VHT80	58	5290	NSS1-MCS0	11.42	11.38	14.50	14.41

MIMO_ Ant0+1

Band	Mode	Channel	Frequency(MHz)	Data Rate(Mbps)	ANT 1 Average Power(dBm)	ANT 2 Average Power(dBm)	Max. Tune-up	Total Average Power(dBm)
5.6G	802.11n HT20	100	5500	MCS8	12.40	12.34	16.00	15.38
		104	5520		12.34	12.29	16.00	15.33
		108	5540		12.27	12.20	16.00	15.25
		112	5560		12.37	12.34	16.00	15.37
		116	5580		12.49	12.45	16.00	15.48
		132	5660		12.41	12.37	16.00	15.40
		136	5680		12.50	12.46	16.00	15.49
		140	5700		12.76	12.70	16.00	15.74
	802.11n HT40	102	5270	MCS8	10.10	10.02	13.50	13.07
		118	5590		12.18	12.14	15.50	15.17
		134	5670		12.38	12.34	15.50	15.37
	802.11ac_VHT20	100	5500	NSS1-MCS0	12.34	12.30	16.00	15.33
		104	5520		12.30	12.24	16.00	15.28
		108	5540		12.24	12.16	16.00	15.21
		112	5560		12.31	12.30	16.00	15.32
		116	5580		12.41	12.40	16.00	15.42
		132	5660		12.37	12.32	16.00	15.36
		136	5680		12.42	12.38	16.00	15.41
		140	5700		12.62	12.60	16.00	15.62
	802.11ac_VHT40	102	5270	NSS1-MCS0	10.05	10.01	13.50	13.04
		118	5590		12.11	12.09	15.50	15.11
		134	5670		12.08	12.05	15.50	15.08
	802.11ac VHT80	106	5530	NSS1-MCS0	9.03	9.02	12.50	12.04
		122	5610		10.24	10.20	13.50	13.23

MIMO_ Ant0+1

Band	Mode	Channel	Frequency(MHz)	Data Rate(Mbps)	ANT 1 Average Power(dBm)	ANT 2 Average Power(dBm)	Max. Tune-up	Total Average Power(dBm)
5.8G	802.11n HT20	149	5745	MCS8	9.74	9.71	13.00	12.74
		153	5765		9.69	9.65	13.00	12.68
		157	5785		9.77	9.72	13.00	12.76
		161	5805		9.70	9.66	13.00	12.69
		165	5825		9.73	9.69	13.00	12.72
	802.11n HT40	151	5755	MCS8	9.95	9.90	13.00	12.94
		159	5795		9.86	9.82	13.00	12.85
	802.11ac_VHT20	149	5745	NSS1-MCS0	9.69	9.67	13.00	12.69
		153	5765		9.64	9.61	13.00	12.64
		157	5785		9.72	9.70	13.00	12.72
		161	5805		9.64	9.60	13.00	12.63
		165	5825		9.68	9.64	13.00	12.67
	802.11ac_VHT40	151	5755	NSS1-MCS0	9.89	9.87	13.00	12.89
		159	5795		9.82	9.79	13.00	12.82
	802.11ac VHT80	159	5795	NSS1-MCS0	9.62	9.54	13.00	12.59

8.2. SAR TEST RESULTS

General Notes:

1) Per KDB447498 D01, all measurement SAR results are scaled to the maximum tune-up tolerance limit to demonstrate compliant.
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:≤0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is≤100 MHz. When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel must be used.
3) Per KDB865664 D01,for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg; if the deviation among the repeated measurement is ≤ 20%,and the measured SAR <1.45W/kg, only one repeated measurement is required.
4) Per KDB865664 D02, SAR plot is only required for the highest measured SAR in each exposure configuration, wireless mode and frequency band combination; Plots are also required when the measured SAR is > 1.5 W/kg, or > 7.0 W/kg for occupational exposure. The published RF exposure KDB procedures may require additional plots; for example, to support SAR to peak location separation ratio test exclusion and/or volume scan post-processing.

GSM Notes:

Per KDB941225 D01, SAR test reduction for GPRS and EDGE modes is determined by the source-based time-averaged output power specified for production units, including tune-up tolerance. The data mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested.

UMTS Notes:

Per KDB941225 D01, When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤¼ 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.

LTE notes:

1) The LTE test configurations are determined according to KDB941225 D05 SAR for LTE Devices.The general test procedures used for SAR testing can be found in Section 7.1.3.
2) A-MPR was disabled for all SAR test by setting NS_01 on the base station simulator.SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames(maximum TTI)

WLAN Notes:

1. For exposure conditions with multiple test positions, such as handset operating next to the ear, devices with hotspot mode, procedures for initial test position can be applied. Using the transmission mode determined by the DSSS procedure or initial test configuration, area scans are measured for all positions in an exposure condition. The test position with the highest extrapolated (peak)SAR is used as the initial test position. 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. Otherwise, SAR is evaluated at the subsequent highest peak SAR position until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured.
2. Justification for test configurations for WLAN per KDB Publication 248227 for 2.4GHZ WIFI single transmission chain operations, the highest measured maximum output power Channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4GHz 802.11g/n) was not required due to the maximum allowed powers and the highest reported DSSS SAR. See Section7.1.4 for more information.
3. Justification for test configurations for WLAN per KDB Publication 248227 for 5GHZ WIFI single transmission chain operations, the initial test configuration was selected according to the transmission mode with the highest maximum allowed power. Other transmission mode were not investigated since the highest reported SAR for initial test configuration adjusted by the ratio of maximum output powers is less than1.2W/kg. See Section 7.1.4 for more information.

8.2.1. SAR MEASUREMENT RESULT

1) SAR test results of GSM & UMTS

Test No.	Band	Mode	Channel	Test Position	Separation Distance (cm)	Sensor	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g (W/kg)	Reported 1g SAR (W/kg)
T01	GSM 850	GPRS12	190	Rear Face	0	-	31	30.58	0.04	0.44	0.485
T02	GSM 850	GPRS12	190	Left Side	0	-	31	30.58	-0.04	0.0154	0.017
T03	GSM 850	GPRS12	190	Right Side	0	-	31	30.58	0.01	0.181	0.199
T04	GSM 850	GPRS12	190	Top Side	0	-	31	30.58	0.11	**1.05**	**1.157**
T05	GSM 850	GPRS12	190	Bottom Side	0	-	31	30.58	-0.14	0.0032	0.004
T06	GSM 850	GPRS12	128	Top Side	0	-	31	30.31	0.08	0.926	1.085
T07	GSM 850	GPRS12	251	Top Side	0	-	31	30.25	0.06	0.953	1.133
T40_ Repeated	GSM 850	GPRS12	190	Top Side	0	-	31	30.58	0.03	0.947	1.043
T08	GSM 1900	GPRS12	661	Rear Face	0	On	24.5	24.17	0.04	0.143	0.154
T09	GSM 1900	GPRS12	661	Left Side	0	-	28.5	28.17	-0.08	0.0138	0.015
T10	GSM 1900	GPRS12	661	Right Side	0	-	28.5	28.17	0.02	0.147	0.159
T11	GSM 1900	GPRS12	661	Top Side	0	On	24.5	24.17	0.11	1.09	1.176
T12	GSM 1900	GPRS12	661	Bottom Side	0	-	28.5	28.17	-0.16	0.0025	0.003
T13	GSM 1900	GPRS12	512	Top Side	0	On	24.5	23.89	0.15	**1.06**	**1.220**
T14	GSM 1900	GPRS12	810	Top Side	0	On	24.5	24.11	0.02	0.907	0.992
T41_ Repeated	GSM 1900	GPRS12	661	Top Side	0	On	24.5	24.17	0.07	1.07	1.154
T15	GSM 1900	GPRS12	661	Rear Face	0.9	Off	28.5	28.17	0.07	0.854	0.921
T18	GSM 1900	GPRS12	661	Top Side	0.9	Off	28.5	28.17	0.11	1.12	1.208
T19	GSM 1900	GPRS12	512	Top Side	0.9	Off	28.5	27.89	-0.02	**1.14**	**1.312**
T20	GSM 1900	GPRS12	810	Top Side	0.9	Off	28.5	28.11	0.05	1.08	1.181
T42_ Repeated	GSM 1900	GPRS12	512	Top Side	0.9	Off	28.5	27.89	0.17	1.09	1.254
T21	UMTS B2	RMC12.2K	9400	Rear Face	0	-	24	23.53	0.02	0.908	1.012
T24	UMTS B2	RMC12.2K	9400	Right Side	0	-	24	23.53	-0.04	0.0849	0.095
T25	UMTS B2	RMC12.2K	9400	Top Side	0	-	24	23.53	0.04	1.22	1.359
T26	UMTS B2	RMC12.2K	9262	Top Side	0	-	24	23.43	0.11	1.18	1.345
T27	UMTS B2	RMC12.2K	9538	Top Side	0	-	24	22.6	0.07	**1.01**	**1.394**
T43_ Repeated	UMTS B2	RMC12.2K	9400	Top Side	0	-	24	23.53	0.04	1.12	1.248
T28	UMTS B5	RMC12.2K	4182	Rear Face	0	-	24	23.51	0.06	0.31	0.347
T29	UMTS B5	RMC12.2K	4182	Right Side	0	-	24	23.51	-0.012	0.0351	0.039
T30	UMTS B5	RMC12.2K	4182	Top Side	0	-	24	23.51	0.07	0.891	0.997
T31	UMTS B5	RMC12.2K	4132	Top Side	0	-	24	23.27	0.05	**0.907**	**1.073**
T32	UMTS B5	RMC12.2K	4233	Top Side	0	-	24	23.4	-0.03	0.864	0.992
T44_ Repeated	UMTS B5	RMC12.2K	4132	Top Side	0	-	24	23.27	0.05	0.905	1.071

Note: The value with boldface is the maximum SAR Value of each test band.

2) SAR test results of LTE

Test No.	Band	Mode	Channel	RB	Offset	Test Position	Separation Distance (cm)	Sensor	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g (W/kg)	Reported 1g SAR (W/kg)
T100	LTE B2	QPSK20M	19100	1	0	Rear Face	0	-	24	23.7	0.03	0.647	0.693
T101	LTE B2	QPSK20M	19100	1	0	Right Side	0	-	24	23.7	-0.14	0.077	0.083
T102	LTE B2	QPSK20M	19100	1	0	Top Side	0	-	24	23.7	-0.05	1.08	1.157
T103	LTE B2	QPSK20M	18900	1	0	Top Side	0	-	24	23.44	0.16	1.03	1.172
T104	LTE B2	QPSK20M	18700	1	0	Top Side	0	-	23	22.87	0.02	**1.17**	**1.206**
T110 _Repeated	LTE B2	QPSK20M	18700	1	0	Top Side	0	-	23	22.87	0.08	1.15	1.185
T105	LTE B2	QPSK20M	19100	50	0	Rear Face	0	-	22.5	22.26	0.03	0.571	0.603
T106	LTE B2	QPSK20M	19100	50	0	Right Side	0	-	22.5	22.26	-0.08	0.055	0.058
T107	LTE B2	QPSK20M	19100	50	0	Top Side	0	-	22.5	22.26	0.12	0.811	0.857
T108	LTE B2	QPSK20M	19100	50	0	Top Side	0		22.5	21.63	0.11	0.743	0.908
T109	LTE B2	QPSK20M	18700	50	0	Top Side	0	-	22.5	21.32	0.16	**0.728**	**0.955**
T111 _Repeated	LTE B2	QPSK20M	19100	50	0	Top Side	0	-	22.5	22.6	0.05	0.807	0.789
T180	LTE B2	QPSK20M	19100	100	0	Top Side	0	-	22.5	22.13	0.04	0.72	0.784
T112	LTE B4	QPSK20M	20175	1	0	Rear Face	0	On	20	19.83	0.04	0.598	0.622
T113	LTE B4	QPSK20M	20175	1	0	Right Side	0	-	24	23.83	-0.09	0.0674	0.070
T114	LTE B4	QPSK20M	20175	1	0	Top Side	0	On	20	19.83	0.06	0.896	0.932
T115	LTE B4	QPSK20M	20050	1	0	Top Side	0	On	20	19.59	0.13	**0.95**	**1.044**
T116	LTE B4	QPSK20M	20300	1	0	Top Side	0	On	20	19.45	-0.15	0.789	0.896
T170 _Repeated	LTE B4	QPSK20M	20050	1	0	Top Side	0	On	20	19.59	0.15	0.92	1.011
T117	LTE B4	QPSK20M	20175	50	0	Rear Face	0	On	18.5	18.4	0.02	0.529	0.541
T118	LTE B4	QPSK20M	20175	50	0	Right Side	0	-	22.5	22.4	-0.02	0.0579	0.059
T119	LTE B4	QPSK20M	20175	50	0	Top Side	0	On	18.5	18.4	0.06	0.804	0.823
T120	LTE B4	QPSK20M	20050	50	0	Top Side	0	On	18.5	18.08	0.09	**0.828**	**0.912**
T121	LTE B4	QPSK20M	20300	50	0	Top Side	0	On	18.5	17.95	0.14	0.693	0.787
T171 _Repeated	LTE B4	QPSK20M	20050	50	0	Top Side	0	On	18.5	18.08	0.09	0.825	0.909
T181	LTE B4	QPSK20M	20175	100	0	Top Side	0	On	18.5	18.07	0.13	0.71	0.784
T122	LTE B4	QPSK20M	20175	1	0	Rear Face	0.9	Off	24	23.83	0.03	0.574	0.597
T124	LTE B4	QPSK20M	20175	1	0	Top Side	0.9	Off	24	23.83	-0.04	**0.758**	**0.788**
T127	LTE B4	QPSK20M	20175	50	0	Rear Face	0.9	Off	22.5	22.4	0.06	0.507	**0**.519
T129	LTE B4	QPSK20M	20175	50	0	Top Side	0.9	Off	22.5	22.4	0.03	**0.559**	**0.572**
T132	LTE B5	QPSK10M	20450	1	0	Rear Face	0	-	23	22.92	-0.02	0.27	0.275
T133	LTE B5	QPSK10M	20450	1	0	Left Side	0	-	23	22.92	-0.11	0.0137	0.014
T134	LTE B5	QPSK10M	20450	1	0	Right Side	0	-	23	22.92	-0.15	0.0272	0.028
T135	LTE B5	QPSK10M	20450	1	0	Top Side	0	-	23	22.92	-0.11	**0.646**	**0.658**
T136	LTE B5	QPSK10M	20450	1	0	Bottom Side	0	-	23	22.92	-0.07	0.0057	0.006
T139	LTE B5	QPSK10M	20600	25	0	Rear Face	0	-	22	21.48	0.04	0.186	0.210
T140	LTE B5	QPSK10M	20600	25	0	Left Side	0	-	22	21.48	-0.09	0.0107	0.012
T141	LTE B5	QPSK10M	20600	25	0	Right Side	0	-	22	21.48	-0.04	0.0215	0.024
T142	LTE B5	QPSK10M	20600	25	0	Top Side	0	-	22	21.48	0.11	**0.505**	**0.569**
T143	LTE B5	QPSK10M	20600	25	0	Bottom Side	0	-	22	21.48	-0.16	0.0024	0.003

Note: The value with boldface is the maximum SAR Value of each test band.

Test No.	Band	Mode	Channel	RB	Offset	Test Position	Separation Distance (cm)	Sensor	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g (W/kg)	Reported 1g SAR (W/kg)
T146	LTE B12	QPSK10M	23095	1	24	Rear Face	0	-	25	24.76	0.03	0.254	0.268
T147	LTE B12	QPSK10M	23095	1	24	Left Side	0		25	24.76	-0.06	0.0234	0.025
T148	LTE B12	QPSK10M	23095	1	24	Right Side	0	-	25	24.76	-0.07	0.0535	0.057
T149	LTE B12	QPSK10M	23095	1	24	Top Side	0	-	25	24.76	0.09	0.947	1.001
T150	LTE B12	QPSK10M	23095	1	24	Bottom Side	0		25	24.76	-0.17	0.0014	0.001
T151	LTE B12	QPSK10M	23130	1	24	Top Side	0	-	24.5	24.13	0.04	0.971	1.057
T152	LTE B12	QPSK10M	23060	1	24	Top Side	0	-	24.54	24.1	0.1	**1**	**1.107**
T172 _Repeated	LTE B12	QPSK10M	23060	1	24	Top Side	0	-	24.54	24.1	0.11	0.989	1.094
T153	LTE B12	QPSK10M	23095	25	25	Rear Face	0	-	24	23.81	0.07	0.124	0.130
T154	LTE B12	QPSK10M	23095	25	25	Left Side	0		24	23.81	-0.04	0.0214	0.022
T155	LTE B12	QPSK10M	23095	25	25	Right Side	0	-	24	23.81	-0.08	0.0433	0.045
T156	LTE B12	QPSK10M	23095	25	25	Top Side	0	-	24	23.81	0.04	0.798	0.834
T157	LTE B12	QPSK10M	23095	25	25	Bottom Side	0	-	24	23.81	-0.17	0.0007	0.001
T158	LTE B12	QPSK10M	23130	25	25	Top Side	0	-	24	23.5	0.12	**0.772**	**0.866**
T159	LTE B12	QPSK10M	23060	25	25	Top Side	0	-	24	23.67	0.05	0.747	0.806
T173 _Repeated	LTE B12	QPSK10M	23095	25	25	Top Side	0	-	24	23.81	0.11	0.795	0.831
T182	LTE B12	QPSK10M	23130	50	0	Top Side	0	-	23	22.67	0.1	0.725	0.782
T160	LTE B13	QPSK10M	23230	1	0	Rear Face	0	-	22.5	22.16	0.05	0.153	0.165
T161	LTE B13	QPSK10M	23230	1	0	Left Side	0		22.5	22.16	-0.01	0.0035	0.004
T162	LTE B13	QPSK10M	23230	1	0	Right Side	0	-	22.5	22.16	-0.06	0.043	0.047
T163	LTE B13	QPSK10M	23230	1	0	Top Side	0	-	22.5	22.16	-0.19	**0.608**	**0.658**
T164	LTE B13	QPSK10M	23230	1	0	Bottom Side	0		22.5	22.16	-0.15	0.0002	0.0002
T165	LTE B13	QPSK10M	23230	25	0	Rear Face	0	-	21	20.97	0.07	0.121	0.122
T166	LTE B13	QPSK10M	23230	25	0	Left Side	0	-	21	20.97	-0.06	0.002	0.002
T167	LTE B13	QPSK10M	23230	25	0	Right Side	0	-	21	20.97	-0.1	0.0311	0.031
T168	LTE B13	QPSK10M	23230	25	0	Top Side	0	-	21	20.97	0.09	**0.475**	**0.478**
T169	LTE B13	QPSK10M	23230	25	0	Bottom Side	0	-	21	20.97	-0.14	0.00014	0.000

Note: The value with boldface is the maximum SAR Value of each test band.

3) SAR test results of 2.4G WIFI _separation distance=0cm

Test No.	Band	Channel	Test Position	Ant	Data Rate	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g (W/kg)	Reported 1g SAR (W/kg)
T310	802.11b	1	Rear Face	0	1Mbps	17	16.93	0.04	0.813	0.826
T311	802.11b	1	Left Side	0	1Mbps	17	16.93	0.06	0.212	0.215
T312	802.11b	1	Bottom Side	0	1Mbps	17	16.93	-0.09	1.26	1.280
T313	802.11b	6	Bottom Side	0	1Mbps	17	15.92	-0.13	**1.05**	**1.346**
T314	802.11b	11	Bottom Side	0	1Mbps	17	16.34	0.08	0.942	1.097
T315	802.11b	1	Bottom Side	0	1Mbps	17	16.93	0.11	1.25	1.270
T316	802.11b	6	Rear Face	1	1Mbps	16.5	16.47	-0.07	**0.754**	**0.759**
T317	802.11b	6	Right Side	1	1Mbps	16.5	16.47	0.15	0.016	0.016
T318	802.11b	6	Bottom Side	1	1Mbps	16.5	16.47	-0.03	0.733	0.738
T319	802.11b	1	Bottom Side	1	1Mbps	16.5	15.5	0.06	0.539	0.679
T320	802.11b	11	Bottom Side	1	1Mbps	16.5	16.43	-0.07	0.689	0.700
T400	Bluetooth_3-DH5	39	Rear Face	-	-	9	8.71	<0.001	<0.001	<0.001
T401	Bluetooth_3-DH5	39	Left Side	-	-	9	8.71	<0.001	<0.001	<0.001
T402	Bluetooth_3-DH5	39	Bottom Side	-	-	9	8.71	<0.001	<0.001	<0.001

Note:

1.The value with boldface is the maximum SAR Value of each test band.

2.The area scan SAR result <0.001,can not find zoom scan cube.

4) SAR test results of 5G WiFi_ separation distance=0cm

Test No.	Band	Channel	Test Position	Ant	Data Rate	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g (W/kg)	Reported 1g SAR (W/kg)
T321	802.11ac_VHT20	64	Rear Face	0	NSS1-MCS0	14.5	14.1	-0.04	0.347	0.380
T322	802.11ac_VHT20	64	Left Side	0	NSS1-MCS0	14.5	14.1	0.16	0.221	0.242
T323	802.11ac_VHT20	64	Bottom Side	0	NSS1-MCS0	14.5	14.1	-0.02	1.08	1.184
T324	802.11ac_VHT20	52	Bottom Side	0	NSS1-MCS0	14.5	14.09	0.08	**1.09**	**1.198**
T325	802.11ac_VHT20	56	Bottom Side	0	NSS1-MCS0	12	11.99	0.04	1.18	1.183
T351 _Repeated	802.11ac_VHT20	56	Bottom Side	0	NSS1-MCS0	12	11.99	0.05	1.16	1.163
T326	802.11ac_VHT20	64	Rear Face	1	NSS1-MCS0	14.5	14.04	0.03	**0.07**	**0.078**
T327	802.11ac_VHT20	64	Right Side	1	NSS1-MCS0	14.5	14.04	<0.001	<0.001	<0.001
T328	802.11ac_VHT20	64	Bottom Side	1	NSS1-MCS0	14.5	14.04	-0.08	0.035	0.039
T329	802.11ac_VHT20	52	Rear Face	1	NSS1-MCS0	14	13.93	-0.14	0.053	0.054
T330	802.11ac_VHT20	56	Rear Face	1	NSS1-MCS0	11.5	11.39	0.05	0.051	0.052
T331	802.11ac_VHT20	140	Rear Face	0	NSS1-MCS0	13	12.73	-0.07	0.496	0.528
T332	802.11ac_VHT20	140	Left Side	0	NSS1-MCS0	13	12.73	-0.15	0.232	0.247
T333	802.11ac_VHT20	140	Bottom Side	0	NSS1-MCS0	13	12.73	0.09	**1.3**	**1.383**
T334	802.11ac_VHT20	116	Bottom Side	0	NSS1-MCS0	12.5	12.45	0.02	1.24	1.254
T335	802.11ac_VHT20	100	Bottom Side	0	NSS1-MCS0	12.5	12.39	-0.03	0.916	0.939
T352 _Repeated	802.11ac_VHT20	140	Bottom Side	0	NSS1-MCS0	13	12.73	0.04	1.294	1.377
T336	802.11ac_VHT20	140	Rear Face	1	NSS1-MCS0	13	12.72	0.13	**0.091**	**0.097**
T337	802.11ac_VHT20	140	Right Side	1	NSS1-MCS0	13	12.72	-0.04	0.00109	0.001
T338	802.11ac_VHT20	140	Bottom Side	1	NSS1-MCS0	13	12.72	-0.02	0.022	0.023
T339	802.11ac_VHT20	100	Rear Face	1	NSS1-MCS0	12.5	12.34	0.08	0.051	0.053
T340	802.11ac_VHT20	116	Rear Face	1	NSS1-MCS0	12.5	12.49	-0.14	0.047	0.047
T341	802.11a	149	Rear Face	0	6Mbps	11	10.83	0.03	0.539	0.561
T342	802.11a	149	Left Side	0	6Mbps	11	10.83	0.02	0.275	0.286
T343	802.11a	149	Bottom Side	0	6Mbps	11	10.83	0.06	**1.29**	**1.341**
T344	802.11a	157	Bottom Side	0	6Mbps	10.5	10.12	0.12	1.16	1.266
T345	802.11a	165	Bottom Side	0	6Mbps	11	10.59	0.1	1.09	1.198
T353 _Repeated	802.11a	149	Bottom Side	0	6Mbps	11	10.83	0.06	1.27	1.321
T346	802.11a	157	Rear Face	1	6Mbps	10	9.75	-0.09	**0.17**	**0.180**
T347	802.11a	157	Right Side	1	6Mbps	10	9.75	-0.04	0.013	0.014
T348	802.11a	157	Bottom Side	1	6Mbps	10	9.75	0.03	0.053	0.056
T349	802.11a	149	Rear Face	1	6Mbps	10	9.53	0.09	0.122	0.136
T350	802.11a	165	Rear Face	1	6Mbps	10	9.49	0.08	0.15	0.169

Note:

1.The value with boldface is the maximum SAR Value of each test band.

2.The area scan SAR result <0.001,can not find zoom scan cube.

9. MULTIPLE TRANSMITTER EVALUATION & BT ESTIMATED SAR

The following tables list information which is relevant for the decision if a simultaneous transmit evaluation is necessary according to FCC KDB 447498D01 General RF Exposure Guidance v06.

No.	Configuration	Body
1	WWAN+WiFi2.4G	Yes
2	WWAN+BT	Yes
3	WWAN+WiFi5G	Yes
4	WiFi2.4G(Ant1)+BT	Yes
5	WiFi5G(Ant1)+BT	Yes
6	WiFi2.4G(Ant0)+WiFi2.4G(Ant1)	Yes
7	WiFi5G(Ant0)+WiFi5G(Ant1)	Yes

Note:

2G&3G&4G share the same antenna and can’t transmit simultaneously.

9.1 SAR SUMMATION SCENARIO

1) About BT/WiFi and GSM/UMTS/LTE antenna

Test Position / SAR1g(W/kg)	Rear Face	Left Side	Right Side	Top Side	Bottom Side
GSM 850	0.485	0.017	0.199	1.157	0.004
GSM1900	0.154	0.015	0.059	1.312	0.003
UMTS B2	1.012		0.095	1.394	
UMTS B5	0.347		0.039	1.073	
LTE B2	0.693		0.083	1.206	
LTE B4	0.622		0.070	1.044	
LTE B5	0.275	0.014	0.028	0.658	0.006
LTE B12	0.268	0.025	0.057	1.107	0.001
LTE B13	0.165	0.004	0.047	0.658	0.0002
2.4GWiFi_Ant0	0.826	0.215			1.346
2.4GWiFi_Ant1	0.759		0.016		0.738
5.3G WiFi_Ant0	0.38	0.242			1.198
5.3G WiFi_Ant1	0.078		<0.001		0.039
5.6G WiFi_Ant0	0.528	0.247			1.383
5.6G WiFi_Ant1	0.097		0.001		0.023
5.8G WiFi_Ant0	0.561	0.286			1.341
5.8G WiFi_Ant1	0.18		0.014		0.056
BT	<0.001	<0.001	<0.001	<0.001	<0.001
WWAN+WLAN MAX$\sum SAR_{1g}$	1.838	0.311	0.399	1.59	1.384
WWAN+BT MAX$\sum SAR_{1g}$	1.013	0.026	0.2	1.395	0.007
WLAN_Ant0+WLAN_Ant1 MAX$\sum SAR_{1g}$	1.585				2.084
WLAN+BT MAX$\sum SAR_{1g}$	0.827		0.017		0.739

Note:

1. $SAR_{MAX.total}$=$SAR_{UMTS\ B2}$ +$SAR_{2.4G\ WIFI}$=1.012W/kg +0.826W/kg =1.838W/kg.
   Thus $SAR_{MAX.total}$=1.838W/kg >1.6W/kg, so Peak SAR location are required for WIFI and WWAN antenna.
2. $SAR_{MAX.total}$=$SAR_{2.4G\ WFI\ Ant0}$ +$SAR_{2.4G\ WIFI\ Ant1}$=1.346W/kg +0.738W/kg =2.084W/kg.
   Thus $SAR_{MAX.total}$=2.084W/kg >1.6W/kg, so Peak SAR location are required for WIFI2.4G_Ant0 and WIFI2.4G_Ant1 antenna.

9.2 SIMULTANEOUS TRANSMISSION CONLCUSION

According to KDB447498 D01, When the sum of SAR is larger than 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 0.04 for all antenna pairs in the configuration to qualify for 1-g SAR test exclusion. When 10-g SAR applies, the ratio must be ≤ 0.10.
When SAR is measured for both antennas in the pair the peak location separation distance is computed by the following formula:

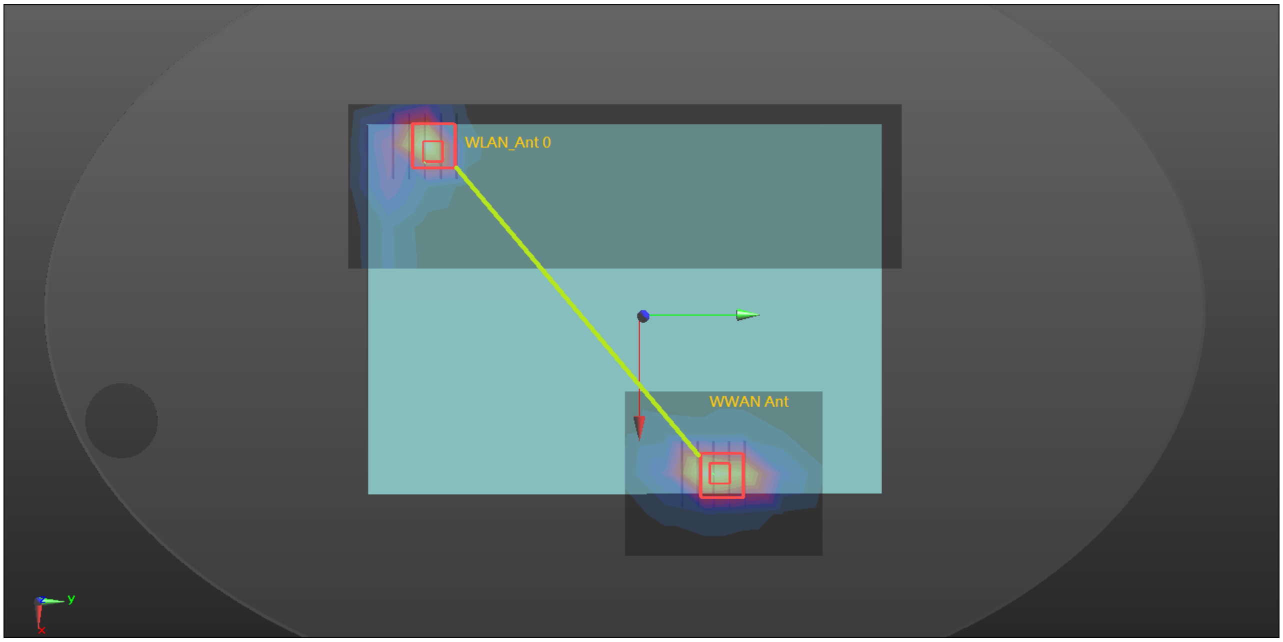
$$\text{Distance}_{Tx1\text{-}Tx2} = R_i = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2 + (z_1 - z_2)^2}$$

$$\text{SPLS Ratio} = (SAR_1 + SAR_2)^{1.5}/R_i$$

When standalone test exclusion applies, SAR is estimated; the peak location is assumed to be at the feed-point or geometric center of the antenna. Due to curvatures on the SAM phantom, when SAR is estimated for one of the antennas in an antenna pair, the measured peak SAR location should be translated onto the test device to determine the peak location separation for the antenna pair. The ERP location on the phantom is aligned with the ERP location on the handset, with 6mm separation in the z coordinate due to the ear spacer. A measured peak location can be translated onto the handset, with respect to the ERP location, by ignoring the 6 mm offset in the z coordinate. The assumed peak location of the antenna with estimated SAR can also be determined with respect to the ERP location on the handset. The peak location separation distance is estimated by the x and y coordinated of the peaks, referenced to the ERP location. While flat phantoms are not expected to have these issues, the same peak translation approach should be applied to determine peak location separation.

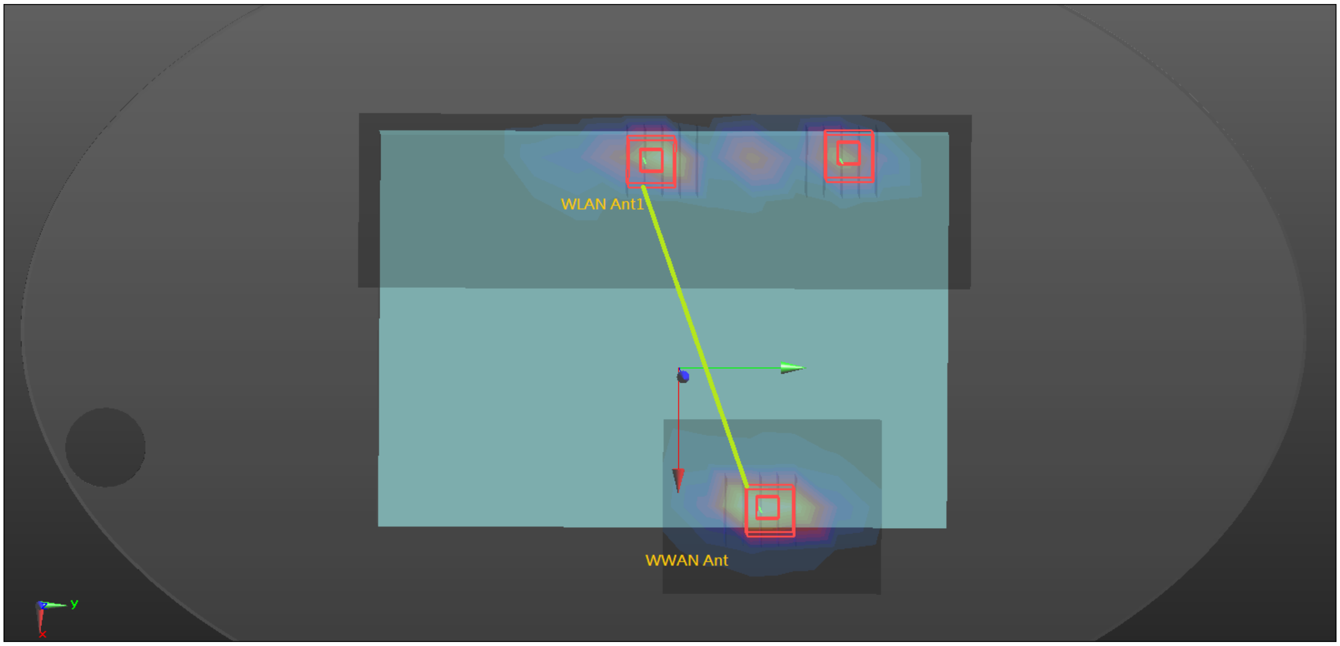
1） The sum of aggregate 1g SAR was above 1.6 W/kg for Rear Face configuration with UMTS B2 and WiFi2.4G_Ant0.

The Peak SAR location is as below:



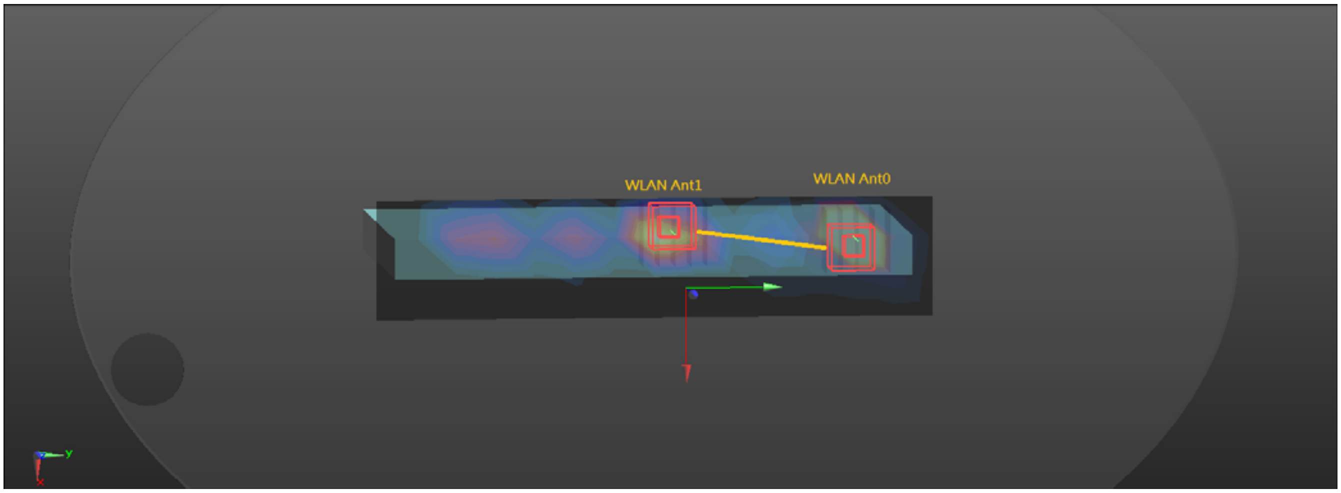
Mode	Reported SAR_{1g}	Peak SAR_{1g}	X	Y	Z	D(mm)	SPLSR	Ratio Limit	Simultaneous SAR
	mW/g	mW/g	m	m	m				
UMTS B2	1.012	0.91	80.00	47.20	-1.09	213049	0	0.04	NO
WiFi 2.4G_Ant0	0.826	0.81	-73.6	-100.4	2.28				

1） The sum of aggregate 1g SAR was above 1.6 W/kg for Rear Face configuration with UMTS B2 and WiFi2.4G_Ant1.
The Peak SAR location is as below:



Mode	Reported SAR_{1g}	Peak SAR_{1g}	X	Y	Z	D(mm)	SPLSR	Ratio Limit	Simultaneous SAR
	mW/g	mW/g	m	m	m				
UMTS B2	1.012	0.91	80.00	47.20	-1.09	167386	0	0.04	NO
WiFi 2.4G_Ant0	0.759	0.75	-78.40	-6.80	2.30				

1） The sum of aggregate 1g SAR was above 1.6 W/kg for Bottom Side configuration with WiFi 2.4G_Ant0 and WiFi2.4G_Ant1.
The Peak SAR location is as below:



Mode	Reported SAR_{1g}	Peak SAR_{1g}	X	Y	Z	D(mm)	SPLSR	Ratio Limit	Simultaneous SAR
	mW/g	mW/g	m	m	m				
WiFi 2.4G_Ant0	1.346	1.05	-6.8	100	2.66	95618.7	0	0.04	NO
WiFi 2.4G_Ant1	0.759	0.73	-15.6	4.8	1.09				

APPENDIX

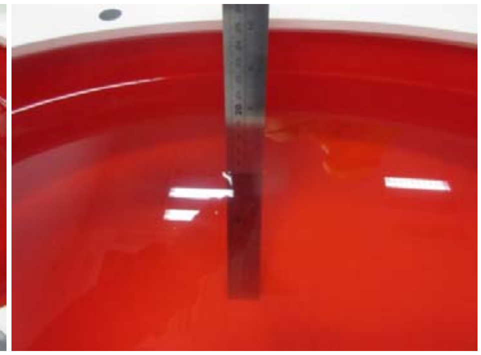
1. Test Layout

Specific Absorption Rate Test Layout

Liquid depth in the flat Phantom (≥15cm depth)

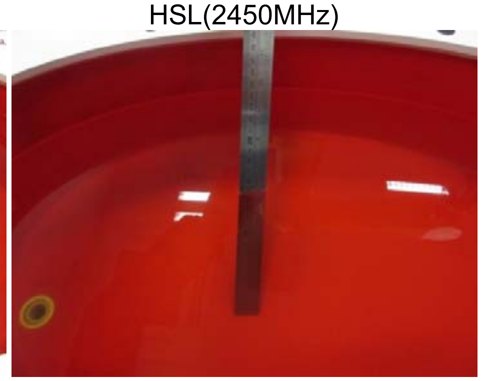
HSL(750MHz)

HSL(835MHz)



HSL(1750-1900MHz)

HSL(2450MHz)



HSL(5GHz)

Appendix A. SAR Plots of System Verification

(Pls See BTL-FCC SAR-1-1904T064_Appendix A.)

Appendix B. SAR Plots of SAR Measurement

(Pls See BTL-FCC SAR-1-1904T064_Appendix B.)

Appendix C. Calibration Certificate

(Pls See BTL-FCC SAR-1-1904T064_Appendix C.)

Appendix D. Photographs of the Test Set-Up

(Pls See BTL-FCC SAR-1-1904T064_Appendix D.)

End of Test Report