FCC SAR Test Report

Report No.	:	**W7L-P21090022SA01**
Applicant	:	**PAX Technology Limited**
Address	:	**Room 2416, 24/F., Sun Hung Kai Centre, 30 Harbour Hong Kong China**
Product	:	**Pay Tablet**
FCC ID	:	**V5PM8**
Brand	:	**PAX**
Model No.	:	**M8**
Standards	:	**FCC 47 CFR Part 2 (2.1093) / IEEE C95.1:1992 / IEEE 1528:2013** **KDB 865664 D01 v01r04 / KDB 865664 D02 v01r02 / KDB 248227 D01 v02r02** **KDB 447498 D01 v06 / KDB 616217 D04 v01r02 / KDB 941225 D01 v03r01** **KDB 941225 D05 v02r05**
Sample Received Date	:	**Sep. 18, 2021**
Date of Testing	:	**Sep. 22, 2021 ~ Sep. 30, 2021**
FCC Designation No.	:	**CN1171**

CERTIFICATION: The above equipment have been tested by **BV 7LAYERS COMMUNICATIONS TECHNOLOGY (SHENZHEN) CO. LTD.**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's SAR characteristics under the conditions specified in this report. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product certification, approval, or endorsement by A2LA or any government agencies.

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ACCREDITED
Certificate # 3939.01

Table of Contents

Release Control Record

Report No.	Reason for Change	Date Issued
W7L-P21090022SA01	Initial release	Oct. 23, 2021

1. Summary of Maximum SAR Value

Equipment Class	Mode	Highest Reported Body SAR_{1g} (0 cm Gap) (W/kg)
PCB	WCDMA II	1.17
	WCDMA IV	1.02
	WCDMA V	1.16
	LTE 2	1.18
	LTE 4	1.09
	LTE 5	1.09
	LTE 12	1.11
	LTE 13	0.79
	LTE 17	N/A
DTS	2.4G WLAN	0.95
NII	5.2G WLAN	1.34
	5.3G WLAN	1.32
	5.6G WLAN	0.67
	5.8G WLAN	0.88
DSS	Bluetooth	0.21
Highest Simultaneous Transmission SAR		1.59

Note:

1. The SAR limit **(Head & Body: SAR_{1g} 1.6 W/kg, Extremity: SAR_{10g} 4.0 W/kg)** for general population / uncontrolled exposure is specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992.

2. Description of Equipment Under Test

EUT Type	Pay Tablet
FCC ID	V5PM8
Brand Name	PAX
Model Name	M8
HW Version	M8-XXX-XXX-XXXX
SW Version	V0.0.0.1
Tx Frequency Bands (Unit: MHz)	WCDMA Band II : 1852.4 ~ 1907.6 WCDMA Band IV : 1712.4 ~ 1752.6 WCDMA Band V : 826.4 ~ 846.6 LTE Band 2 : 1850.7 ~ 1909.3 (1.4M), 1851.5 ~ 1908.5 (3M), 1852.5 ~ 1907.5 (5M), 1855 ~ 1905 (10M), 1857.5 ~ 1902.5 (15M), 1860 ~ 1900 (20M) LTE Band 4 : 1710.7 ~ 1754.3 (1.4M), 1711.5 ~ 1753.5 (3M), 1712.5 ~ 1752.5 (5M), 1715 ~ 1750 (10M), 1717.5 ~ 1747.5 (15M), 1720 ~ 1745 (20M) LTE Band 5 : 824.7 ~ 848.3 (1.4M), 825.5 ~ 847.5 (3M), 826.5 ~ 846.5 (5M), 829 ~ 844 (10M) LTE Band 12 : 699.7 ~ 715.3 (1.4M), 700.5 ~ 714.5 (3M), 701.5 ~ 713.5 (5M), 704 ~ 711 (10M) LTE Band 13 : 779.5 ~ 784.5 (5M), 782 (10M) LTE Band 17 : 706.5 ~ 713.5 (5M), 709 ~ 711 (10M) WLAN : 2412 ~ 2462, 5180 ~ 5240, 5260 ~ 5320, 5500 ~ 5720, 5745 ~ 5825 Bluetooth : 2402 ~ 2480
Uplink Modulations	WCDMA : QPSK LTE : QPSK, 16QAM 802.11b : DSSS 802.11a/g/n/ac : OFDM Bluetooth : GFSK, π/4-DQPSK, 8-DPSK
Maximum Tune-up Conducted Power (Unit: dBm)	Please refer to section 4.5.1of this report.
Antenna Type	WLAN / BT: PIFA Antenna WWAN: Fixed Internal Antenna
EUT Stage	Identical Prototype

Note:

1. The above EUT information is declared by manufacturer and for more detailed features description please refers to the manufacturer's specifications or User's Manual.
2. This device supports both LTE B17 and B12.Since the supported frequency span for LTE B17 falls completely within the B12 , they have the same target power, and share the same transmission path, therefore SAR was only assessed for LTE B12.

3. SAR Measurement System

3.1 Definition of Specific Absorption Rate (SAR)

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

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

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

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

SAR measurement can be related to the electrical field in the tissue by

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

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

3.2 SPEAG DASY System

DASY system consists of high precision robot, probe alignment sensor, phantom, robot controller, controlled measurement server and near-field probe. The robot includes six axes that can move to the precision position of the DASY5 software defined. The DASY software can define the area that is detected by the probe. The robot is connected to controlled box. Controlled measurement server is connected to the controlled robot box. The DAE includes amplifier, signal multiplexing, AD converter, offset measurement and surface detection. It is connected to the Electro-optical coupler (ECO). The ECO performs the conversion form the optical into digital electric signal of the DAE and transfers data to the PC.

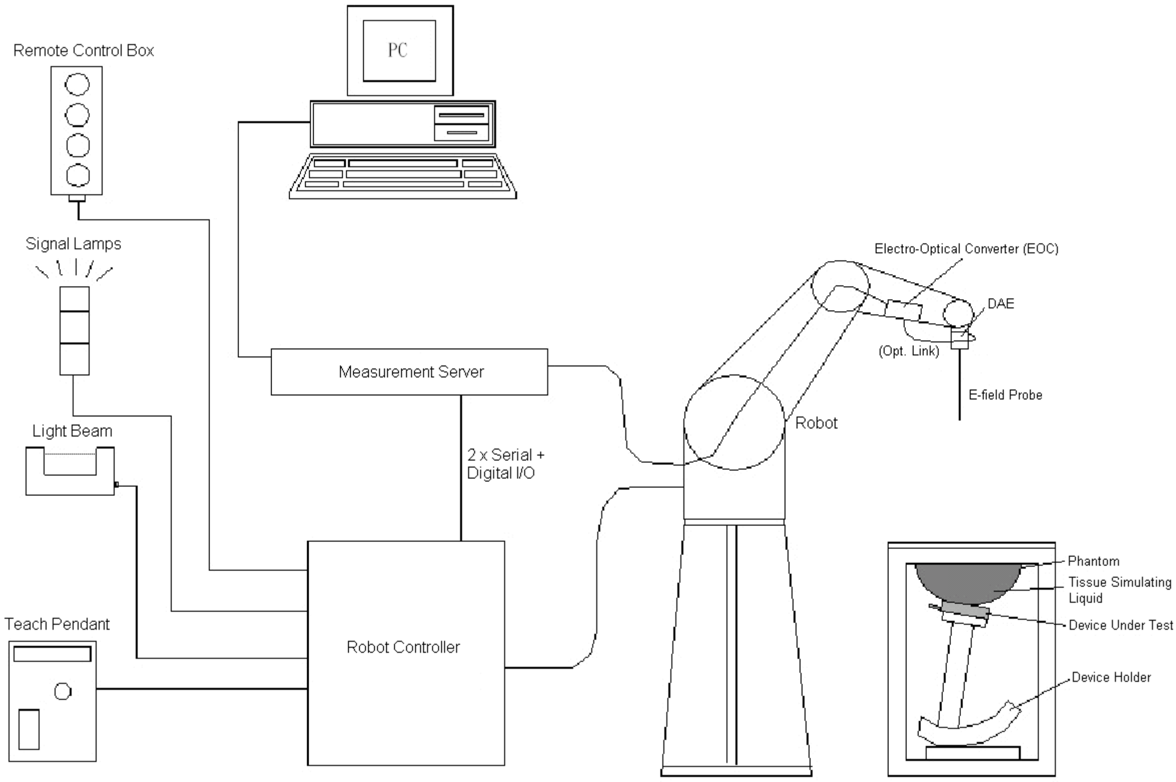


Fig-3.1 DASY System Setup

3.2.1 Robot

The DASY system uses the high precision robots from Stäubli SA (France). For the 6-axis controller system, the robot controller version (DASY5: CS8c) from Stäubli is used. The Stäubli robot series have many features that are important for our application:

- High precision (repeatability ±0.035 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)

Fig-3.2 DASY5

3.2.2 Probes

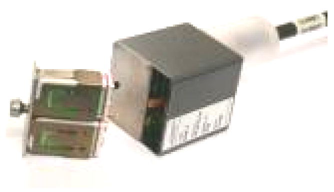
The SAR measurement is conducted with the dosimetric probe. The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency.

Model	EX3DV4
Construction	Symmetrical design with triangular core. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE).
Frequency	10 MHz to 6 GHz Linearity: ± 0.2 dB
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: ± 0.2 dB (noise: typically < 1 µW/g)
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm

Model	ES3DV3
Construction	Symmetrical design with triangular core. Interleaved sensors. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE).
Frequency	10 MHz to 4 GHz Linearity: ± 0.2 dB
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.3 dB in tissue material (rotation normal to probe axis)
Dynamic Range	5 µW/g to 100 mW/g Linearity: ± 0.2 dB
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 3.9 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.0 mm

3.2.3 Data Acquisition Electronics (DAE)

Model	DAE3, DAE4
Construction	Signal amplifier, multiplexer, A/D converter and control logic. Serial optical link for communication with DASY embedded system (fully remote controlled). Two step probe touch detector for mechanical surface detection and emergency robot stop.
Measurement Range	-100 to +300 mV (16 bit resolution and two range settings: 4mV, 400mV)
Input Offset Voltage	< 5µV (with auto zero)
Input Bias Current	< 50 fA
Dimensions	60 x 60 x 68 mm



3.2.4 Phantoms

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.
Material	Vinylester, glass fiber reinforced (VE-GF)
Shell Thickness	2 ± 0.2 mm (6 ± 0.2 mm at ear point)
Dimensions	Length: 1000 mm Width: 500 mm Height: adjustable feet
Filling Volume	approx. 25 liters

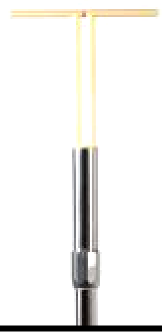
Model	ELI
Construction	Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated 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.
Material	Vinylester, glass fiber reinforced (VE-GF)
Shell Thickness	2.0 ± 0.2 mm (bottom plate)
Dimensions	Major axis: 600 mm Minor axis: 400 mm
Filling Volume	approx. 30 liters

3.2.5 Device Holder

Model	Mounting Device	
Construction	In combination with the Twin SAM Phantom or ELI4, the Mounting Device enables the rotation of the mounted transmitter device in spherical coordinates. Rotation point is the ear opening point. Transmitter devices can be easily and accurately positioned according to IEC, IEEE, FCC or other specifications. The device holder can be locked for positioning at different phantom sections (left head, right head, flat).	
Material	POM	

Model	Laptop Extensions Kit	
Construction	Simple but effective and easy-to-use extension for Mounting Device that facilitates the testing of larger devices according to IEC 62209-2 (e.g., laptops, cameras, etc.). It is lightweight and fits easily on the upper part of the Mounting Device in place of the phone positioner.	
Material	POM, Acrylic glass, Foam	

3.2.6 System Validation Dipoles

Model	D-Serial	
Construction	Symmetrical dipole with l/4 balun. Enables measurement of feed point impedance with NWA. Matched for use near flat phantoms filled with tissue simulating solutions.	
Frequency	750 MHz to 5800 MHz	
Return Loss	> 20 dB	
Power Capability	> 100 W (f < 1GHz), > 40 W (f > 1GHz)	

3.2.7 Tissue Simulating Liquids

For SAR measurement of the field distribution inside the phantom, the phantom must be filled with homogeneous tissue simulating liquid to a depth of at least 15 cm. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm. The nominal dielectric values of the tissue simulating liquids in the phantom and the tolerance of 5% are listed in Table-3.1.

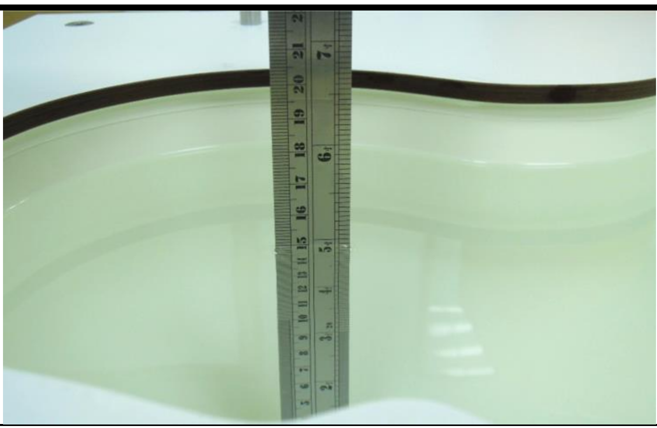
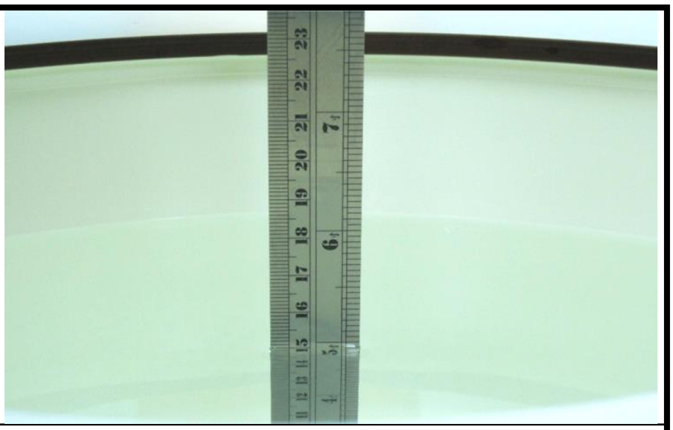
	

Photo of Liquid Height for Head Position	**Photo of Liquid Height for Body Position**

The dielectric properties of the head tissue simulating liquids are defined in IEEE 1528, and KDB 865664 D01 Appendix A. For the body tissue simulating liquids, the dielectric properties are defined in KDB 865664 D01 Appendix A. The dielectric properties of the tissue simulating liquids were verified prior to the SAR evaluation using a dielectric assessment kit and a network analyzer.

Table-3.1 Targets of Tissue Simulating Liquid

Frequency (MHz)	Target Permittivity	Range of ±5%	Target Conductivity	Range of ±5%
For Head				
750	41.9	39.8 ~ 44.0	0.89	0.85 ~ 0.93
835	41.5	39.4 ~ 43.6	0.90	0.86 ~ 0.95
900	41.5	39.4 ~ 43.6	0.97	0.92 ~ 1.02
1450	40.5	38.5 ~ 42.5	1.20	1.14 ~ 1.26
1640	40.3	38.3 ~ 42.3	1.29	1.23 ~ 1.35
1750	40.1	38.1 ~ 42.1	1.37	1.30 ~ 1.44
1800	40.0	38.0 ~ 42.0	1.40	1.33 ~ 1.47
1900	40.0	38.0 ~ 42.0	1.40	1.33 ~ 1.47
2000	40.0	38.0 ~ 42.0	1.40	1.33 ~ 1.47
2300	39.5	37.5 ~ 41.5	1.67	1.59 ~ 1.75
2450	39.2	37.2 ~ 41.2	1.80	1.71 ~ 1.89
2600	39.0	37.1 ~ 41.0	1.96	1.86 ~ 2.06
3500	37.9	36.0 ~ 39.8	2.91	2.76 ~ 3.06
5200	36.0	34.2 ~ 37.8	4.66	4.43 ~ 4.89
5300	35.9	34.1 ~ 37.7	4.76	4.52 ~ 5.00
5500	35.6	33.8 ~ 37.4	4.96	4.71 ~ 5.21
5600	35.5	33.7 ~ 37.3	5.07	4.82 ~ 5.32
5800	35.3	33.5 ~ 37.1	5.27	5.01 ~ 5.53

The following table gives the recipes for tissue simulating liquids.

Table-3.2 Recipes of Tissue Simulating Liquid

Tissue Type	Bactericide	DGBE	HEC	NaCl	Sucrose	Triton X-100	Water	Diethylene Glycol Mono-hexylether
H750	0.2	-	0.2	1.5	56.0	-	42.1	-
H835	0.2	-	0.2	1.5	57.0	-	41.1	-
H900	0.2	-	0.2	1.4	58.0	-	40.2	-
H1450	-	43.3	-	0.6	-	-	56.1	-
H1640	-	45.8	-	0.5	-	-	53.7	-
H1750	-	47.0	-	0.4	-	-	52.6	-
H1800	-	44.5	-	0.3	-	-	55.2	-
H1900	-	44.5	-	0.2	-	-	55.3	-
H2000	-	44.5	-	0.1	-	-	55.4	-
H2300	-	44.9	-	0.1	-	-	55.0	-
H2450	-	45.0	-	0.1	-	-	54.9	-
H2600	-	45.1	-	0.1	-	-	54.8	-
H3500	-	8.0	-	0.2	-	20.0	71.8	-
H5G	-	-	-	-	-	17.2	65.5	17.3

3.3 SAR System Verification

The system check verifies that the system operates within its specifications. It is performed daily or before every SAR measurement. The system check uses normal SAR measurements in the flat section of the phantom with a matched dipole at a specified distance. The system verification setup is shown as below.

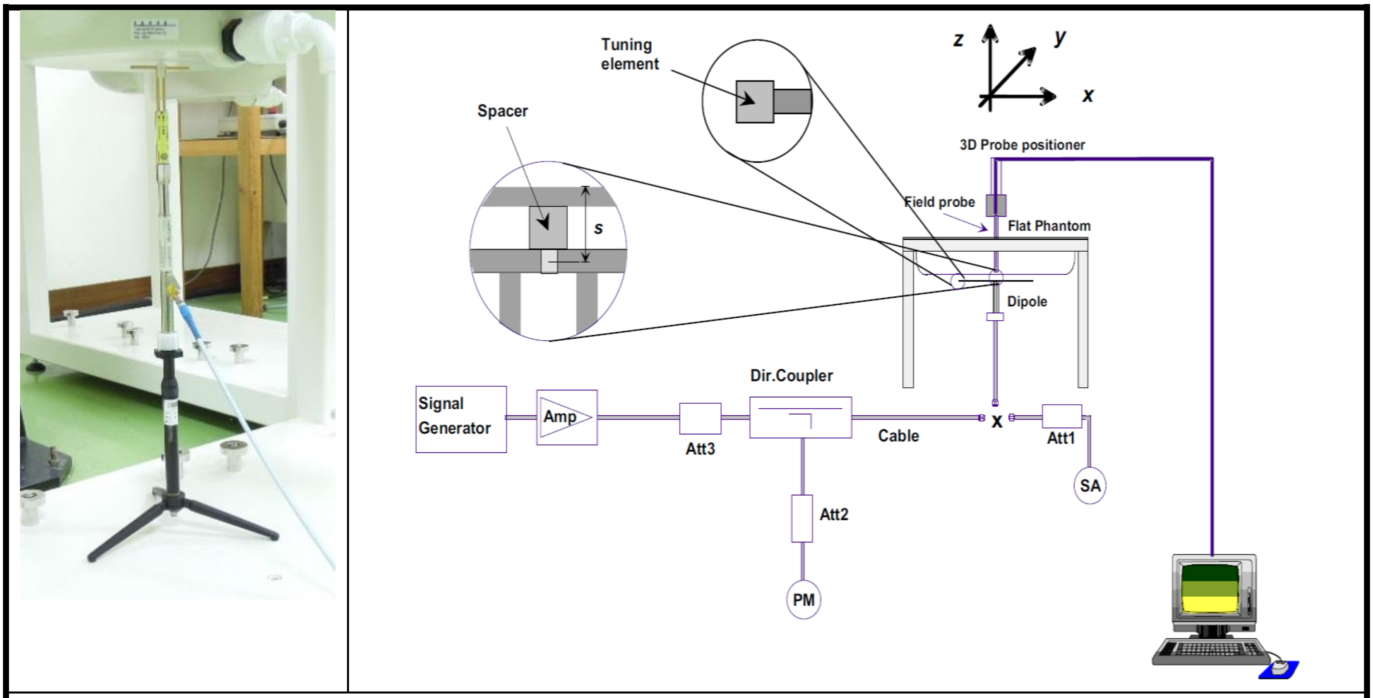


Fig-3.4 System Verification Setup

The validation dipole is placed beneath the flat phantom with the specific spacer in place. The distance spacer is touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The spectrum analyzer measures the forward power at the location of the system check dipole connector. The signal generator is adjusted for the desired forward power (250 mW is used for 700 MHz to 3 GHz, 100 mW is used for 3.5 GHz to 6 GHz) at the dipole connector and the power meter is read at that level. After connecting the cable to the dipole, the signal generator is readjusted for the same reading at power meter.

After system check testing, the SAR result will be normalized to 1W forward input power and compared with the reference SAR value derived from validation dipole certificate report. The deviation of system check should be within 10 %.

3.4 SAR Measurement Procedure

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

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

The SAR measurement procedures for each of test conditions are as follows:

(a) Make EUT to transmit maximum output power
(b) Measure conducted output power through RF cable
(c) Place the EUT in the specific position of phantom
(d) Perform SAR testing steps on the DASY system
(e) Record the SAR value

3.4.1 Area & Zoom Scan Procedure

First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an Area Scan is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan is required. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR-distribution over 10 g. According to KDB 865664 D01, the resolution for Area and Zoom scan is specified in the table below.

Items	<= 2 GHz	2-3 GHz	3-4 GHz	4-5 GHz	5-6 GHz
Area Scan (Δx, Δy)	<= 15 mm	<= 12 mm	<= 12 mm	<= 10 mm	<= 10 mm
Zoom Scan (Δx, Δy)	<= 8 mm	<= 5 mm	<= 5 mm	<= 4 mm	<= 4 mm
Zoom Scan (Δz)	<= 5 mm	<= 5 mm	<= 4 mm	<= 3 mm	<= 2 mm
Zoom Scan Volume	>= 30 mm	>= 30 mm	>= 28 mm	>= 25 mm	>= 22 mm

Note:

When zoom scan is required and report SAR is <= 1.4 W/kg, the zoom scan resolution of Δx / Δy (2-3GHz: <= 8 mm, 3-4GHz: <= 7 mm, 4-6GHz: <= 5 mm) may be applied.

3.4.2 Volume Scan Procedure

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

3.4.3 Power Drift Monitoring

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

3.4.4 Spatial Peak SAR Evaluation

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

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

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

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

3.4.5 SAR Averaged Methods

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

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

4. SAR Measurement Evaluation

4.1 EUT Configuration and Setting

<Connections between EUT and System Simulator>

For WWAN SAR testing, the EUT was linked and controlled by base station emulator (Agilent E5515C is used for GSM/WCDMA/CDMA, and Anritsu MT8820C is used for LTE). Communication between the EUT and the emulator was established by air link. The distance between the EUT and the communicating antenna of the emulator is larger than 50 cm and the output power radiated from the emulator antenna is at least 30 dB smaller than the output power of EUT. The EUT was set from the emulator to radiate maximum output power during SAR testing.

<Considerations Related to WCDMA for Setup and Testing>

WCDMA Handsets Body-worn SAR

SAR for body-worn configurations is measured using a 12.2 kbps RMC with TPC bits configured to all “1’s”. The 3G SAR test reduction procedure is applied to other spreading codes and multiple $DPDCH_n$ configurations supported by the handset with 12.2 kbps RMC as the primary mode.

Handsets with Release 5 HSDPA

The 3G SAR test reduction procedure is applied to HSDPA body-worn configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for HSDPA using the HSDPA body SAR procedures in the “Release 5 HSDPA Data Devices”, for the highest reported SAR body-worn exposure configuration in 12.2 kbps RMC. Handsets with both HSDPA and HSUPA are tested according to Release 6 HSPA test procedures.

Handsets with Release 6 HSUPA

The 3G SAR test reduction procedure is applied to HSPA (HSUPA/HSDPA with RMC) body-worn configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for HSPA using the HSPA body SAR procedures in the “Release 6 HSPA Data Devices”, for the highest reported body-worn exposure SAR configuration in 12.2 kbps RMC. When VOIP is applicable for next to the ear head exposure in HSPA, the 3G SAR test reduction procedure is applied to HSPA with 12.2 kbps RMC as the primary mode; otherwise, the same HSPA configuration used for body-worn measurements is tested for next to the ear head exposure.

Release 5 HSDPA Data Devices

The 3G SAR test reduction procedure is applied to body SAR with 12.2 kbps RMC as the primary mode. Otherwise, body SAR for HSDPA is measured using an FRC with H-Set 1 in Sub-test 1 and a 12.2 kbps RMC configured in Test Loop Mode 1, for the highest reported SAR configuration in 12.2 kbps RMC without HSDPA. HSDPA is configured according to the applicable UE category of a test device. The number of HS-DSCH / HS-PDSCHs, HARQ processes, minimum inter-TTI interval, transport block sizes and RV coding sequence are defined by the H-set. To maintain a consistent test configuration and stable transmission conditions, QPSK is used in the H-set for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 4 ms and a CQI repetition factor of 2 to maintain a constant rate of active CQI slots. DPCCH and DPDCH gain factors (β_c, β_d), and HS-DPCCH power offset parameters (Δ_{ACK}, Δ_{NACK}, Δ_{CQI}) are set according to values indicated in below. The CQI value is determined by the UE category, transport block size, number of HS-PDSCHs and modulation used in the H-set.

Sub-test	β_c	β_d	β_d (SF)	β_c / β_d	β_{hs} (1)	CM (dB)(2)	MPR
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: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 8 ⇔ A_{hs} = β_{hs} / β_c = 30 / 15 ⇔ β_{hs} = 30 / 15 * β_c.
Note 2: CM = 1 for β_c / β_d = 12 / 15, β_{hs} / β_c = 24 / 15.
Note 3: For subtest 2 the β_c / β_d ratio of 12 / 15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 11 / 15 and β_d = 15 / 15.

Release 6 HSUPA Data Devices

The 3G SAR test reduction procedure is applied to body SAR with 12.2 kbps RMC as the primary mode. Otherwise, body SAR for HSPA is measured with E-DCH Sub-test 5, using H-Set 1 and QPSK for FRC and a 12.2 kbps RMC configured in Test Loop Mode 1 and power control algorithm 2, according to the highest reported body SAR configuration in 12.2 kbps RMC without HSPA. When VOIP applies to head exposure, the 3G SAR test reduction procedure is applied with 12.2 kbps RMC as the primary mode. Otherwise, the same HSPA configuration used for body SAR measurements are applied to head exposure testing. Due to inner loop power control requirements in HSPA, a communication test set is required for output power and SAR tests. The 12.2 kbps RMC, FRC H-set 1 and E-DCH configurations for HSPA are configured according to the β values indicated in below.

Sub-test	β_c	β_d	β_d (SF)	β_c / β_d	β_{hs} (1)	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM (2) (dB)	MPR (dB)	AG (4) Index	E-TFCI
1	11 / 15 (3)	15 / 15 (3)	64	11 / 15 (3)	22 / 15	209 / 225	1039 / 225	4	1	1.0	0.0	20	75
2	6 / 15	15 / 15	64	6 / 15	12 / 15	12 / 15	94 / 75	4	1	3.0	2.0	12	67
3	15 / 15	9 / 15	64	15 / 9	30 / 15	30 / 15	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} = β_{hs} / β_c = 30 / 15 ⇔ β_{hs} = 30 / 15 * β_c.
Note 2: CM = 1 for β_c / β_d = 12 / 15, β_{hs} / β_c = 24 / 15. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.
Note 3: For subtest 1 the β_c / β_d ratio of 11 / 15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 10 / 15 and β_d = 15 / 15.
Note 4: For subtest 5 the β_c / β_d ratio of 15 / 15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 14 / 15 and β_d = 15 / 15.
Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g.
Note 6: β_{ed} cannot be set directly; it is set by Absolute Grant Value.

<Considerations Related to LTE for Setup and Testing>

This device contains LTE transmitter which follows 3GPP standards, is category 4, supports both QPSK and 16QAM modulations, and supported LTE band and channel bandwidth is listed in below. The output power was tested per 3GPP TS 36.521-1 maximum transmit procedures for both QPSK and 16QAM modulation. The results please refer to section 4.6 of this report.

EUT Supported LTE Band and Channel Bandwidth						
LTE Band	BW 1.4 MHz	BW 3 MHz	BW 5 MHz	BW 10 MHz	BW 15 MHz	BW 20 MHz
2	V	V	V	V	V	V
4	V	V	V	V	V	V
5	V	V	V	V		
12	V	V	V	V		
13			V	V		
17			V	V		

The LTE maximum power reduction (MPR) in accordance with 3GPP TS 36.101 is active all times during LTE operation. The allowed MPR for the maximum output power is specified in below.

Modulation	Channel Bandwidth / RB Configurations						LTE MPR Setting (dB)
	BW 1.4 MHz	BW 3 MHz	BW 5 MHz	BW 10 MHz	BW 15 MHz	BW 20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	1
16QAM	<= 5	<= 4	<= 8	<= 12	<= 16	<= 18	1
16QAM	> 5	> 4	> 8	> 12	> 16	> 18	2

Note: MPR is according to the standard and implemented in the circuit (mandatory).

In addition, the device is compliant with additional maximum power reduction (A-MPR) requirements defined in 3GPP TS 36.101 section 6.2.4 that was disabled for all FCC compliance testing.

During LTE SAR testing, the related parameters of operating band, channel bandwidth, uplink channel number, modulation type, and RB was set in base station simulator. When the EUT has registered and communicated to base station simulator, the simulator set to make EUT transmitting the maximum radiated power.

<Considerations Related to WLAN for Setup and Testing>

In general, various vendor specific external test software and chipset based internal test modes are typically used for SAR measurement. These chipset based test mode utilities are generally hardware and manufacturer dependent, and often include substantial flexibility to reconfigure or reprogram a device. A Wi-Fi device must be configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools for SAR measurement. The test frequencies established using test mode must correspond to the actual channel frequencies. When 802.11 frame gaps are accounted for in the transmission, a maximum transmission duty factor of 92 - 96% is typically achievable in most test mode configurations. A minimum transmission duty factor of 85% is required to avoid certain hardware and device implementation issues related to wide range SAR scaling. In addition, a periodic transmission duty factor is required for current generation SAR systems to measure SAR correctly. The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

According to KDB 248227 D01, this device has installed WLAN engineering testing software which can provide continuous transmitting RF signal. During WLAN SAR testing, this device was operated to transmit continuously at the maximum transmission duty with specified transmission mode, operating frequency, lowest data rate, and maximum output power.

Initial Test Configuration

An initial test configuration is determined for OFDM transmission modes in 2.4 GHz and 5 GHz bands according to the channel bandwidth, modulation and data rate combination(s) with the highest maximum output power specified for production units in each standalone and aggregated frequency band. When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band.

Subsequent Test Configuration

SAR measurement requirements for the remaining 802.11 transmission mode configurations that have not been tested in the initial test configuration are determined separately for each standalone and aggregated frequency band, in each exposure condition, according to the maximum output power specified for production units. Additional power measurements may be required to determine if SAR measurements are required for subsequent highest output power channels in a subsequent test configuration. When the highest reported SAR for the initial test configuration according to the initial test position or fixed exposure position requirements, is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for that subsequent test configuration.

SAR Test Configuration and Channel Selection

When multiple channel bandwidth configurations in a frequency band have the same specified maximum output power, the initial test configuration is using largest channel bandwidth, lowest order modulation, lowest data rate, and lowest order 802.11 mode (i.e., 802.11a is chosen over 802.11n then 802.11ac or 802.11g is chosen over 802.11n). After an initial test configuration is determined, if multiple test channels have the same measured maximum output power, the channel chosen for SAR measurement is determined according to the following.

1) The channel closest to mid-band frequency is selected for SAR measurement.

2) For channels with equal separation from mid-band frequency; for example, high and low channels or two mid-band channels, the higher frequency (number) channel is selected for SAR measurement.

Test Reduction for U-NII-1 (5.2 GHz) and U-NII-2A (5.3 GHz) Bands

For devices that operate in both U-NII bands using the same transmitter and antenna(s), SAR test reduction is determined according to the following.

1) When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition).

2) When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration.

<Considerations Related to Bluetooth for Setup and Testing>

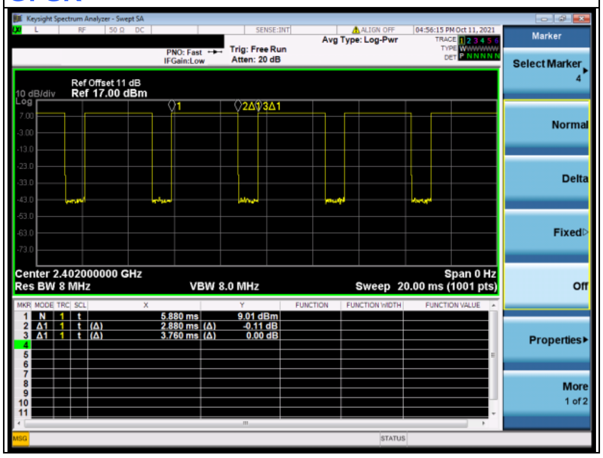
This device has installed Bluetooth engineering testing software which can provide continuous transmitting RF signal. During Bluetooth SAR testing, this device was operated to transmit continuously at the maximum transmission duty with specified transmission mode, operating frequency, lowest data rate, and maximum output power.

<Duty Cycle of Test Signal>

BT

GFSK: Duty cycle = 2.88 / 3.76=0.7659

GFSK



4.2 EUT Testing Position

4.2.1 Body Exposure Conditions

For full-size tablet, according to KDB 616217 D04, SAR evaluation is required for back surface and edges of the devices. The back surface and edges of the tablet are tested with the tablet touching the phantom. Exposures from antennas through the front surface of the display section of a tablet are generally limited to the user's hands. Exposures to hands for typical consumer transmitters used in tablets are not expected to exceed the extremity SAR limit; therefore, SAR evaluation for the front surface of tablet display screens are generally not necessary. When voice mode is supported on a tablet and it is limited to speaker mode or headset operations only, additional SAR testing for this type of voice use is not required.

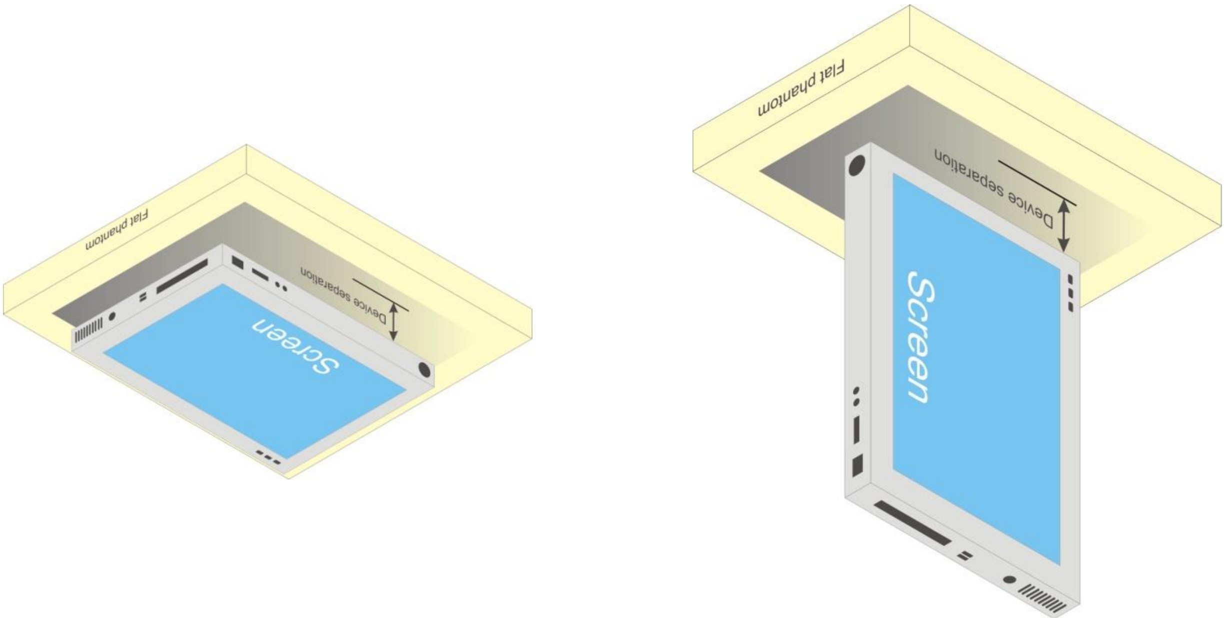


Fig-4.1 Illustration for Tablet Setup

4.2.2 SAR Test Exclusion Evaluations

According to KDB 447498 D01, the SAR test exclusion condition is based on source-based time-averaged maximum conducted output power, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions. The SAR exclusion threshold is determined by the following formula.

1. For the test separation distance <= 50 mm

$$\frac{\textbf{Max. Tune up Power}_{(mW)}}{\textbf{Min. Test Separation Distance}_{(mm)}} \times \sqrt{f_{(GHz)}} \leq \textbf{3.0 for SAR-1g}, \leq \textbf{7.5 for SAR-10g}$$

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

2. For the test separation distance > 50 mm, and the frequency at 100 MHz to 1500 MHz

$$\left[(\text{Threshold at 50 mm in Step 1}) + (\text{Test Separation Distance} - 50\text{ mm}) \times \left(\frac{f_{(MHz)}}{150}\right)\right]_{(mW)}$$

3. For the test separation distance > 50 mm, and the frequency at > 1500 MHz to 6 GHz

$$[(\text{Threshold at 50 mm in Step 1}) + (\text{Test Separation Distance} - 50\text{ mm}) \times 10]_{(mW)}$$

Exposure Position	Wireless Interface	WCDMA Band V	WCDMA Band IV	WCDMA Band II	LTE Band 12	LTE Band 17	LTE Band 13	LTE Band 5	LTE Band 4	LTE Band 2
Exposure Position	Calculated Frequency	846MHz	1750MHz	1907MHz	715MHz	713MHz	784MHz	848MHz	1754MHz	1909MHz
	Maximum power (dBm)	22.50	22.5	22.5	24	24	22.5	22.5	22.5	22.5
	Maximum rated power(mW)	178.0	178.0	178.0	251.0	251.0	178.0	178.0	178.0	178.0
Rear Face	Separation distance(mm)	5.0								
	exclusion threshold	32.7	47.1	49.2	42.5	42.4	31.5	32.8	47.2	49.2
	Testing required?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Left Side	Separation distance(mm)	59.0								
	exclusion threshold	214.0	203.0	199.0	220.0	220.0	216.0	214.0	203.0	199.0
	Testing required?	**No**	**No**	**No**	**Yes**	**Yes**	**No**	**No**	**No**	**No**
Right Side	Separation distance(mm)	51.1								
	exclusion threshold	169.0	124.0	120.0	183.0	183.0	175.0	169.0	124.0	120.0
	Testing required?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Top Side	Separation distance(mm)	205.0								
	exclusion threshold	1037.0	1663.0	1659.0	916.0	914.0	980.0	1039.0	1663.0	1659.0
	Testing required?	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**
Bottom Side	Separation distance(mm)	5.0								
	exclusion threshold	32.7	47.1	49.2	42.5	42.4	31.5	32.8	47.2	49.2
	Testing required?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**

Exposure Position	Wireless Interface	BT	2.4GHz WLAN	5GHz WLAN
	Calculated Frequency	2480MHz	2462MHz	5825MHz
	Maximum power (dBm)	9	16.5	15
	Maximum rated power(mW)	8.0	45.0	32.0
Rear Face	Separation distance(mm)	5.0		
	exclusion threshold	2.5	14.1	15.5
	Testing required?	**No**	**Yes**	**Yes**
Left Side	Separation distance(mm)	90.0		
	exclusion threshold	495.0	496.0	462.0
	Testing required?	**No**	**No**	**No**
Right Side	Separation distance(mm)	12.5		
	exclusion threshold	1.0	5.7	6.2
	Testing required?	**No**	**Yes**	**Yes**
Top Side	Separation distance(mm)	5.0		
	exclusion threshold	2.5	14.1	15.5
	Testing required?	**No**	**Yes**	**Yes**
Bottom Side	Separation distance(mm)	205.0		
	exclusion threshold	1645.0	1646.0	1612.0
	Testing required?	**No**	**No**	**No**

Note:

1. When separation distance <= 50 mm and the calculated result shown in above table is <= 3.0 for SAR-1g exposure condition, or <= 7.5 for SAR-10g exposure condition, the SAR testing exclusion is applied.
2. When separation distance > 50 mm and the device output power is less than the calculated result (power threshold, mW) shown in above table, the SAR testing exclusion is applied

4.2.3 Simultaneous Transmission Possibilities

The simultaneous transmission possibilities for this device are listed as below.

Simultaneous TX Combination	Capable Transmit Configurations	Body Exposure Condition
1	WWAN + WLAN2.4G	Yes
2	WWAN + WLAN5G	Yes
3	WWAN + BT	Yes
4	WLAN5G + BT	Yes
5	WWAN+WLAN5G + BT	Yes

Note :

1. The 2.4G WLAN and 5G WLAN cannot transmit simultaneously.
2. The 2.4G WLAN and BT cannot transmit simultaneously.

4.3 Tissue Verification

The measuring results for tissue simulating liquid are shown as below.

Test Date	Tissue Type	Frequency (MHz)	Liquid Temp. (℃)	Measured Conductivity (σ)	Measured Permittivity (ε_r)	Target Conductivity (σ)	Target Permittivity (ε_r)	Conductivity Deviation (%)	Permittivity Deviation (%)
Sep. 22, 2021	Head	750	22.5	0.876	41.326	0.89	41.90	-1.57	-1.37
Sep. 23, 2021	Head	835	22.4	0.903	41.498	0.90	41.50	0.33	0.00
Sep. 24, 2021	Head	1750	22.7	1.384	38.482	1.37	40.10	1.02	-4.03
Sep. 26, 2021	Head	1900	22.6	1.373	40.283	1.40	40.00	-1.93	0.71
Sep. 27, 2021	Head	2450	22.3	1.795	38.822	1.80	39.20	-0.28	-0.96
Sep. 28, 2021	Head	5250	22.5	4.741	36.265	4.71	35.90	0.66	1.02
Sep. 29, 2021	Head	5600	22.8	5.099	35.754	5.07	35.50	0.57	0.72
Sep. 30, 2021	Head	5800	22.4	5.313	35.464	5.27	35.30	0.82	0.46

Note:

The dielectric properties of the tissue simulating liquid must be measured within 24 hours before the SAR testing and within ±5% of the target values. Liquid temperature during the SAR testing must be within ±2 ℃.

4.4 System Verification

The measuring result for system verification is tabulated as below.

Test Date	Mode	Frequency (MHz)	1W Target SAR-1g (W/kg)	Measured SAR-1g (W/kg)	Normalized to 1W SAR-1g (W/kg)	Deviation (%)	Dipole S/N	Probe S/N	DAE S/N
Sep. 22, 2021	Head	835	8.58	2.00	8.00	-6.76	1078	7515	905
Sep. 23, 2021	Head	835	9.49	2.45	9.80	3.27	4d092	7515	905
Sep. 24, 2021	Head	1750	36.40	9.64	38.56	5.93	1111	7515	905
Sep. 26, 2021	Head	1900	40.10	9.97	39.88	-0.55	5d142	7515	905
Sep. 27, 2021	Head	2450	52.50	12.20	48.80	-7.05	735	7515	905
Sep. 28, 2021	Head	5250	78.50	8.46	84.60	7.77	1203	7515	905
Sep. 29, 2021	Head	5600	81.60	7.53	75.30	-7.72	1203	7515	905
Sep. 30, 2021	Head	5800	76.70	7.34	73.40	-4.30	1203	7515	905

Note:

Comparing to the reference SAR value provided by SPEAG, the validation data should be within its specification of 10 %. The result indicates the system check can meet the variation criterion and the plots can be referred to Appendix A of this report.

4.5 Maximum Output Power

4.5.1 Maximum Conducted Power

The maximum conducted average power (Unit: dBm) including tune-up tolerance is shown as below.

Mode	WCDMA Band II	WCDMA Band IV	WCDMA Band V
RMC 12.2K	22.5	22.5	22.5
HSDPA	21.5	21.5	21.5
HSUPA	21.5	21.5	21.5

Mode	LTE 2	LTE 4	LTE 5	LTE 12
QPSK / 16QAM	22.5 / 21.5	22.5 / 21.5	22.5 / 21.5	24.0 / 23.0

Mode	LTE 13	LTE 17
QPSK / 16QAM	22.5 / 21.5	24.0 / 23.0

Mode	2.4G WLAN	5.2G WLAN	5.3G WLAN	5.6G WLAN	5.8G WLAN
802.11b	16.5	N/A	N/A	N/A	N/A
802.11g	15.0	N/A	N/A	N/A	N/A
802.11a	N/A	14.5	14.5	15.0	15.0
802.11n HT20	15.0	14.5	14.5	15.0	15.0
802.11n HT40	14.0	14.0	14.0	14.0	14.0
802.11ac VHT20	N/A	14.5	14.5	14.5	15.0
802.11ac VHT40	N/A	14.0	14.0	14.0	14.0
802.11ac VHT80	N/A	13.0	13.0	13.0	13.0

Mode	2.4G Bluetooth
GFSK	9.0
π/4-DQPSK	6.5
8-DPSK	6.5
LE	-2.5

4.5.2 Measured Conducted Power Result

The measuring conducted average power (Unit: dBm) is shown as below.

Band	WCDMA Band II			WCDMA Band IV			WCDMA Band V			3GPP MPR (dB)
Channel	9262	9400	9538	1312	1413	1513	4132	4182	4233	
Frequency (MHz)	1852.4	1880.0	1907.6	1712.4	1732.6	1752.6	826.4	836.4	846.6	
RMC 12.2K	**21.94**	21.87	21.75	**21.78**	21.75	21.72	21.67	21.70	**21.79**	-
HSDPA Subtest-1	20.89	20.85	20.76	20.75	20.68	20.66	20.60	20.61	20.66	0
HSDPA Subtest-2	20.87	20.83	20.73	20.73	20.65	20.64	20..58	20.59	20.62	0
HSDPA Subtest-3	20.31	20.23	20.25	20.21	20.19	20.18	20.09	20.02	20.13	0.5
HSDPA Subtest-4	20.25	20.20	20.19	20.19	20.16	20.15	20.12	20.13	20.16	0.5
HSUPA Subtest-1	20.88	20.86	20.77	20.70	20.69	20.65	20.69	20.68	20.70	0
HSUPA Subtest-2	18.92	18.89	18.87	18.67	18.65	18.63	18.66	18.67	18.73	2
HSUPA Subtest-3	19.86	19.84	19.83	19.67	19.66	19.65	19.71	19.75	19.77	1
HSUPA Subtest-4	18.89	18.78	18.85	18.64	18.63	18.65	18.68	18.66	18.71	2
HSUPA Subtest-5	20.85	20.82	20.83	20.68	20.66	20.67	20.64	20.67	20.68	0

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low CH 18607	Mid CH 18900	High CH 19193		Low CH 18607	Mid CH 18900	High CH 19193	
			1850.7 MHz	1880.0 MHz	1909.3 MHz		1850.7 MHz	1880.0 MHz	1909.3 MHz	
2 / 1.4M	1	0	21.65	21.59	21.44	0	21.00	20.93	20.80	1
	1	2	21.95	21.86	21.77	0	21.29	21.15	21.14	1
	1	5	21.54	21.43	21.32	0	20.78	20.72	20.68	1
	3	0	21.72	21.64	21.64	0	20.79	20.65	20.62	1
	3	1	21.96	21.87	21.68	0	20.83	20.87	20.72	1
	3	3	21.71	21.62	21.59	0	20.79	20.68	20.66	1
	6	0	20.84	20.69	20.64	1	19.78	19.71	19.55	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low CH 18615	Mid CH 18900	High CH 19185		Low CH 18615	Mid CH 18900	High CH 19185	
			1851.5 MHz	1880.0 MHz	1908.5 MHz		1851.5 MHz	1880.0 MHz	1908.5 MHz	
2 / 3M	1	0	21.67	21.61	21.43	0	20.97	20.99	20.83	1
	1	7	21.91	21.87	21.77	0	21.26	21.18	21.12	1
	1	14	21.50	21.43	21.32	0	20.81	20.72	20.68	1
	8	0	20.71	20.67	20.64	1	19.75	19.66	19.62	2
	8	3	20.89	20.87	20.70	1	19.88	19.82	19.75	2
	8	7	20.68	20.69	20.63	1	19.81	19.66	19.62	2
	15	0	20.81	20.70	20.58	1	19.78	19.65	19.58	2

Band / BW	RB Size	RB Offset	QPSK Low CH 18625 1852.5 MHz	QPSK Mid CH 18900 1880.0 MHz	QPSK High CH 19175 1907.5 MHz	3GPP MPR (dB)	16QAM Low CH 18625 1852.5 MHz	16QAM Mid CH 18900 1880.0 MHz	16QAM High CH 19175 1907.5 MHz	3GPP MPR (dB)
2 / 5M	1	0	21.68	21.56	21.44	0	20.98	20.95	20.83	1
	1	12	21.96	21.84	21.77	0	21.23	21.21	21.11	1
	1	24	21.51	21.42	21.36	0	20.81	20.72	20.67	1
	12	0	20.74	20.67	20.61	1	19.75	19.64	19.59	2
	12	6	20.89	20.88	20.71	1	19.85	19.86	19.71	2
	12	13	20.72	20.65	20.64	1	19.76	19.68	19.65	2
	25	0	20.79	20.73	20.61	1	19.78	19.66	19.55	2

Band / BW	RB Size	RB Offset	QPSK Low CH 18650 1855.0 MHz	QPSK Mid CH 18900 1880.0 MHz	QPSK High CH 19150 1905.0 MHz	3GPP MPR (dB)	16QAM Low CH 18650 1855.0 MHz	16QAM Mid CH 18900 1880.0 MHz	16QAM High CH 19150 1905.0 MHz	3GPP MPR (dB)
2 / 10M	1	0	21.65	21.59	21.44	0	20.98	20.92	20.79	1
	1	24	21.96	21.84	21.78	0	21.28	21.17	21.14	1
	1	49	21.48	21.46	21.32	0	20.81	20.73	20.64	1
	25	0	20.75	20.66	20.64	1	19.77	19.62	19.65	2
	25	12	20.95	20.82	20.71	1	19.89	19.80	19.76	2
	25	25	20.70	20.62	20.63	1	19.75	19.69	19.62	2
	50	0	20.84	20.73	20.58	1	19.82	19.65	19.59	2

Band / BW	RB Size	RB Offset	QPSK Low CH 18675 1857.5 MHz	QPSK Mid CH 18900 1880.0 MHz	QPSK High CH 19125 1902.5 MHz	3GPP MPR (dB)	16QAM Low CH 18675 1857.5 MHz	16QAM Mid CH 18900 1880.0 MHz	16QAM High CH 19125 1902.5 MHz	3GPP MPR (dB)
2 / 15M	1	0	21.72	21.59	21.41	0	21.02	20.99	20.79	1
	1	37	21.94	21.89	21.73	0	21.27	21.18	21.14	1
	1	74	21.54	21.49	21.33	0	20.77	20.78	20.66	1
	36	0	20.72	20.67	20.65	1	19.81	19.62	19.66	2
	36	19	20.96	20.87	20.71	1	19.83	19.84	19.72	2
	36	39	20.68	20.63	20.63	1	19.80	19.67	19.65	2
	75	0	20.84	20.71	20.63	1	19.83	19.68	19.52	2

Band / BW	RB Size	RB Offset	QPSK Low CH 18700 1860.0 MHz	QPSK Mid CH 18900 1880.0 MHz	QPSK High CH 19100 1900.0 MHz	3GPP MPR (dB)	16QAM Low CH 18700 1860.0 MHz	16QAM Mid CH 18900 1880.0 MHz	16QAM High CH 19100 1900.0 MHz	3GPP MPR (dB)
2 / 20M	1	0	21.73	21.63	21.49	0	21.05	21.00	20.85	1
	1	50	**21.98**	21.92	21.79	0	21.31	21.23	21.16	1
	1	99	21.56	21.50	21.37	0	20.83	20.80	20.69	1
	50	0	20.78	20.72	20.66	1	19.83	19.70	19.67	2
	50	25	20.97	20.89	20.76	1	19.91	19.88	19.77	2
	50	50	20.76	20.70	20.65	1	19.83	19.73	19.67	2
	100	0	20.85	20.75	20.66	1	19.84	19.73	19.60	2

Band / BW	RB Size	RB Offset	QPSK Low CH 19957 1710.7 MHz	QPSK Mid CH 20175 1732.5 MHz	QPSK High CH 20393 1754.3 MHz	3GPP MPR (dB)	16QAM Low CH 19957 1710.7 MHz	16QAM Mid CH 20175 1732.5 MHz	16QAM High CH 20393 1754.3 MHz	3GPP MPR (dB)
4 / 1.4M	1	0	21.39	21.41	21.34	0	20.79	20.80	20.75	1
	1	2	21.69	21.68	21.67	0	21.06	21.00	21.07	1
	1	5	21.35	21.32	21.29	0	20.58	20.60	20.64	1
	3	0	21.62	21.62	21.70	0	20.77	20.71	20.76	1
	3	1	21.71	21.70	21.59	0	20.65	20.77	20.70	1
	3	3	21.63	21.62	21.67	0	20.73	20.70	20.76	1
	6	0	20.72	20.65	20.68	1	19.72	19.73	19.65	2

Band / BW	RB Size	RB Offset	QPSK Low CH 19965 1711.5 MHz	QPSK Mid CH 20175 1732.5 MHz	QPSK High CH 20385 1753.5 MHz	3GPP MPR (dB)	16QAM Low CH 19965 1711.5 MHz	16QAM Mid CH 20175 1732.5 MHz	16QAM High CH 20385 1753.5 MHz	3GPP MPR (dB)
4 / 3M	1	0	21.41	21.43	21.33	0	20.76	20.86	20.78	1
	1	7	21.65	21.69	21.67	0	21.03	21.03	21.05	1
	1	14	21.31	21.32	21.29	0	20.61	20.60	20.64	1
	8	0	20.61	20.65	20.70	1	19.73	19.72	19.76	2
	8	3	20.64	20.70	20.61	1	19.70	19.72	19.73	2
	8	7	20.60	20.69	20.71	1	19.75	19.68	19.72	2
	15	0	20.69	20.66	20.62	1	19.72	19.67	19.68	2

Band / BW	RB Size	RB Offset	QPSK Low CH 19975 1712.5 MHz	QPSK Mid CH 20175 1732.5 MHz	QPSK High CH 20375 1752.5 MHz	3GPP MPR (dB)	16QAM Low CH 19975 1712.5 MHz	16QAM Mid CH 20175 1732.5 MHz	16QAM High CH 20375 1752.5 MHz	3GPP MPR (dB)
4 / 5M	1	0	21.42	21.38	21.34	0	20.77	20.82	20.78	1
	1	12	21.70	21.66	21.67	0	21.00	21.06	21.04	1
	1	24	21.32	21.31	21.33	0	20.61	20.60	20.63	1
	12	0	20.64	20.65	20.67	1	19.73	19.70	19.73	2
	12	6	20.64	20.71	20.62	1	19.67	19.76	19.69	2
	12	13	20.64	20.65	20.72	1	19.70	19.70	19.75	2
	25	0	20.67	20.69	20.65	1	19.72	19.68	19.65	2

Band / BW	RB Size	RB Offset	QPSK Low CH 20000 1715.0 MHz	QPSK Mid CH 20175 1732.5 MHz	QPSK High CH 20350 1750.0 MHz	3GPP MPR (dB)	16QAM Low CH 20000 1715.0 MHz	16QAM Mid CH 20175 1732.5 MHz	16QAM High CH 20350 1750.0 MHz	3GPP MPR (dB)
4 / 10M	1	0	21.39	21.41	21.34	0	20.77	20.79	20.74	1
	1	24	21.70	21.66	21.68	0	21.05	21.02	21.07	1
	1	49	21.29	21.35	21.29	0	20.61	20.61	20.60	1
	25	0	20.65	20.64	20.70	1	19.75	19.68	19.79	2
	25	12	20.70	20.65	20.62	1	19.71	19.70	19.74	2
	25	25	20.62	20.62	20.71	1	19.69	19.71	19.72	2
	50	0	20.72	20.69	20.62	1	19.76	19.67	19.69	2

Band / BW	RB Size	RB Offset	QPSK Low CH 20025 1717.5 MHz	QPSK Mid CH 20175 1732.5 MHz	QPSK High CH 20325 1747.5 MHz	3GPP MPR (dB)	16QAM Low CH 20025 1717.5 MHz	16QAM Mid CH 20175 1732.5 MHz	16QAM High CH 20325 1747.5 MHz	3GPP MPR (dB)
4 / 15M	1	0	21.46	21.41	21.31	0	20.81	20.86	20.74	1
	1	37	21.68	21.71	21.63	0	21.04	21.03	21.07	1
	1	74	21.35	21.38	21.30	0	20.57	20.66	20.62	1
	36	0	20.62	20.65	20.71	1	19.79	19.68	19.80	2
	36	19	20.71	20.70	20.62	1	19.65	19.74	19.70	2
	36	39	20.60	20.63	20.71	1	19.74	19.69	19.75	2
	75	0	20.72	20.67	20.67	1	19.77	19.70	19.62	2

Band / BW	RB Size	RB Offset	QPSK Low CH 20050 1720.0 MHz	QPSK Mid CH 20175 1732.5 MHz	QPSK High CH 20300 1745.0 MHz	3GPP MPR (dB)	16QAM Low CH 20050 1720.0 MHz	16QAM Mid CH 20175 1732.5 MHz	16QAM High CH 20300 1745.0 MHz	3GPP MPR (dB)
4 / 20M	1	0	21.47	21.45	21.39	0	20.84	20.87	20.80	1
	1	50	21.72	**21.74**	21.69	0	21.08	21.08	21.09	1
	1	99	21.37	21.39	21.34	0	20.63	20.68	20.65	1
	50	0	20.68	20.70	20.72	1	19.81	19.76	19.81	2
	50	25	20.72	20.75	20.67	1	19.73	19.78	19.75	2
	50	50	20.68	20.70	20.73	1	19.77	19.75	19.77	2
	100	0	20.73	20.74	20.70	1	19.78	19.75	19.70	2

Band / BW	RB Size	RB Offset	QPSK Low CH 20407 824.7 MHz	QPSK Mid CH 20525 836.5 MHz	QPSK High CH 20643 848.3 MHz	3GPP MPR (dB)	16QAM Low CH 20407 824.7 MHz	16QAM Mid CH 20525 836.5 MHz	16QAM High CH 20643 848.3 MHz	3GPP MPR (dB)
5 / 1.4M	1	0	21.53	21.56	21.54	0	20.81	20.82	20.84	1
	1	2	21.70	21.62	21.69	0	20.92	20.93	20.93	1
	1	5	21.62	21.55	21.61	0	20.85	20.77	20.87	1
	3	0	21.63	21.61	21.64	0	20.65	20.67	20.62	1
	3	1	21.63	21.70	21.57	0	20.64	20.76	20.65	1
	3	3	21.60	21.57	21.60	0	20.58	20.60	20.64	1
	6	0	20.64	20.64	20.62	1	19.64	19.68	19.64	2

Band / BW	RB Size	RB Offset	QPSK Low CH 20415 825.5 MHz	QPSK Mid CH 20525 836.5 MHz	QPSK High CH 20635 847.5 MHz	3GPP MPR (dB)	16QAM Low CH 20415 825.5 MHz	16QAM Mid CH 20525 836.5 MHz	16QAM High CH 20635 847.5 MHz	3GPP MPR (dB)
5 / 3M	1	0	21.55	21.58	21.53	0	20.78	20.88	20.87	1
	1	7	21.66	21.63	21.69	0	20.89	20.96	20.91	1
	1	14	21.58	21.55	21.61	0	20.88	20.77	20.87	1
	8	0	20.62	20.64	20.64	1	19.61	19.68	19.62	2
	8	3	20.56	20.70	20.59	1	19.69	19.71	19.68	2
	8	7	20.57	20.64	20.64	1	19.60	19.58	19.60	2
	15	0	20.61	20.65	20.56	1	19.64	19.62	19.67	2

Band / BW	RB Size	RB Offset	QPSK Low CH 20425 826.5 MHz	QPSK Mid CH 20525 836.5 MHz	QPSK High CH 20625 846.5 MHz	3GPP MPR (dB)	16QAM Low CH 20425 826.5 MHz	16QAM Mid CH 20525 836.5 MHz	16QAM High CH 20625 846.5 MHz	3GPP MPR (dB)
5 / 5M	1	0	21.56	21.53	21.54	0	20.79	20.84	20.87	1
	1	12	21.71	21.60	21.69	0	20.86	20.99	20.90	1
	1	24	21.59	21.54	21.65	0	20.88	20.77	20.86	1
	12	0	20.65	20.64	20.61	1	19.61	19.66	19.59	2
	12	6	20.56	20.71	20.60	1	19.66	19.75	19.64	2
	12	13	20.61	20.60	20.65	1	19.55	19.60	19.63	2
	25	0	20.59	20.68	20.59	1	19.64	19.63	19.64	2

Band / BW	RB Size	RB Offset	QPSK Low CH 20450 829.0 MHz	QPSK Mid CH 20525 836.5 MHz	QPSK High CH 20600 844.0 MHz	3GPP MPR (dB)	16QAM Low CH 20450 829.0 MHz	16QAM Mid CH 20525 836.5 MHz	16QAM High CH 20600 844.0 MHz	3GPP MPR (dB)
5 / 10M	1	0	21.61	21.60	21.59	0	20.86	20.89	20.89	1
	1	24	**21.73**	21.68	21.71	0	20.94	21.01	20.95	1
	1	49	21.64	21.62	21.66	0	20.90	20.85	20.88	1
	25	0	20.69	20.68	20.66	1	19.69	19.72	19.67	2
	25	12	20.72	20.64	20.65	1	19.72	19.77	19.70	2
	25	25	20.65	20.65	20.66	1	19.62	19.65	19.65	2
	50	0	20.70	20.60	20.64	1	19.70	19.70	19.69	2

Band / BW	RB Size	RB Offset	QPSK Low CH 23017 699.7 MHz	QPSK Mid CH 23095 707.5 MHz	QPSK High CH 23173 715.3 MHz	3GPP MPR (dB)	16QAM Low CH 23017 699.7 MHz	16QAM Mid CH 23095 707.5 MHz	16QAM High CH 23173 715.3 MHz	3GPP MPR (dB)
12 / 1.4M	1	0	22.83	22.89	22.87	0	22.10	22.14	22.16	1
	1	2	23.06	23.01	23.10	0	22.31	22.35	22.35	1
	1	5	22.98	22.94	23.00	0	22.20	22.15	22.25	1
	3	0	22.99	23.00	23.03	0	21.99	22.04	21.99	1
	3	1	22.97	23.07	22.94	0	21.99	22.14	22.03	1
	3	3	23.08	23.08	23.11	0	22.12	22.17	22.21	1
	6	0	22.05	22.02	22.12	1	21.04	21.11	21.07	2

Band / BW	RB Size	RB Offset	QPSK Low CH 23025 700.5 MHz	QPSK Mid CH 23095 707.5 MHz	QPSK High CH 23165 714.5 MHz	3GPP MPR (dB)	16QAM Low CH 23025 700.5 MHz	16QAM Mid CH 23095 707.5 MHz	16QAM High CH 23165 714.5 MHz	3GPP MPR (dB)
12 / 3M	1	0	22.85	22.91	22.86	0	22.07	22.20	22.19	1
	1	7	23.02	23.02	23.10	0	22.28	22.38	22.33	1
	1	14	22.94	22.94	23.00	0	22.23	22.15	22.25	1
	8	0	21.98	22.03	22.03	1	20.95	21.05	20.99	2
	8	3	21.90	22.07	21.96	1	21.04	21.09	21.06	2
	8	7	22.05	22.15	22.15	1	21.14	21.15	21.17	2
	15	0	22.02	22.03	22.06	1	21.04	21.05	21.10	2

Band / BW	RB Size	RB Offset	QPSK Low CH 23035 701.5 MHz	QPSK Mid CH 23095 707.5 MHz	QPSK High CH 23155 713.5 MHz	3GPP MPR (dB)	16QAM Low CH 23035 701.5 MHz	16QAM Mid CH 23095 707.5 MHz	16QAM High CH 23155 713.5 MHz	3GPP MPR (dB)
12 / 5M	1	0	22.86	22.86	22.87	0	22.08	22.16	22.19	1
	1	12	23.07	22.99	23.10	0	22.25	22.41	22.32	1
	1	24	22.95	22.93	23.04	0	22.23	22.15	22.24	1
	12	0	22.01	22.03	22.00	1	20.95	21.03	20.96	2
	12	6	21.90	22.08	21.97	1	21.01	21.13	21.02	2
	12	13	22.09	22.11	22.16	1	21.09	21.17	21.20	2
	25	0	22.00	22.06	22.09	1	21.04	21.06	21.07	2

Band / BW	RB Size	RB Offset	QPSK Low CH 23060 704.0 MHz	QPSK Mid CH 23095 707.5 MHz	QPSK High CH 23130 711.0 MHz	3GPP MPR (dB)	16QAM Low CH 23060 704.0 MHz	16QAM Mid CH 23095 707.5 MHz	16QAM High CH 23130 711.0 MHz	3GPP MPR (dB)
12 / 10M	1	0	22.91	22.93	22.92	0	22.15	22.21	22.21	1
	1	24	23.09	23.07	**23.12**	0	22.33	22.43	22.37	1
	1	49	23.00	23.01	23.05	0	22.25	22.23	22.26	1
	25	0	22.05	22.08	22.05	1	21.03	21.09	21.04	2
	25	12	21.98	22.09	22.02	1	21.07	21.15	21.08	2
	25	25	22.13	22.16	22.17	1	21.16	21.22	21.22	2
	50	0	22.06	22.08	22.14	1	21.10	21.13	21.12	2

Band / BW	RB Size	RB Offset	QPSK Low CH 23205 779.5 MHz	QPSK Mid CH 23230 782.0 MHz	QPSK High CH 23255 784.5 MHz	3GPP MPR (dB)	16QAM Low CH 23205 779.5 MHz	16QAM Mid CH 23230 782.0 MHz	16QAM High CH 23255 784.5 MHz	3GPP MPR (dB)
13 / 5M	1	0	21.75	21.73	21.75	0	21.01	21.03	21.06	1
	1	12	21.84	21.78	21.84	0	21.05	21.11	21.08	1
	1	24	21.75	21.72	21.79	0	21.06	21.00	21.06	1
	12	0	20.73	20.72	20.72	1	19.74	19.76	19.74	2
	12	6	20.74	20.81	20.77	1	19.81	19.85	19.81	2
	12	13	20.75	20.74	20.78	1	19.78	19.80	19.83	2
	25	0	20.71	20.75	20.72	1	19.78	19.77	19.79	2

Band / BW	RB Size	RB Offset	QPSK Mid CH 23230 782.0 MHz	3GPP MPR (dB)	16QAM Mid CH 23230 782.0 MHz	3GPP MPR (dB)
13 / 10M	1	0	21.80	0	21.08	1
	1	24	**21.86**	0	21.13	1
	1	49	21.80	0	21.08	1
	25	0	20.77	1	19.82	2
	25	12	20.82	1	19.87	2
	25	25	20.79	1	19.85	2
	50	0	20.77	1	19.84	2

Band / BW	RB Size	RB Offset	QPSK Low CH 23755 706.5 MHz	QPSK Mid CH 23790 710.0 MHz	QPSK High CH 23825 713.5 MHz	3GPP MPR (dB)	16QAM Low CH 23755 706.5 MHz	16QAM Mid CH 23790 710.0 MHz	16QAM High CH 23825 713.5 MHz	3GPP MPR (dB)
17 / 5M	1	0	22.88	22.86	22.87	0	22.13	22.19	22.22	1
	1	12	23.09	22.99	23.08	0	22.24	22.38	22.29	1
	1	24	22.96	22.92	23.03	0	22.28	22.18	22.27	1
	12	0	21.94	21.94	21.91	1	20.90	20.96	20.89	2
	12	6	21.96	22.12	22.01	1	21.04	21.14	21.03	2
	12	13	22.03	22.03	22.08	1	21.01	21.07	21.10	2
	25	0	21.94	22.04	21.95	1	21.00	21.00	21.01	2

Band / BW	RB Size	RB Offset	QPSK Low CH 23780 709.0 MHz	QPSK Mid CH 23790 710.0 MHz	QPSK High CH 23800 711.0 MHz	3GPP MPR (dB)	16QAM Low CH 23780 709.0 MHz	16QAM Mid CH 23790 710.0 MHz	16QAM High CH 23800 711.0 MHz	3GPP MPR (dB)
17 / 10M	1	0	22.93	22.93	22.92	0	22.20	22.24	22.24	1
	1	24	**23.11**	23.07	23.10	0	22.32	22.40	22.34	1
	1	49	23.01	23.00	23.04	0	22.30	22.26	22.29	1
	25	0	21.98	21.99	21.96	1	20.98	21.02	20.97	2
	25	12	22.04	22.13	22.06	1	21.10	21.16	21.09	2
	25	25	22.07	22.08	22.09	1	21.08	21.12	21.12	2
	50	0	22.00	22.06	22.00	1	21.06	21.07	21.06	2

	Mode	Channel	Frequency (MHz)	Average power (dBm)
2.4GHz WLAN	802.11b 1Mbps	1	2412	15.22
		6	2437	15.08
		11	2462	15.04
	802.11g 6Mbps	1	2412	14.02
		6	2437	13.90
		11	2462	13.98
	802.11n-HT20 MCS0	1	2412	13.92
		6	2437	14.25
		11	2462	14.12
	802.11n-HT40 MCS0	3	2422	13.28
		6	2437	12.91
		9	2452	12.98

	Mode	Channel	Frequency (MHz)	Average power (dBm)
5.2GHz WLAN	802.11a 6Mbps	36	5180	14.10
		40	5200	14.00
		44	5220	13.92
		48	5240	13.99
	802.11n-HT20 MCS0	36	5180	13.98
		40	5200	14.00
		44	5220	13.83
		48	5240	13.86
	802.11n-HT40 MCS0	38	5190	13.22
		46	5230	13.25
	802.11ac-VHT20 MCS0	36	5180	13.96
		40	5200	13.85
		44	5220	13.80
		48	5240	13.91
	802.11ac-VHT40 MCS0	38	5190	13.24
		46	5230	13.22
	802.11ac-VHT80 MCS0	42	5210	12.02

	Mode	Channel	Frequency (MHz)	Average power (dBm)
5.3GHz WLAN	802.11a 6Mbps	52	5260	13.91
		56	5280	13.85
		60	5300	13.89
		64	5320	13.87
	802.11n-HT20 MCS0	52	5260	13.82
		56	5280	13.76
		60	5300	13.80
		64	5320	13.85
	802.11n-HT40 MCS0	54	5270	13.12
		62	5310	13.02
	802.11ac-VHT20 MCS0	52	5260	13.86
		56	5280	13.70
		60	5300	13.77
		64	5320	13.75
	802.11ac-VHT40 MCS0	54	5270	13.16
		62	5310	13.07
	802.11ac-VHT80 MCS0	58	5290	11.95

	Mode	Channel	Frequency (MHz)	Average power (dBm)
5.6GHz WLAN	802.11a 6Mbps	100	5500	13.84
		116	5580	14.20
		124	5620	13.81
		132	5660	13.78
		140	5700	14.02
		144	5720	14.05
	802.11n-HT20 MCS0	100	5500	13.78
		116	5580	14.18
		124	5620	13.74
		132	5660	13.70
		140	5700	14.01
		144	5720	13.97
	802.11n-HT40 MCS0	102	5510	13.06
		110	5550	13.10
		126	5630	12.77
		134	5670	12.80
		142	5710	12.82
	802.11ac-VHT20 MCS0	100	5500	13.74
		116	5580	13.78
		124	5620	13.69
		132	5660	13.63
		140	5700	13.95
		144	5720	13.98
	802.11ac-VHT40 MCS0	102	5510	13.03
		110	5550	13.12
		126	5630	12.97
		134	5670	13.18
		142	5710	13.25
	802.11ac-VHT80 MCS0	106	5530	11.82
		122	5610	11.80
		138	5690	12.00

	Mode	Channel	Frequency (MHz)	Average power (dBm)
5.8GHz WLAN	802.11a 6Mbps	149	5745	14.08
		157	5785	14.10
		165	5825	14.12
	802.11n-HT20 MCS0	149	5745	14.05
		157	5785	14.07
		165	5825	14.06
	802.11n-HT40 MCS0	151	5755	12.90
		159	5795	12.88
	802.11ac-VHT20 MCS0	149	5745	14.05
		157	5785	14.02
		165	5825	14.08
	802.11ac-VHT40 MCS0	151	5755	13.26
		159	5795	12.92
	802.11ac-VHT80 MCS0	155	5775	11.98

<Bluetooth>

Mode	**Bluetooth GFSK**		
Channel / Frequency (MHz)	**0 (2402)**	**39 (2441)**	**78 (2480)**
Average Power	7.99	**8.56**	7.54
Mode	**Bluetooth π/4-DQPSK**		
Channel / Frequency (MHz)	**0 (2402)**	**39 (2441)**	**78 (2480)**
Average Power	5.39	**6.05**	4.80
Mode	**Bluetooth 8-DPSK**		
Channel / Frequency (MHz)	**0 (2402)**	**39 (2441)**	**78 (2480)**
Average Power	5.05	**5.62**	4.55
Mode	**Bluetooth LE(1Mbps)**		
Channel / Frequency (MHz)	**0 (2402)**	**19 (2440)**	**39 (2480)**
Average Power	-4.95	-3.65	-4.32
Mode	**Bluetooth LE(2Mbps)**		
Channel / Frequency (MHz)	**0 (2402)**	**19 (2440)**	**39 (2480)**
Average Power	-6.40	-4.90	-5.87
Mode	**Bluetooth LE(S2)**		
Channel / Frequency (MHz)	**0 (2402)**	**19 (2440)**	**39 (2480)**
Average Power	-4.33	-3.02	-3.85
Mode	**Bluetooth LE(S8)**		
Channel / Frequency (MHz)	**0 (2402)**	**19 (2440)**	**39 (2480)**
Average Power	-4.54	-3.07	-3.98

4.6 SAR Testing Results

4.6.1 SAR Test Reduction Considerations

<KDB 447498 D01, General RF Exposure Guidance>

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

(1) ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz

(2) ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz

(3) ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz

<KDB 941225 D01, 3G SAR Measurement Procedures>

The mode tested for SAR is referred to as the primary mode. The equivalent modes considered for SAR test reduction are denoted as secondary modes. Both primary and secondary modes must be in the same frequency band. When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ 1/4 dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.

<KDB 941225 D05, SAR Evaluation Considerations for LTE Devices>

(1) QPSK with 1 RB and 50% RB allocation

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

(2) QPSK with 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 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.

(3) Higher order modulations

SAR is required only when the highest maximum output power for the configuration in the higher order modulation is > 1/2 dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is > 1.45 W/kg.

(4) Other channel bandwidth

SAR is required when the highest maximum output power of the smaller channel bandwidth is > 1/2 dB higher than the equivalent channel configurations in the largest channel bandwidth configuration or the reported SAR of a configuration for the largest channel bandwidth is > 1.45 W/kg.

<KDB 248227 D01, SAR Guidance for Wi-Fi Transmitters>

(1) For handsets operating next to ear, hotspot mode or mini-tablet configurations, the initial test position procedures were applied. The test position with the highest extrapolated peak SAR will be used as the initial test position. When the reported SAR of initial test position is <= 0.4 W/kg, SAR testing for remaining test positions is not required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is <= 0.8 W/kg or all test positions are measured.

(2) For WLAN 2.4 GHz, the highest measured maximum output power channel for DSSS was selected for SAR measurement. When the reported SAR is <= 0.8 W/kg, no further SAR testing is required. Otherwise, SAR is evaluated at the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel. For OFDM modes (802.11g/n), SAR is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and it is <= 1.2 W/kg.

(3) For WLAN 5 GHz, the initial test configuration was selected according to the transmission mode with the highest maximum output power. When the reported SAR of initial test configuration is > 0.8 W/kg, SAR is required for the subsequent highest measured output power channel until the reported SAR result is <= 1.2 W/kg or all required channels are measured. For other transmission modes, SAR is not required when the highest reported SAR for initial test configuration is adjusted by the ratio of subsequent test configuration to initial test configuration specified maximum output power and it is <= 1.2 W/kg.

(4) For WLAN MIMO mode, the power-based standalone SAR test exclusion or the sum of SAR provision in KDB 447498 to determine simultaneous transmission SAR test exclusion should be applied. Otherwise, SAR for MIMO mode will be measured with all applicable antennas transmitting simultaneously at the specified maximum output power of MIMO operation.