Certificate #4312.01

FCC SAR TEST REPORT

Product Name:	Smart Mobile Payment Terminal
Trade Mark:	PAX
Model No.:	A99
Add. Model No.:	N/A
Report Number:	24091913831SAR-1
Test Standards:	FCC 47 CFR Part 2 §2.1093 ANSI/IEEE C95.1-1992 IEEE Std 1528-2013
FCC ID:	V5PA99
Test Result:	PASS
Date of Issue:	November 25, 2024

Prepared for:

PAX Technology Limited
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Prepared by:

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Prepared by: Curry Xue, Test Engineer

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Date: November 25, 2024

Version

Version No.	Date	Description
V1.0	November 25, 2024	Original Report

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1. GENERAL INFORMATION

1.1. STATEMENT OF COMPLIANCE

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

Equipment Class	Mode	Highest Reported Extremity SAR_{10g} (0 cm Gap) (W/kg)
Limits		**4.0 W/kg**
PCB	**GSM850**	0.262
	PCS 1900	0.459
	WCDMA Band II	0.410
	WCDMA Band IV	0.370
	WCDMA Band V	0.189
	LTE Band 2	0.448
	LTE Band 5	0.206
	LTE Band 7	**1.096**
	LTE Band 40	0.242
	LTE Band 41 (38)	0.788
	LTE Band 66 (4)	0.397
DTS	**2.4G WLAN**	0.459
DSS	**Bluetooth**	0.048
Max. SAR		**1.096**

1.2. CLIENT INFORMATION

Applicant:	PAX Technology Limited
Address of Applicant:	Room 2416, 24/F., Sun Hung Kai Centre, 30 Harbour Road, Wanchai, Hong Kong
Manufacturer:	PAX Computer Technology (Shenzhen) Co., Ltd.
Address of Manufacturer:	Room 701, PAX Technology Building, Shanxia Community, Pinghu Sub-district, Longgang District, Shenzhen, China

1.3. EUT INFORMATION

1.3.1. General Description of EUT

Product Name:	Smart Mobile Payment Terminal
Trade Mark:	PAX
Model No.:	A99
Add. Model No.:	N/A
FCC ID:	V5PA99
S/N:	3170002328
Sample Received Date:	September 3, 2024
Sample Tested Date:	October 17, 2024 to October 27, 2024

1.3.2. Description of Accessories

Adapter 1	
Model No.:	SW-0983
Input:	100-240 V~50/60 Hz 0.5 A
Output:	5.0 V ⎓ 2.0 A

Adapter 2	
Model No.:	GLH50E2000HW
Input:	100-240 V~50/60 Hz 0.4 A
Output:	5.0 V ⎓ 2.0 A

Cable	
Connector:	USB Cable
Cable Type:	Unshielded without ferrite
Length:	1.0 Meter

Battery	
Model No.:	BF1024
Battery Type:	Lithium-ion Polymer Battery
Rated Voltage:	7.2 Vdc
Rated Capacity:	2600 mAh

1.3.3. EUT Tx Frequency Bands

RF Type	Band(s)	Tx Frequency Range (Unit: MHz)
GSM	**GSM 850:**	824.2 - 848.8
	PCS 1900:	1850.2 - 1909.8
WCDMA	**WCDMA Band II:**	1852.4 - 1907.6
	WCDMA Band IV:	1712.4 - 1752.6
	WCDMA Band V:	826.4 - 846.6
LTE	**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 7:	2502.5 - 2567.5 (5M), 2505 - 2565 (10M), 2507.5 - 2562.5 (15M), 2510 - 2560 (20M)
	LTE Band 38:	2572.5 - 2617.5 (5M), 2575 - 2615 (10M), 2577.5 - 2612.5 (15M), 2580 - 2610 (20M)
	LTE Band 40:	2307.5 - 2312.5 (5M), 2310 (10M), 2352.5 - 2357.5 (5M), 2355 (10M),
	LTE Band 41:	2557.5 - 2562.5 (5M), 2560 - 2650 (10M), 2562.5 - 2647.5 (15M), 2565 - 2645 (20M)
	LTE Band 66:	1710.7 - 1779.3 (1.4M), 1711.5 - 1778.5 (3M), 1712.5 - 1777.5 (5M), 1715 - 1775 (10M), 1717.5 - 1772.5 (15M), 1720 - 1770 (20M)
WLAN	**2.4 GHz:**	2412 - 2462
Bluetooth	**2.4 GHz:**	2402 - 2480
NFC	**13.553 - 13.567 MHz**	13.56

Note 1:
According to 201504 FCC TCB workshop RF exposure slides, for overlapping bands, only larger band was tested.

1. The maximum output power, including tolerance, for the smaller band is = the larger band to qualify for the SAR test exclusion.
2. The channel bandwidth and other operating parameters for the smaller band is fully supported by the larger band.
   - Band 66 (1710 - 1780 MHz) SAR can support band 4 (1710 - 1755 MHz).
   - Band 41 (2555 - 2655 MHz) SAR can support band 38 (2570 – 2620 MHz).

1.3.4. Wireless Technologies

GSM	GPRS (Multi-Slot Class: 12-4UP) EDGE (Multi-Slot Class: 12-4UP)
WCDMA	RMC HSDPA HSUPA
LTE	QPSK 16QAM
2.4G WLAN	802.11b 802.11g 802.11n (HT20)
Bluetooth	BR+EDR LE
Others	NFC
Antenna Type	WWAN/WLAN/Bluetooth: FIFA Antenna NFC: Loop Antenna
Power Reduction	Not Support
Dynamic Antenna	Not Support
Wireless Router (Hotspot)	2.4G WLAN: Not Support
VOIP	Not Support
Dual SIM	SIM 1: GSM+WCDMA + LTE SIM 2: GSM+WCDMA + LTE Note : This device support dual SIM but they share the same antenna. Since these two SIM are used for subscriber identification only and it is not related to RF identity, only SIM1 was used for SAR testing.

1.4. MAXIMUM CONDUCTED POWER

The maximum conducted average power including tune-up tolerance is shown as below.
The maximum conducted average power including tune-up tolerance is shown as below.

➢ **GSM**

Mode	Maximum conducted average power (dBm)	
	GSM 850	DCS 1900
GSM (GMSK, 1Tx-slot)	N/A	N/A
GPRS (GMSK, 1Tx-slot)	34.0	31.5
GPRS (GMSK, 2Tx-slot)	32.0	29.0
GPRS (GMSK, 3Tx-slot)	30.0	27.5
GPRS (GMSK, 4Tx-slot)	28.0	25.5
EDGE (8PSK, 1Tx-slot)	27.5	26.5
EDGE (8PSK, 2Tx-slot)	26.5	26.0
EDGE (8PSK, 3Tx-slot)	24.0	23.5
EDGE (8PSK, 4Tx-slot)	22.0	21.5

➢ **WCDMA**

Mode	Maximum conducted average power (dBm)		
	WCDMA Band II	WCDMA Band V	WCDMA Band IV
RMC 12.2K	24.5	24.5	24.5
HSDPA Subtest-1	24.0	23.0	23.5
HSDPA Subtest-2	23.5	23.0	24.0
HSDPA Subtest-3	23.5	22.5	24.0
HSDPA Subtest-4	23.5	22.5	24.0
HSUPA Subtest-1	21.5	21.0	24.0
HSUPA Subtest-2	22.5	22.0	23.5
HSUPA Subtest-3	22.0	21.5	24.0
HSUPA Subtest-4	22.0	21.5	24.0
HSUPA Subtest-5	23.5	23.0	23.5

➢ **LTE**

Band	Mode	Maximum conducted average power (dBm)
LTE Band 2	QPSK/16QAM	25.0
LTE Band 4	QPSK/16QAM	25.0
LTE Band 5	QPSK/16QAM	24.5
LTE Band 7	QPSK/16QAM	25.0
LTE Band 38	QPSK/16QAM	24.5
LTE Band 40	QPSK/16QAM	23.5
LTE Band 41	QPSK/16QAM	24.5
LTE Band 66	QPSK/16QAM	25.0

➢ **2.4GHz WLAN**

Mode	Maximum conducted average power (dBm)
802.11b	17.0
802.11g	16.5
802.11n-HT20	14.0

➢ **Bluetooth**

Mode	Modulation	Maximum conducted average power (dBm)
BR + EDR	GFSK	6.5
	π/4-DQPSK	4.5
	8-DPSK	4.5
LE	GFSK	-1.0

1.5. OTHER INFORMATION

None.

1.6. TEST LOCATION

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: 16/F, Block A, Building 6th, Baoneng Science and Technology Park, Longhua Street, Longhua District, Shenzhen, China
Telephone: +86 (0) 755 2823 0888
Fax: +86 (0) 755 2823 0886

1.7. TEST FACILITY

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

Shenzhen UnionTrust Quality and Technology Co., Ltd.

CNAS-Lab Code: L9069
The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

A2LA-Lab Certificate No.: 4312.01
Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

ISED Wireless Device Testing Laboratories
CAB identifier: CN0032

FCC Accredited Lab.
Designation Number: CN1194
Test Firm Registration Number: 259480

1.8. GUIDANCE STANDARD

The tests documented in this report were performed in accordance with FCC 47 CFR Part 2 §2.1093, IEEE Std 1528-2013, ANSI/IEEE C95.1-1992, the following FCC Published RF exposure KDB procedures:

KDB 865664 D01 v01r04
KDB 865664 D02 v01r02
KDB 248227 D01 v02r02
KDB 447498 D04 v01
KDB 648474 D04 v01r03
KDB 941225 D01 v03r01
KDB 941225 D05 v02r05
KDB 941225 D05A v01r02
KDB 941225 D07 v01r02

2. SPECIFIC ABSORPTION RATE (SAR)

2.1. INTRODUCTION

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling, by appropriate techniques, to produce specific absorption rates (SARs) as averaged over the whole-body, any 1 g or any 10 g of tissue (defined as a tissue volume in the shape of a cube). All SAR values are to be averaged over any six-minute period. When portable device was used within 20 cm of the user's body, SAR evaluation of the device will be required. The SAR limit in chapter 2.3.

2.2. SAR DEFINITION

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

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

SAR is expressed in units of Watts per kilogram (W/kg)
SAR measurement can be related to the electrical field in the tissue by

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

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

2.3. SAR LIMITS

Limits for Occupational/Controlled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

Limits for General Population/Uncontrolled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	1.6	4.0

Note:

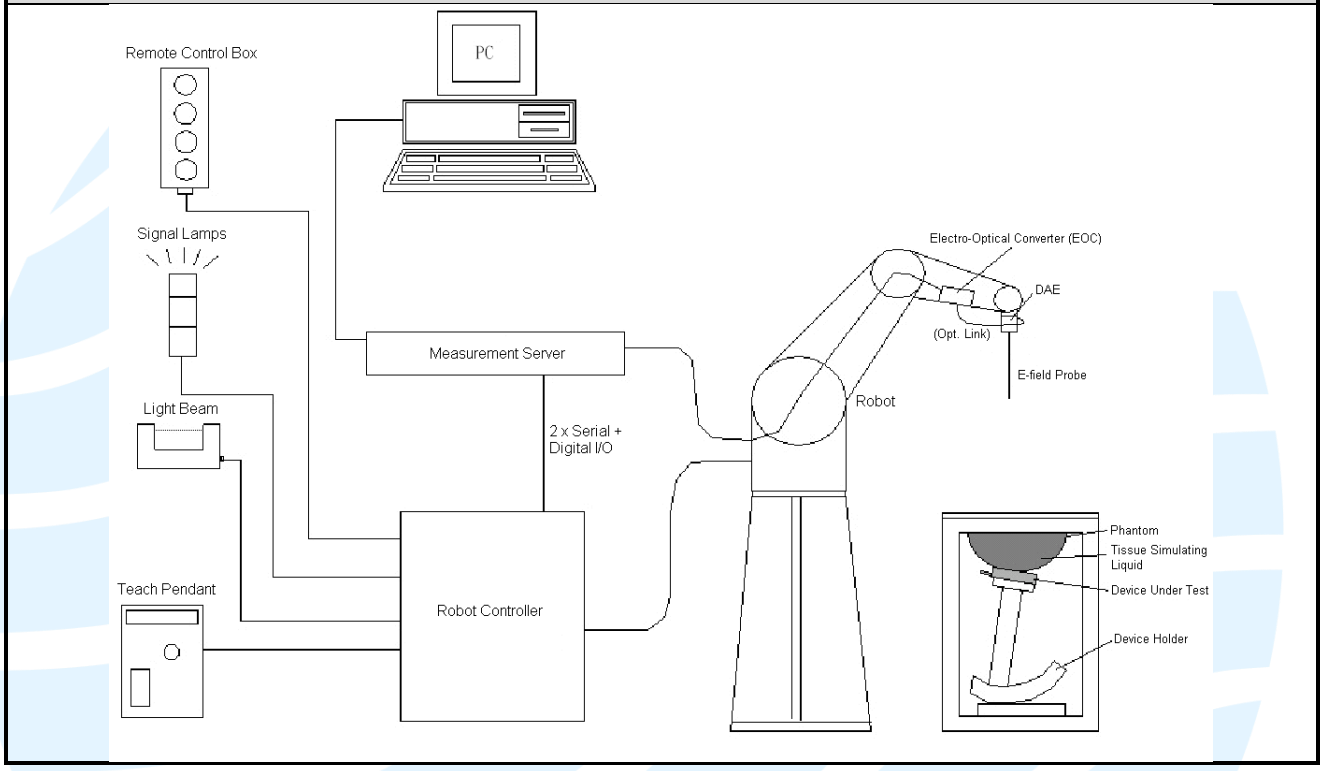
1) Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1 gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.
2) At frequencies above 6.0 GHz, SAR limits are not applicable and MPE limits for power density should be applied at 5 cm or more from the transmitting device.
3) The SAR limit is specified in FCC 47 CFR Part 2 §2.1093, ANSI/IEEE C95.1-1992.

3. SAR MEASUREMENT SYSTEM

3.1. 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.

DASY Measurement System



3.1.1. Robot

The DASY system uses the high precision robots from Stäubli SA (France). For the 6-axis controller system, the robot controller version (DASY4: CS7MB) from Stäubli is used. The Stäubli robot series have many features that are important for our application:

- High precision (repeatability ±0.02 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)

3.1.2. Probe

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	

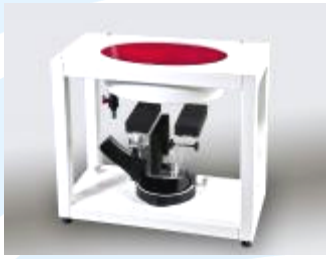
Model	ES3DV3	
Construction	Symmetrical design with triangular core. Interleaved sensors. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE).	
Frequency	10 MHz to 4 GHz Linearity: ± 0.2 dB	
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 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	

3.1.3. 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 detectors 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	

3.1.4. Phantom

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	

3.1.5. 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	

3.1.6. 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. SAR SCAN PROCEDURE

3.2.1. SAR Reference Measurement (drift)

Prior to the SAR test, local SAR shall be measured at a stationary reference point where the SAR exceeds the lower detection limit of the measurement system.

3.2.2. Area Scan

Measurement procedures for evaluating the SAR of wireless device start with a coarse measurement grid to determine the approximate location of the local peak SAR values. This is known as the area-scan procedure. All antennas and radiating structures that may contribute to the measured SAR or influence the SAR distribution must be included in the area scan. The area scan measurement resolution must enable the extrapolation algorithms of the SAR system to correctly identify the peak SAR location(s) for subsequent zoom scan measurements to correctly determine the 1-g SAR. Area scans are performed at a constant distance from the phantom surface, determined by the measurement frequencies. When a measured peak is closer than ½ the zoom scan volume dimension (x, y) from the edge of the area scan region, unless the entire peak and gram-averaging volume are both captured within the zoom scan volume, the area scan must be repeated by shifting and expanding the area scan region to ensure all peaks are away from the area scan boundary. The area scan resolutions specified in the table below must be applied to the SAR measurements.

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 mm ± 1 mm	½·δ·ln(2) mm ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scans spatial resolution: Δx_{Area}, Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

3.2.3. Zoom Scan

To evaluate the peak spatial-average SAR values with respect to 1 g or 10 g cubes, fine resolution volume scans, called zoom scans, are performed at the peak SAR locations identified during the area scan. If the cube volume within the zoom scan chosen to calculate the peak spatial-average SAR touches any boundary of the zoom-scan volume, the zoom scan shall be repeated with the center of the zoom-scan volume shifted to the new maximum SAR location. For any secondary peaks found in the area scan that are within 2 dB of the maximum peak and are not within this zoom scan, the zoom scan shall be performed for such peaks, unless the peak spatial-average SAR at the location of the maximum peak is more than 2 dB below the applicable SAR limit (i.e., 1 W/kg for a 1.6 W/kg 1 g limit, or 1.26 W/kg for a 2 W/kg 10 g limit). The zoom scan resolutions specified in the table below must be applied to the SAR measurements.

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom Scan spatial resolution, normal to phantom surface	uniform grid: ΔZ_{Zoom}(n)		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	ΔZ_{Zoom}(1): between 1^{ST} two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		ΔZ_{Zoom}(n>1): between subsequent points	≤ 1.5·ΔZ_{Zoom}(n-1) mm	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see IEEE Std 1528-2013 for details.

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

3.2.4. SAR Drift Measurement

The local SAR (or conducted power) shall be measured at exactly the same location as in 3.2.1 section. The absolute value of the measurement drift (the difference between the SAR measured in 3.2.1 and 3.2.4 section) shall be recorded. The SAR drift shall be kept within ± 5%.

3.3. EQUIPMENT LIST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Interval
System Validation Dipole	SPEAG	D835V2	4d005	Mar. 15, 2024	3 Year
System Validation Dipole	SPEAG	D1750V2	1086	Mar. 14, 2024	3 Year
System Validation Dipole	SPEAG	D1900V2	509	Mar. 14, 2024	3 Year
System Validation Dipole	SPEAG	D2300V2	1087	Jun. 07, 2024	3 Year
System Validation Dipole	SPEAG	D2600V2	1082	Jan. 03, 2024	3 Year
System Validation Dipole	SPEAG	D2450V2	883	Jan. 02, 2024	3 Year
Dosimetric E-Field Probe	SPEAG	ES3DV3	3090	Mar. 26, 2024	1 Year
Data Acquisition Electronics	SPEAG	DAE4	662	Mar. 18,2024	1 Year
Wideband Radio Communication Tester	R&S	CMW500	120932	Mar. 29,2024	1 Year
ENA Series Network Analyzer	Agilent	8753ES	US39170317	Oct. 31, 2023	1 Year
Twin Phantom	SPEAG	SAM	TP-1376	N/A	N/A
Twin Phantom	SPEAG	SAM	TP-1378	N/A	N/A
Robot controller	STAUBLI	CS7MB	F05/511KA1/A/01	N/A	N/A
Robot	STAUBLI	RX90BL	F05/511KA1/A/01	N/A	N/A
Dielectric Assessment Kit	SPEAG	DAK-3.5	1056	N/A	N/A
USB/GPIB Interface	Agilent	82357B	N10149	N/A	N/A
Signal Generator	R&S	SMB100A	103718	Mar. 29, 2024	1 Year
POWER METER	R&S	NRP	101293	Oct. 27, 2023	1 Year
Thermometer	Shanghai Gao Zhi Precision Instrument Co., Ltd.	HB6801	18022507	Oct. 29, 2023	1 Year
Dual Directional Coupler	Agilent	778D	MY52180234	Oct. 27, 2023	1 Year
Amplifier	Mini-Circuit	ZHL42	QA1252001	Mar. 29, 2024	1 Year
DC Source	Agilent	66319B	MY43000795	Oct. 31, 2023	1 Year

3.4. MEASUREMENT UNCERTAINTY

TABLE 1 EXPOSURE ASSESSMENT UNCERTAINTY FOR HANDSET SAR

Source of Uncertainty	Tolerance (± %)	Probability Distribution	Divisor	Ci (1g)	Ci (10g)	Standard Uncertainty (1g) (± %)	Standard Uncertainty (10g) (± %)	Vi Veff
Measurement System								
Probe Calibration (< 3 GHz)	7.5	N (k=2)	2	1	1	3.75	3.75	∞
Probe Calibration (> 3 GHz)	6.3	N (k=2)	2	1	1	3.15	3.15	∞
Axial Isotropy	1.2	N (k=2)	2	0.7	0.7	0.42	0.42	∞
Hemispherical Isotropy	3.2	N (k=2)	2	0.7	0.7	1.12	1.12	∞
Boundary Effects	2	Rectangular	√3	1	1	1.15	1.15	∞
Linearity	0.9	N (k=2)	2	1	1	0.45	0.45	∞
Detection Limits	0.25	Rectangular	√3	1	1	0.14	0.14	∞
Modulation Response	2.4	Rectangular	√3	1	1	1.39	1.39	∞
Readout Electronics	0.3	Normal	1	1	1	0.30	0.30	∞
Response Time	0	Rectangular	√3	1	1	0.00	0.00	∞
Integration Time	1.7	Rectangular	√3	1	1	0.98	0.98	∞
RF Ambient – Noise	3	Rectangular	√3	1	1	1.73	1.73	∞
RF Ambient – Reflections	3	Rectangular	√3	1	1	1.73	1.73	∞
Probe Positioner	0.4	Rectangular	√3	1	1	0.23	0.23	∞
Probe Positioning	6.7	Rectangular	√3	1	1	3.87	3.87	∞
Max. SAR Evaluation	4	Rectangular	√3	1	1	2.31	2.31	∞
Test Sample Related								
Device Positioning	2.3 / 2.4	Normal	1	1	1	2.30	2.40	30
Device Holder	2.8 / 2.8	Normal	1	1	1	2.80	2.80	30
Power Drift	5	Rectangular	√3	1	1	2.89	2.89	∞
Power Scaling	0	Rectangular	√3	1	1	0.00	0.00	∞
Phantom and Setup								
Phantom Uncertainty	7.9	Rectangular	√3	1	1	4.56	4.56	∞
SAR correction	1.2 / 0.97	Rectangular	√3	1	0.84	0.69	0.47	∞
Liquid Conductivity (Meas.)	2.5	Rectangular	√3	0.78	0.71	1.13	1.02	∞
Liquid Permittivity (Meas.)	2.5	Rectangular	√3	0.26	0.26	0.38	0.38	∞
Temp. unc. - Conductivity	3.4	Rectangular	√3	0.78	0.71	1.53	1.39	∞
Temp. unc. - Permittivity	0.4	Rectangular	√3	0.23	0.26	0.05	0.06	∞
Combined Standard Uncertainty (k = 1) (≤ 3 GHz)						9.64	9.62	
Combined Standard Uncertainty (k = 1) (> 3 GHz)						9.42	9.40	
Max. Expanded Uncertainty (k = 2)						**19.27**	**19.23**	

TABLE 2SYSTEM VALIDATION Measurement uncertainty

Source of Uncertainty	Tolerance (± %)	Probability Distribution	Divisor	Ci (1g)	Ci (10g)	Standard Uncertainty (1g) (± %)	Standard Uncertainty (10g) (± %)	Vi Veff
Measurement System								
Probe Calibration (< 3 GHz)	7.5	N (k=2)	2	1	1	3.75	3.75	∞
Probe Calibration (> 3 GHz)	6.3	N (k=2)	2	1	1	3.15	3.15	∞
Axial Isotropy	1.2	N (k=2)	2	0.7	0.7	0.42	0.42	∞
Hemispherical Isotropy	3.2	N (k=2)	2	0.7	0.7	1.12	1.12	∞
Boundary Effects	2	Rectangular	√3	1	1	1.15	1.15	∞
Linearity	0.9	N (k=2)	2	1	1	0.45	0.45	∞
Detection Limits	0.25	Rectangular	√3	1	1	0.14	0.14	∞
Modulation Response	2.4	Rectangular	√3	1	1	1.39	1.39	∞
Readout Electronics	0.3	Normal	1	1	1	0.30	0.30	∞
Response Time	0	Rectangular	√3	1	1	0.00	0.00	∞
Integration Time	1.7	Rectangular	√3	1	1	0.98	0.98	∞
RF Ambient – Noise	3	Rectangular	√3	1	1	1.73	1.73	∞
RF Ambient – Reflections	3	Rectangular	√3	1	1	1.73	1.73	∞
Probe Positioner	0.4	Rectangular	√3	1	1	0.23	0.23	∞
Probe Positioning	6.7	Rectangular	√3	1	1	3.87	3.87	∞
Max. SAR Evaluation	4	Rectangular	√3	1	1	2.31	2.31	∞
Test Sample Related								
Device Positioning	2.3 / 2.4	Normal	1	1	1	2.30	2.40	30
Device Holder	2.8 / 2.8	Normal	1	1	1	2.80	2.80	30
Power Drift	5	Rectangular	√3	1	1	2.89	2.89	∞
Power Scaling	0	Rectangular	√3	1	1	0.00	0.00	∞
Phantom and Setup								
Phantom Uncertainty	7.9	Rectangular	√3	1	1	4.56	4.56	∞
SAR correction	1.2 / 0.97	Rectangular	√3	1	0.84	0.69	0.47	∞
Liquid Conductivity (Meas.)	2.5	Rectangular	√3	0.78	0.71	1.13	1.02	∞
Liquid Permittivity (Meas.)	2.5	Rectangular	√3	0.26	0.26	0.38	0.38	∞
Temp. unc. - Conductivity	3.4	Rectangular	√3	0.78	0.71	1.53	1.39	∞
Temp. unc. - Permittivity	0.4	Rectangular	√3	0.23	0.26	0.05	0.06	∞
Combined Standard Uncertainty (k = 1) (≤ 3 GHz)						9.64	9.62	
Combined Standard Uncertainty (k = 1) (> 3 GHz)						9.42	9.40	
Max. Expanded Uncertainty (k = 2)						**19.27**	**19.23**	

3.5. TISSUE DIELECTRIC PARAMETER MEASUREMENT & SYSTEM VERIFICATION

Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval.

3.5.1. Tissue Simulating Liquids

The temperature of the tissue-equivalent medium used during measurement must also be within 18 °C to 25 °C and within ± 2 °C of the temperature when the tissue parameters are characterized. The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements. The parameters should be re-measured after each 3 - 4 days of use; or earlier if the dielectric parameters can become out of tolerance.

The depth of tissue-equivalent liquid in a phantom must be ≥ 15.0 cm with ≤ ± 0.5 cm variation for SAR measurements ≤ 3 GHz and ≥ 10.0 cm with ≤ ± 0.5 cm variation for measurements > 3 GHz. 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

Tissue Dielectric Parameters for Head and Body

Target Frequency	Head		Body	
(MHz)	ε_r	σ(S/m)	ε_r	σ(S/m)
750	*41.9*	*0.89*	*55.5*	*0.96*
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
1450	*40.5*	*1.20*	*54.0*	*1.30*
1640	*40.3*	*1.29*	*53.8*	*1.40*
1750	*40.1*	*1.37*	*53.4*	*1.49*
1800	40.0	1.40	53.3	1.52
1900	40.0	1.40	53.3	1.52
2000	40.0	1.40	53.3	1.52
2300	*39.5*	*1.67*	*52.9*	*1.81*
2450	39.2	1.80	52.7	1.95
2600	*39.0*	*1.96*	*52.5*	*2.16*
3500	*37.9*	*2.91*	*51.3*	*3.31*
5200	*36.0*	*4.66*	*49.0*	*5.30*
5300	*35.9*	*4.76*	*48.9*	*5.42*
5500	*35.6*	*4.96*	*48.6*	*5.65*
5600	*35.5*	*5.07*	*48.5*	*5.77*
5800	35.3	5.27	48.2	6.00

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

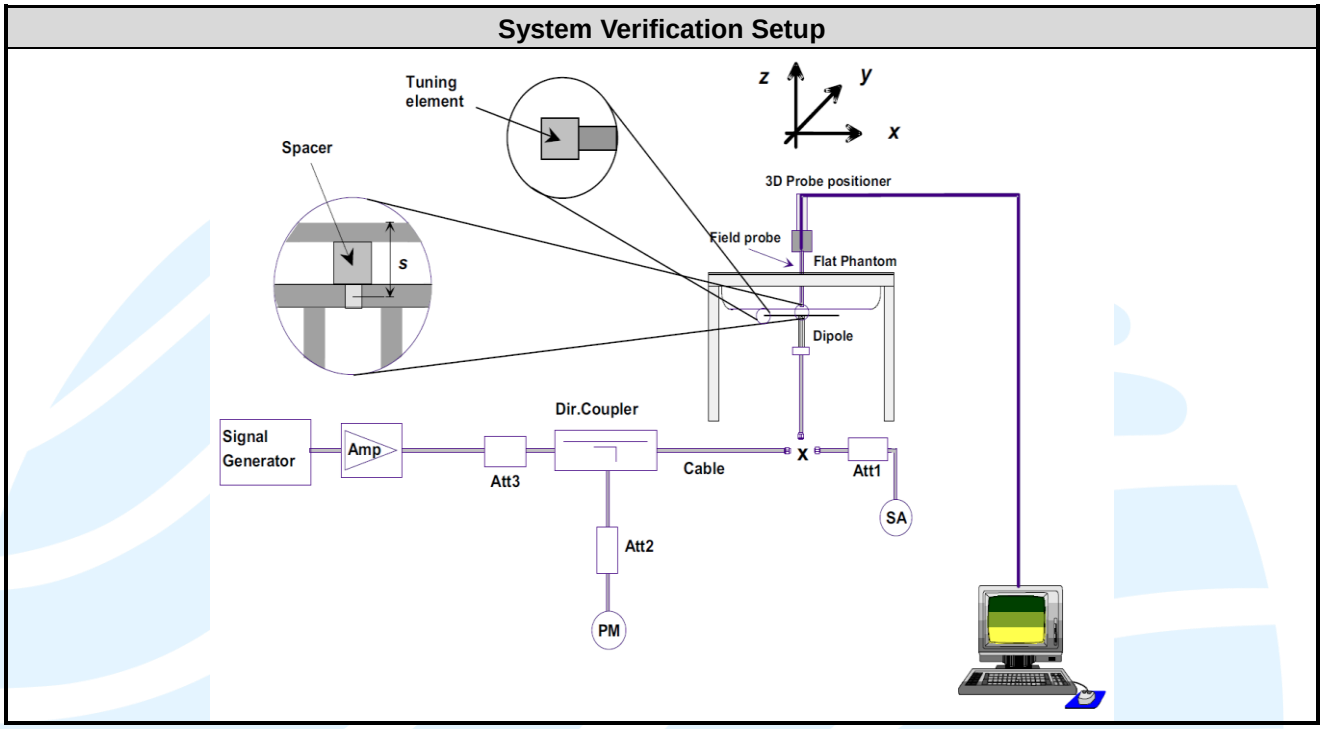
The following table gives the recipes for tissue simulating liquids.

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	1.4	57.0	-	41.1	-
H835	0.1	-	1.0	1.4	57.0	-	40.5	-
H900	0.1	-	1.0	1.5	56.5	-	40.9	-
H1450	-	45.5	-	0.7	-	-	53.8	-
H1640	-	45.8	-	0.5	-	-	53.7	-
H1750	-	44.5	-	0.3	-	-	55.2	-
H1800	-	44.9	-	0.2	-	-	54.9	-
H1900	-	44.9	-	0.2	-	-	54.9	-
H2000	-	50	-	-	-	-	50	-
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	65.52	17.3
B750	0.2	-	0.2	0.8	48.8	-	50.0	-
B835	0.2	-	0.2	0.9	48.5	-	50.2	-
B900	0.2	-	0.2	0.9	48.2	-	50.5	-
B1450	-	34.0	-	0.3	-	-	65.7	-
B1640	-	32.5	-	0.3	-	-	67.2	-
B1750	-	29.4	-	0.4	-	-	70.2	-
B1800	-	29.5	-	0.4	-	-	70.1	-
B1900	-	29.5	-	0.3	-	-	70.2	-
B2000	-	30.0	-	0.2	-	-	69.8	-
B2300	-	31.0	-	0.1	-	-	68.9	-
B2450	-	31.4	-	0.1	-	-	68.5	-
B2600	-	31.8	-	0.1	-	-	68.1	-
B3500	-	28.8	-	0.1	-	-	71.1	-
B5G	-	-	-	-	-	10.7	78.6	10.7

3.5.2. System Check Description

The system check procedure provides a simple, fast, and reliable test method that can be performed daily or before every SAR measurement. The objective here is to ascertain that the measurement system has acceptable accuracy and repeatability. This test requires a flat phantom and a radiating source. The system verification setup is shown as below.

System Verification Setup



3.5.3. 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 (%)
Oct. 27, 2024	Head	835	22.5	0.890	41.410	0.90	41.50	-1.12	-0.22
Oct. 26, 2024	Head	1750	22.3	1.407	40.940	1.37	40.10	2.70	2.09
Oct. 18, 2024	Head	1900	22.4	1.399	39.060	1.40	40.00	-0.07	-2.35
Oct. 18, 2024	Head	2300	22.4	1.667	38.800	1.67	39.50	-0.18	-1.77
Oct. 19, 2024	Head	2450	22.3	1.786	40.410	1.80	39.20	-0.78	3.09
Oct. 17, 2024	Head	2600	22.6	2.056	37.590	1.96	39.00	4.90	-3.62
Oct. 19, 2024	Head	2600	22.3	2.054	38.330	1.96	39.00	4.80	-1.72

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. The variation of the liquid temperature must be within ± 2 °C during the test.

3.5.4. System Verification

The measuring result for system verification is tabulated as below.

Test Date	Tissue Type	Freq. (MHz)	1W Target SAR-1g (W/kg)	1W Target SAR-10g (W/kg)	Measured SAR-1g (W/kg)	Measured SAR-10g (W/kg)	Normalized to 1W SAR-1g (W/kg)	Normalized to 1W SAR-10g (W/kg)	Deviation 1g(%)	Deviation 10g(%)	Dipole S/N	Probe S/N	DAE S/N
Oct. 27, 2024	Head	835	9.61	6.23	2.290	1.490	9.16	5.96	-4.68	-4.33	4d005	3090	662
Oct. 26, 2024	Head	1750	36.80	19.50	9.650	5.310	38.60	21.24	4.89	8.92	1086	3090	662
Oct. 18, 2024	Head	1900	40.00	20.90	10.300	5.450	41.20	21.80	3.00	4.31	509	3090	662
Oct. 18, 2024	Head	2300	47.20	22.30	12.400	5.720	49.60	22.88	5.08	2.60	1087	3090	662
Oct. 19, 2024	Head	2450	53.70	24.80	13.400	6.260	53.60	25.04	-0.19	0.97	883	3090	662
Oct. 17, 2024	Head	2600	56.10	24.80	14.400	6.450	57.60	25.80	2.67	4.03	1082	3090	662
Oct. 19, 2024	Head	2600	56.10	24.80	14.700	6.530	58.80	26.12	4.81	5.32	1082	3090	662

Note:

Comparing to the reference SAR value, 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. 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. 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.

4.1.1. GSM Configuration and Testing

GSM (GMSK: CS1) voice mode transmits with 1 time slot. GPRS (GMSK: CS1) and EDGE (GMSK: MCS1, 8PSK: MCS9) may transmit up to 4 time slots in the 8 time-slot frame according to the multislot class implemented in a device.

4.1.2. WCDMA Configuration and Testing

WCDMA Handsets Head SAR

SAR for next to the ear head exposure is measured using a 12.2 kbps RMC with TPC bits configured to all “1’s”. The 3G SAR test reduction procedure is applied to AMR configurations with 12.2 kbps RMC as the primary mode.

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 DPDCHn 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 (βc, βd), and HS-DPCCH power offset parameters (ΔACK, ΔNACK, ΔCQI) 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.

HSPA+ SAR Guidance

The 3G SAR test reduction procedure is applied to HSPA+ (uplink) with 12.2 kbps RMC as the primary mode. Otherwise, when SAR is required for Rel. 6 HSPA, SAR is required for Rel. 7 HSPA+. Power is measured for HSPA+ that supports uplink 16QAM according to configurations in Table C.11.1.4 of 3GPP TS 34.121-1 to determine SAR test reduction.

DC-HSDPA SAR Guidance

The 3G SAR test reduction procedure is applied to DC-HSDPA with 12.2 kbps RMC as the primary mode. Otherwise, when SAR is required for Rel. 5 HSDPA, SAR is required for Rel. 8 DC-HSDPA. Power is measured for DC-HSDPA according to the H-Set 12, FRC configuration in Table C.8.1.12 of 3GPP TS 34.121-1 to determine SAR test reduction. A primary and a secondary serving HS-DSCH Cell are required to perform the power measurement and for the results to be acceptable.

4.1.3. LTE Configuration and Testing

UE power class is category 3. 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 please refer to the tune up procedure.

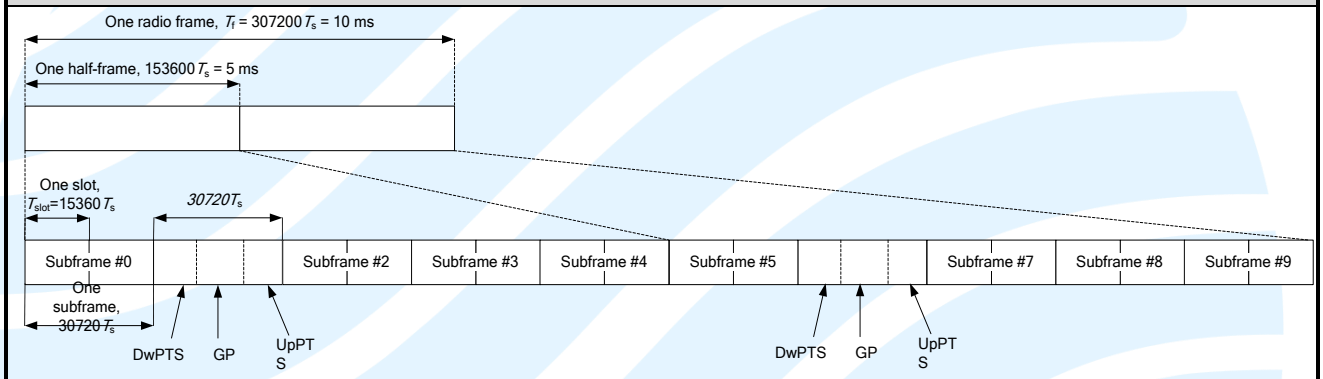
In addition, the device is compliant with additional maximum power reduction (A-MPR) requirements defined in 3GPP TS 36.101 section 6.2.4 that was disabled for all FCC compliance testing.

A properly configured base station simulator is used for the SAR and power measurements, so spectrum plots for each RB allocation and offset configuration are not included in the SAR report to demonstrate that the tested RB allocations have been correctly established at the maximum output power conditions.

TDD-LTE Setup Configurations

According to KDB 941225 D05, SAR testing for TDD-LTE device must be tested using a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by the defined 3GPP TDD-LTE configurations. The TDD-LTE of this device supports frame structure type 2 defined in 3GPP TS 36.211 section 4.2, and the frame structure configuration can be referred to below.

3GPP TS 36.211 Figure 4.2-1: Frame Structure Type 2



3GPP TS 36.211 Table 4.2-1: Configuration of Special Subframe

Special Subframe Configuration	Normal Cyclic Prefix in Downlink			Extended Cyclic Prefix in Downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal Cyclic Prefix in Uplink	Extended Cyclic Prefix in Uplink		Normal Cyclic Prefix in Uplink	Extended Cyclic Prefix in Uplink
0	6592·Ts	2192·Ts	2560·Ts	7680·Ts	2192·Ts	2560·Ts
1	19760·Ts			20480·Ts		
2	21952·Ts			23040·Ts		
3	24144·Ts			25600·Ts		
4	26336·Ts			7680·Ts	4384·Ts	5120·Ts
5	6592·Ts	4384·Ts	5120·Ts	20480·Ts		
6	19760·Ts			23040·Ts		
7	21952·Ts			12800·Ts		
8	24144·Ts			-	-	-
9	13168·Ts			-	-	-

Uplink-Downlink Configurations and duty cycle											
Uplink-Downlink Configuration	Downlink-to-Uplink Switch-Point Periodicity	Subframe Number									Duty-Cycle
		0	1	2	3	4	5	6	7	8	9	
0	5 ms	D	S	U	U	U	D	S	U	U	U	63.33%
1	5 ms	D	S	U	U	D	D	S	U	U	D	43.33%
2	5 ms	D	S	U	D	D	D	S	U	D	D	23.33%
3	10 ms	D	S	U	U	U	D	D	D	D	D	31.67%
4	10 ms	D	S	U	U	D	D	D	D	D	D	21.67%
5	10 ms	D	S	U	D	D	D	D	D	D	D	11.67%
6	5 ms	D	S	U	U	U	D	S	U	U	D	53.33%

Considering the highest transmission duty cycle, TDD-LTE was tested using Uplink-Downlink Configuration 0 with 6 uplink subframe and 2 special subframe. The special subframe was set to special subframe configuration 7 using extended cyclic prefix uplink. Therefore, SAR testing for TDD-LTE was performed at the maximum output power with highest transmission duty cycle of 63.33%.

4.1.4. WLAN Configuration 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.

4.2. EUT TESTING POSITION

4.2.1. Extremity Exposure Conditions

Devices that are designed or intended for use on extremities, or mainly operated in extremity only exposure conditions, i.e., hands, wrists, feet and ankles, may require extremity SAR evaluation. When the device also operates in close proximity to the user's body, SAR compliance for the body is also required. The 1-g body and 10-g extremity SAR Test Exclusion Thresholds in 8.2 should be applied to determine SAR test requirements. When extremity SAR testing is required, a flat phantom must be used if the exposure condition is more conservative than the actual use conditions; otherwise, a KDB inquiry is required to determine the phantom and test requirements. Body SAR compliance is also tested with a flat phantom. For devices with irregular shapes or form factors that do not conform to a flat phantom, and/or unusual operating configurations and exposure conditions, a KDB inquiry is also required to determine the appropriate SAR measurement procedures. Unless it is specified differently in the published RF exposure KDB procedures, when simultaneous transmission applies to extremity exposure, the simultaneous transmission SAR test exclusion provisions should be applied. When simultaneous transmission SAR measurement is required, the enlarged zoom scan and volume scan post-processing procedures in KDB Publication 865664 D01 should be applied.

SAR can test the sides near the antenna, the surface of the device should be tested for SAR compliance with the device touching the phantom. 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 device surface is used to determine if SAR testing is required for the adjacent surfaces, with the adjacent surface positioned against the phantom and the surface containing the antenna positioned perpendicular to the phantom.

4.3. MEASURED CONDUCTED POWER RESULT

4.3.1. Conducted Power of GSM Bands

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

Band	GSM 850			PCS 1900		
Channel	128	190	251	512	661	810
Frequency (MHz)	824.2	836.6	848.8	1850.2	1880.0	1909.8
Maximum Burst-Averaged Output Power						
GSM (GMSK, 1Tx-slot)	N/A	N/A	N/A	N/A	N/A	N/A
GPRS (GMSK, 1Tx-slot)	33.42	33.35	**33.47**	**30.77**	30.66	**30.77**
GPRS (GMSK, 2Tx-slot)	31.15	31.27	31.41	28.52	28.45	28.19
GPRS (GMSK, 3Tx-slot)	29.08	29.23	29.36	26.91	26.86	26.58
GPRS (GMSK, 4Tx-slot)	27.18	27.24	27.34	24.83	24.80	24.54
EDGE (8PSK, 1Tx-slot)	27.19	27.11	26.84	26.00	26.17	25.60
EDGE (8PSK, 2Tx-slot)	26.00	26.13	25.89	24.83	25.41	24.89
EDGE (8PSK, 3Tx-slot)	23.47	23.40	23.19	22.73	23.15	22.73
EDGE (8PSK, 4Tx-slot)	21.59	21.60	21.47	20.39	21.20	20.67
Maximum Frame-Averaged Output Power						
GSM (GMSK, 1Tx-slot)	N/A	N/A	N/A	N/A	N/A	N/A
GPRS (GMSK, 1Tx-slot)	24.42	24.35	24.47	21.77	21.66	21.77
GPRS (GMSK, 2Tx-slot)	25.15	25.27	**25.41**	22.52	22.45	22.19
GPRS (GMSK, 3Tx-slot)	24.82	24.97	25.10	**22.65**	22.60	22.32
GPRS (GMSK, 4Tx-slot)	24.18	24.24	24.34	21.83	21.80	21.54
EDGE (8PSK, 1Tx-slot)	18.19	18.11	17.84	17.00	17.17	16.60
EDGE (8PSK, 2Tx-slot)	20.00	20.13	19.89	18.83	19.41	18.89
EDGE (8PSK, 3Tx-slot)	19.21	19.14	18.93	18.47	18.89	18.47
EDGE (8PSK, 4Tx-slot)	18.59	18.60	18.47	17.39	18.20	17.67

Note:

1) SAR testing was performed on the maximum frame-averaged power mode.
2) 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)

4.3.2. Conducted Power of WCDMA Bands

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

Band	WCDMA Band II			WCDMA Band V			WCDMA Band IV		
Channel	9262	9400	9538	4132	4182	4233	1312	1413	1513
Frequency (MHz)	1852.4	1880.0	1907.6	826.4	836.4	846.6	1712.4	1732.6	1752.6
RMC 12.2K	24.09	24.22	**24.24**	23.72	23.74	**23.78**	23.69	**23.76**	23.75
HSDPA Subtest-1	23.39	23.32	23.21	22.54	22.37	22.42	23.21	23.07	23.21
HSDPA Subtest-2	23.18	23.16	22.93	22.55	22.18	22.28	23.37	23.18	23.32
HSDPA Subtest-3	23.02	22.99	22.76	22.12	21.84	21.93	23.33	23.13	23.27
HSDPA Subtest-4	22.93	23.10	22.82	22.13	21.78	21.93	23.27	23.09	23.22
HSUPA Subtest-1	20.80	20.90	21.06	20.75	20.57	20.48	23.48	22.63	22.72
HSUPA Subtest-2	21.90	21.48	21.38	21.71	20.78	20.97	23.05	22.96	23.00
HSUPA Subtest-3	21.36	21.44	21.36	21.11	20.93	20.89	23.45	22.90	22.91
HSUPA Subtest-4	21.45	21.74	21.62	20.83	20.82	20.77	23.50	23.14	23.37
HSUPA Subtest-5	23.19	23.11	22.84	22.50	22.18	22.28	23.04	22.82	22.87

4.3.3. Conducted Power of LTE Bands

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

➢ **LTE Band 2**

Conducted Power(dBm)								
Modulation			QPSK			16QAM		
Band	Bandwidth (MHz)	RB	18607	18900	19193	18607	18900	19193
			1850.7 MHz	1880 MHz	1909.3 MHz	1850.7 MHz	1880 MHz	1909.3 MHz
2	1.4	1RB#0	24.01	24.05	23.69	23.84	23.43	22.75
		1RB#2	24.07	24.04	24.18	22.55	23.64	22.54
		1RB#5	24.32	24.03	24.18	23.25	23.25	22.63
		3RB#0	24.27	24.15	24.21	22.96	23.34	22.99
		3RB#1	24.24	24.26	24.17	22.94	23.35	22.83
		3RB#3	24.22	24.25	24.20	23.03	23.24	23.06
		6RB#0	23.17	23.25	23.17	22.67	22.36	22.58
Band	Bandwidth (MHz)	RB	18615	18900	19185	18615	18900	19185
			1851.5 MHz	1880 MHz	1908.5 MHz	1851.5 MHz	1880 MHz	1908.5 MHz
2	3	1RB#0	24.22	24.07	24.34	22.60	23.67	23.90
		1RB#8	24.23	24.08	24.20	23.18	23.74	23.09
		1RB#14	24.16	24.02	24.19	23.12	23.00	23.31
		8RB#0	23.26	23.11	23.28	22.53	22.40	22.57
		8RB#4	23.26	23.15	23.25	22.52	22.47	22.53
		8RB#7	23.20	23.22	23.18	22.89	22.40	22.55
		15RB#0	23.30	23.15	23.27	22.23	22.19	22.30
Band	Bandwidth (MHz)	RB	18625	18900	19175	18625	18900	19175
			1852.5 MHz	1880 MHz	1907.5 MHz	1852.5 MHz	1880 MHz	1907.5 MHz
2	5	1RB#0	24.04	24.14	23.97	23.33	23.31	22.74
		1RB#12	24.08	24.28	24.22	23.39	23.05	22.63
		1RB#24	24.04	24.36	24.20	23.33	23.09	22.66
		12RB#0	23.10	23.14	23.17	22.16	22.24	22.26
		12RB#6	23.17	23.13	23.29	22.27	22.15	22.24
		12RB#13	23.12	23.20	23.22	22.27	22.33	22.32
		25RB#0	23.10	23.13	23.24	22.32	22.34	22.40
Band	Bandwidth (MHz)	RB	18650	18900	19150	18650	18900	19150
			1855 MHz	1880 MHz	1905 MHz	1855 MHz	1880 MHz	1905 MHz
2	10	1RB#0	23.78	24.20	24.18	23.16	23.81	22.57
		1RB#24	24.10	24.27	24.25	23.06	23.75	22.64
		1RB#49	24.22	24.38	24.25	22.48	23.20	22.66
		25RB#0	23.27	23.26	23.20	22.35	22.48	22.48
		25RB#12	23.13	23.13	23.24	22.36	22.45	22.43
		25RB#25	23.14	23.18	23.18	22.58	22.25	22.34
		50RB#0	23.19	23.21	23.26	22.27	22.33	22.33
Band	Bandwidth (MHz)	RB	18675	18900	19125	18675	18900	19125
			1857.5 MHz	1880 MHz	1902.5 MHz	1857.5 MHz	1880 MHz	1902.5 MHz
2	15	1RB#0	24.21	24.10	24.22	23.28	23.84	23.34
		1RB#38	24.10	24.17	24.21	23.22	23.80	23.86
		1RB#74	24.12	24.20	24.19	23.23	23.93	23.81
		38RB#0	23.09	23.09	23.21	23.16	23.07	23.22
		38RB#18	23.16	23.05	23.19	23.14	23.08	23.23
		38RB#37	23.14	23.10	23.25	23.12	23.03	23.20
		75RB#0	23.14	23.08	23.19	22.34	22.27	22.31
Band	Bandwidth (MHz)	RB	18700	18900	19100	18700	18900	19100
			1860 MHz	1880 MHz	1900 MHz	1860 MHz	1880 MHz	1900 MHz
2	20	1RB#0	24.45	23.17	24.25	23.10	23.10	23.89
		1RB#49	24.36	24.16	24.31	23.02	23.25	23.74
		1RB#99	24.18	24.27	24.39	23.10	23.48	23.90
		50RB#0	23.14	23.11	23.33	22.29	22.36	22.36
		50RB#25	23.04	23.15	23.28	22.35	22.35	22.32
		50RB#50	23.12	23.29	23.22	22.35	22.36	22.36
		100RB#0	23.04	23.15	23.15	22.36	22.31	23.32

➢ **LTE Band 4**

Conducted Power(dBm)								
Modulation			QPSK			16QAM		
Band	Bandwidth (MHz)	RB	19957	20175	20393	19957	20175	20393
			1710.7 MHz	1732.5 MHz	1754.3 MHz	1710.7 MHz	1732.5 MHz	1754.3 MHz
4	1.4	1RB#0	24.23	24.44	24.22	23.84	22.94	23.33
		1RB#2	24.40	24.29	24.26	23.89	23.25	23.41
		1RB#5	24.19	24.27	24.16	23.24	23.29	23.35
		3RB#0	24.30	24.30	24.49	23.22	23.43	23.18
		3RB#1	24.28	24.10	24.31	23.26	23.21	23.30
		3RB#3	24.36	24.09	24.41	23.30	23.34	23.18
		6RB#0	23.13	23.11	23.25	22.71	22.46	23.20
Band	Bandwidth (MHz)	RB	19965	20175	20385	19965	20175	20385
			1711.5 MHz	1732.5 MHz	1753.5 MHz	1711.5 MHz	1732.5 MHz	1753.5 MHz
4	3	1RB#0	24.20	24.24	24.11	23.28	23.42	23.87
		1RB#8	24.15	24.33	24.20	23.39	23.23	23.85
		1RB#14	24.40	23.23	24.25	23.21	24.02	23.24
		8RB#0	23.17	23.29	23.22	22.57	22.63	23.21
		8RB#4	23.19	23.24	23.23	23.23	22.64	23.13
		8RB#7	23.34	23.26	23.27	22.54	22.65	22.53
		15RB#0	23.24	23.25	23.20	22.47	26.36	22.39
Band	Bandwidth (MHz)	RB	19975	20175	20375	19975	20175	20375
			1712.5 MHz	1732.5 MHz	1752.5 MHz	1712.5 MHz	1732.5 MHz	1752.5 MHz
4	5	1RB#0	24.39	24.55	24.48	23.23	23.18	22.61
		1RB#12	24.23	24.09	24.53	23.12	23.60	22.65
		1RB#24	24.42	24.44	24.41	23.23	23.51	22.70
		12RB#0	23.24	23.19	23.27	22.37	22.33	22.41
		12RB#6	23.21	23.21	23.25	22.34	22.26	22.41
		12RB#13	23.24	23.17	23.32	22.29	22.29	22.38
		25RB#0	23.15	23.14	23.16	22.24	22.37	22.56
Band	Bandwidth (MHz)	RB	20000	20175	20350	20000	20175	20350
			1715 MHz	1732.5 MHz	1750 MHz	1715 MHz	1732.5 MHz	1750 MHz
4	10	1RB#0	24.14	24.33	24.24	23.36	23.19	24.06
		1RB#24	24.15	24.25	24.37	23.33	23.23	24.15
		1RB#49	24.16	24.35	24.35	23.40	23.21	24.09
		25RB#0	23.11	23.22	23.28	22.36	22.56	22.47
		25RB#12	23.23	23.27	23.18	22.34	22.55	22.47
		25RB#25	23.32	23.19	23.19	22.43	22.55	22.48
		50RB#0	23.23	23.14	23.36	22.39	22.44	22.65
Band	Bandwidth (MHz)	RB	20025	20175	20325	20025	20175	20325
			1717.5 MHz	1732.5 MHz	1747.5 MHz	1717.5 MHz	1732.5 MHz	1747.5 MHz
4	15	1RB#0	24.20	24.31	24.14	23.13	23.21	23.31
		1RB#38	24.16	24.39	24.23	23.33	23.32	23.28
		1RB#74	24.23	24.42	24.29	23.34	23.39	23.38
		38RB#0	23.21	23.14	23.31	23.18	23.27	23.30
		38RB#18	23.16	23.24	23.29	23.21	23.21	23.28
		38RB#37	23.16	23.29	23.27	23.16	23.27	23.26
		75RB#0	23.28	23.26	23.25	22.37	22.52	22.39
Band	Bandwidth (MHz)	RB	20050	20175	20300	20050	20175	20300
			1720 MHz	1732.5 MHz	1745 MHz	1720 MHz	1732.5 MHz	1745 MHz
4	20	1RB#0	24.34	24.27	24.52	23.20	22.99	22.48
		1RB#49	24.50	24.30	24.65	23.30	22.97	22.86
		1RB#99	24.58	24.36	24.68	23.34	23.11	22.90
		50RB#0	23.20	23.33	23.24	22.46	22.50	22.50
		50RB#25	23.25	23.31	23.26	22.44	22.49	22.48
		50RB#50	23.23	23.17	23.46	22.49	22.53	22.67
		100RB#0	23.24	23.22	23.25	22.50	22.35	22.43

➢ **LTE Band 5**

Conducted Power(dBm)								
Modulation			QPSK			16QAM		
Band	Bandwidth (MHz)	RB	20407	20525	20643	20407	20525	20643
			824.7 MHz	836.5 MHz	848.3 MHz	824.7 MHz	836.5 MHz	848.3 MHz
5	1.4	1RB#0	23.57	23.84	23.82	22.78	22.53	23.09
		1RB#2	23.62	23.74	23.84	22.75	22.57	23.32
		1RB#5	23.60	23.84	23.86	22.72	22.51	22.27
		3RB#0	23.69	23.78	23.84	22.56	22.66	22.42
		3RB#1	23.84	23.76	23.77	22.34	22.70	22.47
		3RB#3	23.74	23.87	23.84	22.27	22.65	22.37
		6RB#0	22.72	22.76	22.84	21.68	22.40	21.92
Band	Bandwidth (MHz)	RB	20415	20525	20635	20415	20525	20635
			825.5 MHz	836.5 MHz	847.5 MHz	825.5 MHz	836.5 MHz	847.5 MHz
5	3	1RB#0	23.44	23.72	23.98	22.74	23.23	22.43
		1RB#8	23.65	23.71	23.80	22.96	23.38	23.05
		1RB#14	23.82	23.66	23.85	23.01	23.42	23.08
		8RB#0	22.75	22.70	22.83	22.05	21.75	22.14
		8RB#4	22.68	22.70	22.81	22.00	21.77	22.12
		8RB#7	22.78	22.67	22.78	22.50	22.34	22.07
		15RB#0	22.73	22.68	22.85	21.83	22.22	21.90
Band	Bandwidth (MHz)	RB	20425	20525	20625	20425	20525	20625
			826.5 MHz	836.5 MHz	846.5 MHz	826.5 MHz	836.5 MHz	846.5 MHz
5	5	1RB#0	23.67	23.89	23.73	21.92	22.92	22.96
		1RB#12	23.85	23.77	23.66	22.08	22.87	22.85
		1RB#24	23.73	24.02	23.68	22.12	23.02	22.82
		12RB#0	22.70	22.86	22.91	21.83	21.82	21.85
		12RB#6	22.69	22.86	22.87	21.85	21.87	21.85
		12RB#13	22.75	22.83	22.85	22.22	22.29	21.78
		25RB#0	22.86	22.85	22.86	22.34	22.29	22.00
Band	Bandwidth (MHz)	RB	20450	20525	20600	20450	20525	20600
			829 MHz	836.5 MHz	844 MHz	829 MHz	836.5 MHz	844 MHz
5	10	1RB#0	23.84	23.82	23.80	22.52	23.03	22.32
		1RB#24	23.69	23.89	23.76	22.67	23.50	22.63
		1RB#49	23.79	23.83	23.72	22.60	23.43	22.61
		25RB#0	22.83	22.78	22.73	22.39	21.89	22.41
		25RB#12	22.76	22.85	22.88	22.37	21.89	22.41
		25RB#25	22.80	22.78	22.85	21.90	22.27	22.04
		50RB#0	22.86	22.72	22.79	21.92	22.33	21.84

➢ **LTE Band 7**

Conducted Power(dBm)								
Modulation			QPSK			16QAM		
Band	Bandwidth (MHz)	RB	20775	21100	21425	20775	21100	21425
			2502.5 MHz	2535 MHz	2567.5 MHz	2502.5 MHz	2535 MHz	2567.5 MHz
7	5	1RB#0	24.57	24.25	24.47	22.74	23.58	23.05
		1RB#12	24.47	24.21	24.36	22.82	23.62	22.99
		1RB#24	24.58	24.24	24.38	22.80	23.65	23.06
		12RB#0	22.98	22.79	23.01	22.06	22.18	22.01
		12RB#6	22.89	22.79	23.01	22.02	22.12	22.01
		12RB#13	22.99	22.94	22.99	22.03	22.19	21.98
		25RB#0	22.97	22.90	22.93	22.07	22.17	22.09
Band	Bandwidth (MHz)	RB	20800	21100	21400	20800	21100	21400
			2505 MHz	2535 MHz	2565 MHz	2505 MHz	2535 MHz	2565 MHz
7	10	1RB#0	23.83	23.98	23.92	23.39	23.12	23.96
		1RB#24	23.81	24.07	23.96	23.49	23.32	24.04
		1RB#49	23.91	24.13	23.96	23.51	23.32	23.97
		25RB#0	22.90	22.99	23.05	21.96	22.20	22.07
		25RB#12	22.89	22.99	22.94	21.95	22.20	22.09
		25RB#25	22.87	22.89	22.94	22.02	22.23	22.21
		50RB#0	22.86	22.98	23.07	22.08	22.15	22.20
Band	Bandwidth (MHz)	RB	20825	21100	21375	20825	21100	21375
			2507.5 MHz	2535 MHz	2562.5 MHz	2507.5 MHz	2535 MHz	2562.5 MHz
7	15	1RB#0	23.80	23.56	23.85	23.44	23.23	23.93
		1RB#38	23.84	23.53	23.84	23.41	23.28	23.95
		1RB#74	23.83	23.55	23.95	23.56	23.38	23.99
		38RB#0	23.04	22.88	23.01	22.84	22.87	23.01
		38RB#18	22.85	22.87	23.01	22.83	22.87	23.01
		38RB#37	22.84	22.88	23.01	22.85	22.88	23.01
		75RB#0	22.85	22.87	23.00	22.01	22.11	22.13
Band	Bandwidth (MHz)	RB	20850	21100	21350	20850	21100	21350
			2510 MHz	2535 MHz	2560 MHz	2510 MHz	2535 MHz	2560 MHz
7	20	1RB#0	24.11	23.91	24.03	23.19	23.92	23.36
		1RB#49	24.12	23.96	24.06	23.19	23.96	23.36
		1RB#99	24.15	24.14	24.13	23.20	24.08	23.40
		50RB#0	23.01	22.85	23.00	22.14	22.05	22.33
		50RB#25	22.83	22.86	23.07	22.16	22.06	22.15
		50RB#50	22.88	23.02	23.01	22.04	22.19	22.30
		100RB#0	22.99	22.98	22.99	22.08	22.14	22.12

➢ **LTE Band 38**

Conducted Power(dBm)								
Modulation			QPSK			16QAM		
Band	Bandwidth (MHz)	RB	37775	38000	38225	37775	38000	38225
			2572.5 MHz	2595 MHz	2617.5 MHz	2572.5 MHz	2595 MHz	2617.5 MHz
38	5	1RB#0	23.79	23.68	23.82	23.61	23.23	23.84
		1RB#12	23.81	23.73	23.83	23.89	23.19	23.84
		1RB#24	23.75	23.80	23.84	23.54	23.48	23.82
		12RB#0	22.84	22.96	22.95	21.35	21.48	21.43
		12RB#6	22.84	22.94	22.97	21.39	21.52	21.43
		12RB#13	22.86	22.90	22.93	21.38	21.58	21.38
		25RB#0	22.86	22.86	22.94	21.50	21.39	21.63
Band	Bandwidth (MHz)	RB	37800	38000	38200	37800	38000	38200
			2575 MHz	2595 MHz	2615 MHz	2575 MHz	2595 MHz	2615 MHz
38	10	1RB#0	23.43	23.39	23.70	23.06	22.88	23.60
		1RB#24	23.45	23.43	23.60	23.12	23.73	23.62
		1RB#49	23.54	23.50	23.70	23.21	23.13	23.43
		25RB#0	22.47	22.51	22.60	21.07	21.34	21.19
		25RB#12	22.43	22.62	22.67	21.10	21.35	21.24
		25RB#25	22.49	22.57	22.58	21.14	21.36	21.30
		50RB#0	22.41	22.53	22.48	21.14	21.20	21.19
Band	Bandwidth (MHz)	RB	37825	38000	38175	37825	38000	38175
			2577.5 MHz	2595 MHz	2612.5 MHz	2577.5 MHz	2595 MHz	2612.5 MHz
38	15	1RB#0	23.77	23.98	23.83	22.97	24.02	23.13
		1RB#38	23.78	23.98	23.91	22.96	23.45	23.13
		1RB#74	23.76	24.02	23.96	23.11	23.53	23.17
		38RB#0	22.83	22.85	23.03	22.83	22.86	23.02
		38RB#18	22.83	22.86	23.02	22.82	22.86	23.02
		38RB#37	22.82	22.86	23.02	22.81	22.86	23.02
		75RB#0	22.81	22.86	23.02	21.51	21.66	21.67
Band	Bandwidth (MHz)	RB	37850	38000	38150	37850	38000	38150
			2580 MHz	2595 MHz	2610 MHz	2580 MHz	2595 MHz	2610 MHz
38	20	1RB#0	23.81	23.83	23.78	23.51	23.52	22.97
		1RB#49	23.81	23.98	23.98	23.47	23.55	22.88
		1RB#99	23.93	24.12	24.02	23.56	23.71	22.80
		50RB#0	22.96	23.11	23.15	21.89	21.72	21.74
		50RB#25	23.09	23.14	23.18	21.89	21.73	21.72
		50RB#50	22.98	23.23	23.20	21.85	21.89	21.69
		100RB#0	23.06	23.06	23.23	21.75	21.67	21.73

➢ **LTE Band 40A**

Conducted Power(dBm)								
Modulation			QPSK			16QAM		
Band	Bandwidth (MHz)	RB	38725	38750	38775	38725	38750	38775
			2307.5 MHz	2310 MHz	2312.5 MHz	2307.5 MHz	2310 MHz	2312.5 MHz
40	5	1RB#0	22.55	22.52	22.5	21.36	21.44	21.67
		1RB#12	22.73	22.54	22.43	21.4	21.5	21.65
		1RB#24	22.72	22.55	22.46	21.44	21.48	21.7
		12RB#0	21.03	21.14	21.19	20.17	20.02	20.27
		12RB#6	21.07	21.15	21.24	20.16	20.02	20.28
		12RB#13	21.07	21.15	21.21	20.16	20.03	20.28
		25RB#0	21.04	21.15	21.14	21.04	21.15	21.22
Band	Bandwidth (MHz)	RB	--	38750	--	--	38750	--
			--	2310 MHz	--	--	2310 MHz	--
40	10	1RB#0	--	22.41	--	--	21.18	--
		1RB#24	--	22.5	--	--	21.15	--
		1RB#49	--	22.5	--	--	21.08	--
		25RB#0	--	20.84	--	--	20.06	--
		25RB#12	--	20.84	--	--	20.06	--
		25RB#25	--	20.96	--	--	19.92	--
		50RB#0	--	18.91	--	--	17.87	--

➢ **LTE Band 40B**

Conducted Power(dBm)								
Modulation			QPSK			16QAM		
Band	Bandwidth (MHz)	RB	39175	39200	39225	39175	39200	39225
			2352.5 MHz	2355 MHz	2357.5 MHz	2352.5 MHz	2355 MHz	2357.5 MHz
40	5	1RB#0	22.96	22.85	22.92	22.86	21.82	22.11
		1RB#12	22.94	22.82	22.94	22.93	21.75	22.24
		1RB#24	22.92	22.95	22.88	22.93	21.80	22.07
		12RB#0	22.93	21.44	21.49	22.94	20.55	20.76
		12RB#6	22.94	21.44	21.49	22.94	20.43	20.76
		12RB#13	22.94	21.44	21.49	22.94	20.54	20.76
		25RB#0	22.94	21.44	21.49	22.94	21.44	21.49
Band	Bandwidth (MHz)	RB	--	39200	--	--	39200	--
			--	2355 MHz	--	--	2355 MHz	--
40	10	1RB#0	--	22.86	--	--	21.44	--
		1RB#24	--	22.89	--	--	21.46	--
		1RB#49	--	22.98	--	--	21.59	--
		25RB#0	--	21.21	--	--	20.40	--
		25RB#12	--	21.21	--	--	20.33	--
		25RB#25	--	21.19	--	--	20.49	--
		50RB#0	--	19.26	--	--	18.17	--

➢ **LTE Band 41 (2555-2655MHz)**

Conducted Power(dBm)								
Modulation			QPSK			16QAM		
Band	Bandwidth (MHz)	RB	40265	40690	41215	40265	40690	41215
			2557.5 MHz	2600 MHz	2652.5 MHz	2557.5 MHz	2600 MHz	2652.5 MHz
41	5	1RB#0	23.74	23.70	23.77	23.66	23.39	23.77
		1RB#12	23.75	23.82	23.87	23.44	23.37	23.78
		1RB#24	23.84	23.80	23.83	23.54	23.38	23.76
		12RB#0	22.81	22.96	23.03	21.38	21.47	21.33
		12RB#6	22.73	22.93	22.97	21.38	21.50	21.35
		12RB#13	22.84	22.85	22.95	21.40	21.56	21.45
		25RB#0	22.79	22.91	22.95	21.53	21.41	21.51
Band	Bandwidth (MHz)	RB	40290	40690	41190	40290	40690	41190
			2560 MHz	2600 MHz	2650 MHz	2560 MHz	2600 MHz	2650 MHz
41	10	1RB#0	23.20	23.57	23.48	22.96	22.89	23.33
		1RB#24	23.29	23.50	23.53	22.87	22.89	23.40
		1RB#49	23.32	23.54	23.60	22.97	22.91	23.87
		25RB#0	22.40	22.65	22.42	21.08	21.23	21.17
		25RB#12	22.41	22.55	22.37	21.10	21.28	21.19
		25RB#25	22.48	22.57	22.55	21.04	21.31	21.28
		50RB#0	22.37	22.48	22.48	21.06	21.26	21.17
Band	Bandwidth (MHz)	RB	40315	40690	41165	40315	40690	41165
			2562.5 MHz	2600 MHz	2647.5 MHz	2562.5 MHz	2600 MHz	2647.5 MHz
41	15	1RB#0	23.33	23.55	23.54	22.90	22.83	23.75
		1RB#38	23.24	23.67	23.49	22.82	22.96	23.52
		1RB#74	23.44	23.61	23.53	22.97	22.90	23.71
		38RB#0	22.37	22.48	22.43	22.37	22.49	22.43
		38RB#18	22.37	22.50	22.43	22.37	22.50	22.43
		38RB#37	22.37	22.50	22.43	22.37	22.51	22.43
		75RB#0	22.38	22.51	22.43	21.20	21.36	21.18
Band	Bandwidth (MHz)	RB	40340	40690	41140	40340	40690	41140
			2565 MHz	2600 MHz	2645 MHz	2565 MHz	2600 MHz	2645 MHz
41	20	1RB#0	23.74	23.92	23.86	23.65	23.45	22.64
		1RB#49	23.76	24.11	23.88	23.61	23.47	22.67
		1RB#99	23.86	24.21	23.83	23.82	23.69	22.76
		50RB#0	22.50	22.77	22.63	21.41	21.37	21.28
		50RB#25	22.51	22.80	22.63	21.42	21.39	21.28
		50RB#50	22.71	22.73	22.77	21.49	21.47	21.39
		100RB#0	22.67	22.73	22.61	21.31	21.44	21.34

➢ **LTE Band 66**

Conducted Power(dBm)								
Modulation			QPSK			16QAM		
Band	Bandwidth (MHz)	RB	131979	132322	132665	131979	132322	132665
			1710.7 MHz	1745 MHz	1779.3 MHz	1710.7 MHz	1745 MHz	1779.3 MHz
66	1.4	1RB#0	24.21	24.25	24.32	23.85	23.76	22.69
		1RB#2	24.22	24.26	24.30	23.83	23.77	22.55
		1RB#5	24.22	24.22	24.28	23.84	23.81	22.62
		3RB#0	24.39	24.27	24.25	23.01	22.78	23.19
		3RB#1	24.37	24.27	24.23	23.08	22.78	23.18
		3RB#3	24.38	24.25	24.18	23.07	22.75	23.22
		6RB#0	23.30	23.23	23.23	22.46	22.51	22.38
Band	Bandwidth (MHz)	RB	131987	132322	132657	131987	132322	132657
			1711.5 MHz	1745 MHz	1778.5 MHz	1711.5 MHz	1745 MHz	1778.5 MHz
66	3	1RB#0	24.26	24.37	24.34	23.21	22.95	23.20
		1RB#8	24.28	24.43	24.33	23.15	22.85	23.14
		1RB#14	24.28	24.39	24.30	23.18	22.95	23.21
		8RB#0	23.19	23.34	23.15	22.61	22.76	22.41
		8RB#4	23.20	23.35	23.26	22.61	22.77	22.42
		8RB#7	23.27	23.22	23.29	22.53	22.74	22.41
		15RB#0	23.23	23.34	23.15	22.40	22.30	22.42
Band	Bandwidth (MHz)	RB	131997	132322	132647	131997	132322	132647
			1712.5 MHz	1745 MHz	1777.5 MHz	1712.5 MHz	1745 MHz	1777.5 MHz
66	5	1RB#0	24.31	24.25	24.18	22.83	23.58	22.99
		1RB#12	24.36	24.25	24.11	22.77	23.61	22.94
		1RB#24	24.34	24.29	24.15	22.79	23.54	22.97
		12RB#0	23.23	23.27	23.25	22.38	22.58	22.23
		12RB#6	23.23	23.29	23.17	22.38	22.59	22.24
		12RB#13	23.34	23.21	23.28	22.39	22.61	22.30
		25RB#0	23.27	23.26	23.23	22.57	22.52	22.36
Band	Bandwidth (MHz)	RB	132022	132322	132622	132022	132322	132622
			1715 MHz	1745 MHz	1775 MHz	1715 MHz	1745 MHz	1775 MHz
66	10	1RB#0	24.16	24.31	24.28	23.42	23.11	23.86
		1RB#24	24.19	24.36	24.20	23.39	23.13	23.82
		1RB#49	24.17	24.38	24.22	23.41	23.18	23.90
		25RB#0	23.16	23.25	23.33	22.39	22.54	22.52
		25RB#12	23.15	23.37	23.23	22.39	22.55	22.53
		25RB#25	23.28	23.26	23.37	22.41	22.55	22.49
		50RB#0	23.32	23.36	23.32	22.37	22.54	22.51
Band	Bandwidth (MHz)	RB	132047	132322	132597	132047	132322	132597
			1717.5 MHz	1745 MHz	1772.5 MHz	1717.5 MHz	1745 MHz	1772.5 MHz
66	15	1RB#0	24.18	24.34	24.23	23.42	23.62	23.86
		1RB#38	24.18	24.36	24.23	23.40	23.64	23.89
		1RB#74	24.21	24.36	24.24	23.41	23.60	23.87
		38RB#0	23.20	23.19	23.31	23.20	23.21	23.32
		38RB#18	23.19	23.21	23.32	23.19	23.21	23.33
		38RB#37	23.19	23.21	23.33	23.19	23.22	23.32
		75RB#0	23.18	23.22	23.33	22.40	22.50	22.42
Band	Bandwidth (MHz)	RB	132072	132322	132572	132072	132322	132572
			1720 MHz	1745 MHz	1770 MHz	1720 MHz	1745 MHz	1770 MHz
66	20	1RB#0	24.54	24.27	24.31	23.17	23.96	22.97
		1RB#49	24.55	24.32	24.31	23.20	23.97	22.97
		1RB#99	24.55	24.39	24.33	23.28	24.03	23.05
		50RB#0	23.21	23.23	23.35	22.48	22.48	22.57
		50RB#25	23.20	23.29	23.33	22.47	22.50	22.56
		50RB#50	23.36	23.33	23.23	22.50	22.49	22.54
		100RB#0	23.28	23.18	23.25	22.40	22.60	22.42

4.3.4. Conducted Power of WLAN

The measuring conducted average power is shown as below.

Band	Mode	Channel	Frequency (MHz)	Average Power (dBm)
2.4GHz	802.11b	1	2412	16.30
		6	2437	***16.60***
		11	2462	16.16
	802.11g	1	2412	15.55
		6	2437	16.08
		11	2462	15.59
	802.11n-HT20	1	2412	13.07
		6	2437	13.57
		11	2462	13.09

4.3.5. Conducted Power of BT

Mode	Modulation	Channel	Frequency (MHz)	Average Power (dBm)
BR + EDR	GFSK	0	2402	6.32
		39	2441	4.30
		78	2480	3.79
	π/4-DQPSK	0	2402	4.12
		39	2441	3.22
		78	2480	3.11
	8-DPSK	0	2402	4.09
		39	2441	3.23
		78	2480	3.10

Mode	Modulation	Channel	Frequency (MHz)	Average Power (dBm)
LE	GFSK	0	2402	-2.08
		19	2440	-1.39
		39	2480	-2.98

4.4. SAR TEST EXCLUSION EVALUATIONS

4.4.1. Standalone SAR Test Exclusion Considerations

According to KDB 447498 D04, SAR-based thresholds are derived based on frequency, power, and separation distance of the RF source. The formula defines the thresholds in general for either available maximum time-averaged power or maximum time-averaged ERP, whichever is greater.

The separation distance is the smallest distance from any part of the antenna or radiating structure for all persons, during operation at the applicable ERP. In the case of mobile or portable devices, the separation distance is from the outer housing of the device where it is closest to the antenna.

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

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

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

where

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

f is in GHz, d is the separation distance (cm), and ERP_{20cm} is per Formula (B.1).

Table B.2—Example Power Thresholds (mW)

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

Mode	Max. time-averaged Power (dBm)	Gain (dBi)	ERP (dBm)	P_{ant} (mW)	Left Side			Right Side			Top Side			Bottom Side		
					Ant. to Surface (cm)	P_{th} (mW)	Require SAR Testing ?	Ant. to Surface (cm)	P_{th} (mW)	Require SAR Testing ?	Ant. to Surface (cm)	P_{th} (mW)	Require SAR Testing ?	Ant. to Surface (cm)	P_{th} (mW)	Require SAR Testing ?
GSM 850	26.00	-3.33	20.52	398.11	0.5	9.04	Yes	7.1	395.96	Yes	1.2	31.45	Yes	11.9	826.40	No
DCS 1900	23.00	1.47	24.47	279.90	0.5	3.35	Yes	7.1	451.35	No	1.2	16.89	Yes	11.9	1172.23	No
WCDMA Band II	24.50	1.47	25.97	395.37	0.5	3.35	Yes	7.1	451.47	No	1.2	16.90	Yes	11.9	1172.39	No
WCDMA Band IV	24.50	2.66	27.16	520.00	0.5	3.59	Yes	7.1	460.15	Yes	1.2	17.80	Yes	11.9	1183.64	No
WCDMA Band V	24.50	-3.33	19.02	281.84	0.5	9.07	Yes	7.1	395.63	No	1.2	31.52	Yes	11.9	824.99	No
LTE Band 2	25.00	1.47	26.47	443.61	0.5	3.35	Yes	7.1	451.38	No	1.2	16.89	Yes	11.9	1172.27	No
LTE Band 4	25.00	2.66	27.66	583.45	0.5	3.59	Yes	7.1	460.05	Yes	1.2	17.79	Yes	11.9	1183.51	No
LTE Band 5	24.50	-3.33	19.02	281.84	0.5	9.04	Yes	7.1	395.88	No	1.2	31.47	Yes	11.9	826.08	No
LTE Band 7	25.00	4.49	29.49	889.20	0.5	2.64	Yes	7.1	422.29	Yes	1.2	14.10	Yes	11.9	1133.77	No
LTE Band 38	24.50	3.83	28.33	680.77	0.5	2.60	Yes	7.1	420.46	Yes	1.2	13.93	Yes	11.9	1131.31	No
LTE Band 40	23.50	2.59	26.09	406.44	0.5	2.83	Yes	7.1	430.47	No	1.2	14.85	Yes	11.9	1144.73	No
LTE Band 41	24.50	4.49	28.99	792.50	0.5	2.55	Yes	7.1	417.98	Yes	1.2	13.71	Yes	11.9	1127.95	No
LTE Band 66	25.00	2.79	27.79	601.17	0.5	3.55	Yes	7.1	458.59	Yes	1.2	17.64	Yes	11.9	1181.63	No
WLAN 2.4G	17.00	1.84	18.84	76.56	6.2	329.02	No	0.5	2.72	Yes	4.5	178.74	No	12.3	1212.61	No
Bluetooth	6.50	2.29	8.79	7.57	6.2	328.75	No	0.5	2.72	Yes	4.5	178.55	No	12.3	1212.19	No

Note:

1) Based on the antenna location shown on appendix D of this report for SAR test exclusion.
2) The 1 mW Blanket Exemption applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power of no more than 1 mW, regardless of separation distance.

4.4.2. Estimated SAR Calculation

According to KDB 447498 D04, when an antenna qualifies for test exemption in single transmitter/antenna mode, its actual SAR value may not be available, because it was not required to be measured. In this case, the SAR contribution of that antenna to simultaneous transmission must be estimated relative to the SAR or MPE based exemption criteria for the applicable terms in the equation of § 1.1307(b)(3(ii)(B) (see also Appendix C), by multiplying the corresponding ratio by the SAR limit of 1.6 W/kg for 1-g SAR. This is referred to as estimated SAR.

For instance, a given antenna may qualify for a SAR-based exemption according to Section B.4, with $P_{ant} < P_{th}$, where Pant is maximum time-averaged power or effective radiated power (ERP), whichever is greater, and P_{th} is defined in Formula (B.2). Then, per the preceding paragraph, the estimated SAR is computed as $SAR_{est} = 1.6 * P_{ant} / P_{th}$ [W/kg].

If RF exposure testing requirements for a specific device are covered in a KDB publication, those requirements must be satisfied before applying any SAR test exemption provisions. For example, this is the case for handheld PTT two-way radios, handsets, laptops, and tablets, etc.

Finally, when 10-g extremity SAR applies, SAR test exemption may be considered by applying a factor of 2.5 to the SAR-based exemption thresholds.

Mode / Band	Frequency (GHz)	P_{ant} (mW)	Ant. to Surface (cm)	P_{th} (mW)	Test Position	Estimated 10g SAR (W/kg)
GSM 850	848.8	398.11	11.9	826.40	Bottom Side	1.927
DCS 1900	1909.8	279.90	11.9	1172.23	Bottom Side	0.955
WCDMA Band II	1907.6	395.37	11.9	1172.39	Bottom Side	1.349
WCDMA Band IV	1752.6	520.00	11.9	1183.64	Bottom Side	1.757
WCDMA Band V	846.6	281.84	11.9	824.99	Bottom Side	1.367
LTE Band 2	1909.3	443.61	11.9	1172.27	Bottom Side	1.514
LTE Band 4	1754.3	583.45	11.9	1183.51	Bottom Side	1.972
LTE Band 5	848.3	281.84	11.9	826.08	Bottom Side	1.365
LTE Band 7	2567.5	889.20	11.9	1133.77	Bottom Side	3.137
LTE Band 38	2617.5	680.77	11.9	1131.31	Bottom Side	2.407
LTE Band 40	2357.5	406.44	11.9	1144.73	Bottom Side	1.420
LTE Band 41	2687.5	792.50	11.9	1127.95	Bottom Side	2.810
LTE Band 66	1779.3	601.17	11.9	1181.63	Bottom Side	2.035
WLAN 2.4G	2472	76.56	12.3	1212.61	Bottom Side	0.253
Bluetooth	2480	7.57	12.3	1212.19	Bottom Side	0.025

4.5. SAR TESTING RESULTS

4.5.1. SAR Test Reduction Considerations

KDB 447498 D04 Interim 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:

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

a) GSM SAR Test Reduction

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. The GMSK EDGE configurations are grouped with GPRS and considered with respect to time-averaged maximum output power to determine compliance. The 3G SAR test reduction procedure is applied to 8-PSK EDGE with GMSK GPRS/EDGE as the primary mode.

b) 3G SAR Test Reduction Procedure

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 for LTE Devices

a) 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.

b) 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.

c) 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.

d) Others 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 Wi-Fi SAR

a) 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.

b) 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.

c) 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.

d) 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.

4.5.2. SAR Results for Extremity Exposure Condition (Separation Distance is 0 cm)

Plot No.	Band	Mode	Test Position	Channel	RB#	RB Offset	Duty Cycle	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Measured SAR-10g (W/kg)	Scaling Factor	Scaled SAR-10g (W/kg)
1	GSM850	GPRS10	Front Face	251	-	-	-	32.0	31.41	0.02	0.4	0.229	1.15	**0.262**
	GSM850	GPRS10	Rear Face	251	-	-	-	32.0	31.41	-0.11	0.1	0.0713	1.15	0.082
	GSM850	GPRS10	Left Side	251	-	-	-	32.0	31.41	-0.20	0.286	0.137	1.15	0.157
	GSM850	GPRS10	Right Side	251	-	-	-	32.0	31.41	0.01	0.0531	0.0302	1.15	0.035
	GSM850	GPRS10	Top Side	251	-	-	-	32.0	31.41	0.10	0.0852	0.0511	1.15	0.059
	PCS 1900	GPRS11	Front Face	512	-	-	-	27.5	26.91	0.02	0.188	0.106	1.15	0.121
	PCS 1900	GPRS11	Rear Face	512	-	-	-	27.5	26.91	0.08	0.0272	0.0173	1.15	0.020
2	PCS 1900	GPRS11	Left Side	512	-	-	-	27.5	26.91	-0.05	0.796	0.401	1.15	**0.459**
	PCS 1900	GPRS11	Right Side	512	-	-	-	27.5	26.91	-0.03	0.053	0.029	1.15	0.033
	PCS 1900	GPRS11	Top Side	512	-	-	-	27.5	26.91	0.17	0.0444	0.024	1.15	0.027
	WCDMA Band II	RMC12.2K	Front Face	9538	-	-	-	24.5	24.24	-0.02	0.173	0.0949	1.06	0.101
	WCDMA Band II	RMC12.2K	Rear Face	9538	-	-	-	24.5	24.24	0.05	0.0295	0.0183	1.06	0.019
3	WCDMA Band II	RMC12.2K	Left Side	9538	-	-	-	24.5	24.24	-0.04	0.787	0.386	1.06	**0.410**
	WCDMA Band II	RMC12.2K	Right Side	9538	-	-	-	24.5	24.24	-0.18	0.0358	0.0193	1.06	0.020
	WCDMA Band II	RMC12.2K	Top Side	9538	-	-	-	24.5	24.24	0.14	0.032	0.0162	1.06	0.017
	WCDMA Band IV	RMC12.2K	Front Face	1413	-	-	-	24.5	23.76	0.18	0.225	0.13	1.19	0.154
	WCDMA Band IV	RMC12.2K	Rear Face	1413	-	-	-	24.5	23.76	-0.13	0.0698	0.0469	1.19	0.056
4	WCDMA Band IV	RMC12.2K	Left Side	1413	-	-	-	24.5	23.76	-0.03	0.685	0.312	1.19	**0.370**
	WCDMA Band IV	RMC12.2K	Right Side	1413	-	-	-	24.5	23.76	0.01	0.0615	0.0345	1.19	0.041
	WCDMA Band IV	RMC12.2K	Top Side	1413	-	-	-	24.5	23.76	0.03	0.0729	0.0427	1.19	0.051
5	WCDMA Band V	RMC12.2K	Front Face	4233	-	-	-	24.5	23.78	0.07	0.281	0.16	1.18	**0.189**
	WCDMA Band V	RMC12.2K	Rear Face	4233	-	-	-	24.5	23.78	-0.06	0.0796	0.0564	1.18	0.067
	WCDMA Band V	RMC12.2K	Left Side	4233	-	-	-	24.5	23.78	-0.20	0.334	0.158	1.18	0.186
	WCDMA Band V	RMC12.2K	Right Side	4233	-	-	-	24.5	23.78	-0.07	0.0568	0.0354	1.18	0.042
	WCDMA Band V	RMC12.2K	Top Side	4233	-	-	-	24.5	23.78	0.13	0.0707	0.0425	1.18	0.050
	LTE Band 2	QPSK20M	Front Face	18700	1	0	-	25.0	24.45	0.03	0.234	0.13	1.14	0.148
	LTE Band 2	QPSK20M	Rear Face	18700	1	0	-	25.0	24.45	-0.09	0.0304	0.0191	1.14	0.022
6	LTE Band 2	QPSK20M	Left Side	18700	1	0	-	25.0	24.45	-0.05	0.822	0.395	1.14	**0.448**
	LTE Band 2	QPSK20M	Right Side	18700	1	0	-	25.0	24.45	0.03	0.0619	0.0336	1.14	0.038
	LTE Band 2	QPSK20M	Top Side	18700	1	0	-	25.0	24.45	0.19	0.0366	0.0209	1.14	0.024
	LTE Band 2	QPSK20M	Front Face	18700	50	0	-	24.0	23.33	0.07	0.175	0.0969	1.17	0.113
	LTE Band 2	QPSK20M	Rear Face	18700	50	0	-	24.0	23.33	0.13	0.0238	0.0149	1.17	0.017
	LTE Band 2	QPSK20M	Left Side	18700	50	0	-	24.0	23.33	-0.03	0.628	0.302	1.17	0.352
	LTE Band 2	QPSK20M	Right Side	18700	50	0	-	24.0	23.33	0.09	0.0448	0.0243	1.17	0.028

Plot No.	Band	Mode	Test Position	Channel	RB#	RB Offset	Duty Cycle	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Measured SAR-10g (W/kg)	Scaling Factor	Scaled SAR-10g (W/kg)
	LTE Band 2	QPSK20M	Top Side	18700	50	0	-	24.0	23.33	0.13	0.0263	0.015	1.17	0.018
7	LTE Band 5	QPSK10M	Front Face	20525	1	49	-	24.5	24.03	0.05	0.32	0.185	1.11	**0.206**
	LTE Band 5	QPSK10M	Rear Face	20525	1	49	-	24.5	24.03	-0.01	0.0884	0.0626	1.11	0.070
	LTE Band 5	QPSK10M	Left Side	20525	1	49	-	24.5	24.03	0.02	0.33	0.158	1.11	0.176
	LTE Band 5	QPSK10M	Right Side	20525	1	49	-	24.5	24.03	0.02	0.0657	0.0409	1.11	0.046
	LTE Band 5	QPSK10M	Top Side	20525	1	49	-	24.5	24.03	0.06	0.0848	0.0494	1.11	0.055
	LTE Band 5	QPSK10M	Front Face	20525	25	12	-	23.5	22.90	0.03	0.274	0.158	1.15	0.181
	LTE Band 5	QPSK10M	Rear Face	20525	25	12	-	23.5	22.90	-0.06	0.0758	0.0538	1.15	0.062
	LTE Band 5	QPSK10M	Left Side	20525	25	12	-	23.5	22.90	0.06	0.287	0.136	1.15	0.156
	LTE Band 5	QPSK10M	Right Side	20525	25	12	-	23.5	22.90	0.11	0.0655	0.0408	1.15	0.047
	LTE Band 5	QPSK10M	Top Side	20525	25	12	-	23.5	22.90	0.03	0.0781	0.0463	1.15	0.053
	LTE Band 7	QPSK20M	Front Face	20850	1	99	-	25.0	24.46	0.15	0.256	0.122	1.13	0.138
	LTE Band 7	QPSK20M	Rear Face	20850	1	99	-	25.0	24.46	0.04	0.0738	0.0423	1.13	0.048
8	LTE Band 7	QPSK20M	Left Side	20850	1	99	-	25.0	24.46	-0.02	2.36	0.968	1.13	**1.096**
	LTE Band 7	QPSK20M	Right Side	20850	1	99	-	25.0	24.46	0.17	0.0119	0.00563	1.13	0.006
	LTE Band 7	QPSK20M	Top Side	20850	1	99	-	25.0	24.46	0.06	0.0564	0.031	1.13	0.035
	LTE Band 7	QPSK20M	Front Face	20850	50	0	-	23.5	23.08	-0.12	0.192	0.0926	1.10	0.102
	LTE Band 7	QPSK20M	Rear Face	20850	50	0	-	23.5	23.08	-0.02	0.0527	0.0304	1.10	0.033
	LTE Band 7	QPSK20M	Left Side	20850	50	0	-	23.5	23.08	-0.05	1.81	0.744	1.10	0.820
	LTE Band 7	QPSK20M	Right Side	20850	50	0	-	23.5	23.08	0.06	0.0089	0.00491	1.10	0.005
	LTE Band 7	QPSK20M	Top Side	20850	50	0	-	23.5	23.08	0.08	0.0414	0.0223	1.10	0.025
	LTE Band 40	QPSK10M	Front Face	39200	1	49	-	23.5	22.98	0.03	0.0639	0.0327	1.13	0.037
	LTE Band 40	QPSK10M	Rear Face	39200	1	49	-	23.5	22.98	0.03	0.00964	0.00562	1.13	0.006
9	LTE Band 40	QPSK10M	Left Side	39200	1	49	-	23.5	22.98	-0.02	0.489	0.215	1.13	**0.242**
	LTE Band 40	QPSK10M	Right Side	39200	1	49	-	23.5	22.98	0.17	0.00334	0.00141	1.13	0.002
	LTE Band 40	QPSK10M	Top Side	39200	1	49	-	23.5	22.98	-0.15	0.015	0.00633	1.13	0.007
	LTE Band 40	QPSK10M	Front Face	39200	25	0	-	21.5	21.21	0.13	0.0496	0.0251	1.07	0.027
	LTE Band 40	QPSK10M	Rear Face	39200	25	0	-	21.5	21.21	0.02	0.00771	0.00438	1.07	0.005
	LTE Band 40	QPSK10M	Left Side	39200	25	0	-	21.5	21.21	0.00	0.391	0.171	1.07	0.183
	LTE Band 40	QPSK10M	Right Side	39200	25	0	-	21.5	21.21	0.02	0.00237	0.00103	1.07	0.001
	LTE Band 40	QPSK10M	Top Side	39200	25	0	-	21.5	21.21	-0.04	0.0113	0.00472	1.07	0.005
	LTE Band 41(38)	QPSK20M	Front Face	40690	1	99	-	24.5	24.21	0.09	0.337	0.156	1.07	0.167
	LTE Band 41(38)	QPSK20M	Rear Face	40690	1	99	-	24.5	24.21	-0.10	0.0836	0.0465	1.07	0.050
10	LTE Band 41(38)	QPSK20M	Left Side	40690	1	99	-	24.5	24.21	-0.07	1.8	0.737	1.07	**0.788**
	LTE Band 41(38)	QPSK20M	Right Side	40690	1	99	-	24.5	24.21	-0.02	0.0163	0.00919	1.07	0.010
	LTE Band 41(38)	QPSK20M	Top Side	40690	1	99	-	24.5	24.21	-0.17	0.0828	0.045	1.07	0.048

Plot No.	Band	Mode	Test Position	Channel	RB#	RB Offset	Duty Cycle	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Measured SAR-10g (W/kg)	Scaling Factor	Scaled SAR-10g (W/kg)
	LTE Band 41(38)	QPSK20M	Front Face	40690	50	25	-	23.5	22.80	0.07	0.252	0.117	1.17	0.137
	LTE Band 41(38)	QPSK20M	Rear Face	40690	50	25	-	23.5	22.80	0.09	0.0614	0.0345	1.17	0.041
	LTE Band 41(38)	QPSK20M	Left Side	40690	50	25	-	23.5	22.80	-0.04	1.49	0.606	1.17	0.712
	LTE Band 41(38)	QPSK20M	Right Side	40690	50	25	-	23.5	22.80	0.05	0.0122	0.0069	1.17	0.008
	LTE Band 41(38)	QPSK20M	Top Side	40690	50	25	-	23.5	22.80	0.02	0.0602	0.0327	1.17	0.038
	LTE Band 66(4)	QPSK20M	Front Face	132072	1	50	-	25.0	24.55	0.09	0.264	0.153	1.11	0.170
	LTE Band 66(4)	QPSK20M	Rear Face	132072	1	50	-	25.0	24.55	-0.11	0.0835	0.0556	1.11	0.062
11	LTE Band 66(4)	QPSK20M	Left Side	132072	1	50	-	25.0	24.55	-0.03	0.785	0.358	1.11	**0.397**
	LTE Band 66(4)	QPSK20M	Right Side	132072	1	50	-	25.0	24.55	0.09	0.0628	0.0355	1.11	0.039
	LTE Band 66(4)	QPSK20M	Top Side	132072	1	50	-	25.0	24.55	0.02	0.0677	0.0397	1.11	0.044
	LTE Band 66(4)	QPSK20M	Front Face	132072	50	50	-	24.0	23.36	0.03	0.201	0.116	1.16	0.134
	LTE Band 66(4)	QPSK20M	Rear Face	132072	50	50	-	24.0	23.36	-0.16	0.063	0.042	1.16	0.049
	LTE Band 66(4)	QPSK20M	Left Side	132072	50	50	-	24.0	23.36	-0.16	0.612	0.279	1.16	0.323
	LTE Band 66(4)	QPSK20M	Right Side	132072	50	50	-	24.0	23.36	0.10	0.0508	0.0286	1.16	0.033
	LTE Band 66(4)	QPSK20M	Top Side	132072	50	50	-	24.0	23.36	0.00	0.0567	0.0331	1.16	0.038
	2.4GHz	IEEE 802.11b	Front Face	6	-	-	99.52%	17.0	16.60	0.05	0.141	0.0726	1.10	0.080
	2.4GHz	IEEE 802.11b	Rear Face	6	-	-	99.52%	17.0	16.60	0.03	0.0599	0.0314	1.10	0.035
	2.4GHz	IEEE 802.11b	Left Side	6	-	-	99.52%	17.0	16.60	0.05	0.0176	0.00937	1.10	0.010
12	2.4GHz	IEEE 802.11b	Right Side	6	-	-	99.52%	17.0	16.60	0.17	1.01	0.417	1.10	**0.459**
	2.4GHz	IEEE 802.11b	Top Side	6	-	-	99.52%	17.0	16.60	0.17	0.031	0.018	1.10	0.020
	2.4GHz	Bluetooth DH5	Front Face	0	-	-	76.80%	7.0	6.32	0.02	0.0112	0.0058	1.17	0.009
	2.4GHz	Bluetooth DH5	Rear Face	0	-	-	76.80%	7.0	6.32	-0.07	0.00397	0.00202	1.17	0.003
	2.4GHz	Bluetooth DH5	Left Side	0	-	-	76.80%	7.0	6.32	0.02	0.00172	0.000942	1.17	0.001
13	2.4GHz	Bluetooth DH5	Right Side	0	-	-	76.80%	7.0	6.32	0.16	0.076	0.0314	1.17	**0.048**
	2.4GHz	Bluetooth DH5	Top Side	0	-	-	76.80%	7.0	6.32	-0.14	0.00232	0.00131	1.17	0.002

Note:

1. Scaled SAR-10g (W/kg) = (Measured SAR-10g (W/kg) x Scaling Factor) / Duty Cycle.
2. "*" indicates that the data is repeated.

4.6. SAR MEASUREMENT VARIABILITY

4.6.1. Repeated Measurement

According to KDB 865664 D01, SAR measurement variability was assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. Alternatively, if the highest measured SAR for both head and body tissue-equivalent media are ≤ 1.45 W/kg and the ratio of these highest SAR values, i.e., largest divided by smallest value, is ≤ 1.10, the highest SAR configuration for either head or body tissue-equivalent medium may be used to perform the repeated measurement. These 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.

SAR repeated measurement procedure:

1) When the highest measured SAR is < 0.80 W/kg, repeated measurement is not required.
2) When the highest measured SAR is >= 0.80 W/kg, repeat that measurement once.
3) 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, perform a second repeated measurement.
4) If the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20, and the original, first or second repeated measurement is >= 1.5 W/kg, perform a third repeated measurement.

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.

All the extremity measured SAR are less than 2 W/kg, so the repeated measurement is not required.

4.7. SIMULTANEOUS MULTI-BAND TRANSMISSION EVALUATION

4.7.1. Simultaneous Transmission SAR Test Exclusion Considerations

a) Sum of SAR

Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneous transmitting antenna. When the sum of SAR1g of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit (SAR1g 1.6 W/kg), the simultaneous transmission SAR is not required. When the sum of SAR1g is greater than the SAR limit (SAR1g 1.6 W/kg), SAR test exclusion is determined by the SPLSR.

b) SAR to Peak Location Separation Ratio

The simultaneous transmitting antennas in each operating mode and exposure condition combination are considered one pair at a time to determine the SPLSR.

$$SPLSR = (SAR_1 + SAR_2)^{1.5}/R_i$$

The ratio is rounded to two decimal digits, and must be ≤ 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.
SAR_1 and SAR_2 are the highest reported or estimated SAR values for each antenna in the pair, and R_i is the separation distance in mm between the peak SAR locations for the antenna pair

$$peak\ location\ separation\ distance = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2 + (z_1 - z_2)^2}$$

Where $(x_1,\ y_1,\ z_1)$ and $(x_2,\ y_2,\ z_2)$ are the coordinates of the extrapolated peak SAR locations in the area or zoom scans.
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 will be translated onto the test device to determine the peak location separation for the antenna pair.
When SAR is estimated for both antennas, the peak location separation should be determined by the closest physical separation of the antennas, according to the feed-point or geometric center of the antennas.

c) Volume Scan

When the SPLSR is <= 0.04 for 1-g SAR and <= 0.10 for 10-g SAR, the simultaneous transmission SAR is not required. Otherwise, the enlarged zoom scan and volume scan post-processing procedures will be performed.

4.7.2. Simultaneous Transmission Possibilities

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

Simultaneous Transmission Configurations	Body Exposure Condition
WCDMA (Voice / Data) + WLAN (Data)	No
LTE (Data) + WLAN (Data)	No
WCDMA (Voice / Data) + BT (Data)	No
LTE (Data) + BT (Data)	No

Note:

1) The 2.4G WLAN and 5G WLAN cannot transmit simultaneously.
2) The WLAN and Bluetooth cannot transmit simultaneously, so there is no co-location test requirement for WLAN and Bluetooth.
3) Both WCDMA and LTE can transmit through either WWAN MAIN Ant. However, only one technology (WCDMA or LTE) can transmit from an antenna at a time, and the other technology transmits through the other antenna.

*** End of Report ***

APPENDIX A. SAR PLOTS OF SYSTEM VERIFICATION

The plots for system verification with largest deviation for each SAR system combination are shown as follows.

APPENDIX B. SAR PLOTS OF SAR MEASUREMENT

The SAR plots for highest measured SAR in each exposure configuration, wireless mode and frequency band combination, and measured SAR > 1.5 W/kg are shown as follows.

APPENDIX C. CALIBRATION CERTIFICATE FOR PROBE AND DIPOLE

The calibration certificates are shown as follows.

APPENDIX D. PHOTOGRAPHS OF EUT AND SETUP

The photographs of EUT and setup are shown as follows.