FCC SAR TEST REPORT

Product Name:	Tekion Connected Car Device
Trade Mark:	Tekion
Model No.:	CCD1
Add. Model No.:	N/A
Report Number:	2210202229SAR-2
Test Standards:	FCC 47 CFR Part 2 §2.1093 ANSI/IEEE C95.1-1992 IEEE Std 1528-2013
FCC ID:	2APD6TEKCCD002
Test Result:	PASS
Date of Issue:	May 18, 2023

Prepared for:

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Prepared by:

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Version

Version No.	Date	Description
V1.0	May 18, 2023	Original Report

CONTENTS

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 Body SAR_{1g} (0 cm Gap) (W/kg)
PCB	LTE Band 2	0.907
	LTE Band 4	0.745
	LTE Band 5	0.833
	LTE Band 12	0.702
	LTE Band 13	0.673
	LTE Band 25	0.768
	LTE Band 26	0.903
DTS	2.4G WLAN	0.433 (Note 1)
NII	5.2G WLAN	0.968 (Note 1)
	5.8G WLAN	1.084 (Note 1)
DSS	Bluetooth	N/A (Note 1)
Highest Simultaneous Transmission SAR		
PCB + DTS		N/A
PCB + NII		N/A
PCB + DSS		N/A

Note 1: This report base on the report no.: 2210202229SAR-1 Issued December 5, 2022, the manufacturer enabled LTE function. After evaluation, all WLAN test data refer to the original report except for the LTE SAR tests.

1.2. CLIENT INFORMATION

Applicant:	Saravanabhavan Chandrasekaran
Address of Applicant:	Qmax Systems India Pvt. Ltd. , 795, Trunk Road, Poonamallee, Chennai-600056
Manufacturer:	Saravanabhavan Chandrasekaran
Address of Manufacturer:	Qmax Systems India Pvt. Ltd. , 795, Trunk Road, Poonamallee, Chennai-600056

1.3. EUT INFORMATION

1.3.1. General Description of EUT

Product Name:	Tekion Connected Car Device
Trade Mark:	Tekion
Model No.:	CCD1
Add. Model No.:	N/A
FCC ID:	2APD6TEKCCD002
DUT Stage:	Production Unit
Software Version:	0.43 (Provided by the customer)
Hardware Version:	1.0 (Provided by the customer)
Sample Received Date:	October 9, 2022
Sample Tested Date:	March 30, 2023 to April 8, 2023

1.3.2. Description of Accessories

Battery	
Model No.:	103450-2000mAh
Battery Type:	Lithium-ion Rechargeable Battery
Rated Voltage:	3.7 Vdc
Limited Charge Voltage:	4.2 Vdc
Rated Capacity:	2000 mAh

1.3.3. EUT Tx Frequency Bands

RF Type	Band(s)	Tx Frequency Range (Unit: MHz)
WLAN	2.4 GHz:	2412 - 2462
	U-NII-1:	5180 - 5240
	U-NII-3:	5745 - 5825
Bluetooth	2.4 GHz:	2402 - 2480
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 12:	699.7 - 715.3 (1.4M), 700.5 - 714.5 (3M), 701.5 - 713.5 (5M), 704 - 711 (10M)
	LTE Band 13:	779.5 - 784.5 (5M), 782 (10M)
	LTE Band 25:	1850.7 - 1914.3 (1.4M), 1851.5 - 1913.5 (3M), 1852.5 - 1912.5 (5M), 1855 - 1910 (10M), 1857.5 - 1907.5 (15M), 1860 - 1905 (20M)
	LTE Band 26:	814.7 - 848.3 (1.4M), 815.5 - 847.5 (3M), 816.5 - 846.5 (5M), 819 - 844 (10M), 821.5 - 841.5 (15M)

1.3.4. Wireless Technologies

LTE	QPSK 16QAM
2.4G WLAN	802.11b 802.11g 802.11n (HT20)
5G WLAN	802.11a 802.11n (HT20/HT40) 802.11ac (VHT20/VHT40/VHT80)
Bluetooth	BR+EDR LE 2LE
Antenna Type	FPCB Antenna
Power Reduction	Not Support
Dynamic Antenna	Not Support

1.4. MAXIMUM CONDUCTED POWER

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

- **2.4GHz WLAN**

Mode	Maximum Conducted Power (dBm)
802.11b	10.5
802.11g	10.0
802.11n-HT20	10.0

- **5GHz WLAN**

Mode	Maximum Conducted Power (dBm)	
	U-NII-1	U-NII-3
802.11a	7.0	3.5
802.11n-HT20	4.0	2.5
802.11n-HT40	4.0	2.0
802.11ac-VHT20	3.5	2.0
802.11ac-VHT40	3.5	1.5
802.11ac-VHT80	2.0	1.5

- **Bluetooth**

Mode	Modulation	Maximum Conducted Power (dBm)
BR + EDR	GFSK	-7.0
	π/4-DQPSK	-7.0
	8-DPSK	-7.0
LE	GFSK	-7.0
2LE	GFSK	-13.5

- **LTE**

Band	Mode	Maximum Conducted Power (dBm)
LTE Band 2	QPSK / 16QAM	12.0
LTE Band 4	QPSK / 16QAM	15.0
LTE Band 5	QPSK / 16QAM	14.5
LTE Band 12	QPSK / 16QAM	15.5
LTE Band 13	QPSK / 16QAM	19.5
LTE Band 25	QPSK / 16QAM	10.5
LTE Band 26	QPSK / 16QAM	18.0

1.5. OTHER INFORMATION

None.

1.6. TEST LOCATION

Shenzhen UnionTrust Quality and Technology Co., Ltd.

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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 941225 D06 v02r01
KDB 941225 D05 v02r05

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:

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

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

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

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

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:

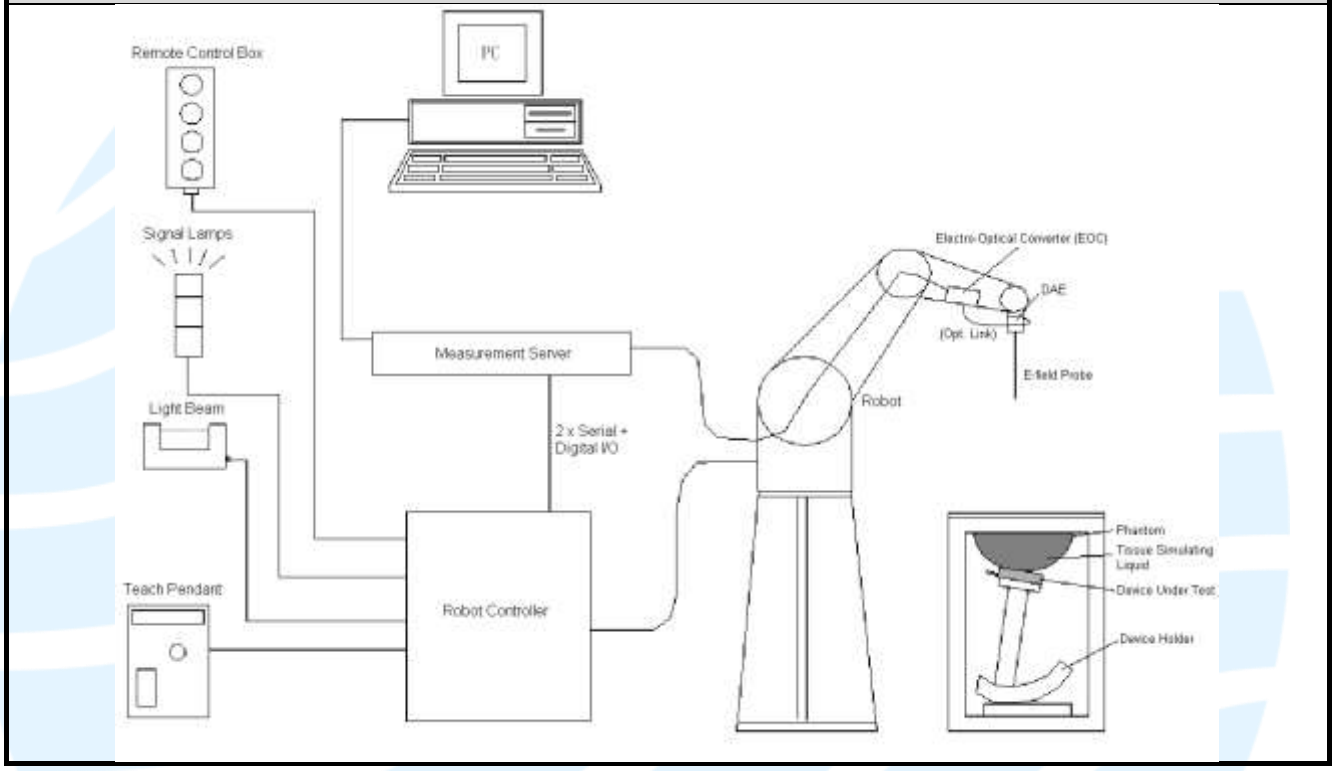
1) Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1 gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.
2) At frequencies 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.

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

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	D750V3	1109	May 17, 2021	1 Year
System Validation Dipole	SPEAG	D835V2	4d005	April 13, 2021	1 Year
System Validation Dipole	SPEAG	D1750V2	1086	April 14, 2021	1 Year
System Validation Dipole	SPEAG	D1900V2	509	April 14, 2021	1 Year
Dosimetric E-Field Probe	SPEAG	ES3DV3	3090	Mar. 15, 2023	1 Year
Data Acquisition Electronics	SPEAG	DAE4	662	Mar. 08, 2023	1 Year
Wideband Radio Communication Tester	R&S	CMW500	120932	Apr. 15, 2022	1 Year
ENA Series Network Analyzer	Agilent	8753ES	US39170317	Nov. 01, 2022	1 Year
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	Apr. 15, 2022	1 Year
POWER METER	R&S	NRP	101293	Nov. 03, 2022	1 Year
Thermometer	Shanghai Gao Zhi Precision Instrument Co., Ltd.	HB6801	18022507	Nov. 02, 2022	1 Year
Dual Directional Coupler	Agilent	778D	MY52180234	Nov. 03, 2022	1 Year
Amplifier	Mini-Circuit	ZHL42	QA1252001	Apr. 15, 2022	1 Year
DC Source	Agilent	66319B	MY43000795	Nov. 01, 2022	1 Year

3.4. MEASUREMENT UNCERTAINTY

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.

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		
Target Frequency	Head	
(MHz)	ε_r	σ(S/m)
750	*41.9*	*0.89*
835	41.5	0.90
900	41.5	0.97
1450	*40.5*	*1.20*
1640	*40.3*	*1.29*
1750	*40.1*	*1.37*
1800	40.0	1.40
1900	40.0	1.40
2000	40.0	1.40
2300	*39.5*	*1.67*
2450	39.2	1.80
2600	*39.0*	*1.96*
3500	*37.9*	*2.91*
5200	*36.0*	*4.66*
5300	*35.9*	*4.76*
5500	*35.6*	*4.96*
5600	*35.5*	*5.07*
5800	35.3	5.27
(ε_r = relative permittivity, σ = conductivity and ρ = 1000 kg/m^3)		

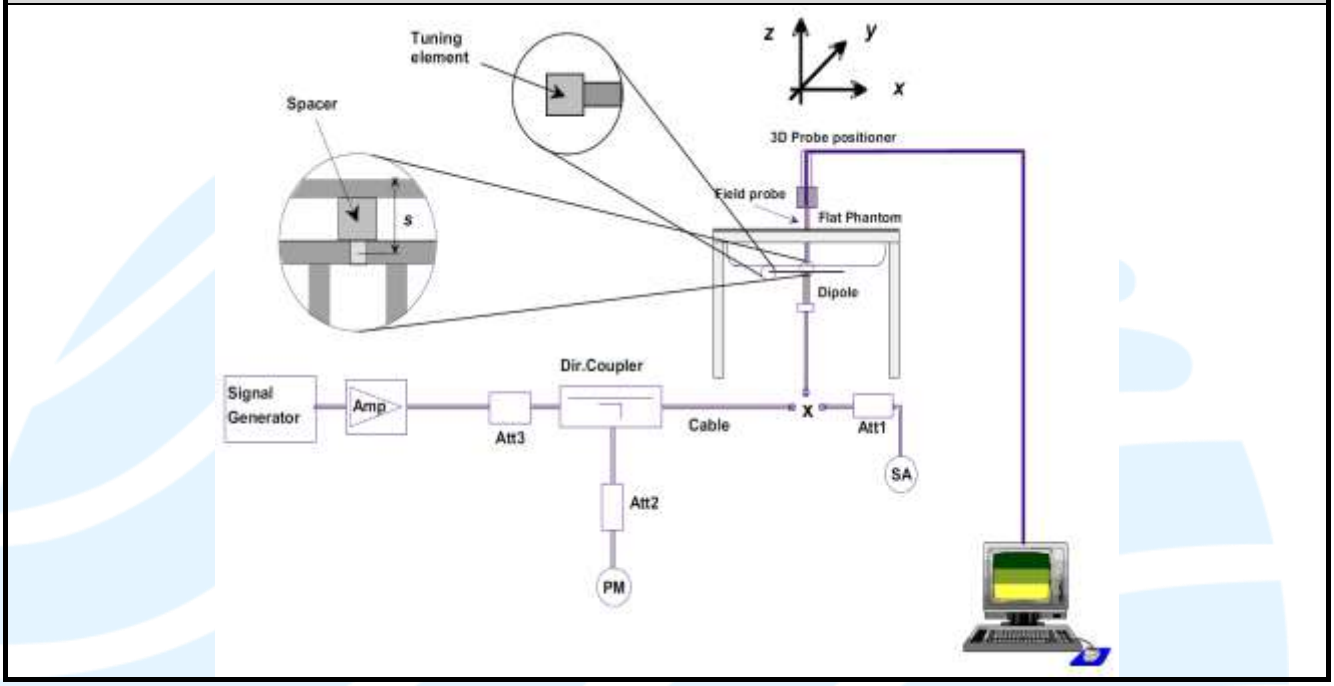
The following table gives the recipes for tissue simulating liquids.

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	-	-	-	-	-	17.24	65.52	17.24

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 (%)
Apr. 03, 2023	Head	750	21.4	0.883	41.230	0.89	41.94	-0.79	-1.69
Apr. 03, 2023	Head	835	21.4	0.936	40.430	0.91	41.55	2.86	-2.70
Apr. 06, 2023	Head	1750	21.7	1.307	40.590	1.37	40.08	-4.60	1.27
Apr. 06, 2023	Head	1900	21.7	1.454	40.030	1.40	40.00	3.86	0.08

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 Validation

The SAR measurement system was validated according to procedures in KDB 865664 D01. The validation status in tabulated summary is as below.

Test Date	Probe S/N	Calibration Point		Measured Conductivity (σ)	Measured Permittivity (ε_r)	Validation for CW			Validation for Modulation		
						Sensitivity Range	Probe Linearity	Probe Isotropy	Modulation Type	Duty Factor	PAR
Mar. 23, 2023	3090	Head	750	0.8847	41.72	Pass	Pass	Pass	GMSK	N/A	Pass
Mar. 23, 2023	3090	Head	835	0.9287	40.90	Pass	Pass	Pass	GMSK	N/A	Pass
Mar. 23, 2023	3090	Head	1750	1.312	41.83	Pass	Pass	Pass	GMSK	N/A	Pass
Mar. 23, 2023	3090	Head	1900	1.446	41.27	Pass	Pass	Pass	GMSK	N/A	Pass

3.5.5. System Verification

The measuring result for system verification is tabulated as below.

Test Date	Tissue Type	Frequency (MHz)	1W Target SAR-1g (W/kg)	Measured SAR-1g (W/kg)	Normalized to 1W SAR-1g (W/kg)	Deviation (%)	Dipole S/N	Probe S/N	DAE S/N
Apr. 03, 2023	Head	750	8.39	0.081	8.10	-3.46	1109	3090	662
Apr. 03, 2023	Head	835	9.49	0.095	9.50	0.11	4d005	3090	662
Apr. 06, 2023	Head	1750	36.40	0.346	34.60	-4.95	1086	3090	662
Apr. 06, 2023	Head	1900	39.90	0.385	38.50	-3.51	509	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. 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.

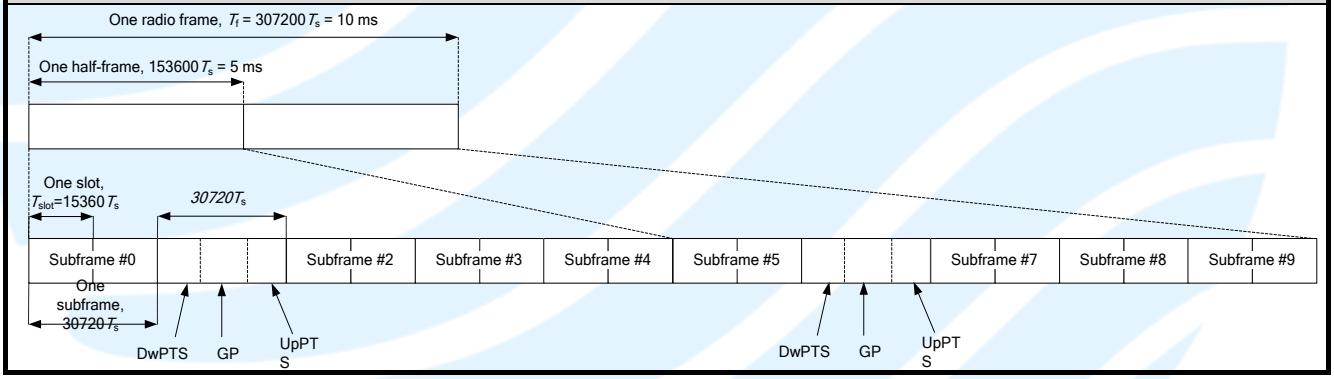
In addition, the device is compliant with additional maximum power reduction (A-MPR) requirements defined in 3GPP TS 36.101 section 6.2.4 that was disabled for all FCC compliance testing.

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%.

4.1.2. 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.

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

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

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

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

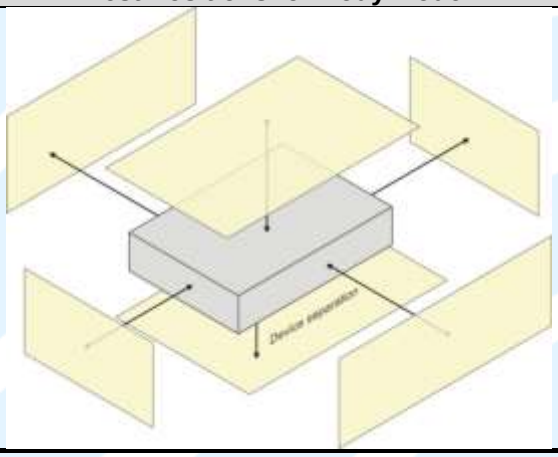
4.2. EUT TESTING POSITION

4.2.1. Body Exposure Conditions

RF Exposure Conditions	Test Position	Separation Distance	SAR test exclusion
Body	Front Face	0 cm	Note 1
	Rear Face		
	Left Side		
	Right Side		
	Top Side		
	Bottom Side		

Note:

1) Based on the antenna location shown on appendix D of this report, for SAR test exclusion, please refer to section 4.4.

Test Positions for Body Mode


4.3. MEASURED CONDUCTED POWER RESULT

4.3.1. 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	9.60
		6	2437	9.90
		11	2462	9.50
	802.11g	1	2412	9.20
		6	2437	9.30
		11	2462	9.40
	802.11n-HT20	1	2412	8.90
		6	2437	9.00
		11	2462	9.10

Mode	Band	Channel	Frequency (MHz)	Average Power (dBm)
802.11a	U-NII-1	36	5180	6.62
		40	5200	5.95
		48	5240	5.32
	U-NII-3	149	5745	3.19
		157	5785	2.75
		165	5825	2.51

Mode	Band	Channel	Frequency (MHz)	Average Power (dBm)
802.11n-HT20	U-NII-1	36	5180	3.51
		40	5200	3.29
		48	5240	3.36
	U-NII-3	149	5745	1.89
		157	5785	1.84
		165	5825	1.82

Mode	Band	Channel	Frequency (MHz)	Average Power (dBm)
802.11n-HT40	U-NII-1	38	5190	3.41
		46	5230	2.23
	U-NII-3	151	5755	1.48
		159	5795	1.06

Mode	Band	Channel	Frequency (MHz)	Average Power (dBm)
802.11ac-VHT20	U-NII-1	36	5180	3.18
		40	5200	2.34
		48	5240	1.72
	U-NII-3	149	5745	1.25
		157	5785	0.70
		165	5825	0.79

Mode	Band	Channel	Frequency (MHz)	Average Power (dBm)
802.11ac-VHT40	U-NII-1	38	5190	2.90
		46	5230	3.11
	U-NII-3	151	5755	1.19
		159	5795	0.77

Mode	Band	Channel	Frequency (MHz)	Average Power (dBm)
802.11ac-VHT80	U-NII-1	42	5210	1.49
	U-NII-3	155	5775	1.00

4.3.2. Conducted Power of BT

Mode	Modulation	Channel	Frequency (MHz)	Average Power (dBm)
BR + EDR	GFSK	0	2402	-9.93
		39	2441	-8.83
		78	2480	-7.53
	π/4-DQPSK	0	2402	-9.43
		39	2441	-9.03
		78	2480	-7.83
	8-DPSK	0	2402	-9.63
		39	2441	-8.73
		78	2480	-7.93

Mode	Modulation	Channel	Frequency (MHz)	Average Power (dBm)
LE	GFSK	0	2402	-7.83
		19	2440	-8.23
		39	2480	-7.43
2LE	GFSK	0	2402	-15.93
		19	2440	-15.43
		39	2480	-14.03

4.3.3. Conducted Power of LTE Bands

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

➢ **LTE Band 2**

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 18607	Mid CH 18900	High CH 19193		Low CH 18607	Mid CH 18900	High CH 19193		Low CH 18607	Mid CH 18900	High CH 19193	
			1850.7 MHz	1880.0 MHz	1909.3 MHz		1850.7 MHz	1880.0 MHz	1909.3 MHz		1850.7 MHz	1880.0 MHz	1909.3 MHz	
2 / 1.4M	1	0	9.37	11.01	11.28	0	9.87	9.72	10.67	1	/	/	/	2
	1	2	11.53	11.01	11.32	0	10.16	10.27	10.83	1	/	/	/	2
	1	5	11.24	11.35	11.21	0	10.08	10.01	10.66	1	/	/	/	2
	3	0	11.20	11.10	11.37	0	10.06	10.05	10.07	1	/	/	/	2
	3	1	11.16	11.21	11.42	0	10.16	9.92	10.61	1	/	/	/	2
	3	3	11.16	10.97	11.43	0	10.20	9.69	10.68	1	/	/	/	2
	6	0	10.25	10.10	10.31	1	9.11	9.07	9.71	2	/	/	/	3

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 18615	Mid CH 18900	High CH 19185		Low CH 18615	Mid CH 18900	High CH 19185		Low CH 18615	Mid CH 18900	High CH 19185	
			1851.5 MHz	1880.0 MHz	1908.5 MHz		1851.5 MHz	1880.0 MHz	1908.5 MHz		1851.5 MHz	1880.0 MHz	1908.5 MHz	
2 / 3M	1	0	11.42	11.00	11.66	0	9.80	10.42	10.78	1	/	/	/	2
	1	7	11.33	10.80	11.58	0	9.66	10.42	11.00	1	/	/	/	2
	1	14	11.44	11.02	11.45	0	9.96	10.65	10.77	1	/	/	/	2
	8	0	10.04	9.92	10.47	1	9.20	9.23	9.45	2	/	/	/	3
	8	3	10.25	10.17	10.51	1	9.14	9.17	9.37	2	/	/	/	3
	8	7	10.14	10.13	10.52	1	9.27	9.36	9.24	2	/	/	/	3
	15	0	10.05	10.15	10.56	1	9.08	9.06	9.45	2	/	/	/	3

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 18625	Mid CH 18900	High CH 19175		Low CH 18625	Mid CH 18900	High CH 19175		Low CH 18625	Mid CH 18900	High CH 19175	
			1852.5 MHz	1880.0 MHz	1907.5 MHz		1852.5 MHz	1880.0 MHz	1907.5 MHz		1852.5 MHz	1880.0 MHz	1907.5 MHz	
2 / 5M	1	0	11.05	11.06	11.39	0	9.71	10.32	9.97	1	/	/	/	2
	1	12	11.19	11.01	11.44	0	9.71	10.32	10.17	1	/	/	/	2
	1	24	11.40	11.03	11.29	0	9.81	10.35	9.87	1	/	/	/	2
	12	0	9.99	9.98	10.45	1	9.02	8.86	9.40	2	/	/	/	3
	12	6	10.33	10.03	10.34	1	9.05	9.26	9.46	2	/	/	/	3
	12	13	10.25	10.13	10.34	1	9.19	9.03	9.55	2	/	/	/	3
	25	0	10.23	10.03	10.37	1	9.12	8.90	9.57	2	/	/	/	3

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 18650	Mid CH 18900	High CH 19150		Low CH 18650	Mid CH 18900	High CH 19150		Low CH 18650	Mid CH 18900	High CH 19150	
			1855.0 MHz	1880.0 MHz	1905.0 MHz		1855.0 MHz	1880.0 MHz	1905.0 MHz		1855.0 MHz	1880.0 MHz	1905.0 MHz	
2 / 10M	1	0	11.16	11.23	11.25	0	9.82	10.46	11.18	1	/	/	/	2
	1	24	11.44	11.35	11.65	0	9.93	11.26	11.26	1	/	/	/	2
	1	49	11.39	11.19	11.35	0	10.80	10.78	10.99	1	/	/	/	2
	25	0	10.14	9.98	10.44	1	9.56	9.19	9.58	2	/	/	/	3
	25	12	10.29	10.13	10.46	1	9.45	9.08	9.74	2	/	/	/	3
	25	25	10.37	10.13	10.54	1	9.63	9.15	9.67	2	/	/	/	3
	50	0	10.19	10.02	10.79	1	9.57	8.84	9.46	2	/	/	/	3

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 18675	Mid CH 18900	High CH 19125		Low CH 18675	Mid CH 18900	High CH 19125		Low CH 18675	Mid CH 18900	High CH 19125	
			1857.5 MHz	1880.0 MHz	1902.5 MHz		1857.5 MHz	1880.0 MHz	1902.5 MHz		1857.5 MHz	1880.0 MHz	1902.5 MHz	
2 / 15M	1	0	11.15	11.05	11.44	0	10.77	10.76	10.94	1	/	/	/	2
	1	37	11.16	11.10	11.46	0	11.29	10.43	10.86	1	/	/	/	2
	1	74	11.20	11.29	11.45	0	10.60	10.80	11.15	1	/	/	/	2
	36	0	10.43	9.97	10.52	1	10.26	10.35	10.04	2	/	/	/	3
	36	19	10.32	9.99	10.67	1	10.26	10.35	10.04	2	/	/	/	3
	36	39	10.30	10.16	10.65	1	10.26	10.35	10.04	2	/	/	/	3
	75	0	10.22	10.03	10.59	1	10.26	10.35	10.04	2	/	/	/	3

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 18700	Mid CH 18900	High CH 19100		Low CH 18700	Mid CH 18900	High CH 19100		Low CH 18700	Mid CH 18900	High CH 19100	
			1860.0 MHz	1880.0 MHz	1900.0 MHz		1860.0 MHz	1880.0 MHz	1900.0 MHz		1860.0 MHz	1880.0 MHz	1900.0 MHz	
2 / 20M	1	0	11.50	10.74	11.29	0	10.18	10.33	10.26	1	/	/	/	2
	1	50	11.68	10.95	11.50	0	10.29	10.63	10.49	1	/	/	/	2
	1	99	10.74	10.87	11.24	0	10.00	10.94	10.07	1	/	/	/	2
	50	0	10.36	10.25	10.39	1	10.03	10.57	9.92	2	/	/	/	3
	50	25	10.25	10.27	10.35	1	10.12	10.49	9.92	2	/	/	/	3
	50	50	10.15	10.34	10.55	1	10.19	10.57	9.92	2	/	/	/	3
	100	0	10.15	10.20	10.41	1	9.81	10.44	9.92	2	/	/	/	3

➢ **LTE Band 4**

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 19957	Mid CH 20175	High CH 20393		Low CH 19957	Mid CH 20175	High CH 20393		Low CH 19957	Mid CH 20175	High CH 20393	
			1710.7 MHz	1732.5 MHz	1754.3 MHz		1710.7 MHz	1732.5 MHz	1754.3 MHz		1710.7 MHz	1732.5 MHz	1754.3 MHz	
4 / 1.4M	1	0	14.56	14.03	13.77	0	13.31	12.92	12.92	1	/	/	/	2
	1	2	14.53	14.11	14.02	0	13.51	13.53	13.38	1	/	/	/	2
	1	5	14.58	13.89	13.86	0	13.38	13.28	13.04	1	/	/	/	2
	3	0	14.24	13.98	13.91	0	13.28	12.86	12.66	1	/	/	/	2
	3	1	14.28	14.16	13.88	0	13.42	13.21	12.80	1	/	/	/	2
	3	3	14.25	14.02	13.81	0	13.36	13.26	12.53	1	/	/	/	2
	6	0	13.27	13.02	12.69	1	12.20	12.30	11.89	2	/	/	/	3

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 19965	Mid CH 20175	High CH 20385		Low CH 19965	Mid CH 20175	High CH 20385		Low CH 19965	Mid CH 20175	High CH 20385	
			1711.5 MHz	1732.5 MHz	1753.5 MHz		1711.5 MHz	1732.5 MHz	1753.5 MHz		1711.5 MHz	1732.5 MHz	1753.5 MHz	
4 / 3M	1	0	14.58	14.10	13.93	0	14.38	13.30	13.14	1	/	/	/	2
	1	7	14.44	14.24	13.95	0	13.66	13.19	12.96	1	/	/	/	2
	1	14	14.19	14.13	14.01	0	13.74	13.36	13.10	1	/	/	/	2
	8	0	13.40	13.25	12.86	1	12.92	11.92	11.62	2	/	/	/	3
	8	3	13.39	13.20	12.79	1	12.74	12.16	11.96	2	/	/	/	3
	8	7	13.38	13.23	12.88	1	12.64	12.66	11.82	2	/	/	/	3
	15	0	13.42	13.14	12.95	1	12.48	12.26	11.70	2	/	/	/	3

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 19975	Mid CH 20175	High CH 20375		Low CH 19975	Mid CH 20175	High CH 20375		Low CH 19975	Mid CH 20175	High CH 20375	
			1712.5 MHz	1732.5 MHz	1752.5 MHz		1712.5 MHz	1732.5 MHz	1752.5 MHz		1712.5 MHz	1732.5 MHz	1752.5 MHz	
4 / 5M	1	0	14.29	14.24	13.86	0	13.47	13.11	13.01	1	/	/	/	2
	1	12	14.21	14.20	13.84	0	13.10	13.03	12.96	1	/	/	/	2
	1	24	14.28	14.06	14.08	0	13.07	13.41	12.89	1	/	/	/	2
	12	0	13.38	13.03	12.94	1	12.19	12.01	11.76	2	/	/	/	3
	12	6	13.31	13.06	12.88	1	12.34	12.17	11.92	2	/	/	/	3
	12	13	13.21	13.07	12.94	1	12.12	12.04	11.65	2	/	/	/	3
	25	0	13.27	13.05	12.94	1	12.27	12.05	11.94	2	/	/	/	3

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 20000	Mid CH 20175	High CH 20350		Low CH 20000	Mid CH 20175	High CH 20350		Low CH 20000	Mid CH 20175	High CH 20350	
			1715.0 MHz	1732.5 MHz	1750.0 MHz		1715.0 MHz	1732.5 MHz	1750.0 MHz		1715.0 MHz	1732.5 MHz	1750.0 MHz	
4 / 10M	1	0	14.36	14.27	14.06	0	13.99	13.41	13.64	1	/	/	/	2
	1	24	14.43	14.30	14.05	0	13.96	13.59	13.40	1	/	/	/	2
	1	49	14.21	14.26	14.12	0	13.33	13.22	13.34	1	/	/	/	2
	25	0	13.47	13.02	12.97	1	12.42	12.10	12.03	2	/	/	/	3
	25	12	13.37	13.08	13.05	1	12.19	12.21	12.08	2	/	/	/	3
	25	25	13.33	13.14	12.90	1	12.31	12.22	11.80	2	/	/	/	3
	50	0	13.47	13.01	12.96	1	11.90	11.95	11.90	2	/	/	/	3

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 20025	Mid CH 20175	High CH 20325		Low CH 20025	Mid CH 20175	High CH 20325		Low CH 20025	Mid CH 20175	High CH 20325	
			1717.5 MHz	1732.5 MHz	1747.5 MHz		1717.5 MHz	1732.5 MHz	1747.5 MHz		1717.5 MHz	1732.5 MHz	1747.5 MHz	
4 / 15M	1	0	14.43	14.36	14.15	0	13.87	13.84	13.44	1	/	/	/	2
	1	37	14.37	14.12	14.00	0	13.76	13.68	13.32	1	/	/	/	2
	1	74	14.18	14.07	13.92	0	13.66	13.51	13.37	1	/	/	/	2
	36	0	13.48	13.08	13.25	1	13.16	13.01	12.60	2	/	/	/	3
	36	19	13.41	13.13	12.97	1	13.11	12.72	12.92	2	/	/	/	3
	36	39	13.31	13.10	12.97	1	13.02	12.91	12.83	2	/	/	/	3
	75	0	13.39	13.06	13.03	1	12.74	12.64	12.81	2	/	/	/	3

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 20050	Mid CH 20175	High CH 20300		Low CH 20050	Mid CH 20175	High CH 20300		Low CH 20050	Mid CH 20175	High CH 20300	
			1720.0 MHz	1732.5 MHz	1745.0 MHz		1720.0 MHz	1732.5 MHz	1745.0 MHz		1720.0 MHz	1732.5 MHz	1745.0 MHz	
4 / 20M	1	0	14.59	14.24	13.96	0	13.21	13.29	13.59	1	/	/	/	2
	1	50	14.36	14.26	14.33	0	13.79	13.13	13.88	1	/	/	/	2
	1	99	14.47	14.26	13.85	0	13.18	13.13	12.82	1	/	/	/	2
	50	0	13.45	13.45	13.23	1	12.92	12.73	13.04	2	/	/	/	3
	50	25	13.34	13.34	13.14	1	12.85	12.95	12.70	2	/	/	/	3
	50	50	13.48	13.48	13.05	1	13.21	12.91	12.83	2	/	/	/	3
	100	0	13.43	13.43	13.24	1	12.70	12.64	12.64	2	/	/	/	3

➢ **LTE Band 5**

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 20407	Mid CH 20525	High CH 20643		Low CH 20407	Mid CH 20525	High CH 20643		Low CH 20407	Mid CH 20525	High CH 20643	
			824.7 MHz	836.5 MHz	848.3 MHz		824.7 MHz	836.5 MHz	848.3 MHz		824.7 MHz	836.5 MHz	848.3 MHz	
5 / 1.4M	1	0	13.64	13.59	13.40	0	12.48	12.90	12.60	1	/	/	/	2
	1	2	13.82	13.77	13.55	0	12.77	13.14	12.96	1	/	/	/	2
	1	5	13.65	13.67	13.35	0	12.63	13.12	12.53	1	/	/	/	2
	3	0	13.54	13.72	13.43	0	12.55	12.91	12.86	1	/	/	/	2
	3	1	13.76	13.87	13.48	0	13.04	12.61	12.72	1	/	/	/	2
	3	3	13.70	13.79	13.47	0	13.09	12.66	12.62	1	/	/	/	2
	6	0	12.73	12.80	12.57	1	11.81	11.76	11.79	2	/	/	/	3

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 20415	Mid CH 20525	High CH 20635		Low CH 20415	Mid CH 20525	High CH 20635		Low CH 20415	Mid CH 20525	High CH 20635	
			825.5 MHz	836.5 MHz	847.5 MHz		825.5 MHz	836.5 MHz	847.5 MHz		825.5 MHz	836.5 MHz	847.5 MHz	
5 / 3M	1	0	13.76	13.84	13.82	0	13.12	12.79	13.18	1	/	/	/	2
	1	7	13.84	13.80	13.86	0	13.14	12.89	13.11	1	/	/	/	2
	1	14	13.70	13.60	13.89	0	12.95	12.76	13.12	1	/	/	/	2
	8	0	12.93	12.60	12.81	1	12.00	11.60	12.14	2	/	/	/	3
	8	3	12.86	12.69	12.73	1	11.99	11.64	11.96	2	/	/	/	3
	8	7	12.92	12.62	12.72	1	11.99	11.54	12.03	2	/	/	/	3
	15	0	12.91	12.65	12.80	1	11.90	11.47	11.81	2	/	/	/	3

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 20425	Mid CH 20525	High CH 20625		Low CH 20425	Mid CH 20525	High CH 20625		Low CH 20425	Mid CH 20525	High CH 20625	
			826.5 MHz	836.5 MHz	846.5 MHz		826.5 MHz	836.5 MHz	846.5 MHz		826.5 MHz	836.5 MHz	846.5 MHz	
5 / 5M	1	0	13.64	13.74	13.72	0	12.17	12.25	12.78	1	/	/	/	2
	1	12	13.79	13.66	13.60	0	12.26	11.94	12.89	1	/	/	/	2
	1	24	13.93	13.40	13.48	0	12.25	11.83	13.04	1	/	/	/	2
	12	0	12.82	12.63	12.76	1	11.91	11.70	11.62	2	/	/	/	3
	12	6	12.80	12.89	12.71	1	11.79	11.94	11.74	2	/	/	/	3
	12	13	12.72	12.86	12.57	1	11.73	11.76	11.66	2	/	/	/	3
	25	0	12.74	12.82	12.67	1	11.81	11.87	11.62	2	/	/	/	3

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 20450	Mid CH 20525	High CH 20600		Low CH 20450	Mid CH 20525	High CH 20600		Low CH 20450	Mid CH 20525	High CH 20600	
			829.0 MHz	836.5 MHz	844.0 MHz		829.0 MHz	836.5 MHz	844.0 MHz		829.0 MHz	836.5 MHz	844.0 MHz	
5 / 10M	1	0	13.68	13.70	13.40	0	13.10	13.23	12.46	1	/	/	/	2
	1	24	13.78	13.71	13.83	0	13.10	13.35	13.00	1	/	/	/	2
	1	49	13.94	13.62	13.34	0	13.24	12.96	12.57	1	/	/	/	2
	25	0	12.48	12.75	12.55	1	11.65	11.71	11.67	2	/	/	/	3
	25	12	12.49	12.64	12.63	1	11.69	11.79	11.62	2	/	/	/	3
	25	25	12.59	12.71	12.74	1	11.56	11.66	11.71	2	/	/	/	3
	50	0	12.49	12.88	12.72	1	11.46	11.50	11.55	2	/	/	/	3

➢ **LTE Band 12**

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 23017	Mid CH 23095	High CH 23173		Low CH 23017	Mid CH 23095	High CH 23173		Low CH 23017	Mid CH 23095	High CH 23173	
			699.7 MHz	707.5 MHz	715.3 MHz		699.7 MHz	707.5 MHz	715.3 MHz		699.7 MHz	707.5 MHz	715.3 MHz	
12 / 1.4M	1	0	14.62	14.48	14.59	0	13.59	13.77	13.76	1	/	/	/	2
	1	2	14.79	14.60	14.72	0	13.36	13.77	14.25	1	/	/	/	2
	1	5	14.69	14.54	14.65	0	13.58	13.78	13.98	1	/	/	/	2
	3	0	14.52	14.23	14.50	0	13.81	13.63	13.36	1	/	/	/	2
	3	1	14.71	14.55	14.66	0	13.57	13.76	13.49	1	/	/	/	2
	3	3	14.63	14.52	14.65	0	13.43	13.09	13.64	1	/	/	/	2
	6	0	13.56	13.45	13.56	1	12.57	12.57	12.59	2	/	/	/	3

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 23025	Mid CH 23095	High CH 23165		Low CH 23025	Mid CH 23095	High CH 23165		Low CH 23025	Mid CH 23095	High CH 23165	
			700.5 MHz	707.5 MHz	714.5 MHz		700.5 MHz	707.5 MHz	714.5 MHz		700.5 MHz	707.5 MHz	714.5 MHz	
12 / 3M	1	0	14.57	14.42	14.78	0	13.98	13.82	14.24	1	/	/	/	2
	1	7	14.51	14.71	14.76	0	13.79	13.79	14.17	1	/	/	/	2
	1	14	14.43	14.54	14.74	0	13.89	13.58	14.22	1	/	/	/	2
	8	0	13.65	13.52	13.63	1	12.70	12.33	12.48	2	/	/	/	3
	8	3	13.54	13.52	13.61	1	12.29	12.64	12.71	2	/	/	/	3
	8	7	13.46	13.52	13.60	1	12.36	12.41	12.82	2	/	/	/	3
	15	0	13.57	13.42	13.48	1	12.64	12.41	12.58	2	/	/	/	3

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 23035	Mid CH 23095	High CH 23155		Low CH 23035	Mid CH 23095	High CH 23155		Low CH 23035	Mid CH 23095	High CH 23155	
			701.5 MHz	707.5 MHz	713.5 MHz		701.5 MHz	707.5 MHz	713.5 MHz		701.5 MHz	707.5 MHz	713.5 MHz	
12 / 5M	1	0	14.41	14.38	14.62	0	13.22	13.56	13.16	1	/	/	/	2
	1	12	14.32	14.43	14.69	0	13.17	13.91	13.03	1	/	/	/	2
	1	24	14.46	14.48	14.55	0	12.81	13.76	13.35	1	/	/	/	2
	12	0	13.50	13.35	13.56	1	12.31	12.40	12.46	2	/	/	/	3
	12	6	13.44	13.45	13.70	1	12.17	12.54	12.68	2	/	/	/	3
	12	13	13.43	13.46	13.46	1	12.45	12.42	12.40	2	/	/	/	3
	25	0	13.48	13.37	13.39	1	12.21	12.36	12.50	2	/	/	/	3

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 23060	Mid CH 23095	High CH 23130		Low CH 23060	Mid CH 23095	High CH 23130		Low CH 23060	Mid CH 23095	High CH 23130	
			704.0 MHz	707.5 MHz	711.0 MHz		704.0 MHz	707.5 MHz	711.0 MHz		704.0 MHz	707.5 MHz	711.0 MHz	
12 / 10M	1	0	14.64	14.15	14.40	0	13.43	13.83	13.82	1	/	/	/	2
	1	24	14.69	14.50	14.81	0	13.41	14.48	13.88	1	/	/	/	2
	1	49	14.83	14.30	14.49	0	13.51	13.79	13.90	1	/	/	/	2
	25	0	13.38	13.43	13.52	1	12.14	12.49	12.57	2	/	/	/	3
	25	12	13.39	13.35	13.44	1	12.51	12.78	12.51	2	/	/	/	3
	25	25	13.63	13.31	13.40	1	12.64	12.58	12.57	2	/	/	/	3
	50	0	13.50	13.25	13.51	1	12.52	12.28	12.33	2	/	/	/	3

➢ **LTE Band 13**

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 23205	Mid CH 23230	High CH 23255		Low CH 23205	Mid CH 23230	High CH 23255		Low CH 23205	Mid CH 23230	High CH 23255	
			779.5 MHz	782.0 MHz	784.5 MHz		779.5 MHz	782.0 MHz	784.5 MHz		779.5 MHz	782.0 MHz	784.5 MHz	
13 / 5M	1	0	14.15	14.40	14.41	0	13.83	13.82	13.22	1	/	/	/	2
	1	12	14.50	14.81	14.32	0	14.48	13.88	13.17	1	/	/	/	2
	1	24	14.30	14.49	14.46	0	13.79	13.90	12.81	1	/	/	/	2
	12	0	13.43	13.52	13.50	1	12.49	12.57	12.31	2	/	/	/	3
	12	6	13.35	13.44	13.44	1	12.78	12.51	12.17	2	/	/	/	3
	12	13	13.31	13.40	13.43	1	12.58	12.57	12.45	2	/	/	/	3
	25	0	13.25	13.51	13.48	1	12.28	12.33	12.21	2	/	/	/	3

LTE Band / BW	RB Size	RB Offset	QPSK	3GPP MPR (dB)	16QAM	3GPP MPR (dB)	64QAM	3GPP MPR (dB)
			Mid CH 23230		Mid CH 23230		Mid CH 23230	
			782.0 MHz		782.0 MHz		782.0 MHz	
13 / 10M	1	0	14.64	0	13.43	1	/	2
	1	24	14.69	0	13.41	1	/	2
	1	49	14.83	0	13.51	1	/	2
	25	0	13.38	1	12.14	2	/	3
	25	12	13.39	1	12.51	2	/	3
	25	25	13.63	1	12.64	2	/	3
	50	0	13.50	1	12.52	2	/	3

➢ **LTE Band 25**

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 26047	Mid CH 26365	High CH 26683		Low CH 26047	Mid CH 26365	High CH 26683		Low CH 26047	Mid CH 26365	High CH 26683	
			1850.7 MHz	1882.5 MHz	1914.3 MHz		1850.7 MHz	1882.5 MHz	1914.3 MHz		1850.7 MHz	1882.5 MHz	1914.3 MHz	
25 / 1.4M	1	0	9.37	11.01	11.28	0	9.87	9.72	10.67	1	/	/	/	2
	1	2	11.53	11.01	11.32	0	10.16	10.27	10.83	1	/	/	/	2
	1	5	11.24	11.35	11.21	0	10.08	10.01	10.66	1	/	/	/	2
	3	0	11.20	11.10	11.37	0	10.06	10.05	10.07	1	/	/	/	2
	3	1	11.16	11.21	11.42	0	10.16	9.92	10.61	1	/	/	/	2
	3	3	11.16	10.97	11.43	0	10.20	9.69	10.68	1	/	/	/	2
	6	0	10.25	10.10	10.31	1	9.11	9.07	9.71	2	/	/	/	3

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 26055	Mid CH 26365	High CH 26675		Low CH 26055	Mid CH 26365	High CH 26675		Low CH 26055	Mid CH 26365	High CH 26675	
			1851.5 MHz	1882.5 MHz	1913.5 MHz		1851.5 MHz	1882.5 MHz	1913.5 MHz		1851.5 MHz	1882.5 MHz	1913.5 MHz	
25 / 3M	1	0	11.42	11.00	11.66	0	9.80	10.42	10.78	1	/	/	/	2
	1	7	11.33	10.80	11.58	0	9.66	10.42	11.00	1	/	/	/	2
	1	14	11.44	11.02	11.45	0	9.96	10.65	10.77	1	/	/	/	2
	8	0	10.04	9.92	10.47	1	9.20	9.23	9.45	2	/	/	/	3
	8	3	10.25	10.17	10.51	1	9.14	9.17	9.37	2	/	/	/	3
	8	7	10.14	10.13	10.52	1	9.27	9.36	9.24	2	/	/	/	3
	15	0	10.05	10.15	10.56	1	9.08	9.06	9.45	2	/	/	/	3

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 26065	Mid CH 26365	High CH 26665		Low CH 26065	Mid CH 26365	High CH 26665		Low CH 26065	Mid CH 26365	High CH 26665	
			1852.5 MHz	1882.5 MHz	1912.5 MHz		1852.5 MHz	1882.5 MHz	1912.5 MHz		1852.5 MHz	1882.5 MHz	1912.5 MHz	
25 / 5M	1	0	11.05	11.06	11.39	0	9.71	10.32	9.97	1	/	/	/	2
	1	12	11.19	11.01	11.44	0	9.71	10.32	10.17	1	/	/	/	2
	1	24	11.40	11.03	11.29	0	9.81	10.35	9.87	1	/	/	/	2
	12	0	9.99	9.98	10.45	1	9.02	8.86	9.40	2	/	/	/	3
	12	6	10.33	10.03	10.34	1	9.05	9.26	9.46	2	/	/	/	3
	12	13	10.25	10.13	10.34	1	9.19	9.03	9.55	2	/	/	/	3
	25	0	10.23	10.03	10.37	1	9.12	8.90	9.57	2	/	/	/	3

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 26090	Mid CH 26365	High CH 26640		Low CH 26090	Mid CH 26365	High CH 26640		Low CH 26090	Mid CH 26365	High CH 26640	
			1855.0 MHz	1882.5 MHz	1910.0 MHz		1855.0 MHz	1882.5 MHz	1910.0 MHz		1855.0 MHz	1882.5 MHz	1910.0 MHz	
25 / 10M	1	0	11.16	11.23	11.25	0	9.82	10.46	11.18	1	/	/	/	2
	1	24	11.44	11.35	11.65	0	9.93	11.26	11.26	1	/	/	/	2
	1	49	11.39	11.19	11.35	0	10.80	10.78	10.99	1	/	/	/	2
	25	0	10.14	9.98	10.44	1	9.56	9.19	9.58	2	/	/	/	3
	25	12	10.29	10.13	10.46	1	9.45	9.08	9.74	2	/	/	/	3
	25	25	10.37	10.13	10.54	1	9.63	9.15	9.67	2	/	/	/	3
	50	0	10.19	10.02	10.79	1	9.57	8.84	9.46	2	/	/	/	3

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 26115	Mid CH 26365	High CH 26615		Low CH 26115	Mid CH 26365	High CH 26615		Low CH 26115	Mid CH 26365	High CH 26615	
			1857.5 MHz	1882.5 MHz	1907.5 MHz		1857.5 MHz	1882.5 MHz	1907.5 MHz		1857.5 MHz	1882.5 MHz	1907.5 MHz	
25 / 15M	1	0	11.15	11.05	11.44	0	10.77	10.76	10.94	1	/	/	/	2
	1	37	11.16	11.10	11.46	0	11.29	10.43	10.86	1	/	/	/	2
	1	74	11.20	11.29	11.45	0	10.60	10.80	11.15	1	/	/	/	2
	36	0	10.43	9.97	10.52	1	10.26	10.35	10.04	2	/	/	/	3
	36	19	10.32	9.99	10.67	1	10.26	10.35	10.04	2	/	/	/	3
	36	39	10.30	10.16	10.65	1	10.26	10.35	10.04	2	/	/	/	3
	75	0	10.22	10.03	10.59	1	10.26	10.35	10.04	2	/	/	/	3

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 26140	Mid CH 26365	High CH 26590		Low CH 26140	Mid CH 26365	High CH 26590		Low CH 26140	Mid CH 26365	High CH 26590	
			1860.0 MHz	1882.5 MHz	1905.0 MHz		1860.0 MHz	1882.5 MHz	1905.0 MHz		1860.0 MHz	1882.5 MHz	1905.0 MHz	
25 / 20M	1	0	11.50	10.74	11.29	0	10.18	10.33	10.26	1	/	/	/	2
	1	50	11.68	10.95	11.50	0	10.29	10.63	10.49	1	/	/	/	2
	1	99	10.74	10.87	11.24	0	10.00	10.94	10.07	1	/	/	/	2
	50	0	10.36	10.25	10.39	1	10.03	10.57	9.92	2	/	/	/	3
	50	25	10.25	10.27	10.35	1	10.12	10.49	9.92	2	/	/	/	3
	50	50	10.15	10.34	10.55	1	10.19	10.57	9.92	2	/	/	/	3
	100	0	10.15	10.20	10.41	1	9.81	10.44	9.92	2	/	/	/	3

➢ **LTE Band 26**

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 26697	Mid CH 26865	High CH 27033		Low CH 26697	Mid CH 26865	High CH 27033		Low CH 26697	Mid CH 26865	High CH 27033	
			814.7 MHz	831.5 MHz	848.3 MHz		814.7 MHz	831.5 MHz	848.3 MHz		814.7 MHz	831.5 MHz	848.3 MHz	
26 / 1.4M	1	0	17.20	17.05	17.17	0	16.25	16.43	17.04	1	/	/	/	2
	1	2	17.27	17.20	17.14	0	16.65	17.10	16.55	1	/	/	/	2
	1	5	17.25	16.92	17.26	0	16.35	16.53	16.62	1	/	/	/	2
	3	0	17.15	17.09	17.19	0	16.41	15.96	16.02	1	/	/	/	2
	3	1	17.30	17.19	17.08	0	16.22	16.23	15.93	1	/	/	/	2
	3	3	17.22	17.19	17.12	0	16.28	15.92	16.10	1	/	/	/	2
	6	0	16.32	16.13	16.22	1	15.23	15.10	15.26	2	/	/	/	3

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 26705	Mid CH 26865	High CH 27025		Low CH 26705	Mid CH 26865	High CH 27025		Low CH 26705	Mid CH 26865	High CH 27025	
			815.5 MHz	831.5 MHz	847.5 MHz		815.5 MHz	831.5 MHz	847.5 MHz		815.5 MHz	831.5 MHz	847.5 MHz	
26 / 3M	1	0	17.08	17.20	17.28	0	16.60	16.04	16.63	1	/	/	/	2
	1	7	17.25	17.16	17.30	0	16.55	16.32	17.14	1	/	/	/	2
	1	14	17.31	17.29	17.36	0	16.78	16.24	16.83	1	/	/	/	2
	8	0	16.35	16.17	16.46	1	15.52	14.86	15.50	2	/	/	/	3
	8	3	16.43	16.13	16.41	1	15.37	15.18	15.77	2	/	/	/	3
	8	7	16.45	16.16	16.41	1	15.78	15.04	15.99	2	/	/	/	3
	15	0	16.42	16.02	16.28	1	15.28	14.93	15.32	2	/	/	/	3

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 26715	Mid CH 26865	High CH 27015		Low CH 26715	Mid CH 26865	High CH 27015		Low CH 26715	Mid CH 26865	High CH 27015	
			816.5 MHz	831.5 MHz	846.5 MHz		816.5 MHz	831.5 MHz	846.5 MHz		816.5 MHz	831.5 MHz	846.5 MHz	
26 / 5M	1	0	16.97	17.22	17.00	0	15.94	16.45	15.74	1	/	/	/	2
	1	12	17.12	16.95	17.13	0	15.78	16.22	15.71	1	/	/	/	2
	1	24	17.20	17.18	17.12	0	15.56	16.19	15.73	1	/	/	/	2
	12	0	16.30	16.16	16.26	1	15.27	14.95	15.26	2	/	/	/	3
	12	6	16.40	16.06	16.19	1	15.39	15.06	15.29	2	/	/	/	3
	12	13	16.33	16.21	16.09	1	15.15	15.10	15.03	2	/	/	/	3
	25	0	16.25	16.14	16.10	1	15.21	15.17	15.28	2	/	/	/	3

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 26740	Mid CH 26865	High CH 26990		Low CH 26740	Mid CH 26865	High CH 26990		Low CH 26740	Mid CH 26865	High CH 26990	
			819.0 MHz	831.5 MHz	844.0 MHz		819.0 MHz	831.5 MHz	844.0 MHz		819.0 MHz	831.5 MHz	844.0 MHz	
26 / 10M	1	0	17.14	16.99	17.22	0	16.86	16.71	16.94	1	/	/	/	2
	1	24	17.24	17.09	17.32	0	16.79	16.64	16.87	1	/	/	/	2
	1	49	17.26	17.11	17.34	0	17.10	16.95	17.18	1	/	/	/	2
	25	0	16.25	16.10	16.33	1	15.28	15.13	15.36	2	/	/	/	3
	25	12	16.30	16.15	16.38	1	15.34	15.19	15.42	2	/	/	/	3
	25	25	16.32	16.17	16.40	1	15.29	15.14	15.37	2	/	/	/	3
	50	0	16.37	16.22	16.45	1	14.95	14.80	15.03	2	/	/	/	3

LTE Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)	64QAM			3GPP MPR (dB)
			Low CH 26765	Mid CH 26865	High CH 26965		Low CH 26765	Mid CH 26865	High CH 26965		Low CH 26765	Mid CH 26865	High CH 26965	
			821.5 MHz	831.5 MHz	841.5 MHz		821.5 MHz	831.5 MHz	841.5 MHz		821.5 MHz	831.5 MHz	841.5 MHz	
26 / 15M	1	0	17.19	17.05	17.20	0	16.39	16.27	16.93	1	/	/	/	2
	1	37	17.48	17.25	17.30	0	16.46	16.34	16.86	1	/	/	/	2
	1	74	17.20	17.06	17.32	0	16.50	16.38	17.17	1	/	/	/	2
	36	0	16.13	15.99	16.31	1	16.22	16.10	15.35	2	/	/	/	3
	36	19	16.07	15.93	16.36	1	16.28	16.16	15.41	2	/	/	/	3
	36	39	16.02	15.88	16.38	1	16.06	15.94	15.36	2	/	/	/	3
	75	0	15.99	15.85	16.43	1	16.03	15.91	15.02	2	/	/	/	3

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). Pth is given by Formula (B.2).

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

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

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. Tune-up Power (dBm)	Max. Tune-up Power (mW)	Front Face			Rear Face			Left Side		
			Ant. to Surface (mm)	Calculated Result (mW)	Require SAR Testing?	Ant. to Surface (mm)	Calculated Result (mW)	Require SAR Testing?	Ant. to Surface (mm)	Calculated Result (mW)	Require SAR Testing?
BT (2402-2480MHz)	-7.0	0.20	/	1	NO	/	/	NO	/	1	NO
LTE Band 2 (1850-1910MHz)	12.0	15.85	5	3.35	Yes	5	3.35	Yes	48	218.93	No
LTE Band 4 (1710-1755MHz)	15.0	31.62	5	3.58	Yes	5	3.58	Yes	48	224.74	No
LTE Band 5 (824-849MHz)	14.5	28.18	5	15.96	Yes	5	15.96	Yes	48	400.52	No
LTE Band 12 (699-716MHz)	15.5	35.48	5	24.04	Yes	5	24.04	Yes	48	469.26	No
LTE Band 13 (777-787MHz)	19.5	89.13	5	19.15	Yes	5	19.15	Yes	48	429.77	No
LTE Band 25 (1850-1915MHz)	10.5	11.22	5	3.34	Yes	5	3.34	Yes	48	218.75	No
LTE Band 26 (814-849MHz)	18.0	63.10	5	15.96	Yes	5	15.96	Yes	48	400.52	No

Mode	Max. Tune-up Power (dBm)	Max. Tune-up Power (mW)	Right Side			Top Side			Bottom Side		
			Ant. to Surface (mm)	Calculated Result (mW)	Require SAR Testing?	Ant. to Surface (mm)	Calculated Result (mW)	Require SAR Testing?	Ant. to Surface (mm)	Calculated Result (mW)	Require SAR Testing?
BT (2402-2480MHz)	-7.0	0.20	/	1	NO	/	/	NO	/	1	NO
LTE Band 2 (1850-1910MHz)	12.0	15.85	5	3.35	Yes	60	330.67	No	12	16.89	No
LTE Band 4 (1710-1755MHz)	15.0	31.62	5	3.58	Yes	60	338.07	No	12	17.79	Yes
LTE Band 5 (824-849MHz)	14.5	28.18	5	15.96	Yes	60	550.43	No	12	55.56	No
LTE Band 12 (699-716MHz)	15.5	35.48	5	24.04	Yes	60	629.13	No	12	75.93	No
LTE Band 13 (777-787MHz)	19.5	89.13	5	19.15	Yes	60	584.16	No	12	63.85	Yes
LTE Band 25 (1850-1915MHz)	10.5	11.22	5	3.34	Yes	60	330.45	No	12	16.86	No
LTE Band 26 (814-849MHz)	18.0	63.10	5	15.96	Yes	60	550.43	No	12	55.56	Yes

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.

4.5. SAR TESTING RESULTS

4.5.1. SAR Test Reduction Considerations

KDB 447498 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

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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.

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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.

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

Plot No.	LTE Band	Mode	Test Position	Channel	RB	offset	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaling Factor	Scaled SAR-1g (W/kg)	Note
	Band 2	QPSK20M	Front Face	18700	1	50	12.0	11.68	-0.08	0.234	1.08	0.252	
	Band 2	QPSK20M	Rear Face	18700	1	50	12.0	11.68	0.08	0.0493	1.08	0.053	
	Band 2	QPSK20M	Right Side	18700	1	50	12.0	11.68	-0.01	0.815	1.08	0.877	
	Band 2	QPSK20M	Right Side	18700	1	50	12.0	11.68	-0.02	0.806	1.08	0.868	Repeat
	Band 2	QPSK20M	Bottom Side	18700	1	50	12.0	11.68	0.05	0.0193	1.08	0.021	
	Band 2	QPSK20M	Front Face	19100	50	50	11.0	10.55	0.12	0.00968	1.11	0.011	
	Band 2	QPSK20M	Rear Face	19100	50	50	11.0	10.55	0.12	0.0388	1.11	0.043	
	Band 2	QPSK20M	Right Side	19100	50	50	11.0	10.55	0.01	0.689	1.11	0.764	
	Band 2	QPSK20M	Bottom Side	19100	50	50	11.0	10.55	0.05	0.0144	1.11	0.016	
1	Band 2	QPSK20M	Right Side	18900	1	50	12.0	10.95	-0.03	0.712	1.27	**0.907**	
	Band 2	QPSK20M	Right Side	19100	1	50	12.0	11.50	-0.05	0.698	1.12	0.783	
	Band 2	QPSK20M	Right Side	18700	100	0	10.5	10.15	-0.20	0.577	1.08	0.625	
	Band 4	QPSK20M	Front Face	20050	1	0	15.0	14.59	-0.06	0.237	1.10	0.260	
	Band 4	QPSK20M	Rear Face	20050	1	0	15.0	14.59	0.03	0.0269	1.10	0.030	
2	Band 4	QPSK20M	Right Side	20050	1	0	15.0	14.59	0.04	0.678	1.10	**0.745**	
	Band 4	QPSK20M	Bottom Side	20050	1	0	15.0	14.59	0.12	0.00331	1.10	0.004	
	Band 4	QPSK20M	Front Face	20050	50	50	14.0	13.48	0.06	0.163	1.13	0.184	
	Band 4	QPSK20M	Rear Face	20050	50	50	14.0	13.48	0.02	0.0232	1.13	0.026	
	Band 4	QPSK20M	Right Side	20050	50	50	14.0	13.48	0.13	0.597	1.13	0.673	
	Band 4	QPSK20M	Bottom Side	20050	50	50	14.0	13.48	0.19	0.00269	1.13	0.003	
	Band 5	QPSK10M	Front Face	20450	1	49	14.5	13.94	0.19	0.227	1.14	0.258	
	Band 5	QPSK10M	Rear Face	20450	1	49	14.5	13.94	0.02	0.00753	1.14	0.009	
	Band 5	QPSK10M	Right Side	20450	1	49	14.5	13.94	-0.02	0.187	1.14	0.213	
	Band 5	QPSK10M	Bottom Side	20450	1	49	14.5	13.94	0.15	0.00607	1.14	0.007	
3	Band 5	QPSK10M	Front Face	20525	25	0	13.0	12.75	0.13	0.786	1.06	**0.833**	
	Band 5	QPSK10M	Rear Face	20525	25	0	13.0	12.75	0.18	0.0505	1.06	0.053	
	Band 5	QPSK10M	Right Side	20525	25	0	13.0	12.75	0.02	0.745	1.06	0.789	
	Band 5	QPSK10M	Bottom Side	20525	25	0	13.0	12.75	0.08	0.0173	1.06	0.018	
	Band 5	QPSK10M	Front Face	20450	25	0	13.0	12.48	0.05	0.235	1.13	0.265	
	Band 5	QPSK10M	Front Face	20600	25	0	13.0	12.55	0.18	0.263	1.11	0.292	
	Band 5	QPSK10M	Front Face	20525	50	0	13.0	12.88	0.03	0.728	1.03	0.748	
4	Band 12	QPSK10M	Front Face	23060	1	49	15.5	14.83	-0.07	0.602	1.17	**0.702**	
	Band 12	QPSK10M	Rear Face	23060	1	49	15.5	14.83	0.08	0.0272	1.17	0.032	
	Band 12	QPSK10M	Right Side	23060	1	49	15.5	14.83	0.20	0.523	1.17	0.610	
	Band 12	QPSK10M	Bottom Side	23060	1	49	15.5	14.83	0.02	0.00275	1.17	0.003	
	Band 12	QPSK10M	Front Face	23060	25	25	14.0	13.63	-0.05	0.562	1.09	0.612	
	Band 12	QPSK10M	Rear Face	23060	25	25	14.0	13.63	0.18	0.0226	1.09	0.025	
	Band 12	QPSK10M	Right Side	23060	25	25	14.0	13.63	0.01	0.415	1.09	0.452	
	Band 12	QPSK10M	Bottom Side	23060	25	25	14.0	13.63	0.07	0.00908	1.09	0.010	
5	Band 13	QPSK10M	Front Face	23230	1	0	19.5	18.94	-0.02	0.592	1.14	**0.673**	
	Band 13	QPSK10M	Rear Face	23230	1	0	19.5	18.94	0.18	0.0266	1.14	0.030	
	Band 13	QPSK10M	Right Side	23230	1	0	19.5	18.94	-0.11	0.298	1.14	0.339	
	Band 13	QPSK10M	Bottom Side	23230	1	0	19.5	18.94	-0.14	0.0152	1.14	0.017	
	Band 13	QPSK10M	Front Face	23230	25	25	18.5	17.84	-0.02	0.473	1.16	0.551	
	Band 13	QPSK10M	Rear Face	23230	25	25	18.5	17.84	0.12	0.0216	1.16	0.025	
	Band 13	QPSK10M	Right Side	23230	25	25	18.5	17.84	-0.03	0.294	1.16	0.342	
	Band 13	QPSK10M	Bottom Side	23230	25	25	18.5	17.84	0.14	0.0116	1.16	0.014	

Plot No.	LTE Band	Mode	Test Position	Channel	RB	offset	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaling Factor	Scaled SAR-1g (W/kg)	Note
	Band 25	QPSK20M	Front Face	26140	1	50	10.5	10.05	-0.02	0.136	1.11	0.151	
	Band 25	QPSK20M	Rear Face	26140	1	50	10.5	10.05	0.17	0.0113	1.11	0.013	
6	Band 25	QPSK20M	Right Side	26140	1	50	10.5	10.05	0.11	0.692	1.11	**0.768**	
	Band 25	QPSK20M	Bottom Side	26140	1	50	10.5	10.05	-0.03	0.0174	1.11	0.019	
	Band 25	QPSK20M	Front Face	26140	50	50	9.5	9.08	0.13	0.00765	1.10	0.008	
	Band 25	QPSK20M	Rear Face	26140	50	50	9.5	9.08	0.03	0.00933	1.10	0.010	
	Band 25	QPSK20M	Right Side	26140	50	50	9.5	9.08	-0.02	0.583	1.10	0.642	
	Band 25	QPSK20M	Bottom Side	26140	50	50	9.5	9.08	0.05	0.0139	1.10	0.015	
7	Band 26	QPSK15M	Front Face	26765	1	37	18.0	17.48	0.03	0.801	1.13	**0.903**	
	Band 26	QPSK15M	Front Face	26765	1	37	18.0	17.48	0.02	0.792	1.13	0.893	Repeat
	Band 26	QPSK15M	Rear Face	26765	1	37	18.0	17.48	0.17	0.0418	1.13	0.047	
	Band 26	QPSK15M	Right Side	26765	1	37	18.0	17.48	0.09	0.464	1.13	0.523	
	Band 26	QPSK15M	Bottom Side	26765	1	37	18.0	17.48	0.03	0.0188	1.13	0.021	
	Band 26	QPSK15M	Front Face	26765	36	0	16.5	16.13	0.03	0.634	1.09	0.690	
	Band 26	QPSK15M	Rear Face	26765	36	0	16.5	16.13	0.10	0.0341	1.09	0.037	
	Band 26	QPSK15M	Right Side	26765	36	0	16.5	16.13	-0.17	0.534	1.09	0.581	
	Band 26	QPSK15M	Bottom Side	26765	36	0	16.5	16.13	-0.10	0.00208	1.09	0.002	
	Band 26	QPSK15M	Front Face	26865	1	37	18.0	17.25	0.03	0.364	1.19	0.433	
	Band 26	QPSK15M	Front Face	26965	1	37	18.0	17.30	-0.05	0.502	1.17	0.590	
	Band 26	QPSK15M	Front Face	26765	75	0	16.5	15.99	0.04	0.71	1.12	0.798	

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.

Band	Mode	Test Position	Channel	Original Measured SAR-1g (W/kg)	1st Repeated SAR-1g (W/kg)	L/S Ratio	2nd Repeated SAR-1g (W/kg)	L/S Ratio	3rd Repeated SAR-1g (W/kg)	L/S Ratio
Body Exposure Condition										
LTE 2	QPSK20M	Right Side	18700	0.815	0.806	1.0112	N/A	N/A	N/A	N/A
LTE 26	QPSK15M	Front Face	26765	0.801	0.792	1.0114	N/A	N/A	N/A	N/A

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
WLAN_SISO + BT	No
WWAN + WLAN_SISO + BT	No
WWAN + WLAN	No
WWAN + BT	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.

*** 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.