中认信通
CHINA CERTIFICATION ICT CO., LTD (DONGGUAN)

ACCREDITED
TESTING LABORATORY
CERTIFICATE # 6356.01

# SAR TEST REPORT

**Applicant: Shenzhen Tanding Technology Co., Ltd.**

Address: Rm 2728, Pengrunda COMM Plaza, No.3368 Houbin Rd. Yuehai St., Nanshan Dist., Shenzhen, Guangdong, China

**FCC ID: 2BHVO-PH-001**

**Product Name: LTE MiFi Router**

**Standard(s): 47 CFR Part 2(2.1093)**

The above device has been tested and found compliant with the requirement of the relative standards by China Certification ICT Co., Ltd (Dongguan)

**Report Number: 2403V84480E-SA**

**Date Of Issue: 2024/09/15**

**Reviewed By: Ken Zong** Ken Zong

Title: SAR Engineer

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Title: SAR Engineer

**Test Laboratory: China Certification ICT Co., Ltd (Dongguan)**

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Tel: +86-769-82016888

# SAR TEST RESULTS SUMMARY

| Operation Frequency Bands | Highest Reported 1g SAR (W/kg) | | Limits (W/kg) |
|---|---|---|---|
| | Body SAR | | |
| **LTE Band 2** | 0.49 | | **1.6** |
| **LTE Band 5** | 0.27 | | |
| **LTE Band 12** | 0.33 | | |
| **LTE Band 66** | **0.56** | | |
| **Maximum Simultaneous Transmission SAR** | | | |
| **Items** | **Body SAR** | **Hotspot** | **Limits** |
| Sum SAR(W/kg) | **0.76** | **0.76** | **1.6** |
| SPLSR | N/A | N/A | **0.04** |
| EUT Received Date: | 2024/07/08 | | |
| Tested Date: | 2024/08/22 ~ 2024/08/23 | | |
| Tested Result: | Pass | | |

## Test Facility

The Test site used by China Certification ICT Co., Ltd (Dongguan) to collect test data is located on the No. 113, Pingkang Road, Dalang Town, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 442868, the FCC Designation No. : CN1314.

## Declarations

China Certification ICT Co., Ltd (Dongguan) is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with a triangle symbol "▲". Customer model name, addresses, names, trademarks etc. are not considered data.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

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# DOCUMENT REVISION HISTORY

| Revision Number | Report Number | Description of Revision | Date of Revision |
|---|---|---|---|
| 1.0 | 2403V84480E-SA | Original Report | 2024/09/15 |

# 1. GENERAL INFORMATION

## 1.1 Product Description for Equipment under Test (EUT)

| | |
|---|---|
| **EUT Name:** | LTE MiFi Router |
| **EUT Model:** | R1878 |
| **Brand:** | PHILIPS |
| **Device Type:** | Portable |
| **Exposure Category:** | Population / Uncontrolled |
| **Antenna Type(s):** | Internal Antenna |
| **Body-Worn Accessories:** | None |
| **Operation modes:** | FDD-LTE and WLAN |
| **Frequency Band:** | LTE Band 2: 1850-1910 MHz(TX); 1930-1990 MHz(RX)<br>LTE Band 5: 824-849 MHz(TX); 869-894 MHz(RX)<br>LTE Band 12: 699-716 MHz(TX); 729-746 MHz(RX)<br>LTE Band 66: 1710-1780 MHz(TX); 2110-2200 MHz(RX)<br>WLAN 2.4G : 2412 MHz-2462 MHz/2422-2452 MHz(TX/RX) |
| **Conducted RF Power:** | LTE Band 2: 23.31 dBm<br>LTE Band 5: 24.36 dBm<br>LTE Band 12: 24.22 dBm<br>LTE Band 66: 22.99 dBm<br>WLAN 2.4G: 9.77 dBm |
| **Dimensions (L*W*H):** | 105mm (L)*62mm (W) *8mm (H) |
| **Rated Input Voltage:** | DC 3.8 V from Rechargeable Battery |
| **Serial Number:** | 2O0R-1 |
| **Normal Operation:** | Body |

## 1.2 Test Specification, Methods and Procedures

The tests documented in this report were performed in accordance with FCC 47 CFR § 2.1093, IEEE 1528-2013, the following FCC Published RF exposure KDB procedures:

KDB 447498 D01 General RF Exposure Guidance v06
KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
KDB 865664 D02 RF Exposure Reporting v01r02
KDB 941225 D05 SAR for LTE Devices v02r05
KDB 941225 D06 Hotspot Mode v02r01

TCB Workshop April 2019: RF Exposure Procedures

## 1.3 SAR Limits

**FCC Limit**

| EXPOSURE LIMITS | SAR (W/kg) | |
|---|---|---|
| | (General Population / Uncontrolled Exposure Environment) | (Occupational / Controlled Exposure Environment) |
| Spatial Average (averaged over the whole body) | 0.08 | 0.4 |
| Spatial Peak (averaged over any 1 g of tissue) | **1.60** | 8.0 |
| Spatial Peak (hands/wrists/feet/ankles averaged over 10 g) | 4.0 | 20.0 |

Population/Uncontrolled Environments are defined as locations where there is the exposure of individual who have no knowledge or control of their exposure.

Occupational/Controlled Environments are defined as locations where there is exposure that may be incurred by people who are aware of the potential for exposure (i.e. as a result of employment or occupation).

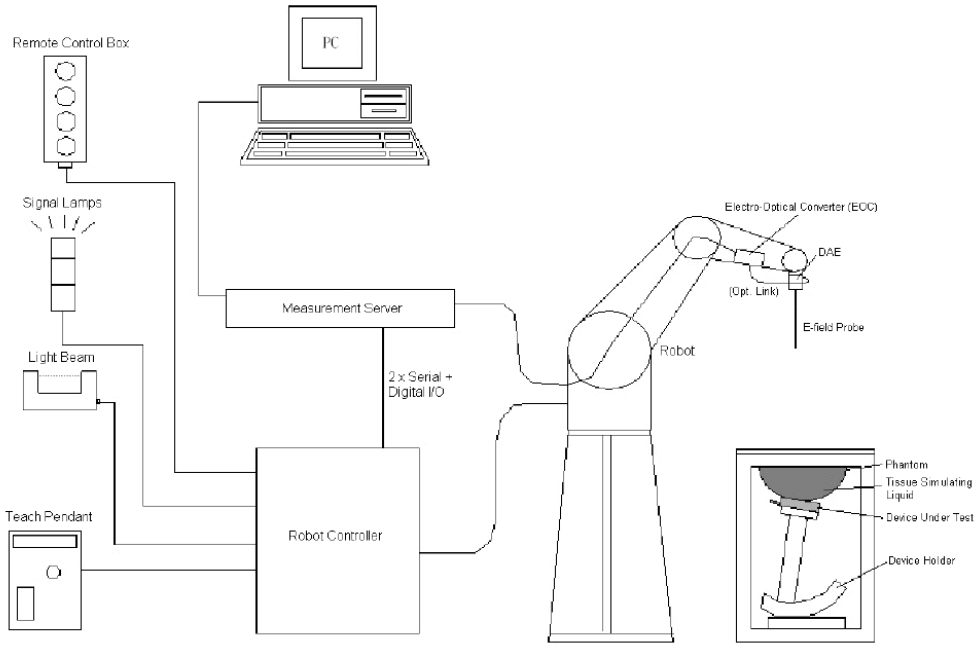
General Population/Uncontrolled environments Spatial Peak limit 1.6W/kg for 1g SAR applied to the EUT.

# 2. SAR MEASUREMENT SYSTEM

These measurements were performed with the automated near-field scanning system DASY5 from Schmid & Partner Engineering AG (SPEAG) which is the Fifth generation of the system shown in the figure hereinafter:

## DASY5 System Description

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



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal application, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running Win7 professional operating system and the DASY52 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

**DASY5 Measurement Server**

The DASY5 measurement server is based on a PC/104 CPU board with a 400MHz Intel ULV Celeron, 128MB chip-disk and 128MB RAM. The necessary circuits for communication with the DAE4 (or DAE3) electronics box, as well as the 16 bit AD-converter system for optical detection and digital I/O interface are contained on the DASY5 I/O board, which is directly connected to the PC/104 bus of the CPU board.

The measurement server performs all real-time data evaluation of field measurements and surface detection, controls robot movements and handles safety operation. The PC operating system cannot interfere with these time critical processes. All connections are supervised by a watchdog, and disconnection of any of the cables to the measurement server will automatically disarm the robot and disable all program-controlled robot movements. Furthermore, the measurement server is equipped with an expansion port which is reserved for future applications. Please note that this expansion port does not have a standardized point out, and therefore only devices provided by SPEAG can be connected. Devices from any other supplier could seriously damage the measurement server.

**Data Acquisition Electronics**

The data acquisition electronics (DAE4) consist of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder with a control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information, as well as an optical uplink for commands and the clock.

The mechanical probe mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection.

The input impedance of both the DAE4 as well as of the DAE3 box is 200MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

**EX3DV4 E-Field Probes**

| | |
|---|---|
| **Frequency** | 10 MHz to > 6 GHz<br>Linearity: ± 0.2 dB (30 MHz to 6 GHz) |
| **Directivity** | ± 0.3 dB in TSL (rotation around probe axis)<br>± 0.5 dB in TSL (rotation normal to probe axis) |
| **Dynamic Range** | 10 µW/g to > 100 mW/g<br>Linearity: ± 0.2 dB (noise: typically < 1 µW/g) |
| **Dimensions** | Overall length: 337 mm (Tip: 20 mm)<br>Tip diameter: 2.5 mm (Body: 12 mm)<br>Typical distance from probe tip to dipole centers: 1 mm |
| **Application** | High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields); the only probe that enables compliance testing for frequencies up to 6 GHz with precision of better 30%. |
| **Compatibility** | DASY3, DASY4, DASY52 SAR and higher, EASY4/MRI |

**Calibration Frequency Points for EX3DV4 E-Field Probes SN: 7329 Calibrated: 2024/3/27**

| Calibration Frequency Point(MHz) | Frequency Range(MHz) | | Conversion Factor | | |
|---|---|---|---|---|---|
| | From | To | X | Y | Z |
| 750 Head | 650 | 810 | 8.79 | 10.07 | 9.05 |
| 900 Head | 810 | 1000 | 8.42 | 9.50 | 8.93 |
| 1750 Head | 1650 | 1810 | 7.56 | 8.56 | 7.71 |
| 1900 Head | 1810 | 2000 | 7.37 | 8.32 | 7.54 |
| 2300 Head | 2200 | 2399 | 7.21 | 8.13 | 7.41 |
| 2450 Head | 2399 | 2500 | 7.05 | 7.92 | 7.22 |
| 2600 Head | 2500 | 2700 | 6.91 | 7.77 | 7.08 |
| 5250 Head | 5140 | 5360 | 4.96 | 5.61 | 5.16 |
| 5600 Head | 5490 | 5675 | 4.38 | 4.98 | 4.56 |
| 5750 Head | 5675 | 5860 | 4.54 | 5.16 | 4.70 |

**SAM Twin Phantom**

The SAM twin phantom is a fiberglass shell phantom with 2mm shell thickness (except the ear region, where shell thickness increases to 6 mm). The phantom has three measurement areas:
_ Left Head
_ Right Head
_ Flat phantom

The phantom table for the DASY systems based on the robots have the size of 100 x 50 x 85 cm (L x W x H).
For easy dislocation these tables have fork lift cut outs at the bottom.
The bottom plate contains three pairs of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. Only one device holder is necessary if two phantoms are used (e.g., for different liquids)

A white cover is provided to cover the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. Free space scans of devices on top of this phantom cover are possible. Three reference marks are provided on the phantom counter. These reference marks are used to teach the absolute phantom position relative to the robot.

**Robots**

The DASY5 system uses the high precision industrial robot. The robot offers the same features important for our application:

- High precision (repeatability 0.02mm)
- High reliability (industrial design)
- Low maintenance costs (virtually maintenance free due to direct drive gears; no belt drives)
- Jerk-free straight movements (brushless synchrony motors; no stepper motors)
- Low ELF interference (motor control fields shielded via the closed metallic construction shields)

The above mentioned robots are controlled by the Staubli CS8c robot controllers. All information regarding the use and maintenance of the robot arm and the robot controller is contained on the CDs delivered along with the robot. Paper manuals are available upon request direct from Staubli.

**SAR Scan Procedures**

**Step 1: Power Reference Measurement**

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. The minimum distance of probe sensors to surface is 1.4 mm. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

**Step 2: Area Scans**

Area scans are defined prior to the measurement process being executed with a user defined variable spacing between each measurement point (integral) allowing low uncertainty measurements to be conducted. Scans defined for FCC applications utilize a 15mm 2 step integral, with 1.5mm interpolation used to locate the peak SAR area used for zoom scan assessments.

Where the system identifies multiple SAR peaks (which are within 25% of peak value) the system will provide the user with the option of assessing each peak location individually for zoom scan averaging.

Area Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

| | ≤ 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 scan spatial resolution: $\Delta x_{Area}$, $\Delta y_{Area}$ | ≤ 2 GHz: ≤ 15 mm<br>2 – 3 GHz: ≤ 12 mm | 3 – 4 GHz: ≤ 12 mm<br>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. | |

**Step 3: Zoom Scan (Cube Scan Averaging)**

The averaging zoom scan volume utilized in the DASY5 software is in the shape of a cube and the side dimension of a 1 g or 10 g mass is dependent on the density of the liquid representing the simulated tissue. A density of 1000 kg/m$^3$ is used to represent the head and body tissue density and not the phantom liquid density, in order to be consistent with the definition of the liquid dielectric properties, i.e. the side length of the 1g cube is 10mm,with the side length of the 10g cube is 21.5mm.

Zoom Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

| | | | ≤ 3 GHz | > 3 GHz |
|---|---|---|---|---|
| Maximum zoom scan spatial resolution: $\Delta x_{Zoom}$, $\Delta y_{Zoom}$ | | | ≤ 2 GHz: ≤ 8 mm<br>2 – 3 GHz: ≤ 5 mm* | 3 – 4 GHz: ≤ 5 mm*<br>4 – 6 GHz: ≤ 4 mm* |
| Maximum zoom scan spatial resolution, normal to phantom surface | uniform grid: $\Delta z_{Zoom}(n)$ | | ≤ 5 mm | 3 – 4 GHz: ≤ 4 mm<br>4 – 5 GHz: ≤ 3 mm<br>5 – 6 GHz: ≤ 2 mm |
| | graded grid | $\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface | ≤ 4 mm | 3 – 4 GHz: ≤ 3 mm<br>4 – 5 GHz: ≤ 2.5 mm<br>5 – 6 GHz: ≤ 2 mm |
| | | $\Delta z_{Zoom}(n>1)$: between subsequent points | $\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$ mm | |
| Minimum zoom scan volume | x, y, z | | ≥ 30 mm | 3 – 4 GHz: ≥ 28 mm<br>4 – 5 GHz: ≥ 25 mm<br>5 – 6 GHz: ≥ 22 mm |

Note: $\delta$ 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.

**Step 4: Power Drift Measurement**

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

When the cube intersects with the surface of the phantom, it is oriented so that 3 vertices touch the surface of the shell or the center of a face is tangent to the surface. The face of the cube closest to the surface is modified in order to conform to the tangent surface.

The zoom scan integer steps can be user defined so as to reduce uncertainty, but normal practice for typical test applications (including FCC) utilize a physical step of 7 x7 x 7 (5mmx5mmx5mm) providing a volume of 30 mm in the X & Y & Z axis.

**Tissue Dielectric Parameters for Head and Body Phantoms**

The head tissue dielectric parameters recommended by the IEC 62209-1:2016

**Recommended Tissue Dielectric Parameters for Head liquid**

**Table A.3 – Dielectric properties of the head tissue-equivalent liquid**

| Frequency MHz | Relative permittivity $\varepsilon_r$ | Conductivity ($\sigma$) S/m |
|---|---|---|
| 300 | 45,3 | 0,87 |
| 450 | 43,5 | 0,87 |
| *750* | *41,9* | *0,89* |
| 835 | 41,5 | 0,90 |
| 900 | 41,5 | 0,97 |
| 1 450 | 40,5 | 1,20 |
| *1 500* | *40,4* | *1,23* |
| *1 640* | *40,2* | *1,31* |
| *1 750* | *40,1* | *1,37* |
| 1 800 | 40,0 | 1,40 |
| 1 900 | 40,0 | 1,40 |
| 2 000 | 40,0 | 1,40 |
| *2 100* | *39,8* | *1,49* |
| *2 300* | *39,5* | *1,67* |
| 2 450 | 39,2 | 1,80 |
| *2 600* | *39,0* | *1,96* |
| 3 000 | 38,5 | 2,40 |
| *3 500* | *37,9* | *2,91* |
| *4 000* | *37,4* | *3,43* |
| *4 500* | *36,8* | *3,94* |
| *5 000* | *36,2* | *4,45* |
| *5 200* | *36,0* | *4,66* |
| *5 400* | *35,8* | *4,86* |
| *5 600* | *35,5* | *5,07* |
| *5 800* | *35,3* | *5,27* |
| *6 000* | *35,1* | *5,48* |

NOTE For convenience, permittivity and conductivity values at those frequencies which are not part of the original data provided by Drossos et al. [33] or the extension to 5 800 MHz are provided (i.e. the values shown *in italics*). These values were linearly interpolated between the values in this table that are immediately above and below these values, except the values at 6 000 MHz that were linearly extrapolated from the values at 3 000 MHz and 5 800 MHz.

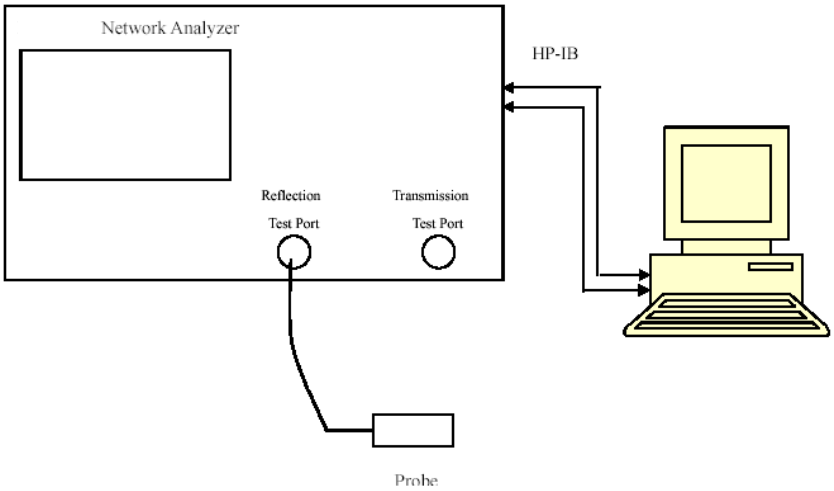
# 3. EQUIPMENT LIST AND CALIBRATION

## 3.1 Equipments List & Calibration Information

| Equipment | Model | S/N | Calibration Date | Calibration Due Date |
|---|---|---|---|---|
| DASY5 Test Software | DASY52.10 | N/A | NCR | NCR |
| DASY5 Measurement Server | DASY5 4.5.12 | 1567 | NCR | NCR |
| Data Acquisition Electronics | DAE4 | 1354 | 2023/11/17 | 2024/11/16 |
| E-Field Probe | EX3DV4 | 7329 | 2024/3/27 | 2025/3/26 |
| Mounting Device | MD4HHTV5 | BJPCTC0152 | NCR | NCR |
| Twin SAM | Twin SAM V5.0 | 1412 | NCR | NCR |
| Dipole, 750 MHz | D750V3 | 1230 | 2023/3/24 | 2026/3/23 |
| Dipole, 900 MHz | D900V2 | 1d217 | 2023/3/24 | 2026/3/23 |
| Dipole, 1750 MHz | D1750V2 | 1200 | 2023/3/27 | 2026/3/26 |
| Dipole, 1900 MHz | D1900V2 | 5d251 | 2023/3/27 | 2026/3/26 |
| Simulated Tissue Liquid Head(500-9500 MHz) | HBBL600-10000V6 | 220420-2 | Each Time | / |
| Network Analyzer | 8753B | 2828A00170 | 2023/10/17 | 2024/10/16 |
| Dielectric assessment kit | 1319 | SM DAK 040 CA | NCR | NCR |
| MXG Vector Signal Generator | N5182B | MY51350144 | 2024/4/1 | 2025/3/31 |
| Power Meter | E4419B | MY45103907 | 2023/10/18 | 2024/10/17 |
| USB Power Sensor | U2001H | MY50000432 | 2024/4/1 | 2025/3/31 |
| Power Amplifier | ZHL-5W-202-S+ | 416402204 | NCR | NCR |
| Power Amplifier | ZVE-6W-83+ | 637202210 | NCR | NCR |
| Directional Coupler | 441493 | 520Z | NCR | NCR |
| Attenuator | 20dB, 100W | LN749 | NCR | NCR |
| Attenuator | 6dB, 150W | 2754 | NCR | NCR |
| Thermometer | DTM3000 | 3892 | 2024/4/1 | 2025/3/31 |
| Thermohygrometer | HTC-1 | N/A | 2024/4/1 | 2025/3/31 |
| Radio Communication Analyzer | MT8820C | 6201181458 | 2024/4/1 | 2025/3/31 |
| Spectrum Analyzer | FSU26 | 100147 | 2024/4/1 | 2025/3/31 |

# 4. SAR MEASUREMENT SYSTEM VERIFICATION

## 4.1 Liquid Verification




Liquid Verification Setup Block Diagram

**Liquid Verification Results**

| Frequency (MHz) | Liquid Type | Liquid Parameter | | Target Value | | Delta (%) | | Tolerance (%) |
|---|---|---|---|---|---|---|---|---|
| | | $\varepsilon_r$ | σ (S/m) | $\varepsilon_r$ | σ (S/m) | $\Delta\varepsilon_r$ | Δσ (S/m) | |
| 704 | Simulated Tissue Liquid Head | 43.454 | 0.884 | 42.15 | 0.89 | 3.09 | -0.67 | ±5 |
| 707.5 | Simulated Tissue Liquid Head | 43.409 | 0.886 | 42.13 | 0.89 | 3.04 | -0.45 | ±5 |
| 711 | Simulated Tissue Liquid Head | 43.364 | 0.889 | 42.11 | 0.89 | 2.98 | -0.11 | ±5 |
| 750 | Simulated Tissue Liquid Head | 42.877 | 0.914 | 41.9 | 0.89 | 2.33 | 2.7 | ±5 |

**Liquid Verification above was performed on 2024/08/23.*

| Frequency (MHz) | Liquid Type | Liquid Parameter | | Target Value | | Delta (%) | | Tolerance (%) |
|---|---|---|---|---|---|---|---|---|
| | | $\varepsilon_r$ | σ (S/m) | $\varepsilon_r$ | σ (S/m) | $\Delta\varepsilon_r$ | Δσ (S/m) | |
| 829 | Simulated Tissue Liquid Head | 41.883 | 0.915 | 41.53 | 0.9 | 0.85 | 1.67 | ±5 |
| 836.5 | Simulated Tissue Liquid Head | 41.79 | 0.922 | 41.5 | 0.9 | 0.7 | 2.44 | ±5 |
| 844 | Simulated Tissue Liquid Head | 41.689 | 0.938 | 41.5 | 0.91 | 0.46 | 3.08 | ±5 |
| 900 | Simulated Tissue Liquid Head | 41.266 | 0.942 | 41.5 | 0.9 | -0.56 | 4.67 | ±5 |

**Liquid Verification above was performed on 2024/08/23.*

| Frequency (MHz) | Liquid Type | Liquid Parameter | | Target Value | | Delta (%) | | Tolerance (%) |
|---|---|---|---|---|---|---|---|---|
| | | $\varepsilon_r$ | σ (S/m) | $\varepsilon_r$ | σ (S/m) | $\Delta\varepsilon_r$ | Δσ (S/m) | |
| 1717.5 | Simulated Tissue Liquid Head | 39.189 | 1.333 | 40.13 | 1.35 | -2.34 | -1.26 | ±5 |
| 1745 | Simulated Tissue Liquid Head | 39.079 | 1.36 | 40.1 | 1.37 | -2.55 | -0.73 | ±5 |
| 1750 | Simulated Tissue Liquid Head | 39.058 | 1.365 | 40.1 | 1.37 | -2.6 | -0.36 | ±5 |
| 1772.5 | Simulated Tissue Liquid Head | 38.961 | 1.387 | 40.06 | 1.38 | -2.74 | 0.51 | ±5 |

**Liquid Verification above was performed on 2024/08/23.*

| Frequency (MHz) | Liquid Type | Liquid Parameter | | Target Value | | Delta (%) | | Tolerance (%) |
|---|---|---|---|---|---|---|---|---|
| | | $\varepsilon_r$ | σ (S/m) | $\varepsilon_r$ | σ (S/m) | $\Delta\varepsilon_r$ | Δσ (S/m) | |
| 1860 | Simulated Tissue Liquid Head | 40.749 | 1.385 | 40 | 1.4 | 1.87 | -1.07 | ±5 |
| 1880 | Simulated Tissue Liquid Head | 40.715 | 1.397 | 40 | 1.4 | 1.79 | -0.21 | ±5 |
| 1900 | Simulated Tissue Liquid Head | 40.685 | 1.409 | 40 | 1.4 | 1.71 | 0.64 | ±5 |

**Liquid Verification above was performed on 2024/08/22.*

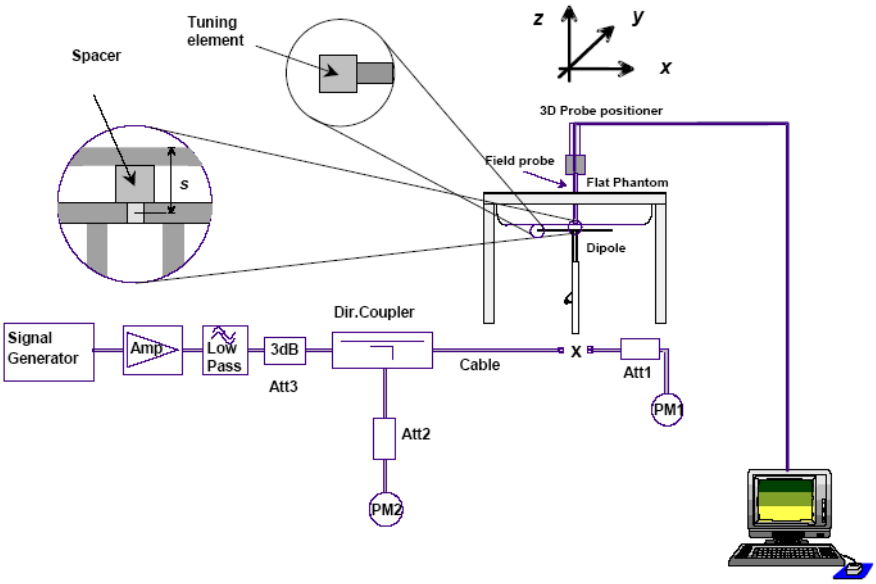
## 4.2 System Accuracy Verification

Prior to the assessment, the system validation kit was used to test whether the system was operating within its specifications of ±10%. The validation results are tabulated below. And also the corresponding SAR plot is attached as well in the SAR plots files.

The spacing distances in the **System Verification Setup Block Diagram** is given by the following:

a) s = 15 mm ± 0,2 mm for 300 MHz ≤ f ≤ 1 000 MHz;
b) s = 10 mm ± 0,2 mm for 1 000 MHz < f ≤ 3 000 MHz;
c) s = 10 mm ± 0,2 mm for 3 000 MHz < f ≤ 6 000 MHz.

**System Verification Setup Block Diagram**




**System Accuracy Check Results**

| Date | Frequency Band | Liquid Type | Input Power (mW) | Measured SAR (W/kg) | | Normalized to 1W (W/kg) | Target Value (W/kg) | Delta (%) | Tolerance (%) |
|---|---|---|---|---|---|---|---|---|---|
| 2024/08/23 | 750 MHz | Simulated Tissue Liquid Head | 100 | 1g | 0.896 | 8.96 | 8.49 | 5.54 | ±10 |
| 2024/08/23 | 900 MHz | Simulated Tissue Liquid Head | 100 | 1g | 1.12 | 11.2 | 10.9 | 2.75 | ±10 |
| 2024/08/23 | 1750 MHz | Simulated Tissue Liquid Head | 100 | 1g | 3.57 | 35.7 | 35.8 | -0.28 | ±10 |
| 2024/08/22 | 1900 MHz | Simulated Tissue Liquid Head | 100 | 1g | 3.71 | 37.1 | 38.9 | -4.63 | ±10 |

*The SAR values above are normalized to 1 Watt forward power.

## 4.3 SAR SYSTEM VALIDATION DATA

**System Performance 750 MHz Head was performed on 2024/08/23**

**DUT: D750V3; Type: 750 MHz; Serial: 1230**

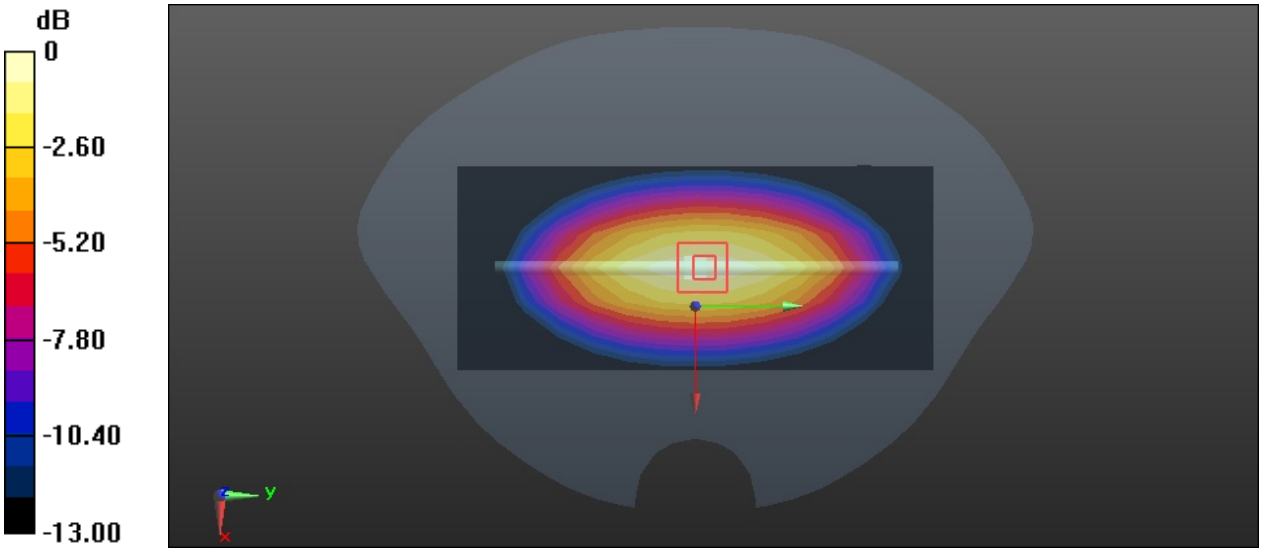
Communication System: CW (0); Frequency: 750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 750 MHz; $\sigma$ = 0.914 S/m; $\varepsilon_r$ =42.877; $\rho$ = 1000 kg/m$^3$;
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(8.79, 10.07, 9.05)@ 750 MHz; Calibrated: 2024/3/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Area Scan(7x15x1):**Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.981 W/kg

**Zoom Scan (5x5x7)/Cube 0:**Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value =34.62 V/m; Power Drift =0.15 dB
Peak SAR (extrapolated) = 1.21 W/kg
**SAR(1 g) = 0.896 W/kg; SAR(10 g) = 0.582 W/kg**
Maximum value of SAR (measured) = 0.965 W/kg




0 dB = 0.965 W/kg = -0.15 dBW/kg

**System Performance 900 MHz Head was performed on 2024/08/23**

**DUT: D900V2; Type: 900 MHz; Serial: 1d217**

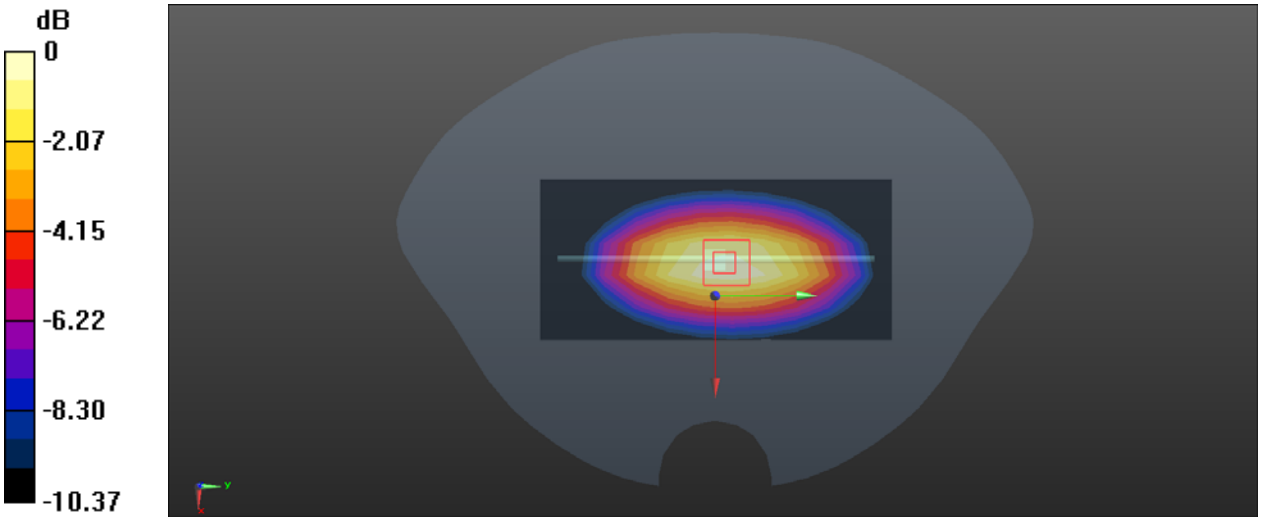
Communication System: CW; Frequency: 900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 900 MHz; $\sigma$ = 0.942 S/m; $\varepsilon_r$ = 41.266; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(8.42, 9.5, 8.93)@ 900 MHz; Calibrated: 2024/3/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Area Scan (6x12x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.41 W/kg

**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 34.97 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 1.74 W/kg
**SAR(1 g) = 1.12 W/kg; SAR(10 g) = 0.744 W/kg**
Maximum value of SAR (measured) = 1.32 W/kg




0 dB = 1.32 W/kg = 1.21 dBW/kg

**System Performance 1750MHz Head was performed on 2024/08/23**

**DUT: D1900V2; Type: 1750 MHz; Serial: 1200**

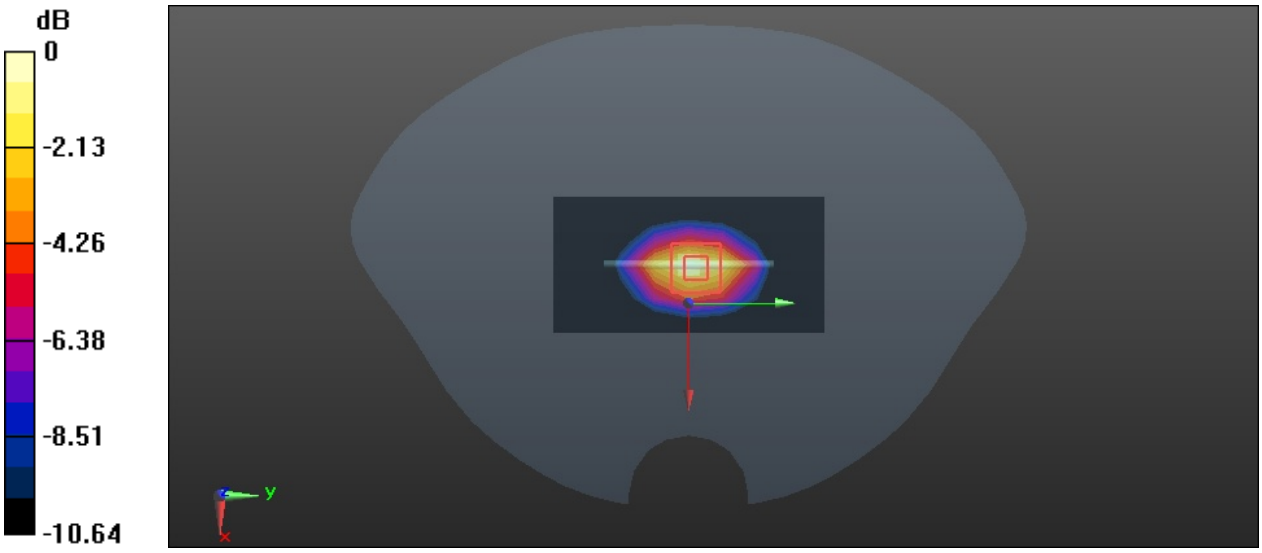
Communication System: CW; Frequency: 1750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1750 MHz; $\sigma$ = 1.365 S/m; $\varepsilon_r$ = 39.058; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(7.56, 8.56, 7.71)@ 1750 MHz; Calibrated: 2024/3/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Area Scan(5x9x1):**Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 4.48 W/kg

**Zoom Scan (5x5x7)/Cube 0:**Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value =57.02 V/m; Power Drift =0.15dB
Peak SAR (extrapolated) = 6.32 W/kg
**SAR(1 g) = 3.57 W/kg; SAR(10 g) = 1.93 W/kg**
Maximum value of SAR (measured) = 4.39 W/kg




0 dB = 4.39 W/kg = 6.42 dBW/kg

**System Performance 1900MHz Head was performed on 2024/08/22**

**DUT: D1900V2; Type: 1900 MHz; Serial: 5d251**

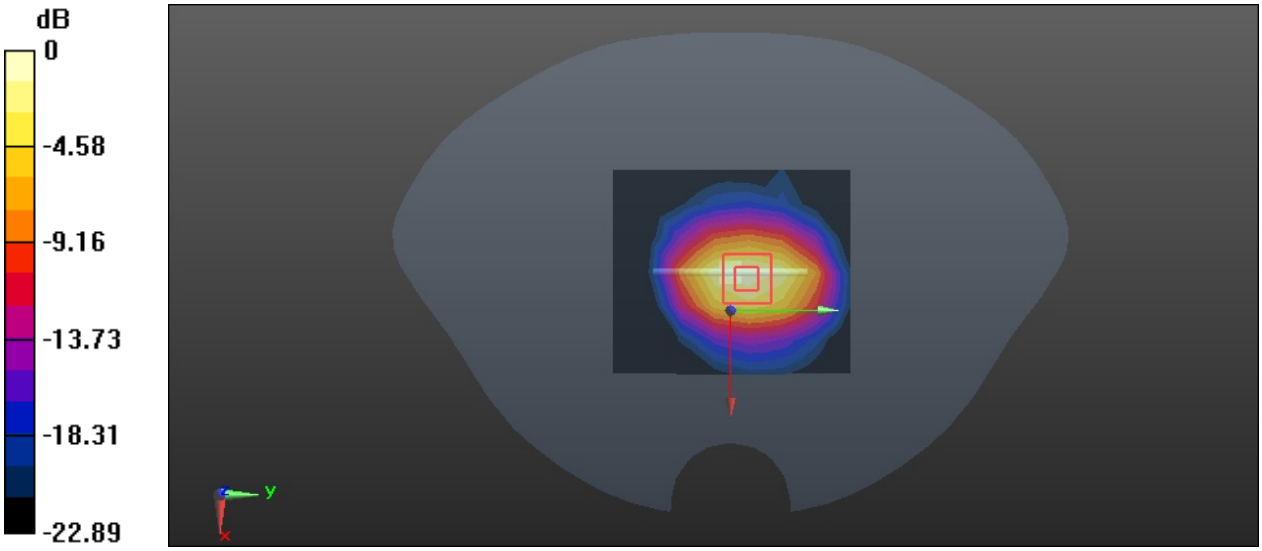
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; $\sigma$ = 1.409 S/m; $\varepsilon_r$ = 40.685; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(7.37, 8.32, 7.54)@ 1900 MHz; Calibrated: 2024/3/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM; Type: Twin SAM V5.0; Serial: TP:1412
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

**Area Scan(7x8x1):**Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 4.34 W/kg

**Zoom Scan (5x5x7)/Cube 0:**Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value =50.66 V/m; Power Drift =0.14 dB
Peak SAR (extrapolated) = 6.35 W/kg
**SAR(1 g) = 3.71 W/kg; SAR(10 g) = 1.97 W/kg**
Maximum value of SAR (measured) = 4.56 W/kg




0 dB = 4.56 W/kg = 6.59 dBW/kg

# 5. EUT TEST STRATEGY AND METHODOLOGY

## 5.1 Test positions for body-worn and other configurations

Body-worn operating configurations should be tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in normal use configurations. Devices with a headset output should be tested with a headset connected to the device. When multiple accessories that do not contain metallic components are supplied with the device, the device may be tested with only the accessory that dictates the closest spacing to the body. When multiple accessories that contain metallic components are supplied with the device, the device must be tested with each accessory that contains a unique metallic component. If multiple accessories share an identical metallic component (e.g., the same metallic belt-clip used with different holsters with no other metallic components), only the accessory that dictates the closest spacing to the body must be tested.

Body-worn accessories may not always be supplied or available as options for some devices that are intended to be authorized for body-worn use. A separation distance of 1.5 cm between the back of the device and a flat phantom is recommended for testing body-worn SAR compliance under such circumstances. Other separation distances may be used, but they should not exceed 2.5 cm. In these cases, the device may use body-worn accessories that provide a separation distance greater than that tested for the device provided however that the accessory contains no metallic components.

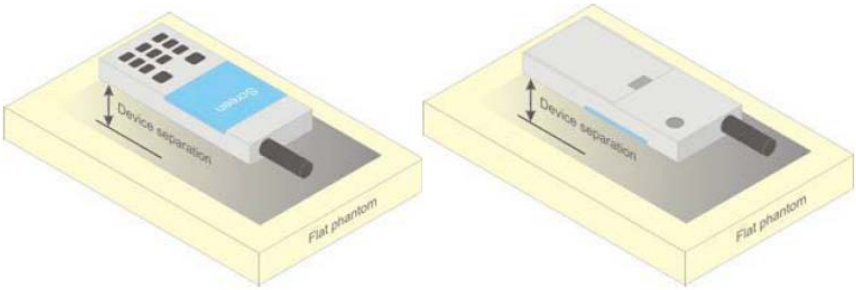



**Figure 5 – Test positions for body-worn devices**

## 5.2 Test Distance for SAR Evaluation

In this case the EUT(Equipment Under Test) is set 10mm away from the phantom, the test distance is 10mm.

## 5.3 SAR Evaluation Procedure

The evaluation was performed with the following procedure:

Step 1: Measurement of the SAR value at a fixed location above the ear point or central position was used as a reference value for assessing the power drop. The SAR at this point is measured at the start of the test and then again at the end of the testing.

Step 2: The SAR distribution at the exposed side of the head was measured at a distance of 4 mm from the inner surface of the shell. The area covered the entire dimension of the head or radiating structures of the EUT, the horizontal grid spacing was 15 mm x 15 mm, and the SAR distribution was determined by integrated grid of 1.5mm x 1.5mm. Based on these data, the area of the maximum absorption was determined by spline interpolation. The first Area Scan covers the entire dimension of the EUT to ensure that the hotspot was correctly identified.

Step 3: Around this point, a volume of 30 mm x 30 mm x 30 mm was assessed by measuring 7x 7 x 7 points. On the basis of this data set, the spatial peak SAR value was evaluated under the following procedure:

1) The data at the surface were extrapolated, since the center of the dipoles is 1.2 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.3 mm. The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip.

2) The maximum interpolated value was searched with a straightforward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1 g or 10 g) were computed by the 3D-Spline interpolation algorithm. The 3D-Spline is composed of three one dimensional splines with the “Not a knot"-condition (in x, y and z-directions). The volume was integrated with the trapezoidal-algorithm. One thousand points (10 x 10 x 10) were interpolated to calculate the averages.

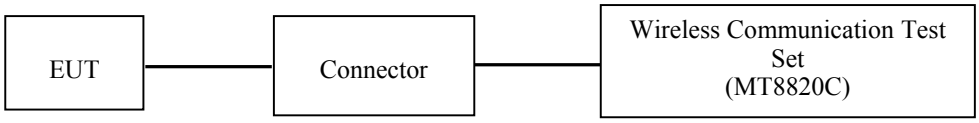
All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

Step 4: Re-measurement of the SAR value at the same location as in Step 1. If the value changed by more than 5%, the evaluation was repeated.

# 6. CONDUCTED OUTPUT POWER MEASUREMENT

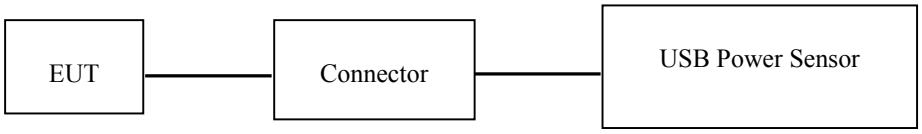
## 6.1 Test Procedure

The RF output of the transmitter was connected to the input of the Wireless Communication Test Set through Connector.




**LTE**

The RF output of the transmitter was connected to the input port of the USB Power Sensor through Connector.




**WLAN**

## 6.2 Description of Test Configuration

**EUT Operation Condition:**

| | |
|---|---|
| **EUT Operation Mode:** | The system was configured for testing in each operation mode. |
| **Equipment Modifications:** | No |
| **EUT Exercise Software:** | No |

The maximum power was configured per 3GPP Standard for each operation modes as below setting:

**LTE (FDD):**

The following tests were conducted according to the test requirements in 3GPP TS36.101

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

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

| Modulation | Channel bandwidth / Transmission bandwidth (RB) | | | | | | MPR (dB) |
|---|---|---|---|---|---|---|---|
| | 1.4 MHz | 3.0 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | |
| QPSK | > 5 | > 4 | > 8 | > 12 | > 16 | > 18 | ≤ 1 |
| 16 QAM | ≤ 5 | ≤ 4 | ≤ 8 | ≤ 12 | ≤ 16 | ≤ 18 | ≤ 1 |
| 16 QAM | > 5 | > 4 | > 8 | > 12 | > 16 | > 18 | ≤ 2 |

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signaling Value of "NS_01".

**Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)**

| Network Signalling value | Requirements (sub-clause) | E-UTRA Band | Channel bandwidth (MHz) | Resources Blocks ($N_{RB}$) | A-MPR (dB) |
|---|---|---|---|---|---|
| NS_01 | 6.6.2.1.1 | Table 5.5-1 | 1.4, 3, 5, 10, 15, 20 | Table 5.6-1 | NA |
| NS_03 | 6.6.2.2.1 | 2, 4,10, 23, 25, 35, 36 | 3 | >5 | ≤ 1 |
| | | | 5 | >6 | ≤ 1 |
| | | | 10 | >6 | ≤ 1 |
| | | | 15 | >8 | ≤ 1 |
| | | | 20 | >10 | ≤ 1 |
| NS_04 | 6.6.2.2.2 | 41 | 5 | >6 | ≤ 1 |
| | | | 10, 15, 20 | See Table 6.2.4-4 | |
| NS_05 | 6.6.3.3.1 | 1 | 10,15,20 | ≥ 50 | ≤ 1 |
| NS_06 | 6.6.2.2.3 | 12, 13, 14, 17 | 1.4, 3, 5, 10 | Table 5.6-1 | n/a |
| NS_07 | 6.6.2.2.3<br>6.6.3.3.2 | 13 | 10 | Table 6.2.4-2 | Table 6.2.4-2 |
| NS_08 | 6.6.3.3.3 | 19 | 10, 15 | > 44 | ≤ 3 |
| NS_09 | 6.6.3.3.4 | 21 | 10, 15 | > 40 | ≤ 1 |
| | | | | > 55 | ≤ 2 |
| NS_10 | | 20 | 15, 20 | Table 6.2.4-3 | Table 6.2.4-3 |
| NS_11 | 6.6.2.2.1 | 23[1] | 1.4, 3, 5, 10 | Table 6.2.4-5 | Table 6.2.4-5 |
| .. | | | | | |
| NS_32 | - | - | - | - | - |
| Note 1: Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region. | | | | | |

## 6.3 Maximum Target Output Power

| Max Target Power(dBm) | | | |
|---|---|---|---|
| Mode/Band | Channel | | |
| | Low | Middle | High |
| LTE Band 2 | 23.5 | 23.5 | 23.5 |
| LTE Band 5 | 24.5 | 24.5 | 24.5 |
| LTE Band 12 | 24.5 | 24.5 | 24.5 |
| LTE Band 66 | 23 | 23 | 23 |
| WLAN 2.4G(802.11b) | 9.5 | 8 | 9.8 |
| WLAN 2.4G(802.11g) | 9.8 | 9.8 | 9.8 |
| WLAN 2.4G(802.11n ht20) | 9.5 | 9 | 9 |
| WLAN 2.4G(802.11n ht40) | 9 | 9 | 9 |
| WLAN 2.4G(802.11ax20) | 9.8 | 8 | 9.8 |
| WLAN 2.4G(802.11ax40) | 9.5 | 9 | 9.5 |

Note: The Maximum Target Power for LTE bands corresponds to their maximum power in QPSK modes with maxim um bandwidth.

**6.4 Test Results:**
**LTE Band 2:**

| Test Bandwidth | Test Modulation | Resource Block & RB offset | Low Channel (dBm) | Middle Channel (dBm) | High Channel (dBm) |
|---|---|---|---|---|---|
| 1.4M | QPSK | 1@0 | 20.88 | 22.10 | 21.01 |
| | | 1@3 | 21.35 | 21.88 | 20.87 |
| | | 1@5 | 21.52 | 21.92 | 21.21 |
| | | 3@0 | 19.24 | 21.85 | 21.18 |
| | | 3@1 | 21.56 | 21.70 | 21.23 |
| | | 3@3 | 21.44 | 21.87 | 21.12 |
| | | 6@0 | 20.71 | 21.33 | 20.73 |
| | 16-QAM | 1@0 | 20.40 | 21.42 | 20.48 |
| | | 1@3 | 20.49 | 21.29 | 20.54 |
| | | 1@5 | 20.65 | 21.47 | 20.20 |
| | | 3@0 | 20.48 | 21.08 | 20.78 |
| | | 3@1 | 20.51 | 21.11 | 20.72 |
| | | 3@3 | 20.91 | 21.05 | 20.68 |
| | | 6@0 | 20.14 | 20.48 | 19.99 |
| 3M | QPSK | 1@0 | 21.68 | 22.16 | 22.14 |
| | | 1@8 | 22.26 | 21.98 | 21.49 |
| | | 1@14 | 21.48 | 21.56 | 21.13 |
| | | 8@0 | 20.84 | 21.18 | 20.65 |
| | | 8@4 | 20.81 | 21.29 | 20.87 |
| | | 8@7 | 20.93 | 21.15 | 20.70 |
| | | 15@0 | 21.19 | 21.24 | 20.62 |
| | 16-QAM | 1@0 | 20.85 | 21.62 | 21.14 |
| | | 1@8 | 21.25 | 21.35 | 20.79 |
| | | 1@14 | 20.73 | 21.15 | 20.56 |
| | | 8@0 | 20.12 | 20.50 | 20.05 |
| | | 8@4 | 20.17 | 20.65 | 20.46 |
| | | 8@7 | 20.46 | 20.76 | 20.25 |
| | | 15@0 | 20.67 | 20.63 | 19.97 |
| 5M | QPSK | 1@0 | 21.50 | 21.62 | 22.20 |
| | | 1@12 | 21.58 | 21.74 | 21.30 |
| | | 1@24 | 22.21 | 21.75 | 21.23 |
| | | 12@0 | 20.82 | 21.42 | 21.45 |
| | | 12@7 | 21.79 | 21.33 | 20.74 |
| | | 12@13 | 21.28 | 21.10 | 20.89 |
| | | 25@0 | 21.26 | 21.23 | 21.08 |
| | 16-QAM | 1@0 | 20.85 | 21.13 | 21.69 |
| | | 1@12 | 20.94 | 21.18 | 20.93 |
| | | 1@24 | 21.66 | 21.26 | 20.57 |
| | | 12@0 | 20.29 | 20.71 | 20.67 |
| | | 12@7 | 20.94 | 20.46 | 20.17 |
| | | 12@13 | 20.54 | 20.46 | 20.35 |

| Test Bandwidth | Test Modulation | Resource Block & RB offset | Low Channel (dBm) | Middle Channel (dBm) | High Channel (dBm) |
|---|---|---|---|---|---|
| | | 25@0 | 20.53 | 20.49 | 20.21 |
| 10M | QPSK | 1@0 | 22.00 | 22.04 | 23.07 |
| | | 1@25 | 21.86 | 21.28 | 22.02 |
| | | 1@49 | 23.31 | 22.16 | 21.45 |
| | | 25@0 | 21.16 | 20.79 | 21.63 |
| | | 25@12 | 21.67 | 20.95 | 21.74 |
| | | 25@25 | 21.79 | 21.08 | 20.99 |
| | | 50@0 | 21.49 | 20.90 | 21.71 |
| | 16-QAM | 1@0 | 20.61 | 21.46 | 22.39 |
| | | 1@25 | 20.89 | 20.64 | 21.50 |
| | | 1@49 | 21.95 | 21.65 | 20.60 |
| | | 25@0 | 20.39 | 20.04 | 21.06 |
| | | 25@12 | 20.98 | 20.35 | 21.01 |
| | | 25@25 | 20.86 | 20.38 | 20.19 |
| | | 50@0 | 20.82 | 20.20 | 21.06 |
| 15M | QPSK | 1@0 | 21.60 | 21.74 | 23.07 |
| | | 1@37 | 21.85 | 21.08 | 21.99 |
| | | 1@74 | 22.61 | 21.78 | 21.29 |
| | | 36@0 | 21.15 | 20.63 | 21.63 |
| | | 36@20 | 21.49 | 20.72 | 21.54 |
| | | 36@39 | 22.05 | 20.92 | 21.20 |
| | | 75@0 | 21.34 | 20.82 | 21.42 |
| | 16-QAM | 1@0 | 20.83 | 21.47 | 22.29 |
| | | 1@37 | 21.17 | 20.59 | 21.23 |
| | | 1@74 | 21.97 | 21.21 | 20.28 |
| | | 36@0 | 20.49 | 20.06 | 21.15 |
| | | 36@20 | 20.87 | 19.90 | 20.95 |
| | | 36@39 | 20.93 | 20.19 | 20.52 |
| | | 75@0 | 20.69 | 20.20 | 20.68 |
| 20M | QPSK | 1@0 | 21.98 | 21.88 | 21.79 |
| | | 1@49 | 23.08 | 23.17 | 22.82 |
| | | 1@99 | 21.63 | 21.54 | 21.79 |
| | | 50@0 | 22.74 | 22.92 | 22.57 |
| | | 50@24 | 21.77 | 21.76 | 21.53 |
| | | 50@50 | 21.84 | 21.73 | 21.73 |
| | | 100@0 | 21.67 | 21.61 | 21.51 |
| | 16-QAM | 1@0 | 22.25 | 21.81 | 21.79 |
| | | 1@49 | 21.61 | 21.87 | 21.76 |
| | | 1@99 | 21.87 | 21.99 | 21.55 |
| | | 50@0 | 21.92 | 21.66 | 21.59 |
| | | 50@24 | 21.86 | 21.79 | 21.64 |
| | | 50@50 | 21.75 | 21.74 | 21.86 |
| | | 100@0 | 22.07 | 21.72 | 21.75 |

**LTE Band 5:**

| Test Bandwidth | Test Modulation | Resource Block & RB offset | Low Channel (dBm) | Middle Channel (dBm) | High Channel (dBm) |
|---|---|---|---|---|---|
| 1.4M | QPSK | 1@0 | 23.85 | 23.27 | 23.74 |
| | | 1@3 | 23.79 | 23.31 | 23.62 |
| | | 1@5 | 23.86 | 23.46 | 23.48 |
| | | 3@0 | 23.61 | 23.55 | 23.51 |
| | | 3@1 | 23.54 | 23.32 | 23.39 |
| | | 3@3 | 23.38 | 23.34 | 23.36 |
| | | 6@0 | 23.17 | 22.73 | 22.82 |
| | 16-QAM | 1@0 | 23.15 | 22.80 | 23.12 |
| | | 1@3 | 22.97 | 22.80 | 23.00 |
| | | 1@5 | 23.00 | 22.82 | 22.89 |
| | | 3@0 | 23.06 | 22.68 | 22.88 |
| | | 3@1 | 22.83 | 22.82 | 22.67 |
| | | 3@3 | 22.80 | 22.99 | 22.67 |
| | | 6@0 | 22.48 | 22.20 | 22.21 |
| 3M | QPSK | 1@0 | 24.20 | 23.76 | 24.02 |
| | | 1@8 | 24.22 | 23.63 | 23.54 |
| | | 1@14 | 23.45 | 23.12 | 23.20 |
| | | 8@0 | 23.13 | 22.97 | 23.03 |
| | | 8@4 | 23.04 | 23.17 | 23.31 |
| | | 8@7 | 23.30 | 21.77 | 23.18 |
| | | 15@0 | 23.16 | 22.99 | 21.76 |
| | 16-QAM | 1@0 | 23.19 | 23.19 | 22.29 |
| | | 1@8 | 23.54 | 23.07 | 22.95 |
| | | 1@14 | 23.06 | 22.64 | 22.66 |
| | | 8@0 | 22.30 | 22.27 | 22.29 |
| | | 8@4 | 22.31 | 20.92 | 22.66 |
| | | 8@7 | 22.69 | 22.39 | 22.45 |
| | | 15@0 | 22.31 | 22.31 | 22.45 |
| 5M | QPSK | 1@0 | 23.74 | 23.93 | 23.78 |
| | | 1@12 | 23.46 | 23.30 | 23.46 |
| | | 1@24 | 23.66 | 23.59 | 23.35 |
| | | 12@0 | 23.31 | 23.13 | 23.39 |
| | | 12@7 | 23.40 | 23.14 | 23.12 |
| | | 12@13 | 23.20 | 22.84 | 23.26 |
| | | 25@0 | 23.41 | 23.20 | 23.25 |
| | 16-QAM | 1@0 | 22.12 | 23.21 | 23.46 |
| | | 1@12 | 23.22 | 22.72 | 23.14 |
| | | 1@24 | 23.36 | 23.13 | 22.91 |
| | | 12@0 | 22.31 | 22.44 | 22.53 |
| | | 12@7 | 22.52 | 22.33 | 22.42 |
| | | 12@13 | 22.45 | 22.23 | 22.38 |

| Test Bandwidth | Test Modulation | Resource Block & RB offset | Low Channel (dBm) | Middle Channel (dBm) | High Channel (dBm) |
|---|---|---|---|---|---|
| | | 25@0 | 22.70 | 22.44 | 22.43 |
| 10M | QPSK | 1@0 | 22.72 | 24.12 | 24.36 |
| | | 1@25 | 22.72 | 22.83 | 23.48 |
| | | 1@49 | 23.07 | 24.1 | 23.61 |
| | | 25@0 | 22.5 | 22.76 | 23.04 |
| | | 25@12 | 23.76 | 24.04 | 23.81 |
| | | 25@25 | 23.05 | 22.82 | 22.94 |
| | | 50@0 | 22.82 | 22.94 | 23.01 |
| | 16-QAM | 1@0 | 23.31 | 22.98 | 23.26 |
| | | 1@25 | 22.65 | 22.79 | 22.8 |
| | | 1@49 | 23.62 | 23.88 | 23.13 |
| | | 25@0 | 23.13 | 22.84 | 22.72 |
| | | 25@12 | 23.21 | 22.93 | 22.89 |
| | | 25@25 | 22.83 | 22.78 | 23.22 |
| | | 50@0 | 22.6 | 22.79 | 22.91 |

**LTE Band 12:**

| Test Bandwidth | Test Modulation | Resource Block & RB offset | Low Channel (dBm) | Middle Channel (dBm) | High Channel (dBm) |
|---|---|---|---|---|---|
| 1.4M | QPSK | 1@0 | 24.22 | 22.87 | 23.81 |
| | | 1@3 | 23.68 | 22.80 | 23.54 |
| | | 1@5 | 23.79 | 23.27 | 23.65 |
| | | 3@0 | 23.76 | 22.94 | 23.46 |
| | | 3@1 | 23.67 | 22.98 | 23.57 |
| | | 3@3 | 23.72 | 23.04 | 22.30 |
| | | 6@0 | 23.26 | 22.43 | 22.86 |
| | 16-QAM | 1@0 | 23.09 | 22.16 | 22.92 |
| | | 1@3 | 23.13 | 22.23 | 22.46 |
| | | 1@5 | 23.04 | 22.42 | 23.03 |
| | | 3@0 | 23.09 | 22.10 | 22.85 |
| | | 3@1 | 23.22 | 22.32 | 21.77 |
| | | 3@3 | 23.21 | 22.66 | 22.72 |
| | | 6@0 | 22.31 | 20.40 | 22.14 |
| 3M | QPSK | 1@0 | 24.08 | 23.61 | 24.13 |
| | | 1@8 | 23.62 | 23.37 | 23.71 |
| | | 1@14 | 23.62 | 22.67 | 23.43 |
| | | 8@0 | 23.09 | 22.36 | 23.01 |
| | | 8@4 | 23.20 | 22.62 | 23.22 |
| | | 8@7 | 22.03 | 22.50 | 22.96 |
| | | 15@0 | 23.09 | 22.89 | 23.11 |
| | 16-QAM | 1@0 | 23.22 | 23.06 | 23.55 |
| | | 1@8 | 23.21 | 23.08 | 22.58 |
| | | 1@14 | 22.63 | 22.44 | 22.58 |
| | | 8@0 | 22.27 | 21.78 | 22.37 |
| | | 8@4 | 22.49 | 21.86 | 22.36 |
| | | 8@7 | 22.21 | 21.95 | 22.36 |
| | | 15@0 | 22.21 | 22.16 | 22.21 |
| 5M | QPSK | 1@0 | 23.78 | 22.99 | 23.46 |
| | | 1@12 | 23.14 | 22.54 | 23.34 |
| | | 1@24 | 23.06 | 23.04 | 23.45 |
| | | 12@0 | 23.14 | 22.84 | 23.22 |
| | | 12@7 | 22.71 | 22.54 | 23.04 |
| | | 12@13 | 22.79 | 22.53 | 23.06 |
| | | 25@0 | 23.12 | 22.52 | 22.96 |
| | 16-QAM | 1@0 | 22.97 | 22.70 | 23.34 |
| | | 1@12 | 22.64 | 22.25 | 22.90 |
| | | 1@24 | 22.29 | 22.73 | 22.98 |
| | | 12@0 | 22.43 | 22.05 | 22.42 |
| | | 12@7 | 20.39 | 21.89 | 22.43 |
| | | 12@13 | 22.04 | 21.68 | 22.35 |

| Test Bandwidth | Test Modulation | Resource Block & RB offset | Low Channel (dBm) | Middle Channel (dBm) | High Channel (dBm) |
|---|---|---|---|---|---|
| | | 25@0 | 22.24 | 21.64 | 22.22 |
| 10M | QPSK | 1@0 | 24.2 | 22.91 | 23.58 |
| | | 1@25 | 22.75 | 22.64 | 22.97 |
| | | 1@49 | 23.35 | 23.7 | 24.03 |
| | | 25@0 | 22.99 | 23.29 | 22.84 |
| | | 25@12 | 22.71 | 22.67 | 22.71 |
| | | 25@25 | 22.67 | 22.69 | 22.87 |
| | | 50@0 | 22.54 | 22.77 | 22.6 |
| | 16-QAM | 1@0 | 23.56 | 22.86 | 23.07 |
| | | 1@25 | 22.59 | 22.52 | 22.86 |
| | | 1@49 | 22.98 | 23.25 | 23.27 |
| | | 25@0 | 22.99 | 22.78 | 22.75 |
| | | 25@12 | 22.61 | 22.65 | 22.63 |
| | | 25@25 | 23.13 | 22.79 | 22.81 |
| | | 50@0 | 22.98 | 22.85 | 22.52 |

**LTE Band 66:**

| Test Bandwidth | Test Modulation | Resource Block & RB offset | Low Channel (dBm) | Middle Channel (dBm) | High Channel (dBm) |
|---|---|---|---|---|---|
| 1.4M | QPSK | 1@0 | 22.06 | 21.40 | 21.33 |
| | | 1@3 | 22.39 | 21.27 | 21.13 |
| | | 1@5 | 22.39 | 21.72 | 21.19 |
| | | 3@0 | 22.44 | 21.28 | 21.07 |
| | | 3@1 | 22.27 | 21.39 | 20.99 |
| | | 3@3 | 22.23 | 21.22 | 21.25 |
| | | 6@0 | 21.64 | 20.73 | 20.70 |
| | 16-QAM | 1@0 | 21.78 | 20.72 | 20.72 |
| | | 1@3 | 21.51 | 20.89 | 20.67 |
| | | 1@5 | 21.77 | 21.18 | 20.66 |
| | | 3@0 | 21.63 | 20.63 | 20.35 |
| | | 3@1 | 21.21 | 20.69 | 20.50 |
| | | 3@3 | 21.41 | 20.68 | 20.51 |
| | | 6@0 | 21.16 | 20.03 | 20.23 |
| 3M | QPSK | 1@0 | 22.58 | 21.52 | 21.52 |
| | | 1@8 | 22.84 | 21.72 | 21.29 |
| | | 1@14 | 22.28 | 21.20 | 20.83 |
| | | 8@0 | 21.57 | 20.93 | 20.59 |
| | | 8@4 | 21.70 | 20.86 | 20.60 |
| | | 8@7 | 21.73 | 20.77 | 20.43 |
| | | 15@0 | 21.90 | 20.98 | 20.52 |
| | 16-QAM | 1@0 | 22.00 | 21.29 | 21.45 |
| | | 1@8 | 22.15 | 21.24 | 20.96 |
| | | 1@14 | 21.43 | 20.58 | 20.63 |
| | | 8@0 | 20.86 | 20.21 | 19.99 |
| | | 8@4 | 21.12 | 20.15 | 20.05 |
| | | 8@7 | 21.34 | 20.04 | 19.88 |
| | | 15@0 | 21.23 | 20.09 | 19.97 |
| 5M | QPSK | 1@0 | 22.33 | 21.28 | 21.27 |
| | | 1@12 | 22.20 | 21.08 | 20.92 |
| | | 1@24 | 22.44 | 21.55 | 21.16 |
| | | 12@0 | 21.56 | 20.61 | 20.60 |
| | | 12@7 | 21.92 | 20.82 | 20.48 |
| | | 12@13 | 21.75 | 20.61 | 20.49 |
| | | 25@0 | 21.78 | 20.88 | 20.96 |
| | 16-QAM | 1@0 | 21.79 | 20.66 | 20.92 |
| | | 1@12 | 21.79 | 20.49 | 20.46 |
| | | 1@24 | 21.87 | 21.07 | 20.78 |
| | | 12@0 | 21.01 | 20.33 | 20.01 |
| | | 12@7 | 21.28 | 20.32 | 19.93 |
| | | 12@13 | 21.13 | 20.17 | 19.88 |

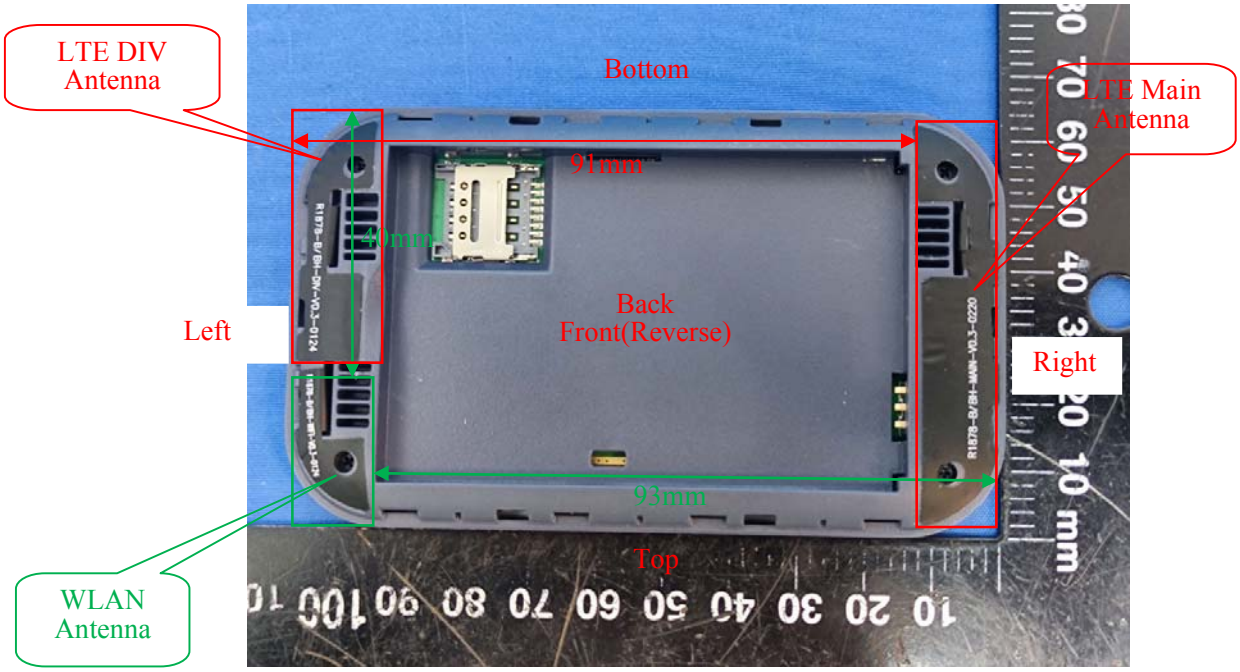
| Test Bandwidth | Test Modulation | Resource Block & RB offset | Low Channel (dBm) | Middle Channel (dBm) | High Channel (dBm) |
|---|---|---|---|---|---|
| | | 25@0 | 21.03 | 20.00 | 20.07 |
| 10M | QPSK | 1@0 | 22.06 | 21.80 | 22.34 |
| | | 1@25 | 21.89 | 20.71 | 20.73 |
| | | 1@49 | 22.99 | 21.88 | 21.45 |
| | | 25@0 | 21.58 | 20.36 | 20.81 |
| | | 25@12 | 21.55 | 20.42 | 20.41 |
| | | 25@25 | 21.98 | 20.65 | 20.38 |
| | | 50@0 | 21.74 | 20.55 | 20.80 |
| | 16-QAM | 1@0 | 21.72 | 21.04 | 21.23 |
| | | 1@25 | 21.60 | 20.08 | 20.69 |
| | | 1@49 | 22.68 | 21.48 | 21.16 |
| | | 25@0 | 20.69 | 19.62 | 20.23 |
| | | 25@12 | 20.86 | 19.88 | 19.92 |
| | | 25@25 | 21.04 | 19.87 | 19.75 |
| | | 50@0 | 20.99 | 19.95 | 19.97 |
| 15M | QPSK | 1@0 | 22.11 | 21.26 | 22.41 |
| | | 1@37 | 21.99 | 20.71 | 21.03 |
| | | 1@74 | 22.30 | 21.87 | 21.11 |
| | | 36@0 | 21.42 | 20.06 | 21.13 |
| | | 36@20 | 21.63 | 20.35 | 20.48 |
| | | 36@39 | 21.58 | 20.51 | 20.39 |
| | | 75@0 | 21.47 | 20.55 | 20.97 |
| | 16-QAM | 1@0 | 21.53 | 20.66 | 21.83 |
| | | 1@37 | 21.32 | 19.94 | 20.59 |
| | | 1@74 | 21.91 | 21.17 | 20.42 |
| | | 36@0 | 20.82 | 19.50 | 20.34 |
| | | 36@20 | 20.90 | 19.71 | 20.09 |
| | | 36@39 | 20.93 | 19.84 | 19.78 |
| | | 75@0 | 20.89 | 19.58 | 20.15 |
| 20M | QPSK | 1@0 | 21.37 | 21.18 | 21.83 |
| | | 1@49 | 21.72 | 21.32 | 21.3 |
| | | 1@99 | 22.57 | 22.72 | 22.61 |
| | | 50@0 | 22.36 | 22.56 | 22.24 |
| | | 50@24 | 21.22 | 21.93 | 21.67 |
| | | 50@50 | 21.42 | 21.12 | 21.66 |
| | | 100@0 | 21.36 | 21.56 | 21.39 |
| | 16-QAM | 1@0 | 21.57 | 21.61 | 21.25 |
| | | 1@49 | 21.3 | 21.2 | 21.13 |
| | | 1@99 | 21.15 | 21.27 | 21.26 |
| | | 50@0 | 21.22 | 21.14 | 21.21 |
| | | 50@24 | 21.71 | 21.22 | 21.09 |
| | | 50@50 | 21.42 | 21.37 | 21.29 |
| | | 100@0 | 21.53 | 21.61 | 21.72 |

**WLAN 2.4G:**

| Mode | Channel frequency (MHz) | Data Rate | RF Output Power (dBm) |
|---|---|---|---|
| 802.11b | 2412 | 1Mbps | 9.19 |
| | 2437 | | 7.45 |
| | 2462 | | 9.62 |
| 802.11g | 2412 | 6Mbps | **9.77** |
| | 2437 | | 9.45 |
| | 2462 | | 9.44 |
| 802.11n ht20 | 2412 | MCS0 | 9.11 |
| | 2437 | | 8.72 |
| | 2462 | | 8.84 |
| 802.11n ht40 | 2422 | MCS0 | 8.83 |
| | 2437 | | 8.63 |
| | 2452 | | 8.63 |
| 802.11ax20 | 2412 | MCS0 | 9.59 |
| | 2437 | | 7.97 |
| | 2462 | | 9.53 |
| 802.11ax40 | 2422 | MCS0 | 9.35 |
| | 2437 | | 8.98 |
| | 2452 | | 9.29 |

# 7. Standalone SAR test exclusion considerations

**Antennas Location:**




*Note: The LTE DIV antenna can not transmit, and is receiving only.*

### 7.1 Antenna Distance To Edge

| Antenna Distance To Edge(mm) | | | | | | |
|---|---|---|---|---|---|---|
| **Antenna** | **Front** | **Back** | **Left** | **Right** | **Top** | **Bottom** |
| WWAN Antenna(LTE) | < 5 | < 5 | 91 | < 5 | < 5 | < 5 |
| WLAN Antenna | < 5 | < 5 | < 5 | 93 | < 5 | 40 |

### 7.2 Standalone SAR test exclusion considerations

| Mode | Frequency (MHz) | Output Power (dBm) | Output Power (mW) | Distance (mm) | Calculated value | Threshold (1-g) | SAR Test Exclusion |
|---|---|---|---|---|---|---|---|
| WLAN 2.4G | 2462 | 9.8 | 9.55 | 0 | 3.0 | 3 | YES |

**NOTE:**
The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[( max. power of channel, including tune-up tolerance, mW )/( min. test separation distance, mm)] ·
[√f(GHz)] ≤ 3.0 for 1-g SAR and ≤7.5 for 10-g extremity SAR, where
1. f(GHz) is the RF channel transmit frequency in GHz.
2. Power and distance are rounded to the nearest mW and mm before calculation.
3. The result is rounded to one decimal place for comparison.
4. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion.

**7.3 Standalone SAR estimation:**

| Mode | Frequency (MHz) | Output Power (dBm) | Output Power (mW) | Distance (mm) | Estimated 1-g (W/kg) |
|---|---|---|---|---|---|
| WLAN 2.4G Body | 2462 | 9.8 | 9.55 | 10 | 0.20 |

When standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:
[( max. power of channel, including tune-up tolerance , mW)/( min. test separation distance,mm)] · [√f(GHz)/x ]
W/kg for test separation distances ≤50 mm;
where x = 7.5 for 1-g SAR.
When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion.

**7.4 SAR test exclusion for the EUT edge considerations Result**

| Mode | Front Edge | Back Edge | Left Edge | Right Edge | Top Edge | Bottom Edge |
|---|---|---|---|---|---|---|
| LTE Band 2 | **Required** | **Required** | Exclusion | **Required** | **Required** | **Required** |
| LTE Band 5 | **Required** | **Required** | Exclusion | **Required** | **Required** | **Required** |
| LTE Band 12 | **Required** | **Required** | Exclusion | **Required** | **Required** | **Required** |
| LTE Band 66 | **Required** | **Required** | Exclusion | **Required** | **Required** | **Required** |
| WLAN 2.4G | Exclusion* | Exclusion* | Exclusion* | Exclusion* | Exclusion* | Exclusion* |

**Note:**
**Required:** The distance to Edge is less than 25mm, testing is required.
**Exclusion:** The distance to Edge is more than 25 mm, testing is not required.
**Exclusion*:** SAR test exclusion evaluation has been done above.

# 8. SAR MEASUREMENT RESULTS

This page summarizes the results of the performed dosimetric evaluation.

## 8.1 SAR Test Data

### Environmental Conditions

| | | |
|---|---|---|
| **Temperature:** | 21.9-22.7 ℃ | 22.1-22.8 ℃ |
| **Relative Humidity:** | 39 % | 46 % |
| **ATM Pressure:** | 100.8 kPa | 100.2 kPa |
| **Test Date:** | 2024/08/23 | 2024/08/22 |

*Testing was performed by Wen Chen, Leo Lu, Aixlee Li, Ken Zong.*

**LTE Band 2:**

| EUT Position | Frequency (MHz) | Bandwidth (MHz) | Test Mode | Max. Meas. Power (dBm) | Max. Rated Power (dBm) | 1g SAR (W/kg) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Scaled Factor | Meas. SAR | Scaled SAR | Plot |
| Body Front (10mm) | 1860 | 20 | 1RB | / | / | / | / | / | / |
| | 1880 | 20 | 1RB | 23.17 | 23.5 | 1.079 | 0.452 | **0.49** | 1# |
| | 1900 | 20 | 1RB | / | / | / | / | / | / |
| | 1880 | 20 | 50%RB | 22.92 | 23.5 | 1.143 | 0.419 | 0.48 | / |
| Body Back (10mm) | 1860 | 20 | 1RB | / | / | / | / | / | / |
| | 1880 | 20 | 1RB | 23.17 | 23.5 | 1.079 | 0.408 | 0.44 | / |
| | 1900 | 20 | 1RB | / | / | / | / | / | / |
| | 1880 | 20 | 50%RB | 22.92 | 23.5 | 1.143 | 0.430 | 0.49 | / |
| Body Right (10mm) | 1860 | 20 | 1RB | / | / | / | / | / | / |
| | 1880 | 20 | 1RB | 23.17 | 23.5 | 1.079 | 0.316 | 0.34 | / |
| | 1900 | 20 | 1RB | / | / | / | / | / | / |
| | 1880 | 20 | 50%RB | 22.92 | 23.5 | 1.143 | 0.298 | 0.34 | / |
| Body Top (10mm) | 1860 | 20 | 1RB | / | / | / | / | / | / |
| | 1880 | 20 | 1RB | 23.17 | 23.5 | 1.079 | 0.032 | 0.03 | / |
| | 1900 | 20 | 1RB | / | / | / | / | / | / |
| | 1880 | 20 | 50%RB | 22.92 | 23.5 | 1.143 | 0.040 | 0.05 | / |
| Body Bottom (10mm) | 1860 | 20 | 1RB | / | / | / | / | / | / |
| | 1880 | 20 | 1RB | 23.17 | 23.5 | 1.079 | 0.142 | 0.15 | / |
| | 1900 | 20 | 1RB | / | / | / | / | / | / |
| | 1880 | 20 | 50%RB | 22.92 | 23.5 | 1.143 | 0.123 | 0.14 | / |

**LTE Band 5:**

| EUT Position | Frequency (MHz) | Bandwidth (MHz) | Test Mode | Max. Meas. Power (dBm) | Max. Rated Power (dBm) | 1g SAR (W/kg) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Scaled Factor | Meas. SAR | Scaled SAR | Plot |
| Body Front (10mm) | 829 | 10 | 1RB | / | / | / | / | / | / |
| | 836.5 | 10 | 1RB | 24.12 | 24.5 | 1.091 | 0.249 | **0.27** | 2# |
| | 844 | 10 | 1RB | / | / | / | / | / | / |
| | 836.5 | 10 | 50%RB | 24.04 | 24.5 | 1.112 | 0.188 | 0.21 | / |
| Body Back (10mm) | 829 | 10 | 1RB | / | / | / | / | / | / |
| | 836.5 | 10 | 1RB | 24.12 | 24.5 | 1.091 | 0.210 | 0.23 | / |
| | 844 | 10 | 1RB | / | / | / | / | / | / |
| | 836.5 | 10 | 50%RB | 24.04 | 24.5 | 1.112 | 0.201 | 0.22 | / |
| Body Right (10mm) | 829 | 10 | 1RB | / | / | / | / | / | / |
| | 836.5 | 10 | 1RB | 24.12 | 24.5 | 1.091 | 0.034 | 0.04 | / |
| | 844 | 10 | 1RB | / | / | / | / | / | / |
| | 836.5 | 10 | 50%RB | 24.04 | 24.5 | 1.112 | 0.031 | 0.03 | / |
| Body Top (10mm) | 829 | 10 | 1RB | / | / | / | / | / | / |
| | 836.5 | 10 | 1RB | 24.12 | 24.5 | 1.091 | 0.203 | 0.22 | / |
| | 844 | 10 | 1RB | / | / | / | / | / | / |
| | 836.5 | 10 | 50%RB | 24.04 | 24.5 | 1.112 | 0.154 | 0.17 | / |
| Body Bottom (10mm) | 829 | 10 | 1RB | / | / | / | / | / | / |
| | 836.5 | 10 | 1RB | 24.12 | 24.5 | 1.091 | 0.217 | 0.24 | / |
| | 844 | 10 | 1RB | / | / | / | / | / | / |
| | 836.5 | 10 | 50%RB | 24.04 | 24.5 | 1.112 | 0.174 | 0.19 | / |

**LTE Band 12:**

| EUT Position | Frequency (MHz) | Bandwidth (MHz) | Test Mode | Max. Meas. Power (dBm) | Max. Rated Power (dBm) | 1g SAR (W/kg) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Scaled Factor | Meas. SAR | Scaled SAR | Plot |
| Body Front (10mm) | 704 | 10 | 1RB | / | / | / | / | / | / |
| | 707.5 | 10 | 1RB | 23.7 | 24.5 | 1.202 | 0.187 | 0.22 | / |
| | 711 | 10 | 1RB | / | / | / | / | / | / |
| | 707.5 | 10 | 50%RB | 23.29 | 24.5 | 1.321 | 0.155 | 0.20 | / |
| Body Back (10mm) | 704 | 10 | 1RB | / | / | / | / | / | / |
| | 707.5 | 10 | 1RB | 23.7 | 24.5 | 1.202 | 0.244 | 0.29 | / |
| | 711 | 10 | 1RB | / | / | / | / | / | / |
| | 707.5 | 10 | 50%RB | 23.29 | 24.5 | 1.321 | 0.247 | **0.33** | 3# |
| Body Right (10mm) | 704 | 10 | 1RB | / | / | / | / | / | / |
| | 707.5 | 10 | 1RB | 23.7 | 24.5 | 1.202 | 0.048 | 0.06 | / |
| | 711 | 10 | 1RB | / | / | / | / | / | / |
| | 707.5 | 10 | 50%RB | 23.29 | 24.5 | 1.321 | 0.047 | 0.06 | / |
| Body Top (10mm) | 704 | 10 | 1RB | / | / | / | / | / | / |
| | 707.5 | 10 | 1RB | 23.7 | 24.5 | 1.202 | 0.090 | 0.11 | / |
| | 711 | 10 | 1RB | / | / | / | / | / | / |
| | 707.5 | 10 | 50%RB | 23.29 | 24.5 | 1.321 | 0.077 | 0.10 | / |
| Body Bottom (10mm) | 704 | 10 | 1RB | / | / | / | / | / | / |
| | 707.5 | 10 | 1RB | 23.7 | 24.5 | 1.202 | 0.056 | 0.07 | / |
| | 711 | 10 | 1RB | / | / | / | / | / | / |
| | 707.5 | 10 | 50%RB | 23.29 | 24.5 | 1.321 | 0.075 | 0.10 | / |

**LTE Band 66:**

| EUT Position | Frequency (MHz) | Bandwidth (MHz) | Test Mode | Max. Meas. Power (dBm) | Max. Rated Power (dBm) | 1g SAR (W/kg) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Scaled Factor | Meas. SAR | Scaled SAR | Plot |
| Body Front (10mm) | 1717.5 | 20 | 1RB | / | / | / | / | / | / |
| | 1745 | 20 | 1RB | 22.72 | 23 | 1.067 | 0.345 | 0.37 | / |
| | 1772.5 | 20 | 1RB | / | / | / | / | / | / |
| | 1745 | 20 | 50%RB | 22.56 | 23 | 1.107 | 0.338 | 0.37 | / |
| Body Back (10mm) | 1717.5 | 20 | 1RB | / | / | / | / | / | / |
| | 1745 | 20 | 1RB | 22.72 | 23 | 1.067 | 0.522 | **0.56** | 4# |
| | 1772.5 | 20 | 1RB | / | / | / | / | / | / |
| | 1745 | 20 | 50%RB | 22.56 | 23 | 1.107 | 0.449 | 0.50 | / |
| Body Right (10mm) | 1717.5 | 20 | 1RB | / | / | / | / | / | / |
| | 1745 | 20 | 1RB | 22.72 | 23 | 1.067 | 0.496 | 0.53 | / |
| | 1772.5 | 20 | 1RB | / | / | / | / | / | / |
| | 1745 | 20 | 50%RB | 22.56 | 23 | 1.107 | 0.396 | 0.44 | / |
| Body Top (10mm) | 1717.5 | 20 | 1RB | / | / | / | / | / | / |
| | 1745 | 20 | 1RB | 22.72 | 23 | 1.067 | 0.048 | 0.05 | / |
| | 1772.5 | 20 | 1RB | / | / | / | / | / | / |
| | 1745 | 20 | 50%RB | 22.56 | 23 | 1.107 | 0.040 | 0.04 | / |
| Body Bottom (10mm) | 1717.5 | 20 | 1RB | / | / | / | / | / | / |
| | 1745 | 20 | 1RB | 22.72 | 23 | 1.067 | 0.195 | 0.21 | / |
| | 1772.5 | 20 | 1RB | / | / | / | / | / | / |
| | 1745 | 20 | 50%RB | 22.56 | 23 | 1.107 | 0.173 | 0.19 | / |

**Note:**

1. When the 1-g SAR is ≤ 0.8W/Kg, testing for other channels are optional.
2. SAR for LTE band exposure configurations is measured according to the procedures of KDB 941225 D05 SAR for LTE Devices v02.
3. KDB941225D05-SAR for higher order modulation is required only when the highest maximum output power for the configuration in the higher order modulation is > 0.5 dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is > 1.45 W/kg
4. KDB941225D05-For QPSK with 100% RB allocation, when the reported SAR measured for the Highest output power channel is <1.45 W/kg, tests for the remaining required test channels are optional.
5.KDB941225D05- For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg.
6. KDB941225D05- Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offset the upper edge, middle and lower edge of each required test channel.
7. KDB941225D05- other channel bandwidths SAR test is required when the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is > 0.5 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.

# 9. Measurement Variability

In accordance with published RF Exposure KDB procedure 865664 D01 SAR measurement 100 MHz to 6 GHz v01. 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

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

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

**The Highest Measured SAR Configuration in Each Frequency Band**

**Body**

| **SAR probe calibration point** | Frequency Band | Freq.(MHz) | EUT Position | Meas. SAR (W/kg) | | Largest to Smallest SAR Ratio |
|---|---|---|---|---|---|---|
| | | | | Original | Repeated | |
| / | / | / | / | / | / | / |

**Note:**

1. Second Repeated Measurement is not required since the ratio of the largest to smallest SAR for the original and first repeated measurement is not > 1.20.
2. The measured SAR results **do not** have to be scaled to the maximum tune-up tolerance to determine if repeated measurements are required.
3. SAR measurement variability must be assessed for each frequency band, which is determined by the **SAR probe calibration point and tissue-equivalent medium** used for the device measurements.

# 10. SAR SIMULTANEOUS TRANSMISSION DESCRIPTION

**Simultaneous Transmission:**

| Description of Simultaneous Transmit Capabilities | | |
|---|---|---|
| **Transmitter Combination** | **Simultaneous?** | **Hotspot?** |
| WWAN(LTE) + WLAN 2.4G | √ | √ |

**Simultaneous SAR test exclusion considerations:**

| Mode(SAR1+SAR2) | Position | Reported SAR(W/kg) | | ΣSAR < 1.6W/kg |
|---|---|---|---|---|
| | | SAR1 | SAR2 | |
| WWAN(LTE) + WLAN 2.4G | Body | 0.56 | 0.20 | 0.76 |

**Conclusion:**
Sum of SAR: **ΣSAR ≤ 1.6 W/kg** therefore simultaneous transmission SAR with Volume Scans is **not required**.

# 11. SAR Plots

**Please Refer to the Attachment.**

# APPENDIX A MEASUREMENT UNCERTAINTY

The uncertainty budget has been determined for the measurement system and is given in the following Table.

**Measurement uncertainty evaluation for IEEE1528-2013 SAR test**

| Source of uncertainty | Tolerance/ uncertainty ± % | Probability distribution | Divisor | ci (1 g) | ci (10 g) | Standard uncertainty ± %, (1 g) | Standard uncertainty ± %, (10 g) |
|---|---|---|---|---|---|---|---|
| **Measurement system** | | | | | | | |
| Probe calibration | 6.55 | N | 1 | 1 | 1 | 6.3 | 6.3 |
| Axial Isotropy | 4.7 | R | √3 | 1 | 1 | 2.7 | 2.7 |
| Hemispherical Isotropy | 9.6 | R | √3 | 0 | 0 | 0.0 | 0.0 |
| Boundary effect | 1.0 | R | √3 | 1 | 1 | 0.6 | 0.6 |
| Linearity | 4.7 | R | √3 | 1 | 1 | 2.7 | 2.7 |
| Detection limits | 1.0 | R | √3 | 1 | 1 | 0.6 | 0.6 |
| Readout electronics | 0.3 | N | 1 | 1 | 1 | 0.3 | 0.3 |
| Response time | 0.0 | R | √3 | 1 | 1 | 0.0 | 0.0 |
| Integration time | 0.0 | R | √3 | 1 | 1 | 0.0 | 0.0 |
| RF ambient conditions – noise | 1.0 | R | √3 | 1 | 1 | 0.6 | 0.6 |
| RF ambient conditions– reflections | 1.0 | R | √3 | 1 | 1 | 0.6 | 0.6 |
| Probe positioner mech. Restrictions | 0.8 | R | √3 | 1 | 1 | 0.5 | 0.5 |
| Probe positioning with respect to phantom shell | 6.7 | R | √3 | 1 | 1 | 3.9 | 3.9 |
| Post-processing | 2.0 | R | √3 | 1 | 1 | 1.2 | 1.2 |
| **Test sample related** | | | | | | | |
| Test sample positioning | 2.8 | N | 1 | 1 | 1 | 2.8 | 2.8 |
| Device holder uncertainty | 6.3 | N | 1 | 1 | 1 | 6.3 | 6.3 |
| Drift of output power | 5.0 | R | √3 | 1 | 1 | 2.9 | 2.9 |
| **Phantom and set-up** | | | | | | | |
| Phantom uncertainty (shape and thickness tolerances) | 4.0 | R | √3 | 1 | 1 | 2.3 | 2.3 |
| Liquid conductivity target) | 5.0 | R | √3 | 0.64 | 0.43 | 1.8 | 1.2 |
| Liquid conductivity meas.) | 2.5 | N | 1 | 0.64 | 0.43 | 1.6 | 1.1 |
| Liquid permittivity target) | 5.0 | R | √3 | 0.6 | 0.49 | 1.7 | 1.4 |
| Liquid permittivity meas.) | 2.5 | N | 1 | 0.6 | 0.49 | 1.5 | 1.2 |
| Combined standard uncertainty | | RSS | | | | 12.2 | 12.0 |
| Expanded uncertainty 95 % confidence interval) | | | | | | 24.1 | 23.7 |

**Measurement uncertainty evaluation for IEC62209-1 SAR test**

| Source of uncertainty | Tolerance/ uncertainty ± % | Probability distribution | Divisor | ci (1 g) | ci (10 g) | Standard uncertainty ± %, (1 g) | Standard uncertainty ± %, (10 g) |
|---|---|---|---|---|---|---|---|
| **Measurement system** | | | | | | | |
| Probe calibration | 6.55 | N | 1 | 1 | 1 | 6.3 | 6.3 |
| Axial Isotropy | 4.7 | R | √3 | 1 | 1 | 2.7 | 2.7 |
| Hemispherical Isotropy | 9.6 | R | √3 | 0 | 0 | 0.0 | 0.0 |
| Boundary effect | 1.0 | R | √3 | 1 | 1 | 0.6 | 0.6 |
| Linearity | 4.7 | R | √3 | 1 | 1 | 2.7 | 2.7 |
| Detection limits | 1.0 | R | √3 | 1 | 1 | 0.6 | 0.6 |
| Readout electronics | 0.3 | N | 1 | 1 | 1 | 0.3 | 0.3 |
| Response time | 0.0 | R | √3 | 1 | 1 | 0.0 | 0.0 |
| Integration time | 0.0 | R | √3 | 1 | 1 | 0.0 | 0.0 |
| RF ambient conditions – noise | 1.0 | R | √3 | 1 | 1 | 0.6 | 0.6 |
| Probe positioning with respect to phantom shell | 6.7 | R | √3 | 1 | 1 | 3.9 | 3.9 |
| Probe positioner mech. Restrictions | 0.8 | R | √3 | 1 | 1 | 0.5 | 0.5 |
| RF ambient conditions– reflections | 1.0 | R | √3 | 1 | 1 | 0.6 | 0.6 |
| Post-processing | 2.0 | R | √3 | 1 | 1 | 1.2 | 1.2 |
| **Test sample related** | | | | | | | |
| Test sample positioning | 2.8 | N | 1 | 1 | 1 | 2.8 | 2.8 |
| Device holder uncertainty | 6.3 | N | 1 | 1 | 1 | 6.3 | 6.3 |
| Drift of output power | 5.0 | R | √3 | 1 | 1 | 2.9 | 2.9 |
| **Phantom and set-up** | | | | | | | |
| Phantom uncertainty (shape and thickness tolerances) | 4.0 | R | √3 | 1 | 1 | 2.3 | 2.3 |
| Liquid conductivity target) | 5.0 | R | √3 | 0.64 | 0.43 | 1.8 | 1.2 |
| Liquid conductivity meas.) | 2.5 | N | 1 | 0.64 | 0.43 | 1.6 | 1.1 |
| Liquid permittivity target) | 5.0 | R | √3 | 0.6 | 0.49 | 1.7 | 1.4 |
| Liquid permittivity meas.) | 2.5 | N | 1 | 0.6 | 0.49 | 1.5 | 1.2 |
| Combined standard uncertainty | | RSS | | | | 12.2 | 12.0 |
| Expanded uncertainty 95 % confidence interval) | | | | | | 24.0 | 23.6 |

# APPENDIX B EUT TEST POSITION PHOTOS

**Please Refer to the Attachment.**

# APPENDIX C CALIBRATION CERTIFICATES

**Please Refer to the Attachment.**

******* END OF REPORT *******