MOTOROLA SOLUTIONS

SAMM 826

CERTIFICATE 2518.05

## DECLARATION OF COMPLIANCE SAR ASSESSMENT Part 1 of 2

**Motorola Solutions Inc.**
**EME Test Laboratory**
Motorola Solutions Malaysia Sdn Bhd
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**Date of Report:** 10/10/2024
**Report Revision:** B

| | |
|---|---|
| **Responsible Engineer:** | Yeng Yee Yeong (EME Engineer) |
| **Report Author:** | Yeng Yee Yeong (EME Engineer) |
| **Date/s Tested:** | 7/18/2024-7/30/2024, 8/1/2024-8/2/2024, 8/5/2024-8/10/2024 |
| **Manufacturer:** | Motorola Solutions Malaysia Sdn. Bhd. |
| **Manufacturer Location:** | Plot 2A, Medan Bayan Lepas Mukim, 12 SWD, 11900 Bayan Lepas, Penang, Malaysia |
| **DUT Description:** | Handheld Portable –<br>136-174 MHz 5W LKP DISPLAY BT/WIFI<br>136-174 MHz 5W NKP BT/WIFI |
| **Test TX mode(s):** | CW (PTT), WLAN 2.4GHz, WLAN 5GHz |
| **Max. Power output:** | Refer Table 3 |
| **Tx Frequency Bands:** | Refer Table 3 |
| **Signaling type:** | Refer Table 3 |
| **Model(s) Tested:** | AAH07JDH9SA1AN, AAH07JDC9SA1AN |
| **Model(s) Certified: (HVIN/PMN)** | Refer 1.0 Introduction |
| **Serial Number(s):** | 651EAK0077, 651EAK0149, 651EAK0065, 174EAK0333, 174EAK0325 |
| **Classification:** | Occupational/Controlled Environment |
| **Applicant Name:** | Motorola Solutions Inc. |
| **Applicant Address:** | Plot 2A, Medan Bayan Lepas Mukim, 12 SWD, 11900 Bayan Lepas, Penang, Malaysia |
| **Firmware Version (FVIN):** | B02.25.01.0019 |
| **FCC ID:** | AZ489FT7181<br>This report contains results that are immaterial for FCC equipment approval, which are clearly identified. |
| **FCC Test Firm Registration Number:** | 823256 |
| **IC:** | 109U-89FT7181<br>This report contains results that are immaterial for ISED equipment approval, which are clearly identified. |
| **ISED Test Site registration:** | 24843 |

The test results clearly demonstrate compliance with Occupational/Controlled Environment RF Exposure limits of 8 W/kg averaged over 1 gram per the requirements of FCC 47 CFR § 2.1093 and RSS-102 (Issue 6)

**Based on the information and the testing results provided herein, the undersigned certifies that when used as stated in the operating instructions supplied, said product complies with the national and international reference standards and guidelines listed in section 4.0 of this report (no deviation from standard methods). This report shall not be reproduced without written approval from an officially designated representative of the Motorola Solutions Inc EME Laboratory. I attest to the accuracy of the data and assume full responsibility for the completeness of these measurements. The results and statements contained in this report pertain only to the device(s) evaluated.**

**Saw Sun Hock (Approval Signatory)**
**Approved Date: 10/10/2024**

**Part 1 of 2**

**APPENDICES**

**Part 2 of 2**

**APPENDICES**

D System Verification Check Scans
E DUT Scans
F Shorten Scan of Highest SAR Configuration
G DUT Test Position Photos
H DUT, Body worn and audio accessories Photos

## Report Revision History

| Date | Revision | Comments |
|---|---|---|
| 09/16/2024 | A | Initial release |
| 10/10/2024 | B | To update WLAN 5GHz Power at Table 3a<br><br>To update WLAN 5GHz Antenna Gain at Table 4 |

## 1.0 Introduction

This report details the utilization, test setup, test equipment, and test results of the Specific Absorption Rate (SAR) measurements performed at the Motorola Solutions Inc. EME Test Laboratory for handheld portable model number AAH07JDH9SA1AN and AAH07JDC9SA1AN. These devices are classified as Occupational/Controlled Environment and model certified are lists as below:

| Models | Hardware Version ID Number (HVIN) | Product Marketing Name (PMN) | Description |
|---|---|---|---|
| AAH07JDH9SA1AN | AAH07JDH9SA1AN | R5 | 136-174 MHz 5W LKP DISPLAY BT/WIFI |
| AAH07JDC9SA1AN | AAH07JDC9SA1AN | R5 | 136-174 MHz 5W NKP BT/WIFI |

## 2.0 FCC SAR Summary

**Table 1**

| Equipment Class | Frequency band (MHz) | Max Calc at Body (W/kg) | Max Calc at Face (W/kg) |
|---|---|---|---|
| | | 1g-SAR | 1g-SAR |
| TNF | 150.8-173.4MHz (LMR) | 2.51 | 1.52 |
| DTS | 2412-2462MHz (WLAN 2.4GHz) | 0.106 | 0.081 |
| NII | 5180-5825MHz (WLAN 5GHz) | 0.177 | 0.130 |
| *DSS | 2402-2480MHz (Bluetooth) | NA | NA |
| Simultaneous Results | | 2.69 | 1.65 |

*Results not required per KDB (refer to sections 15.0 & 17.1)

## 3.0 Abbreviations / Definitions

BT: Bluetooth
CNR: Calibration Not Required
CW: Continuous Wave
DSS Part 15 Spread Spectrum Transmitter
DSSS: Direct Sequence Spread Spectrum
DUT: Device Under Test
EME: Electromagnetic Energy
FHSS: Frequency Hopping Spread Spectrum
FM: Frequency Modulation
LMR: Land Mobile Radio
NA: Not Applicable

| | |
|---|---|
| OFDM: | Orthogonal Frequency Division Multiplexing |
| PTT: | Push to Talk |
| RSM: | Remote Speaker Microphone |
| SAR: | Specific Absorption Rate |
| TNF: | Licensed Non-Broadcast Transmitter Held to Face |
| WLAN: | Wireless Local Area Network |

Audio accessories: These accessories allow communication while the DUT is worn on the body.
Body worn accessories: These accessories allow the DUT to be worn on the body of the user.
Maximum Power: Defined as the upper limit of the production line final test station

## 4.0 Referenced Standards and Guidelines

This product is designed to comply with the following applicable national and international standards and guidelines.

- Federal Communications Commission, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields", OET Bulletin 65, FCC, Washington, D.C.: 1997.
- Institute of Electrical and Electronics Engineers (IEEE) C95.1-2019
- International Commission on Non-Ionizing Radiation Protection (ICNIRP) 2020
- Ministry of Health (Canada) Safety Code 6 (2015), Limits of Human Exposure to Radio frequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz
- RSS-102 (Issue 6) – Radio Frequency (RF) Exposure Compliance of Radio communication Apparatus (All Frequency Bands)
- Australian Communications Authority Radio communications (Electromagnetic Radiation - Human Exposure) Standard (2014)
- ANATEL, Brazil Regulatory Authority, Resolution No 700 of September 28, 2018 "Approves the Regulation on the Assessment of Human Exposure to Electric, Magnetic and Electromagnetic Fields Associated with the Operation of Radio communication Transmitting Stations.
- IEC/IEEE 62209-1528-2020- Measurement procedure for the assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Part 1528: Human models, instrumentation, and procedures (Frequency range of 4 MHz to 10 GHz)
- FCC KDB – 643646 D01 SAR Test for PTT Radios v01r03
- FCC KDB – 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB – 865664 D02 RF Exposure Reporting v01r02
- FCC KDB – 447498 D01 General RF Exposure Guidance v06
- FCC KDB – 248227 D01 802.11 Wi-Fi SAR v02r02

## 5.0 SAR Limits

**Table 2**

| EXPOSURE LIMITS | SAR (W/kg) | |
|---|---|---|
| | (General Population / Uncontrolled Exposure Environment) | (Occupational / Controlled Exposure Environment) |
| Spatial Average - ANSI - (averaged over the whole body) | 0.08 | 0.4 |
| Spatial Peak - ANSI - (averaged over any 1-g of tissue) | 1.6 | 8.0 |
| Spatial Peak – ICNIRP/ANSI - (hands/wrists/feet/ankles averaged over 10-g) | 4.0 | 20.0 |
| Spatial Peak - ICNIRP - (Head and Trunk 10-g) | 2.0 | 10.0 |

## 6.0 Description of Device Under Test (DUT)

This portable device operates in the LMR bands using frequency modulation (FM) incorporating traditional simplex two-way radio transmission protocol. This device also contains WLAN technology for data capabilities over WLAN 2.4GHz and 5GHz wireless networks and Bluetooth technology for short range wireless devices.

The LMR bands in this device operate in a half duplex system. A half duplex system only allows the user to transmit or receive. This device cannot transmit and receive simultaneously. The user must stop transmitting in order to receive a signal or listen for a response, regardless of PTT button or use of voice activated audio accessories. This type of operation, along with the RF safety booklet, which instructs the user to transmit no more than 50% of the time, justifies the use of 50% duty factor for this device.

This device also incorporates a Class 1 Bluetooth device which is a Frequency Hopping Spread Spectrum (FHSS) technology. The Bluetooth radio modem is used to wireless link audio accessories. The maximum actual transmission duty cycle is imposed by the Bluetooth standard. The maximum duty cycle for BT is 77%, BT LE (1M) is 62.74% and BT LE (2M) is 33.64%.

Table 3 below summarizes the technologies, bands, maximum duty cycles and maximum output powers. Maximum output powers are defined as upper limit of the production line final test station.

## Table 3

| Technology | Transmit Band (MHz) | Transmission | Duty Cycle (%) | Conducted (Average Detector) Maximum Power (W) |
|---|---|---|---|---|
| LMR | 136-174 | FM | *50 | 6.00 |
| WLAN 802.11 b | 2412-2462 | DSSS | 98.88 | 0.0562 (CH1, 6 & 11) |
| WLAN 802.11 g | 2412-2462 | OFDM | 96.88 | 0.0562 (CH1, 6 & 11) |
| WLAN 802.11 n | 2412-2462 | OFDM | 98.01 | 0.0562 (CH1, 6 & 11) |
| Bluetooth | 2402 - 2480 | FHSS | 77 | 0.0120 |
| Bluetooth LE (1M) | | | 62.74 | 0.0089 |
| Bluetooth LE (2M) | | | 33.64 | 0.0089 |
| 802.11 a (20 MHz) | 5180 - 5825 | OFDM | 97.01 | UNII-1: 0.0631<br>UNII-2A: 0.0631 (Other Channels)<br>UNII-2A: 0.0501 (CH64)<br>UNII-2C: 0.0316 (Other Channels)<br>UNII-2C: 0.0200 (CH 100)<br>UNII-3: 0.0316 |
| 802.11 n (20 MHz) | 5180 - 5825 | OFDM | 97.97 | UNII-1: 0.0631 (Other Channels)<br>UNII-1: 0.0501 (CH36)<br>UNII-2A: 0.0631 (Other Channels)<br>UNII-2A: 0.0398 (CH64)<br>UNII-2C: 0.0316 (Other Channels)<br>UNII-2C: 0.0251 (CH 100)<br>UNII-3: 0.0316 |
| 802.11 ac (20 MHz) | 5180 - 5825 | OFDM | 97.97 | UNII-1: 0.0631 (Other Channels)<br>UNII-1: 0.0501 (CH36)<br>UNII-2A: 0.0631 (Other Channels)<br>UNII-2A: 0.0398 (CH64)<br>UNII-2C: 0.0316 (Other Channels)<br>UNII-2C: 0.0251 (CH 100)<br>UNII-3: 0.0316 |

Note - * includes 50% PTT operation

The intended operating positions are “at the face” with the DUT at least 1 inch from the mouth, and “at the body” by means of the offered body worn accessories. Body worn audio and PTT operation is accomplished by means of optional remote accessories that are connected to the radio. Operation at the body without an audio accessory attached is possible by means of BT accessories.

To meet the margin requirement for RBE in EMC RE test, the maximum power WLAN 2.4GHz 802.11b, g & n, and for WLAN 5GHz 802.11a, n & ac were reduced as shown in Table 3a, SAR test was already conducted at the higher power level, hence it was not impacted. After the final production, the maximum power will be the same as Table 3a.

**Table 3a**

| Technology | Transmit Band (MHz) | Transmission | Duty Cycle (%) | Conducted (Average Detector) Maximum Power (W) |
|---|---|---|---|---|
| WLAN 802.11 b | 2412-2462 | DSSS | 98.88 | 0.0299 (CH1, 6 & 11) |
| WLAN 802.11 g | 2412-2462 | OFDM | 96.88 | 0.0248 (CH1)<br>0.0355 (CH6 & 11) |
| WLAN 802.11 n | 2412-2462 | OFDM | 98.01 | 0.0166 (CH1)<br>0.0376 (CH6 & 11) |
| 802.11 a (20 MHz) | 5180 - 5825 | OFDM | 97.01 | UNII-1: 0.0432 (CH36)<br>UNII-1: 0.0537 (CH40, 44 & 48)<br>UNII-2A: 0.0631 (Other Channels)<br>UNII-2A: 0.0339 (CH64)<br>UNII-2C: 0.0316 (Other Channels)<br>UNII-2C: 0.0110 (CH 100)<br>UNII-2C: 0.0200 (CH 140)<br>UNII-3: 0.0316 |
| 802.11 n (20 MHz) | 5180 - 5825 | OFDM | 97.97 | UNII-1: 0.0355 (CH36)<br>UNII-1: 0.0537 (CH40, 44 & 48)<br>UNII-2A: 0.0631 (Other Channels)<br>UNII-2A: 0.0282 (CH64)<br>UNII-2C: 0.0316 (Other Channels)<br>UNII-2C: 0.0093 (CH 100)<br>UNII-2C: 0.0200 (CH 140)<br>UNII-3: 0.0316 |

**Table 3a (Continued)**

| Technology | Transmit Band (MHz) | Transmission | Duty Cycle (%) | Conducted (Average Detector) Maximum Power (W) |
|---|---|---|---|---|
| 802.11 ac (20 MHz) | 5180 - 5825 | OFDM | 97.97 | UNII-1: 0.0355 (CH36)<br>UNII-1: 0.0537 (CH40, 44 & 48)<br>UNII-2A: 0.0631 (Other Channels)<br>UNII-2A: 0.0282 (CH64)<br>UNII-2C: 0.0316 (Other Channels)<br>UNII-2C: 0.0093 (CH 100)<br>UNII-2C: 0.0200 (CH 140)<br>UNII-3: 0.0316 |

## 7.0 Optional Accessories and Test Criteria

This device is offered with optional accessories. All accessories were individually evaluated during the test plan creation to determine if testing was required per the guidelines outlined in "SAR Test Reduction Considerations for Occupational PTT Radios" FCC KDB 643646 to assess compliance of this device. The following sections identify the test criteria and details for each accessory category. Refer to Exhibit 7B for antenna separation distances.

## 7.1 Antennas

**Table 4**

| Antenna No. | Antenna Models | Description | Selected for test | Tested |
|---|---|---|---|---|
| 1 | AN000389A01 | ANTENNA, CHIP,GNSS/BT/WIFI ANTENNA MODULE<br>GNSS: 1560- 1610MHz, ¼ wave, 2.4dBi<br>BT/BTLE/WLAN 2.4GHz: 2400-2485MHz, ¼ wave, 3dBi<br>WLAN 5GHz: 5150-5250MHz, ¼ wave, 3.17dBi<br>WLAN 5GHz: 5250-5725MHz, ¼ wave, 6dBi<br>WLAN 5GHz: 5725-5850MHz, ¼ wave, 2.58dBi | Yes | Yes |
| 2 | PMAD4116A | VHF HELICAL ANTENNA (144-165 MHZ), ½ wave, -6dBi | Yes | Yes |
| 3 | PMAD4117A | VHF HELICAL ANTENNA (136-155 MHZ), ½ wave, -7dBi | Yes | Yes |
| 4 | PMAD4118A | VHF HELICAL ANTENNA (152-174 MHZ), ½ wave, -6dBi | Yes | Yes |
| 5 | *PMAD4119A | VHF STUBBY ANTENNA (136-148 MHZ), ¼ wave, -10.5dBi | Yes | Yes |
| 6 | PMAD4120A | VHF STUBBY ANTENNA (146-160 MHZ), ¼ wave, -10dBi | Yes | Yes |
| 7 | PMAD4121B | VHF STUBBY ANTENNA (160-174 MHZ), ¼ wave, -8dBi | Yes | Yes |
| 8 | PMAD4147A | VHF WHIP ANT ,136-174MHZ, ¼ wave, -5.5dBi | Yes | Yes |

Note - * antenna not applicable for FCC frequency range

## 7.2 Batteries

**Table 5**

| Battery No. | Battery Models | Description | Selected for test | Tested | Comments |
|---|---|---|---|---|---|
| 1 | PMNN4888A | BATT IMPRES LIION IP68 2200T SLIM | Yes | Yes | Default battery for body testing |
| 2 | PMNN4889A | BATT IMPRES LIION IP68 3200T HICAP | Yes | Yes | Default battery for face testing |
| 3 | PMNN4890A | BATT IMPRES LIION TIA4950 IP68 3200T | Yes | Yes | |

## 7.3 Body worn Accessories

**Table 6**

| Body worn No. | Body worn Models | Description | Selected for test | Tested | Comments |
|---|---|---|---|---|---|
| 1 | HLN6602A | UNIVERSAL CHESTPACK | Yes | Yes | |
| 2 | NTN5243A | STRAP | Yes | Yes | Tested with PMLN8662A, PMLN8663A & PMLN8664A |
| 3 | PMLN8662A | HARD LEATHER CARRY CASE WITH 3.0 INCH SWIVEL BELT LOOP (LIMITED KEYPAD) | Yes | Yes | Tested with swivel belt loop removed with NTN5243 |
| 4 | PMLN8663A | HARD LEATHER CARRY CASE WITH 3.0 INCH FIXED BELT LOOP (LIMITED KEYPAD) | Yes | Yes | Tested with NTN5243 |
| 5 | PMLN8664A | NYLON CARRY CASE WITH 3.0 INCH FIXED BELT LOOP (LIMITED KEYPAD) | Yes | Yes | Tested with NTN5243 |
| 6 | PMLN8665A | HARD LEATHER CARRY CASE WITH 3.0 INCH SWIVEL BELT LOOP (NO KEYPAD) | No | No | By Similarity to PMLN8662A |
| 7 | PMLN8666A | HARD LEATHER CARRY CASE WITH 3.0 INCH FIXED BELT LOOP (NO KEYPAD) | No | No | By Similarity to PMLN8663A |
| 8 | PMLN8667A | NYLON CARRY CASE WITH 3.0 INCH FIXED BELT LOOP (NO KEYPAD) | No | No | By Similarity to PMLN8664A |
| 9 | PMLN4651A | 2 INCH BELT CLIP | Yes | Yes | |
| 10 | PMLN7008A | 2.5-INCH BELT CLIP | Yes | Yes | |
| 11 | PMLN5610A | 2.5 INCH SWIVEL BELT LOOP | No | No | Can be excluded from testing with PMLN8662A as already tested with worst case configuration with NTN5243A |
| 12 | PMLN5611A | 3.0 INCH SWIVEL BELT LOOP | No | No | Can be excluded from testing with PMLN8662A as already tested with worst case configuration with NTN5243A |

## 7.4 Audio Accessories

**Table 7**

| Audio No. | Audio Acc. Models | Description | Selected for test | Tested | Comments |
|---|---|---|---|---|---|
| 1 | PMMN4170A | RM560 IMPRES WINDPORTING REMOTE SPEAKER MICROPHONE, LARGE | Yes | Yes | Default Audio |
| 2 | PMLN5727A | EARPIECE INLINE MIC/PTT,SWVL,MAGONE | Yes | *No | |
| 3 | PMLN5733A | EARBUD W IN-LINE MIC/PTT, MAG ONE | Yes | *No | |
| 4 | PMLN6757A | EARPIECE,ADJUST D-STYLE W/ IN-LINE PTT/MIC | Yes | *No | |
| 5 | PMLN6759A | AUDIO ACCESSORY-HEADSET,TEMPLE TRANSDUCER | Yes | *No | |
| 6 | PMLN6760A | BEHIND THE HEAD H/DUTY HEADSET, SLIM | Yes | *No | |
| 7 | PMLN6761A | AUDIO ACCESSORY-HEADSET,ULTRA-LITE HEADSET MAGONE | Yes | *No | |
| 8 | PMMN4071AL | MICROPHONE,IMPRES RSM LARGE 3.5 JACK NC | Yes | *No | |
| 9 | PMLN6754A | IMPRES 3WIRE SURV KIT W/CLR TUBE-BLK | Yes | *No | |
| 10 | PMLN7269ANS | SURVEILLANCE,2-WIRE, IMPRES SURVEILLANCE KIT, WITH QUICK DISCONNECT CLEAR ACOUSTIC TUBE, BLACK | Yes | *No | |
| 11 | PMMN4073A | MICROPHONE,IMPRES RSM, SMALL 3.5 JACK | Yes | *No | |
| 12 | PMMN4171A | RM530 IMPRES WINDPORTING REMOTE SPEAKER MICROPHONE, SMALL | Yes | *No | |
| 13 | PMLN7270A | 2-WIRE SURVEILLANCE KIT W/QUICK DISCONNECT CLEAR ACOUSTIC TUBE,BEIGE | Yes | *No | |
| 14 | PMLN5732A | EARSET W/ BOOM MIC, MAG ONE | No | No | By Similarity to PMLN5727A |
| 15 | PMLN6635A | ACCESSORY KIT,LIGHTWEIGHT HEADSET | No | No | By Similarity to PMLN6759A |
| 16 | PMLN6763A | BEHIND THE HEAD H/DUTY HEADSET/TIA, SLIM | No | No | By Similarity to PMLN6760A |
| 17 | PMLN7464A | OVER THE HEAD H/DUTY HEADSET, SLIM | No | No | By Similarity to PMLN6760A |

Note - * Intended for test. Per KDB provision tests not required.

## Table 7 (Continued)

| Audio No. | Audio Acc. Models | Description | Selected for test | Tested | Comments |
|---|---|---|---|---|---|
| 18 | PMLN7465A | OVER THE HEAD H/DUTY HEADSET/TIA, SLIM | No | No | By Similarity to PMLN6760A |
| 19 | PMMN4075A | MICROPHONE,RSM, SMALL IP57, NO EMERG | No | No | By Similarity to PMMN4073A |
| 20 | PMMN4076A | MICROPHONE,RSM SMALL 3.5 JACK, NO EMERG | No | No | By Similarity to PMMN4073A |
| 21 | PMMN4108A | AUDIO ACCESSORY-REMOTE SPEAKER MICROPHONE,IMPRES WINDPORTING RSM IP67 | No | No | By Similarity to PMMN4073A |
| 22 | PMLN6755A | AUDIO ACCESSORY-SURVEILLANCE,IMPRES 3WIRE SURV KIT W/CLR TUBE-BGE | No | No | By Similarity to PMLN6754A |
| 23 | PMMN4071A | MICROPHONE,IMPRES RSM LARGE 3.5 JACK NC | No | No | By Similarity to PMMN4073A |
| 24 | PMMN4073AL | MICROPHONE,IMPRES RSM, SMALL 3.5 JACK | No | No | By Similarity to PMMN4071AL |
| 25 | AARLN4885B | RECEIVE ONLY EARBUD FOR REM SPK MIC | No | No | Receive only |
| 26 | MDRLN4885B | RECEIVE-ONLY COVERED EARBUD WITH COILED CORD | No | No | Receive only |
| 27 | MDRLN4941A | RECEIVER-ONLY EARPIECE WITH TRANSLUCENT TUBE | No | No | Receive only |
| 28 | PMLN4620B | D-SHELL RX-ONLY EARPIECE(3.5MM) | No | No | Receive only |
| 29 | PMLN7396A | RX-ONLY ADJ D-STYLE W/STD 3.5MM JACK | No | No | Receive only |
| 30 | PMLN7560A | REC ONLY EARPIECE W/TRANSLUCENT TUBE | No | No | Receive only |
| 31 | PMLN8120A | RX ONLY XL CLEAR TUBE EARPIECE, 3.5MM JACK | No | No | Receive only |
| 32 | RLN4941A | RX ONLY EXTRA LOUD EARPIECE W/TRANSLUCENT TUBE | No | No | Receive only |
| 33 | WADN4190B | EAR RCVR W/COIL CBL&3.5MM PLUG | No | No | Receive only |
| 34 | PMLN8652A | RECEIVE ONLY EXTRA LOUD EARPIECE,3.5MM JACK | No | No | Receive only |

## 8.0 Description of Test System

DASY5™ Test System

### 8.1 Descriptions of Robotics/Probes/Readout Electronics

**Table 8**

| Dosimetric System type | System version | DAE type | Probe Type |
|---|---|---|---|
| **Schmid & Partner Engineering AG SPEAG DASY 5** | 52.10.4.1527 | DAE4 | EX3DV4 (E-Field) |

The **DASY5™** is operated per the instructions in the DASY5™ Users Manual. The complete manual is available directly from SPEAG™. All measurement equipment used to assess SAR compliance was calibrated according to ISO/IEC 17025 A2LA guidelines. Section 9.0 presents additional test equipment information. Appendices B and C present the applicable calibration certificates.

## 8.2 Description of Phantom(s)

**Table 9**

| Phantom Type | Phantom(s) Used | Material Parameters | Phantom Dimensions LxWxD (mm) | Material Thickness (mm) | Support Structure Material | Loss Tangent (wood) |
|---|---|---|---|---|---|---|
| Triple Flat | NA | 200MHz -6GHz; Er = 3-5, Loss Tangent = ≤0.05 | 280x175x175 | 2mm +/- 0.2mm | Wood | < 0.05 |
| SAM | NA | 300MHz -6GHz; Er = < 5, Loss Tangent = ≤0.05 | Human Model | | | |
| Oval Flat | √ | 300MHz -6GHz; Er = 4+/- 1, Loss Tangent = ≤0.05 | 600x400x190 | | | |

## 8.3 Description of Simulated Tissue

The sugar based simulate tissue is produced by placing the correct measured amount of De-ionized water into a large container. Each of the dried ingredients are weighed and added to the water carefully to avoid clumping. If the solution has a high sugar concentration the water is pre-heated to aid in dissolving the ingredients. The solution is mixed thoroughly, covered, and allowed to sit overnight prior to use.

The simulated tissue mixture was mixed based on the Simulated Tissue Composition indicated in Table 10. During the daily testing of this product, the applicable mixture was used to measure the Di-electric parameters at each of the tested frequencies to verify that the Di-electric parameters were within the tolerance of the tissue specifications.

**Simulated Tissue Composition (percent by mass)**

**Table 10**

| Ingredients | 150MHz | 2.45GHz (1) | 5GHz(1) |
|---|---|---|---|
| | Head | Head | Head |
| Sugar | 55.4 | NA | NA |
| Diacetin | 0 | NA | NA |
| De ionized-Water | 38.35 | NA | NA |
| Salt | 5.15 | NA | NA |
| HEC | 1.0 | NA | NA |
| Bact. | 0.1 | NA | NA |

Note: (1) SPEAG provides Motorola proprietary stimulant ingredients for the 2.45GHz and 5GHz band.

## 9.0 Additional Test Equipment

The Table below lists additional test equipment used during the SAR assessment.

**Table 11**

| Equipment Type | Model Number | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|
| SPEAG PROBE | EX3DV4 | 7882 | 06/25/2024 | 06/25/2027 |
| Speag Probe | EX3DV4 | 7486 | 01/19/2024 | 01/19/2027 |
| SPEAG DAE | DAE4 | 850 | 04/14/2022 | 04/14/2025 |
| Speag DAE | DAE4 | 684 | 02/22/2022 | 02/22/2025 |
| POWER AMPLIFIER | 50W 1000A | 14715 | CNR | CNR |
| AMPLIFIER | 5S1G4 | 312988 | CNR | CNR |
| AMPLIFIER | 5S4G11 | 312663 | CNR | CNR |
| VECTOR SIGNAL GENERATOR | E4438C | MY42081753 | 08/30/2023 | 08/30/2024 |
| VECTOR SIGNAL GENERATOR | E4438C | MY47272101 | 11/25/2023 | 11/25/2024 |
| BI-DIRECTIONAL COUPLER | 3020A | 41935 | 08/10/2023 | 08/10/2024* |
| BI-DIRECTIONAL COUPLER | 3022 | 81640 | 06/13/2024 | 06/13/2025 |
| BI-DIRECTIONAL COUPLER | 3024 | 61182 | 06/13/2024 | 06/13/2025 |
| POWER METER | E4418B | MY45100911 | 08/11/2023 | 08/11/2024* |
| POWER METER | E4416A | MY50001037 | 08/09/2023 | 08/09/2024* |
| POWER METER | E4417A | GB41292245 | 12/09/2023 | 12/09/2024 |
| POWER METER | E4419B | GB42420608 | 12/10/2023 | 12/10/2024 |
| POWER SENSOR | E4412A | MY61020016 | 08/21/2023 | 08/21/2024 |
| POWER SENSOR | E4412A | MY61050006 | 04/29/2024 | 04/29/2025 |
| POWER SENSOR | E9301B | MY41495594 | 11/02/2023 | 11/02/2024 |
| POWER SENSOR | E9301B | MY41495733 | 08/21/2023 | 08/21/2024 |
| POWER SOURCE | SE UMS 160 CB | 4320 | 10/12/2023 | 10/12/2024 |
| POWER METER | E4418B | GB40206480 | 01/15/2024 | 01/15/2025 |
| POWER SENSOR | E9301B | MY55210006 | 02/01/2024 | 02/01/2025 |
| DIGITAL THERMOMETER | 1523 | 3492108 | 01/23/2024 | 01/23/2025 |
| TEMPERATURE PROBE | PR-10L-4-100-1/4-6-BX | WNWR037791 | 01/26/2024 | 01/26/2025 |
| THERMOMETER | HH806AU | 080307 | 12/15/2023 | 12/15/2024 |
| TEMPERATURE PROBE | 80PK-22 | 06032017 | 12/15/2023 | 12/15/2024 |
| DATA LOGGER | DSB | 16326820 | 11/26/2023 | 11/26/2024 |
| DATA LOGGER | DSB | 16326831 | 11/26/2023 | 11/26/2024 |
| DATA LOGGER | DSB | 16398306 | 12/31/2023 | 12/31/2024 |
| NETWORK ANALYZER | E5071B | MY42403218 | 09/15/2023 | 09/15/2024 |
| THERMOMETER | HH202A | 35881 | 01/17/2024 | 01/17/2025 |
| TEMPERATURE PROBE | 80PK-22 | 05032017 | 12/28/2023 | 12/28/2024 |
| DIELECTRIC ASSESSMENT KIT | DAK-12 | 1051 | 10/16/2023 | 10/16/2024 |
| DIELECTRIC ASSESSMENT KIT | DAK-3.5 | 1120 | 10/16/2023 | 10/16/2024 |
| SPEAG DIPOLE | CLA150 | 4016 | 01/06/2023 | 01/06/2026 |
| SPEAG DIPOLE | D2450V2 | 703 | 01/12/2023 | 01/12/2026 |
| SPEAG DIPOLE | D5GHzV2 | 1022 | 04/11/2024 | 04/11/2027 |

Note: * Indicates equipment used for SAR assessment before calibration due date.

## 10.0 SAR Measurement System Validation and Verification

DASY output files of the probe/dipole calibration certificates and system verification test results are included in Appendices B, C & D respectively.

### 10.1 System Validation

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

**Table 12**

| Dates | Probe Calibration Point | | Probe SN | Measured Tissue Parameters | | Validation | | |
|---|---|---|---|---|---|---|---|---|
| | | | | σ | $\epsilon_r$ | Sensitivity | Linearity | Isotropy |
| **CW** | | | | | | | | |
| 07/09/2024 | Head | 150 | 7882 | 0.77 | 50.08 | Pass | Pass | Pass |
| 04/07/2024 | Head | 2450 | 7486 | 1.83 | 42.90 | Pass | Pass | Pass |
| 04/28/2024 | Head | 5250 | 7486 | 4.69 | 37.62 | Pass | Pass | Pass |
| 04/28/2024 | Head | 5600 | 7486 | 5.15 | 38.25 | Pass | Pass | Pass |
| 06/10/2024 | Head | 5800 | 7486 | 4.91 | 33.55 | Pass | Pass | Pass |
| **WLAN** | | | | | | | | |
| 04/07/2024 | Head | 2450 | 7486 | 1.83 | 42.90 | Pass | Pass | Pass |
| 04/28/2024 | Head | 5250 | 7486 | 4.69 | 37.62 | Pass | Pass | Pass |
| 04/28/2024 | Head | 5600 | 7486 | 5.15 | 38.25 | Pass | Pass | Pass |
| 06/10/2024 | Head | 5800 | 7486 | 4.91 | 33.55 | Pass | Pass | Pass |

### 10.2 System Verification

System verification checks were conducted each day during the SAR assessment. The results are normalized to 1W. Appendix D includes DASY plots with the largest deviation from the qualified source SAR target for each dipole. The Table below summarizes the daily system check results used for the SAR assessment.

**Table 13**

| Probe Serial # | Tissue Type | Dipole Kit / Serial # | Ref SAR @ 1W (W/kg) | System Check Results Measured (W/kg) | System Check Test Results when normalized to 1W (W/kg) | Tested Date | Deviation (%) |
|---|---|---|---|---|---|---|---|
| 7882 | IEEE/IEC Head | SPEAG CLA150 / 4016 | 3.77 ± 10% | 4.06 | 4.06 | 07/19/24@ | **7.7** |
| | | | | 3.89 | 3.89 | 07/20/24 | 3.2 |
| | | | | 4.01 | 4.01 | 07/21/24@ | 6.4 |

Note: '@' indicates that system verification result covers next test day (within 24 hours)

## Table 13 (Continued)

| Probe Serial # | Tissue Type | Dipole Kit / Serial # | Ref SAR @ 1W (W/kg) | System Check Results Measured (W/kg) | System Check Test Results when normalized to 1W (W/kg) | Tested Date | Deviation (%) |
|---|---|---|---|---|---|---|---|
| 7882 | IEEE/IEC Head | SPEAG CLA150 / 4016 | 3.77 ± 10% | 4.03 | 4.03 | 07/22/24@ | 6.9 |
| | | | | 3.80 | 3.80 | 07/23/24@ | 0.8 |
| | | | | 3.75 | 3.75 | 07/24/24@ | -0.5 |
| | | | | 3.93 | 3.93 | 07/25/24 | -0.5 |
| 7486 | IEEE/IEC Head | SPEAG D2450V2 / 703 | 52.3 ± 10% | 1.66 | 52.53 | 07/18/24@ | 0.4 |
| | | SPEAG D2450V2 / 703 | 52.3 ± 10% | 1.64 | 51.90 | 07/19/24@ | -0.8 |
| | | SPEAG D2450V2 / 703 | 52.3 ± 10% | 12.5 | 50.00 | 07/30/24 | **-4.4** |
| | | SPEAG D5GHzV2 / 1022 (5250) | 79.1 ± 10% | 2.36 | 74.68 | 07/20/24@ | -5.6 |
| | | SPEAG D5GHzV2 / 1022 (5250) | 79.1 ± 10% | 7.92 | 79.20 | 07/22/24@ | 0.1 |
| | | SPEAG D5GHzV2 / 1022 (5250) | 79.1 ± 10% | 2.50 | 79.11 | 07/23/24 | 0.02 |
| | | SPEAG D5GHzV2 / 1022 (5250) | 79.1 ± 10% | 7.65 | 76.50 | 08/01/24 | -3.3 |
| | | SPEAG D5GHzV2 / 1022 (5250) | 79.1 ± 10% | 2.53 | 80.06 | 08/09/24 | 1.2 |
| | | SPEAG D5GHzV2 / 1022 (5600) | 81.9 ± 10% | 8.24 | 82.4 | 08/07/24 | 0.6 |

Note: '@' indicates that system verification result covers next test day (within 24 hours)

**Table 13 (Continued)**

| Probe Serial # | Tissue Type | Dipole Kit / Serial # | Ref SAR @ 1W (W/kg) | System Check Results Measured (W/kg) | System Check Test Results when normalized to 1W (W/kg) | Tested Date | Deviation (%) |
|---|---|---|---|---|---|---|---|
| 7486 | IEEE/IEC Head | SPEAG D5GHzV2 / 1022 (5600) | 81.9 ± 10% | 8.23 | 82.3 | 08/05/24@ | -3.3 |
| | | SPEAG D5GHzV2 / 1022 (5600) | 81.9 ± 10% | 7.63 | 76.3 | 08/06/24@ | **-6.8** |
| | | SPEAG D5GHzV2 / 1022 (5600) | 81.9 ± 10% | 8.24 | 82.4 | 08/07/24@ | 0.6 |
| | | SPEAG D5GHzV2 / 1022 (5800) | 79.7 ± 10% | 7.93 | 79.3 | 07/26/24@ | -0.5 |
| | | SPEAG D5GHzV2 / 1022 (5800) | 79.7 ± 10% | 8.00 | 80.0 | 07/27/24@ | 0.4 |
| | | SPEAG D5GHzV2 / 1022 (5800) | 79.7 ± 10% | 7.94 | 79.4 | 07/28/24@ | -0.4 |
| | | SPEAG D5GHzV2 / 1022 (5800) | 79.7 ± 10% | 7.86 | 78.6 | 08/01/24@ | -1.4 |
| | | SPEAG D5GHzV2 / 1022 (5800) | 79.7 ± 10% | 7.88 | 78.8 | 07/29/24@ | -1.1 |

Note: '@' indicates that system verification result covers next test day (within 24 hours)

## 10.3 Equivalent Tissue Test Results

Simulated tissue prepared for SAR measurements is measured daily and within 24 hours prior to actual SAR testing to verify that the tissue is within +/- 5% & +/-10% of target parameters at the center of the transmit band. This measurement is done using the applicable equipment indicated in section 9.0. The Table below summarizes the measured tissue parameters used for the SAR assessment.

## Table 14

| Frequency (MHz) | Tissue Type | Conductivity Target (S/m) | Dielectric Constant Target | Conductivity Meas. (S/m) | Dielectric Constant Meas. | Tested Date |
|---|---|---|---|---|---|---|
| 164.988 | IEEE/ IEC Head | 0.77 (0.73-0.81) | 51.6 (49-54.2) | 0.800 | 49.413 | 07/19/2024@ |
| 150.800 | IEEE/ IEC Head | 0.76 (0.72-0.8) | 52.3 (49.6-54.9) | 0.790 | 50.038 | 07/19/2024@ |
| 164.988 | IEEE/ IEC Head | 0.77 (0.73-0.81) | 51.6 (49-54.2) | 0.782 | 49.279 | 07/20/2024 |
| 150.800 | IEEE/ IEC Head | 0.76 (0.72-0.8) | 52.3 (49.6-54.9) | 0.772 | 49.908 | 07/20/2024 |
| 164.988 | IEEE/ IEC Head | 0.77 (0.73-0.81) | 51.6 (49-54.2) | 0.788 | 50.216 | 07/21/2024@ |
| 150.800 | IEEE/ IEC Head | 0.76 (0.72-0.8) | 52.3 (49.6-54.9) | 0.777 | 50.866 | 07/21/2024@ |
| 144.013 | IEEE/ IEC Head | 0.76 (0.72-0.79) | 52.6 (49.9-55.2) | 0.758 | 51.431 | 07/22/2024@ |
| 138.000 | IEEE/ IEC Head | 0.75 (0.71-0.79) | 52.9 (50.2-55.5) | 0.753 | 51.704 | 07/22/2024@ |
| 147.988 | IEEE/ IEC Head | 0.76 (0.72-0.8) | 52.4 (49.8-55) | 0.761 | 51.253 | 07/22/2024@ |
| 146.013 | IEEE/ IEC Head | 0.76 (0.72-0.8) | 52.5 (49.9-55.1) | 0.759 | 51.343 | 07/22/2024@ |
| 164.988 | IEEE/ IEC Head | 0.77 (0.73-0.81) | 51.6 (49-54.2) | 0.774 | 50.516 | 07/22/2024@ |
| 150.800 | IEEE/ IEC Head | 0.76 (0.72-0.8) | 52.3 (49.6-54.9) | 0.763 | 51.132 | 07/22/2024@ |
| 144.013 | IEEE/ IEC Head | 0.76 (0.72-0.79) | 52.6 (49.9-55.2) | 0.777 | 51.359 | 07/23/2024@ |
| 138.000 | IEEE/ IEC Head | 0.75 (0.71-0.79) | 52.9 (50.2-55.5) | 0.768 | 51.626 | 07/23/2024@ |
| 147.988 | IEEE/ IEC Head | 0.76 (0.72-0.8) | 52.4 (49.8-55) | 0.766 | 51.179 | 07/23/2024@ |
| 146.013 | IEEE/ IEC Head | 0.76 (0.72-0.8) | 52.5 (49.9-55.1) | 0.774 | 51.269 | 07/23/2024@ |
| 164.988 | IEEE/ IEC Head | 0.77 (0.73-0.81) | 51.6 (49-54.2) | 0.788 | 50.438 | 07/23/2024@ |
| 150.800 | IEEE/ IEC Head | 0.76 (0.72-0.8) | 52.3 (49.6-54.9) | 0.778 | 51.051 | 07/23/2024@ |
| 154.988 | IEEE/ IEC Head | 0.76 (0.73-0.8) | 52.1 (49.5-54.7) | 0.781 | 50.862 | 07/23/2024@ |
| 173.400 | IEEE/ IEC Head | 0.78 (0.74-0.82) | 51.2 (48.6-53.8) | 0.795 | 50.094 | 07/23/2024@ |
| 138.000 | IEEE/ IEC Head | 0.75 (0.71-0.79) | 52.9 (50.2-55.5) | 0.721 | 50.792 | 07/24/2024 |
| 164.988 | IEEE/ IEC Head | 0.77 (0.73-0.81) | 51.6 (49-54.2) | 0.741 | 49.598 | 07/25/2024 |

Note: '@' indicates that tissue test result covers next test day (within 24 hours)

## Table 14 (Continued)

| Frequency (MHz) | Tissue Type | Conductivity Target (S/m) | Dielectric Constant Target | Conductivity Meas. (S/m) | Dielectric Constant Meas. | Tested Date |
|---|---|---|---|---|---|---|
| 2462.000 | IEEE/ IEC Head | 1.81 (1.72-1.9) | 39.2 (35.3-43.1) | 1.847 | 38.323 | 07/18/2024@ |
| 2437.000 | IEEE/ IEC Head | 1.79 (1.7-1.88) | 39.2 (35.3-43.1) | 1.749 | 36.848 | 07/19/2024@ |
| 2412.000 | IEEE/ IEC Head | 1.77 (1.68-1.86) | 39.3 (35.3-43.2) | 1.704 | 36.467 | 07/30/2024 |
| 5260.000 | IEEE/ IEC Head | 4.72 (4.25-5.19) | 35.9 (32.3-39.5) | 4.452 | 33.714 | 07/20/2024@ |
| 5260.000 | IEEE/ IEC Head | 4.72 (4.25-5.19) | 35.9 (32.3-39.5) | 4.578 | 35.500 | 07/22/2024 |
| 5300.000 | IEEE/ IEC Head | 4.78 (4.3-5.26) | 35.9 (32.3-39.5) | 4.620 | 35.422 | 07/22/2024@ |
| 5320.000 | IEEE/ IEC Head | 4.78 (4.3-5.26) | 35.9 (32.3-39.5) | 4.530 | 34.852 | 07/23/2024 |
| 5300.000 | IEEE/ IEC Head | 4.78 (4.3-5.26) | 35.9 (32.3-39.5) | 4.313 | 33.973 | 07/31/2024@ |
| 5320.000 | IEEE/ IEC Head | 4.78 (4.3-5.26) | 35.9 (32.3-39.5) | 4.715 | 36.751 | 08/09/2024 |
| 5600.000 | IEEE/ IEC Head | 5.07 (4.56-5.58) | 35.5 (32-39.1) | 4.963 | 32.287 | 08/07/2024 |
| 5600.000 | IEEE/ IEC Head | 5.07 (4.56-5.58) | 35.5 (32-39.1) | 4.764 | 32.982 | 08/05/2024@ |
| 5600.000 | IEEE/ IEC Head | 5.07 (4.56-5.58) | 35.5 (32-39.1) | 4.693 | 32.872 | 08/06/2024@ |
| 5500.000 | IEEE/ IEC Head | 4.97 (4.47-5.46) | 35.7 (32.1-39.2) | 4.585 | 33.063 | 08/06/2024@ |
| 5720.000 | IEEE/ IEC Head | 5.19 (4.67-5.71) | 35.4 (31.8-38.9) | 5.095 | 32.052 | 08/07/2024 |
| 5785.000 | IEEE/ IEC Head | 5.26 (4.73-5.78) | 35.3 (31.8-38.8) | 4.981 | 34.767 | 07/26/24@ |
| 5785.000 | IEEE/ IEC Head | 5.26 (4.73-5.78) | 35.3 (31.8-38.8) | 5.117 | 37.051 | 07/27/24@ |
| 5785.000 | IEEE/ IEC Head | 5.26 (4.73-5.78) | 35.3 (31.8-38.8) | 4.948 | 32.647 | 07/28/24@ |
| 5785.000 | IEEE/ IEC Head | 5.26 (4.73-5.78) | 35.3 (31.8-38.8) | 5.174 | 35.947 | 08/01/24@ |
| 5745.000 | IEEE/ IEC Head | 5.22 (4.69-5.74) | 35.4 (31.8-38.9) | 4.900 | 32.723 | 07/28/24@ |
| 5825.000 | IEEE/ IEC Head | 5.30 (4.77-5.83) | 35.3 (31.7-38.8) | 4.987 | 32.591 | 07/28/24@ |
| 5825.000 | IEEE/ IEC Head | 5.30 (4.77-5.83) | 35.3 (31.7-38.8) | 5.163 | 37.375 | 07/29/24@ |

Note: '@' indicates that tissue test result covers next test day (within 24 hours)

## 11.0 Environmental Test Conditions

The EME Laboratory's ambient environment is well controlled resulting in very stable simulated tissue temperature and therefore stable dielectric properties. Simulated tissue temperature is measured prior to each scan to insure it is within +/ - 2ºC of the temperature at which the dielectric properties were determined. The liquid depth within the phantom used for measurements was at least 15cm. Additional precautions are routinely taken to ensure the stability of the simulated tissue such as covering the phantoms when scans are not actively in process in order to minimize evaporation. The lab environment is continuously monitored. The Table below presents the range and average environmental conditions during the SAR tests reported herein:

**Table 15**

| | Target | Measured |
|---|---|---|
| **Ambient Temperature** | 18 – 25 ˚C | Range: 19.7 – 22.7˚C<br>Avg. 21.7 ˚C |
| **Tissue Temperature** | 18 – 25 ˚C | Range: 19.7-22.8˚C<br>Avg. 21.3˚C |

Relative humidity target range is a recommended target

The EME Lab RF environment uses a Spectrum Analyzer to monitor for extraneous large signal RF contaminants that could possibly affect the test results. If such unwanted signals are discovered the SAR scans are repeated.

## 12.0 DUT Test Setup and Methodology

### 12.1 Measurements

SAR measurements were performed using the DASY system described in section 8.0 using zoom scans. Oval flat phantoms filled with applicable simulated tissue were used for body and face testing.

The Table below includes the step sizes and resolution of area and zoom scans per KDB 865664 requirements.

**Table 16**

| Description | | ≤ 3 GHz | > 3 GHz |
|---|---|---|---|
| Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface | | 5 ± 1 mm | ½·δ·ln(2) ± 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: ΔxArea, ΔyArea | | ≤ 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. | |
| Maximum zoom scan spatial resolution: ΔxZoom, ΔyZoom | | ≤ 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: ΔzZoom(n) | ≤ 5 mm | 3 – 4 GHz: ≤ 4 mm<br>4 – 5 GHz: ≤ 3 mm<br>5 – 6 GHz: ≤ 2 mm |
| Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.<br>* When zoom scan is required and the reported SAR from the area scan based 1-g SAR estimation procedures of KDB 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. | | | |

## 12.2 DUT Configuration(s)

The DUT is a portable device operational at the body and face as described in section 6.0 while using the applicable accessories listed in section 7.0. All accessories listed in section 7.0 of this report were considered when implementing the guidelines specified in KDB 643646.

## 12.3 DUT Positioning Procedures

The positioning of the device for each body location is described below and illustrated in Appendix G.

### 12.3.1 Body

The DUT was positioned in normal use configuration against the phantom with the offered body worn accessory as well as with and without the offered audio accessories as applicable.

### 12.3.2 Head

Not applicable.

### 12.3.3 Face

The DUT was positioned with its' front and back sides separated 2.5cm from the phantom.

## 12.4 DUT Test Channels

The number of test channels was determined by using the following IEEE 1528 equation. The use of this equation produces the same or more test channels compared to the FCC KDB 447498 number of test channels formula.

$$N_c = 2 * roundup[10 * (f_{high} - f_{low}) / f_c] + 1$$

Where

$N_c$ = Number of channels
$F_{high}$ = Upper channel
$F_{low}$ = Lower channel
$F_c$ = Center channel

## 12.5 SAR Result Scaling Methodology

The calculated 1-gram averaged SAR results indicated as "Max Calc. 1g-SAR" in the data Tables is determined by scaling the measured SAR to account for power leveling variations and drift. Appendix F includes a shortened scan to justify SAR scaling for drift. For this device the "Max Calc. 1g-SAR are scaled using the following formula:

$$Max\_Calc = SAR\_meas \cdot 10^{\frac{-Drift}{10}} \cdot \frac{P\_\max}{P\_\text{int}} \cdot DC$$

P_max = Maximum Power (W)
P_int = Initial Power (W)
Drift = DASY drift results (dB)
SAR_meas = Measured 1-g or 10-g Avg. SAR (W/kg)
DC = Transmission mode duty cycle in % where applicable
50% duty cycle is applied for PTT operation

Note: for conservative results, the following are applied:
If P_int > P_max, then P_max/P_int = 1.
Drift = 1 for positive drift

Additional SAR scaling was applied using the methodologies outlined in FCC KDB 865664 using tissue sensitivity values. SAR was scaled for conditions where the tissue permittivity was measured above the nominal target and for tissue conductivity that was measured below the nominal target. Negative or reduced SAR scaling is not permitted.

## 12.6 DUT Test Plan

The guidelines and requirements outlined in section 4.0 were used to assess compliance of this device. All modes of operation identified in section 6.0 were considered during the development of the test plan. All tests were performed in CW and WLAN modes and 50% duty cycle was applied to PTT configurations in the final results.

Standalone and simultaneous BT testing were assessed in sections 15.0 and 17.1 per the guidelines of KDB 447498.

# 13.0 DUT Test Data

## 13.1 LMR assessments at the Body for 150.8-173.4MHz band

Battery PMNN4888A was selected as the default battery for assessments at the Body because it is the thinnest battery (refer to Exhibit 7B for battery illustration). The default battery was used during conducted power measurements for all test channels within FCC allocated frequency range (150.8-173.4MHz) which are listed in Table 17. The channel with the highest conducted power will be identified as the default channel per KDB 643646 (SAR Test for PTT Radios).

**Table 17**

| Test Freq (MHz) | Power (W) |
|---|---|
| 150.8000 | 5.870 |
| 152.0125 | 5.890 |
| 154.9875 | 5.870 |
| 159.9875 | 5.960 |
| 160.0125 | 5.960 |
| 164.9875 | 5.960 |
| 173.4000 | 5.900 |

**Assessments at the Body with Body worn HLN6602A**

DUT assessment with offered antennas, default battery and, default body worn accessory per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 17 for highest output power channel.

**Table 18**

| Antenna | Battery | Carry Accessory | Cable Accessory | Test Freq (MHz) | Init Pwr (W) | SAR Drift (dB) | Meas. 1g-SAR (W/kg) | Max Calc. 1g-SAR (W/kg) | Run# |
|---|---|---|---|---|---|---|---|---|---|
| PMAD4116A | PMNN4888A | HLN6602A | PMMN4170A | 164.9875 | 5.92 | -0.35 | 1.03 | 0.57 | BL-AB-240719-08 |
| PMAD4117A | | | | 150.8000 | 5.80 | 0.17 | 0.85 | 0.44 | BL-AB-240719-09 |
| PMAD4118A | | | | 164.9875 | 5.85 | -0.29 | 1.76 | 0.96 | BL-AB-240719-10 |
| PMAD4120A | | | | 150.8000 | 5.78 | -0.76 | 1.27 | 0.79 | BL-AB-240719-11 |
| PMAD4121B | | | | 164.9875 | 5.86 | -0.46 | 2.74 | 1.56 | BL-AB-240719-12 |
| PMAD4147A | | | | 164.9875 | 5.85 | -0.66 | 1.34 | 0.80 | BL-AB-240719-13 |
| Optional/Additional batteries | | | | | | | | | |
| PMAD4121B | PMNN4889A | HLN6602A | PMMN4170A | 164.9875 | 5.88 | -0.43 | 2.11 | 1.19 | BL-AB-240719-14 |
| | PMNN4890A | | | | 5.58 | -0.41 | 2.10 | 1.24 | BL-AB-240719-15 |

**Assessments at the Body with Body worn PMLN4651A**

DUT assessment with offered antennas, default battery and, default body worn accessory per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 17 for highest output power channel.

**Table 19**

| Antenna | Battery | Carry Accessory | Cable Accessory | Test Freq (MHz) | Init Pwr (W) | SAR Drift (dB) | Meas. 1g-SAR (W/kg) | Max Calc. 1g-SAR (W/kg) | Run# |
|---|---|---|---|---|---|---|---|---|---|
| PMAD4116A | PMNN4888A | PMLN4651A | PMMN4170A | 164.9875 | 5.92 | -0.30 | 1.43 | 0.78 | BL-AB-240719-16 |
| PMAD4117A | | | | 150.8000 | 5.82 | 0.05 | 1.55 | 0.80 | BL-AB-240719-17 |
| PMAD4118A | | | | 164.9875 | 5.86 | -0.30 | 3.05 | 1.67 | BL-AB-240719-18 |
| PMAD4120A | | | | 150.8000 | 5.83 | -0.42 | 2.22 | 1.26 | BL-AB-240719-19 |
| PMAD4121B | | | | 164.9875 | 5.90 | -0.38 | 2.76 | 1.53 | EMR-AB-240719-20 |
| PMAD4147A | | | | 164.9875 | 5.93 | -0.52 | 2.37 | 1.35 | EMR-AB-240719-21 |
| Optional/Additional batteries | | | | | | | | | |
| PMAD4118A | PMNN4889A | PMLN4651A | PMMN4170A | 164.9875 | 5.97 | -0.57 | 3.05 | 1.75 | EMR-AB-240719-22 |
| | PMNN4890A | | | 164.9875 | 5.60 | -0.47 | 2.71 | 1.62 | EMR-AB-240719-23 |

**Assessments at the Body with Body worn PMLN7008A**

DUT assessment with offered antennas, default battery and, default body worn accessory per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 17 for highest output power channel.

**Table 20**

| Antenna | Battery | Carry Accessory | Cable Accessory | Test Freq (MHz) | Init Pwr (W) | SAR Drift (dB) | Meas. 1g-SAR (W/kg) | Max Calc. 1g-SAR (W/kg) | Run# |
|---|---|---|---|---|---|---|---|---|---|
| PMAD4116A | PMNN4888A | PMLN7008A | PMMN4170A | 164.9875 | 5.92 | -0.51 | 1.46 | 0.83 | EMR-AB-240719-24 |
| PMAD4117A | | | | 150.8000 | 5.92 | -0.13 | 1.44 | 0.75 | EMR-AB-240719-25 |
| PMAD4118A | | | | 164.9875 | 5.92 | -0.46 | 2.99 | 1.68 | EMR-AB-240719-26 |
| PMAD4120A | | | | 150.8000 | 5.87 | -0.79 | 1.95 | 1.20 | EMR-AB-240720-01@ |

**Table 20 (Continued)**

| Antenna | Battery | Carry Accessory | Cable Accessory | Test Freq (MHz) | Init Pwr (W) | SAR Drift (dB) | Meas. 1g-SAR (W/kg) | Max Calc. 1g-SAR (W/kg) | Run# |
|---|---|---|---|---|---|---|---|---|---|
| PMAD4121B | PMNN4888A | PMLN7008A | PMMN4170A | 164.9875 | 5.93 | -0.43 | 2.64 | 1.47 | EMR-AB-240720-02@ |
| PMAD4147A | | | | | 5.93 | -0.57 | 2.23 | 1.29 | EMR-AB-240720-03@ |
| Optional/Additional batteries | | | | | | | | | |
| PMAD4118A | PMNN4889A | PMLN7008A | PMMN4170A | 164.9875 | 6.00 | -0.45 | 2.86 | 1.59 | EMR-AB-240720-04@ |
| | PMNN4890A | | | | 5.57 | -0.47 | 2.43 | 1.46 | EMR-AB-240720-05@ |

**Assessments at the Body with Body worn PMLN8662A w/o belt loop w/ NTN5243A**

DUT assessment with offered antennas, default battery and, default body worn accessory per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 17 for highest output power channel.

**Table 21**

| Antenna | Battery | Carry Accessory | Cable Accessory | Test Freq (MHz) | Init Pwr (W) | SAR Drift (dB) | Meas. 1g-SAR (W/kg) | Max Calc. 1g-SAR (W/kg) | Run# |
|---|---|---|---|---|---|---|---|---|---|
| PMAD4116A | PMNN4888A | PMLN8662A w/o belt loop w/ NTN5243A | PMMN4170A | 164.9875 | 5.95 | -0.68 | 0.70 | 0.41 | EMR-AB-240720-07 |
| PMAD4117A | | PMLN8662A w/o belt loop w/ NTN5243A | | 150.8000 | 5.85 | -0.17 | 0.52 | 0.28 | EMR-AB-240720-09 |
| PMAD4118A | | PMLN8662A w/o belt loop w/ NTN5243A | | 164.9875 | 5.93 | -0.25 | 1.62 | 0.87 | EMR-AB-240720-10 |
| PMAD4120A | | PMLN8662A w/o belt loop w/ NTN5243A | | 150.8000 | 5.87 | -0.56 | 0.64 | 0.37 | EMR-AB-240720-11 |
| PMAD4121B | | PMLN8662A w/o belt loop w/ NTN5243A | | 164.9875 | 5.96 | -0.07 | 0.66 | 0.34 | EMR-AB-240720-12 |
| PMAD4147A | | PMLN8662A w/o belt loop w/ NTN5243A | | 164.9875 | 5.96 | -0.67 | 0.72 | 0.42 | EMR-AB-240720-13 |

**Table 21 (Continued)**

| Antenna | Battery | Carry Accessory | Cable Accessory | Test Freq (MHz) | Init Pwr (W) | SAR Drift (dB) | Meas. 1g-SAR (W/kg) | Max Calc. 1g-SAR (W/kg) | Run# |
|---|---|---|---|---|---|---|---|---|---|
| Optional/Additional batteries | | | | | | | | | |
| PMAD4118A | PMNN4889A | PMLN8662A w/o belt loop w/ NTN5243A | PMMN4170A | 164.9875 | 6.00 | -0.73 | 1.25 | 0.74 | EMR-AB-240720-14 |
| | PMNN4890A | PMLN8662A w/o belt loop w/ NTN5243A | | | 5.60 | -0.49 | 1.21 | 0.73 | EMR-AB-240720-15 |

**Assessments at the Body with Body worn PMLN8663A w/ NTN5243A**

DUT assessment with offered antennas, default battery and, default body worn accessory per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 17 for highest output power channel.

**Table 22**

| Antenna | Battery | Carry Accessory | Cable Accessory | Test Freq (MHz) | Init Pwr (W) | SAR Drift (dB) | Meas. 1g-SAR (W/kg) | Max Calc. 1g-SAR (W/kg) | Run# |
|---|---|---|---|---|---|---|---|---|---|
| PMAD4116A | PMNN4888A | PMLN8663A w/ NTN5243A | PMMN4170A | 164.9875 | 5.94 | -0.56 | 1.21 | 0.70 | BL-AB-240721-03 |
| PMAD4117A | | PMLN8663A w/ NTN5243A | | 150.8000 | 5.87 | -0.13 | 1.28 | 0.67 | BL-AB-240721-04 |
| PMAD4118A | | PMLN8663A w/ NTN5243A | | 164.9875 | 5.88 | -0.24 | 2.43 | 1.31 | BL-AB-240721-07 |
| PMAD4120A | | PMLN8663A w/ NTN5243A | | 150.8000 | 5.88 | -0.74 | 1.80 | 1.09 | BL-AB-240722-02@ |
| PMAD4121B | | PMLN8663A w/ NTN5243A | | 164.9875 | 5.90 | -0.07 | 1.37 | 0.71 | BL-AB-240722-04@ |
| PMAD4147A | | PMLN8663A w/ NTN5243A | | 164.9875 | 5.91 | -0.81 | 2.19 | 1.34 | BL-AB-240722-06@ |
| Optional/Additional batteries | | | | | | | | | |
| PMAD4147A | PMNN4889A | PMLN8663A w/ NTN5243A | PMMN4170A | 164.9875 | 6.00 | -0.56 | 2.12 | 1.21 | BL-AB-240722-08@ |
| | PMNN4890A | PMLN8663A w/ NTN5243A | | | 5.56 | -0.64 | 1.70 | 1.06 | EMR-AB-240722-10@ |

**Assessments at the Body with Body worn PMLN8664A w/ NTN5243A**

DUT assessment with offered antennas, default battery and, default body worn accessory per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 17 for highest output power channel.

**Table 23**

| Antenna | Battery | Carry Accessory | Cable Accessory | Test Freq (MHz) | Init Pwr (W) | SAR Drift (dB) | Meas. 1g-SAR (W/kg) | Max Calc. 1g-SAR (W/kg) | Run# |
|---|---|---|---|---|---|---|---|---|---|
| PMAD4116A | PMNN4888A | PMLN8664A w/ NTN5243A | PMMN4170A | 164.9875 | 5.93 | -0.50 | 0.62 | 0.35 | EMR-AB-240722-11@ |
| PMAD4117A | | PMLN8664A w/ NTN5243A | | 150.8000 | 5.86 | -0.19 | 1.12 | 0.60 | EMR-AB-240722-14@ |
| PMAD4118A | | PMLN8664A w/ NTN5243A | | 164.9875 | 5.96 | -0.12 | 1.32 | 0.68 | EMR-AB-240722-15@ |
| PMAD4120A | | PMLN8664A w/ NTN5243A | | 150.8000 | 5.86 | -0.87 | 1.41 | 0.88 | EMR-AB-240722-17@ |
| PMAD4121B | | PMLN8664A w/ NTN5243A | | 164.9875 | 5.92 | -0.22 | 1.05 | 0.56 | BL-AB-240722-20 |
| PMAD4147A | | PMLN8664A w/ NTN5243A | | 164.9875 | 5.95 | -0.69 | 1.60 | 0.95 | BL-AB-240722-22 |
| Optional/Additional batteries | | | | | | | | | |
| PMAD4147A | PMNN4889A | PMLN8664A w/ NTN5243A | PMMN4170A | 164.9875 | 6.00 | -0.40 | 1.65 | 0.90 | BL-AB-240723-02@ |
| | PMNN4890A | PMLN8664A w/ NTN5243A | | | 5.60 | -0.38 | 1.59 | 0.93 | BL-AB-240723-03@ |

**Assessment at the Body with other audio accessories**

Assessment per “KDB 643646 Body SAR Test Consideration for Audio Accessories without Built-in Antenna; Sec 1, A. when overall < 4.0 W/kg, SAR tested for that audio accessory is not necessary.” This was applicable to all remaining accessories.

**Assessment of wireless BT configuration**

Assessment using the overall highest SAR configuration at the body from above without an audio accessory attached. SAR plots of the highest results per Table (bolded) is present in Appendix E.

**Table 24**

| Antenna | Battery | Carry Accessory | Cable Accessory | Test Freq (MHz) | Init Pwr (W) | SAR Drift (dB) | Meas. 1g-SAR (W/kg) | Max Calc. 1g-SAR (W/kg) | Run# |
|---|---|---|---|---|---|---|---|---|---|
| PMAD4118A | PMNN4889A | PMLN4651A | None (BT) | 164.9875 | 6.00 | -0.24 | 4.75 | **2.51** | BL-AB-240723-04@ |

## 13.2 LMR assessments at the Face for 150.8-173.4MHz band

Battery PMNN4889A was selected as the default battery for assessments at the Face because it has the highest capacity (refer to Exhibit 7B for battery illustration). The default battery was used during conducted power measurements for all test channels within FCC allocated frequency range (150.8-173.4MHz) which are listed in Table 24. The channel with the highest conducted power will be identified as the default channel per KDB 643646 (SAR Test for PTT Radios).

**Table 24**

| Test Freq (MHz) | Power (W) |
|---|---|
| 150.8000 | 5.890 |
| 152.0125 | 5.910 |
| 154.9875 | 5.890 |
| 159.9875 | 5.990 |
| 160.0125 | 5.990 |
| 164.9875 | 6.000 |
| 173.4000 | 5.920 |

DUT assessment with offered antennas, default battery with front of DUT positioned 2.5cm facing phantom per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 24 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix E.

**Table 25**

| Antenna | Battery | Carry Accessory | Cable Accessory | Test Freq (MHz) | Init Pwr (W) | SAR Drift (dB) | Meas. 1g-SAR (W/kg) | Max Calc. 1g-SAR (W/kg) | Run# |
|---|---|---|---|---|---|---|---|---|---|
| PMAD4116A | PMNN4889A | @ front | None (BT) | 164.9875 | 6.00 | -0.21 | 1.81 | 0.95 | BL-FACE-240723-05@ |
| PMAD4117A | PMNN4889A | @ front | None (BT) | 150.8000 | 5.88 | -0.07 | 1.39 | 0.72 | BL-FACE-240723-06@ |
| PMAD4118A | PMNN4889A | @ front | None (BT) | 164.9875 | 6.00 | 0.03 | 1.94 | 0.97 | BL-FACE-240723-07@ |
| PMAD4120A | PMNN4889A | @ front | None (BT) | 150.8000 | 5.90 | -0.20 | 1.08 | 0.58 | BL-FACE-240723-08@ |
| PMAD4121B | PMNN4889A | @ front | None (BT) | 164.9875 | 6.00 | -0.02 | 1.15 | 0.58 | BL-FACE-240723-09@ |
| PMAD4147A | PMNN4889A | @ front | None (BT) | 164.9875 | 6.00 | -0.39 | 2.48 | 1.36 | BL-FACE-240723-10@ |
| Optional/Additional batteries | | | | | | | | | |
| PMAD4147A | PMNN4888A | @ front | None (BT) | 164.9875 | 5.96 | -0.32 | 2.50 | 1.35 | EMR-FACE-240723-11@ |
| PMAD4147A | PMNN4890A | @ front | None (BT) | 164.9875 | 5.70 | -0.23 | 2.74 | **1.52** | BL-FACE-240725-20 |

## 13.3 Assessment for outside FCC Frequency range (LMR)

Assessment of outside FCC frequency range using highest SAR configuration from above. SAR plots of the highest results per Table (bolded) is present in the Appendix E.

**Table 26**

| Antenna | Battery | Carry Accessory | Cable Accessory | Test Freq (MHz) | Init Pwr (W) | SAR Drift (dB) | Meas. 1g-SAR (W/kg) | Max Calc. 1g-SAR (W/kg) | Run# |
|---|---|---|---|---|---|---|---|---|---|
| Body | | | | | | | | | |
| PMAD4116A | PMNN4889A | PMLN4651A | None (BT) | 144.0125 | 5.75 | -0.31 | 4.09 | 2.29 | EMR-AB-240723-13@ |
| PMAD4117A | PMNN4889A | PMLN4651A | None (BT) | 138.0000 | 5.91 | -0.61 | 6.14 | **3.59** | EMR-AB-240725-11@ |
| PMAD4117A | PMNN4889A | PMLN4651A | None (BT) | 144.0125 | 5.73 | -0.29 | 4.00 | 2.24 | EMR-AB-240723-15@ |
| PMAD4119A | PMNN4889A | PMLN4651A | None (BT) | 138.0000 | 5.77 | 0.13 | 2.55 | 1.33 | EMR-AB-240723-16@ |
| PMAD4119A | PMNN4889A | PMLN4651A | None (BT) | 144.0125 | 5.70 | -0.70 | 2.33 | 1.44 | EMR-AB-240723-17@ |
| PMAD4119A | PMNN4889A | PMLN4651A | None (BT) | 147.9875 | 5.83 | -0.01 | 1.35 | 0.70 | EMR-AB-240723-18@ |
| PMAD4120A | PMNN4889A | PMLN4651A | None (BT) | 146.0125 | 5.85 | -0.22 | 3.19 | 1.72 | EMR-AB-240723-19@ |

**Table 26 (Continued)**

| Antenna | Battery | Carry Accessory | Cable Accessory | Test Freq (MHz) | Init Pwr (W) | SAR Drift (dB) | Meas. 1g-SAR (W/kg) | Max Calc. 1g-SAR (W/kg) | Run# |
|---|---|---|---|---|---|---|---|---|---|
| Body | | | | | | | | | |
| PMAD4147A | PMNN4889A | PMLN4651A | None (BT) | 138.0000 | 5.80 | 0.07 | 1.97 | 1.02 | EMR-AB-240723-20@ |
| PMAD4147A | PMNN4889A | PMLN4651A | None (BT) | 144.0125 | 5.70 | -0.26 | 4.33 | 2.42 | EMR-AB-240723-21@ |
| Face | | | | | | | | | |
| PMAD4116A | PMNN4890A | @ front | None (BT) | 144.0125 | 5.61 | -0.25 | 1.31 | 0.74 | EMR-FACE-240723-22@ |
| PMAD4117A | PMNN4890A | @ front | None (BT) | 138.0000 | 5.43 | 0.32 | 1.04 | 0.57 | BL-FACE-240723-24 |
| PMAD4117A | PMNN4890A | @ front | None (BT) | 144.0125 | 5.30 | -0.24 | 1.66 | **0.99** | BL-FACE-240723-25 |
| PMAD4119A | PMNN4890A | @ front | None (BT) | 138.0000 | 5.42 | 0.66 | 0.49 | 0.27 | BL-FACE-240723-26 |
| PMAD4119A | PMNN4890A | @ front | None (BT) | 144.0125 | 5.45 | -0.28 | 1.03 | 0.60 | BL-FACE-240723-27 |
| PMAD4119A | PMNN4890A | @ front | None (BT) | 147.9875 | 5.52 | -0.47 | 0.75 | 0.46 | BL-FACE-240723-28 |
| PMAD4120A | PMNN4890A | @ front | None (BT) | 146.0125 | 5.54 | -0.35 | 0.89 | 0.52 | BL-FACE-240723-29 |
| PMAD4147A | PMNN4890A | @ front | None (BT) | 138.0000 | 5.55 | 0.19 | 0.46 | 0.25 | BL-FACE-240724-01@ |
| PMAD4147A | PMNN4890A | @ front | None (BT) | 144.0125 | 5.45 | -0.23 | 1.39 | 0.81 | BL-FACE-240724-02@ |

## 13.4 Assessment for ISED, Canada (LMR)

Based on the assessment results for body and face per KDB643646, additional tests were required for ISED, Canada frequency range (138-174MHz). The overall highest test configuration from 150.8-173.4MHz band was repeated with test frequencies 138.0000MHz and 144.0125MHz. Test result refer to Table 26 above.

As per ISED Notice 2016-DRS001, additional tests were required for the low, mid and high frequency channels for the configuration with the highest SAR value. The SAR results are in Table 27 below and the SAR plots of the highest results per Table (bolded) are presented in the Appendix E.

**Table 27**

| Antenna | Battery | Carry Accessory | Cable Accessory | Test Freq (MHz) | Init Pwr (W) | SAR Drift (dB) | Meas. 1g-SAR (W/kg) | Max Calc. 1g-SAR (W/kg) | Run# |
|---|---|---|---|---|---|---|---|---|---|
| Body | | | | | | | | | |
| PMAD4117A | PMNN4889A | PMLN4651A | None (BT) | 138.0000 | 5.91 | -0.61 | 6.14 | **3.59** | EMR-AB-240725-11@ |
| PMAD4117A | PMNN4889A | PMLN4651A | None (BT) | 144.0125 | 5.73 | -0.29 | 4.00 | 2.24 | EMR-AB-240723-15@ |
| PMAD4117A | PMNN4889A | PMLN4651A | None (BT) | 154.9875 | 5.87 | -0.01 | 1.68 | 0.86 | EMR-AB-240724-07@ |
| Face | | | | | | | | | |
| PMAD4147A | PMNN4890A | @ front | None (BT) | 138.0000 | 5.55 | 0.19 | 0.46 | 0.25 | BL-FACE-240724-01@ |
| PMAD4147A | PMNN4890A | @ front | None (BT) | 164.9875 | 5.70 | -0.23 | 2.74 | **1.52** | BL-FACE-240725-20 |
| PMAD4147A | PMNN4890A | @ front | None (BT) | 173.4000 | 5.40 | -0.23 | 1.36 | 0.80 | BL-FACE-240724-04@ |

## 14.0 DUT Test Data for WLAN

SAR test reduction is applied using the following criteria according to KDB 248227 D01:

a. For 2.4GHz 802.11 g/n SAR testing is not required when then highest reported SAR for DSSS is adjusted by ratio of OFDM to DSSS specified maximum output power and adjusted SAR is ≤1.2 W/kg.

b. U-NII-1 SAR testing not required when U-NII-2A band highest reported SAR for a test configuration is ≤1.2 W/kg.

c. For all positions/configurations, when reported SAR is >0.8W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤1.2 W/kg or all required test positions/configurations are tested.

## 14.1 WLAN 2.4GHz assessments at the Body for 802.11b/g/n (2412-2462MHz)

**Output Power Data**

Battery PMNN4888A was selected as the default battery for assessments at the Body because it is the thinnest battery (refer to Exhibit 7B for battery illustration). The default battery was used during conducted power measurements for all test channels within FCC allocated frequency range (2412-2462MHz) which are listed in Table 28 These power measurements were used to determine the necessary modes for SAR testing according to KDB 248227 D01.

**Table 28**

| Band | 802.11 | Ch. BW | Ch. | Freq. (MHz) | Measured conducted power (W) |
|---|---|---|---|---|---|
| 2.4 GHz | b | 20 | 1 | 2412 | 0.044 |
| | | | 6 | 2437 | 0.042 |
| | | | 11 | 2462 | 0.056 |
| | g | 20 | 1 | 2412 | 0.044 |
| | | | 6 | 2437 | 0.042 |
| | | | 11 | 2462 | 0.055 |
| | n | 20 | 1 | 2412 | 0.046 |
| | | | 6 | 2437 | 0.044 |
| | | | 11 | 2462 | 0.042 |

**Assessments at the Body for WLAN 2.4GHz (2412-2462MHz)**

DUT assessment with WLAN internal antenna, offered batteries and without any cable accessory attached against the phantom with the offered body worn accessories. Refer to Table 28 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in the Appendix E.

**Table 29**

| Antenna | Battery | Carry Accessory | Cable Accessory | Test Freq (MHz) | Init Pwr (W) | SAR Drift (dB) | Meas. 1g-SAR (W/kg) | Max Calc. 1g-SAR (W/kg) | Run# |
|---|---|---|---|---|---|---|---|---|---|
| 802.11b, 20MHz BW | | | | | | | | | |
| AN000389A01 | PMNN4888A | HLN6602A | None | 2462.0000 | 0.056 | -0.12 | 0.071 | **0.074** | MHN(ABE)-AB-240719-01@ |

**Table 29 (Continued)**

| Antenna | Battery | Carry Accessory | Cable Accessory | Test Freq (MHz) | Init Pwr (W) | SAR Drift (dB) | Meas. 1g-SAR (W/kg) | Max Calc. 1g-SAR (W/kg) | Run# |
|---|---|---|---|---|---|---|---|---|---|
| 802.11b, 20MHz BW | | | | | | | | | |
| AN000389A01 | PMNN4888A | PMLN4651A | None | 2462.0000 | 0.056 | -0.37 | 0.051 | 0.057 | MHN(ABE)-AB-240719-02@ |
| | | PMLN7008A | | | 0.056 | -0.02 | 0.061 | 0.062 | MHN(ABE)-AB-240719-04@ |
| | | PMLN8662A w/o belt loop w/ NTN5243A | | | 0.056 | -0.28 | 0.024 | 0.026 | ZIQ-AB-240719-05@ |
| | | PMLN8663A w/ NTN5243A | | | 0.056 | -0.18 | 0.008 | 0.009 | ZIQ-AB-240719-07@ |
| | | PMLN8664A w/ NTN5243A | | | 0.056 | -0.14 | 0.024 | 0.025 | ZIQ-AB-240719-09@ |
| Optional/Additional batteries | | | | | | | | | |
| AN000389A01 | PMNN4889A | HLN6602A | None | 2462.0000 | 0.056 | -0.20 | 0.045 | 0.048 | ZIQ-AB-240719-10@ |
| | PMNN4890A | | | | 0.056 | -0.38 | 0.050 | 0.056 | MHN-AB-240719-11@ |

## 14.2 WLAN 2.4GHz assessments at the Face for 802.11b/g/n (2412-2462MHz)

### Output Power Data

Battery PMNN4889A was selected as the default battery for assessments at the Face because it has the highest capacity (refer to Exhibit 7B for battery illustration). The default battery was used during conducted power measurements for all test channels within FCC allocated frequency range (2412-2462MHz) which are listed in Table 30 These power measurements were used to determine the necessary modes for SAR testing according to KDB 248227 D01.

**Table 30**

| Band | 802.11 | Ch. BW | Ch. | Freq. (MHz) | Measured conducted power (W) |
|---|---|---|---|---|---|
| 2.4 GHz | b | 20 | 1 | 2412 | 0.049 |
| | | | 6 | 2437 | 0.047 |
| | | | 11 | 2462 | 0.056 |
| | g | 20 | 1 | 2412 | 0.048 |
| | | | 6 | 2437 | 0.046 |
| | | | 11 | 2462 | 0.055 |
| | n | 20 | 1 | 2412 | 0.051 |
| | | | 6 | 2437 | 0.048 |
| | | | 11 | 2462 | 0.046 |

**Assessments at the Face for WLAN 2.4GHz (2412-2462MHz)**

DUT assessment with WLAN internal antenna and offered batteries with front of DUT positioned 2.5cm facing phantom. SAR plots of the highest results per Table (bolded) are presented in the Appendix E.

**Table 31**

| Antenna | Battery | Carry Accessory | Cable Accessory | Test Freq (MHz) | Init Pwr (W) | SAR Drift (dB) | Meas. 1g-SAR (W/kg) | Max Calc. 1g-SAR (W/kg) | Run# |
|---|---|---|---|---|---|---|---|---|---|
| 802.11b, 20MHz | | | | | | | | | |
| AN000389A01 | PMNN4889A | None, Radio front @2.5cm | None | 2462.0000 | 0.056 | -0.14 | 0.054 | **0.057** | MHN(ABE)-FACE-240719-12@ |
| Optional/Additional batteries | | | | | | | | | |
| AN000389A01 | PMNN4889A | None, Radio front @2.5cm | None | 2462.0000 | 0.056 | 0.12 | 0.053 | 0.054 | MHN(ABE)-FACE-240719-13@ |
| | PMNN4890A | | | | 0.056 | -0.06 | 0.048 | 0.050 | MHN(ABE)-FACE-240719-15 |

**Assessments for ISED Canada**

Based on the assessment results for body and face per KDB643646 D01, additional tests were not required for the Industry Canada frequency range (2412-2462MHz) as the testing performed is in compliance with Industry Canada frequency range.

As per ISED Notice 2016-DRS001, additional tests were required for the low, mid and high frequency channels for the configuration with the highest SAR value. The SAR results are in Tables below. SAR plots of the highest results per Tables (bolded) are presented in Appendix E.

**Table 32**

| Antenna | Battery | Carry Accessory | Cable Accessory | Test Freq (MHz) | Init Pwr (W) | SAR Drift (dB) | Meas. 1g-SAR (W/kg) | Max Calc. 1g-SAR (W/kg) | Run# |
|---|---|---|---|---|---|---|---|---|---|
| 802.11b, 20MHz BW | | | | | | | | | |
| Body | | | | | | | | | |
| AN000389A01 | PMNN4888A | HLN6602A | None | 2412.0000 | 0.045 | -0.23 | 0.079 | **0.106** | ZIQ-AB-240730-03 |
| | | | | 2437.0000 | 0.042 | -0.39 | 0.057 | 0.084 | SAN-AB-240720-05@ |
| | | | | 2462.0000 | 0.056 | -0.12 | 0.071 | 0.074 | MHN(ABE)-AB-240719-01@ |
| Face | | | | | | | | | |
| AN000389A01 | PMNN4889A | None, Radio front @2.5cm | None | 2412.0000 | 0.049 | -0.21 | 0.067 | **0.081** | SAN-FACE-240720-11@ |
| | | | | 2437.0000 | 0.047 | -0.18 | 0.044 | 0.055 | MHN(ABE)-FACE-240720-02@ |
| | | | | 2462.0000 | 0.056 | -0.14 | 0.054 | 0.057 | MHN(ABE)-FACE-240719-12@ |

## 14.3 WLAN 5GHz assessments at the Body for 802.11a/n/ac (5180-5825MHz)

**Output Power Data**

Battery PMNN4888A was selected as the default battery for assessments at the Body because it is the thinnest battery (refer to Exhibit 7B for battery illustration). The default battery was used during conducted power measurements for all test channels within FCC allocated frequency range (5180-5825MHz) which are listed in Table 33. These power measurements were used to determine the necessary modes for SAR testing according to KDB 248227 D01.

## Table 33

| Band | 802.11 | Ch. BW | Ch. | Freq. (MHz) | Measured conducted power (W) |
|---|---|---|---|---|---|
| U-NII-1 (5.15-5.25GHz) | a | 20 | 36 | 5180 | 0.062 |
| | | | 40 | 5200 | 0.052 |
| | | | 44 | 5220 | 0.060 |
| | | | 48 | 5240 | 0.059 |
| | n | 20 | 36 | 5180 | 0.042 |
| | | | 40 | 5200 | 0.054 |
| | | | 44 | 5220 | 0.063 |
| | | | 48 | 5240 | 0.062 |
| | ac | 20 | 36 | 5180 | 0.042 |
| | | | 40 | 5200 | 0.051 |
| | | | 44 | 5220 | 0.041 |
| | | | 48 | 5240 | 0.050 |
| U-NII-2A (5.25-5.35GHz) | a | 20 | 52 | 5260 | 0.059 |
| | | | 56 | 5280 | 0.052 |
| | | | 60 | 5300 | 0.058 |
| | | | 64 | 5320 | 0.046 |
| | n | 20 | 52 | 5260 | 0.061 |
| | | | 56 | 5280 | 0.054 |
| | | | 60 | 5300 | 0.061 |
| | | | 64 | 5320 | 0.039 |
| | ac | 20 | 52 | 5260 | 0.049 |
| | | | 56 | 5280 | 0.047 |
| | | | 60 | 5300 | 0.049 |
| | | | 64 | 5320 | 0.038 |
| U-NII-2C (5.47-5.725GHz) | a | 20 | 100 | 5500 | 0.020 |
| | | | 120 | 5600 | 0.027 |
| | | | 144 | 5720 | 0.026 |
| | n | 20 | 100 | 5500 | 0.024 |
| | | | 120 | 5600 | 0.029 |
| | | | 144 | 5720 | 0.027 |
| | ac | 20 | 100 | 5500 | 0.016 |
| | | | 120 | 5600 | 0.029 |
| | | | 144 | 5720 | 0.027 |
| U-NII-3 (5.745-5.85GHz) | a | 20 | 149 | 5745 | 0.027 |
| | | | 157 | 5785 | 0.032 |
| | | | 165 | 5825 | 0.031 |
| | n | 20 | 149 | 5180 | 0.028 |
| | | | 157 | 5200 | 0.027 |
| | | | 165 | 5220 | 0.025 |
| | ac | 20 | 149 | 5180 | 0.028 |
| | | | 157 | 5200 | 0.027 |
| | | | 165 | 5220 | 0.025 |

## 14.4 WLAN 5GHz assessments at the Face for 802.11a/n/ac (5180-5825MHz)

### Output Power Data

Battery PMNN4889A was selected as the default battery for assessments at the Face because it has the highest capacity (refer to Exhibit 7B for battery illustration). The default battery was used during conducted power measurements for all test channels within FCC allocated frequency range (5180-5825MHz) which are listed in Table 34 These power measurements were used to determine the necessary modes for SAR testing according to KDB 248227 D01.

**Table 34**

| Band | 802.11 | Ch. BW | Ch. | Freq. (MHz) | Measured conducted power (W) |
|---|---|---|---|---|---|
| U-NII-1 (5.15-5.25GHz) | a | 20 | 36 | 5180 | 0.062 |
| | | | 40 | 5200 | 0.059 |
| | | | 44 | 5220 | 0.061 |
| | | | 48 | 5240 | 0.060 |
| | n | 20 | 36 | 5180 | 0.042 |
| | | | 40 | 5200 | 0.061 |
| | | | 44 | 5220 | 0.063 |
| | | | 48 | 5240 | 0.062 |
| | ac | 20 | 36 | 5180 | 0.044 |
| | | | 40 | 5200 | 0.051 |
| | | | 44 | 5220 | 0.050 |
| | | | 48 | 5240 | 0.049 |
| U-NII-2A (5.25-5.35GHz) | a | 20 | 52 | 5260 | 0.059 |
| | | | 56 | 5280 | 0.053 |
| | | | 60 | 5300 | 0.058 |
| | | | 64 | 5320 | 0.047 |
| | n | 20 | 52 | 5260 | 0.061 |
| | | | 56 | 5280 | 0.055 |
| | | | 60 | 5300 | 0.061 |
| | | | 64 | 5320 | 0.039 |
| | ac | 20 | 52 | 5260 | 0.048 |
| | | | 56 | 5280 | 0.047 |
| | | | 60 | 5300 | 0.049 |
| | | | 64 | 5320 | 0.036 |
| U-NII-2C (5.47-5.725GHz) | a | 20 | 100 | 5500 | 0.020 |
| | | | 120 | 5600 | 0.027 |
| | | | 144 | 5720 | 0.026 |
| | n | 20 | 100 | 5500 | 0.024 |
| | | | 120 | 5600 | 0.028 |
| | | | 144 | 5720 | 0.028 |
| | ac | 20 | 100 | 5500 | 0.016 |
| | | | 120 | 5600 | 0.028 |
| | | | 144 | 5720 | 0.028 |

**Table 34 (Continued)**

| Band | 802.11 | Ch. BW | Ch. | Freq. (MHz) | Measured conducted power (W) |
|---|---|---|---|---|---|
| U-NII-3 (5.745-5.85GHz) | a | 20 | 149 | 5745 | 0.027 |
| | | | 157 | 5785 | 0.031 |
| | | | 165 | 5825 | 0.031 |
| | n | 20 | 36 | 5180 | 0.028 |
| | | | 40 | 5200 | 0.027 |
| | | | 44 | 5220 | 0.026 |
| | ac | 20 | 36 | 5180 | 0.028 |
| | | | 40 | 5200 | 0.027 |
| | | | 44 | 5220 | 0.026 |

**Assessments at the Body for U-NII-2A (5.25-5.35GHz)**

DUT assessment with WLAN internal antenna, offered battery and without any cable accessory attached against the phantom with the offered body worn accessories. SAR plots of the highest results per Table (bolded) are presented in the Appendix E.

**Table 35**

| Antenna | Battery | Carry Accessory | Cable Accessory | Test Freq (MHz) | Init Pwr (W) | SAR Drift (dB) | Meas. 1g-SAR (W/kg) | Max Calc. 1g-SAR (W/kg) | Run# |
|---|---|---|---|---|---|---|---|---|---|
| 802.11a, 20MHz BW | | | | | | | | | |
| AN000389A01 | PMNN4888A | HLN6602A | None | 5260.0000 | 0.059 | -0.21 | 0.141 | **0.165** | SAN-AB-240720-08 |
| | | PMLN4651A | | | 0.059 | -0.08 | 0.068 | 0.077 | SAN-AB-240720-10 |
| | | PMLN7008A | | | 0.059 | -0.33 | 0.075 | 0.090 | MHN-AB-240720-15 |
| | | PMLN8662A w/o belt loop w/ NTN5243A | | | 0.059 | -0.26 | 0.027 | 0.032 | MHN-AB-240720-16 |
| | | PMLN8663A w/ NTN5243A | | | 0.059 | -0.09 | 0.007 | 0.008 | MHN-AB-240720-17 |
| | | PMLN8664A w/ NTN5243A | | | 0.059 | -0.27 | 0.019 | 0.022 | MHN-AB-240721-01@ |
| AN000389A01 | | | | | | | | | |
| AN000389A01 | PMNN4889A | HLN6602A | None | 5260.0000 | 0.059 | -0.38 | 0.130 | 0.156 | MHN(ABE)-AB-240722-02 |
| | PMNN4890A | | | | 0.058 | -0.28 | 0.124 | 0.148 | MHN(ABE)-AB-240722-04 |

### Assessments at the Face for U-NII-2A (5.25-5.35GHz)

DUT assessment with WLAN internal antenna and offered batteries with front of DUT positioned 2.5cm facing phantom. SAR plots of the highest results per Table (bolded) are presented in the Appendix E.

**Table 36**

| Antenna | Battery | Carry Accessory | Cable Accessory | Test Freq (MHz) | Init Pwr (W) | SAR Drift (dB) | Meas. 1g-SAR (W/kg) | Max Calc. 1g-SAR (W/kg) | Run# |
|---|---|---|---|---|---|---|---|---|---|
| 802.11a, 20MHz BW | | | | | | | | | |
| AN000389A01 | PMNN4889A | None, Radio front @2.5cm | None | 5260.0000 | 0.059 | -0.11 | 0.103 | 0.116 | ZIQ-FACE-240722-06 |
| AN000389A01 | | | | | | | | | |
| AN000389A01 | PMNN4888A | None, Radio front @2.5cm | None | 5260.0000 | 0.059 | -0.02 | 0.116 | **0.130** | ZIQ-FACE-240722-08 |
| | PMNN4890A | | | | 0.058 | 0.08 | 0.105 | 0.117 | ZIQ-FACE-240722-09 |

### Assessments for ISED Canada

Based on the assessment results for body and face per KDB643646 D01, additional tests were not required for the Industry Canada frequency range (UNII-2A, 5.25-5.35GHz) as the testing performed is in compliance with Industry Canada frequency range.

As per ISED Notice 2016-DRS001, additional tests were required for the low, mid and high frequency channels for the configuration with the highest SAR value. The SAR results are in Tables below. SAR plots of the highest results per Tables (bolded) are presented in Appendix E.

**Table 37**

| Antenna | Battery | Carry Accessory | Cable Accessory | Test Freq (MHz) | Init Pwr (W) | SAR Drift (dB) | Meas. 1g-SAR (W/kg) | Max Calc. 1g-SAR (W/kg) | Run# |
|---|---|---|---|---|---|---|---|---|---|
| 802.11a, 20MHz BW | | | | | | | | | |
| Body | | | | | | | | | |
| AN000389A01 | PMNN4888A | HLN6602A | None | 5260.0000 | 0.059 | -0.21 | 0.141 | 0.165 | SAN-AB-240720-08 |
| | | | | 5300.0000 | 0.058 | -0.26 | 0.148 | **0.177** | ZIQ-AB-240723-04@ |
| | | | | 5320.0000 | 0.046 | -0.17 | 0.118 | 0.137 | MHN(ABE)-AB-240723-07 |

**Table 37 (Continued)**

| Antenna | Battery | Carry Accessory | Cable Accessory | Test Freq (MHz) | Init Pwr (W) | SAR Drift (dB) | Meas. 1g-SAR (W/kg) | Max Calc. 1g-SAR (W/kg) | Run# |
|---|---|---|---|---|---|---|---|---|---|
| 802.11a, 20MHz BW | | | | | | | | | |
| Face | | | | | | | | | |
| AN000389A01 | PMNN4888A | None, Radio front @2.5cm | None | 5260.0000 | 0.059 | -0.02 | 0.116 | **0.130** | ZIQ-FACE-240722-08 |
| | | | | 5300.0000 | 0.058 | -0.09 | 0.091 | 0.105 | ZIQ-FACE-240801-02@ |
| | | | | 5320.0000 | 0.046 | -0.04 | 0.069 | 0.078 | ZIQ-FACE-240809-02 |

### Assessments at the Body for U-NII-2C (5.47-5.725GHz)

DUT assessment with WLAN internal antenna, offered battery and without any cable accessory attached against the phantom with the offered body worn accessories. SAR plots of the highest results per Table (bolded) are presented in the Appendix E.

**Table 38**

| Antenna | Battery | Carry Accessory | Cable Accessory | Test Freq (MHz) | Init Pwr (W) | SAR Drift (dB) | Meas. 1g-SAR (W/kg) | Max Calc. 1g-SAR (W/kg) | Run# |
|---|---|---|---|---|---|---|---|---|---|
| 802.11a, 20MHz BW | | | | | | | | | |
| AN000389A01 | PMNN4888A | HLN6602A | None | 5600.0000 | 0.027 | -0.18 | 0.142 | **0.176** | MHN-AB-240807-12 |
| | | PMLN4651A | | | 0.027 | -0.39 | 0.041 | 0.053 | MHN-AB-240805-04 |
| | | PMLN7008A | | | 0.03 | -0.29 | 0.071 | 0.090 | ZIQ-AB-240806-06@ |
| | | PMLN8662A w/o belt loop w/ NTN5243A | | | 0.027 | -0.01 | 0.023 | 0.027 | MHN-AB-240806-02@ |
| | | PMLN8663A w/ NTN5243A | | | 0.027 | 0.00 | 0.001 | 0.001 | MHN-AB-240806-03@ |
| | | PMLN8664A w/ NTN5243A | | | 0.03 | -0.63 | 0.015 | 0.021 | ZIQ-AB-240806-05@ |
| Optional/Additional batteries | | | | | | | | | |
| AN000389A01 | PMNN4889A | HLN6602A | None | 5600.0000 | 0.027 | -0.16 | 0.086 | 0.106 | ZIQ-AB-240806-09 |
| | PMNN4890A | | | | 0.027 | -0.20 | 0.059 | 0.076 | MHN-AB-240806-11 |

### Assessments at the Face for U-NII-2C (5.47-5.725GHz)

DUT assessment with WLAN internal antenna and offered batteries with front of DUT positioned 2.5cm facing phantom. SAR plots of the highest results per Table (bolded) are presented in the Appendix E.

**Table 39**

| Antenna | Battery | Carry Accessory | Cable Accessory | Test Freq (MHz) | Init Pwr (W) | SAR Drift (dB) | Meas. 1g-SAR (W/kg) | Max Calc. 1g-SAR (W/kg) | Run# |
|---|---|---|---|---|---|---|---|---|---|
| 802.11a, 20MHz BW | | | | | | | | | |
| AN000389A01 | PMNN4889A | None, Radio front @2.5cm | None | 5600.0000 | 0.027 | -0.34 | 0.050 | 0.064 | MHN-FACE-240806-12 |
| AN000389A01 | | | | | | | | | |
| AN000389A01 | PMNN4888A | None, Radio front @2.5cm | None | 5600.0000 | 0.027 | -0.28 | 0.048 | 0.061 | MHN-FACE-240806-13 |
| | PMNN4890A | | | | 0.027 | -0.17 | 0.051 | **0.065** | MHN-FACE-240807-01@ |

### Assessments for ISED Canada

Based on the assessment results for body and face per KDB643646 D01, additional tests were not required for the Industry Canada frequency range (UNII-2C, 5.47-5.725GHz) as the testing performed is in compliance with Industry Canada frequency range.

As per ISED Notice 2016-DRS001, additional tests were required for the low, mid and high frequency channels for the configuration with the highest SAR value. The SAR results are in Tables below. SAR plots of the highest results per Tables (bolded) are presented in Appendix E.

**Table 40**

| Antenna | Battery | Carry Accessory | Cable Accessory | Test Freq (MHz) | Init Pwr (W) | SAR Drift (dB) | Meas. 1g-SAR (W/kg) | Max Calc. 1g-SAR (W/kg) | Run# |
|---|---|---|---|---|---|---|---|---|---|
| 802.11a, 20MHz BW | | | | | | | | | |
| Body | | | | | | | | | |
| AN000389A01 | PMNN4888A | HLN6602A | None | 5500.0000 | 0.020 | -0.37 | 0.062 | 0.071 | MHN-AB-240807-03@ |
| | | | | 5600.0000 | 0.027 | -0.18 | 0.142 | **0.176** | MHN-AB-240807-12 |
| | | | | 5720.0000 | 0.026 | -0.42 | 0.068 | 0.093 | MHN-AB-240807-09 |

**Table 40 (Continued)**

| Antenna | Battery | Carry Accessory | Cable Accessory | Test Freq (MHz) | Init Pwr (W) | SAR Drift (dB) | Meas. 1g-SAR (W/kg) | Max Calc. 1g-SAR (W/kg) | Run# |
|---|---|---|---|---|---|---|---|---|---|
| 802.11a, 20MHz BW | | | | | | | | | |
| Face | | | | | | | | | |
| AN000389A01 | PMNN4890A | None, Radio front @2.5cm | None | 5500.0000 | 0.020 | 0.10 | 0.033 | 0.034 | MHN-FACE-240807-02@ |
| | | | | 5600.0000 | 0.027 | -0.17 | 0.051 | **0.065** | MHN-FACE-240807-01@ |
| | | | | 5720.0000 | 0.026 | -0.28 | 0.045 | 0.060 | ZIQ-FACE-240807-06 |

### Assessments at the Body for U-NII-3 (5.745-5.85GHz)

DUT assessment with WLAN internal antenna, offered battery and without any cable accessory attached against the phantom with the offered body worn accessories. SAR plots of the highest results per Table (bolded) are presented in the Appendix E.

**Table 41**

| Antenna | Battery | Carry Accessory | Cable Accessory | Test Freq (MHz) | Init Pwr (W) | SAR Drift (dB) | Meas. 1g-SAR (W/kg) | Max Calc. 1g-SAR (W/kg) | Run# |
|---|---|---|---|---|---|---|---|---|---|
| 802.11a, 20MHz BW | | | | | | | | | |
| AN000389A01 | PMNN4888A | HLN6602A | None | 5785.0000 | 0.032 | -0.23 | 0.032 | 0.035 | ZIQ-AB-240727-02@ |
| | | PMLN4651A | | | 0.032 | -0.33 | 0.019 | 0.021 | MHN-AB-240727-05@ |
| | | PMLN7008A | | | 0.032 | -0.52 | 0.016 | 0.019 | MHN-AB-240727-04@ |
| | | PMLN8662A w/o belt loop w/ NTN5243A | | | 0.032 | 0.34 | 0.005 | 0.005 | MHN-AB-240727-07@ |
| | | PMLN8663A w/ NTN5243A | | | 0.032 | -0.36 | 0.004 | 0.005 | ZIQ-AB-240727-09@ |
| | | PMLN8664A w/ NTN5243A | | | 0.032 | 0.89 | 0.005 | 0.005 | ZIQ-AB-240727-12 |
| Optional/Additional batteries | | | | | | | | | |
| AN000389A01 | PMNN4889A | HLN6602A | None | 5785.0000 | 0.031 | -0.24 | 0.024 | 0.027 | ZIQ-AB-240728-02@ |
| | PMNN4890A | | | | 0.031 | -0.24 | 0.063 | **0.069** | DAN(ABE)-AB-240802-03@ |

### Assessments at the Face for U-NII-3 (5.745-5.85GHz)

DUT assessment with WLAN internal antenna and offered batteries with front of DUT positioned 2.5cm facing phantom. SAR plots of the highest results per Table (bolded) are presented in the Appendix E.

**Table 42**

| Antenna | Battery | Carry Accessory | Cable Accessory | Test Freq (MHz) | Init Pwr (W) | SAR Drift (dB) | Meas. 1g-SAR (W/kg) | Max Calc. 1g-SAR (W/kg) | Run# |
|---|---|---|---|---|---|---|---|---|---|
| 802.11a, 20MHz BW | | | | | | | | | |
| AN000389A01 | PMNN4889A | None, Radio front @2.5cm | None | 5785.0000 | 0.031 | -0.55 | 0.044 | 0.052 | ABE-FACE-240728-07@ |
| Optional/Additional batteries | | | | | | | | | |
| AN000389A01 | PMNN4888A | None, Radio front @2.5cm | None | 5785.0000 | 0.032 | -0.60 | 0.046 | **0.054** | ZIQ(ABE)-FACE-240728-09@ |
| | PMNN4890A | | | | 0.031 | -0.51 | 0.040 | 0.047 | ZIQ-FACE-240729-01@ |

### Assessments for ISED Canada

Based on the assessment results for body and face per KDB643646 D01, additional tests were not required for the Industry Canada frequency range (UNII-3, 5.745-5.85GHz) as the testing performed is in compliance with Industry Canada frequency range.

As per ISED Notice 2016-DRS001, additional tests were required for the low, mid and high frequency channels for the configuration with the highest SAR value. The SAR results are in Tables below. SAR plots of the highest results per Tables (bolded) are presented in Appendix E.

**Table 43**

| Antenna | Battery | Carry Accessory | Cable Accessory | Test Freq (MHz) | Init Pwr (W) | SAR Drift (dB) | Meas. 1g-SAR (W/kg) | Max Calc. 1g-SAR (W/kg) | Run# |
|---|---|---|---|---|---|---|---|---|---|
| 802.11a, 20MHz BW | | | | | | | | | |
| Body | | | | | | | | | |
| AN000389A01 | PMNN4890A | HLN6602A | None | 5745.0000 | 0.027 | -0.39 | 0.022 | 0.029 | ZIQ(ABE)-AB-240729-09@ |
| | | | | 5785.0000 | 0.031 | -0.24 | 0.063 | **0.069** | DAN(ABE)-AB-240802-03@ |
| | | | | 5825.0000 | 0.030 | -0.09 | 0.022 | 0.025 | ZIQ-AB-240730-01@ |

**Table 43 (Continued)**

| Antenna | Battery | Carry Accessory | Cable Accessory | Test Freq (MHz) | Init Pwr (W) | SAR Drift (dB) | Meas. 1g-SAR (W/kg) | Max Calc. 1g-SAR (W/kg) | Run# |
|---|---|---|---|---|---|---|---|---|---|
| 802.11a, 20MHz BW | | | | | | | | | |
| Face | | | | | | | | | |
| AN000389A01 | PMNN4888A | None, Radio front @2.5cm | None | 5745.0000 | 0.027 | -0.16 | 0.037 | 0.046 | DAN(ABE)-FACE-240729-06@ |
| | | | | 5785.0000 | 0.032 | -0.60 | 0.046 | **0.054** | ZIQ(ABE)-FACE-240728-09@ |
| | | | | 5825.0000 | 0.031 | -0.21 | 0.031 | 0.035 | DAN(ABE)-FACE-240729-07@ |

## 15.0 Assessment at the Bluetooth band

Per guidelines in KDB 447498, the following formula was used to determine the test exclusion for standalone Bluetooth transmitter;

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] *[$\sqrt{F_{(GHz)}}$] = 2.9, which is ≤ 3 for 1-g SAR

Where:

Max. Power = 9.26mW (12.02mW*77.00% duty cycle)
Min. test separation distance = 5mm for actual test separation < 5mm
F(GHz) = 2.48 GHz

Per the result from the calculation above, the standalone SAR assessment was not required for Bluetooth band. Therefore, SAR results for Bluetooth are not reported herein.

## 16.0 Shortened Scan Assessment

A “shortened” scan using the highest SAR configuration overall from above was performed to validate the SAR drift of the full DASY5™ coarse and zoom scans. Note that the shortened scan represents the zoom scan performance result; this is obtained by first running a coarse scan to find the peak area and then, using a newly charged battery, a zoom scan only was performed. The results of the shortened cube scan presented in Appendix D demonstrate that the scaling methodology used to determine the calculated SAR results presented herein are valid. The SAR result from the Table below is provided in Appendix F.

**Table 44**

| Antenna | Battery | Carry Accessory | Cable Accessory | Test Freq (MHz) | Init Pwr (W) | SAR Drift (dB) | Meas. 1g-SAR (W/kg) | Max Calc. 1g-SAR (W/kg) | Run# |
|---|---|---|---|---|---|---|---|---|---|
| PMAD4118A | PMNN4889A | PMLN4651A | None (BT) | 164.9875 | 5.90 | -0.20 | 4.66 | **2.48** | EMR-AB-240725-10@ |

## 17.0 Simultaneous Transmission

The Table below summarizes the simultaneous transmission conditions for this device.

**Table 45**

| Exposure Conditions | Item | Capable Simultaneous Transmit Configurations |
|---|---|---|
| Body-Worn | 1 | LMR + WLAN 2.4 GHz |
| | 2 | LMR + WLAN 5 GHz |
| | 3 | LMR + WLAN 2.4 GHz + BT |
| | 4 | LMR + WLAN 5 GHz + BT |
| | 5 | LMR + BT |
| Face | 1 | LMR + WLAN 2.4 GHz |
| | 2 | LMR + WLAN 5 GHz |
| | 3 | LMR + WLAN 2.4 GHz + BT |
| | 4 | LMR + WLAN 5 GHz + BT |
| | 5 | LMR + BT |

WLAN 2.4 GHz, BT and 5GHz are sharing the same antenna, only one technology to transmit at a single time.

## 17.1 Simultaneous Transmission Exclusion for BT

Per guidelines in KDB 447498, the following formula was used to determine the test exclusion to an antenna that transmits simultaneously with other antennas for test distances ≤ 50mm:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] *[√F(GHz)/X] = 0.39W/kg, which is ≤ 0.4 W/kg (1g)

Where:

X = 7.5 for 1g-SAR; 18.75 for 10g
Max. Power = 9.26mW (12.02mW*77.0% duty cycle)
Min. test separation distance = 5mm for actual test separation < 5mm
F(GHz) = 2.48 GHz

Per the result from the calculation above, simultaneous exclusion is applied and therefore SAR results are not reported herein.

## 17.2 Simultaneous Transmission between LMR, WLAN 2.4GHz, WLAN 5GHz

**Table 38**

| Exposure condition | Standalone SAR (W/kg) | | | Sum of SAR (W/kg) | |
|---|---|---|---|---|---|
| | LMR | 2.4GHz | 5GHz | LMR + 2.4GHz | LMR + 5GHz |
| Body worn Exposure | 2.51 | 0.106 | 0.177 | 2.62 | 2.69 |
| Face Exposure | 1.52 | 0.081 | 0.130 | 1.60 | 1.65 |

The test results clearly demonstrate compliance with FCC Occupational/Controlled RF Exposure limits of 8 W/kg averaged over 1 gram per the requirements of FCC 47 CFR § 2.1093 and RSS-102 (Issue 6).

## 18.0 Results Summary

The test results are based on the test guidelines from section 4.0 and satisfying frequencies within FCC bands and ISED Canada Frequency bands, the highest Operational Maximum Calculated 1-gram average SAR values found for this filing:

**Table 39**

| Designator | Frequency band (MHz) | Max Calc at Body (W/kg) | Max Calc at Face (W/kg) |
|---|---|---|---|
| | | 1g-SAR | 1g-SAR |
| **FCC US** | | | |
| LMR | 150.8-173.4 | 2.51 | 1.52 |
| WLAN 2.4 GHz | 2412 - 2462 | 0.106 | 0.081 |
| WLAN 5 GHz | 5180 - 5825 | 0.177 | 0.130 |
| BT | 2402 - 2480 | NA | NA |
| Highest Simultaneous Transmission SAR | Sum of SAR (W/kg) | 2.69 | 1.65 |
| **ISED Canada** | | | |
| LMR | 138-174 | 3.59 | 1.52 |
| WLAN 2.4 GHz | 2412 - 2462 | 0.106 | 0.081 |
| WLAN 5 GHz | 5180 - 5825 | 0.177 | 0.130 |
| BT | 2402 - 2480 | NA | NA |
| Highest Simultaneous Transmission SAR | Sum of SAR (W/kg) | 3.77 | 1.65 |
| **Overall** | | | |
| LMR | 136-174 | 3.59 | 1.52 |
| WLAN 2.4 GHz | 2412 - 2462 | 0.106 | 0.081 |
| WLAN 5 GHz | 5180 - 5825 | 0.177 | 0.130 |
| BT | 2402 - 2480 | NA | NA |
| Highest Simultaneous Transmission SAR | Sum of SAR (W/kg) | 3.77 | 1.65 |

All results are scaled to the maximum output power.

The test results clearly demonstrate compliance with FCC Occupational/Controlled Environment RF Exposure limits of 8 W/kg averaged over 1 gram per the requirements of FCC 47 CFR § 2.1093 and RSS-102 (Issue 6).

## 19.0 Variability Assessment

Per the guidelines in KDB 865664 SAR variability assessment is not required because SAR results are below 4.0W/kg (Occupational).

## 18.0 System Uncertainty

A system uncertainty analysis is not required for this report per KDB 865664 because the highest report SAR value for Occupational exposure is less than 7.5W/kg.

Per the guidelines of ISO/IEC 17025 a reported system uncertainty is required and therefore measurement uncertainty budget is included in Appendix A.

# Appendix A

## Measurement Uncertainty Budget

# Uncertainty Budget for System Validation (dipole & flat phantom) for 150 MHz

| *a* | *b* | *c* | *d* | *e = f(d,k)* | *f* | *g* | *h = c x f / e* | *i = c x g / e* | *k* |
|---|---|---|---|---|---|---|---|---|---|
| **Uncertainty Component** | **IEEE 1528 section** | **Tol. (± %)** | **Prob. Dist.** | **Div.** | **$c_i$ (1 g)** | **$c_i$ (10 g)** | **1 g $u_i$ (±%)** | **10 g $u_i$ (±%)** | **$v_i$** |
| **Measurement System** | | | | | | | | | |
| Probe Calibration | E.2.1 | 6.7 | N | 1.00 | 1 | 1 | 6.7 | 6.7 | ∞ |
| Axial Isotropy | E.2.2 | 4.7 | R | 1.73 | 1 | 1 | 2.7 | 2.7 | ∞ |
| Spherical Isotropy | E.2.2 | 9.6 | R | 1.73 | 0 | 0 | 0.0 | 0.0 | ∞ |
| Boundary Effect | E.2.3 | 1.0 | R | 1.73 | 1 | 1 | 0.6 | 0.6 | ∞ |
| Linearity | E.2.4 | 4.7 | R | 1.73 | 1 | 1 | 2.7 | 2.7 | ∞ |
| System Detection Limits | E.2.5 | 1.0 | R | 1.73 | 1 | 1 | 0.6 | 0.6 | ∞ |
| Readout Electronics | E.2.6 | 0.3 | N | 1.00 | 1 | 1 | 0.3 | 0.3 | ∞ |
| Response Time | E.2.7 | 1.1 | R | 1.73 | 1 | 1 | 0.6 | 0.6 | ∞ |
| Integration Time | E.2.8 | 0.0 | R | 1.73 | 1 | 1 | 0.0 | 0.0 | ∞ |
| RF Ambient Conditions - Noise | E.6.1 | 3.0 | R | 1.73 | 1 | 1 | 1.7 | 1.7 | ∞ |
| RF Ambient Conditions - Reflections | E.6.1 | 0.0 | R | 1.73 | 1 | 1 | 0.0 | 0.0 | ∞ |
| Probe Positioner Mechanical Tolerance | E.6.2 | 0.4 | R | 1.73 | 1 | 1 | 0.2 | 0.2 | ∞ |
| Probe Positioning w.r.t. Phantom | E.6.3 | 1.4 | R | 1.73 | 1 | 1 | 0.8 | 0.8 | ∞ |
| Max. SAR Evaluation (ext., int., avg.) | E.5 | 3.4 | R | 1.73 | 1 | 1 | 2.0 | 2.0 | ∞ |
| **Dipole** | | | | | | | | | |
| Dipole Axis to Liquid Distance | 8, E.4.2 | 2.0 | R | 1.73 | 1 | 1 | 1.2 | 1.2 | ∞ |
| Input Power and SAR Drift Measurement | 8, 6.6.2 | 5.0 | R | 1.73 | 1 | 1 | 2.9 | 2.9 | ∞ |
| **Phantom and Tissue Parameters** | | | | | | | | | |
| Phantom Uncertainty | E.3.1 | 4.0 | R | 1.73 | 1 | 1 | 2.3 | 2.3 | ∞ |
| Liquid Conductivity (target) | E.3.2 | 5.0 | R | 1.73 | 0.64 | 0.43 | 1.8 | 1.2 | ∞ |
| Liquid Conductivity (measurement) | E.3.3 | 3.3 | R | 1.73 | 0.64 | 0.43 | 1.2 | 0.8 | ∞ |
| Liquid Permittivity (target) | E.3.2 | 5.0 | R | 1.73 | 0.6 | 0.49 | 1.7 | 1.4 | ∞ |
| Liquid Permittivity (measurement) | E.3.3 | 1.9 | R | 1.73 | 0.6 | 0.49 | 0.6 | 0.5 | ∞ |
| **Combined Standard Uncertainty** | | | RSS | | | | 10 | 9 | 99999 |
| **Expanded Uncertainty** (95% CONFIDENCE LEVEL) | | | *k*=2 | | | | 19 | 18 | |

Notes for uncertainty budget Tables:
a) Column headings *a-k* are given for reference.
b) Tol. - tolerance in influence quantity.
c) Prob. Dist. – Probability distribution
d) N, R - normal, rectangular probability distributions
e) Div. - divisor used to translate tolerance into normally distributed standard uncertainty
f) *ci* - sensitivity coefficient that should be applied to convert the variability of the uncertainty component into a variability of SAR.
g) *ui* – SAR uncertainty
h) *vi* - degrees of freedom for standard uncertainty and effective degrees of freedom for the expanded uncertainty

# Uncertainty Budget for System Validation (dipole & flat phantom) for 800 MHz to 3 GHz

| *a* | *b* | *c* | *d* | *e = f(d,k)* | *f* | *g* | *h = c x f / e* | *i = c x g / e* | *k* |
|---|---|---|---|---|---|---|---|---|---|
| **Uncertainty Component** | **IEEE 1528 section** | **Tol. (± %)** | **Prob. Dist.** | **Div.** | **$c_i$ (1 g)** | **$c_i$ (10 g)** | **1 g $u_i$ (±%)** | **10 g $u_i$ (±%)** | **$v_i$** |
| **Measurement System** | | | | | | | | | |
| Probe Calibration | E.2.1 | 6.0 | N | 1.00 | 1 | 1 | 6.0 | 6.0 | ∞ |
| Axial Isotropy | E.2.2 | 4.7 | R | 1.73 | 1 | 1 | 2.7 | 2.7 | ∞ |
| Spherical Isotropy | E.2.2 | 9.6 | R | 1.73 | 0 | 0 | 0.0 | 0.0 | ∞ |
| Boundary Effect | E.2.3 | 1.0 | R | 1.73 | 1 | 1 | 0.6 | 0.6 | ∞ |
| Linearity | E.2.4 | 4.7 | R | 1.73 | 1 | 1 | 2.7 | 2.7 | ∞ |
| System Detection Limits | E.2.5 | 1.0 | R | 1.73 | 1 | 1 | 0.6 | 0.6 | ∞ |
| Readout Electronics | E.2.6 | 0.3 | N | 1.00 | 1 | 1 | 0.3 | 0.3 | ∞ |
| Response Time | E.2.7 | 1.1 | R | 1.73 | 1 | 1 | 0.6 | 0.6 | ∞ |
| Integration Time | E.2.8 | 0.0 | R | 1.73 | 1 | 1 | 0.0 | 0.0 | ∞ |
| RF Ambient Conditions - Noise | E.6.1 | 3.0 | R | 1.73 | 1 | 1 | 1.7 | 1.7 | ∞ |
| RF Ambient Conditions - Reflections | E.6.1 | 0.0 | R | 1.73 | 1 | 1 | 0.0 | 0.0 | ∞ |
| Probe Positioner Mechanical Tolerance | E.6.2 | 0.4 | R | 1.73 | 1 | 1 | 0.2 | 0.2 | ∞ |
| Probe Positioning w.r.t. Phantom | E.6.3 | 1.4 | R | 1.73 | 1 | 1 | 0.8 | 0.8 | ∞ |
| Max. SAR Evaluation (ext., int., avg.) | E.5 | 3.4 | R | 1.73 | 1 | 1 | 2.0 | 2.0 | ∞ |
| **Dipole** | | | | | | | | | |
| Dipole Axis to Liquid Distance | 8, E.4.2 | 2.0 | R | 1.73 | 1 | 1 | 1.2 | 1.2 | ∞ |
| Input Power and SAR Drift Measurement | 8, 6.6.2 | 5.0 | R | 1.73 | 1 | 1 | 2.9 | 2.9 | ∞ |
| **Phantom and Tissue Parameters** | | | | | | | | | |
| Phantom Uncertainty | E.3.1 | 4.0 | R | 1.73 | 1 | 1 | 2.3 | 2.3 | ∞ |
| Liquid Conductivity (target) | E.3.2 | 5.0 | R | 1.73 | 0.64 | 0.43 | 1.8 | 1.2 | ∞ |
| Liquid Conductivity (measurement) | E.3.3 | 3.3 | R | 1.73 | 0.64 | 0.43 | 1.2 | 0.8 | ∞ |
| Liquid Permittivity (target) | E.3.2 | 5.0 | R | 1.73 | 0.6 | 0.49 | 1.7 | 1.4 | ∞ |
| Liquid Permittivity (measurement) | E.3.3 | 1.9 | R | 1.73 | 0.6 | 0.49 | 0.6 | 0.5 | ∞ |
| **Combined Standard Uncertainty** | | | RSS | | | | 9 | 9 | 99999 |
| **Expanded Uncertainty** (95% CONFIDENCE LEVEL) | | | *k*=2 | | | | 18 | 17 | |

Notes for uncertainty budget Tables:

a) Column headings *a-k* are given for reference.

b) Tol. - tolerance in influence quantity.

c) Prob. Dist. – Probability distribution

d) N, R - normal, rectangular probability distributions

e) Div. - divisor used to translate tolerance into normally distributed standard uncertainty

f) *ci* - sensitivity coefficient that should be applied to convert the variability of the uncertainty component into a variability of SAR.

g) *ui* – SAR uncertainty

h) *vi* - degrees of freedom for standard uncertainty and effective degrees of freedom for the expanded uncertainty

# Uncertainty Budget for System Validation (dipole & flat phantom) for 3 to 6 GHz

| *a* | *b* | *c* | *d* | *e = f(d,k)* | *f* | *g* | *h = c x f / e* | *i = c x g / e* | *k* |
|---|---|---|---|---|---|---|---|---|---|
| **Uncertainty Component** | **IEEE 1528 section** | **Tol. (± %)** | **Prob. Dist.** | **Div.** | **$c_i$ (1 g)** | **$c_i$ (10 g)** | **1 g $u_i$ (±%)** | **10 g $u_i$ (±%)** | **$v_i$** |
| **Measurement System** | | | | | | | | | |
| Probe Calibration | E.2.1 | 7.0 | N | 1.00 | 1 | 1 | 7.0 | 7.0 | ∞ |
| Axial Isotropy | E.2.2 | 4.7 | R | 1.73 | 1 | 1 | 2.7 | 2.7 | ∞ |
| Spherical Isotropy | E.2.2 | 9.6 | R | 1.73 | 0 | 0 | 0.0 | 0.0 | ∞ |
| Boundary Effect | E.2.3 | 2.0 | R | 1.73 | 1 | 1 | 1.2 | 1.2 | ∞ |
| Linearity | E.2.4 | 4.7 | R | 1.73 | 1 | 1 | 2.7 | 2.7 | ∞ |
| System Detection Limits | E.2.5 | 1.0 | R | 1.73 | 1 | 1 | 0.6 | 0.6 | ∞ |
| Readout Electronics | E.2.6 | 0.3 | N | 1.00 | 1 | 1 | 0.3 | 0.3 | ∞ |
| Response Time | E.2.7 | 1.1 | R | 1.73 | 1 | 1 | 0.6 | 0.6 | ∞ |
| Integration Time | E.2.8 | 0.0 | R | 1.73 | 1 | 1 | 0.0 | 0.0 | ∞ |
| RF Ambient Conditions - Noise | E.6.1 | 3.0 | R | 1.73 | 1 | 1 | 1.7 | 1.7 | ∞ |
| RF Ambient Conditions - Reflections | E.6.1 | 0.0 | R | 1.73 | 1 | 1 | 0.0 | 0.0 | ∞ |
| Probe Positioner Mechanical Tolerance | E.6.2 | 1.0 | R | 1.73 | 1 | 1 | 0.6 | 0.6 | ∞ |
| Probe Positioning w.r.t. Phantom | E.6.3 | 4.0 | R | 1.73 | 1 | 1 | 2.3 | 2.3 | ∞ |
| Max. SAR Evaluation (ext., int., avg.) | E.5 | 2.1 | R | 1.73 | 1 | 1 | 1.2 | 1.2 | ∞ |
| **Dipole** | | | | | | | | | |
| Dipole Axis to Liquid Distance | 8, E.4.2 | 2.0 | R | 1.73 | 1 | 1 | 1.2 | 1.2 | ∞ |
| Input Power and SAR Drift Measurement | 8, 6.6.2 | 5.0 | R | 1.73 | 1 | 1 | 2.9 | 2.9 | ∞ |
| **Phantom and Tissue Parameters** | | | | | | | | | |
| Phantom Uncertainty | E.3.1 | 4.0 | R | 1.73 | 1 | 1 | 2.3 | 2.3 | ∞ |
| Dielectric Parameter Correction | -- | 1.4 | N | 1.00 | 1 | 0.79 | 1.4 | 1.1 | ∞ |
| Liquid Conductivity (measurement) | E.3.3 | 3.3 | R | 1.73 | 0.64 | 0.43 | 1.2 | 0.8 | ∞ |
| Liquid Permittivity (measurement) | E.3.3 | 1.9 | R | 1.73 | 0.6 | 0.49 | 0.6 | 0.5 | ∞ |
| **Combined Standard Uncertainty** | | | RSS | | | | 10 | 10 | 99999 |
| **Expanded Uncertainty** (95% CONFIDENCE LEVEL) | | | *k*=2 | | | | 19 | 19 | |

Notes for uncertainty budget Tables:

a) Column headings *a-k* are given for reference.

b) Tol. - tolerance in influence quantity.

c) Prob. Dist. – Probability distribution

d) N, R - normal, rectangular probability distributions

e) Div. - divisor used to translate tolerance into normally distributed standard uncertainty

f) *ci* - sensitivity coefficient that should be applied to convert the variability of the uncertainty component into a variability of SAR.

g) *ui* – SAR uncertainty

h) *vi* - degrees of freedom for standard uncertainty and effective degrees of freedom for the expanded uncertainty

# Uncertainty Budget for Device Under Test, for 100 MHz to 800 MHz

| *a* | *b* | *c* | *d* | *e* = *f(d,k)* | *f* | *g* | *h* = *c* x *f* / *e* | *i* = *c* x *g* / *e* | *k* |
|---|---|---|---|---|---|---|---|---|---|
| **Uncertainty Component** | **IEEE 1528 section** | **Tol. (± %)** | **Prob Dist** | **Div.** | **$c_i$ (1 g)** | **$c_i$ (10 g)** | **1 g $u_i$ (±%)** | **10 g $u_i$ (±%)** | **$v_i$** |
| **Measurement System** | | | | | | | | | |
| Probe Calibration | E.2.1 | 6.7 | N | 1.00 | 1 | 1 | 6.7 | 6.7 | ∞ |
| Axial Isotropy | E.2.2 | 4.7 | R | 1.73 | 0.707 | 0.707 | 1.9 | 1.9 | ∞ |
| Hemispherical Isotropy | E.2.2 | 9.6 | R | 1.73 | 0.707 | 0.707 | 3.9 | 3.9 | ∞ |
| Boundary Effect | E.2.3 | 1.0 | R | 1.73 | 1 | 1 | 0.6 | 0.6 | ∞ |
| Linearity | E.2.4 | 4.7 | R | 1.73 | 1 | 1 | 2.7 | 2.7 | ∞ |
| System Detection Limits | E.2.5 | 1.0 | R | 1.73 | 1 | 1 | 0.6 | 0.6 | ∞ |
| Readout Electronics | E.2.6 | 0.3 | N | 1.00 | 1 | 1 | 0.3 | 0.3 | ∞ |
| Response Time | E.2.7 | 1.1 | R | 1.73 | 1 | 1 | 0.6 | 0.6 | ∞ |
| Integration Time | E.2.8 | 1.1 | R | 1.73 | 1 | 1 | 0.6 | 0.6 | ∞ |
| RF Ambient Conditions - Noise | E.6.1 | 3.0 | R | 1.73 | 1 | 1 | 1.7 | 1.7 | ∞ |
| RF Ambient Conditions - Reflections | E.6.1 | 0.0 | R | 1.73 | 1 | 1 | 0.0 | 0.0 | ∞ |
| Probe Positioner Mech. Tolerance | E.6.2 | 0.4 | R | 1.73 | 1 | 1 | 0.2 | 0.2 | ∞ |
| Probe Positioning w.r.t Phantom | E.6.3 | 1.4 | R | 1.73 | 1 | 1 | 0.8 | 0.8 | ∞ |
| Max. SAR Evaluation (ext., int., avg.) | E.5 | 3.4 | R | 1.73 | 1 | 1 | 2.0 | 2.0 | ∞ |
| **Test sample Related** | | | | | | | | | |
| Test Sample Positioning | E.4.2 | 3.2 | N | 1.00 | 1 | 1 | 3.2 | 3.2 | 29 |
| Device Holder Uncertainty | E.4.1 | 4.0 | N | 1.00 | 1 | 1 | 4.0 | 4.0 | 8 |
| SAR drift | 6.6.2 | 5.0 | R | 1.73 | 1 | 1 | 2.9 | 2.9 | ∞ |
| **Phantom and Tissue Parameters** | | | | | | | | | |
| Phantom Uncertainty | E.3.1 | 4.0 | R | 1.73 | 1 | 1 | 2.3 | 2.3 | ∞ |
| Liquid Conductivity (target) | E.3.2 | 5.0 | R | 1.73 | 0.64 | 0.43 | 1.8 | 1.2 | ∞ |
| Liquid Conductivity (measurement) | E.3.3 | 3.3 | N | 1.00 | 0.64 | 0.43 | 2.1 | 1.4 | ∞ |
| Liquid Permittivity (target) | E.3.2 | 5.0 | R | 1.73 | 0.6 | 0.49 | 1.7 | 1.4 | ∞ |
| Liquid Permittivity (measurement) | E.3.3 | 1.9 | N | 1.00 | 0.6 | 0.49 | 1.1 | 0.9 | ∞ |
| **Combined Standard Uncertainty** | | | RSS | | | | 12 | 11 | 482 |
| **Expanded Uncertainty** (95% CONFIDENCE LEVEL) | | | *k*=2 | | | | 23 | 23 | |

Notes for uncertainty budget Tables:
a) Column headings *a-k* are given for reference.
b) Tol. - tolerance in influence quantity.
c) Prob. Dist. – Probability distribution
d) N, R - normal, rectangular probability distributions
e) Div. - divisor used to translate tolerance into normally distributed standard uncertainty
f) *ci* - sensitivity coefficient that should be applied to convert the variability of the uncertainty component into a variability of SAR.
g) *ui* – SAR uncertainty
h) *vi* - degrees of freedom for standard uncertainty and effective degrees of freedom for the expanded uncertainty

# Uncertainty Budget for Device Under Test, for 800 MHz to 3 GHz

| *a* | *b* | *c* | *d* | *e = f(d,k)* | *f* | *g* | *h = c x f / e* | *i = c x g / e* | *k* |
|---|---|---|---|---|---|---|---|---|---|
| **Uncertainty Component** | **IEEE 1528 section** | **Tol. (± %)** | **Prob Dist** | **Div.** | **$c_i$ (1 g)** | **$c_i$ (10 g)** | **1 g $u_i$ (±%)** | **10 g $u_i$ (±%)** | **$v_i$** |
| **Measurement System** | | | | | | | | | |
| Probe Calibration | E.2.1 | 6.0 | N | 1.00 | 1 | 1 | 6.0 | 6.0 | ∞ |
| Axial Isotropy | E.2.2 | 4.7 | R | 1.73 | 0.707 | 0.707 | 1.9 | 1.9 | ∞ |
| Hemispherical Isotropy | E.2.2 | 9.6 | R | 1.73 | 0.707 | 0.707 | 3.9 | 3.9 | ∞ |
| Boundary Effect | E.2.3 | 1.0 | R | 1.73 | 1 | 1 | 0.6 | 0.6 | ∞ |
| Linearity | E.2.4 | 4.7 | R | 1.73 | 1 | 1 | 2.7 | 2.7 | ∞ |
| System Detection Limits | E.2.5 | 1.0 | R | 1.73 | 1 | 1 | 0.6 | 0.6 | ∞ |
| Readout Electronics | E.2.6 | 0.3 | N | 1.00 | 1 | 1 | 0.3 | 0.3 | ∞ |
| Response Time | E.2.7 | 1.1 | R | 1.73 | 1 | 1 | 0.6 | 0.6 | ∞ |
| Integration Time | E.2.8 | 1.1 | R | 1.73 | 1 | 1 | 0.6 | 0.6 | ∞ |
| RF Ambient Conditions - Noise | E.6.1 | 3.0 | R | 1.73 | 1 | 1 | 1.7 | 1.7 | ∞ |
| RF Ambient Conditions - Reflections | E.6.1 | 0.0 | R | 1.73 | 1 | 1 | 0.0 | 0.0 | ∞ |
| Probe Positioner Mech. Tolerance | E.6.2 | 0.4 | R | 1.73 | 1 | 1 | 0.2 | 0.2 | ∞ |
| Probe Positioning w.r.t Phantom | E.6.3 | 1.4 | R | 1.73 | 1 | 1 | 0.8 | 0.8 | ∞ |
| Max. SAR Evaluation (ext., int., avg.) | E.5 | 3.4 | R | 1.73 | 1 | 1 | 2.0 | 2.0 | ∞ |
| **Test sample Related** | | | | | | | | | |
| Test Sample Positioning | E.4.2 | 3.2 | N | 1.00 | 1 | 1 | 3.2 | 3.2 | 29 |
| Device Holder Uncertainty | E.4.1 | 4.0 | N | 1.00 | 1 | 1 | 4.0 | 4.0 | 8 |
| SAR drift | 6.6.2 | 5.0 | R | 1.73 | 1 | 1 | 2.9 | 2.9 | ∞ |
| **Phantom and Tissue Parameters** | | | | | | | | | |
| Phantom Uncertainty | E.3.1 | 4.0 | R | 1.73 | 1 | 1 | 2.3 | 2.3 | ∞ |
| Liquid Conductivity (target) | E.3.2 | 5.0 | R | 1.73 | 0.64 | 0.43 | 1.8 | 1.2 | ∞ |
| Liquid Conductivity (measurement) | E.3.3 | 3.3 | N | 1.00 | 0.64 | 0.43 | 2.1 | 1.4 | ∞ |
| Liquid Permittivity (target) | E.3.2 | 5.0 | R | 1.73 | 0.6 | 0.49 | 1.7 | 1.4 | ∞ |
| Liquid Permittivity (measurement) | E.3.3 | 1.9 | N | 1.00 | 0.6 | 0.49 | 1.1 | 0.9 | ∞ |
| **Combined Standard Uncertainty** | | | RSS | | | | 11 | 11 | 419 |
| **Expanded Uncertainty** (95% CONFIDENCE LEVEL) | | | *k*=2 | | | | 22 | 22 | |

Notes for uncertainty budget Tables:
a) Column headings *a-k* are given for reference.
b) Tol. - tolerance in influence quantity.
c) Prob. Dist. – Probability distribution
d) N, R - normal, rectangular probability distributions
e) Div. - divisor used to translate tolerance into normally distributed standard uncertainty
f) *ci* - sensitivity coefficient that should be applied to convert the variability of the uncertainty component into a variability of SAR.
g) *ui* – SAR uncertainty
h) *vi* - degrees of freedom for standard uncertainty and effective degrees of freedom for the expanded uncertainty

# Uncertainty Budget for Device Under Test, for 3 to 6 GHz

| *a* | *b* | *c* | *d* | *e = f(d,k)* | *f* | *g* | *h = c x f / e* | *i = c x g / e* | *k* |
|---|---|---|---|---|---|---|---|---|---|
| **Uncertainty Component** | **IEEE 1528 section** | **Tol. (± %)** | **Prob Dist** | **Div.** | **$c_i$ (1 g)** | **$c_i$ (10 g)** | **1 g $u_i$ (±%)** | **10 g $u_i$ (±%)** | **$v_i$** |
| **Measurement System** | | | | | | | | | |
| Probe Calibration | E.2.1 | 7.0 | N | 1.00 | 1 | 1 | 7.0 | 7.0 | ∞ |
| Axial Isotropy | E.2.2 | 4.7 | R | 1.73 | 0.707 | 0.707 | 1.9 | 1.9 | ∞ |
| Hemispherical Isotropy | E.2.2 | 9.6 | R | 1.73 | 0.707 | 0.707 | 3.9 | 3.9 | ∞ |
| Boundary Effect | E.2.3 | 2.0 | R | 1.73 | 1 | 1 | 1.2 | 1.2 | ∞ |
| Linearity | E.2.4 | 4.7 | R | 1.73 | 1 | 1 | 2.7 | 2.7 | ∞ |
| System Detection Limits | E.2.5 | 1.0 | R | 1.73 | 1 | 1 | 0.6 | 0.6 | ∞ |
| Readout Electronics | E.2.6 | 0.3 | N | 1.00 | 1 | 1 | 0.3 | 0.3 | ∞ |
| Response Time | E.2.7 | 1.1 | R | 1.73 | 1 | 1 | 0.6 | 0.6 | ∞ |
| Integration Time | E.2.8 | 1.1 | R | 1.73 | 1 | 1 | 0.6 | 0.6 | ∞ |
| RF Ambient Conditions - Noise | E.6.1 | 3.0 | R | 1.73 | 1 | 1 | 1.7 | 1.7 | ∞ |
| RF Ambient Conditions - Reflections | E.6.1 | 0.0 | R | 1.73 | 1 | 1 | 0.0 | 0.0 | ∞ |
| Probe Positioner Mech. Tolerance | E.6.2 | 1.0 | R | 1.73 | 1 | 1 | 0.6 | 0.6 | ∞ |
| Probe Positioning w.r.t Phantom | E.6.3 | 4.0 | R | 1.73 | 1 | 1 | 2.3 | 2.3 | ∞ |
| Max. SAR Evaluation (ext., int., avg.) | E.5 | 2.1 | R | 1.73 | 1 | 1 | 1.2 | 1.2 | ∞ |
| **Test sample Related** | | | | | | | | | |
| Test Sample Positioning | E.4.2 | 3.2 | N | 1.00 | 1 | 1 | 3.2 | 3.2 | 29 |
| Device Holder Uncertainty | E.4.1 | 4.0 | N | 1.00 | 1 | 1 | 4.0 | 4.0 | 8 |
| SAR drift | 6.6.2 | 5.0 | R | 1.73 | 1 | 1 | 2.9 | 2.9 | ∞ |
| **Phantom and Tissue Parameters** | | | | | | | | | |
| Phantom Uncertainty | E.3.1 | 4.0 | R | 1.73 | 1 | 1 | 2.3 | 2.3 | ∞ |
| Dielectric Parameter Correction | -- | 1.4 | N | 1.00 | 1 | 0.79 | 1.4 | 1.1 | ∞ |
| Liquid Conductivity (measurement) | E.3.3 | 3.3 | N | 1.00 | 0.64 | 0.43 | 2.1 | 1.4 | ∞ |
| Liquid Permittivity (measurement) | E.3.3 | 1.9 | N | 1.00 | 0.6 | 0.49 | 1.1 | 0.9 | ∞ |
| **Combined Standard Uncertainty** | | | RSS | | | | 12 | 12 | 504 |
| **Expanded Uncertainty** (95% CONFIDENCE LEVEL) | | | *k*=2 | | | | 23 | 23 | |

Notes for uncertainty budget Tables:
a) Column headings *a-k* are given for reference.
b) Tol. - tolerance in influence quantity.
c) Prob. Dist. – Probability distribution
d) N, R - normal, rectangular probability distributions
e) Div. - divisor used to translate tolerance into normally distributed standard uncertainty
f) *ci* - sensitivity coefficient that should be applied to convert the variability of the uncertainty component into a variability of SAR.
g) *ui* – SAR uncertainty
h) *vi* - degrees of freedom for standard uncertainty and effective degrees of freedom for the expanded uncertainty