

 MOTOROLA SOLUTIONS	    SMM 826 CERTIFICATE 2518.05																																												
DECLARATION OF COMPLIANCE SAR ASSESSMENT Part 1 of 2																																													
Motorola Solutions Inc. EME Test Laboratory Motorola Solutions Malaysia Sdn Bhd Plot 2A, Medan Bayan Lepas, Mukim 12 SWD 11900 Bayan Lepas Penang, Malaysia.	Date of Report: 10/10/2024 Report Revision: B																																												
<table style="width: 100%; border: none;"> <tr> <td style="width: 30%;">Responsible Engineer:</td> <td>Yeng Yee Yeong (EME Engineer)</td> </tr> <tr> <td>Report Author:</td> <td>Yeng Yee Yeong (EME Engineer)</td> </tr> <tr> <td>Date/s Tested:</td> <td>7/18/2024-7/30/2024, 8/1/2024-8/2/2024, 8/5/2024-8/10/2024</td> </tr> <tr> <td>Manufacturer:</td> <td>Motorola Solutions Malaysia Sdn. Bhd.</td> </tr> <tr> <td>Manufacturer Location:</td> <td>Plot 2A, Medan Bayan Lepas Mukim, 12 SWD, 11900 Bayan Lepas, Penang, Malaysia</td> </tr> <tr> <td>DUT Description:</td> <td>Handheld Portable – 136-174 MHz 5W LKP DISPLAY BT/WIFI 136-174 MHz 5W NKP BT/WIFI</td> </tr> <tr> <td>Test TX mode(s):</td> <td>CW (PTT), WLAN 2.4GHz, WLAN 5GHz</td> </tr> <tr> <td>Max. Power output:</td> <td>Refer Table 3</td> </tr> <tr> <td>Tx Frequency Bands:</td> <td>Refer Table 3</td> </tr> <tr> <td>Signaling type:</td> <td>Refer Table 3</td> </tr> <tr> <td>Model(s) Tested:</td> <td>AAH07JDH9SA1AN, AAH07JDC9SA1AN</td> </tr> <tr> <td>Model(s) Certified:</td> <td>Refer 1.0 Introduction</td> </tr> <tr> <td>(HVIN/PMN)</td> <td></td> </tr> <tr> <td>Serial Number(s):</td> <td>651EAK0077, 651EAK0149, 651EAK0065, 174EAK0333, 174EAK0325</td> </tr> <tr> <td>Classification:</td> <td>Occupational/Controlled Environment</td> </tr> <tr> <td>Applicant Name:</td> <td>Motorola Solutions Inc.</td> </tr> <tr> <td>Applicant Address:</td> <td>Plot 2A, Medan Bayan Lepas Mukim, 12 SWD, 11900 Bayan Lepas, Penang, Malaysia</td> </tr> <tr> <td>Firmware Version (FVIN):</td> <td>B02.25.01.0019</td> </tr> <tr> <td>FCC ID:</td> <td>AZ489FT7181 This report contains results that are immaterial for FCC equipment approval, which are clearly identified.</td> </tr> <tr> <td>FCC Test Firm Registration Number:</td> <td>823256</td> </tr> <tr> <td>IC:</td> <td>109U-89FT7181 This report contains results that are immaterial for ISED equipment approval, which are clearly identified.</td> </tr> <tr> <td>ISED Test Site registration:</td> <td>24843</td> </tr> </table> 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.		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 – 136-174 MHz 5W LKP DISPLAY BT/WIFI 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:	Refer 1.0 Introduction	(HVIN/PMN)		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 This report contains results that are immaterial for FCC equipment approval, which are clearly identified.	FCC Test Firm Registration Number:	823256	IC:	109U-89FT7181 This report contains results that are immaterial for ISED equipment approval, which are clearly identified.	ISED Test Site registration:	24843
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- E DUT Scans
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- 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 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 (Other Channels) UNII-2A: 0.0631 (Other Channels) UNII-2A: 0.0501 (CH64) UNII-2C: 0.0316 (Other Channels) UNII-2C: 0.0200 (CH 100) UNII-3: 0.0316
802.11 n (20 MHz)	5180 - 5825	OFDM	97.97	UNII-1: 0.0631 (Other Channels) UNII-1: 0.0501 (CH36) UNII-2A: 0.0631 (Other Channels) UNII-2A: 0.0398 (CH64) UNII-2C: 0.0316 (Other Channels) UNII-2C: 0.0251 (CH 100) UNII-3: 0.0316
802.11 ac (20 MHz)	5180 - 5825	OFDM	97.97	UNII-1: 0.0631 (Other Channels) UNII-1: 0.0501 (CH36) UNII-2A: 0.0631 (Other Channels) UNII-2A: 0.0398 (CH64) UNII-2C: 0.0316 (Other Channels) UNII-2C: 0.0251 (CH 100) 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) 0.0355 (CH6 & 11)
WLAN 802.11 n	2412-2462	OFDM	98.01	0.0166 (CH1) 0.0376 (CH6 & 11)
802.11 a (20 MHz)	5180 - 5825	OFDM	97.01	UNII-1: 0.0432 (CH36) UNII-1: 0.0537 (CH40, 44 & 48) UNII-2A: 0.0631 (Other Channels) UNII-2A: 0.0339 (CH64) UNII-2C: 0.0316 (Other Channels) UNII-2C: 0.0110 (CH 100) UNII-2C: 0.0200 (CH 140) UNII-3: 0.0316
802.11 n (20 MHz)	5180 - 5825	OFDM	97.97	UNII-1: 0.0355 (CH36) UNII-1: 0.0537 (CH40, 44 & 48) UNII-2A: 0.0631 (Other Channels) UNII-2A: 0.0282 (CH64) UNII-2C: 0.0316 (Other Channels) UNII-2C: 0.0093 (CH 100) UNII-2C: 0.0200 (CH 140) 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) UNII-1: 0.0537 (CH40, 44 & 48) UNII-2A: 0.0631 (Other Channels) UNII-2A: 0.0282 (CH64) UNII-2C: 0.0316 (Other Channels) UNII-2C: 0.0093 (CH 100) UNII-2C: 0.0200 (CH 140) 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 GNSS: 1560- 1610MHz, ¼ wave, 2.4dBi BT/BTLE/WLAN 2.4GHz: 2400- 2485MHz, ¼ wave, 3dBi WLAN 5GHz: 5150-5250MHz, ¼ wave, 3.17dBi WLAN 5GHz: 5250-5725MHz, ¼ wave, 6dBi 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	ϵ_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 $\pm 2^{\circ}\text{C}$ 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 Avg. 21.7 °C
Tissue Temperature	18 – 25 °C	Range: 19.7-22.8°C 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	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location		$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
Maximum area scan spatial resolution: Δx_{Area} , Δy_{Area}		≤ 2 GHz: ≤ 15 mm $2 - 3$ GHz: ≤ 12 mm	$3 - 4$ GHz: ≤ 12 mm $4 - 6$ GHz: ≤ 10 mm
		When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\leq$ 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: Δx_{Zoom} , Δy_{Zoom}		≤ 2 GHz: ≤ 8 mm $2 - 3$ GHz: ≤ 5 mm*	$3 - 4$ GHz: ≤ 5 mm* $4 - 6$ GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$	≤ 5 mm	$3 - 4$ GHz: ≤ 4 mm $4 - 5$ GHz: ≤ 3 mm $5 - 6$ 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. * 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.

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

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:

$$\text{Max_Calc} = \text{SAR_meas} \cdot 10^{\frac{-\text{Drift}}{10}} \cdot \frac{P_{\text{max}}}{P_{\text{int}}} \cdot \text{DC}$$

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 $P_{\text{int}} > P_{\text{max}}$, then $P_{\text{max}}/P_{\text{int}} = 1$.

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:

- For 2.4GHz 802.11 g/n SAR testing is not required when the 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.
- U-NII-1 SAR testing not required when U-NII-2A band highest reported SAR for a test configuration is ≤ 1.2 W/kg.
- For all positions/configurations, when reported SAR is > 0.8 W/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;

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] * [\sqrt{F_{(\text{GHz})}}] = 2.9$, 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 $\leq 50\text{mm}$:

$$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] * [\sqrt{F(\text{GHz})/X}] = 0.39\text{W/kg, which is } \leq 0.4 \text{ W/kg (1g)}$$

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

<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	$e = f(d,k)$	<i>f</i>	<i>g</i>	$h = c \times f / e$	$i = c \times g / e$	<i>k</i>
Uncertainty Component	IEEE 1528 section	Tol. (± %)	Prob. Dist.	Div.	<i>c_i</i> (1 g)	<i>c_i</i> (10 g)	1 g <i>u_i</i> (±%)	10 g <i>u_i</i> (±%)	<i>v_i</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)			<i>k</i> =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) *c_i* - sensitivity coefficient that should be applied to convert the variability of the uncertainty component into a variability of SAR.
- g) *u_i* – SAR uncertainty
- h) *v_i* - 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

<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i> = <i>f</i> (<i>d</i> , <i>k</i>)	<i>f</i>	<i>g</i>	<i>h</i> = <i>c</i> × <i>f</i> / <i>e</i>	<i>i</i> = <i>c</i> × <i>g</i> / <i>e</i>	<i>k</i>
Uncertainty Component	IEEE 1528 section	Tol. (± %)	Prob. Dist.	Div.	<i>c_i</i> (1 g)	<i>c_i</i> (10 g)	1 g <i>u_i</i> (±%)	10 g <i>u_i</i> (±%)	<i>v_i</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)			<i>k</i> =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) *c_i* - sensitivity coefficient that should be applied to convert the variability of the uncertainty component into a variability of SAR.

g) *u_i* – SAR uncertainty

h) *v_i* - 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

<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i> = <i>f</i> (<i>d</i> , <i>k</i>)	<i>f</i>	<i>g</i>	<i>h</i> = <i>c</i> × <i>f</i> / <i>e</i>	<i>i</i> = <i>c</i> × <i>g</i> / <i>e</i>	<i>k</i>
Uncertainty Component	IEEE 1528 section	Tol. (± %)	Prob. Dist.	Div.	<i>c_i</i> (1 g)	<i>c_i</i> (10 g)	1 g <i>u_i</i> (±%)	10 g <i>u_i</i> (±%)	<i>v_i</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)			<i>k</i> =2				19	19	

Notes for uncertainty budget Tables:

- Column headings *a-k* are given for reference.
- Tol. - tolerance in influence quantity.
- Prob. Dist. – Probability distribution
- N, R - normal, rectangular probability distributions
- Div. - divisor used to translate tolerance into normally distributed standard uncertainty
- c_i* - sensitivity coefficient that should be applied to convert the variability of the uncertainty component into a variability of SAR.
- u_i* – SAR uncertainty
- v_i* - 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

<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i> = <i>f</i> (<i>d</i> , <i>k</i>)	<i>f</i>	<i>g</i>	<i>h</i> = <i>c</i> × <i>f</i> / <i>e</i>	<i>i</i> = <i>c</i> × <i>g</i> / <i>e</i>	<i>k</i>
Uncertainty Component	IEEE 1528 section	Tol. (± %)	Prob Dist	Div.	<i>c_i</i> (1 g)	<i>c_i</i> (10 g)	1 g <i>u_i</i> (±%)	10 g <i>u_i</i> (±%)	<i>v_i</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)			<i>k</i> =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) *c_i* - sensitivity coefficient that should be applied to convert the variability of the uncertainty component into a variability of SAR.

g) *u_i* – SAR uncertainty

h) *v_i* - 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

<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i> = <i>f</i> (<i>d</i> , <i>k</i>)	<i>f</i>	<i>g</i>	<i>h</i> = <i>c</i> × <i>f</i> / <i>e</i>	<i>i</i> = <i>c</i> × <i>g</i> / <i>e</i>	<i>k</i>
Uncertainty Component	IEEE 1528 section	Tol. (± %)	Prob Dist	Div.	<i>c_i</i> (1 g)	<i>c_i</i> (10 g)	1 g <i>u_i</i> (±%)	10 g <i>u_i</i> (±%)	<i>v_i</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)			<i>k</i> =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) *c_i* - sensitivity coefficient that should be applied to convert the variability of the uncertainty component into a variability of SAR.

g) *u_i* – SAR uncertainty

h) *v_i* - 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

<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i> = <i>f</i> (<i>d</i> , <i>k</i>)	<i>f</i>	<i>g</i>	<i>h</i> = <i>c</i> × <i>f</i> / <i>e</i>	<i>i</i> = <i>c</i> × <i>g</i> / <i>e</i>	<i>k</i>
Uncertainty Component	IEEE 1528 section	Tol. (± %)	Prob Dist	Div.	<i>c_i</i> (1 g)	<i>c_i</i> (10 g)	1 g <i>u_i</i> (±%)	10 g <i>u_i</i> (±%)	<i>v_i</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)			<i>k</i> =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) *c_i* - sensitivity coefficient that should be applied to convert the variability of the uncertainty component into a variability of SAR.

g) *u_i* – SAR uncertainty

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