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
Plot 2A, Medan Bayan Lepas,
Mukim 12 SWD 11900 Bayan Lepas Penang, Malaysia.

Date of Report: **10/02/2024**
Report Revision: **A**

Responsible Engineer:	Puteri Alifah Ilyana Binti Nor Rahim (EME Engineer)
Report Author:	Puteri Alifah Ilyana Binti Nor Rahim (EME Engineer)
Date/s Tested:	07/31/2024-08/09/2024, 08/15/2024, 9/13/2024, 9/19/2024, 9/25/2024-9/28/2024
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 – 400-512 MHz 4W LKP DISPLAY BT/WIFI
Test TX mode(s):	CW (PTT), Bluetooth, WLAN 2.4GHz 802.11 b/g/n, WLAN 5.0GHz 802.11 a/n/ac
Max. Power output:	Refer table 4, 4a
Tx Frequency Bands:	Refer table 4, 4a
Signaling type:	Refer table 4, 4a
Model(s) Tested:	AAH07RDH9SA1AN
Model(s) Certified: (HVIN/PMN)	Refer 1.0 Introduction
Serial Number(s):	651EAP0064, 651EAP0071, 651EAP0038
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):	D02.25.01.0010
FCC ID:	AZ489FT7182 This report contains results that are immaterial for FCC equipment approval, which re-clearly identified.
FCC Test Firm Registration Number:	823256
IC:	109U-89FT7182 This report contains results that are immaterial for ISED equipment approval, which re-clearly identified.
ISED Test Site registration:	24843

The test results clearly demonstrate compliance with 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)

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: 10/09/2024

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
10/02/2024	A	Initial release

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 AAH07RDH9SA1AN. This device is classified as Occupational/Controlled and model certified is listed as below:

Table 1

Model	Hardware Version ID Number (HVIN)	Product Marketing Name (PMN)	Description
AAH07RDC9SA1AN	AAH07RDC9SA1AN	R5	400-512 MHz 4W NKP BT/WIFI
AAH07RDH9SA1AN	AAH07RDH9SA1AN	R5	400-512 MHz 4W LKP DISPLAY BT/WIFI
AAH07RDH9SA1AN-AMA2	AAH07RDH9SA1AN-AMA2	R5	400-512 MHz 4W LKP DISPLAY BT/WIFI

2.0 FCC SAR Summary

Table 2

Equipment Class	Frequency band (MHz)	Max Calc at Body (W/kg)	Max Calc at Face (W/kg)
		1g-SAR	1g-SAR
TNF	406.125-512 (LMR)	4.81	3.14
*DSS	2402-2480MHz (Bluetooth)	NA	NA
DTS	2402-2480MHz (WLAN 2.4GHz)	0.025	0.071
NII	5180-5825MHz (WLAN 5GHz)	0.081	0.140
**Simultaneous Results		4.89	3.28

*Results not required per KDB (refer to sections 15.0 and 18.1)

3.0 Abbreviations / Definitions

BT: Bluetooth
CNR: Calibration Not Required
CW: Continuous Wave
DSS Part 15 Spread Spectrum Transmitter
DUT: Device Under Test
DTS Digital Transmission System
EME: Electromagnetic Energy
FHSS: Frequency Hopping Spread Spectrum
FM: Frequency Modulation
LMR: Land Mobile Radio
NA: Not Applicable
PTT: Push to Talk

RSM: Remote Speaker Microphone
SAR: Specific Absorption Rate
TNF: Licensed Non-Broadcast Transmitter Held to Face

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)
- 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
- FCC KDB - 648474 D04 Handset SAR v01r03

5.0 SAR Limits

Table 3

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). 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 4 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 4

Technology	Transmit Band (MHz)	Transmission	Duty Cycle (%)	Conducted (Average Detector) Maximum Power (W)
LMR	400-527	FM	50*	4.80
Bluetooth	2402 - 2480	FHSS	77	0.0120
Bluetooth LE (1M)			62.47	0.0089
Bluetooth LE (2M)			33.64	0.0089
802.11 b	2412 - 2462	DSSS, OFDM	802.11b - 98.88 802.11g - 96.88 802.11n- 98.01	0.0562
802.11 g				
802.11 n				
802.11 a (20 MHz)	5180 - 5825	OFDM	97.01	UNII-1: 0.0631 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 2.5cm 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 802.11g & n, and for WLAN 5GHz 802.11a & n were reduced as shown in Table 4a, SAR test was already conducted at the higher power level, hence it was not impacted.

Table 4a

Technology	Transmit Band (MHz)	Transmission	Duty Cycle (%)	Conducted (Average Detector) Maximum Power (W)
WLAN 802.11 g	2412-2462	OFDM	96.88	0.0248 (CH1)
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: 0.0347 (CH36), UNII-1: 0.0537 (CH40, 44 & 48) UNII-2A: 0.0331 (CH64) UNII-2C: 0.0107 (CH 100)
802.11 n & ac (20 MHz)	5180 - 5825	OFDM	97.97	UNII-1: 0.0457 (CH36), UNII-1: 0.0537 (CH40, 44 & 48) UNII-2A: 0.0275 (CH64) UNII-2C: 0.0115 (CH 100)

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 5

Antenna No.	Antenna Models	Description	Selected for test	Tested
1	AN000348A01	Antenna, Stubby, 400-527MHz, 90mm, ¼ wave, Ferrule, 0 dBi	Yes	Yes
2	AN000389A01	Antenna, Chip, GNSS/BT/Wifi Antenna Module GNSS: 1560-1610MHz, ¼ wave, 3.4dBi, BT/BTLE/WLAN 2.4GHz: 2400-2485MHz, ¼ wave, 1.5dBi, WLAN 5GHz: 5150-5250MHz, ¼ wave, 3.4 dBi, 5250-5725MHz, ¼ wave, 5dBi, 5725-5850MHz, ¼ wave, 2.2 dBi	Yes	Yes
3	PMAE4069A	Antenna, Stamped Metal, UHF Stubby ¼ wave, Antenna 400 - 450MHz, -1.5 dBi	Yes	Yes
4	PMAE4070A	UHF Stubby ¼ wave Antenna 440 - 490MHz, 0 dBi	Yes	Yes
5	PMAE4071A	UHF Stubby ¼ wave Antenna 470 - 527MHz, 0 dBi	Yes	Yes
6	PMAE4079A	Antenna, Stamped Metal, UHF Slim ¼ wave Whip Antenna 400 - 527MHz, 0.5 dBi	Yes	Yes

7.2 Battery

Table 6

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 7

Body worn No.	Body worn Models	Description	Selected for test	Tested	Comments
1	NTN5243A	Strap	Yes	Yes	Tested with PMLN8662A, PMLN8663A & PMLN8664A
2	PMLN8662A	Hard Leather Carry Case With 3.0 Inch Swivel Belt Loop (Limited Keypad)	Yes	Yes	.Tested without swivel belt loop and with NTN5243

Table 7 (Continued)

Body worn No.	Body worn Models	Description	Selected for test	Tested	Comments
3	PMLN8663A	Hard Leather Carry Case With 3.0 Inch Fixed Belt Loop (Limited Keypad)	Yes	Yes	Tested with NTN5243
4	PMLN8664A	Nylon Carry Case With 3.0 Inch Fixed Belt Loop (Limited Keypad)	Yes	Yes	Tested with NTN5243
5	PMLN8665A	Hard Leather Carry Case With 3.0 Inch Swivel Belt Loop (No Keypad)	No	No	By Similarity to PMLN8662A
6	PMLN8666A	Hard Leather Carry Case With 3.0 Inch Fixed Belt Loop (No Keypad)	No	No	By Similarity to PMLN8663A
7	PMLN8667A	Nylon Carry Case With 3.0 Inch Fixed Belt Loop (No Keypad)	No	No	By Similarity to PMLN8664A
8	PMLN4651A	2 Inch Belt Clip	Yes	Yes	
9	PMLN7008A	2.5-Inch Belt Clip	Yes	Yes	

7.4 Audio Accessories

Table 8

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	Yes	
3	PMLN5733A	EARBUD W IN-LINE MIC/PTT, MAG ONE	Yes	Yes	
4	PMLN6757A	EARPIECE,ADJUST D-STYLE W/ IN-LINE PTT/MIC	Yes	Yes	
5	PMLN6759A	AUDIO ACCESSORY-HEADSET,TEMPLE TRANSDUCER	Yes	Yes	
6	PMLN6760A	BEHIND THE HEAD H/DUTY HEADSET, SLIM	Yes	Yes	
7	PMLN6761A	AUDIO ACCESSORY-HEADSET,ULTRA-LITE HEADSET MAGONE	Yes	Yes	

Table 8 (Continued)

Audio No.	Audio Acc. Models	Description	Selected for test	Tested	Comments
8	PMMN4071AL	MICROPHONE,IMPRES RSM LARGE 3.5 JACK NC	Yes	Yes	
9	PMLN6754A	IMPRES 3WIRE SURV KIT W/CLR TUBE-BLK	Yes	Yes	
10	PMLN7269ANS	SURVEILLANCE,2-WIRE, IMPRES SURVEILLANCE KIT, WITH QUICK DISCONNECT CLEAR ACOUSTIC TUBE, BLACK	Yes	Yes	
11	PMMN4073A	MICROPHONE,IMPRES RSM, SMALL 3.5 JACK	Yes	Yes	
12	PMMN4171A	RM530 IMPRES WINDPORTING REMOTE SPEAKER MICROPHONE, SMALL	Yes	Yes	
13	PMLN7270A	2-WIRE SURVEILLANCE KIT W/QUICK DISCONNECT CLEAR ACOUSTIC TUBE,BEIGE	Yes	Yes	
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
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

Table 8 (Continued)

Audio No.	Audio Acc. Models	Description	Selected for test	Tested	Comments
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

DASY8™ Test System

8.1 Descriptions of Robotics/Probes/Readout Electronics

Table 9

Dosimetric System type	System version	DAE type	Probe Type
Schmid & Partner Engineering AG SPEAG DASY 5	52.10.2.1495	DAE4	EX3DV4 (E-Field)
Schmid & Partner Engineering AG SPEAG DASY 8	V16.2.2.1588	DAE4	EX3DV4 (E-Field)

The DASY5™ and DASY8™ systems are operated per the instructions in the DASY5™and DASY8™ User's 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 10

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 11. 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 11

Ingredients	450MHz	2.45GHz(1)	5GHz(1)
	Head		
Sugar	56.0	NA	NA
Diacetin	0	NA	NA
De ionized – Water	39.1	NA	NA
Salt	3.8	NA	NA
HEC	1.0	NA	NA
Bact.	0.1	NA	NA

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

9.0 Additional Test Equipment

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

Table 12

Equipment Type	Model Number	Serial Number	Calibration Date	Calibration Due Date
SPEAG PROBE	EX3DV4	7534	5/24/2024	5/24/2027
SPEAG PROBE	EX3DV4	7364	2/28/2022	2/28/2025
SPEAG DAE	DAE4	1598	5/13/2024	5/13/2027
SPEAG DAE	DAE4	1294	12/8/2023	12/8/2026
POWER AMPLIFIER	50W 1000A	14715	CNR	CNR
AMPLIFIER	5S4G11	312664	CNR	CNR
AMPLIFIER	5S1G4	313326	CNR	CNR
VECTOR SIGNAL GENERATOR	E4438C	MY42081753	8/30/2023	8/302024*
VECTOR SIGNAL GENERATOR	E4438C	MY45091093	8/17/2024	8/17/2025
BI-DIRECTIONAL COUPLER	3020A	40295	6/13/2024	6/13/2025
BI-DIRECTIONAL COUPLER	3020A	41935	8/10/2023	8/10/2024*
BI-DIRECTIONAL COUPLER	3024	61178	11/27/2023	11/27/2024
POWER METER	E4418B	MY45100911	8/11/2023	8/11/2024*
POWER METER	E4416A	MY50001037	8/9/2023	8/9/2024*
POWER METER	E4419B	MY45103725	7/18/2024	7/18/2025
POWER METER	E4417A	GB41292245	12/9/2023	12/9/2024
POWER METER	E4418B	GB40206480	1/15/2024	1/15/2025
POWER SENSOR	E9301B	MY41495733	8/21/2023	8/21/2024*
POWER SENSOR	E4412A	MY61020016	8/21/2023	8/21/2024
POWER SENSOR	E4412A	MY61050006	4/29/2024	4/29/2025
POWER SENSOR	E4412A	MY61060011	4/29/2024	4/29/2025
POWER SENSOR	E9301B	MY55210006	2/1/2024	2/1/2025
POWER SOURCE	SE UMS 160 CA	4251	4/2/2024	4/2/2025
NETWORK ANALYZER	E5071B	MY42403218	9/15/2023	9/15/2024*
NETWORK ANALYZER	E5071B	MY42403147	6/6/2024	6/6/2025
DIELECTRIC ASSESSMENT KIT	DAK-3.5	1120	10/16/2023	10/16/2024*
DIELECTRIC ASSESSMENT KIT	DAK-3.5	1156	4/8/2024	4/8/2025
DATA LOGGER	DSB	16398306	12/31/2023	12/31/2024
DATA LOGGER	DSB	16326820	11/26/2023	11/26/2024
DATA LOGGER	DSB	16326831	11/26/2023	11/26/2024
DIGITAL THERMOMETER	1523	3492108	1/23/2024	1/23/2025
THERMOMETER	HH806AU	080307	12/15/2023	12/15/2024
TEMPERATURE PROBE	PR-10L-4-100-1/4-6-BX	WNWR037791	1/26/2024	1/26/2025
TEMPERATURE PROBE	80PK-22	06032017	12/15/2023	12/15/2024

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

Table 12 (Continued)

Equipment Type	Model Number	Serial Number	Calibration Date	Calibration Due Date
SPEAG DIPOLE	D450V3	1053	2/17/2022	2/17/2025
SPEAG DIPOLE	D2450V2	781	10/13/2021	10/13/2024
SPEAG DIPOLE	D2450V2	703	1/12/2023	1/12/2026
SPEAG DIPOLE	D2450V2	782	7/16/2022	7/16/2025
SPEAG DIPOLE	D5GHzV2	1022	4/11/2024	4/11/2027
SPEAG DIPOLE	D5GHzV2	1026	7/17/2024	7/17/2027

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 13

Dates	Probe Calibration Point		Probe SN	Measured Tissue Parameters		Validation		
				σ	ϵ_r	Sensitivity	Linearity	Isotropy
CW								
06/07/2024	Head	450	7534	0.83	41.93	Pass	Pass	Pass
04/07/2024	Head	2450	7364	1.83	42.90	Pass	Pass	Pass
04/28/2024	Head	5250		4.69	37.62	Pass	Pass	Pass
04/28/2024	Head	5600		5.15	38.25	Pass	Pass	Pass
06/10/2024	Head	5800		4.91	33.55	Pass	Pass	Pass
WLAN								
04/07/2024	Head	2450	7364	1.83	42.90	Pass	Pass	Pass
04/28/2024	Head	5250		4.69	37.62	Pass	Pass	Pass
04/29/2024	Head	5600		5.15	38.25	Pass	Pass	Pass
06/10/2024	Head	5800		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 14

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 (%)
7534	IEEE/IEC Head	SPEAG D450V3 / 1053	4.60 +/- 10%	1.13	4.52	7/30/2024@	-1.7
				1.17	4.68	7/31/2024@	1.7
				1.16	4.64	7/31/2024@	0.9
				1.19	4.76	8/1/2024@	3.5
				1.11	4.44	8/1/2024@	-3.5
				1.10	4.40	8/2/2024@	-4.3
				1.07	4.28	8/2/2024@	-7.0
				1.06	4.24	8/4/2024@	**-7.8**
				1.08	4.32	8/4/2024@	-6.1
				1.12	4.48	8/6/2024@	-2.6
				1.10	4.40	8/6/2024@	-4.3
				1.11	4.44	8/7/2024	-3.5
				1.14	4.56	8/7/2024	-0.9
				1.16	4.64	9/13/2024	0.9
				1.17	4.68	9/18/2024@	1.7
				1.17	4.68	9/25/2024@	1.7
				1.17	4.68	9/26/2024@	1.7
				1.11	4.44	9/26/2024@	-3.5
				1.14	4.56	9/27/2024	-0.9
7364	IEEE/IEC Head	SPEAG D2450V2/ 781	52.7 +/- 10%	1.71	54.11	7/31/2024@	**2.7**
		SPEAG D2450V2/ 703	52.3 +/- 10%	1.81	57.28	8/1/2024	**9.5**
		SPEAG D2450V2/ 782	52.8 +/- 10%	1.73	54.75	9/25/2024@	**3.7**
		SPEAG D5250V2 / 1022	79.1 +/- 10%	2.49	78.80	8/3/2024	-0.4
				7.44	74.40	8/4/2024	-5.9
				7.40	74.00	9/26/2024@	-6.4
		SPEAG D5600V2 /1022	81.9 +/- 10%	7.82	78.20	8/5/2024@	-4.5
				7.69	76.90	8/6/2024	-6.1
		SPEAG D5800V2 / 1022	79.7 +/- 10%	8.04	80.40	8/7/2024@	0.9
				7.19	71.90	8/8/2024@	**-9.8**
				7.74	77.40	8/15/2024	-2.9
				7.68	76.80	9/26/2024@	-3.6
		SPEAG D5800V2 / 1026	80.7 +/- 10%	7.86	78.60	9/28/2024	**-2.6**

Note: "@" indicates the System verification covered for 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% 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 15

Frequency (MHz)	Tissue Type	Conductivity Target (S/m)	Dielectric Constant Target	Conductivity Meas. (S/m)	Dielectric Constant Meas.	Tested Date
400.0125	IEEE/ IEC Head	0.87 (0.83-0.91)	44.1 (41.9-46.3)	0.831	44.387	8/4/2024@
				0.838	44.693	8/6/2024@
				0.831	45.245	9/25/2024@
				0.828	45.359	9/26/2024@
406.2000		0.87 (0.83-0.91)	44 (41.8-46.2)	0.832	44.941	7/30/2024@
				0.844	44.919	7/31/2024@
				0.834	44.587	8/1/2024@
				0.842	45.506	8/2/2024@
				0.833	44.410	8/7/2024
				0.842	45.827	9/18/2024@
				0.834	45.221	9/26/2024@
422.3000		0.87 (0.83-0.91)	43.8 (41.6-46)	0.850	43.907	8/4/2024
				0.857	45.442	9/18/2024@
430.0000		0.87 (0.83-0.91)	43.7 (41.6-45.9)	0.856	43.752	8/4/2024
				0.864	45.265	9/18/2024@
440.0000		0.87 (0.83-0.91)	43.6 (41.4-45.8)	0.862	43.709	8/7/2024
				0.866	44.343	9/25/2024@
450.0000		0.87 (0.83-0.91)	43.5 (41.3-45.7)	0.870	44.014	7/30/2024@
				0.882	44.008	7/31/2024@
				0.852	42.270	7/31/2024
				0.842	43.530	8/1/2024@
				0.873	43.589	8/1/2024
				0.831	42.509	8/4/2024@
				0.874	43.351	8/4/2024
				0.882	43.603	8/6/2024@
				0.845	42.812	8/6/2024@
				0.871	43.503	8/7/2024
				0.852	42.980	8/7/2024
				0.828	42.419	8/13/2024
				0.882	44.822	9/18/2024@
				0.875	44.133	9/25/2024@
				0.874	44.233	9/26/2024@
				0.840	42.661	9/27/2024

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

Table 15 (continued)

Frequency (MHz)	Tissue Type	Conductivity Target (S/m)	Dielectric Constant Target	Conductivity Meas. (S/m)	Dielectric Constant Meas.	Tested Date
457.9000	IEEE/ IEC Head	0.87 (0.83-0.91)	43.5 (41.3-45.6)	0.859	42.129	7/31/2024@
				0.881	43.409	8/1/2024@
				0.889	44.368	8/2/2024@
				0.880	43.489	9/13/2024
470.0125		0.87 (0.83-0.91)	43.4 (41.2-45.6)	0.869	41.882	7/31/2024@
				0.891	43.152	8/1/2024@
				0.899	44.136	8/2/2024@
				0.890	42.975	8/4/2024@
				0.888	43.118	8/7/2024
				0.892	43.246	9/13/2024
				0.893	43.747	9/25/2024@
				0.892	43.815	9/26/2024@
475.0000		0.87 (0.83-0.92)	43.4 (41.2-45.5)	0.892	43.030	8/7/2024
				0.897	43.650	9/25/2024@
489.9875		0.87 (0.83-0.92)	43.3 (41.1-45.5)	0.904	43.275	8/7/2024
				0.910	43.355	9/25/2024@
519.5000		0.87 (0.83-0.92)	43.1 (41-45.3)	0.892	41.108	8/4/2024@
				0.904	41.491	8/6/2024
				0.912	41.680	8/7/2024
				0.905	41.600	9/26/2024
526.9875		0.88 (0.83-0.92)	43.1 (40.9-45.2)	0.899	40.969	8/4/2024@
				0.911	41.342	8/6/2024@
				0.918	41.540	8/7/2024
				0.911	41.460	9/26/2024
				0.907	41.131	9/27/2024

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

Table 15 (continued)

Frequency (MHz)	Tissue Type	Conductivity Target (S/m)	Dielectric Constant Target	Conductivity Meas. (S/m)	Dielectric Constant Meas.	Tested Date
2412.000	IEEE/ IEC Head	1.77 (1.59-1.94)	39.3 (35.3-43.2)	1.777	37.631	7/31/2024@
				1.885	42.442	8/1/2024
				1.758	38.242	9/25/2024@
2437.000		1.79 (1.7-1.88)	39.2 (35.3-43.1)	1.796	37.580	7/31/2024@
				1.778	38.196	9/25/2024@
2450.000		1.80 (1.71-1.89)	39.2 (35.3-43.1)	1.806	37.557	7/31/2024@
				1.920	42.363	8/1/2024
				1.789	38.174	9/25/2024@
2462.000		1.82 (1.73-1.91)	39.2 (35.3-43.1)	1.818	37.531	7/31/2024@
				1.798	38.155	9/25/2024@
5250.000		4.71 (4.24-5.18)	36.0 (32.4-39.5)	4.735	38.392	8/3/2024
				4.446	38.077	8/4/2024
				4.382	32.706	9/26/2024@
5260.000		4.72 (4.25-5.19)	35.9 (32.3-39.5)	4.748	38.375	8/3/2024
				4.458	38.057	8/4/2024
				4.396	32.692	9/26/2024@
5300.000		4.76 (4.28-5.24)	35.9 (32.3-39.5)	4.500	38.006	8/4/2024
				4.446	32.652	9/26/2024@
5320.000		4.78 (4.3-5.26)	35.9 (32.3-39.5)	4.522	37.983	8/4/2024
				4.470	32.630	9/26/2024@
5500.000		4.97 (4.47-5.46)	35.7 (32.1-39.2)	4.688	37.276	8/5/2024
				4.585	33.063	8/6/2024
5600.000		5.07 (4.56 - 5.58)	35.5 (32.0-39.1)	4.808	37.104	8/5/2024
				4.693	32.872	8/6/2024
5720.000		5.19 (4.67-5.71)	35.4 (31.8-38.9)	4.819	32.655	8/6/2024@
5745.000		5.22 (4.69-5.74)	35.4 (31.8-38.9)	4.886	36.076	8/7/2024@
				5.149	35.940	8/8/2024@
				4.985	31.983	9/26/2024@
5785.000		5.26 (4.73-5.78)	35.3 (31.8-38.8)	4.832	37.301	8/15/2024
				5.019	31.897	9/26/2024@
5800.000		5.27 (4.74-5.80)	35.3 (31.8-38.8)	4.898	32.487	8/6/2024@
				4.953	35.971	8/7/2024@
				5.214	35.835	8/8/2024@
				4.850	37.278	8/15/2024
				5.031	31.866	9/26/2024@
				5.149	31.841	9/27/2024@
5825.000		5.30 (4.77-5.83)	35.3 (31.7-38.8)	4.877	37.239	8/15/2024
				5.175	31.788	9/27/2024@

Note: "@" indicates that tissue test result covers next 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 +/ - 2^{o}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 16

	Target	Measured
Ambient Temperature	18 – 25 ˚C	Range: 19.6 – 22.6˚C Avg. 21.1 ˚C
Tissue Temperature	18 – 25 ˚C	Range: 20.2-21.9˚C Avg. 21.05˚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 17

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 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
		When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan spatial resolution: ΔxZoom, ΔyZoom		≤ 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: ΔzZoom(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 Configuration(s)

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 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 50% duty cycle was applied to PTT configurations in the final results.

Standalone and simultaneous BT testing were assessed in sections 15.0 and 18.1 per the guidelines of KDB 447498.

13.0 DUT Test Data

13.1 LMR assessments at the Body for 406.1 – 512.000MHz 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 (406.1-512.0 MHz) which are listed in Table 18. The channel with the highest conducted power will be identified as the default channel per KDB 643646 (SAR Test for PTT Radios).

Table 18

Test Freq (MHz)	Power (W)
406.2000	4.770
422.3000	4.680
430.0000	4.640
435.4000	4.690
440.0125	4.620
441.5000	4.670
449.9875	4.700
450.0000	4.710
457.9000	4.730
470.0000	4.720
470.0125	4.720
475.0000	4.650
484.0000	4.630
489.9875	4.610
496.2000	4.600
512.0000	4.660

Assessments at the Body with Body worn PMLN4651A

DUT assessment with offered antennas, default battery and, optional body worn accessory per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 18 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#
AN000348A01	PMNN4888A	PMLN4651A	PMMN4170A	406.2000	4.72	-0.39	3.36	2.60	AMF-AB-240731-18@
				422.3000					
				441.5000					
				457.9000					
				475.0000					
				496.2000					
				512.0000					
PMAE4069A				406.2000	4.71	-0.43	3.54	1.99	AMF-AB-240731-20
				422.3000					
				435.4000					
				449.9875					
PMAE4070A				440.0125					
				457.9000	4.75	-0.14	6.45	3.37	AMF-AB-240731-21
				475.0000					
				489.9875					
PMAE4071A				470.0125	4.63	-0.23	5.93	3.24	AMF-AB-240801-01@
				484.0000					
				496.2000					
				512.0000					
PMAE4079A				406.2000	4.72	-0.38	4.27	2.37	AMF-AB-240801-02@
				422.3000					
				441.5000					
				457.9000					
				475.0000					
				496.2000					
				512.0000					
Assessment of Additional Batteries									
PMAE4070A	PMNN4889A	PMLN4651A	PMMN4170A	457.9000	4.78	-0.30	6.23	3.35	AMF-AB-240801-03@
	PMNN4890A				4.46	-0.25	5.16	2.94	AMF-AB-240801-04@

Assessments at the Body with Body worn PMLN7008A

DUT assessment with offered antennas, default battery and, optional body worn accessory per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 18 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#
AN000348A01	PMNN4888A	PMLN7008A	PMMN4170A	406.2000	4.72	-0.34	4.61	2.53	BAD-AB-240801-05@
				422.3000					
				441.5000					
				457.9000					
				475.0000					
				496.2000					
				512.0000					
PMAE4069A				406.2000	4.71	-0.40	3.42	1.91	BAD-AB-240801-06@
				422.3000					
				435.4000					
				449.9875					
PMAE4070A				440.0125					
				457.9000	4.78	-0.20	5.67	2.98	BAD-AB-240801-07@
				475.0000					
				489.9875					
PMAE4071A				470.0125	4.78	-0.23	6.09	3.22	BAD-AB-240801-08@
				484.0000					
				496.2000					
				512.0000					
PMAE4079A				406.2000	4.72	-0.27	4.15	2.25	BAD-AB-240801-09@
				422.3000					
				441.5000					
				457.9000					
				475.0000					
				496.2000					
				512.0000					
Assessment of Additional Batteries									
PMAE4071A	PMNN4889A	PMLN7008A	PMMN4170A	470.0125	4.78	-0.33	5.78	3.13	BAD-AB-240801-10@
	PMNN4890A				4.48	-0.32	4.81	2.77	BAD-AB-240801-11@

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

DUT assessment with offered antennas, default battery and, optional body worn accessory per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 18 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#
AN000348A01	PMNN4888A	PMLN8662A w/o belt loop w/ NTN5243A	PMMN4170A	406.2000	4.70	-0.37	2.68	1.49	BAD-AB-240801-12@
				422.3000					
				441.5000					
				457.9000					
				475.0000					
				496.2000					
				512.0000					
PMAE4069A				406.2000	4.72	-0.44	2.02	1.14	BAD-AB-240801-13@
				422.3000					
				435.4000					
				449.9875					
PMAE4070A				440.0125					
				457.9000	4.71	-0.13	3.68	1.93	BAD-AB-240801-14@
				475.0000					
				489.9875					
PMAE4071A				470.0125	4.74	-0.13	3.98	2.08	MA-AB-240801-17
				484.0000					
				496.2000					
				512.0000					
PMAE4079A				406.2000	4.69	-0.29	2.36	1.29	MA-AB-240801-18
				422.3000					
				441.5000					
				457.9000					
				475.0000					
				496.2000					
				512.0000					
Assessment of Additional Batteries									
PMAE4071A	PMNN4889A	PMLN8662A w/o belt loop w/ NTN5243A	PMMN4170A	470.0125	4.78	-0.26	3.91	2.08	MA-AB-240802-01@
	PMNN4890A				4.46	-0.30	3.26	1.88	MA-AB-240802-02@

Assessments at the Body with Body worn PMLN8663A w/ NTN5243A

DUT assessment with offered antennas, default battery and, optional body worn accessory per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 18 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#
AN000348A01	PMNN4888A	PMLN8663A w/ NTN5243A	PMMN4170A	406.2000	4.73	-0.46	1.74	0.98	MA-AB-240802-03@
				422.3000					
				441.5000					
				457.9000					
				475.0000					
				496.2000					
				512.0000					
PMAE4069A				406.2000	4.66	-0.27	1.49	0.82	MA-AB-240802-05@
				422.3000					
				435.4000					
				449.9875					
PMAE4070A				440.0125					
				457.9000	4.69	-0.22	3.14	1.69	MA-AB-240802-06@
				475.0000					
				489.9875					
PMAE4071A				470.0125	4.73	-0.24	2.98	1.60	MA-AB-240802-07@
				484.0000					
				496.2000					
				512.0000					
PMAE4079A				406.2000	4.68	-0.31	1.73	0.95	AMF-AB-240802-09@
				422.3000					
				441.5000					
				457.9000					
				475.0000					
				496.2000					
				512.0000					
Assessment of Additional Batteries									
PMAE4071A	PMNN4889A	PMLN8663A w/ NTN5243A	PMMN4170A	470.0125	4.77	-0.19	3.11	1.63	AMF-AB-240802-10@
	PMNN4890A				4.45	-0.21	2.87	1.62	AMF-AB-240802-11@

Assessments at the Body with Body worn PMLN8664A w/ NTN5243A

DUT assessment with offered antennas, default battery and, optional body worn accessory per KDB 643646. Optional batteries were tested per the requirements of KDB 643646. Refer to Table 18 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#
AN000348A01	PMNN4888A	PMLN8664A w/ NTN5243A	PMMN4170A	406.2000	4.71	-0.31	2.81	1.54	AMF-AB-240802-12@
				422.3000					
				441.5000					
				457.9000					
				475.0000					
				496.2000					
				512.0000					
PMAE4069A				406.2000	4.71	-0.3	2.15	1.17	MA-AB-240802-15
				422.3000					
				435.4000					
				449.9875					
PMAE4070A				440.0125					
				457.9000	4.68	-0.19	3.84	2.06	MA-AB-240802-16
				475.0000					
				489.9875					
PMAE4071A				470.0125	4.68	-0.18	3.89	2.08	MA-AB-240802-17
				484.0000					
				496.2000					
				512.0000					
PMAE4079A				406.2000	4.68	-0.31	2.29	1.26	MA-AB-240802-18
				422.3000					
				441.5000					
				457.9000					
				475.0000					
				496.2000					
				512.0000					
Assessment of Additional Batteries									
PMAE4071A	PMNN4889A	PMLN8664A w/ NTN5243A	PMMN4170A	470.0125	4.7	-0.23	3.84	2.07	MA-AB-240802-19
	PMNN4890A				4.41	-0.27	3.32	1.92	MA-AB-240802-20

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) are presented 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#
PMAE4070A	PMNN4888A	PMLN4651A	None(BT)	457.9000	4.70	-0.19	6.94	**3.70**	BAD-AB-240913-27

13.2 LMR assessments at the Face for 406.12 – 512.000MHz 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 (406.1 – 512.000MHz) which are listed in Table 25. The channel with the highest conducted power will be identified as the default channel per KDB 643646 (SAR Test for PTT Radios).

Table 25

Test Freq (MHz)	Power (W)
406.2000	4.800
422.3000	4.730
430.0000	4.700
435.4000	4.740
440.0125	4.680
441.5000	4.720
449.9875	4.780
450.0000	4.770
457.9000	4.790
470.0000	4.780
470.0125	4.780
475.0000	4.680
484.0000	4.680
489.9875	4.670
496.2000	4.650
512.0000	4.700

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 25 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in 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#
AN000348A01	PMNN4889A	@ Front	N/A	406.2000	4.72	-0.26	3.93	2.12	MA-FACE-240803-03@
				422.3000					
				441.5000					
				457.9000					
				475.0000					
				496.2000					
				512.0000					
PMAE4069A				406.2000	4.67	-0.36	3.09	1.73	MA-FACE-240803-02@
				422.3000					
				435.4000					
				449.9875					

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#
PMAE4070A	PMNN4889A	@ Front	N/A	440.0125					
				457.9000	4.70	-0.19	5.03	2.68	MA-FACE-240803-04@
				475.0000					
				489.9875					
PMAE4071A				470.0125	4.75	-0.29	4.47	2.41	MA-FACE-240803-05@
				484.0000					
				496.2000					
				512.0000					
PMAE4079A				406.2000	4.67	-0.24	3.88	2.11	MA-FACE-240803-06@
				422.3000					
				441.5000					
				457.9000					
				475.0000					
				496.2000					
				512.0000					
Additional batteries									
PMAE4070A	PMNN4888A	@ Front	N/A	457.900	4.76	-0.22	4.66	2.47	MA-FACE-240803-07@
	PMNN4890A			457.900	4.43	-0.18	4.80	**2.71**	MA-FACE-240803-08@

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 assessments for 802.11b/g/n (2.412-2.462GHz)

Output Power Data

These power measurements were used to determine the necessary modes for SAR testing according to KDB 248227.

Table 27

Band	802.11	Ch. BW	Ch.	Freq. (MHz)	Measured conducted power (W)
2.4 GHz	b	20	1	2412	0.0217
			6	2437	0.0210
			11	2462	0.0200
	g	20	1	2412	0.0169
			6	2437	0.0257
			11	2462	0.0245
	n	20	1	2412	0.0113
			6	2437	0.0268
			11	2462	0.0256

The new derivative model was assessed with the previous highest applicable configuration at the Body and Face. SAR plots of the highest results per Table (bolded) are presented in Appendix E.

Table 28

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#
AN000389A01	PMNN4888A	PMLN4651A	None	2412.0000	0.054	-0.21	0.022	0.024	BAD(MAN)-AB-240731-03
		PMLN7008A		2412.0000	0.054	-0.25	0.022	**0.025**	MIN-AB-240731-04
		PMLN8662A w/o belt loop w/ NTN5243A		2412.0000	0.054	-0.67**	0.018	0.022	MIN-AB-240731-06
		PMLN8663A w/ NTN5243A		2412.0000	0.054	-0.85**	0.009	0.011	BAD(MAN)-AB-240801-11
		PMLN8664A w/ NTN5243A		2412.0000	0.054	-0.75**	0.009	0.011	MIN-AB-240801-02@

Table 28 (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#
Assessment of Additional Battery									
AN000389A01	PMNN4889A	PMLN7008A	None	2412.0000	0.053	0.08	0.017	0.018	BAD(MAN)-AB-240926-01@
	PMNN4890A			2412.0000	0.054	0.00	0.015	0.016	BAD(MAN)-AB-240926-03@

** Measure SAR is very low where a SAR drift measurement was not practical

Assessments at the Face

DUT assessment with WLAN internal antenna and offered battery 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 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#
AN000389A01	PMNN4889A	Radio @ front 2.5cm	None	2412.0000	0.053	-0.46	0.059	**0.071**	MIN-FACE-240801-03@
Assessment of Additional Battery									
AN000389A01	PMNN4888A	Radio @ front 2.5cm	None	2412.0000	0.054	-0.06	0.061	0.066	BAD(MAN)-FACE-240801-04@
	PMNN4890A			2412.0000	0.054	-0.38	0.059	0.068	BAD(MAN)-FACE-240801-05@

14.2 Assessment for WLAN 5.0 GHz (802.11 a/n/ac)

Output Power Data

These power measurements were used to determine the necessary modes for SAR testing according to KDB 248227.

Table 30

Band	802.11	Ch. BW	Ch.	Freq. (MHz)	Measured conducted power (W)
U-NII-1 (5.15-5.25GHz)	a	20	36	5180	0.0532
			40	5200	0.0505
			44	5220	0.0508
			48	5240	0.0501
	n		36	5180	0.0422
			40	5200	0.0519
			44	5220	0.0507
			48	5240	0.0500
	ac		36	5180	0.0419
			40	5200	0.0516
			44	5220	0.0505
			48	5240	0.0500
UNII-2A (5.25-5.35GHz)	a	20	52	5260	0.0582
			56	5280	0.0569
			60	5300	0.0546
			64	5320	0.0431
	n		52	5260	0.0607
			56	5280	0.0590
			60	5300	0.0569
			64	5320	0.0362
	ac		52	5260	0.0604
			56	5280	0.0604
			60	5300	0.0604
			64	5320	0.0367
U-NII-2C (5.47-5.65 GHz)	a	20	100	5500	0.0191
			120	5600	0.0310
			144	5720	0.0273
	n		100	5500	0.0201
			120	5600	0.0259
			144	5720	0.0229
	ac		100	5500	0.0205
			120	5600	0.0265
			144	5720	0.0232
UNII-3 (5.65-5.85 GHz)	a	20	149	5745	0.0268
			157	5785	0.0239
			165	5825	0.0216
	n		149	5745	0.0281
			157	5785	0.0255
			165	5825	0.0232
	ac		149	5745	0.0284
			157	5785	0.0259
			165	5825	0.0236

(U-NII-2A 5.25-5.35 GHz)

The new derivative model was assessed with the previous highest applicable configuration at the Body and Face. SAR plots of the Body and Face highest results per Table (bolded) are presented in 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#
UNII-2A: 802.11n, 40MHz BW - Body									
AN000389A01	PMNN4888A	PMLN4651A	None	5260.0000	0.058	-0.23	0.069	**0.081**	MHN(MAN)-AB-240803-04
		PMLN7008A		5260.0000	0.058	-0.36	0.066	0.080	MHN(MAN)-AB-240803-05
		PMLN8662A w/o belt loop w/ NTN5243A		5260.0000	0.058	0.00	0.039	0.044	MFR-AB-240803-07
		PMLN8663A w/ NTN5243A		5260.0000	0.058	-0.40	0.007	0.008	MFR-AB-240803-08
		PMLN8664A w/ NTN5243A		5260.0000	0.058	0.02	0.048	0.054	MFR-AB-240803-09
Assessment of Additional Battery									
AN000389A01	PMNN4889A	PMLN4651A	None	5260.0000	0.059	-0.27	0.053	0.061	MIN-AB-240927-01@
	PMNN4890A			5260.0000	0.059	-0.06	0.050	0.055	MIN-AB-240927-03@
UNII-2A: 802.11n, 40MHz BW - Face									
AN000389A01	PMNN4889A	@ Front	None	5260.0000	0.059	-0.17	0.112	0.128	MIN-FACE-240804-06
Assessment of Additional Battery									
AN000389A01	PMNN4889A	@ Front	None	5260.0000	0.058	-0.12	0.116	0.133	MIN-FACE-240804-07
	PMNN4890A			5260.0000	0.059	-0.31	0.113	**0.133**	MIN-FACE-240804-08

(U-NII-2C 5.47-5.65 GHz)

The new derivative model was assessed with the previous highest applicable configuration at the Body and Face. SAR plots of the Body and Face highest results per Table (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#
UNII-2C: 802.11ac, 80MHz BW - Body									
AN000389A01	PMNN4888A	PMLN4651A	None	5600.0000	0.031	0.37	0.059	**0.062**	MHN(MAN)-AB-240805-10
		PMLN7008A		5600.0000	0.031	0.13	0.050	0.053	MHN(MAN)-AB-240806-01@
		PMLN8662A w/o belt loop w/ NTN5243A		5600.0000	0.031	-0.34	0.015	0.017	MHN(MAN)-AB-240806-02@
		PMLN8663A w/ NTN5243A		5600.0000	0.031	-2.50***	0.012	0.022	MHN(MAN)-AB-240806-03@
		PMLN8664A w/ NTN5243A		5600.0000	0.031	-0.51	0.007	0.008	MIN-AB-240806-07
Assessment of Additional Battery									
AN000389A01	PMNN4889A	PMLN4651A	None	5600.0000	0.032	-0.44	0.009	0.011	MIN-AB-240806-08
	PMNN4890A			5600.0000	0.032	0.25	0.022	0.023	BAD(MAN)-AB-240806-10
UNII-2C: 802.11ac, 80MHz BW - Face									
AN000389A01	PMNN4889A	@ Front	None	5600.0000	0.032	0.04	0.055	0.057	MFR-FACE-240805-01@
Assessment of Additional Battery									
AN000389A01	PMNN4889A	@ Front	None	5600.0000	0.031	-0.26	0.051	0.057	MFR-FACE-240805-02@
	PMNN4890A			5600.0000	0.032	-0.03	0.063	**0.065**	MIN-FACE-240805-05

***Measure SAR is lower than 1.2W/kg although a SAR drift measurement was not practical

(U-NII-3 5.47-5.65 GHz)

The new derivative model was assessed with the previous highest applicable configuration at the Body and Face. SAR plots of the Body and Face highest results per Table (bolded) are presented in Appendix E.

Table 33

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#
UNII-3: 802.11ac, 80MHz BW - Body									
AN000389A01	PMNN4888A	PMLN4651A	None	5745.0000	0.027	-0.23	0.026	0.033	BAD(MAN)-AB-240808-01@
		PMLN7008A		5745.0000	0.027	-0.69**	0.024	**0.034**	BAD(MAN)-AB-240808-03@
		PMLN8662A w/o belt loop w/ NTN5243A		5745.0000	0.027	-10.17**	0.000	0.005	BAD(MAN)-AB-240808-05@
		PMLN8663A w/ NTN5243A		5745.0000	0.027	0.00	0.000*	0.000	MFR-AB-240808-06@
		PMLN8664A w/ NTN5243A		5745.0000	0.027	0.79**	0.003	0.004	MFR-AB-240808-08@
Assessment of Additional Battery									
AN000389A01	PMNN4889A	PMLN7008A	None	5745.0000	0.027	0.04	0.002	0.003	MFR-AB-240927-06@
	PMNN4890A			5745.0000	0.027	0.13	0.014	0.017	MFR-AB-240927-07@
UNII-3: 802.11ac, 80MHz BW - Face									
AN000389A01	PMNN4889A	@ Front	None	5745.0000	0.027	0.38	0.029	0.035	MFR-FACE-240809-04@
Assessment of Additional Battery									
AN000389A01	PMNN4889A	@ Front	None	5745.0000	0.027	-0.45	0.027	**0.036**	MFR-FACE-240809-05@
	PMNN4890A			5745.0000	0.027	-0.26	0.026	0.033	MFR-FACE-240809-06@

*SAR result lower than the ambient noise level

** Measure SAR is very low where a SAR drift measurement was not practical

14.3 Assessment for ISED, Canada

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. SAR plots of the highest results per Table (bolded) are presented in Appendix E.

Table 34

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 406 – 430MHz (UHF)									
AN000348A01	PMNN4888A	PMLN4651A	None (BT)	406.2000	4.66	-0.30	5.85	**3.23**	MA-AB-240927-09@
				422.3000	4.59	-0.21	3.74	2.05	MA-AB-240919-02@
				430.0000	4.57	-0.22	3.41	1.88	MA-AB-240919-03@
Body 450– 470MHz (UHF)									
PMAE4070A	PMNN4888A	PMLN4651A	None (BT)	450.0000	4.66	-0.21	5.03	2.72	BAD-AB-240913-29
				457.9000	4.70	-0.19	6.94	3.70	BAD-AB-240913-27
				470.0000	4.67	-0.33	8.68	**4.81**	BAD-AB-240913-30
Face 406 – 430MHz (UHF)									
AN000348A01	PMNN4889A	@ front	None	406.2000	4.71	-0.20	4.14	**2.21**	MA-FACE-240807-22
				422.3000	4.56	-0.23	2.85	1.58	MA-FACE-240804-28
				430.0000	4.56	-0.27	2.49	1.39	MA-FACE-240804-29
Face 450– 470MHz (UHF)									
AN000348A01	PMNN4890A	@ front	None	450.0000	4.40	-0.20	3.36	1.92	MA-FACE-240805-01@
				457.9000	4.43	-0.18	4.80	2.71	MA-FACE-240803-08@
				470.0000	4.44	-0.25	5.49	**3.14**	MA-FACE-240807-21
WLAN 2.4GHz (Body)									
AN000389A01	PMNN4888A	PMLN7008A	None	2412.0000	0.054	-0.25	0.022	**0.025**	MIN-AB-240731-04
				2437.0000	0.052	-0.19	0.017	0.019	BAD(MAN)-AB-240926-04@
				2462.0000	0.050	-0.14	0.016	0.019	BAD(MAN)-AB-240926-05@
WLAN 2.4GHz (Face)									
AN000389A01	PMNN4889A	@ front	None	2412.0000	0.053	-0.45	0.059	**0.071**	MIN-FACE-240801-03@
				2437.0000	0.051	-0.37	0.045	0.054	BAD(MAN)-FACE-240801-07@
				2462.0000	0.049	-0.09	0.036	0.043	BAD(MAN)-FACE-240801-08@
WLAN U-NII-2A 5.25 – 5.35GHz (Body)									
AN000389A01	PMNN4888A	PMLN4651A	None	5260.0000	0.058	-0.23	0.069	**0.081**	MHN(MAN)-AB-240803-04
				5300.0000	0.055	-0.19	0.055	0.067	MIN-AB-240927-04@
				5320.0000	0.043	-0.13	0.035	0.053	MIN-AB-240927-05@
WLAN U-NII-2A 5.25 – 5.35GHz (Face)									
AN000389A01	PMNN4889A	@ front	None	5260.0000	0.059	-0.31	0.113	0.133	MIN-FACE-240804-08
				5300.0000	0.055	-0.03	0.118	**0.140**	MIN-FACE-240804-09
				5320.0000	0.044	-0.08	0.096	0.116	MIN-FACE-240804-10

Table 34 (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#
WLAN U-NII-2C, 5.47-5.725GHz (Body)									
AN000389A01	PMNN4888A	PMLN4651A	None	5500.0000	0.019	-0.39	0.013	0.015	BAD(MAN)-AB-240806-12
				5600.0000	0.031	0.37	0.059	**0.062**	MHN(MAN)-AB-240805-10
				5720.0000	0.027	-0.22	0.033	0.041	BAD(MAN)-AB-240807-03@
WLAN U-NII-2C, 5.47-5.725GHz (Face)									
AN000389A01	PMNN4890A	@ front	None	5500.0000	0.020	-0.03	0.038	0.040	MIN-FACE-240805-06
				5600.0000	0.032	-0.03	0.063	**0.065**	MIN-FACE-240805-05
				5720.0000	0.028	-0.04	0.026	0.031	BAD(MAN)-FACE-240807-04@
WLAN U-NII-3, 5.65-5.85GHz (Body)									
AN000389A01	PMNN4888A	PMLN7008A	None	5745.0000	0.027	-0.69	0.024	**0.034**	BAD(MAN)-AB-240808-03@
				5785.0000	0.024	-0.35	0.015	0.022	MFR-AB-240927-08@
				5825.0000	0.022	-0.60**	0.005*	0.009	MFR-AB-240928-06@
WLAN U-NII-3, 5.65-5.85GHz (Face)									
AN000389A01	PMNN4888A	@ front	None	5745.0000	0.027	-0.45	0.027	**0.036**	MFR-FACE-240809-05@
				5785.0000	0.024	-0.09	0.019	0.026	MFR-FACE-240815-05
				5825.0000	0.022	-0.09	0.007	0.011	BAD(MAN)-FACE-240815-06

*SAR result lower than the ambient noise level

** Measure SAR is very low where a SAR drift measurement was not practical

15.0 Assessment outside FCC part 90

Assessment of outside FCC Part 90 using the highest SAR configuration for each band from above. SAR plots of the highest results per Table (bolded) are presented in 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#
Body									
AN000348A01	PMNN4888A	PMLN4651A	None (BT)	400.0125	4.62	-0.38	6.05	3.43	BAD-AB-240925-24
				519.5000	4.62	-0.29	4.45	2.47	BAD-AB-240926-05
				526.9875	4.64	-0.51	5.30	3.08	BAD-AB-240926-06
PMAE4069A				400.0125	4.63	-0.46	4.99	2.88	BAD-AB-240926-01@
PMAE4071A				519.5000	4.70	-0.39	7.04	3.93	MA-AB-240926-07
				526.9875	4.72	-0.40	7.11	**3.96**	MA-AB-240926-08
PMAE4079A				400.0125	4.58	-0.38	5.45	3.12	BAD-AB-240926-02@
				519.5000	4.70	-0.33	4.84	2.67	MA-AB-240926-09
				526.9875	4.65	-0.43	5.21	2.97	MA-AB-240926-10

Table 35 (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#
Face									
AN000348A01	PMNN4890A	@ front	None	400.0125	4.56	-0.17	3.97	2.17	MA-FACE-240805-04@
				519.5000	4.41	-0.41	2.54	1.52	MA-FACE-240805-05@
				526.9875	4.42	-0.54	2.81	1.73	MA-FACE-240805-06@
PMAE4069A				400.0125	4.55	-0.23	3.61	2.01	BAD-FACE-240806-10
PMAE4071A				519.5000	4.49	-0.46	4.10	**2.44**	BAD-FACE-240806-11
				526.9875	4.48	-0.31	4.21	2.42	BAD-FACE-240807-01@
PMAE4079A				400.0125	4.53	-0.29	4.08	2.31	BAD-FACE-240807-07@
				519.5000	4.48	-0.27	2.97	1.69	AMF-FACE-240807-10
				526.9875	4.49	-0.29	3.14	1.79	AMF-FACE-240807-11

16.0 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)] *[$\sqrt{F_{(GHz)}}$] = 2.5, which is ≤ 3 for 1-g SAR or 7.5 for 10-g extremity

Where:

Max. power = 9.26mW (12.02mW*77% 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.

17.0 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 per Table (bolded) is present in Appendix F.

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#
PMAE4070A	PMNN4888A	PMLN4651A	None (BT)	470.000	4.64	-0.16	8.58	**4.60**	MA-AB-240927-15@

18.0 Simultaneous Transmission

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

Table 37

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

WLAN 2.4 GHz and 5GHz are sharing the same antenna, only one technology to transmit at a single time. WLAN 2.4GHz and BT are sharing the same antenna and they are in the same frequency range, thus only WLAN 2.4GHz is selected for simultaneous transmission as the WLAN 2.4GHz power is higher than BT power, thus BT is exclude from simultaneous transmission.

18.1 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] = 0.3W/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% 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.

18.2 Simultaneous Transmission between LMR, WLAN 2.4GHz, WLAN 5GHz

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

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	4.81	0.025	0.081	4.84	4.89
Face Exposure	3.14	0.071	0.140	3.21	3.28

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).

19.0 Results Summary

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 and 10-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	406.125 - 512	4.81	3.14
WLAN 2.4 GHz	2412 - 2462	0.025	0.071
WLAN 5 GHz	5180 - 5825	0.081	0.140
BT	2402 - 2480	NA	NA
Highest Simultaneous Transmission SAR	Sum of SAR (W/kg)	4.89	3.28
ISED Canada			
LMR	406.125 – 430	3.23	2.21
LMR	450 - 470	4.81	3.14
WLAN 2.4 GHz	2412 - 2462	0.025	0.071
WLAN 5 GHz	5180 - 5825	0.081	0.140
BT	2402 - 2480	NA	NA
Highest Simultaneous Transmission SAR	Sum of SAR (W/kg)	4.89	3.28
Overall			
LMR	400 - 527	4.81	3.14
WLAN 2.4 GHz	2412 - 2472	0.025	0.071
WLAN 5 GHz	5180 - 5825	0.081	0.140
BT	2402 - 2480	NA	NA
Highest Simultaneous Transmission SAR	Sum of SAR (W/kg)	4.89	3.28

All results are scaled to the maximum output power.

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).

20.0 Variability Assessment

Per the guidelines in KDB 865664 SAR variability assessment is required because SAR results are above 4.0W/kg (Occupational). The Table below includes test results of the original measurement(s), the repeated measurement(s), and the ratio (SAR_{high}/SAR_{low}) for the applicable test configuration(s).

Table 40

Run#	Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Adj Calc. 1g-SAR (W/kg)	Ratio	Comments
BAD-AB-240913-30	PMAE4070A	PMNN4888A	PMLN4651A	None	470.000	4.68	1.05	No additional repeated scans is required due to the Ratio (SAR_{high}/SAR_{low}) < 1.20
MA-AB-240927-15@						4.45		

21.0 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/IEC17025 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 300 MHz to 800MHz

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