MOTOROLA SOLUTIONS

MS ISO/IEC 17025 TESTING SAMM No. 0826

CERTIFICATE 2518.05

DECLARATION OF COMPLIANCE SAR ASSESSMENT Part 1 of 4

Motorola Solutions Inc.
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Date of Report: 09/22/2021
Report Revision: C

Responsible Engineer:	Puteri Alifah Ilyana Binti Nor Rahim (EME Engineer)
Report Author:	Lee Kin Kting (EME Technician)
Date/s Tested:	7/23/2021-8/13/2021, 08/20/2021, 08/31/2021, 09/02/2021, 09/04/2021
Manufacturer:	Motorola Solutions Inc.
DUT Descriptions:	Handheld Portable – MOTOTRBO R7 403-512M 4W TIA NKP BT WIFI GPS ENABLED GOB MOTOTRBO R7 403-512M 4W TIA FKP BT WIFI GPS ENABLED GOB
Test TX mode(s):	CW (PTT), Bluetooth, WLAN 2.4GHz and WLAN5.0 GHz
Max. Power output:	Refer Table 3
Nominal Power:	Refer Table 3
Tx Frequency Bands:	Refer Table 3
Signaling type:	FM, FHSS (Bluetooth), WLAN 2.4GHz and WLAN5.0 GHz
Model(s) Tested:	AAH06RDC9RA1AN (PMUE5723ABA) (IC Model: PMUE5723ABA); AAH06RDN9RA1AN (PMUE5722ABB) (IC Model: PMUE5722ABB)
Model(s) Certified:	Refer Appendix-A
Serial Number(s):	865TXP0188, 865TXP0189, 865TXP0193,865TXP0194, P4N0XP0VH2, P4N0XP0VGK
Classification:	Occupational/Controlled
Applicant Name:	Motorola Solutions Inc.
Applicant Address:	8000 West Sunrise Boulevard, Fort Lauderdale, Florida 33322
FCC ID:	AZ489FT7059; LMR 406.125 - 512 MHz, Bluetooth 2.402-2.480 GHz, WLAN 2.412-2.462 GHz (802.11 b/g/n) & 5180 – 5825GHz (802.11a/n/ac) This report contains results that are immaterial for FCC equipment approval, which are clearly identified.
IC:	109U-89FT7059; LMR 406.125 – 430MHz; 450-470MHz MHz, Bluetooth 2.402-2.480 GHz, WLAN 2.412-2.462 GHz (802.11 b/g/n) & 5180 – 5825GHz (802.11a/n/ac) This report contains results that are immaterial for ISED equipment approval, Which are clearly identified.
ISED Test Site registration:	24843
FCC Test Firm Registration Number:	823256

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 5).

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. This reporting format is consistent with the suggested guidelines of the TIA TSB-150 December 2004. The results and statements contained in this report pertain only to the device(s) evaluated.

Saw Sun Hock
(Approved Signatory)
Approval Date: 9/22/2021

Part 1 of 2

APPENDICES

Part 4 of 4

APPENDICES

Report Revision History

Date	Revision	Comments
09/06/2021	A	Initial release
09/20/2021	B	Updates Antenna Gain
09/22/2021	C	Updates product description, equipment classification and BT power

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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 AAH06RDC9RA1AN (PMUE5723ABA) (IC Model: PMUE5723ABA) and AAH06RDN9RA1AN (PMUE5722ABB) (IC Model: PMUE5722ABB). This device is classified as Occupational/Controlled.

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	406.125-512MHz (LMR)	6.30	3.71
DTS	2412-2462MHz	0.029	0.056
NII	5180 – 5825MHz	0.363	0.234
*DSS	2402-2480MHz	NA	NA
Simultaneous Results (LMR+WLAN)		6.66	3.94

*Results not required per KDB (refer to sections 13.8 and 14.0)

3.0 Abbreviations / Definitions

BT: Bluetooth
CNR: Calibration Not Required
CW: Continuous Wave
CQPSK: Compatible Quadrature Phase Shift Keying
DPSK: Differential Phase-Shift Keying
DQPSK: Differential Quadrature Phase-Shift Keying
DSS: Direct Spread Spectrum
DUT: Device Under Test
EME: Electromagnetic Energy
FHSS: Frequency Hopping Spread Spectrum
FM: Frequency Modulation
GFSK: Gaussian Frequency-Shift Keying
LMR: Land Mobile Radio
NA: Not Applicable
OFDM: Orthogonal Frequency Division Multiplexing
PSM: Public Safety Microphone
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.

- IEC62209-1 (2016) Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)
- Federal Communications Commission, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields", OET Bulletin 65, FCC, Washington, D.C.: 1997.
- IEEE 1528 (2013), Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
- American National Standards Institute (ANSI) / Institute of Electrical and Electronics Engineers (IEEE) C95. 1-1992
- Institute of Electrical and Electronics Engineers (IEEE) C95.1-2005
- International Commission on Non-Ionizing Radiation Protection (ICNIRP) 1998
- 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 5) – 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. 303 of July 2, 2002 "Regulation of the limitation of exposure to electrical, magnetic, and electromagnetic fields in the radio frequency range between 9 kHz and 300 GHz." and "Attachment to resolution # 303 from July 2, 2002"
- IEC62209-2 Edition 1.0 2010-03, Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures – Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 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 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). 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% and BT LE is 62.74% (1M) and 33.64% (2M). Refer to section 14.0 Simultaneous Transmission Exclusion.

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 (%)	Max Power (W)
LMR	400-527	FM	50(1)	4.8
Bluetooth	2402 - 2480	FHSS	77	0.0120
Bluetooth LE (1M)			62.47	0.0080
Bluetooth LE (2M)			33.64	0.0080
802.11 b	2412 - 2462	DSSS, OFDM	802.11b - 98.88 802.11g - 96.88 802.11n- 98.01	0.0316
802.11 g				
802.11 n				
802.11 a	5180 - 5825	OFDM	802.11a - 97.01 802.11n /ac -97.97	0.0631 (5150-5350MHz)(2) 0.0316 (5470-5850MHz)
802.11 n/ac				

(1) includes 50% PTT operation

(2) For WLAN 5 GHZ channels 36, 64 & 100. EME tested WLAN 802.11a channel 64 &100, WLAN 802.11n/ac channels 36, 64, & 100. (Highest power as stated in the table above). However, maximum power of WLAN 802.11a channel 64 (0.0512 W) &100 (0.01995 W), WLAN 802.11n/ac channels 36 (0.0512 W), 64 (0.0512 W), & 100 (0.02512 W) was implemented later at PP vintage radio after fix the failure in FCC EMC RBE test.

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.

7.0 Optional Accessories and Test Criteria

These devices are 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

There are optional removable antennas and one internal BT/WLAN antenna offered for this product. The Table below lists their descriptions.

Table 4

Antenna No.	Antenna Models	Description	Selected for test	Tested
1	AN000348A01	Antenna, Stubby, 400-527MHz, 90mm, ¼ wave, Ferrule, -0.4dBi	Yes	Yes
2	AN000350A01	Antenna, Stubby, Antenna, Stubby, 400-450MHz, 60mm, ¼ wave, Ferrule, -1.7dBi	Yes	Yes
3	AN000351A01	Antenna, Stubby, Antenna, Stubby, 440-490MHz, 60mm, ¼ wave, Ferrule -0.8dBi	Yes	Yes
4	AN000389A01	Internal Antenna PCB Assembly ¼ wave, 1560-1610MHz, 2400-2485MHz, 2.3dBi 5150-5850MHz, 2.7dBi	Yes	Yes
5	PMAE4069A	Antenna, Stamped Metal, UHF Stubby ¼ wave, Antenna 400 - 450MHz, -1 dBi	Yes	Yes
6	PMAE4070A	UHF Stubby ¼ wave Antenna 440 - 490MHz, -1 dBi	Yes	Yes
7	PMAE4071A	UHF Stubby ¼ wave Antenna 470 - 527MHz, -1dBi	Yes	Yes
8	PMAE4079A	Antenna, Stamped Metal, UHF Slim ¼ wave Whip Antenna 400 - 527MHz, 0dBi	Yes	Yes

7.2 Battery

There are four batteries offered for this product. The Table below lists their descriptions.

Table 5

Battery No.	Battery Models	Description	Selected for test	Tested	Comments
1	PMNN4807A	Battery Pack, Battery Impres Li-ion IP68 2200T	Yes	Yes	
2	PMNN4808A	Battery Li-ion IP68 2450t	Yes	Yes	
3	PMNN4809A	Battery Pack, Battery Impres Li-ion IP68 2850T	Yes	Yes	Default battery for body testing
4	PMNN4810A	Battery Pack, Battery Impres Li-ion	Yes	Yes	Default battery

		Tia4950 IP68 3200T			for face testing

7.3 Body worn Accessories

All body worn accessories were considered. The Table below lists the body worn accessories, and body worn accessory descriptions.

Table 6

Body worn No.	Body worn Models	Description	Selected for test	Tested	Comments
1	HLN6602A	Universal Chest pack.	Yes	Yes	
2	NTN5243A	Strap	Yes	Yes	Tested with PMLN8302A & PMLN8304A
3	PMLN4651A	Belt Clip 2 Inch	Yes	Yes	
4	PMLN7008A	Carry Accessory-Belt Clip,2.5-Inch Belt Clip	Yes	Yes	
5	PMLN8299A	Hard Leather Carry Case 3 Inch Swivel Belt Loop Display	No	No	By similarity to PMLN8302A
6	PMLN8300A	Hard Leather Carry Case 2.5 Inch Swivel Belt Loop Display	No	No	By similarity to PMLN8303A
7	PMLN8301A	Hard Leather Carry Case 3 Inch Fixed Belt Loop Display	No	No	By similarity to PMLN8304A
8	PMLN8302A	Hard Leather Carry Case 3 Inch Swivel Belt Loop Non Display	Yes	Yes	Tested with NTN5243A, RLN6488A & PMLN8302A
9	PMLN8303A	Hard Leather Carry Case 2.5 Inch Swivel Belt Loop Non Display	No	No	By similarity to PMLN8302A
10	PMLN8304A	Hard Leather Carry Case 3 Inch Fixed Belt Loop Non Display	Yes	Yes	Tested with NTN5243A
11	RLN6486A	Fireman Radio Strap	No	No	By similarity to RLN6487A
12	RLN6487A	Fireman Radio Strap, XL	Yes	Yes	Tested with RLN6488A & PMLN8302A
13	RLN6488A	Anti-Sway Strap	Yes	Yes	Tested with RLN6487A & PMLN8302A

7.4 Audio Accessories

All audio accessories were considered. The Table below lists the offered audio accessories and their descriptions. Exhibit 7B illustrates photos of the tested audio accessories.

Table 7

Audio No.	Audio Acc. Models	Description	Selected for test	Tested	Comments
1	PMMN4128A	RM780 Impress Wind porting Remove Speaker Microphone, Large (IP68)	Yes	Yes	Default audio
2	PMLN8085A	Behind-The-Head Headset, CGAI Mini	No	No	By similarity with PMLN8086A
3	PMLN8086A	Over-The-Head Headset, CGAI Mini	Yes	Yes	
4	PMLN8265A	Accessory Kit, Headband Headset W/ Nexus	Yes	Yes	Tested withPMLN8297A
5	PMLN8266A	Accessory Kit, Neckband Headset W/ Nexus	No	No	By similarity with PMLN8265A
6	PMLN8267A	Accessory Kit, Hardhat Headset W/ Nexus	No	No	By similarity with PMLN8265A
7	PMLN8295A	2-Wire Swivel Loud Audio Earpiece With Ear tip	Yes	Yes	
8	PMLN8297A	Audio Accessory-Audio Adapter, CGAI - Mini PTT Nexus Adapter	Yes	Yes	Tested with PMLN8265A

Table 7 (Continued)

Audio No.	Audio Acc. Models	Description	Selected for test	Tested	Comments
9	PMLN8337A	1-Wire Single Ear bud With Removable Ear hook Loud Audio Earpiece	Yes	Yes	
10	PMLN8341A	Audio Accessory-Earpiece,1-Wire Xl Clear Tube Earpiece	No	No	By similarity with PMLN8337A
11	PMLN8342A	Audio Accessory-Earpiece,2-Wire Xl Clear Tube Earpiece	No	No	By similarity with PMLN8295A
12	PMLN8343A	Audio Accessory-Earpiece, 3-Wire XL Clear Tube Earpiece, CGAI Mini	Yes	Yes	
13	PMMN4131A	Audio Accessory-Remote Speaker Micro phone, Small Advance RSM, CGAI Mini	No	No	By similarity with PMMN4128A
14	PMMN4140A	Accessory Kit,RM760 RSM	No	No	By similarity with PMMN4128A

8.0 Description of 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™ system 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. The E-field probe first scans a coarse grid over a large area inside the phantom in order to locate the interpolated maximum SAR distribution. After the coarse scan measurement, the probe is automatically moved to a position at the interpolated maximum. The subsequent scan can directly use this position as reference for the cube evaluations.

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. For Diacetin and similar type simulates, sugar and HEC ingredients are not needed. 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	450MHz	2450MHz	5GHz(1)
	Head		
Sugar	56.0	NA	NA
Diacetin	0	51.0	NA
De ionized –Water	39.1	48.75	NA
Salt	3.8	0.15	NA
HEC	1.0	NA	NA
Bact.	0.1	0.1	NA

Note: (1) SPEAG provides Motorola proprietary stimulant ingredients.

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	7533	4/19/2021	4/19/2022
SPEAG PROBE	EX3DV4	7534	4/19/2021	4/19/2022
SPEAG DAE	DAE4	1598	4/7/2021	4/7/2022
SPEAG DAE	DAE3	374	4/8/2021	4/8/2022
BI-DIRECTIONAL COUPLER	3020A	40295	7/8/2021	7/8/2022
BI-DIRECTIONAL COUPLER	3020A	41935	8/21/2020	8/21/2021
BI-DIRECTIONAL COUPLER	3024	61178	11/23/2020	11/23/2021
BI-DIRECTIONAL COUPLER	3024	61182	7/8/2021	7/8/2022
POWER AMPLIFIER	50W100D	0357646	CNR	CNR
POWER AMPLIFIER	50W 1000A	14715	CNR	CNR
POWER AMPLIFIER	5S4G11	312663	CNR	CNR
POWER AMPLIFIER	5S4G11	312664	CNR	CNR
VECTOR SIGNAL GENERATOR	E4438C	MY47272101	10/29/2019	10/29/2021
POWER METER	E4419B	MY45103725	6/29/2021	6/29/2022
POWER METER	E4419B	GB42420608	11/27/2020	11/27/2021
POWER METER	E4418B	GB40206480	11/25/2020	11/25/2021
POWER METER	E4418B	MY45100911	8/30/2019	8/30/2021
POWER METER	E4418B	MY45100739	12/3/2020	12/3/2021
POWER METER	E4416A	MY50001037	8/30/2019	8/30/2021
POWER METER	E4417A	GB41292245	11/27/2020	11/27/2021
POWER SENSOR	E9301B	MY41495594	5/29/2021	5/29/2022
POWER SENSOR	8481B	MY41091243	11/3/2020	11/3/2021
POWER SENSOR	E9301B	MY55210003	5/29/2021	5/29/2022
POWER SENSOR	E9301B	MY41495733	5/29/2021	5/29/2022
POWER SENSOR	E9301B	MY50280001	5/7/2021	5/7/2022
POWER SUORCE	SE UMS 160 CA	4251	5/14/2021	5/14/2022
POWER SENSOR	NRP-Z11	120907	8/19/2020	8/19/2022
DATA LOGGER*	DSB	16398050	8/3/2020	8/3/2021
DATA LOGGER	DSB	16398306	11/24/2020	11/24/2021
TEMPERATURE PROBE	80PK-22	06032017	11/25/2020	11/25/2021
THERMOMETER	HH806AU	080307	11/25/2020	11/25/2021
DIELECTRIC ASSESSMENT KIT*	DAK-3.5	1120	8/12/2020	8/12/2021
DIELECTRIC ASSESSMENT KIT	DAK-3.5	1156	4/7/2021	4/7/2022
NETWORK ANALYZER	E5071B	MY42403147	12/1/2020	12/1/2021
THERMOMETER	HH202A	35881	12/3/2020	12/3/2021
TEMPERATURE PROBE	80PK-22	05032017	12/3/2020	12/3/2021
SPEAG DIPOLE	D450V3	1054	3/11/2019	3/11/2022
SPEAG DIPOLE	D5GHzV2	1027	1/31/2020	1/31/2023
SPEAG DIPOLE	D2450V2	703	10/16/2018	10/16/2021

Note: * Indicated 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								
05/09/2021	Head	450	7533	0.84	43.8	Pass	Pass	Pass
WLAN								
05/05/2021	Head	2450	7534	1.78	36.6	Pass	Pass	Pass
05/06/2021		5250		4.47	33.3	Pass	Pass	Pass
05/07/2021		5600		4.64	33.6	Pass	Pass	Pass
05/08/2021		5750		4.80	38.3	Pass	Pass	Pass
08/09/2021		5250	7533	4.29	36.90	Pass	Pass	Pass
08/11/2021		5600		4.72	37.10	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 for each day during the SAR assessment. 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
7533	IEEE/IEC Head	SPEAG D450V3 / 1054	4.57 +/- 10%	1.21	4.84	07/24/2021#
				1.16	4.64	07/25/2021#
				1.17	4.68	07/26/2021
				1.22	4.88	07/26/2021#
				1.24	4.96	07/27/2021
				1.22	4.88	07/28/2021#
				1.15	4.60	07/28/2021#
				1.18	4.72	07/29/2021#
				1.18	4.72	07/29/2021#
				1.17	4.68	07/30/2021#
				1.22	4.88	07/31/2021
				1.17	4.68	08/05/2021
				1.13	4.52	08/06/2021#
		SPEAG D5GHzV2_ 5250MHz / 1027	80.6 +/- 10%	7.27	72.70	08/31/2021#
				7.33	73.30	09/01/2021#
		SPEAG D5GHzV2_ 5600MHz / 1027	83.6 +/- 10%	7.69	76.90	08/31/2021#
7534		SPEAG D2450V3 / 703	52.9 +/- 10%	1.55	49.05	08/09/2021#
				1.65	52.22	08/10/2021#
		SPEAG D5GHzV2_ 5250MHz / 1027	80.6 +/- 10%	2.35	74.37	07/27/2021
				2.37	75.00	07/28/2021#
				2.52	79.75	08/05/2021#
				2.41	76.27	08/06/2021#
		SPEAG D5GHzV2_ 5600MHz / 1027	83.6 +/- 10%	2.42	76.58	07/29/2021#
				8.72	87.2	07/30/2021#
				2.30	72.78	08/03/2021#
				2.44	77.20	08/04/2021#
				2.47	83.60	08/08/2021
				2.66	84.18	08/12/2021#
		SPEAG D5GHzV2_ 5750MHz / 1027	79.7 +/- 10%	7.85	78.50	07/31/2021#
				2.81	72.15	01/08/2021#
				2.29	72.47	02/08/2021#
				2.30	72.78	03/08/2021#
				2.35	74.37	08/12/2021#

#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 14

Frequency (MHz)	Tissue Type	Conductivity Target (S/m)	Dielectric Constant Target	Conductivity Meas. (S/m)	Dielectric Constant Meas.	Tested Date
400	IEEE/ IEC Head	0.87 (0.83-0.91)	44.1 (41.9-46.3)	0.84	43.3	08/03/2021#
				0.84	44.0	08/05/2021
406		0.87 (0.83-0.91)	44 (41.8-46.2)	0.85	46.0	07/24/2021
				0.85	45.1	07/25/2021#
				0.83	46.0	07/26/2021#
				0.85	44.4	07/27/2021#
				0.83	44.5	07/28/2021#
				0.83	43.6	07/29/2021#
				0.84	43.6	07/31/2021
440		0.87 (0.83-0.91)	43.6 (41.4-45.8)	0.88	45.0	07/24/2021#
				0.86	45.2	07/26/2021#
				0.89	43.4	07/27/2021#
450		0.87 (0.83-0.91)	43.5 (41.3-45.7)	0.88	45.0	07/24/2021#
				0.89	44.20	07/25/2021#
				0.87	45.0	07/26/2021#
				0.89	43.4	07/27/2021#
				0.87	43.6	07/28/2021#
				0.87	42.6	07/29/2021#
				0.88	42.6	07/30/2021#
				0.86	43.20	07/31/2021
				0.88	42.8	08/05/2021
				0.84	42.9	08/06/2021#
458		0.87 (0.83-0.91)	43.5 (41.3-45.6)	0.89	44.8	07/24/2021#
				0.89	44.0	07/25/2021
				0.88	44.8	07/26/2021#
				0.90	43.2	07/27/2021#
				0.85	42.4	08/02/2021#
470		0.87 (0.83-0.91)	43.4 (41.2-45.6)	0.90	43.8	07/25/2021#
				0.89	44.6	07/26/2021#
				0.86	42.2	07/28/2021#
				0.87	42.8	07/31/2021
				0.86	42.2	08/02/2021#
				0.86	42.2	08/03/2021

				0.90	42.4	08/05/2021

Table 14 (Continued)

Frequency (MHz)	Tissue Type	Conductivity Target (S/m)	Dielectric Constant Target	Conductivity Meas. (S/m)	Dielectric Constant Meas.	Tested Date
475	IEEE/ IEC Head	0.87 (0.83-0.92)	43.4 (41.2-45.5)	0.91	44.5	07/24/2021#
				43.7	20.2	07/25/2021
				0.89	44.5	07/26/2021#
				0.91	42.9	07/27/2021#
484		0.87 (0.83-0.92)	43.3 (41.2-45.5)	0.88	43.1	07/26/2021
				0.88	43.4	07/27/2021
				0.87	42.0	07/28/2021
				0.89	42.5	07/31/2021
490		0.87 (0.83-0.92)	43.3 (41.1-45.5)	0.88	43.0	07/26/2021
496		0.87 (0.83-0.92)	43.3 (41.1-45.4)	0.89	43.2	07/27/2021
				0.90	42.2	07/31/2021
512		0.87 (0.83-0.92)	43.2 (41-45.3)	0.90	42.5	07/26/2021
				0.91	42.8	07/27/2021
				0.90	41.5	07/28/2021
				0.91	42.0	07/29/2021#
				0.91	41.9	07/31/2021
520		0.87 (0.83-0.92)	43.1 (41-45.3)	0.90	41.2	08/02/2021#
				0.91	41.2	08/03/2021
				0.89	41.5	08/04/2021#
527		0.88 (0.83-0.92)	43.1 (40.9-45.2)	0.91	41.0	08/02/2021#
						08/03/2021
2412		1.77 (1.68-1.86)	39.3 (35.3-43.2)	1.80	36.5	08/09/2021
2437		1.79 (1.7-1.88)	39.2 (35.3-43.1)	1.87	35.5	08/10/2021
2450		1.8 (1.71-1.89)	39.2 (35.3-43.1)	1.83	36.4	08/09/2021
				1.89	35.5	08/10/2021
2462		1.81 (1.72-1.9)	39.2 (35.3-43.1)	1.84	36.3	08/19/2021#
				1.90	35.4	08/10/2021
5250		4.71 (4.24-5.18)	36 (32.4-39.5)	4.27	38.9	07/27/2021
				4.29	39.2	07/28/2021
				4.35	39.4	08/31/2021#
5260		4.72 (4.25-5.19)	35.9 (32.3-39.5)	4.54	38.9	08/05/2021#
				4.31	38.4	08/06/2021
				4.37	39.4	08/31/2021#
5280		4.74 (4.27-5.21)	35.9 (32.3-39.5)	4.56	38.9	08/05/2021#
				4.39	39.3	08/31/2021#
5300		4.76 (4.28-5.24)	35.9 (32.3-39.5)	4.27	38.9	07/27/2021
				4.29	39.2	07/28/2021
				4.27	38.9	08/31/2021#
5320		4.78 (4.3-5.26)	35.9 (32.3-39.5)	4.61	38.8	08/05/2021#
				4.43	39.3	08/31/2021#

Table 14 (Continued)

Frequency (MHz)	Tissue Type	Conductivity Target (S/m)	Dielectric Constant Target	Conductivity Meas. (S/m)	Dielectric Constant Meas.	Tested Date
5500	IEEE/ IEC Head	4.97 (4.47-5.46)	35.7 (32.1-39.2)	4.63	38.2	08/03/2021#
				4.51	38.5	08/04/2021#
5560		5.03 (4.53-5.53)	35.6 (32-39.1)	4.54	38.4	08/03/2021#
				4.58	38.5	08/04/2021#
5580		5.05 (4.54-5.55)	35.5 (32-39.1)	4.56	38.3	08/03/2021#
				4.60	38.4	08/04/2021#
5600		5.07 (4.56-5.58)	35.5 (32-39.1)	4.66	38.7	07/28/2021#
				4.81	39	07/29/2021
				4.57	37.7	07/30/2021#
5640		5.11 (4.6-5.62)	35.5 (31.9-39)	4.71	38.6	07/28/2021#
				4.81	39.0	07/29/2021
				4.62	37.6	07/30/2021#
				4.65	37.9	08/08/2021#
				4.79	38.8	08/31/2021#
5660		5.13 (4.62-5.64)	35.4 (31.9-39)	4.62	37.4	08/12/2021#
5745		5.22 (4.69-5.74)	35.4 (31.8-38.9)	4.91	38.5	07/31/2021#
				4.70	38.4	08/01/2021#
				4.76	38.8	08/02/2021#
				4.74	38.1	08/03/2021#
5750		5.22 (4.7-5.74)	35.4 (31.8-38.9)	4.91	38.5	07/31/2021#
				4.7	38.4	08/01/2021#
				4.76	38.8	08/02/2021#
				4.75	38.1	08/03/2021#
5825		5.3 (4.77-5.83)	35.3 (31.7-38.8)	4.83	38.0	08/03/2021#

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°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: 18.0 – 24.7˚C Avg. 21.3 ˚C
Tissue Temperature	18 – 25 ˚C	Range: 18.6 – 21.5˚C Avg. 20.1˚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

12.3 Measurements

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

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

Table 16

Description		≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface		5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location		30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: ΔxArea, ΔyArea		≤ 2 GHz: ≤ 15 mm 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.			

12.4 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.

12.5 DUT Positioning Procedures

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

12.5.1 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.

12.5.2 Head

Not applicable.

12.5.3 Face

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

12.6 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

12.7 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"is scaled using the following formula:

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

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

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

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

12.8 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.

13.0 DUT Test Data for LMR

13.1 LMR assessments at the Body for 406.125 – 512.000 MHz band

Battery PMNN4809A 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 (406.125-512.0 MHz) 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). SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 17

Test Freq (MHz)	Power (W)
406.125	4.69
422.300	4.64
435.400	4.63
440.000	4.60
441.400	4.63
450.000	4.71
457.900	4.68
470.000	4.60
475.000	4.63
484.000	4.63
490.000	4.63
496.200	4.64
512.000	4.67

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

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#
AN000348A01	PMNN4809A	HLN6602A	PMMN4128A	406.125	4.74	-0.25	6.22	3.34	AMN-AB-210724-02
AN000350A01				450.000	4.70	-0.63	5.29	3.12	AMN-AB-210725-01#
AN000351A01				450.000	4.70	-0.48	7.67	4.37	AMN-AB-210725-02#
				440.000	4.63	-0.43	9.04	5.17	AMN-AB-210725-03#
				457.900	4.69	-0.46	7.83	4.45	AMN-AB-210725-04#
				475.000	4.65	-0.81	5.78	3.59	AMN-AB-210725-05#
PMAE4069A				450.000	4.71	-0.25	4.76	2.57	AMN-AB-210725-06#
PMAE4070A				450.000	4.69	-0.52	9.17	5.29	AMN-AB-210725-07#
				440.000	4.64	-0.36	9.83	5.52	AMN-AB-210725-08#
				457.900	4.68	-0.28	9.33	5.10	AR-AB-210725-10
				475.000	4.63	-0.42	7.65	4.37	AR-AB-210725-11
				470.000	4.60	-0.48	8.19	4.77	AR-AB-210726-01#
				490.000	4.67	-0.57	5.57	3.26	AR-AB-210726-04
PMAE4071A				512.000	4.69	-0.30	8.56	4.69	AR-AB-210726-05
				496.200	4.64	-0.84	6.81	4.27	AR-AB-210726-06
				484.000	4.65	-0.55	8.11	4.75	AR-AB-210726-07
				470.000	4.61	-0.57	**9.89**	**5.87**	AR-AB-210726-08
PMAE4079A				406.125	4.80	-0.03	5.48	2.76	MA(BAD)-AB-210726-15
Additional batteries									
AN000351A01	PMNN4807A	HLN6602A	PMMN4128A	440.000	4.62	-0.63	8.18	4.91	MA(BAD)-AB-210726-16
PMAE4070A				440.000	4.63	-0.55	9.34	5.50	MA(BAD)-AB-210726-17
PMAE4071A				470.000	4.80	-0.66	9.91	5.77	MA(BAD)-AB-210726-18
AN000351A01	PMNN4808A			440.000	4.63	-0.83	7.01	4.40	AMN-AB-210726-19
PMAE4070A				440.000	4.65	-0.85	7.35	4.61	AMN-AB-210726-20
PMAE4071A				470.000	4.79	-0.86	7.57	4.62	AMN-AB-210726-21
AN000351A01	PMNN4810A			440.000	4.65	-0.59	6.72	3.97	AMN-AB-210726-22
PMAE4070A				440.000	4.63	-0.67	6.94	4.20	AMN-AB-210727-01#

PMAE4071A				470.000	4.80	-0.54	6.90	3.91	AMN-AB-210727-02#

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

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	PMNN4809A	PMLN4651A	PMMN4128A	406.125	4.76	-0.51	4.16	2.36	AMN-AB-210727-03#
AN000350A01				450.000	4.71	-0.61	4.06	2.38	AMN-AB-210727-05#
AN000351A01				450.000	4.70	-0.66	6.54	3.89	AMN-AB-210727-06#
				475.000	4.66	-0.70	5.36	3.24	AMN-AB-210727-07#
PMAE4069A				450.000	4.69	-0.62	4.09	2.41	AMN-AB-210727-08#
PMAE4070A				450.000	4.70	-0.51	7.62	4.38	AMN-AB-210727-09#
				440.000	4.56	-0.31	7.36	4.16	MA(BAD)-AB-210727-10#
				457.900	4.80	-0.45	7.55	4.19	MA(BAD)-AB-210727-11#
				475.000	4.80	-0.55	6.73	3.82	MA(BAD)-AB-210727-12#
PMAE4071A				512.000	4.80	-1.08	6.74	4.32	MA(BAD)-AB-210727-18
				496.200	4.80	-0.71	6.15	3.62	MA(BAD)-AB-210727-19
				484.000	4.80	-0.55	6.01	3.41	MA(BAD)-AB-210727-20
PMAE4079A				406.125	4.78	-0.34	3.90	2.12	AMN-AB-210728-02#
Additional batteries									
PMAE4070A	PMNN4807A	PMLN4651A	PMMN4128A	450.000	4.72	-0.56	7.27	4.21	AMN-AB-210728-03#
PMAE4071A				512.000	4.74	-0.59	**7.68**	**4.45**	AMN-AB-210728-05#
PMAE4070A	PMNN4808A			450.000	4.75	-0.78	5.70	3.45	AMN-AB-210728-06#
PMAE4071A				512.000	4.80	-0.88	5.37	3.29	AMN-AB-210728-07#
PMAE4070A	PMNN4810A			450.000	4.77	-0.46	5.36	3.00	AMN-AB-210728-09#
PMAE4071A				512.000	4.80	-0.87	4.82	2.94	AMN-AB-210728-10#

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

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	PMNN4809A	PMLN7008A	PMMN4128A	406.125	4.78	-0.23	3.99	2.11	MA(BAD)-AB-210728-11#
AN000350A01				450.000	4.80	-0.39	4.01	2.19	MA(BAD)-AB-210728-12#
AN000351A01				450.000	4.80	-0.39	6.66	3.64	MA(RY)-AB-210728-13#
				475.000	4.77	-0.56	5.12	2.93	MA(RY)-AB-210728-14#
PMAE4069A				450.000	4.80	-0.35	4.05	2.19	MA(BAD)-AB-210728-15#
PMAE4070A				450.000	4.80	-0.49	8.00	4.48	MA(BAD)-AB-210728-16#
				440.000	4.64	-0.13	7.19	3.83	MA(RY)-AB-210728-17#
				457.900	4.80	-0.43	7.91	4.37	MA(RY)-AB-210728-18#
				475.000	4.80	-0.66	6.83	3.98	MA(BAD)-AB-210728-19#
PMAE4071A				512.000	4.80	-0.23	7.30	3.85	MA(RY)-AB-210728-21
				484.000	4.80	-0.52	7.24	4.08	MA(RY)-AB-210728-22
				470.000	4.80	-0.51	**8.52**	**4.79**	MA(RY)-AB-210728-23
PMAE4079A				406.125	4.79	-0.28	3.80	1.98	AMN-AB-210728-25
Additional batteries									
PMAE4070A	PMNN4807A	PMLN7008A	PMMN4128A	450.000	4.80	-0.66	7.89	4.59	AMN-AB-210728-26
PMAE4071A				512.000	4.80	-0.63	8.06	4.66	AMN-AB-210728-27
PMAE4070A	PMNN4808A			450.000	4.78	-0.79	5.82	3.51	AMN-AB-210729-01#
PMAE4071A				512.000	4.80	-0.84	5.92	3.59	AMN-AB-210729-02#
PMAE4070A	PMNN4810A			450.000	4.77	-0.44	5.15	2.87	AMN-AB-210729-03#
PMAE4071A				512.000	4.80	-0.57	5.63	3.21	AMN-AB-210729-04#

Assessments at the Body with Body worn PMLN8302A 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. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

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	PMNN4809A	PMLN8302A w/o belt loop w/ NTN5243A	PMMN4128A	406.125	4.80	-0.30	2.60	1.41	MA(RY)-AB-210729-10#
AN000350A01				450.000	4.80	-0.47	2.64	1.47	MA(RY)-AB-210729-11#
AN000351A01				450.000	4.80	-0.49	4.56	2.55	MA(RY)-AB-210729-12#
PMAE4069A				450.000	4.80	-0.25	2.61	1.38	MA(RY)-AB-210729-13#
PMAE4070A				450.000	4.80	-0.36	5.33	2.90	MA(RY)-AB-210729-14#
PMAE4071A				512.000	4.80	-0.45	5.52	3.06	AMN-AB-210730-02#
PMAE4079A				406.125	4.79	-0.20	2.53	1.32	AMN-AB-210729-19
Additional batteries									
PMAE4071A	PMNN4807A	PMLN8302A w/o belt loop w/ NTN5243A	PMMN4128A	512.000	4.80	-0.87	**6.29**	**3.84**	AMN-AB-210730-01#
PMAE4071A	PMNN4808A			512.000	4.80	-1.02	4.56	2.89	AMN-AB-210730-03#
PMAE4071A	PMNN4810A			512.000	4.80	-0.94	4.26	2.64	AMN-AB-210730-05#

Assessments at the Body with Body worn PMLN8304A 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. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

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	PMNN4809A	PMLN8304A w/ NTN5243A	PMMN4128A	406.125	4.76	-0.38	1.88	1.03	AMN-AB-210730-06#
AN000350A01				450.000	4.80	-0.35	1.79	0.97	AMN-AB-210730-07#
AN000351A01				450.000	4.80	-0.52	2.80	1.58	AMN-AB-210730-08#
PMAE4069A				450.000	4.79	-0.54	1.91	1.08	AMN-AB-210730-09#
PMAE4070A				450.000	4.80	-0.53	**3.56**	**2.01**	AMN-AB-210730-10#
PMAE4071A				512.000	4.80	-0.32	3.68	1.98	AMN-AB-210730-11#
PMAE4079A				406.125	4.75	-0.07	1.37	0.70	AMN-AB-210730-12#
Additional batteries									
PMAE4070A	PMNN4807A	PMLN8304A w/ NTN5243A	PMMN4128A	450.000	4.80	-0.40	3.12	1.71	AMN-AB-210730-13#
PMAE4070A	PMNN4808A			450.000	4.80	-0.79	2.71	1.63	AMN-AB-210730-14#
PMAE4070A	PMNN4810A			450.000	4.56	-0.48	2.59	1.52	AMN-AB-210730-15#

Assessments at the Body with Body worn PMLN8302A w/o belt loop w/ RLN6487A w/ RLN6488A

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

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	PMNN4809A	PMLN8302A w/o belt loop w/ RLN6487A w/ RLN6488A	PMMN4128A	406.125	4.70	-0.07	2.50	1.30	MA(RY)-AB-210730-16#
AN000350A01				450.000	4.80	-0.40	2.38	1.30	MA(RY)-AB-210730-17#
AN000351A01				450.000	4.80	-0.64	4.65	2.69	AMN-AB-210730-20
PMAE4069A				450.000	4.80	-0.55	3.01	1.71	AMN-AB-210730-21
PMAE4070A				450.000	4.80	-0.62	5.97	3.44	AMN-AB-210730-22
PMAE4071A				512.000	4.79	-0.86	**6.61**	**4.04**	AMN-AB-210731-02
				496.200	4.77	-0.93	4.80	2.99	AMN-AB-210731-03
				484.000	4.80	-0.67	5.81	3.39	AMN-AB-210731-04
PMAE4079A				406.125	4.80	-0.42	2.76	1.52	AMN-AB-210731-05
Additional batteries									
PMAE4070A	PMNN4807A	PMLN8302A w/o belt loop w/ RLN6487A w/ RLN6488A	PMMN4128A	512.000	4.80	-0.73	6.11	3.61	AMN-AB-210731-07
PMAE4070A	PMNN4808A			512.000	4.80	-1.02	4.76	3.01	AMN-AB-210731-08
PMAE4070A	PMNN4810A			512.000	4.64	-0.42	4.75	2.71	MA(BAD)-AB-210731-09

Assessment at the Body with other audio accessories

Assessment of additional audio accessories per "KDB 643646 Body SAR Test Consideration for Audio Accessories without Built-in Antenna" Section 1, A. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

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#
PMAE4071A	PMNN4809A	HLN6602A	PMLN8086A	470.000	4.80	-0.45	10.30	5.71	MA(BAD)-AB-210731-10
			PMLN8337A			-0.54	10.10	5.72	MA(BAD)-AB-210731-11
			PMLN8295A			-0.48	10.10	5.64	MA(BAD)-AB-210731-12
			PMLN8343A			-0.45	**10.50**	**5.82**	MA(BAD)-AB-210731-13
			PMLN8297A w/ PMLN8265A			-0.46	10.30	5.73	MA(BAD)-AB-210731-14

Assessment of wireless BT configurations

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 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#
PMAE4071A	PMNN4809A	HLN6602A	None(BT)	470.000	4.80	-0.37	**11.30**	**6.15**	AMN-AB-210803-19
				484.000	4.80	-0.45	9.46	5.25	MA(BAD)-AB-210731-16

13.2 LMR assessments at the Face for 406.125 - 512.000MHz band

Battery PMNN4810A 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 MHz) which are listed in Table 26. The channel with the highest conducted power will be identified as the default channel per KDB 643646 (SAR Test for PTT Radios). SAR plots of the highest results per Table (bolded) are presented in Appendix F.

Table 26

Test Freq (MHz)	Power (W)
406.125	4.52
422.300	4.50
435.400	4.53
440.000	4.51
441.400	4.55
450.000	4.56
457.900	4.50
470.000	4.60
475.000	4.51
484.000	4.64
490.000	4.58
496.200	4.58
512.000	4.55

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 67 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in 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#
AN000348A01	PMNN4810A	@ front	None	406.125	4.80	-0.45	3.75	2.11	AR-FACE-210726-02#
AN000350A01				450.000	4.80	-0.18	2.62	1.45	MA(BAD)-FACE-210726-09
AN000351A01				450.000	4.80	-0.25	4.22	2.35	MA(BAD)-FACE-210726-10
PMAE4069A				450.000	4.80	-0.25	2.46	1.37	MA(BAD)-FACE-210726-11
PMAE4070A				450.000	4.80	-0.29	5.01	2.85	MA(BAD)-FACE-210726-12
PMAE4071A				512.000	4.80	-0.16	4.25	2.24	MA(BAD)-FACE-210726-13
PMAE4079A				406.125	4.80	-0.58	3.48	2.06	MA(BAD)-FACE-210727-13#
Additional batteries									
PMAE4070A	PMNN4807A	@ front	None	450.000	4.80	-0.50	5.35	3.00	MA(BAD)-FACE-210727-14#
PMAE4070A	PMNN4808A			450.000	4.80	-0.58	5.38	3.07	MA(BAD)-FACE-210727-15#
PMAE4070A	PMNN4809A			450.000	4.79	-0.40	**6.75**	**3.71**	AMN-FACE-210806-09

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 at the Body 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 28

Mode	Channel #	Channel Frequency	Modulation	Battery: PMNN4809A	Antenna Max Power [mW]
				Antenna port[mW]	
802.11b (1Mbps)	1	2412	DSSS	24.7	31.6
	6	2437		23.7	
	11	2462		22.5	
802.11g (6Mbps)	1	2412	OFDM	24.0	
	6	2437		22.9	
	11	2462		21.6	
802.11n (MCS0)	1	2412	OFDM	24.4	
	6	2437		23.1	
	11	2462		21.7	

Assessments at the Body with all offered Body worn

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

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#
WLAN ant AN000389A01	PMNN4809A	HLN6602A	None	2412.0000	0.0247	0.01	0.021	0.028	BL(SAN)-AB-210809-05
		PMLN4651A				0.04	0.011	0.014	MF-AB-210809-06
		PMLN7008A				-0.03	0.014	0.018	BL(SAN)-AB-210809-07
		PMLN8302A w/o belt loop w/ NTN5243A				0.21	0.009	0.012	BL(SAN)-AB-210809-08
		PMLN8304A w/ NTN5243A				0.00	0.010	0.013	BL(SAN)-AB-210809-09
		PMLN8302A w/o belt loop w/ RLN6487A w/ RLN6488A				-0.18	0.009	0.012	BL(SAN)-AB-210809-10
Additional batteries									
WLAN ant AN000389A01	PMNN4807A	HLN6602A	None	2412.0000	0.0247	-0.10	0.021	**0.029**	BL(SAN)-AB-210809-11
	PMNN4808A					-0.18	0.016	0.021	BL(SAN)-AB-210809-12
	PMNN4810A					0.12	0.014	0.018	BL(SAN)-AB-210809-13

14.2 WLAN assessments at the Face 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 30

Mode	Channel #	Channel Frequency	Modulation	Battery: PMNN4809A Antenna port[mW]	Antenna Max Power [mW]
802.11b (1Mbps)	1	2412	DSSS	24.7	31.6
	6	2437		23.7	
	11	2462		22.5	
802.11g (6Mbps)	1	2412	OFDM	24.0	
	6	2437		22.9	
	11	2462		21.6	
802.11n (MCS0)	1	2412	OFDM	25.1	
	6	2437		24.0	
	11	2462		22.4	

DUT assessment with WLAN internal antenna using all offered batteries with front of the DUT 2.5 cm from the phantom. Refer to Table 30 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix F.

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#
WLAN ant AN000389A01	PMNN4810A	@ front	None	2412.0000	0.0245	0.00	0.024	**0.031**	MFR-FACE-210809-14
Additional Batteries									
WLAN ant AN000389A01	PMNN4807A	@ front	None	2412.0000	0.0243	0.14	0.021	0.028	MFR-FACE-210809-15
	PMNN4808A				0.0244	0.07	0.022	0.029	MFR-FACE-210809-16
	PMNN4809A				0.0247	0.17	0.021	0.026	MFR-FACE-210809-17

14.3 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 32

Band	802.11	Ch. BW	Ch.	Freq. (MHz)	Measured conducted power (W)
U-NII-1 (5.15-5.25GHz)	a	20	36	5180	0.0445
			40	5200	0.0455
			44	5220	0.0472
			48	5240	0.0454
	n		36	5180	0.0463
			40	5200	0.0474
			44	5220	0.0492
			48	5240	0.0474
	ac		36	5180	0.0468
			40	5200	0.0479
			44	5220	0.0494
			48	5240	0.0480
UNII-2A (5.25-5.35GHz)	a	20	52	5260	0.0433
			56	5280	0.0407
			60	5300	0.0439
			64	5320	0.0410
	n		52	5260	0.0452
			56	5280	0.0428
			60	5300	0.0455
			64	5320	0.0426
	ac		52	5260	0.0458
			56	5280	0.0434
			60	5300	0.0462
			64	5320	0.0435

Table 32 (Continue)

Band	802.11	Ch. BW	Ch.	Freq. (MHz)	Measured conducted power (W)
U-NII-2C (5.47-5.65 GHz)	a	20	100	5500	0.0204
			112	5560	0.0202
			116	5580	0.0213
			128	5640	0.0218
	n		100	5500	0.0214
			112	5560	0.0213
			116	5580	0.0224
			128	5640	0.0229
	ac		100	5500	0.0214
			112	5560	0.0212
			116	5580	0.0223
			128	5640	0.0226
UNII-3 (5.65-5.85 GHz)	a	20	132	5660	0.0222
			149	5745	0.0271
			165	5825	0.0200
	n		132	5660	0.0232
			149	5745	0.0286
			165	5825	0.0211
	ac		132	5660	0.0232
			149	5745	0.0286
			165	5825	0.0212

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

Table below presents the data of the body assessment.

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#
AN000389A01	PMNN4809A	HLN6602A	None	5300.000	0.0433	-0.42	0.219	**0.362**	MA(RY)-AB-210727-06
		PMLN4651A				-0.30	0.102	0.164	MA(RY)-AB-210727-07
		PMLN7008A				-0.03	0.112	0.169	AR(SAN)-AB-210727-09
		PMLN8302A w/o belt loop w/ NTN5243A				-0.22	0.027	0.043	MHI-AB-210728-07
		PMLN8304A w/ NTN5243A				-0.26	0.019	0.029	MHI-AB-210728-09
		PMLN8302A w/o belt loop w/ RLN6487A w/ RLN6488A				-0.12	0.109	0.168	MHI-AB-210728-11
Assessment of Additional Battery									
AN000389A01	PMNN4807A	HLN6602A	None	5300.000	0.0427	-0.17	0.224	0.355	MHI-AB-210728-12
	PMNN4808A				0.0428	-0.14	0.195	0.306	AF-AB-210728-13
	PMNN4810A				0.0439	-0.11	0.171	0.260	AF-AB-210728-14

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

Table below presents the data of the face assessment.

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#
AN000389A01	PMNN4810A	@ front	None	5300.000	0.0439	0.04	0.108	0.160	AF-FACE-210728-15
Assessment of Additional Battery									
AN000389A01	PMNN4807A	@ front	None	5300.000	0.0427	-0.03	0.127	**0.195**	AF-FACE-210729-01#
	PMNN4808A				0.0428	-0.24	0.108	0.173	AF-FACE-210729-03#
	PMNN4809A				0.0433	0.03	0.088	0.133	AF-FACE-210729-02#

Assessments at the Body U-NII-2C (5.47-5.65 GHz)

Table below presents the data of the body assessment

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#
AN000389A01	PMNN4809A	HLN6602A	None	5640.000	0.0213	0.10	0.061	**0.093**	MHI-AB-210729-10
		PMLN4651A				0.28	0.025	0.038	MHI-AB-210729-11
		PMLN7008A				-0.27	0.037	0.060	AR-AB-210831-17
		PMLN8302A w/o belt loop w/ NTN5243A				0.09	0.017	0.026	MA(BAD)-AB-210831-20
		PMLN8304A w/ NTN5243A				0.14	0.007	0.010	AF-AB-210730-02#
		PMLN8302A w/o belt loop w/ RLN6487A w/ RLN6488A				0.03	0.003	0.005	AF-AB-210730-04#
Assessment of Additional Battery									
AN000389A01	PMNN4807A	HLN6602A	None	5640.000	0.0213	-0.07	0.059	0.092	AF-AB-210730-05#
	PMNN4808A				0.0212	-0.28	0.047	0.076	AF(SAN)-AB-210731-01#
	PMNN4810A				0.0218	0.21	0.039	0.059	AF(SAN)-AB-210731-02#

Assessments at the Face U-NII-2C (5.47-5.65 GHz)

Table below presents the data of the Face assessment

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#
AN000389A01	PMNN4810A	@ front	None	5640.000	0.0218	-0.19	0.029	0.045	AF-FACE-210729-05#
Assessment of Additional Battery									
AN000389A01	PMNN4807A	@ front	None	5640.000	0.0213	-0.13	0.0367	0.058	MHI-FACE-210729-07
	PMNN4808A				0.0212	-0.20	0.037	**0.060**	MHI-FACE-210729-08
	PMNN4809A				0.0213	-0.08	0.0372	0.058	MHI-FACE-210729-09

Assessments at the Body U-NII-3 (5.65-5.85 GHz)

Table below presents the data of the body assessment.

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#
AN000389A01	PMNN4809A	HLN6602A	None	5745.000	0.0267	-0.36	0.076	**0.101**	AF(SAN)-AB-210731-05
		PMLN4651A				0.03	0.025	0.031	AF(SAN)-AB-210801-03#
		PMLN7008A				-0.27	0.021	0.027	AF(SAN)-AB-210801-06
		PMLN8302A w/o belt loop w/ NTN5243A				-0.40	0.011	0.015	AF(SAN)-AB-210802-01#
		PMLN8304A w/ NTN5243A				0.04	0.004	0.005	MHI-AB-210803-01#
		PMLN8302A w/o belt loop w/ RLN6487A w/ RLN6488A				0.41	0.023	0.028	AF-AB-210803-04#
Assessment of Additional Battery									
AN000389A01	PMNN4807A	HLN6602A	None	5745.000	0.0267	-0.31	0.071	0.093	AF-AB-210803-05#
	PMNN4808A				0.0267	-0.45	0.062	0.084	AF-AB-210803-06#
	PMNN4810A				0.0267	-0.44	0.059	0.079	AF-AB-210803-08#

Assessments at the Face U-NII-3 (5.65-5.85 GHz)

Table below presents the data of the Face assessment.

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#
AN000389A01	PMNN4810A	@ front	None	5745.000	0.0271	0.13	0.057	**0.068**	AF-FACE-210803-09#
Assessment of Additional Battery									
AN000389A01	PMNN4807A	@ front	None	5745.000	0.0267	-0.42	0.044	0.059	AF-FACE-210803-10#
	PMNN4808A				0.0267	-0.03	0.049	0.060	MHI-FACE-210803-13
	PMNN4809A				0.0267	-0.08	0.048	0.059	MHI-FACE-210804-01#

14.4 Assessment 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 (406.125-430 MHz) and (450-470 MHz) 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.

For LMR UHF band, the antenna from the highest Body configuration SAR configuration has frequency range of 470-527 MHz, so only 470MHz is performed.

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#
Body (UHF)									
PMAE4071A	PMNN4809A	HLN6602A	None(BT)	470.000	4.75	-0.35	**11.50**	**6.30**	AMN-AB-210805-09
Face (UHF)									
PMAE4070A	PMNN4809A	@ front	None	450.000	4.79	-0.40	**6.75**	**3.71**	AMN-FACE-210806-09
				457.9000	4.80	-0.34	5.70	3.08	MA(BAD)-FACE-210803-05#
				470.0000	4.80	-0.29	5.05	2.70	MA(BAD)-FACE-210803-06#
WLAN 2.4GHz (Body)									
AN000389A01	PMNN4807A	HLN6602A	None	2412.000	0.0243	-0.10	**0.021**	**0.029**	BL(SAN)-AB-210809-11
				2437.000	0.0232	-0.19	0.017	0.024	BL(SAN)-AB-210810-09
				2462.000	0.0243	-0.22	0.015	0.021	BL(SAN)-AB-210810-11
WLAN 2.4GHz (Face)									
AN000389A01	PMNN4810A	@ front	None	2412.000	0.0245	0.00	0.024	0.031	MFR-FACE-210809-14
				2437.000	0.0233	0.00	0.030	0.042	MFR-FACE-210810-01#
				2462.000	0.0218	0.07	**0.038**	**0.056**	MFR-FACE-210810-02#
WLAN U-NII-2A 5.25 – 5.35GHz (Body)									
AN000389A01	PMNN4807A	HLN6602A	None	5260.000	0.043	-0.23	**0.226**	**0.363**	MA(BAD)-AB-210901-02#
				5280.000	0.040	-0.19	0.208	0.351	MA(BAD)-AB-210901-03#
				5300.000	0.043	-0.42	0.219	0.362	MA(RY)-AB-210727-06
				5320.000	0.040	-0.47	0.168	0.301	MA(BAD)-AB-210901-04#
WLAN U-NII-2A 5.25 – 5.35GHz (Face)									
AN000389A01	PMNN4807A	@ front	None	5260.000	0.043	0.34	0.113	0.172	BL(SAN)-FACE-210806-06#
				5280.000	0.040	-0.02	0.124	0.201	MFR-FACE-210806-05#
				5300.000	0.044	-0.03	0.127	0.189	AF-FACE-210729-01#
				5320.000	0.040	-0.04	**0.144**	**0.234**	BL(SAN)-FACE-210806-07#

Table 39 (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	PMNN4809A	HLN6602A	None	5500.000	0.0203	-0.06	0.045	0.073	MHI-AB-210804-13
				5560.000	0.0201	-0.09	0.044	0.072	MHI-AB-210805-01#
				5580.000	0.0212	-0.11	0.038	0.060	MHI-AB-210805-02#
				5640.000	0.0213	0.05	**0.074**	**0.113**	AF-AB-210812-08#
WLAN U-NII-2C, 5.47-5.725GHz (Face)									
AN000389A01	PMNN4808A	@ front	None	5500.000	0.0201	0.19	0.007	0.012	AF-FACE-210804-08#
				5560.000	0.0200	-0.41	0.027	0.049	AF-FACE-210804-10#
				5580.000	0.0210	-0.41	0.020	0.034	AF-FACE-210804-11#
				5640.000	0.0212	-0.25	**0.050**	**0.082**	MFR-FACE-210809-03#
WLAN U-NII-3, 5.65-5.85GHz (Body)									
AN000389A01	PMNN4809A	HLN6602A	None	5660.000	0.0217	-0.17	**0.078**	**0.122**	MHI-AB-210813-01#
				5745.000	0.0267	-0.36	0.076	0.101	AF(SAN)-AB-210731-05
				5825.000	0.0200	-0.43	0.054	0.097	AF-AB-210804-05#
WLAN U-NII-3, 5.65-5.85GHz (Face)									
AN000389A01	PMNN4810A	@ front	None	5660.000	0.0222	-0.29	0.035	0.055	MHI-FACE-210804-02#
				5745.000	0.0271	0.31	**0.057**	**0.068**	AF-FACE-210803-09#
				5825.000	0.0200	-0.10	0.028	0.047	MHI-FACE-210804-03#

14.5 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)] *[$\sqrt{F}_{(GHz)}$] = 2.92, 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.

14.5.1 ISED Requirement

Based on RSS-102 Issue 5, exemption limits for SAR evaluation for controlled devices at Bluetooth frequency band with separation distance ≤ 5mm was 20 mW.

Standalone Bluetooth transmitter operates at
Maximum conducted power:
= 12.02 mW * 77.0%
= 9.26 mW or 9.67dBm
Equivalent isotropically radiated power (EIRP):
= Maximum conducted power, dBm + Antenna gain, dBi
= 9.66 dBm + (2.3 dBi)
= 11.96dBm or 15.7mW

Higher output power level, maximum power 15.7 mW was below the threshold power level 20mW. Hence SAR test was not required for Bluetooth band.

14.6 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 F.

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#
Body									
AN000348A01	PMNN4809A	HLN6602A	None (BT)	400.000	4.67	-0.45	8.36	4.77	MA(BAD)-AB-210804-02#
				519.500	4.80	-0.72	8.19	4.83	MA(BAD)-AB-210806-05
				527.000	4.80	-0.82	7.86	4.75	MA(BAD)-AB-210803-02#
AN000350A01				400.000	4.72	-0.51	7.07	4.04	MA(BAD)-AB-210805-04
PMAE4069A				400.000	4.56	-0.27	5.54	3.10	MA(BAD)-AB-210805-11
PMAE4071A				519.500	4.80	-0.63	**11.60**	**6.71**	AMN-AB-210806-07
				527.000	4.80	-0.84	10.40	6.31	MA(BAD)-AB-210802-13
PMAE4079A				400.000	4.66	-0.36	6.95	3.89	MA(BAD)-AB-210804-05#
				519.500	4.80	-0.74	8.24	4.89	MA(BAD)-AB-210806-06
				527.000	4.80	-0.85	7.26	4.41	MA(BAD)-AB-210803-04#
Face									
AN000348A01	PMNN4809A	@ front	None	400.000	4.80	-0.38	5.12	2.79	MA(BAD)-FACE-210803-22
				519.500	4.80	-0.19	4.24	2.21	MA(BAD)-FACE-210803-07#
				527.000	4.80	-0.68	4.19	2.45	AMN-FACE-210803-09
AN000350A01				400.000	4.65	-0.79	4.10	2.54	MA(BAD)-FACE-210803-23
PMAE4069A				400.000	4.64	-0.43	3.56	2.03	MA(BAD)-FACE-210803-24
PMAE4071A				519.500	4.80	-0.35	**6.12**	**3.32**	AMN-FACE-210803-11
				527.000	4.80	-0.75	5.49	3.26	AMN-FACE-210803-10
PMAE4079A				400.0000	4.64	-0.24	4.22	2.31	MA(BAD)-FACE-210804-01#
				519.5000	4.79	-0.25	4.06	2.15	AMN-FACE-210803-12
				527.0000	4.80	-0.68	3.73	2.18	AMN-FACE-210803-13

14.7 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 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#
PMAE4071A	PMNN4809A	HLN6602A	None(BT)	470.000	4.75	-0.35	**11.50**	**6.30**	AMN-AB-210805-09

15.0 Simultaneous Transmission

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

Table 42

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

15.1 Simultaneous Transmission Exclusion for BT

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

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

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

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

15.2 Simultaneous Transmission for LMR, WLAN 2.4GHz, WLAN 5GHz

Table 43

Exposure condition	Standalone SAR (W/kg)			Sum of SAR (W/kg)	
	LMR	2.4GHz	5GHz	LMR + 2.4GHz	LMR + 5GHz
Body worn Exposure	6.30	0.029	0.363	6.33	6.66
Face Exposure	3.71	0.056	0.234	3.77	3.94

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.

16.0 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 average SAR values found for this filing:

Table 44

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	6.30	3.71
WLAN	2412-2462	0.029	0.056
	5180 - 5825	0.363	0.234
Simultaneous Results		6.66	3.94
ISED Canada			
LMR	406.125-430; 450-470	6.30	3.71
WLAN	2412-2462	0.029	0.056
	5180 - 5825	0.363	0.234
Simultaneous Results		6.66	3.94
Overall			
LMR	400-527	6.71	3.71
WLAN	2412-2472	0.029	0.056
	5180 - 5825	0.363	0.234
Simultaneous Results		7.07	3.94

All results are scaled to the maximum output power.

17.0 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 45

Run#	Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Adj Calc. 1g-SAR (W/kg)	Ratio	Comments
AMN-AB-210803-19	PMAE4071A	PMNN4809A	HLN6602A	None(BT)	470.000	6.15	1.01	No additional repeated scans is required due to the Ratio (SAR_{high}/SAR_{low}) < 1.20
AMN-AB-210805-09						6.23		

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 17025 a reported system uncertainty is required and therefore measurement uncertainty budget is included in Appendix B.

Appendix A
Model(s) Certified

All certified model(s) listed below have identical PCB layout, design and functionality compare to Tested models:

Model Number	Description
AAH06RDC9RA1AN (PMUE5723AAA) (IC Model: PMUE5723AAA)	MOTOTRBO R7 403-512M 4W TIA NKP BT WIFI GPS ENABLED
AAH06RDC9WA1AN (PMUE5723AAA) (IC Model: PMUE5723AAA)	MOTOTRBO R7 403-512M 4W TIA NKP CFS BT WIFI GPS CAPABLE
AAH06RDC9WA1AN (PMUE5723ABA) (IC Model: PMUE5723ABA)	MOTOTRBO R7 403-512M 4W TIA NKP CFS BT WIFI GPS CAPABLE GOB
AAH06RDN9RA1AN (PMUE5722AAB) (IC Model: PMUE5722AAB)	MOTOTRBO R7 403-512M 4W TIA FKP BT WIFI GPS ENABLED
AAH06RDN9RA1AN (PMUE5724AAB) (IC Model: PMUE5724AAB)	MOTOTRBO R7 403-512M 4W FKP BT WIFI GPS ENABLED
AAH06RDN9WA1AN (PMUE5722AAB) (IC Model: PMUE5722AAB)	MOTOTRBO R7 403-512M 4W TIA FKP CFS BT WIFI GPS CAPABLE
AAH06RDN9WA1AN (PMUE5722ABB) (IC Model: PMUE5722ABB)	MOTOTRBO R7 403-512M 4W TIA FKP CFS BT WIFI GPS CAPABLE GOB
AAH06RDN9WA1AN (PMUE5724AAB) (IC Model: PMUE5724AAB)	MOTOTRBO R7 403-512M 4W FKP CFS BT WIFI GPS CAPABLE

Appendix B
Measurement Uncertainty Budget

Uncertainty Budget for System Validation (Dipole & Flat Phantom) for 450 MHz

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

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

Uncertainty Budget for Device Under Test, for 450 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 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 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 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 3 to 6 GHz

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

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

Appendix C
Probe Calibration Certificates

Please refer report 2 of 4

Appendix D
Dipole Calibration Certificates

Please refer report 3 of 4

Appendix E
SAR Summary Results Table for FCC PAG review

Please refer report 3 of 4