MOTOROLA SOLUTIONS

SAMM 826

CERTIFICATE 2518.05

DECLARATION OF COMPLIANCE SAR ASSESSMENT Part 1 of 3

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: **10/12/2022**
Report Revision: **D**

Responsible Engineer:	Puteri Alifah Ilyana Binti Nor Rahim (EME Engineer)
Report Author:	Muhammad Hizami Bin Ismail (EME Senior Technician)
Date/s Tested:	7/28/2022-8/4/2022, 8/6/2022-8/20/2022, 8/25/2022, 8/29/2022, 8/31/2022
Manufacturer:	Motorola Solutions Inc.
DUT Description:	Handheld Portable – APX N70 Device without pin for battery control Non-UL model
Test TX mode(s):	CW (PTT), BT, WLAN, LTE
Max. Power output:	Refer Table 3
TX Frequency Bands:	Refer Table 3
Signaling type:	FM, QPSK, 16QAM, FHSS, DSSS, OFDM, TDMA and NFC
Model(s) Tested:	H35UCT9PW8AN
Model(s) Certified:	H35UCT9PW8AN
Serial Number(s):	022TYP0015, 022TYP0026, 022TYP0006
Classification:	Occupational/Controlled
Applicant Name:	Motorola Solutions Inc.
Applicant Address:	8000 West Sunrise Boulevard, Fort Lauderdale, Florida 33322
FCC ID:	AZ489FT7147; This report contains results that are immaterial for FCC equipment approval, which are clearly identified.
IC:	109U-89FT7147; 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: 10/12/2022

Part 1 of 3

Report Revision History

Date	Revision	Comments
09/02/2022	A	Initial release
09/13/2022	B	Re-generate the pdf file and amend the Table 4
10/11/2022	C	Update the Body Simultaneous SAR value, Table 3 and SAMM Logo
10/12/2022	D	Update Table 3, insert footnote for Max Conducted (Average) Power

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 H35UCT9PW8AN. 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	762 – 776 MHz (LMR)	0.97	1.79
	792 – 824 MHz (LMR)	1.22	2.19
	851 – 870 MHz (LMR)	0.99	2.19
PCF	LTE B12	0.121	0.071
	LTE B13	0.099	0.056
	LTE B14	0.118	0.079
	LTE B4	0.023	0.269
	LTE B2	0.018	0.174
DTS	2412 – 2462 MHZ (WLAN 2.4 GHz)	0.055	0.293
NII	5180 – 5825 MHz WLAN 5 GHz	0.028	0.533
*DSS	2402-2480MHz (Bluetooth)	NA	NA
Highest Simultaneous Transmission SAR		1.34	2.72

*Results not required per KDB (refer to sections 14.3)

3.0 Abbreviations / Definitions

BT: Bluetooth
CW: Continuous Wave
DSS: Direct Spread Spectrum
DUT: Device Under Test
EME: Electromagnetic Energy
FHSS: Frequency Hopping Spread Spectrum
FM: Frequency Modulation
NA: Not Applicable
LMR: Land Mobile Radio
OFDM: Orthogonal Frequency Division Multiplexing
GFSK: Gaussian Frequency-Shift Keying
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 standard 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 D04 Interim General RF Exposure Guidance v01
- 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
- FCC KDB – 941225 D05 SAR for LTE Devices v02r05
- FCC KDB – 941225 D01 3G SAR Procedures v03r01

5.0 SAR Limits

Table 2

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

6.0 Description of Device Under Test (DUT)

This portable device operates in the LMR bands using frequency modulation (FM) incorporating traditional simplex two-way radio transmission protocol. This device also contains WLAN and LTE technologies for data applications 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 GFSK Bluetooth transmission 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.

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

Table 3

Technologies	Band (MHz)	Transmission	Duty Cycle (%)	Declared Max Power
LMR	762-776, 792-806	FM	*50	2.99 W
LMR	806-825, 851-870	FM	*50	3.60 W
WLAN 802.11 b (22 MHz)	2412-2462	DSSS	99.97	141.25 mW **
WLAN 802.11 g (20 MHz)		OFDM	99.80	89.1 mW **
WLAN 802.11 n (20 MHz)			94.36	
WLAN 802.11 n (40 MHz)	2422-2452		99.80	
(1)WLAN 802.11 a (20 MHz)	5180-5825	OFDM	99.80	79.43 mW **
(2)WLAN 802.11 n/ac (20 MHz)			95.59	
(3)WLAN 802.11 n/ac (40 MHz)			99.60	
(4)WLAN 802.11 ac (80 MHz)			96.15	
LTE Band 2	1850-1910	QPSK, 16QAM	100	252 mW**
LTE Band 4	1710-1755	QPSK, 16QAM	100	
LTE Band 12	699-716	QPSK, 16QAM	100	
LTE Band 13	777-787	QPSK, 16QAM	100	
LTE Band 14	788-798	QPSK, 16QAM	100	
NFC	13.56	NFC	100	35 mW
BT 1.5	2400 - 2485	GFSK	78	22.39 mW***
BT LE	2400 - 2485	GFSK	62.68	5.62 mW***

Note –
* includes 50% PTT operation
** Maximum Conducted Average Power
*** Maximum Conducted Peak Power
(1) ISED max conducted (average) power for U-NII-1 is 25.12mW, U-NII-2A, U-NII-2C and U-NII-3 are 79.43mW.
(2) ISED max conducted (average) power for U-NII-1 is 25.12mW, U-NII-2A, U-NII-2C and U-NII-3 are 79.43mW.
(3) EME tested WLAN 5 GHz 802.11n/ac (40MHz) at 79.43 mW (Highest max conducted average power as stated in the table above). The new power of WLAN 802.11n/ac (40MHz) will be implement in Production unit for all channels are 79.43 mW, except CH 38 is 19.95 mW, CH62 is 15.84 mW and CH104 is 31.62 mW.
(4) EME tested WLAN 5 GHz 802.11ac (80MHz) at 79.43 mW (Highest max conducted average power as stated in the table above). The new power of WLAN 802.11ac (80MHz) will be implement in Production unit for all channels are U-NII-1 is 19.95 mW, U-NII-2A is 10.0 mW, U-NII-2C is 79.43 mW and U-NII-3 is 79.43 mW.

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 accomplish by means of optional remote accessories that are connect 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 one removable antenna and one internal WLAN/BT antenna offered for this product. The Table below lists their descriptions.

Table 4

Antenna No.	Antenna Models	Description	Selected for test	Tested
1	AN000411A01	7/800 Whip Antenna (762-870MHz), -1.1 dBd gain	Yes	Yes
2	AN000413A01	Antenna LTE Main, Low Band, Mid Band 699 - 2155 MHz, 699-716MHz (-2.9dBi), 777-787MHz (-1.5dBi), 788-798MHz (-1.7dBi), 1850-1910MHz (1.1dBi), 1710-1755MHz (1.9dBi)	Yes	Yes
3	AN000413A03	Antenna Wifi/BT 2400 - 2480MHz, 5150 - 5850 MHz, 2412MHz (0.07dBi), 2437MHz (0.21dBi), 2462MHz (0.38dBi), 5180MHz (4.6dBi), 5500MHz (3.3dBi), 5825MHz (3.1dBi)	Yes	Yes

7.2 Batteries

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

Table 5

Battery No.	Battery Models	Description	Selected for test	Tested	Comments
1	PMNN4816A	Standard 3200mAh (new 18650 Li-Ion cell) Non-UL battery	Yes	Yes	
2	PMNN4817A	High Capacity 4400mAH (using RN 2170 Li-Ion cell) Non-UL battery	Yes	Yes	

7.3 Body worn Accessories

All body worn accessories were considered. The Table below lists their descriptions.

Table 6

Body worn No.	Body worn Models	Description	Selected for test	Tested	Comments
1	PMLN5407A	2.5" replacement belt loop	Yes	Yes	Paired with PMLN8372A and PMLN8373A
2	PMLN5408A	2.75" replacement belt loop	Yes	Yes	Paired with PMLN8372A and PMLN8373A
3	PMLN5409A	3" replacement belt loop	Yes	Yes	Paired with PMLN8372A and PMLN8373A
4	PMLN8371A	Aloha Standard plastic carry holster	Yes	Yes	Paired with PMLN8507A and PMLN8508A
5	PMLN8372A	Hybrid Case (Similar to APX NEXT)	Yes	Yes	Only compatible with battery PMNN4816A. Paired with PMLN5407A, PMLN5408A, PMLN5409A, PMLN8507A and PMLN8508A
6	PMLN8373A	Hybrid Case (Similar to APX NEXT)	Yes	*No	Only compatible with battery PMNN4817A. By similarity to PMLN8372A. Paired with PMLN5407A, PMLN5408A, PMLN5409A, PMLN8507A and PMLN8508A
7	PMLN8507A	Carry Accessory - Belt clip, APX N70 2.5" belt clip	Yes	Yes	Paired with PMLN8371A, PMLN8372A and PMLN8373A
8	PMLN8508A	Carry Accessory - Belt clip, APX N70 3" belt clip	Yes	Yes	Paired with PMLN8371A, PMLN8372A and PMLN8373A

Note - * Intended for test. Per KDB 643646 provision tests not required. For body-worn accessories with similar construction and operating configurations, test only the body-worn accessory within the group that is expected to result in the highest SAR.

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	NMN6271A	AUDIO ACCESSORY-REMOTE SPEAKER MICROPHONE,IMPRES XP RSM FOR APX W/ DUAL MIC NOISE SUPPRESSION.	Yes	*No	Paired with PMLN8334A
2	NMN6274B	AUDIO ACCESSORY-REMOTE SPEAKER MICROPHONE,IMPRES XP RSM FOR APX W/ DUAL MIC NOISE SUPPRESSION, 3.5MM THRD JACK	No	No	By similarity to NMN6271A
3	PMLN6827A	ACCESSORY KIT,TACTICAL GCAI PTT INTERFACE MODULE	Yes	*No	Paired with PMLN8334A, PMLN6828A and PMLN6829A
4	PMLN6828A	ACCESSORY KIT,TACTICAL THROAT MICROPHONE	Yes	*No	Paired with PMLN8334A and PMLN6827A
5	PMLN6829A	TACTICAL EAR MICROPHONE	Yes	*No	Paired with PMLN8334A and PMLN6827A
6	PMLN8085A	*BTH heavy duty headset,BEHIND-THE-HEAD HEADSET	Yes	*No	
7	PMLN8086A	OTH heavy duty headset,Over-the-head headset	No	No	By Similarity to PMLN8085A
8	PMLN8265A	OTH headset CH-3, Nexus	Yes	*No	Paired with PMLN8297A
9	PMLN8266A	*BTH headset CH-3, Nexus	Yes	*No	Paired with PMLN8297A
10	PMLN8267A	*Hard hat mount headset CH-3, Nexus	Yes	*No	Paired with PMLN8297A
11	PMLN8297A	3M Nexus body PTT	Yes	*No	Paired with PMLN8265A, PMLN8266A, PMLN8267A
12	PMLN8341A	1-Wire Surveillance Kit with Loud Audio Translucent Tube	Yes	*No	
13	PMLN8342A	2-Wire Surveillance Kit with Loud Audio Translucent Tube	Yes	*No	
14	PMLN8343A	3-Wire Surveillance Kit with Loud Audio Translucent Tube	Yes	*No	
15	PMMN4128A	UL RM 780 Gcai mini RSM , wind porting RSM with buttons	Yes	Yes	Default audio
16	PMMN4132A	Accessory Kit, XVE500 Remote Speaker Mic, High Impact Green with knob	Yes	*No	
17	PMMN4132A BLK	Accessory Kit, XVE500 Remote Speaker Microphone, Black with knob	No	No	By Similarity to PMLN4132A
18	PMMN4137A	Accessory Kit, XVE500 Remote Speaker Mic, High Impact Green with no knob	Yes	*No	
19	PMMN4137A BLK	Accessory Kit, XVE500 Remote Speaker Microphone, Black with no knob	No	No	By Similarity to PMLN4137A
20	PMMN4140A	UL RM760 Gcai mini RSM	Yes	*No	
21	PMMN4141A	XVP750 Remote Speaker Microphone, with channel knob	Yes	*No	
22	PMMN4142A	XVP730 Remote Speaker Microphone, without channel knob	Yes	*No	

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

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	750MHz Head	835MHz Head	1800MHz (1) Head	2450MHz (1) Head	5Hz (1) Head
Sugar	57.0	57.0	NA	NA	NA
Diacetin	NA	NA	NA	NA	NA
De ionized -Water	40.12	40.45	NA	NA	NA
Salt	1.78	1.45	NA	NA	NA
HEC	1	1	NA	NA	NA
Bact.	0.1	0.1	NA	NA	NA

Note: (1) SPEAG provides Motorola proprietary stimulant ingredients for the 1800MHz, 2450GHz and 5GHz band.

9.0 Additional Test Equipment

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

Table 11

Equipment Type	Model Number	Serial Number	Calibration Date	Calibration Due Date
SPEAG PROBE	EXDV4	7519	02/28/2022	02/28/2025
SPEAG PROBE	EX3DV4	7364	02/28/2022	02/28/2025
SPEAG DAE	DAE4	684	02/22/2022	02/22/2025
SPEAG DAE	DAE4	1294	02/22/2022	02/22/2025
POWER AMPLIFIER	50W100D	0357646	CNR	CNR
AMPLIFIER	5S1G4	313326	CNR	CNR
POWER AMPLIFIER	50W 1000A	14715	CNR	CNR
AMPLIFIER	5S4G11	312664	CNR	CNR
VECTOR SIGNAL GENERATOR	E4438C	MY47272101	10/27/2021	10/27/2022
VECTOR SIGNAL GENERATOR	E4438C	MY45091270	09/09/2021	09/09/2022
POWER METER*	E4418B	MY45100911	08/20/2021	08/20/2022
POWER METER*	E4416A	MY50001037	08/16/2020	08/16/2022
POWER METER	E4419B	MY45103725	06/12/2022	06/12/2023
POWER METER	E4418B	MY45107917	07/13/2022	07/13/2023
POWER METER	E4417A	GB41292245	11/24/2021	11/24/2022
POWER METER	E4418B	MY45100739	12/08/2021	12/08/2022
POWER SENSOR	E4412A	MY61050006	04/07/2022	04/07/2023
POWER SENSOR	E4412A	MY61060011	04/07/2022	04/07/2023
POWER SENSOR	E9301B	MY50280001	05/26/2022	05/26/2023
POWER SENSOR	E4412A	MY61060011	04/07/2022	04/07/2023
BI-DIRECTIONAL COUPLER	3020A	40295	06/30/2022	06/30/2023
BI-DIRECTIONAL COUPLER	3022	81640	06/29/2022	06/29/2023
BI-DIRECTIONAL COUPLER	3020A	41931	07/20/2022	07/20/2023
DATA LOGGER	DSB	16326820	11/26/2021	11/26/2022
TEMPERATURE PROBE	80PK-22	06032017	11/26/2021	11/26/2022
THERMOMETER	HH806AU	080307	11/26/2021	11/26/2022
DIELECTRIC ASSESSMENT KIT	DAK-3.5	1120	10/06/2021	10/06/2022
DIGITAL THERMOMETER	1523	3492108	09/28/2021	09/28/2022
TEMPERATURE PROBE	PR-10L-4-100-1/4-6-BX	WNWR037791	09/17/2021	09/17/2022
NETWORK ANALYZER	E5071B	MY42403218	09/13/2021	09/13/2022
POWER SENSOR	E9301B	MY50280001	05/26/2022	05/26/2023
POWER METER	E4417A	GB41292245	11/24/2021	11/24/2022
WIDEBAND RADIO COMMUNICATION TESTER	CMW500	153169	08/28/2020	08/28/2022
SPEAG DIPOLE	D750V3	1098	10/08/2021	10/08/2024
SPEAG DIPOLE	D835V2	4D029	08/27/2021	08/27/2024
SPEAG DIPOLE	D1800V2	2D120	04/20/2020	04/20/2023
SPEAG DIPOLE	D2450V2	782	02/20/2020	02/20/2023
SPEAG DIPOLE	D5GHzV2	1026	09/24/2021	09/24/2024

Note: "*" Equipment used for test dates prior to equipment 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								
06/23/2022	Head	835	7519	0.94	42.40	Pass	Pass	Pass
06/27/2022	Head	2450		1.79	39.90	Pass	Pass	Pass
06/30/2022	Head	5250		4.44	34.30	Pass	Pass	Pass
06/30/2022	Head	5500		4.70	33.90	Pass	Pass	Pass
07/01/2022	Head	5600		4.72	33.00	Pass	Pass	Pass
07/01/2022	Head	5750		4.88	32.80	Pass	Pass	Pass
WLAN								
06/27/2022	Head	2450	7519	1.79	39.90	Pass	Pass	Pass
06/30/2022	Head	5250		4.44	34.30	Pass	Pass	Pass
06/30/2022	Head	5500		4.70	33.90	Pass	Pass	Pass
07/01/2022	Head	5600		4.72	33.00	Pass	Pass	Pass
07/01/2022	Head	5750		4.88	32.80	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
7519	IEEE/IEC Head	SPEAG D835V2 / 4D029	9.83 ± 10%	2.40	9.60	07/26/2022#
			9.84 ± 10%	2.51	10.04	07/27/2022#
				2.52	10.08	07/28/2022#
				2.51	10.04	07/29/2022#
				2.59	10.36	07/30/2022#
				2.52	10.08	07/31/2022#
				2.49	9.96	08/31/2022
		SPEAG D2450V2 / 782	54.50 ± 10%	13.50	54.00	08/01/2022#
				13.00	52.00	08/02/2022
		SPEAG D5250V2 / 1026	80.60 ± 10%	7.82	78.20	08/02/2022#
				7.91	79.10	08/03/2022#
				7.80	78.00	08/04/2022#
		SPEAG D5600V2 / 1026	83.90 ± 10%	8.17	81.70	08/06/2022#
				8.56	85.60	08/07/2022#
				8.54	85.40	08/08/2022#
		SPEAG D5750V2 / 1026	79.70 ± 10%	7.38	73.80	08/09/2022#
				7.42	74.20	08/10/2022

Note: '#' indicates that system verification check covers next test day

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
LMR						
762	IEEE/ IEC Head	0.89 (0.85-0.94)	41.8 (39.8-43.9)	0.88	40.1	08/31/2022
769		0.89 (0.85-0.94)	41.8 (39.7-43.9)	0.86	42.5	07/26/2022#
				0.87	43.1	07/27/2022#
				0.88	42.9	07/30/2022
772		0.89 (0.85-0.94)	41.8 (39.7-43.9)	0.86	43.7	07/28/2022
				0.88	42.8	07/30/2022
774		0.89 (0.85-0.94)	41.8 (39.7-43.9)	0.87	43.1	07/27/2022#
				0.88	42.8	07/30/2022
792		0.89 (0.85-0.94)	41.7 (39.6-43.8)	0.89	40.0	08/31/2022
799		0.90 (0.85-0.94)	41.7 (39.6-43.8)	0.87	41.2	07/29/2022#
812		0.90 (0.85-0.94)	41.6 (39.5-43.7)	0.90	43.2	07/28/2022#
				0.88	41.0	07/29/2022#
824		0.90 (0.85-0.94)	41.6 (39.5-43.6)	0.90	40.7	07/29/2022#
835		0.90 (0.86-0.95)	41.5 (39.4-43.6)	0.92	41.7	07/26/2022#
				0.93	42.3	07/27/2022#
				0.92	42.9	07/28/2022#
				0.91	40.7	07/29/2022#
				0.94	42.0	07/30/2022#
				0.92	40.6	07/31/2022#
				0.91	39.9	08/31/2022
851		0.92 (0.87-0.96)	41.5 (39.4-43.6)	0.96	41.8	07/30/2022#
				0.94	40.3	07/31/2022
860		0.93 (0.88-0.97)	41.5 (39.4-43.6)	0.94	40.2	07/31/2022#
869		0.94 (0.89-0.98)	41.5 (39.4-43.6)	0.95	40.1	07/31/2022

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

Table 14 (Continued)

Frequency (MHz)	Tissue Type	Conductivity Target (S/m)	Dielectric Constant Target	Conductivity Meas. (S/m)	Dielectric Constant Meas.	Tested Date
WLAN						
2412	IEEE/ IEC Head	1.77 (1.68-1.86)	39.3 (35.3-43.2)	1.82	38.0	08/01/2022
				1.78	37.4	08/02/2022
2437		1.79 (1.70-1.88)	39.2 (35.3-43.1)	1.84	38.0	08/01/2022
				1.80	37.3	08/02/2022
2450		1.80 (1.71-1.89)	39.2 (35.3-43.1)	1.85	38.0	08/01/2022#
				1.81	37.3	08/02/2022
2462		1.81 (1.72-1.90)	39.2 (35.3-43.1)	1.86	38.0	08/01/2022#
				1.81	37.3	08/02/2022
5250		4.71 (4.24-5.18) 4.72 (4.24-5.18)	36.0 (32.4-39.5)	4.30	32.9	08/02/2022#
				4.27	32.8	08/03/2022#
				4.28	32.7	08/04/2022#
5290		4.76 (4.28-5.24) 4.78 (4.30-5.26)	35.9 (32.3-39.5	4.35	32.8	08/02/2022#
				4.31	32.7	08/03/2022#
				4.32	32.6	08/04/2022#
5530		4.97 (4.47-5.46) 5.03 (4.53-5.53)	35.6 (32.0-39.2)	4.60	32.5	08/06/2022#
				4.56	32.3	08/07/2022#
5600		5.07 (4.56-5.58)	35.5 (32.0-39.1)	4.67	32.4	08/06/2022#
				4.63	32.2	08/07/2022#
				4.83	33.7	08/08/2022#
5610		5.08 (4.57-5.59)	35.5 (31.9-39.0)	4.84	33.7	08/08/2022#
5690		5.16 (4.64-5.68)	35.4 (31.9-39.0)	4.80	33.1	08/10/2022
5750		5.22 (4.70-5.74)	35.4 (31.8-38.9)	4.98	33.9	08/09/2022#
				4.86	33.0	08/10/2022
5775		5.25 (4.72-5.77)	35.3 (31.8-38.9)	5.01	33.9	08/09/2022#
				4.89	32.9	08/10/2022

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

11.0 Environmental Test Conditions

The EME Laboratory's ambient environment is well controlled resulting in very stable simulated tissue temperature and therefore stable dielectric properties. Simulated tissue temperature is measured prior to each scan to insure it is within +/ - 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: 21.1 – 24.9˚C Avg. 22.74 ˚C
Tissue Temperature	18 – 25 ˚C	Range: 19.3 - 22.8˚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 16

<table>
<tr><th colspan="2">Description</th><th>≤ 3 GHz</th><th>> 3 GHz</th></tr>
<tr><td colspan="2">Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 ± 1 mm</td><td>½·δ·ln(2) ± 0.5 mm</td></tr>
<tr><td colspan="2">Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30° ± 1°</td><td>20° ± 1°</td></tr>
<tr><td colspan="2" rowspan="2">Maximum area scan spatial resolution: ΔxArea, ΔyArea</td><td>≤ 2 GHz: ≤ 15 mm
2 – 3 GHz: ≤ 12 mm</td><td>3 – 4 GHz: ≤ 12 mm
4 – 6 GHz: ≤ 10 mm</td></tr>
<tr><td colspan="2">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.</td></tr>
<tr><td colspan="2">Maximum zoom scan spatial resolution: ΔxZoom, ΔyZoom</td><td>≤ 2 GHz: ≤ 8 mm
2 – 3 GHz: ≤ 5 mm*</td><td>3 – 4 GHz: ≤ 5 mm*
4 – 6 GHz: ≤ 4 mm*</td></tr>
<tr><td>Maximum zoom scan spatial resolution, normal to phantom surface</td><td>uniform grid: ΔzZoom(n)</td><td>≤ 5 mm</td><td>3 – 4 GHz: ≤ 4 mm
4 – 5 GHz: ≤ 3 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td colspan="4">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.</td></tr>
</table>

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. KDB 248227 D01 applied to WLAN test configurations.

12.3 DUT Positioning Procedures

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

12.3.1 Body

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

12.3.2 Head

Not applicable.

12.3.3 Face

The DUT was positioned with its' front 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" 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 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 modes and 50% duty cycle was applied to PTT configurations in the final results.

13.0 DUT Test Data for LMR

13.1 LMR assessments at the Body for 769-775MHz band

Battery PMNN4816A was selected as the default battery for assessments at the Body because it is the only offered 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 (769-775MHz) which are listed in Table 17. The channel with the highest conducted power will be identified as the default channel per KDB 643646 (SAR Test for PTT Radios).

Table 17

Test Freq (MHz)	Power (W)
769.1000	2.900
772.0000	2.890
774.0000	2.840

Assessments at the Body with body worn PMLN8371A w/ PMLN8507A
DUT assessment with offered antenna, default battery and the above mentioned body worn accessory per KDB 643646. Refer to Table 17 for highest output power channel.

Table 18

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
AN000411A01	PMNN4816A	PMLN8371A w/ PMLN8507A belt clip	PMMN4128A	769.1000	2.87	-0.21	1.03	0.56	DAN-AB-220726-09
				772.0000					
				774.0000					
Assessment of Additional Battery									
AN000411A01	PMNN4817A	PMLN8371A w/ PMLN8507A belt clip	PMMN4128A	769.1000	2.89	0.10	1.00	0.52	DAN-AB-220726-10

Assessments at the Body with body worn PMLN8371A w/ PMLN8508A

DUT assessment with offered antenna, default battery and the above mentioned body worn accessory per KDB 643646. Refer to Table 17 for highest output power channel.

Table 19

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
AN000411A01	PMNN4816A	PMLN8371A w/ PMLN8508A belt clip	PMMN4128A	769.1000	2.87	-0.77	1.25	0.78	IRA-AB-220726-13
				772.0000					
				774.0000					
Assessment of Additional Battery									
AN000411A01	PMNN4817A	PMLN8371A w/ PMLN8508A belt clip	PMMN4128A	769.1000	2.90	-0.29	1.06	0.58	IRA-AB-220726-14

Assessments at the Body with body worn PMLN8372A w/ PMLN8507A

DUT assessment with offered antenna, default battery and the above mentioned body worn accessory per KDB 643646. Refer to Table 17 for highest output power channel.

Table 20

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
AN000411A01	PMNN4816A	PMLN8372A w/ PMLN8507A belt clip	PMMN4128A	769.1000	2.87	0.07	0.90	0.47	IRA-AB-220726-16
				772.0000					
				774.0000					

Assessments at the Body with body worn PMLN8372A w/ PMLN8508A

DUT assessment with offered antenna, default battery and the above mentioned body worn accessory per KDB 643646. Refer to Table 17 for highest output power channel.

Table 21

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
AN000411A01	PMNN4816A	PMLN8372A w/ PMLN8508A belt clip	PMMN4128A	769.1000	2.87	-0.20	0.90	0.49	IRA-AB-220726-17
				772.0000					
				774.0000					

Assessments at the Body with body worn PMLN8372A w/ PMLN5407A

DUT assessment with offered antenna, default battery and the above mentioned body worn accessory per KDB 643646. Refer to Table 17 for highest output power channel. .

Table 22

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
AN000411A01	PMNN4816A	PMLN8372A w/ PMLN5407A belt loop	PMMN4128A	769.1000	2.88	-0.26	0.75	0.41	IRA-AB-220727-01#
				772.0000					
				774.0000					

Assessments at the Body with body worn PMLN8372A w/ PMLN5408A

DUT assessment with offered antenna, default battery and the above mentioned body worn accessory per KDB 643646. Refer to Table 17 for highest output power channel.

Table 23

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
AN000411A01	PMNN4816A	PMLN8372A w/ PMLN5408A belt loop	PMMN4128A	769.1000	2.89	-0.33	0.89	0.50	IRA-AB-220727-02#
				772.0000					
				774.0000					

Assessments at the Body with body worn PMLN8372A w/ PMLN5409A

DUT assessment with offered antenna, default battery and the above mentioned body worn accessory per KDB 643646. Refer to Table 17 for highest output power channel.

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#
AN000411A01	PMNN4816A	PMLN8372A w/ PMLN5409A belt loop	PMMN4128A	769.1000	2.89	-0.24	0.90	**0.49**	IRA-AB-220727-03#
				772.0000					
				774.0000					

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 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#
AN000411A01	PMNN4816A	PMLN8371A w/ PMLN8508A belt clip	None	769.1000	2.93	-0.33	1.60	**0.88**	BAD-AB-220728-06#
				772.0000					
				774.0000					

13.2 LMR assessments at the Body for 799-824MHz band

Battery PMNN4816A was selected as the default battery for assessments at the Body because it is the only offered 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 (799-824MHz) 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).

Table 26

Test Freq (MHz)	Power (W)
799.1000	2.880
811.5000	3.600
824.0000	3.590

Assessments at the Body with body worn PMLN8371A w/ PMLN8507A

DUT assessment with offered antenna, default battery and the above mentioned body worn accessory per KDB 643646. Refer to Table 26 for highest output power channel.

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#
AN000411A01	PMNN4816A	PMLN8371A w/ PMLN8507A belt clip	PMMN4128A	799.1000					
				811.5000	3.60	-0.19	1.30	0.68	DAN-AB-220728-14
				824.0000					
Assessment of Additional Battery									
AN000411A01	PMNN4817A	PMLN8371A w/ PMLN8507A belt clip	PMMN4128A	811.5000	3.60	-0.26	1.29	0.68	DAN-AB-220728-15

Assessments at the Body with body worn PMLN8371A w/ PMLN8508A

DUT assessment with offered antenna, default battery and the above mentioned body worn accessory per KDB 643646. Refer to Table 26 for highest output power channel. .

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#
AN000411A01	PMNN4816A	PMLN8371A w/ PMLN8508A belt clip	PMMN4128A	799.1000					
				811.5000	3.59	-0.31	1.43	0.77	BAD-AB-220728-17
				824.0000					
Assessment of Additional Battery									
AN000411A01	PMNN4817A	PMLN8371A w/ PMLN8508A belt clip	PMMN4128A	811.5000	3.60	-0.47	1.39	0.77	BAD-AB-220728-18

Assessments at the Body with body worn PMLN8372A w/ PMLN8507A

DUT assessment with offered antenna, default battery and the above mentioned body worn accessory per KDB 643646. Refer to Table 26 for highest output power channel.

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#
AN000411A01	PMNN4816A	PMLN8372A w/ PMLN8507A belt clip	PMMN4128A	799.1000					
				811.5000	3.60	-0.52	1.52	0.86	BAD-AB-220729-01#
				824.0000					

Assessments at the Body with body worn PMLN8372A w/ PMLN8508A

DUT assessment with offered antenna, default battery and the above mentioned body worn accessory per KDB 643646. Refer to Table 26 for highest output power channel.

Table 30

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#
AN000411A01	PMNN4816A	PMLN8372A w/ PMLN8508A belt clip	PMMN4128A	799.1000					
				811.5000	3.60	-0.49	1.45	0.81	BAD-AB-220729-02#
				824.0000					

Assessments at the Body with body worn PMLN8372A w/ PMLN5407A

DUT assessment with offered antenna, default battery and the above mentioned body worn accessory per KDB 643646. Refer to Table 26 for highest output power channel.

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#
AN000411A01	PMNN4816A	PMLN8372A w/ PMLN5407A belt loop	PMMN4128A	799.1000					
				811.5000	3.60	-0.28	0.69	0.37	BAD-AB-220729-03#
				824.0000					

Assessments at the Body with body worn PMLN8372A w/ PMLN5408A

DUT assessment with offered antenna, default battery and the above mentioned body worn accessory per KDB 643646. Refer to Table 26 for highest output power channel.

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#
AN000411A01	PMNN4816A	PMLN8372A w/ PMLN5408A belt loop	PMMN4128A	799.1000					
				811.5000	3.60	-0.24	0.47	0.25	BAD-AB-220729-04#
				824.0000					

Assessments at the Body with body worn PMLN8372A w/ PMLN5409A

DUT assessment with offered antenna, default battery and the above mentioned body worn accessory per KDB 643646. Refer to Table 26 for highest output power channel.

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#
AN000411A01	PMNN4816A	PMLN8372A w/ PMLN5409A belt loop	PMMN4128A	799.1000					
				811.5000	3.60	-0.41	0.54	0.29	BAD-AB-220729-05#
				824.0000					

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 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#
AN000411A01	PMNN4816A	PMLN8372A w/ PMLN8507A belt clip	None	799.1000					
				811.5000	3.60	-0.65	1.89	**1.10**	BAD-AB-220730-01#
				824.0000					

13.3 LMR assessments at the Body for 851-869MHz band

Battery PMNN4816A was selected as the default battery for assessments at the Body because it is the only offered 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 (851-869MHz) which are listed in Table 35. 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 E.

Table 35

Test Freq (MHz)	Power (W)
851.0000	3.580
860.0000	3.550
869.0000	3.520

Assessments at the Body with body worn PMLN8371A w/ PMLN8507A

DUT assessment with offered antenna, default battery and the above mentioned body worn accessory per KDB 643646. Refer to Table 35 for highest output power channel.

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#
AN000411A01	PMNN4816A	PMLN8371A w/ PMLN8507A belt clip	PMMN4128A	851.0000	3.60	-0.74	1.01	0.60	BAD-AB-220731-01#
				860.0000					
				869.0000					
Assessment of Additional Battery									
AN000411A01	PMNN4817A	PMLN8371A w/ PMLN8507A belt clip	PMMN4128A	851.0000	3.60	-0.24	1.02	0.54	BAD-AB-220731-02#

Assessments at the Body with body worn PMLN8371A w/ PMLN8508A

DUT assessment with offered antenna, default battery and the above mentioned body worn accessory per KDB 643646. Refer to Table 35 for highest output power channel.

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#
AN000411A01	PMNN4816A	PMLN8371A w/ PMLN8508A belt clip	PMMN4128A	851.0000	3.60	-0.25	1.09	0.58	BAD-AB-220731-03#
				860.0000					
				869.0000					
Assessment of Additional Battery									
AN000411A01	PMNN4817A	PMLN8371A w/ PMLN8508A belt clip	PMMN4128A	851.0000	3.60	-0.20	1.15	0.60	BAD-AB-220731-04#

Assessments at the Body with body worn PMLN8372A w/ PMLN8507A

DUT assessment with offered antenna, default battery and the above mentioned body worn accessory per KDB 643646. Refer to Table 35 for highest output power channel.

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#
AN000411A01	PMNN4816A	PMLN8372A w/ PMLN8507A belt clip	PMMN4128A	851.0000	3.60	-0.32	1.14	0.61	BAD-AB-220731-05#
				860.0000					
				869.0000					

Assessments at the Body with body worn PMLN8372A w/ PMLN8508A

DUT assessment with offered antenna, default battery and the above mentioned body worn accessory per KDB 643646. Refer to Table 35 for highest output power channel. .

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#
AN000411A01	PMNN4816A	PMLN8372A w/ PMLN8508A belt clip	PMMN4128A	851.0000	3.60	-0.37	1.02	0.56	BAD-AB-220731-06#
				860.0000					
				869.0000					

Assessments at the Body with body worn PMLN8372A w/ PMLN5407A

DUT assessment with offered antenna, default battery and the above mentioned body worn accessory per KDB 643646. Refer to Table 35 for highest output power channel.

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#
AN000411A01	PMNN4816A	PMLN8372A w/ PMLN5407A belt loop	PMMN4128A	851.0000	3.60	-0.37	0.53	0.29	BAD-AB-220731-07#
				860.0000					
				869.0000					

Assessments at the Body with body worn PMLN8372A w/ PMLN5408A

DUT assessment with offered antenna, default battery and the above mentioned body worn accessory per KDB 643646. Refer to Table 35 for highest output power channel.

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#
AN000411A01	PMNN4816A	PMLN8372A w/ PMLN5408A belt loop	PMMN4128A	851.0000	3.60	-0.29	0.42	0.23	IRA-AB-220731-08#
				860.0000					
				869.0000					

Assessments at the Body with body worn PMLN8372A w/ PMLN5409A

DUT assessment with offered antenna, default battery and the above mentioned body worn accessory per KDB 643646. Refer to Table 35 for highest output power channel.

Table 42

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
AN000411A01	PMNN4816A	PMLN8372A w/ PMLN5409A belt loop	PMMN4128A	851.0000	3.60	-0.35	0.45	0.24	IRA-AB-220731-09#
				860.0000					
				869.0000					

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 43

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
AN000411A01	PMNN4816A	PMLN8372A w/ PMLN8507A belt clip	None	851.0000	3.50	-0.31	1.79	**0.99**	IRA-AB-220731-19
				860.0000					
				869.0000					

13.4 LMR assessment at the Face for 769-775MHz band

Battery PMNN4817A was selected as the default battery for assessments at the Face because it is the only offered 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 (769-775MHz) which are listed in Table 44. The channel with the highest conducted power will be identified as the default channel per KDB 643646 (SAR Test for PTT Radios).

Table 44

Test Freq (MHz)	Power (W)
769.1000	2.890
772.0000	2.880
774.0000	2.840

DUT assessment with offered antenna, default battery with front of DUT positioned 2.5cm facing phantom per KDB 643646. Refer to Table 44 for highest output power channel.

Table 45

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#
AN000411A01	PMNN4817A	Radio @ front 2.5cm	None	769.1000	2.93	-0.50	1.42	0.81	BAD-FACE-220728-07#
				772.0000					
				774.0000					
Assessment of Additional Battery									
AN000411A01	PMNN4816A	Radio @ front 2.5cm	None	769.1000	2.93	-0.36	1.72	0.95	BAD-FACE-220728-08#

DUT assessment with offered antenna, default battery with back of DUT positioned 2.5cm facing phantom per KDB 643646. Refer to Table 44 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix E.

Table 46

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#
AN000411A01	PMNN4817A	Radio @ back 2.5cm	None	769.1000	2.93	-0.31	2.73	**1.50**	IRA-FACE-220730-15
				772.0000					
				774.0000					
Assessment of Additional Battery									
AN000411A01	PMNN4816A	Radio @ back 2.5cm	None	769.1000	2.93	-0.44	2.52	1.42	IRA-FACE-220730-16

13.5 LMR assessments at the Face for 799-824MHz band

Battery PMNN4817A was selected as the default battery for assessments at the Face because it is the only offered 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 (799-824MHz) which are listed in Table 47. 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 E.

Table 47

Test Freq (MHz)	Power (W)
799.1000	2.880
811.5000	3.600
824.0000	3.590

DUT assessment with offered antenna, default battery with front of DUT positioned 2.5cm facing phantom per KDB 643646. Refer to Table 47 for highest output power channel.

Table 48

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#
AN000411A01	PMNN4817A	Radio @ front 2.5cm	None	799.1000					
				811.5000	3.60	-0.40	1.94	1.06	BAD-FACE-220730-02#
				824.0000					
Assessment of Additional Battery									
AN000411A01	PMNN4816A	Radio @ front 2.5cm	None	811.5000	3.60	-0.42	2.39	1.32	BAD-FACE-220730-03#

DUT assessment with offered antenna, default battery with back of DUT positioned 2.5cm facing phantom per KDB 643646. Refer to Table 47 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix E.

Table 49

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#
AN000411A01	PMNN4817A	Radio @ back 2.5cm	None	799.1000					
				811.5000	3.60	-0.37	3.46	1.88	BAD-FACE-220730-04#
				824.0000					
Assessment of Additional Battery									
AN000411A01	PMNN4816A	Radio @ back 2.5cm	None	811.5000	3.60	-0.63	3.40	**1.97**	BAD-FACE-220730-05#

13.6 LMR assessments at the Face for 851-869MHz band

Battery PMNN4817A was selected as the default battery for assessments at the Face because it is the only offered 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 (851-869MHz) which are listed in Table 50. 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 E.

Table 50

Test Freq (MHz)	Power (W)
851.0000	3.570
860.0000	3.550
869.0000	3.530

DUT assessment with offered antennas, default battery with front of DUT positioned 2.5cm facing phantom per KDB 643646 SAR. Refer to Table 50 for highest output power channel.

Table 51

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#
AN000411A01	PMNN4817A	Radio @ front 2.5cm	None	851.0000	3.60	-0.23	2.44	1.29	DAN-FACE-220731-20
				860.0000					
				869.0000					
Assessment of Additional Battery									
AN000411A01	PMNN4816A	Radio @ front 2.5cm	None	851.0000	3.60	-0.19	2.83	1.48	DAN-FACE-220731-21

DUT assessment with offered antenna, default battery with back of DUT positioned 2.5cm facing phantom per KDB 643646. Refer to Table 50 for highest output power channel. SAR plots of the highest results per Table (bolded) are presented in Appendix E.

Table 52

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#
AN000411A01	PMNN4817A	Radio @ back 2.5cm	None	851.0000	3.52	-0.13	4.16	**2.19**	DAN-FACE-220731-26
				860.0000					
				869.0000					
Assessment of Additional Battery									
AN000411A01	PMNN4817A	Radio @ back 2.5cm	None	851.0000	3.60	-0.16	4.07	2.11	DAN-FACE-220731-23

13.7 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 (7/800 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. The SAR results are in Tables below. SAR plot is included in Appendix for the highest configuration.

Table 53

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 (769-775 MHz)									
AN000411A01	PMNN4816A	PMLN8371A w/ PMLN8508A belt clip	None	769.1000	2.93	-0.33	1.60	0.88	BAD-AB-220728-06#
				772.0000	2.93	-0.6	1.65	**0.97**	DAN-AB-220728-12
				774.0000	2.92	-0.24	1.68	0.91	DAN-AB-220728-10#
Face (769-775 MHz)									
AN000411A01	PMNN4817A	Radio @ back 2.5cm	None	769.1000	2.93	-0.31	2.73	1.50	IRA-FACE-220730-15
				772.0000	2.92	-0.64	3.01	**1.79**	BAD-FACE-220730-22
				774.0000	2.92	-0.26	2.88	1.57	BAD-FACE-220730-21

Table 54

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 (799-824 MHz)									
AN000411A01	PMNN4816A	PMLN8372A w/ PMLN8507A belt clip	None	799.1000	2.92	-0.54	1.48	0.86	BAD-AB-220730-09#
				811.5000	3.60	-0.65	1.89	1.10	BAD-AB-220730-01#
				824.0000	3.6	-0.64	2.10	**1.22**	IRA-AB-220730-10#
Face (799-824 MHz)									
AN000411A01	PMNN4817A	Radio @ back 2.5cm	None	799.1000	2.92	-0.48	2.40	1.37	BAD-FACE-220730-06#
				811.5000	3.60	-0.63	3.40	1.97	BAD-FACE-220730-05#
				824.0000	3.57	-0.36	3.99	**2.19**	BAD-FACE-220730-08#

Table 55

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 (851-869MHz)									
AN000411A01	PMNN4816A	PMLN8372A w/ PMLN8507A belt clip	None	851.0000	3.50	-0.31	1.79	**0.99**	IRA-AB-220731-19
				860.0000	3.57	-0.38	1.34	0.74	IRA-AB-220731-17
				869.0000	3.60	-0.51	0.967	0.54	IRA-AB-220731-18
Face (851-869MHz)									
AN000411A01	PMNN4817A	Radio @ back 2.5cm	None	851.0000	3.52	-0.13	4.16	**2.19**	DAN-FACE-220731-26
				860.0000	3.60	-0.12	3.39	1.74	DAN-FACE-220731-24
				869.0000	3.56	-0.33	2.60	1.42	DAN-FACE-220731-25

13.8 Assessment for outside FCC Frequency range (7/800 MHz)

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

Table 56

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 (762-776MHz)									
AN000411A01	PMNN4816A	PMLN8371A w/ PMLN8508A belt clip	None	762.0125	2.96	-0.44	1.38	0.77	BAD-AB-220730-09#
Face (762-776MHz)									
AN000411A01	PMNN4817A	Radio @ back 2.5cm	None	762.0125	2.98	-0.36	2.24	1.22	BAD-FACE-220730-06#

Table 57

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 (792-824MHz)									
AN000411A01	PMNN4816A	PMLN8372A w/ PMLN8507A belt clip	None	792.0125	2.96	-0.26	1.46	**0.86**	DAN-AB-220831-09
Face (792-824MHz)									
AN000411A01	PMNN4816A	Radio @ back 2.5cm	None	792.0125	2.97	-0.38	2.45	**1.37**	DAN-FACE-220831-10

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 Assessment for WLAN 2.4GHz (802.11 b/g/n)

Output Power Data

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

Table 58

Band	802.11	Ch. BW	Ch.	Freq. (MHz)	Measured conducted power (W)
2.4 GHz	b	20	1	2412	0.101
			6	2437	0.099
			11	2462	0.100
	g	20	1	2412	0.058
			6	2437	0.057
			11	2462	0.062
	n	20	1	2412	0.060
			6	2437	0.058
			11	2462	0.063
	n	40	6	2437	0.068

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

Table 59

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
802.11b									
AN000411A01	PMNN4816A	PMLN8371A w/ PMLN8507A belt clip	None	2412.0000	0.101	-0.33	0.025	0.038	DAN-AB-220801-03
		PMLN8371A w/ PMLN8508A belt clip		2412.0000	0.101	-0.22	0.026	**0.038**	DAN-AB-220801-04
		PMLN8372A w/ PMLN8507A belt clip		2412.0000	0.101	-0.14	0.008	0.012	IRA-AB-220801-05
		PMLN8372A w/ PMLN8508A belt clip		2412.0000	0.101	-0.24	0.009	0.014	IRA-AB-220801-06
		PMLN8372A w/ PMLN5407A belt loop		2412.0000	0.101	0.34	0.015	0.021	IRA-AB-220801-07
		PMLN8372A w/ PMLN5408A belt loop		2412.0000	0.101	-0.18	0.013	0.019	IRA-AB-220801-08
		PMLN8372A w/ PMLN5409A belt loop		2412.0000	0.101	-0.70	0.008	0.014	IRA-AB-220801-09
Assessment of Additional Battery									
AN000411A01	PMNN4817A	PMLN8371A w/ PMLN8508A belt clip	None	2412.0000	0.101	-0.20	0.025	0.037	IRA-AB-220801-11

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 60

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
802.11b									
AN000411A01	PMNN4817A	Radio @ front 2.5cm	None	2462.0000	0.102	-0.28	0.130	0.192	DAN-FACE-220801-14
Assessment of Additional Battery									
AN000411A01	PMNN4816A	Radio @ front 2.5cm	None	2462.0000	0.100	-0.10	0.160	**0.230**	DAN-FACE-220802-01#

DUT assessment with WLAN internal antenna and offered battery with back of DUT positioned 2.5cm facing phantom.

Table 61

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
802.11b									
AN000411A01	PMNN4817A	Radio @ back 2.5cm	None	2462.0000	0.102	0.15	0.014	0.019	DAN-FACE-220801-15
Assessment of Additional Battery									
AN000411A01	PMNN4816A	Radio @ back 2.5cm	None	2462.0000	0.100	-0.44	0.012	0.019	DAN-FACE-220802-02#

Assessments for ISED Canada

Based on the assessment results for body and face per KDB643646 D01, additional tests were not required for the Industry Canada frequency range (2412-2462 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. The SAR results are in Tables below. SAR plot is included in Appendix for the highest configuration.

Table 62

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
802.11b									
Body									
AN000411A01	PMNN4816A	PMLN8371A w/ PMLN8508A belt clip	None	2412.0000	0.101	-0.22	0.026	0.038	DAN-AB-220801-04
				2437.0000	0.099	-0.41	0.035	**0.055**	DAN-AB-220801-12
				2462.0000	0.100	-0.23	0.028	0.042	DAN-AB-220801-13
Face									
AN000411A01	PMNN4816A	Radio @ front 2.5cm	None	2412.0000	0.101	-0.14	0.181	0.262	DAN-FACE-220802-04
				2437.0000	0.099	0.01	0.206	**0.293**	DAN-FACE-220802-05
				2462.0000	0.100	-0.10	0.160	0.230	DAN-FACE-220802-01#

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 63

Band	802.11	Ch. BW (MHz)	Ch.	Freq. (MHz)	Measured conducted power (W)
U-NII-1 (5.15-5.25GHz)	a	20	36	5180	0.077
			40	5200	0.073
			44	5220	0.072
			48	5240	0.069
	n	20	36	5180	0.075
			40	5200	0.073
			44	5220	0.072
			48	5240	0.069
		40	38	5190	0.078
			46	5230	0.072
	ac	20	36	5180	0.076
			40	5200	0.074
			44	5220	0.073
			48	5240	0.070
		40	38	5190	0.078
			46	5230	0.072
		80	42	5210	0.070
U-NII-2A (5.25-5.35GHz)	a	20	52	5260	0.068
			56	5280	0.065
			60	5300	0.065
			64	5320	0.060
	n	20	52	5260	0.068
			56	5280	0.067
			60	5300	0.065
			64	5320	0.060
		40	54	5270	0.060
			62	5310	0.070
	ac	20	52	5260	0.069
			56	5280	0.067
			60	5300	0.066
			64	5320	0.060
		40	54	5270	0.070
			62	5310	0.065
		80	58	5290	0.062

Table 63 (Continued)

Band	802.11	Ch. BW (MHz)	Ch.	Freq. (MHz)	Measured conducted power (W)
U-NII-2C (5.47-5.65 GHz)	a	20	100	5500	0.072
			112	5560	0.074
			116	5580	0.072
			128	5640	0.067
	n	20	100	5500	0.072
			112	5560	0.074
			116	5580	0.072
			128	5640	0.067
		40	102	5510	0.080
			110	5550	0.078
			118	5590	0.074
			126	5630	0.069
	ac	20	100	5500	0.073
			112	5560	0.074
			116	5580	0.072
			128	5640	0.067
		40	102	5510	0.076
			110	5550	0.075
			118	5590	0.073
			126	5630	0.068
		80	106	5530	0.071
			122	5610	0.066
			138	5690	0.064
U-NII-3 (5.65-5.85 GHz)	a	20	132	5660	0.066
			149	5745	0.072
			165	5825	0.075
	n	20	132	5660	0.066
			149	5745	0.072
			165	5825	0.076
		40	134	5670	0.068
			142	5710	0.067
			151	5755	0.072
			159	5795	0.072
	ac	20	132	5660	0.066
			149	5745	0.071
			165	5825	0.075
		40	134	5670	0.067
			142	5710	0.067
			151	5755	0.072
			159	5795	0.071
		80	155	5775	0.068

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

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

Table 64

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
802.11ac, 80MHz BW									
AN000413A03	PMNN4816A	PMLN8371A w/ PMLN8507A belt clip	None	5290.0000	0.062	-0.15	0.013	0.016	DAN-AB-220802-14
		PMLN8371A w/ PMLN8508A belt clip		5290.0000	0.062	-0.12	0.011	0.014	DAN-AB-220803-01#
		PMLN8372A w/ PMLN8507A belt clip		5290.0000	0.062	-0.14	0.008	0.010	DAN-AB-220803-02#
		PMLN8372A w/ PMLN8508A belt clip		5290.0000	0.062	-0.30	0.002	0.003	BAD-AB-220803-07
		PMLN8372A w/ PMLN5407A belt loop		5290.0000	0.062	-0.36	0.008	0.011	DAN-AB-220803-09
		PMLN8372A w/ PMLN5408A belt loop		5290.0000	0.062	0.23	0.007	0.009	DAN-AB-220804-01#
		PMLN8372A w/ PMLN5409A belt loop		5290.0000	0.062	-1.15	0.008	0.012	DAN-AB-220804-03#
Assessment of Additional Battery									
AN000413A03	PMNN4817A	PMLN8371A w/ PMLN8507A belt clip	None	5290.0000	0.062	-1.19	0.011	**0.018**	BAD-AB-220804-05#

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

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 65

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
802.11ac, 80MHz BW									
AN000413A03	PMNN4817A	Radio @ front 2.5cm	None	5290.0000	0.062	-0.18	0.301	0.381	BAD-FACE-220804-07
Assessment of Additional Battery									
AN000413A03	PMNN4816A	Radio @ front 2.5cm	None	5290.0000	0.062	-0.32	0.408	**0.533**	IRA-FACE-220804-09

DUT assessment with WLAN internal antenna and offered battery with back of DUT positioned 2.5cm facing phantom.

Table 66

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
802.11ac, 80MHz BW									
AN000413A03	PMNN4817A	Radio @ back 2.5cm	None	5290.0000	0.062	-0.10	0.014	0.017	IRA-FACE-220804-08
Assessment of Additional Battery									
AN000413A03	PMNN4816A	Radio @ back 2.5cm	None	5290.0000	0.062	-0.28	0.008	0.010	IRA-FACE-220805-01#

Additional Assessments 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. The SAR results are in Tables below. SAR plot is included in Appendix for the highest configuration.

Table 67

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
802.11ac, 80MHz BW									
Body									
AN000413A03	PMNN4817A	PMLN8371A w/ PMLN8507A belt clip	None	5290.0000	0.062	-1.19	0.011	**0.018**	BAD-AB-220804-05#
Face`									
AN000413A03	PMNN4816A	Radio @ front 2.5cm	None	5290.0000	0.062	-0.32	0.408	**0.533**	IRA-FACE-220804-09

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

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

Table 68

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
802.11ac, 80MHz BW									
AN000413A03	PMNN4816A	PMLN8371A w/ PMLN8507A belt clip	None	5530.0000	0.071	-1.01	0.016	**0.021**	IRA-AB-220806-08
		PMLN8371A w/ PMLN8508A belt clip		5530.0000	0.071	-0.37	0.016	0.018	IRA-AB-220807-01#
		PMLN8372A w/ PMLN8507A belt clip		5530.0000	0.071	-0.76	0.015	0.019	IRA-AB-220807-03#
		PMLN8372A w/ PMLN8508A belt clip		5530.0000	0.071	0.36	0.019	0.020	DAN-AB-220807-05#
		PMLN8372A w/ PMLN5407A belt loop		5530.0000	0.071	-0.10	0.010	0.011	DAN-AB-220807-06#
		PMLN8372A w/ PMLN5408A belt loop		5530.0000	0.071	-5.07	0.000	0.001	IRA-AB-220807-09
		PMLN8372A w/ PMLN5409A belt loop		5530.0000	0.071	-0.34	0.010	0.011	IRA-AB-220807-10
Assessment of Additional Battery									
AN000413A03	PMNN4817A	PMLN8371A w/ PMLN8507A belt clip	None	5530.0000	0.071	-0.43	0.017	0.020	IRA-AB-220808-01#

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

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 69

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
802.11ac, 80MHz BW									
AN000413A03	PMNN4817A	Radio @ front 2.5cm	None	5530.0000	0.071	-0.24	0.244	0.271	IRA-FACE-220808-02#
Assessment of Additional Battery									
AN000413A03	PMNN4816A	Radio @ front 2.5cm	None	5530.0000	0.071	-0.18	0.349	**0.382**	DAN-FACE-220808-05#

DUT assessment with WLAN internal antenna and offered battery with back of DUT positioned 2.5cm facing phantom.

Table 70

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
802.11ac, 80MHz BW									
AN000413A03	PMNN4817A	Radio @ back 2.5cm	None	5530.0000	0.071	0.05	0.012	0.013	DAN-FACE-220808-04#
Assessment of Additional Battery									
AN000413A03	PMNN4816A	Radio @ back 2.5cm	None	5530.0000	0.071	0.37	0.008	0.009	DAN-FACE-220808-07

Additional Assessments 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. The SAR results are in Tables below. SAR plot is included in Appendix for the highest configuration.

Table 71

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
802.11ac, 80MHz BW									
Body									
AN000413A03	PMNN4816A	PMLN8371A w/ PMLN8507A belt clip	None	5530.0000	0.071	-1.01	0.016	**0.021**	IRA-AB-220806-08
				5610.0000	0.066	-0.89	0.005	0.006	BAD-AB-220809-02#
				5690.0000	0.064	-0.68	0.010	0.013	AF-AB-220830-06#
Face`									
AN000413A03	PMNN4816A	Radio @ front 2.5cm	None	5530.0000	0.071	-0.18	0.349	**0.382**	DAN-FACE-220808-05#
				5610.0000	0.066	0.00	0.300	0.339	BAD-FACE-220808-09
				5690.0000	0.064	-0.09	0.114	0.137	AF-FACE-220830-07#

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

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

Table 72

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
802.11ac, 80MHz BW									
AN000413A03	PMNN4816A	PMLN8371A w/ PMLN8507A belt clip	None	5775.0000	0.068	0.92	0.015	0.017	DAN-AB-220809-07
		PMLN8371A w/ PMLN8508A belt clip		5775.0000	0.068	-0.43	0.010	0.012	DAN-AB-220809-08
		PMLN8372A w/ PMLN8507A belt clip		5775.0000	0.068	-0.36	0.015	0.018	DAN-AB-220809-10
		PMLN8372A w/ PMLN8508A belt clip		5775.0000	0.068	-2.17	0.004	0.007	BAD-AB-220809-12
		PMLN8372A w/ PMLN5407A belt loop		5775.0000	0.068	-1.77	0.001	0.001	BAD-AB-220810-02#
		PMLN8372A w/ PMLN5408A belt loop		5775.0000	0.068	-1.38	0.000	0.001	BAD-AB-220810-03#
		PMLN8372A w/ PMLN5409A belt loop		5775.0000	0.068	-1.20	0.0001	0.0002	BAD-AB-220810-04#
Assessment of Additional Battery									
AN000413A03	PMNN4817A	PMLN8373A w/ PMLN8507A belt clip	None	5775.0000	0.068	0.30	0.025	***0.028**	DAN-AB-220810-08

Note - * Highest body worn configuration is not compatible with battery PMNN4817A

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

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 73

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
802.11ac, 80MHz BW									
AN000413A03	PMNN4817A	Radio @ front 2.5cm	None	5775.0000	0.068	-0.18	0.294	0.338	DAN-FACE-220810-07
Assessment of Additional Battery									
AN000413A03	PMNN4816A	Radio @ front 2.5cm	None	5775.0000	0.068	-0.15	0.355	**0.405**	DAN-FACE-220810-10

DUT assessment with WLAN internal antenna and offered battery with back of DUT positioned 2.5cm facing phantom.

Table 74

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
802.11ac, 80MHz BW									
AN000413A03	PMNN4817A	Radio @ back 2.5cm	None	5775.0000	0.068	-0.81	0.001	0.001	BAD-FACE-220810-12
Assessment of Additional Battery									
AN000413A03	PMNN4816A	Radio @ back 2.5cm	None	5775.0000	0.068	0.48	0.001	0.001	BAD-FACE-220810-11

Additional Assessments 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. The SAR results are in Tables below. SAR plot is included in Appendix for the highest configuration.

Table 75

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
802.11ac, 80MHz BW									
Body									
AN000413A03	PMNN4817A	PMLN8373A w/ PMLN8507A belt clip	None	5775.0000	0.068	0.30	0.025	***0.028**	DAN-AB-220810-08
Face`									
AN000413A03	PMNN4816A	Radio @ front 2.5cm	None	5775.0000	0.068	-0.15	0.355	**0.405**	DAN-FACE-220810-10

Note - * Highest body worn configuration is not compatible with battery PMNN4817A

14.3 Assessment exclusion for BT

14.3.1 FCC Requirement

Per guidelines in KDB 447498 D04 Interim General RF Exposure Guidance v01, SAR-based thresholds are derived based on frequency, power and separation distance of the RF source.

The SAR-based exemption formula indicated below, applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, or less than or equal to the threshold *P*th (mW) refer to Table B.2.

*P*th (mW) = $ERP_{20cm}(\frac{d}{20})^x \ for\ distance\ d \leq 20\ cm$

Where $x = -log10\ \left(\frac{60}{ERP_{20}\sqrt{f}}\right)$

This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive).

Table B.2—Example Power Thresholds (mW)

Frequency (MHz)	Distance (mm)									
	5	10	15	20	25	30	35	40	45	50
300	39	65	88	110	129	148	166	184	201	217
450	22	44	67	89	112	135	158	180	203	226
835	9	25	44	66	90	116	145	175	207	240
1900	3	12	26	44	66	92	122	157	195	236
2450	3	10	22	38	59	83	111	143	179	219
3600	2	8	18	32	49	71	96	125	158	195
5800	1	6	14	25	40	58	80	106	136	169

The closest separation distance from the outer housing (location of the antenna will be indicated in Ex7B) to the phantom is 2.0 cm with a belt clip, as indicated in the picture below.

The BT maximum power of the device is 22.39 mW with 78% duty cycle, therefore the standalone Bluetooth transmitter operates at maximum time-averaged power:
= 22.39 mW * 78%
= 17.46 mW or 12.42 dBm

According to Table B.2, at the distance 20 mm, the power threshold, *P*th at frequency 2450 MHz is 38 mW.

Since the maximum time-averaged power of the device is lower than the power threshold, routine evaluation can be exempted.

14.3.2 ISED Requirement

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

Standalone Bluetooth transmitter operates at maximum time-averaged power:
= 22.39 mW * 78%
= 17.46 mW or 12.42 dBm

Equivalent isotropically radiated power (EIRP):
= Maximum conducted power, dBm + Antenna gain, dBi
= 12.42 dBm + 0.38 dBi
= 12.80 dBm or 19.05 mW

Since the output power level, 19.05 mW is below the threshold power level of 20 mW, SAR test is not required for Bluetooth.

14.4 Assessment exclusion for NFC

Based on below calculation, SAR test exclusion power threshold at 13.56 MHz is 443 mW. Maximum power for NFC is 35 mW, hence SAR test was not required for NFC.

KDB 447498 4.3.1, b.1) for 100 MHz to 6 GHz and test separation distances > 50 mm, the 1-g test exclusion thresholds are determined by following**:**
For 100 MHz to 1500 MHz:
{[Power allowed at *numeric threshold* for 50 mm at 100 MHz] + [(test separation distance – 50 mm) · (f(MHz)/150)]} mW
= **474.3 mW**

Where:
Power allowed at *numeric threshold* for 50 mm at 100 MHz = 474.3 mW
Test separation distance = 50 mm

KDB 447498 4.3.1, c.1) for below 100 MHz and test separation distances >50 mm and <200 mm,
Power threshold at the corresponding test separation distance at 100 MHz in step b) is multiply by [1+log (100/f (MHz))]
= 474.3 mW * [1+log (100/13.56 MHz)]
= 885.9 mW

Where:
f (MHz)= 13.56 MHz

KDB 447498 4.3.1, c.2) for below 100 MHz and test separation distances ≤ 50 mm, Power threshold determined by equation in c) 1) is multiplied by ½
= 885.9 mW * 0.5
= **443.0 mW**

15.0 Shortened Scan Assessment

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

Table 76

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#
AN000411A01	PMNN4817A	Radio @ back 2.5cm	None	860.0000	3.52	-0.06	4.20	2.18	DAN-FACE-220801-01#

16.0 Simultaneous Transmission

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

Table 77

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

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

16.1 Simultaneous transmission exclusion for BT

Per guidelines in KDB 447498 D04 Interim General RF Exposure Guidance v01, SAR-based exemption may be considered for test exemption for portable device exposure conditions; therefore, the following formula was used to determine exemption for simultaneous transmission:

$$[(P_i / P_{th}) + (Evaluated_k / Exposure\ Limit_k)] = 0.73, \text{ which is} < 1$$

where:
the available maximum time-averaged power (P_i)
= 17.46 mW (22.39 mW * 78% duty cycle)

the exemption threshold power (Pth) according to Table B.2 in 13.10 = 38 mW

the maximum reported SAR portable RF source k in the device from an existing evaluation ($Evaluated_k$) = 2.19 W/kg

the occupational/controlled specific absorption rate (SAR) limit for portable sources ($Exposure\ Limit_k$) = 8 W/kg

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

16.2 Simultaneous Transmission for LMR, BT, WLAN 2.4GHz and 5GHz

Table 78

Exposure condition	Standalone SAR (W/kg)				Sum of SAR (W/kg)		
	LMR	2.4GHz	5GHz	LTE	LMR + 2.4GHz	LMR + 5GHz	LMR + LTE
Body worn Exposure	1.22	0.055	0.028	0.121	1.28	1.25	1.34
Face Exposure	2.19	0.293	0.533	0.269	2.48	2.72	2.46

17.0 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 79

Frequency band (MHz)	Max Calc at Body (W/kg)	Max Calc at Face (W/kg)
	1g-SAR	1g-SAR
762 – 776 MHz (LMR)	0.97	1.79
792 – 824 MHz (LMR)	1.22	2.19
851 – 870 MHz (LMR)	0.99	2.19
LTE B12	0.121	0.071
LTE B13	0.099	0.056
LTE B14	0.118	0.079
LTE B4	0.023	0.269
LTE B2	0.018	0.174
2412 – 2462 MHZ (WLAN 2.4 GHz)	0.055	0.293
5180 – 5825 MHz WLAN 5 GHz	0.028	0.533
2402-2480MHz (Bluetooth)	NA	NA
Highest Simultaneous Transmission SAR	1.34	2.72

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 ISED RSS-102 (Issue 5)

18.0 Variability Assessment

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

19.0 System Uncertainty

A system uncertainty analysis is not required for this report per KDB 865664 because the highest report SAR value 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 A.

Appendix A
Measurement Uncertainty Budget

Uncertainty Budget for System Validation (dipole & flat phantom) for 700 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	6.0	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 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 700 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	6.0	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 800 MHz to 3 GHz

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

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

Uncertainty Budget for Device Under Test for 3 to 6 GHz

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

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