MOTOROLA SOLUTIONS

MS ISO/IEC 17025
TESTING
SAMM No. 0826

ACCREDITED
CERTIFICATE 2518.05

DECLARATION OF COMPLIANCE SAR ASSESSMENT Part 1 of 2

Motorola Solutions Inc.
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Date of Report: 5/7/2021
Report Revision: A

Responsible Engineer:	Puteri Alifah Ilyana Binti Nor Rahim (EME Engineer)
Report Author:	Puteri Alifah Ilyana Binti Nor Rahim (EME Engineer)
Date/s Tested:	4/13/2021-4/14/202, 4/16/202, 4/19/2021, 4/22/2021, 5/7/2021
Manufacturer:	Motorola Solutions Inc.
DUT Description:	Handheld Portable – T380 FRS CONSUMER RADIO 462-467MHz Equipment Yellow
Test TX mode(s):	CW (PTT)
Max. Power output:	1.4W (462.5500 MHz – 462.7250 MHz) , 0.7W (467.5625MHz - 467.7125 MHz)
Nominal Power:	1.1W (462.5500 MHz – 462.7250 MHz) , 0.5W (467.5625MHz - 467.7125 MHz)
Tx Frequency Bands:	462.5500 MHz – 462.7250 MHz, 467.5625 MHz - 467.7125 MHz
Signaling type:	FM
Model(s) Tested:	T38X (PMUE5740A)
Model(s) Certified:	T38X (PMUE5740A), T38X (PMUE5737A)
Serial Number(s):	16510XF0135
Classification:	General Population / Uncontrolled
Applicant Name:	Motorola Solutions Inc.
Applicant Address:	800 West Sunrise Boulevard, Fort Lauderdale, Florida 33322
FCC ID:	AZ489FT4966; 462.5500 MHz – 462.7250 MHz, 467.5625 MHz - 467.7125 MHz
IC:	109U-89FT4966; 462.5500 MHz – 462.7250 MHz, 467.5625 MHz - 467.7125 MHz
ISED Test Site registration:	24843
FCC Test Firm Registration Number:	823256

The test results clearly demonstrate compliance with FCC General Population / Uncontrolled RF Exposure limits of 1.6 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.

Sun Hock Saw
Approved Signatory
Approval Date: 5/7/2021

Part 1 of 2

APPENDICES

Part 2 of 2

APPENDICES

Report Revision History

Date	Revision	Comments
5/7/2021	A	Initial release

1.0 Introduction

This report details the utilization, test setup, test equipment, and test results of the Specific Absorption Rate (SAR) measurements performed at the Motorola Solutions Inc. EME Test Laboratory for handheld portable model number T38X (PMUE5740A). This device is classified as General Population/Uncontrolled.

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
FRF	462.5500 - 462.7250	0.89	0.42
	467.5625 - 467.7125	0.93	0.45

3.0 Abbreviations / Definitions

CNR: Calibration Not Required
CW: Continuous Wave
DUT: Device Under Test
EME: Electromagnetic Energy
FM: Frequency Modulation
FRF: Part 95 Family Radio Face Held Transmitter
NA: Not Applicable
PTT: Push to Talk
RSM: Remote Speaker Microphone
SAR: Specific Absorption Rate

Audio accessories: These accessories allow communication while the DUT is worn on the body.

Body worn accessories: These accessories allow the DUT to be worn on the body of the user.

Maximum Power: Defined as the upper limit of the production line final test station.

4.0 Referenced Standards and Guidelines

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

- IEC62209-1 (2016) Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)
- Federal Communications Commission, “Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields”, OET Bulletin 65, FCC, Washington, D.C.: 1997.
- IEEE 1528 (2013), Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
- American National Standards Institute (ANSI) / Institute of Electrical and Electronics Engineers (IEEE) C95. 1-1992
- Institute of Electrical and Electronics Engineers (IEEE) C95.1-2005
- International Commission on Non-Ionizing Radiation Protection (ICNIRP) 1998
- Ministry of Health (Canada) Safety Code 6 (2015), Limits of Human Exposure to Radio frequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz
- RSS-102 (Issue 5) – Radio Frequency (RF) Exposure Compliance of Radio communication Apparatus (All Frequency Bands)
- Australian Communications Authority Radio communications (Electromagnetic Radiation - Human Exposure) Standard (2014)
- ANATEL, Brazil Regulatory Authority, Resolution No. 303 of July 2, 2002 "Regulation of the limitation of exposure to electrical, magnetic, and electromagnetic fields in the radio frequency range between 9 kHz and 300 GHz." and “Attachment to resolution # 303 from July 2, 2002”
- IEC62209-2 Edition 1.0 2010-03, Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures – Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz).
- FCC KDB – 643646 D01 SAR Test for PTT Radios v01r03
- FCC KDB – 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB – 865664 D02 RF Exposure Reporting v01r02
- FCC KDB – 447498 D01 General RF Exposure Guidance v06

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 device operates 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.

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

Table 3

Band (MHz)	Transmission	Duty Cycle (%)	Max Power (W)
462.5500 - 462.7250	FM	*50	1.40
467.5625 - 467.7125	FM	*50	0.70

Note - * includes 50% PTT operation

The intended operating positions are “at the face” with the DUT at least 2.5 cm from the mouth, and “at the body” by means of the offered body worn accessories. Body worn audio and PTT operation is accomplished by means of optional remote accessories that are connected to the radio.

7.0 Optional Accessories and Test Criteria

This device is offered with optional accessories. All accessories were individually evaluated during the test plan creation to determine if testing was required per the guidelines outlined in 4.0 to assess compliance of the device.

7.1 Antennas

There is one fixed antenna offered for this product. The Table below lists its descriptions.

Table 4

Antenna No.	Antenna Model	Description	Selected for test	Tested
1	Fixed antenna	462-468MHz, 1.45dBi gain	Yes	Yes

7.2 Battery

There is one battery offered for this product. The Table below lists their descriptions.

Table 5

Battery No.	Battery Models	Description	Selected for test	Tested
1	HKNN4014B	Battery Pack, Battery, Lithium-Ion, 1130mAh, 3.7VDC, Kit (BT60)	Yes	Yes

7.3 Body worn Accessories

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

Table 6

Body worn No.	Body worn Models	Description	Selected for test	Tested	Comments
1	1564028V01	TLKR- T3 T40 T50 T60 XTB Belt Clip	Yes	Yes	
2	42015005001	Carry Landyard	Yes	Yes	
3	AY000753A02	Short Lanyard (Equipment Yellow)	Yes	Yes	Tested with AY000755A01
4	AY000755A01	Carabineer	Yes	Yes	Tested with AY000753A02
5	PMLN7706AR	Carry Pouch	Yes	Yes	
6	AY000753A03	SHORT LANYARD (NAVY BLUE)	No	No	By similarity to AY000753A02

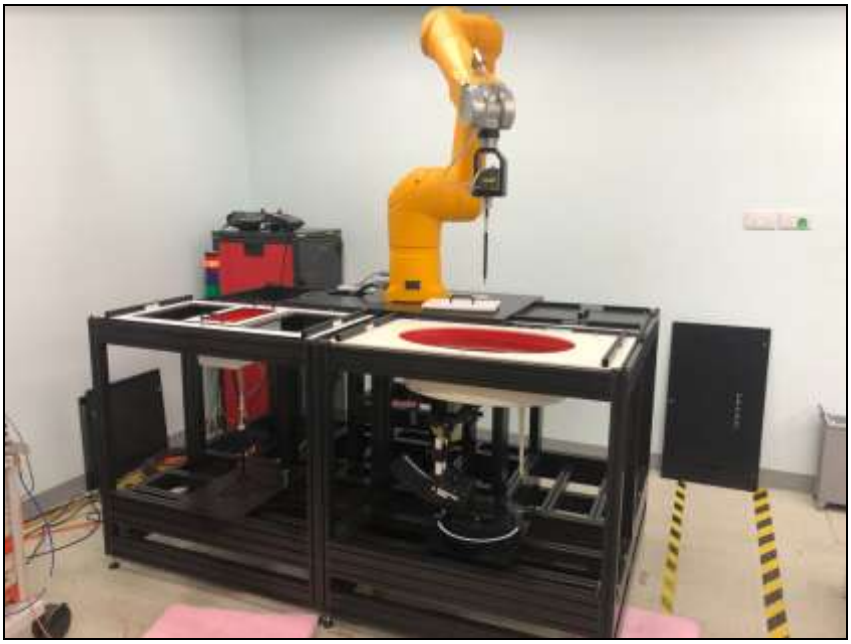
7.4 Audio Accessories

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	Remarks
1	53724C (NTN8867A)	Remote Speaker Mic	Yes	Yes	Default audio
2	IXTN4011A	SINGLE PIN EARPIECE WITH BOOM MIC/VOX	Yes	Yes	
3	53725B (NTN8868C)	Headset w/Swivel Boom Microphone	Yes	Yes	
4	53727B (NTN8870E)	EARBUD WITH PTT MICROPHONE SINGLE PIN	No	No	By similarity to IXTN4011A
5	56320B (NTN9396B)	Earpiece w/Boom Microphone	Yes	Yes	
6	1518 (GU6443A)	1518 TACTICAL HEADSET	Yes	Yes	
7	PMLN7705AR	Single Pin Throat Mic with PTT/VOX	Yes	Yes	

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 6	6.14.0.959	DAE4	EX3DV4 (E-Field)

The DASY6™ system is operated per the instructions in the DASY6™ Users Manual. The complete manual is available directly from SPEAG™. All measurement equipment used to assess SAR compliance was calibrated according to ISO/IEC 17025 A2LA guidelines. Section 9.0 presents additional test equipment information. Appendices B and C present the applicable calibration certificates. The E-field probe first scans a coarse grid over a large area inside the phantom in order to locate the interpolated maximum SAR distribution. After the coarse scan measurement, the probe is automatically moved to a position at the interpolated maximum. The subsequent scan can directly use this position as reference for the cube evaluations.

8.2 Description of Phantom(s)

Table 9

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

8.3 Description of Simulated Tissue

The sugar based simulate tissue is produced by placing the correct measured amount of De-ionized water into a large container. Each of the dried ingredients are weighed and added to the water carefully to avoid clumping. If the solution has a high sugar concentration the water is pre-heated to aid in dissolving the ingredients. For Diacetin and similar type simulates, sugar and HEC ingredients are not needed. The solution is mixed thoroughly, covered, and allowed to sit overnight prior to use.

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

Simulated Tissue Composition (percent by mass)

Table 10

Ingredients	450MHz
	Head
Sugar	56.0
De-ionized Water	39.1
Salt	3.8
HEC	1.0
Bact.	0.1

9.0 Additional Test Equipment

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

Table 11

Equipment Type	Model Number	Serial Number	Calibration Date	Calibration Due Date
Speag Probe	EX3DV4	7594	12/10/2020	12/10/2021
Speag DAE	DAE4	684	5/26/2020	5/26/2021
Bi-directional Coupler	3024	61178	11/23/2020	11/23/2021
Power Amplifier	5S1G4	312859	CNR	CNR
Power Meter	E4419B	MY45103725	6/10/2019	6/10/2021
Power Meter	E4418B	MY45107917	7/1/2019	7/1/2021
Power Sensor	E9301B	MY41495594	5/18/2020	5/18/2021
Power Sensor	8481B	MY41091243	11/3/2020	11/3/2021
Thermometer	HH806AU	80307	11/25/2020	11/25/2021
Temperature Probe	80PK-22	6032017	11/25/2020	11/25/2021
Vector Signal Generator	E4438C	MY47272101	10/29/2019	10/29/2021
Data Logger	DSB	16398050	8/3/2020	8/3/2021
Power Meter	E4416A	MY50001037	8/30/2019	8/30/2021
Power Sensor	E4412A	MY60100004	6/24/2020	6/24/2021
Dielectric Assessment Kit	DAK-3.5	1120	8/12/2020	8/12/2021
Network Analyzer	E5071B	MY42403147	12/1/2020	12/1/2021
Speag Dipole	D450V3	1054	3/11/2019	3/11/2022
Speag Dipole	D450V3	1053	10/19/2018	10/19/2021

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								
3/10/2021	Head	450	7594	0.84	41.50	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
7594	IEEE/ IEC Head	SPEAG D450V3 / 1053	4.57 +/- 10%	1.09	4.36	4/22/2021
				1.16	4.64	5/7/2021
	IEEE/ IEC Head	SPEAG D450V3 / 1054	4.57 +/- 10%	1.19	4.76	4/13/2021
				1.15	4.60	4/14/2021
				1.18	4.72	4/16/2021
				1.11	4.44	4/19/2021

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
450	IEEE/IEC Head	0.87 (0.83-0.91)	43.50 (41.30-45.70)	0.84	42.10	4/13/2021
				0.85	42.20	4/14/2021
				0.84	41.67	4/16/2021
				0.85	42.01	4/19/2021
				0.87	41.76	4/22/2021
				0.85	41.81	5/7/2021
463		0.87 (0.83-0.91)	43.40 (41.30-45.60)	0.86	41.80	4/13/2021
				0.85	41.40	4/16/2021
				0.86	41.55	4/19/2021
				0.86	41.74	4/19/2021
468		0.87 (0.83-0.91)	43.40 (41.20-45.60)	0.87	41.80	4/14/2021
				0.85	41.30	4/16/2021
				0.86	41.64	4/19/2021
				0.88	41.40	4/22/2021
				0.87	41.45	5/7/2021

11.0 Environmental Test Conditions

The EME Laboratory's ambient environment is well controlled resulting in very stable simulated tissue temperature and therefore stable dielectric properties. Simulated tissue temperature is measured prior to each scan to insure it is within +/ - 2^{o}C of the temperature at which the dielectric properties were determined. The liquid depth within the phantom used for measurements was at least 15cm. Additional precautions

are routinely taken to ensure the stability of the simulated tissue such as covering the phantoms when scans are not actively in process in order to minimize evaporation. The lab environment is continuously monitored. The Table below presents the range and average environmental conditions during the SAR tests reported herein:

Table 15

	Target	Measured
Ambient Temperature	18 – 25 ˚C	Range: 20.60 – 23.10˚C Avg. 22.00˚C
Tissue Temperature	18 – 25 ˚C	Range: 20.00 – 20.90˚C Avg. 20.45˚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 disturbances that could possibly affect the test results. If such unwanted signals are discovered the SAR scans are repeated.

12.0 DUT Test Setup and Methodology

12.1 Measurements

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

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

Table 16

Description		≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface		5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location		30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: ΔxArea, ΔyArea		≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
		When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan spatial resolution: ΔxZoom, ΔyZoom		≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: ΔzZoom(n)	≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details. * When zoom scan is required and the reported SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.			

12.2 DUT Configuration(s)

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

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 the offered audio accessories as applicable.

12.3.2 Head

Not applicable.

12.3.3 Face

The DUT was positioned with its' front side 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 and 10-gram averaged SAR results indicated as "Max Calc. 1g-SAR" in the data Tables is determined by scaling the measured SAR to account for power leveling variations and drift. Appendix F includes a shortened scan to justify SAR scaling for drift. For this device the "Max Calc. 1g-SAR" are scaled using the following formula:

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

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

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

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

12.6 DUT Test Plan

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

13.0 DUT Test Data

13.1 Assessments at the Body for 462.5500-462.7250 MHz

Conducted power measurements for channel within frequency range 462.5500 – 462.7250 MHz was measured and listed in Table 17.

Table 17

Test frequency: 462.6375 MHz	
Battery	**Power (W)**
HKNN4014B	1.18

Assessments at the Body with belt clip 1564028V01

DUT assessment with the fixed antenna, batteries and above mentioned body worn accessory. SAR plots of the highest results per Table 18 (bolded) are presented in Appendix E.

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#
Fixed antenna	HKNN4014B	1564028V01	NTN8867A	462.6375	1.18	-0.34	0.60	**0.38**	AM-AB-210413-08

Assessments at the Body with carry lanyard 42015005001

DUT assessment with the fixed antenna, batteries and above mentioned body worn accessory. SAR plots of the highest results per Table 19 (bolded) are presented in Appendix E.

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#
Fixed antenna	HKNN4014B	42015005001	NTN8867A	462.6375	1.18	-0.26	1.22	**0.77**	AM-AB-210419-02

Assessments at the Body with carry pouch PMLN7706AR

DUT assessment with the fixed antenna, batteries and above mentioned body worn accessory. SAR plots of the highest results per Table 20 (bolded) are presented in Appendix E.

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#
Fixed antenna	HKNN4014B	PMLN7706AR	NTN8867A	462.6375	1.18	-0.19	0.57	**0.36**	AM-AB-210413-10

Assessments at the Body with carabineer and short lanyard AY000753A02 with AY000755A01

DUT assessment with the fixed antenna, batteries and above mentioned body worn accessory. SAR plots of the highest results per Table 21 (bolded) are presented in Appendix E.

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#
Fixed antenna	HKNN4014B	AY000753A02 w/ AY000755A01	NTN8867A	462.6375	1.18	-0.26	1.40	**0.88**	AM-AB-210416-04

Assessment at the Body with other audio accessories

Assessment of additional audio accessories with the highest SAR results from Table 18, 19, 20 and 21. SAR plots of the highest results per Table 22 (bolded) are presented in Appendix E.

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#
Fixed antenna	HKNN4014B	AY000753A02 w/ AY000755A01	IXTN4011A	462.6375	1.18	-0.02	1.21	0.72	AM-AB-210419-08
Fixed antenna	HKNN4014B	AY000753A02 w/ AY000755A01	53725C (NTN8868C)	462.6375	1.18	-0.05	0.99	0.59	MA-AB-210507-05
Fixed antenna	HKNN4014B	AY000753A02 w/ AY000755A01	56320B (NTN9396B)	462.6375	1.18	-0.06	1.00	0.60	AM-AB-210419-09
Fixed antenna	HKNN4014B	AY000753A02 w/ AY000755A01	1518 (GU6443A)	462.6375	1.18	-0.11	1.42	0.86	AM-AB-210419-10
Fixed antenna	HKNN4014B	AY000753A02 w/ AY000755A01	PMLN7705AR	462.6375	1.18	-0.31	1.40	**0.89**	AM-AB-210419-07

13.2 Assessments at the Face for 462.5500-462.7250 MHz

Conducted power measurements for channel within frequency range 462.5500 – 462.7250 MHz was measured and listed in Table 23.

Table 23

Test frequency: 462.6375 MHz	
Battery	**Power (W)**
HKNN4014B	1.18

Assessment of fixed antenna with offered batteries with front of DUT positioned 2.5cm facing phantom was performed. SAR plots of the highest results per Table 24 (bolded) are presented in Appendix E.

Table 24

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
Fixed antenna	HKNN4014B	DUT @ Front	None	462.6375	1.18	-0.13	0.68	**0.42**	AM-FACE-210416-05

13.3 Assessments at the Body for 467.5625-467.7125 MHz

Conducted power measurements for channel within frequency range 467.5625 – 467.7125 MHz was measured and listed in Table 25.

Table 25

Test frequency: 467.6375 MHz	
Battery	**Power (W)**
HKNN4014B	0.49

Assessments at the Body with belt clip 1564028V01

DUT assessment with the fixed antenna, batteries and above mentioned body worn accessory. SAR plots of the highest results per Table 26 (bolded) are presented in
Appendix E.

Table 26

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
Fixed antenna	HKNN4014B	1564028V01	NTN8867A	467.6375	0.49	-0.16	0.53	**0.39**	AM-AB-210414-05

Assessments at the Body with carry lanyard 42015005001

DUT assessment with the fixed antenna, batteries and above mentioned body worn accessory. SAR plots of the highest results per Table 27 (bolded) are presented in
Appendix E.

Table 27

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
Fixed antenna	HKNN4014B	42015005001	NTN8867A	467.6375	0.49	-0.11	1.15	**0.85**	MA-AB-210422-12

Assessments at the Body with carry pouch PMLN7706AR

DUT assessment with the fixed antenna, batteries and above mentioned body worn accessory. SAR plots of the highest results per Table 28 (bolded) are presented in
Appendix E.

Table 28

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
Fixed antenna	HKNN4014B	PMLN7706AR	NTN8867A	467.6375	0.49	-0.19	0.47	**0.35**	AM-AB-210414-07

Assessments at the Body with carabineer and short lanyard AY000753A02 with AY000755A01

DUT assessment with the fixed antenna, batteries and above mentioned body worn accessory. SAR plots of the highest results per Table 29 (bolded) are presented in
Appendix E.

Table 29

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
Fixed antenna	HKNN4014B	AY000753A02 w/ AY000755A01	NTN8867A	467.6375	0.49	0.01	1.01	**0.72**	AM-AB-210419-03

Assessment at the Body with other audio accessories

Assessment of additional audio accessories with the highest SAR results from table 26, 27, 28 and 29. SAR plots of the highest results per Table 30 (bolded) are presented in Appendix E.

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#
Fixed antenna	HKNN4014B	42015005001	IXTN4011A	467.6375	0.49	-0.11	0.94	0.69	AM-AB-210419-11
Fixed antenna	HKNN4014B	42015005001	53725C (NTN8868C)	467.6375	0.49	-0.19	1.24	**0.93**	AM-AB-210414-10
Fixed antenna	HKNN4014B	42015005001	56320B (NTN9396B)	467.6375	0.49	-0.20	1.10	0.83	AM-AB-210414-11
Fixed antenna	HKNN4014B	42015005001	1518 (GU6443A)	467.6375	0.49	-0.01	0.93	0.67	AM-AB-210414-12
Fixed antenna	HKNN4014B	42015005001	PMLN7705AR	467.6375	0.49	0.27	1.28	0.92	AM-AB-210419-12

13.4 Assessments at the Face for 467.5625-467.7125 MHz

Conducted power measurements for channel within frequency range 467.5625 – 467.7125 MHz was measured and listed in Table 31.

Table 31

Test frequency: 467.6375 MHz	
Battery	**Power (W)**
HKNN4014B	0.49

Assessment of fix antenna with offered batteries with front of DUT positioned 2.5cm facing phantom was performed. SAR plots of the highest results per Table 32 (bolded) are presented in Appendix E.

Table 32

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Run#
Fixed antenna	HKNN4014B	DUT @ Front	None	467.6375	0.49	-0.10	0.62	**0.45**	AM-FACE-210416-06

13.5 Assessments for ISED Canada

Based on the assessment results for body and face per KDB643646, additional tests were not required for ISED Canada frequency range (462.5500-462.7250 MHz) and (467.5625-467.7125 MHz) as testing performed is in compliance with ISED 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. This is narrow band product and the frequency range is only within 1 MHz, additional test is not required.

13.6 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 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#
Fixed antenna	HKNN4014B	42015005001	53725C (NTN8868C)	467.6375	0.49	-0.07	1.02	0.74	AM-AB-210507-11

14.0 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 34

Technologies	Frequency band (MHz)	Max Calc. at Body (W/kg)	Max Calc. at Face (W/kg)
		1g-SAR	1g-SAR
FM	462.5500 - 462.7250	0.89	0.42
FM	467.5625 - 467.7125	0.93	0.45

All results are scaled to the maximum output power.

The test results clearly demonstrate compliance with FCC General Population/ Uncontrolled RF Exposure limits of 1.6 W/kg averaged over 1 gram per the requirements of FCC 47 CFR § 2.1093 and RSS-102 (Issue 5).

15.0 Variability Assessment

Per the guidelines in KDB 865664 SAR variability assessment is not required because SAR results below 0.8W/kg (General population).

16.0 System Uncertainty

A system uncertainty analysis is not required for this report per KDB 865664 because the highest report SAR value for General Population exposure is less than 1.5W/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 Device Under Test, for 450 MHz

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*	*k*
Uncertainty Component	**IEEE 1528 section**	**Tol. (± %)**	**Prob Dist**	**Div.**	**c_i (1 g)**	**c_i (10 g)**	**1 g u_i (±%)**	**10 g u_i (±%)**	**v_i**
Measurement System									
Probe Calibration	E.2.1	6.7	N	1.00	1	1	6.7	6.7	∞
Axial Isotropy	E.2.2	4.7	R	1.73	0.707	0.707	1.9	1.9	∞
Hemispherical Isotropy	E.2.2	9.6	R	1.73	0.707	0.707	3.9	3.9	∞
Boundary Effect	E.2.3	1.0	R	1.73	1	1	0.6	0.6	∞
Linearity	E.2.4	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	E2.4	1.0	R	1.73	1	1	0.6	0.6	∞
Modulation Response	E2.5	9.6	R	1.73	1	1	5.5	5.5	∞
Readout Electronics	E.2.6	0.3	N	1.00	1	1	0.3	0.3	∞
Response Time	E.2.7	0.8	R	1.73	1	1	0.5	0.5	∞
Integration Time	E.2.8	2.6	R	1.73	1	1	1.5	1.5	∞
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	0.02	R	1.73	1	1	0.0	0.0	∞
Probe Positioning w.r.t Phantom	E.6.3	0.42	R	1.73	1	1	0.2	0.2	∞
Max. SAR Evaluation	E.5	2.0	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	E.2.9	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				13	12	711
Expanded Uncertainty (95% CONFIDENCE LEVEL)			*k*=2				25	25	

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 450 MHz

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*	*k*
Uncertainty Component	**IEEE 1528 section**	**Tol. (± %)**	**Prob Dist**	**Div.**	**c_i (1 g)**	**c_i (10 g)**	**1 g u_i (±%)**	**10 g u_i (±%)**	**v_i**
Measurement System									
Probe Calibration	E.2.1	6.7	N	1.00	1	1	6.7	6.7	∞
Axial Isotropy	E.2.2	4.7	R	1.73	0.707	0.707	1.9	1.9	∞
Hemispherical Isotropy	E.2.2	9.6	R	1.73	0.707	0.707	3.9	3.9	∞
Boundary Effect	E.2.3	1.0	R	1.73	1	1	0.6	0.6	∞
Linearity	E.2.4	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	E2.4	1.0	R	1.73	1	1	0.6	0.6	∞
Modulation Response	E2.5	0.0	R	1.73	1	1	0.0	0.0	∞
Readout Electronics	E.2.6	0.3	N	1.00	1	1	0.3	0.3	∞
Response Time	E.2.7	0.8	R	1.73	1	1	0.5	0.5	∞
Integration Time	E.2.8	2.6	R	1.73	1	1	1.5	1.5	∞
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	0.02	R	1.73	1	1	0.0	0.0	∞
Probe Positioning w.r.t Phantom	E.6.3	0.42	R	1.73	1	1	0.2	0.2	∞
Max. SAR Evaluation	E.5	2.0	R	1.73	1	1	1.2	1.2	∞
Dipole									
Dipole Axis to Liquid Distance	8, E.6.6	2.0	R	1.73	1	1	1.2	1.2	∞
Input Power and SAR Drift Measurement	8, 6.6.4	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				10	10	99999
Expanded Uncertainty (95% CONFIDENCE LEVEL)			*k*=2				21	20	

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