MOTOROLA SOLUTIONS

ACCREDITED
TESTING CERT # 2518.05

DECLARATION OF COMPLIANCE SAR ASSESSMENT Part 1 of 2

Enterprise Mobility Solutions
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Date of Report: 04/23/13
Report Revision: O
Report ID: SAR rpt_PMUD3265A _Rev.O 130423_SR11124

Responsible Engineer:	Tan KaiYan (EME Engineer)
Report Author:	Tan KaiYan (EME Engineer)
Date/s Tested:	03/05/2013-04/01/2013
Manufacturer/Location:	Motorola, Penang
Sector/Group/Div.:	PCR
Date submitted for test:	02/05/13
DUT Description:	136-174MHz 5W NKP GPS BT GOB
Test TX mode(s):	CW (PTT), BT (CW)
Max. Power output:	6 W (VHF), 10 mW (Bluetooth)
Nominal Power:	5 W (VHF), 2.5 mW (Bluetooth)
Tx Frequency Bands:	136-174 MHz, 2.402-2.480 GHz (Bluetooth)
Signaling type:	FM, FHSS (BT)
Model(s) Tested:	PMUD3265A
Model(s) Certified:	PMUD3265A
Serial Number(s):	105TPB0100 & 105TPB0059
Classification:	Occupational/Controlled
FCC ID:	AZ489FT3833; Rule Part 90 (150.8-173.4 MHz); Rule Part 15 (2402-2480 MHz)
IC:	109U-89FT3833; (138-144 MHz; 148-149.9 MHz, 150.05-174 MHz & 2402-2480 MHz)

* Refer to section 15 of part 1 for highest SAR summary results.

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 47 CFR 2.1093(d). The 10 grams result is not applicable to FCC filing.
The test results clearly demonstrate compliance with ICNIRP (1998) Guidelines for limiting exposure in time-varying electric, magnetic, and electromagnetic fields (up to 300 GHz), Health Physics 74, 494-522 RF Exposure limits of 10 W/kg averaged over 10grams of contiguous tissue.

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 3.0 of this report. 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.

Deanna M Zakharia

Deanna Zakharia
EMS EME Lab Senior Resource Manager,
Laboratory Director
Approval Date: 4/26/2013

Certification Date: 4/26/2013

Certification No.: L1130409P

Part 1 of 2

APPENDICES

Part 2 of 2

Report Revision History

Date	Revision	Comments
04/23/2013	O	Initial release

1.0 Introduction example

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 model number PMUD3265A.

2.0 Abbreviations / Definitions

CNR: Calibration Not Required
EME: Electromagnetic Energy
NKP: Non-Keypad
CW: Continuous Wave
DUT: Device Under Test
DC: Duty Cycle
FM: Frequency Modulation/Factory Mutual
NA: Not Applicable
PTT: Push to Talk
RSM: Remote Speaker Microphone
SAR: Specific Absorption Rate
GPS: Global Positioning System
BT: Bluetooth
GFSK: Gaussian Frequency-Shift Keying
PI/4DPSK: π/4 Differential Phase-Shift Keying
8DPSK: 8 Differential Phase-Shift Keying
FHSS: Frequency Hopping Spread Spectrum

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.

3.0 Referenced Standards and Guidelines

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

- IEC62209-1*(2005) 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)
- United States Federal Communications Commission, Code of Federal Regulations; Rule Part 47CFR § 2.1093 sub-part J:1999
- Federal Communications Commission, “Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields”, OET Bulletin 65, Supplement C (Edition 01-01), FCC, Washington, D.C.: June 2001.
- IEEE 1528*(2003), 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 (2009), Limits of Human Exposure to Radio frequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz
- Australian Communications Authority Radio communications (Electromagnetic Radiation - Human Exposure) Standard (2003)
- 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).

* The IEC62209-1 and IEEE 1528 are applicable for hand-held devices used in close proximity to the ear only.

4.0 SAR Limits

TABLE 1

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

5.0 SAR Result Scaling Methodology:

The calculated 1-gram and 10-gram averaged SAR results indicated as "Max Calc. 1g-SAR" and "Max Calc.10g-SAR" in the data tables is determined by scaling the measured SAR to account for power leveling variations and power slump. A table and graph of output power versus time is provided in APPENDIX H. For this device the "Max Calc. 1g-SAR" and "Max Calc.10g-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 KDB450824 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.

6.0 Description of Device Under Test (DUT):

Model PMUD3265A operates using analog frequency modulation (FM) signaling incorporating traditional simplex two-way radio transmission protocol. This model intended use is to be 5-5-90 (5% TX, 5% RX and 90% standby).

This model is also wireless Bluetooth (BT) compatible, with the following operations: Supports Bluetooth 2.1 + EDR (Class 2 BT device); Offers HCI compliant solutions; Receiver sensitivity is -70dBm. The modulation frequency is PI/4DPSK and 8DPSK (GFSK modulation with hopping 79 (1 MHz) channel). Worst case duty cycle for BT is derived from a 5-slot packet type operation which consists of receiving on 1-slot and transmitting on 5-slots, and thus maximum duty cycle is 77% as defined by BT standard.

The model represented under this filing utilize removable antennas (VHF band) capable of transmitting in the 136-174 MHz, and an internal fixed BT antenna capable of transmitting at 2.402 - 2.480 GHz bands respectively. The nominal VHF band output power is 5 W with maximum output power of 6 W and nominal BT output power is 2.5 mW and maximum output of 10 mW, as defined by upper limit of the production line final test station. The intended operating positions are "at the face" with the DUT at least 1 inch from the mouth, and "at the body" by means of the offered body worn accessories. Body worn audio and PTT operation is accomplished by means of optional remote accessories that are connected to the radio. Operation at the body without an audio accessory attached is possible by means of offered wireless BT accessories.

Model PMUD3265A are being offered with the accessories listed in section 7.0.

7.0 Optional Accessories and Test Criteria:

This device is offered with optional accessories. All accessories were individually evaluated during the test plan creation to determine if testing was required per the guidelines outlined in "SAR Test Reduction Considerations for Occupational PTT Radios" FCC KDB 643646 D01 dated 4/4/11 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 three VHF antennas and one BT antenna offered for these models. The table below lists the antennas and their descriptions.

TABLE 2

Antenna Models	Description	Selected for Test	Tested
PMAD4119A*	VHF Stubby Antenna; 136-148 MHz; ¼ wave; -11.0dBi	Yes	Yes
PMAD4120A	VHF Stubby Antenna; 146-160 MHz; ¼ wave; -11.0dBi	Yes	Yes
PMAD4121B	VHF Stubby Antenna; 160-174 MHz; ¼ wave; -11.0dBi	Yes	Yes
0104039J80	IFA Bluetooth Antenna; 2400-2480MHz; ¼ wave, 0dBi	Yes	Yes

***Note: Antenna PMAD4119A bandwidth is outside FCC Part 90.**

7.2 Battery:

There is only one battery offered for this model. The table below lists the battery and its description.

TABLE 3

Battery Models	Description	Selected for Test	Tested	Comments
PMNN4440A	BATT STD IP67 LIION1600M1700T	Yes	Yes	

7.3 Body worn Accessories:

There is only one body worn accessory offered for this model. The table below lists the body worn accessory and its description.

TABLE 4

Body worn Models	Description	Selected for Test	Tested	Comments
PMLN6545A	Plastic Carry Case with Belt Clip	Yes	Yes	

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.

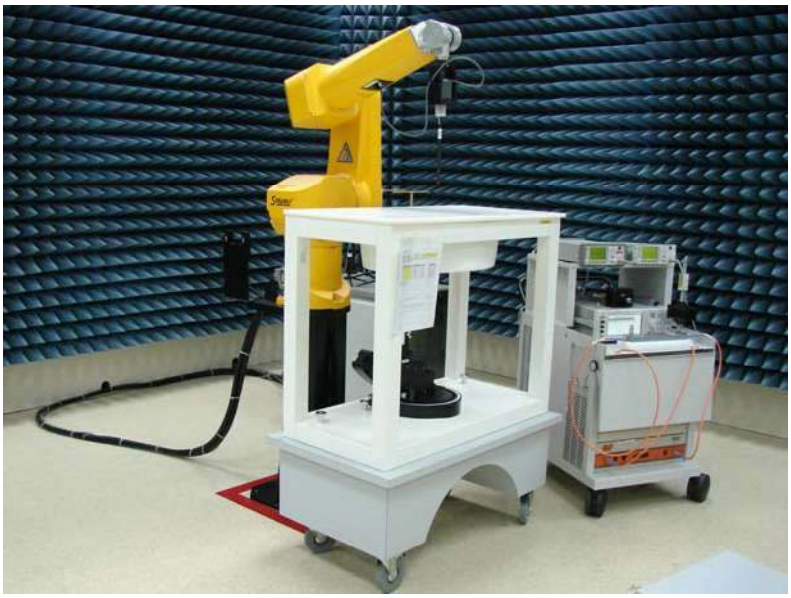
TABLE 5

Audio Acc. Models	Description	Selected for Test	Tested	Comments
89409N	HK200 Bluetooth Earpiece	No	No	BT accessory
AARLN4885B	Receive-Only Covered Earbud with Coiled Cord, for Remote Speaker Microphone	Yes	No	Intended for test with PMMN4071A, PMMN4073A, and PMMN4076A. Per KDB provisions test not required.
GMTN6356A	Non-Secure Wireless Headset & Push-to-Talk Device with Push-to-Talk Audio, 9-Inch Cable with Euro/UK	No	No	BT accessory
NNTN8125B	Operations Critical Wireless Earpiece with 12 inch cable	No	No	BT accessory
NNTN8126B	Operations Critical Wireless Earpiece with 9.5 inch cable	No	No	BT accessory
NNTN8127B	Operations Critical Wireless with Push-To-Talk Pod	No	No	BT accessory
NNTN8143C	Non-Secure Wireless Push-to-Talk Device (for NNTN8125B and NNTN8126B)	No	No	BT accessory
NNTN8189A	Non-Secure Wireless Headset & Push-to-Talk Device with Push-to-Talk Audio,12 inch cable	No	No	BT accessory
NNTN8191C	Push-to-Talk Module, without Charger	No	No	BT accessory
NNTN8294A	Operations Critical Wireless Earbud with 11.5 inch cable	No	No	BT accessory
NNTN8295A	Operations Critical Wireless Earbud with 45 inch cable	No	No	BT accessory
NNTN8316A	Replacement Ear Tips Kit for Wireless Ear Buds	No	No	Replacement kits
NTN2572A	Replacement Wireless Earpiece 12 inch cable	No	No	Replacement kits
NTN2575A	Replacement Wireless Earpiece 9.5 inch cable	No	No	Replacement kits
NTN8821A	Wireless Earpiece Maintenance Kit	No	No	BT accessory
NTN8988A	Commport Ear Strap	No	No	BT accessory
PMLN4620B	D-Shell Receive Only Earpiece (One Size) for Remote Speaker Microphone	No	No	Receive-only. BS to AARLN4885B.
PMLN5724A	2-Wire Surveillance Kit, Black	Yes	No	Per KDB provisions test not required.
PMLN5726A	2-Wire Surveillance Kit, Beige	No	No	BS to PMLN5724A
PMLN5727A	Earpiece In-Line Mic/PTT Swivel, MagOne	Yes	No	Per KDB provisions test not required.
PMLN5731A	Heavy Duty Headset, Noise Cancelling with In-Line PTT	Yes	No	Per KDB provisions test not required.
PMLN5732A	Earset with Boom Microphone, MagOne	Yes	No	Per KDB provisions test not required.
PMLN5733A	Earbud with In-Line Mic/PTT, MagOne	No	No	Receive only
PMMN4071A	IMPRES Remote Speaker Microphone Large, Noise Cancelling with 3.5mm Jack	Yes	No	Per KDB provisions test not required.
PMMN4073A	IMPRES Remote Speaker Microphone Small, with 3.5mm Jack	Yes	No	Per KDB provisions test not required.
PMMN4075A	Remote Speaker Microphone Small, No	Yes	Yes	

TABLE 5

Audio Acc. Models	Description	Selected for Test	Tested	Comments
	Emergency, IP57			
PMMN4076A	Remote Speaker Microphone Small with 3.5mm Jack	Yes	No	Per KDB provisions test not required.
RLN4941A	Receiver-Only Earpiece with Translucent Tube and Rubber Eartip for Remote Speaker Microphone	No	No	Receive-only. BS to AARLN4885B.
RLN5037A	Replacement Ear Tubes	No	No	Replacement kits
WADN4190B	Receive-Only Flexible Earpiece for Remote Speaker Microphone	No	No	Receive-only. BS to AARLN4885B.

8.0 Description of Test System:



8.1 Descriptions of Robotics/Probes/Readout Electronics:

TABLE 6

Disometric System Type	System Version	DAE Type	Probe Type
Schmid & Partner Engineering AG SPEAG™ DASY4™	4.7 build 80	DAE4	ES3DV3 (E-field)
Schmid & Partner Engineering AG SPEAG™ DASY5™	52.8.2.969	DAE4	ES3DV3 (E-field)

The DASY4™ and DASY5™ system is operated per the instructions in the respective DASY4™ and DASY5™ Users Manual. The complete manual is available directly from SPEAG™. All measurement equipment used to assess EME 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 7

Phantom Type	Phantom ID(s)	Material Parameters	Phantom Dimensions LxWxD (mm)	Material Thickness (mm)	Support Structure Material	Loss Tangent (wood)
Dual Flat	NA	300MHz -6GHz; Er = 4+/- 1, Loss Tangent = ≤0.05	600x400x190	2mm +/- 0.2mm	Wood	< 0.05
SAM	NA					
Elliptical	ELI4 1103 ELI5 1150 ELI5 1147					

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 8 below for 300 MHz and 2450 MHz. 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 (by mass)

TABLE 8

Reference Standards	% of Listed Ingredients	300 MHz		2450 MHz	
		Head	Body	Head	Body
FCC Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97-01) IEEE 1528 - 2003 IEC62209-1 (2005) CENELEC EN62209-1 (2006)	Sugar	56.0	47.1	0	0
	Diacetin	0	0	51.0	34.5
	De ionized -Water	37.5	49.48	48.75	65.20
	Salt	5.4	2.32	0.15	0.20
	HEC	1.0	1.0	0	0
	Bact.	0.1	0.1	0.1	0.1

Reference section 10.1 for target parameters

9.0 Additional Test Equipment:

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

TABLE 9

Equipment Type	Model Number	Serial Number	Calibration Date	Calibration Due Date
Power Meter	E4418B	MY45100739	7/12/2012	7/12/2013
Power Sensor	8481B	SG41090258	6/26/2012	6/26/2013
Power Meter	E4418B	MY45101014	10/31/2012	10/31/2013
Power Sensor	8481B	SG41090248	11/6/2012	11/6/2013
Power Meter	E4418B	MY45100532	11/14/2012	11/14/2013
Power Sensor	8481B	MY41091170	11/6/2012	11/6/2013
Power Meter	E4416A	MY50001037	2/27/2013	2/27/2014
Power Sensor	N8481B	MY51450002	2/26/2013	2/26/2014
Power Meter	E4418B	MY45100911	6/25/2012	6/25/2013
Power Sensor	8481B	MY41091243	6/26/2012	6/26/2013
Signal Generator	E4438C	MY45091014	11/2/2012	11/2/2014
Amplifier	10W1000C	312858	CNR*	CNR*
Amplifier	5S1G4	312988	CNR*	CNR*
NARDA Bi-Directional Coupler	3020A	41935	8/24/2012	8/24/2013
NARDA Bi-Directional Coupler	3022	81639	7/31/2012	7/31/2013
Temperature Recording Equipment				
Thermometer	HH202A	35882	7/24/2012	7/24/2013
Thermometer	HH202A	35881	12/18/2012	12/18/2013
Therm. Probe	80PK-22	8765	12/18/2012	12/18/2013
Dickson Temp & RH Data Logger	TM320	06153216	7/6/2012	7/6/2013
Tissue Station				
Network Analyzer	E5071B	MY42403147	11/1/2012	11/1/2013
Dielectric Probe Kit (HP)	85070E	MY44300183	CNR*	CNR*
Dipole				
Speag Dipole	D2450V2	782	11/22/2011 (Body -5/15/2012)	11/22/2013 (Body -5/15/2014)
Speag Dipole	D300V3	1003	11/14/2011 (Body -8/21/2012)	11/14/2013 (Body -8/21/2013)
DAE				
Speag DAE	DAE4	684	12/17/2012	12/17/2013
Speag DAE	DAE4	1294	11/13/2012	11/13/2013
Probe				
Speag Probe	ES3DV3	3274	11/13/2012	11/13/2013
Speag Probe	ES3DV3	3096	11/13/2012	11/13/2013

*** Calibration is not required by the OEM. The dielectric probe kit is used in conjunction with a calibrated network analyzer. The dielectric probe kit is calibrated for short, open, and load using the calibrated network analyzer. A saline solution is routinely measured as an additional check point.**

10.0 SAR Measurement System Verification:

The system performance check was conducted daily and within 24 hours prior to testing. DASY output files of the probe/dipole calibration certificates and system performance test results are included in appendices B, C, D respectively.

10.1 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. Table 10 below summarizes the measured tissue parameters used for the SAR assessment.

TABLE 10

Frequency (MHz)	Tissue Type	Conductivity Target & Range (S/m)	Dielectric Constant Target & Range	Conductivity Meas. (S/m)	Dielectric Constant Meas.	Tested Date
136	FCC Body	0.79 (0.75-0.83)	62.25 (59.14-65.36)	0.78	61.00	03/06/13
	IEEE / IEC Head	0.75 (0.71-0.79)	52.95 (50.30-55.60)	0.74	53.60	03/12/13
142	FCC Body	0.79 (0.75-0.83)	62.10 (59.00-65.20)	0.78	60.90	03/06/13
	IEEE / IEC Head	0.75 (0.71-0.79)	52.67 (50.04-55.30)	0.72	53.10	03/06/13
146	FCC Body	0.80 (0.76-0.84)	62.00 (58.90-65.10)	0.79	60.80	03/06/13
	IEEE / IEC Head	0.76 (0.72-0.80)	52.49 (49.87-55.11)	0.72	52.90	03/06/13
148	FCC Body	0.80 (0.76-0.84)	61.95 (58.85-65.05)	0.79	60.80	03/06/13
	IEEE / IEC Head	0.76 (0.72-0.80)	52.39 (49.77-55.01)	0.73	52.80	03/06/13
151	FCC Body	0.80 (0.76-0.84)	61.88 (58.79-64.97)	0.78	60.80	03/05/13
	IEEE / IEC Head	0.76 (0.72-0.80)	52.25 (49.64-54.86)	0.74	53.00	03/05/13
167	FCC Body	0.81 (0.77-0.85)	61.48 (58.41-64.55)	0.80	60.40	03/06/13
				0.79	60.50	03/07/13
				0.78	60.00	03/29/13
	IEEE / IEC Head	0.77 (0.73-0.81)	51.51 (48.93-54.09)	0.76	52.30	03/05/13
300	FCC Body	0.92 (0.87-0.97)	58.20 (55.29-61.11)	0.89	56.80	03/05/13
				0.89	57.00	03/06/13
				0.89	57.00	03/07/13
				0.88	56.40	03/29/13
	IEEE / IEC Head	0.87 (0.83-0.91)	45.30 (43.04-47.56)	0.87	46.70	03/05/13
				0.86	46.20	03/06/13
				0.87	46.40	03/12/13
2441	FCC Body	1.94 (1.84-2.04)	52.71 (47.44-57.98)	2.02	47.70	04/01/13
2450	FCC Body	1.95 (1.85-2.05)	52.70 (47.43-57.97)	2.03	47.60	04/01/13

10.2 System Check Test Results:

System performance 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 11

Probe Serial #	Tissue Type	Dipole Kit / Serial #	Reference SAR @ 1W (W/kg)	System Check Results Measured (W/kg)	System Check Test Results when normalized to 1W (W/kg)	Tested Date
3096	FCC Body	SPEAG D300V3 / 1003	2.87 +/- 10%	0.70	2.80	03/05/13
				0.70	2.80	03/06/13
				0.69	2.76	03/07/13
				0.71	2.82	03/29/13
	IEEE /IEC Head	SPEAG D300V3 / 1003	2.93 +/- 10%	0.71	2.86	03/05/13
				0.71	2.82	03/06/13
				0.71	2.83	03/12/13
3274	FCC Body	SPEAG D2450V2 / 782	50.60 +/- 10%	13.40	53.60	04/01/13

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 12

	Target	Measured
Ambient Temperature	18 - 25 ˚C	Range: 22.6-23.7˚C Avg. 23.1˚C
Relative Humidity	30 - 70 %	Range: 42.2-52.2% Avg. 45.4%
Tissue Temperature	NA	Range: 20.7-21.5˚C Avg. 21.0˚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 Methodology

12.1 Measurements

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

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 D01.

12.3 DUT Positioning Procedures

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

12.3.1 Body

The DUT was positioned in normal use configuration against the phantom with the offered body worn accessories 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 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 DUT Test Plan:

The guidelines and requirements outlined in "SAR Test Reduction Considerations for Occupational PTT Radios" FCC KDB 643646 D01 dated 4/4/11 for head (face) and body 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 100% CW mode and then 50% duty cycle was applied to the final results. The initial powers measured are within the range of 95% to 100% of the max power.

13.0 DUT Test Data

13.1 Assessment at the Body for 150.8-173.4 MHz Band:

The offered battery PMNN4440A was used for assessment at the Body (refer to Exhibit 7B for the dimension of the battery). The conducted power measurement for all test channels within Part 90 frequency range (150.8-173.4 MHz) is indicated in Table 13. The channel with the highest conducted power will be identified as the default channel per KDB 643646 D01 SAR Test for PTT Radios v01r01. Highest SAR results from each table are bolded. SAR plots of the highest results are presented in Appendix E-G.

TABLE 13

Test Freq (MHz)	Power (W)
150.800	5.99
155.400	5.92
160.000	5.91
167.000	5.98
173.400	5.98

13.1.1 Assessment at the Body with Body worn PMLN6545A:

Assessment of offered antennas with the offered battery and body worn PMLN6545A per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 13 for the highest output power channel.

TABLE 14

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAD4120A	PMNN4440A	PMLN6545A	PMMN4075A	150.800	5.99	-0.564	0.510	0.345	0.29	0.20	Lee-AB-130305-03
				155.400							
				160.000							
PMAD4121B	PMNN4440A	PMLN6545A	PMMN4075A	160.000							
				167.000	5.98	-0.519	2.117	1.321	**1.20**	**0.75**	Lee-AB-130306-13
				173.400							

13.1.2 Assessment of wireless BT configuration at the Body:

Assessment using the overall highest SAR configuration at the body from above without an audio accessory attached.

TABLE 15

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAD4121B	PMNN4440A	PMLN6545A	NONE	160.000							
				167.000	5.96	-0.765	1.443	0.949	**0.87**	**0.57**	Lee-AB-130329-02
				173.400							

13.1.3 Assessment of other audio accessories at the body:

Assessment per KDB 643646 D01 Body SAR Test Considerations for Audio Accessories without Built-in Antenna; Sec 1, A. when overall < 4.0 W/kg, SAR tests for that audio accessory is not necessary. This was applicable to all remaining accessories.

13.2 Assessment outside FCC Part 90 at the Body:

Assessment using the highest SAR configuration from Part 90 assessment above (Run# Lee-AB-130306-13, Table 14) across the antennas (if applicable).

TABLE 16

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAD4119A	PMNN4440A	PMLN6545A	PMMN4075A	136.000	5.80	-0.587	0.548	0.376	0.32	0.22	Lee-AB-130306-09
				142.000	5.81	-0.941	0.329	0.227	0.21	0.15	Lee-AB-130306-10
				148.000	5.83	-0.774	0.215	0.148	0.13	0.09	Lee-AB-130306-11
PMAD4120A	PMNN4440A	PMLN6545A	PMMN4075A	146.000	5.83	-0.465	0.652	0.454	**0.37**	**0.26**	Lee-AB-130306-12

13.3 Assessment at the Face:

The offered battery PMNN4440A was used for assessment at the Face (refer to Exhibit 7B for the dimension of the battery). The conducted power measurement for all test channels within Part 90 frequency range (150.8-173.4 MHz) is listed in Table 17. The channel with the highest conducted power was used as the default channel per KDB 643646 D01 SAR Test for PTT Radios v01r01. SAR plots of the highest results per table (bolded) are presented in Appendix E-G.

TABLE 17

Test Freq (MHz)	Power (W)
150.800	5.99
155.400	5.92
160.000	5.91
167.000	5.98
173.400	5.98

Assessment of each of the offered antennas with the default battery, front of DUT facing phantom per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Head SAR Test Considerations. Refer to Table 17 for highest output power channel.

TABLE 18

Assessments at the Face (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAD4120A	PMNN4440A	NONE	NONE	150.800	5.99	-0.367	0.945	0.723	0.52	0.39	Lee-FACE-130305-06
				155.400							
				160.000							
PMAD4121B	PMNN4440A	NONE	NONE	160.000							
				167.000	5.99	-0.572	0.967	0.738	**0.55**	**0.42**	Lee-FACE-130305-08
				173.400							

13.4 Assessment outside FCC Part 90 at the Face:

Assessment using the highest SAR configuration from Part 90 assessment above (Run# Lee-FACE-130305-08, Table 18) across the antennas (if applicable).

TABLE 19

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAD4119A	PMNN4440A	NONE	NONE	136.000	5.71	-0.033	0.557	0.427	0.29	0.23	Lee-FACE-130312-12
				142.000	5.80	-0.204	0.818	0.624	**0.44**	**0.34**	Lee-FACE-130306-04
				148.000	5.83	-0.867	0.575	0.438	0.36	0.28	Lee-FACE-130306-07
PMAD4120A	PMNN4440A	NONE	NONE	146.000	5.81	-0.500	0.363	0.274	0.21	0.16	Lee-FACE-130306-06

13.5 Assessment for Industry Canada frequency range:

Based on the assessment results for body and face per KDB643646 D01 and additional tests for frequencies outside of Part 90, additional tests were not required for the Industry Canada frequency range (138-144 MHz, 148-149.9 MHz and 150.05-174 MHz) as the testing performed is in compliance with Industry Canada frequency range.

13.6 Assessment for Bluetooth

The DUT was tested at the center of the BT band using the highest overall SAR configuration without the audio accessory cable attached. The highest SAR result from the table below (bolded) is included in Appendix E-G.

TABLE 20

BT Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
0104039J80	PMNN4440A	PMLN6545A	NONE	2441.000	0.01	-0.160	0.00891	0.00456	0.00712	0.00364	Lee-AB-130401-03

13.7 Shorten Scan Assessment:

A “shortened” scan using the highest SAR configuration overall from above was performed to validate the SAR drift of the full DASY4™ 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 E 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 E.

TABLE 21

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAD4121B	PMNN4440A	PMLN6545A	PMMN4075A	167.000	5.99	-0.306	2.384	1.482	1.28	0.80	Lee-AB-130307-03

14.0 Simultaneous Transmission:

Simultaneous Transmission applies. See section 15.0.

15.0 Conclusion:

Based on the test guidelines from KDB 643646 and testing other frequencies outside of Part 90, the highest Operational Maximum Calculated 1-gram and 10-gram average SAR values found for this filing:

TABLE 22

Designator	Frequency band (MHz)	BODY				FACE	
		Max Calc (W/kg)		Simultaneous Calc (W/kg)		Max Calc (W/kg)	
		1g-SAR	10g-SAR	1g-SAR	10g-SAR	1g-SAR	10g-SAR
Overall	136-174	1.28	0.80	1.29	0.80	0.55	0.42
FCC	150.8-173.4	1.28	0.80	1.29	0.80	0.55	0.42
Industry Canada	138-174	1.28	0.80	1.29	0.80	0.55	0.42

All results are scaled to the maximum output power

The test results clearly demonstrate compliance with FCC Occupational/Controlled RF Exposure limits of 8 W/kg averaged over 1 gram per the requirements of 47 CFR 2.1093(d). The 10 grams result is not applicable to FCC filing.