MOTOROLA SOLUTIONS

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TESTING CERT # 2518.05

DECLARATION OF COMPLIANCE SAR ASSESSMENT Part 1 of 2

Enterprise Mobility Solutions
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Date of Report: 04/09/13
Report Revision: O
Report ID: SAR rpt_ PMUE4147A _Rev.O 130409_SR11175

Responsible Engineer:	Tan CheeChin (EME Section Manager)
Report Author:	Tan CheeChin (EME Section Manager)
Date/s Tested:	02/20/13-04/05/13
Manufacturer/Location:	Motorola, Penang
Sector/Group/Div.:	PCR
Date submitted for test:	01/22/13
DUT Description:	403-470MHz, 4W, NKP
Test TX mode(s):	CW (PTT)
Max. Power output:	4.8 W
Nominal Power:	4.0 W
Tx Frequency Bands:	403-470 MHz
Signaling type:	FM
Model(s) Tested:	PMUE4147A
Model(s) Certified:	PMUE4147A
Serial Number(s):	752TOB0112
Classification:	Occupational/Controlled
FCC ID:	ABZ99FT4094; Rule Part 90 (406.1-470 MHz)
IC:	109AB-99FT4094 ; (406.1-430 and 450-470 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.

EMS EME Lab Senior Resource Manager,
Laboratory Director
Approval Date: 4/17/2013

Certification Date: 4/17/2013

Certification No.: L1130406P

Part 1 of 2

APPENDICES

Part 2 of 2

Report Revision History

Date	Revision	Comments
04/09/13	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 PMUE4147A.

2.0 Abbreviations / Definitions

CNR: Calibration Not Required
EME: Electromagnetic Energy
NKP: No 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

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):

This device operates using analog frequency modulation (FM) signaling incorporating traditional simplex two-way radio transmission protocol.

The model represented under this filing utilizes removable antennas (UHF) and capable of transmitting in the 403-470 MHz band respectively. The nominal UHF output power is 4.0 watts with maximum output power of 4.8 watts 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.

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. 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 six UHF antennas offered for this product. The table below lists their descriptions.

TABLE 2

Antenna Models	Description	Selected for test	Tested
NAE6483AR	Flexible Whip 403-520 MHz; ¼ wave; 0 dBi gain	Yes	Yes
PMAE4016A	Antenna Whip 403-520 MHZ; ¼ wave; 0 dBi gain	Yes	Yes
NAE6522AR	Heliflex Stubby 438-470 MHz; ¼ wave; -1 dBi gain	Yes	Yes
PMAE4003A	Heliflex Stubby 430-470; ¼ wave; -1 dBi gain	Yes	Yes
PMAE4002A	Stubby Antenna 403-433 MHz; ¼ wave; -1 dBi gain	Yes	Yes
NAE6521A	Heliflex Stubby 403-440 MHz; ¼ wave; -1 dBi gain	Yes	Yes

7.2 Battery:

There are nine batteries offered for this product. The table below lists its description.

TABLE 3

Battery Models	Description	Selected for test	Tested	Comments
PMNN4072A	ELP Magone - AA NiMH, 1400mAh	Yes	Yes	
NNTN4851A	ELP - AA NiMH, 1400 mAh STD	Yes	Yes	
NNTN4852A	ELP AA NiMH, 1300 mAh FM	Yes	Yes	
NNTN4970A	ELP - Lithium Ion Slim Battery, 1600mAh	Yes	Yes	
NNTN4497CR	ELP - Lithium Ion Ultra High Cap Battery, 2250mAh	Yes	Yes	
PMNN4251AR	ELP(CE) - AA NiMH, 1400mAh	Yes	Yes	
PMNN4252AR	ELP(CE) AA NiMH, 1300mAh	Yes	Yes	
PMNN4253AR	ELP(CE) - Lithium Ion Slim, 1600mAh	Yes	Yes	
PMNN4254AR	ELP(CE) - Lithium Ion Ultra High Cap, 2300mAh	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 4

Body worn Models	Description	Selected for test	Tested	Comments
RLN5383A	ND Leather case with belt loop and D-rings	Yes	Yes	
RLN5644A	Spring Action 2 inch Belt clip	Yes	Yes	
HLN8255B	Spring Action 3 inch Belt clip	Yes	Yes	
HLN9701B	Nylon case with belt loop & D-rings	Yes	Yes	
NTN5243A	Carry case shoulder strap	Yes	Yes	Tested with carry cases
RLN4570A	Chest pack	No	No	By similarity to HLN6602A
RLN5385B	ND Leather case with 3 inch belt loop	Yes	Yes	
TDN9327A	Radio hanger	No	No	
TDN9373A	Door hanger	No	No	
RLN5384B	ND Leather case with 2.5 inch belt loop	No	No	By similarity to RLN5385B
4280483B03	2.5 inch Swivel Belt Loop	No	No	Replacement part
4280483B04	3 inch Swivel Belt Loop	No	No	Replacement part
RLN5716A	T-Strap for leather cases	No	No	
1505596Z02	Replacement strap for HLN6602A/RLN4570A	No	No	Replacement part
HLN6602A	Nylon Chest Pack	Yes	Yes	
HLN9985B	Water proof bag	No	No	
RLN4815A	Radio pack	Yes	Yes	
RLN5500A	Retainer Kit	No	No	
4280384F89	Universal RadioPAK	No	No	

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
PMLN4606A	2 wire surveillance with clear acoustic earpiece	No	No	By similarity to PMLN6530A
RLN4760A	clear comfortable earpiece small right	No	No	Piece part
RLN4761A	clear comfortable earpiece med right	No	No	Piece part
RLN4762A	clear comfortable earpiece large right	No	No	Piece part
RLN4763A	clear comfortable earpiece small left	No	No	Piece part
RLN4764A	clear comfortable earpiece med left	No	No	Piece part
RLN4765A	clear comfortable earpiece large left	No	No	Piece part
5080370E97	replacement rubber ear buds	No	No	Piece part
5080384F72	replacement foam plug ins	No	No	Piece part
REX4648A	replacement windscreen and foam ear pad	No	No	Piece part

(Continued) TABLE 5

Audio Acc. Models	Description	Selected for test	Tested	Comments
RLN6230A	extreme noise kit – black	No	No	Piece part
RLN6231A	extreme noise kit – beige	No	No	Piece part
RLN6232A	low noise kit – black	No	No	Piece part
RLN6241A	low noise kit – beige	No	No	Piece part
RLN6242A	quick disconnect acoustic tube	No	No	Piece part
RLN4941A	Receive only Earpiece w/translucent tube & eartip	Yes	Yes	Intended for test with PMMN4013A
BDN6720A	Flexible Ear Receiver	No	No	Receive only
AARLN4885B	Receive-Only Earpiece with 3.5mm Audio Jack	No	No	By similarity to RLN4941A
PMLN4620B	D-Shell RSM Earpiece 3.5mm Audio Jack	No	No	By similarity to RLN4941A
WADN4190B	Over the Ear Receiver for RSM	No	No	By similarity to RLN4941A
PMLN6533A	Earset with Combined Microphone/PTT	No	No	By similarity to PMLN6530A
PMLN6534A	Earbud with In-Line Mic/PTT /VOX switch (Mag One)	No	No	By similarity to PMLN6531A
PMLN6531A	Ear Receiver with In-Line Mic/ PTT/VOX switch (Mag One)	Yes	Yes	
PMLN6535A	D-Style Earpiece with Mic/PTT	No	No	By similarity to PMLN6530A
PMLN6537A	Earset with Boom Mic and In-Line PTT/VOX switch (Mag One)	Yes	Yes	
PMLN6538A	Lightweight Headset with Swivel Boom Microphone	Yes	Yes	
PMLN6539A	Medium Weight Over-The-Head Dual Muff Headset	Yes	Yes	
PMLN6540A	Heavy-Duty Noise Cancelling Boom Mic Headset	Yes	Yes	
PMLN6541A	Lightweight Temple Transducer Headset	Yes	Yes	
PMMN4013A	Remote Speaker Microphone With 3.5 mm Audio Jack	Yes	Yes	Default audio accessory applicable for offered battery, body worn and antenna
PMMN4029A	Remote Speaker Microphone IP57	No	No	By similarity to PMMN4092A
PMMN4092A	Remote Speaker Microphone (Mag One)	Yes	Yes	
PMLN6445A	2-Wire Surveillance Kit (Beige) with Clear Acoustic Earpiece	No	No	By similarity to PMLN6530A
PMLN6530A	2-Wire Surveillance Kit (Black)with Clear Acoustic Earpiece	Yes	Yes	
PMLN6536A	2-Wire Surveillance kit with quick disconnect acoustic tube, black	No	No	By similarity to PMLN6530A
PMLN6532A	Swivel earpiece with MIC/PTT MAGONE	No	No	By similarity to PMLN6531A
PMLN6542A	Breeze headset with boom MIC & PTT MAGONE	No	No	By similarity to PMLN6537A
5080369E39	Extra Loud earpiece - beige	No	No	Piece part
5080370E91	Extra Loud earpiece - black	No	No	Piece part
MDRLN4941A	Rcv only earpiece with tube and eartip	No	No	By similarity to RLN4941A
PMLN4605A	clear coiled voice tube kit	No	No	Piece part

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 1037 ELI5 1147 ELI5 1150					

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 450 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	450 MHz	
		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	46.5
	Diacetin	0	0
	De ionized -Water	39.1	50.53
	Salt	3.8	1.87
	HEC	1.0	1.0
	Bact.	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
Signal Generator	E4438C	MY45091014	11/2/2012	11/2/2014
Amplifier	10W1000C	312858	CNR*	CNR*
NARDA Bi-Directional Coupler	3020A	41935	8/24/2012	8/24/2013
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
Network Analyzer	E5071B	MY42403147	11/1/2012	11/1/2013
Dielectric Probe Kit (HP)	85070E	MY44300183	CNR*	CNR*
SPEAG™ Dipole	D450V3	1054	(Head- 11/21/2011) (Body -5/21/2012)	(Head -11/21/2013) (Body -5/21/2014)
SPEAG™ Probe	ES3DV3	3096	11/13/2012	11/13/2013
SPEAG™ Probe	ES3DV3	3274	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. The table 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
403	FCC Body	0.93 (0.88-0.98)	57.17 (54.31-60.03)	0.90	55.30	03/18/13
	IEEE / IEC Head	0.87 (0.83-0.91)	44.06 (41.86-46.26)	0.83	44.70	03/15/13
406	FCC Body	0.93 (0.88-0.98)	57.14 (54.28-60.00)	0.91	55.50	02/20/13
				0.91	55.20	02/21/13
				0.89	55.30	02/22/13
				0.90	55.10	02/25/13
				0.90	55.40	02/26/13
				0.90	55.50	02/27/13
				0.90	55.10	02/28/13
				0.90	54.90	03/01/13
				0.91	55.30	03/04/13
				0.89	55.30	03/05/13
				0.90	55.70	03/06/13
				0.90	55.50	03/07/13
				0.90	55.10	03/08/13
				0.91	55.40	03/11/13
	IEEE / IEC Head	0.87 (0.83-0.91)	44.03 (41.83-46.23)	0.84	44.80	03/14/13
430	FCC Body	0.94 (0.89-0.99)	56.90 (54.06-59.74)	0.93	55.10	02/20/13
				0.93	54.90	02/21/13
				0.92	55.10	02/26/13
				0.92	55.10	02/27/13
				0.92	54.70	02/28/13
				0.92	54.50	03/01/13
				0.92	55.00	03/04/13
				0.91	55.00	03/05/13
				0.92	55.30	03/06/13
				0.92	55.10	03/07/13
				0.93	55.10	03/11/13
				0.91	54.70	03/12/13
				0.90	54.80	03/13/13
	IEEE / IEC Head	0.87 (0.83-0.91)	43.74 (41.55-45.93)	0.86	44.30	03/14/13

(Continued) TABLE 10

Frequency (MHz)	Tissue Type	Conductivity Target & Range (S/m)	Dielectric Constant Target & Range	Conductivity Meas. (S/m)	Dielectric Constant Meas.	Tested Date
438	FCC Body	0.94 (0.89-0.99)	56.82 (53.98-59.66)	0.93	55.00	02/20/13
				0.93	54.80	02/21/13
				0.92	54.80	02/22/13
				0.93	54.60	02/25/13
				0.93	54.90	02/26/13
				0.93	55.00	02/27/13
				0.92	54.60	02/28/13
				0.93	54.40	03/01/13
				0.92	54.80	03/05/13
				0.92	55.20	03/06/13
				0.93	55.00	03/07/13
				0.94	54.90	03/11/13
	IEEE / IEC Head	0.87 (0.83-0.91)	43.64 (41.46-45.82)	0.87	44.10	03/14/13
446	FCC Body	0.94 (0.89-0.99)	56.74 (53.90-59.58)	0.93	54.30	03/01/13
				0.94	54.70	03/04/13
				0.92	54.70	03/05/13
				0.93	54.40	03/12/13
				0.92	54.50	03/13/13
				0.93	55.40	04/05/13
450	FCC Body	0.94 (0.89-0.99)	56.70 (53.86-59.54)	0.94	54.80	02/20/13
				0.94	54.60	02/21/13
				0.93	54.50	02/22/13
				0.94	54.40	02/25/13
				0.94	54.70	02/26/13
				0.94	54.80	02/27/13
				0.94	54.40	02/28/13
				0.94	54.20	03/01/13
				0.94	54.70	03/04/13
				0.93	54.60	03/05/13
				0.93	55.00	03/06/13
				0.94	54.70	03/07/13
				0.94	54.40	03/08/13
				0.95	54.70	03/11/13
				0.93	54.40	03/12/13
				0.92	54.40	03/13/13
				0.94	54.60	03/14/13
				0.94	54.50	03/18/13
				0.94	54.50	04/05/13
	IEEE / IEC Head	0.87 (0.83-0.91)	43.50 (41.32-45.68)	0.88	43.80	03/14/13
				0.87	43.70	03/15/13

(Continued) TABLE 10

Frequency (MHz)	Tissue Type	Conductivity Target & Range (S/m)	Dielectric Constant Target & Range	Conductivity Meas. (S/m)	Dielectric Constant Meas.	Tested Date
457	FCC Body	0.94 (0.89-0.99)	56.67 (53.84-59.50)	0.94	54.10	03/01/13
				0.95	54.50	03/04/13
				0.93	54.50	03/05/13
				0.94	54.20	03/12/13
				0.93	54.30	03/13/13
				0.95	54.50	03/14/13
	IEEE / IEC Head	0.87 (0.83-0.91)	43.46 (41.29-45.63)	0.88	43.60	03/14/13
				0.88	43.50	03/15/13
470	FCC Body	0.94 (0.89-0.99)	56.62 (53.79-59.45)	0.95	53.90	03/01/13
				0.95	54.00	03/12/13
				0.95	54.00	03/13/13
				0.96	54.20	03/14/13

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 D450V3 / 1054	4.49 +/- 10%	1.10	4.40	02/20/13
				1.08	4.32	02/21/13
				1.10	4.38	02/22/13
				1.11	4.44	02/25/13
				1.10	4.40	02/26/13
3274	FCC Body	SPEAG D450V3 / 1054	4.49 +/- 10%	1.10	4.40	02/27/13
				1.10	4.44	02/28/13
				1.10	4.40	03/01/13
				1.09	4.36	03/04/13
				1.10	4.40	03/05/13
				1.09	4.36	03/06/13
				1.09	4.36	03/07/13
				1.08	4.32	03/08/13
				1.10	4.40	03/11/13
				1.09	4.36	03/12/13
				1.09	4.36	03/13/13
				1.09	4.36	03/14/13
				1.10	4.40	03/18/13
				1.08	4.32	04/05/13
	IEEE /IEC Head	SPEAG D450V3 / 1054	4.75 +/- 10%	1.15	4.60	03/14/13
				1.15	4.60	03/15/13

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°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: 21.6-24.0˚C Avg. 23.1˚C
Relative Humidity	30 - 70 %	Range: 40.9-57.9% Avg. 46.1%
Tissue Temperature	NA	Range: 20.1-21.4˚C Avg. 20.7˚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 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%-100% maximum power.

13.0 DUT Test Data

13.1 Assessment at the Body:

The battery NNTN4970A was selected as the default battery to assess at the Body since it's the thinnest battery (refer to Exhibit 7B for the dimension of the battery). The conducted power measurement for all test channels within Part 90 frequency range (406.1-470 MHz) using the battery NNTN4970A 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)
406.125	4.70
419.6	4.62
430	4.61
433	4.61
438	4.61
440	4.60
446	4.59
456.7	4.60
470	4.58

Assessment at the Body with Body worn RLN5644A:

Assessment of offered antennas with the default battery and body worn accessory RLN5644A 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.1 g-SAR (W/kg)**	**Max Calc. 10g-SAR (W/kg)**	**Run#**
NAE6483AR	NNTN4970A	RLN5644A	PMMN4013A	406.125	4.68	-0.746	3.582	2.627	2.18	1.60	PS-AB-130220-11
				419.600							
				438.000							
				456.700							
				470.000							
PMAE4016A	NNTN4970A	RLN5644A	PMMN4013A	406.125	4.66	-0.842	3.542	2.627	2.21	1.64	PS-AB-130220-12
				419.600							
				438.000							
				456.700							
				470.000							
NAE6522AR	NNTN4970A	RLN5644A	PMMN4013A	438.000	4.67	-0.869	4.510	3.308	2.83	2.08	PS-AB-130220-13
				446.000							
				456.700							
				470.000							
PMAE4003A	NNTN4970A	RLN5644A	PMMN4013A	430.000	4.63	-1.040	4.236	3.117	2.79	2.05	PS-AB-130220-14
				446.000							
				456.700							
				470.000							
PMAE4002A	NNTN4970A	RLN5644A	PMMN4013A	406.125	4.77	-0.544	3.016	2.194	1.72	1.25	PS-AB-130220-16
				419.600							
				433.000							
NAE6521A	NNTN4970A	RLN5644A	PMMN4013A	406.125	4.66	-0.187	3.036	2.225	1.63	1.20	CcC-AB-130221-02
				419.600							
				430.000							
				440.000							
Assessments of the additional offered battery											
NAE6522AR	PMNN4072A	RLN5644A	PMMN4013A	438.000	4.65	-0.661	4.459	3.248	2.68	1.95	CcC-AB-130221-03
				446.000							
				456.700							
				470.000							
	NNTN4851A	RLN5644A	PMMN4013A	438.000	4.71	-0.877	4.429	3.238	2.76	2.02	CcC-AB-130221-04
				446.000							
				456.700							
				470.000							
	NNTN4852A	RLN5644A	PMMN4013A	438.000	4.61	-0.822	3.867	2.827	2.43	1.78	CcC-AB-130221-05
				446.000							
				456.700							
				470.000							
	NNTN4497CR	RLN5644A	PMMN4013A	438.000	4.78	-0.739	4.480	3.308	2.67	1.97	CcC-AB-130221-06
				446.000							
				456.700							
				470.000							

(Continued) 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.1 g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
NAE6522AR	PMNN4251AR	RLN5644A	PMMN4013A	438.000	4.56	-0.712	4.339	3.178	2.69	1.97	CcC-AB-130221-07
				446.000							
				456.700							
				470.000							
	PMNN4252AR	RLN5644A	PMMN4013A	438.000	4.63	-1.060	3.897	2.857	2.58	1.89	CcC-AB-130221-08
				446.000							
				456.700							
				470.000							
	PMNN4253AR	RLN5644A	PMMN4013A	438.000	4.74	-0.731	5.062	3.709	**3.03**	**2.22**	Lee-AB-130221-09
				446.000							
				456.700							
				470.000							
	PMNN4254AR	RLN5644A	PMMN4013A	438.000	4.78	-0.808	4.610	3.409	2.79	2.06	Lee-AB-130221-10
				446.000							
				456.700							
				470.000							

Assessment at the Body with Body worn HLN8255B:

Assessment of offered antennas with the default battery and body worn accessory HLN8255B per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 13 for highest output power channel.

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.1 g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
NAE6483AR	NNTN4970A	HLN8255B	PMMN4013A	406.125	4.65	-0.097	4.544	3.362	2.40	1.77	Lee-AB-130221-12
				419.600							
				438.000							
				456.700							
				470.000							
PMAE4016A	NNTN4970A	HLN8255B	PMMN4013A	406.125	4.70	-0.274	4.496	3.309	2.45	1.80	CcC-AB-130222-04
				419.600							
				438.000							
				456.700							
				470.000							
NAE6522AR	NNTN4970A	HLN8255B	PMMN4013A	438.000	4.64	-0.922	5.163	3.779	**3.30**	**2.42**	PS-AB-130221-15
				446.000							
				456.700							
				470.000							
PMAE4003A	NNTN4970A	HLN8255B	PMMN4013A	430.000	4.63	-0.119	4.979	3.648	2.65	1.94	PS-AB-130221-17
				446.000							
				456.700							
				470.000							
PMAE4002A	NNTN4970A	HLN8255B	PMMN4013A	406.125	4.63	-0.327	3.279	2.396	1.83	1.34	PS-AB-130221-19
				419.600							
				433.000							
NAE6521A	NNTN4970A	HLN8255B	PMMN4013A	406.125	4.63	-0.130	3.076	2.237	1.64	1.19	CcC-AB-130222-03
				419.600							
				430.000							
				440.000							

(Continued) 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.1 g-SAR (W/kg)**	**Max Calc. 10g-SAR (W/kg)**	**Run#**
Assessments of the additional offered battery											
NAE6522AR	PMNN4072A	HLN8255B	PMMN4013A	438.000	4.64	-0.889	5.119	3.740	3.25	2.37	CcC-AB-130222-05
				446.000							
				456.700							
				470.000							
	NNTN4851A	HLN8255B	PMMN4013A	438.000	4.62	-0.699	4.826	3.509	2.94	2.14	CcC-AB-130222-06
				446.000							
				456.700							
				470.000							
	NNTN4852A	HLN8255B	PMMN4013A	438.000	4.57	-0.932	4.281	3.137	2.79	2.04	PS-AB-130222-07
				446.000							
				456.700							
				470.000							
	NNTN4497CR	HLN8255B	PMMN4013A	438.000	4.77	-0.878	4.735	3.489	2.92	2.15	PS-AB-130222-08
				446.000							
				456.700							
				470.000							
	PMNN4251AR	HLN8255B	PMMN4013A	438.000	4.55	-0.814	4.735	3.469	3.01	2.21	PS-AB-130222-09
				446.000							
				456.700							
				470.000							
	PMNN4252AR	HLN8255B	PMMN4013A	438.000	4.51	-0.919	4.422	3.228	2.91	2.12	PS-AB-130222-10
				446.000							
				456.700							
				470.000							
	PMNN4253AR	HLN8255B	PMMN4013A	438.000	4.69	-0.865	5.230	3.821	3.27	2.39	PS-AB-130222-11
				446.000							
				456.700							
				470.000							
	PMNN4254AR	HLN8255B	PMMN4013A	438.000	4.75	-0.840	4.786	3.529	2.93	2.16	PS-AB-130222-12
				446.000							
				456.700							
				470.000							

Assessment at the Body with Body worn RLN5383A:

Assessment of offered antennas with the default battery and body worn accessory RLN5383A per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 13 for highest output power channel.

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.1 g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
NAE6483AR	NNTN4970A	RLN5383A	PMMN4013A	406.125	4.70	0.028	1.647	1.252	0.84	0.64	Lee-AB-130225-03
				419.600							
				438.000							
				456.700							
				470.000							
PMAE4016A	NNTN4970A	RLN5383A	PMMN4013A	406.125	4.70	-0.017	1.556	1.181	0.80	0.61	Lee-AB-130225-05
				419.600							
				438.000							
				456.700							
				470.000							
NAE6522AR	NNTN4970A	RLN5383A	PMMN4013A	438.000	4.73	-0.788	2.169	0.897	1.32	0.55	Lee-AB-130225-06
				446.000							
				456.700							
				470.000							
PMAE4003A	NNTN4970A	RLN5383A	PMMN4013A	430.000	4.64	-0.094	2.250	1.709	1.19	0.90	Lee-AB-130226-02
				446.000							
				456.700							
				470.000							
PMAE4002A	NNTN4970A	RLN5383A	PMMN4013A	406.125	4.72	-0.382	1.129	0.485	0.63	0.27	Lee-AB-130226-04
				419.600							
				433.000							
NAE6521A	NNTN4970A	RLN5383A	PMMN4013A	406.125	4.72	-0.099	1.190	0.494	0.62	0.26	Lee-AB-130226-06
				419.600							
				430.000							
				440.000							
Assessments of the additional offered battery											
NAE6522AR	PMNN4072A	RLN5383A	PMMN4013A	438.000	4.66	-0.756	2.139	0.853	1.31	0.52	Lee-AB-130226-09
				446.000							
				456.700							
				470.000							
	NNTN4851A	RLN5383A	PMMN4013A	438.000	4.62	-0.723	2.210	0.910	**1.36**	**0.56**	Lee-AB-130226-10
				446.000							
				456.700							
				470.000							
	NNTN4852A	RLN5383A	PMMN4013A	438.000	4.50	-0.730	1.630	1.240	1.03	0.78	PS-AB-130227-05
				446.000							
				456.700							
				470.000							
	NNTN4497CR	RLN5383A	PMMN4013A	438.000	4.79	-0.800	1.790	1.360	1.08	0.82	PS-AB-130227-03
				446.000							
				456.700							
				470.000							
	PMNN4251AR	RLN5383A	PMMN4013A	438.000	4.60	-0.780	1.740	1.330	1.09	0.83	PS-AB-130227-04
				446.000							
				456.700							
				470.000							
	PMNN4252AR	RLN5383A	PMMN4013A	438.000	4.59	-0.820	1.650	1.260	1.04	0.80	PS-AB-130227-02
				446.000							
				456.700							
				470.000							

(Continued) 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.1 g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
NAE6522AR	PMNN4253AR	RLN5383A	PMMN4013A	438.000	4.74	-0.780	2.030	0.869	1.23	0.53	PS-AB-130227-06
				446.000							
				456.700							
				470.000							
	PMNN4254AR	RLN5383A	PMMN4013A	438.000	4.78	-0.730	1.900	1.460	1.13	0.87	PS-AB-130227-07
				446.000							
				456.700							
				470.000							

Assessment at the Body with Body worn HLN9701B:

Assessment of offered antennas with the default battery and body worn accessory HLN9701B per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 13 for highest output power channel.

TABLE 17

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.1 g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
NAE6483AR	NNTN4970A	HLN9701B	PMMN4013A	406.125	4.58	-0.910	4.080	3.000	2.64	1.94	PS-AB-130227-08
				419.600							
				438.000							
				456.700							
				470.000							
PMAE4016A	NNTN4970A	HLN9701B	PMMN4013A	406.125	4.67	-0.950	4.100	3.020	2.62	1.93	PS-AB-130227-09
				419.600							
				438.000							
				456.700							
				470.000							
NAE6522AR	NNTN4970A	HLN9701B	PMMN4013A	438.000	4.68	-0.740	4.930	3.610	**3.00**	**2.20**	PS-AB-130227-10
				446.000							
				456.700							
				470.000							
PMAE4003A	NNTN4970A	HLN9701B	PMMN4013A	430.000	4.67	-0.180	4.550	3.340	2.44	1.79	CcC-AB-130227-12
				446.000							
				456.700							
				470.000							
PMAE4002A	NNTN4970A	HLN9701B	PMMN4013A	406.125	4.68	-0.860	2.900	2.100	1.81	1.31	CcC-AB-130227-14
				419.600							
				433.000							
NAE6521A	NNTN4970A	HLN9701B	PMMN4013A	406.125	4.64	-0.220	2.800	2.050	1.52	1.12	CcC-AB-130227-16
				419.600							
				430.000							
				440.000							

(Continued) TABLE 17

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.1 g-SAR (W/kg)**	**Max Calc. 10g-SAR (W/kg)**	**Run#**
Assessments of the additional offered battery											
NAE6522AR	PMNN4072A	HLN9701B	PMMN4013A	438.000	4.70	-0.730	4.430	3.240	2.68	1.96	CcC-AB-130227-17
				446.000							
				456.700							
				470.000							
	NNTN4851A	HLN9701B	PMMN4013A	438.000	4.60	-0.840	4.550	3.320	2.88	2.10	CcC-AB-130227-18
				446.000							
				456.700							
				470.000							
	NNTN4852A	HLN9701B	PMMN4013A	438.000	4.56	-0.850	4.160	3.020	2.66	1.93	CcC-AB-130227-19
				446.000							
				456.700							
				470.000							
	NNTN4497CR	HLN9701B	PMMN4013A	438.000	4.76	-0.810	4.670	3.420	2.84	2.08	CcC-AB-130227-20
				446.000							
				456.700							
				470.000							
	PMNN4251AR	HLN9701B	PMMN4013A	438.000	4.64	-0.830	4.220	3.060	2.64	1.92	CcC-AB-130227-21
				446.000							
				456.700							
				470.000							
	PMNN4252AR	HLN9701B	PMMN4013A	438.000	4.56	-0.910	4.230	3.060	2.75	1.99	CcC-AB-130227-22
				446.000							
				456.700							
				470.000							
	PMNN4253AR	HLN9701B	PMMN4013A	438.000	4.65	-0.800	4.820	3.500	2.99	2.17	CcC-AB-130227-23
				446.000							
				456.700							
				470.000							
	PMNN4254AR	HLN9701B	PMMN4013A	438.000	4.79	-0.860	4.610	3.390	2.82	2.07	PS-AB-130228-02
				446.000							
				456.700							
				470.000							

Assessment at the Body with Body worn RLN5385B:

Assessment of offered antennas with the default battery and body worn accessory RLN5385B per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 13 for highest output power channel.

TABLE 18

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.1 g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
NAE6483AR	NNTN4970A	RLN5385B	PMMN4013A	406.125	4.70	-0.010	1.410	1.070	0.72	0.55	PS-AB-130228-04
				419.600							
				438.000							
				456.700							
				470.000							
PMAE4016A	NNTN4970A	RLN5385B	PMMN4013A	406.125	4.63	0.070	1.330	1.020	0.69	0.53	PS-AB-130228-06
				419.600							
				438.000							
				456.700							
				470.000							
NAE6522AR	NNTN4970A	RLN5385B	PMMN4013A	438.000	4.64	-0.780	1.660	1.260	1.03	0.78	PS-AB-130228-07
				446.000							
				456.700							
				470.000							
PMAE4003A	NNTN4970A	RLN5385B	PMMN4013A	430.000	4.67	-0.780	1.840	1.400	1.13	0.86	PS-AB-130228-08
				446.000							
				456.700							
				470.000							
PMAE4002A	NNTN4970A	RLN5385B	PMMN4013A	406.125	4.64	-0.850	1.080	0.813	0.68	0.51	CcC-AB-130228-10
				419.600							
				433.000							
NAE6521A	NNTN4970A	RLN5385B	PMMN4013A	406.125	4.72	-0.770	1.100	0.838	0.67	0.51	CcC-AB-130228-12
				419.600							
				430.000							
				440.000							
Assessments of the additional offered battery											
PMAE4003A	PMNN4072A	RLN5385B	PMMN4013A	430.000	4.68	-0.460	1.960	1.500	1.12	0.86	CcC-AB-130228-13
				446.000							
				456.700							
				470.000							
	NNTN4851A	RLN5385B	PMMN4013A	430.000	4.64	-0.410	2.110	1.590	**1.20**	**0.90**	CcC-AB-130228-14
				446.000							
				456.700							
				470.000							
	NNTN4852A	RLN5385B	PMMN4013A	430.000	4.56	-0.130	1.880	1.420	1.02	0.77	CcC-AB-130228-15
				446.000							
				456.700							
				470.000							
	NNTN4497CR	RLN5385B	PMMN4013A	430.000	4.68	-1.040	1.580	1.200	1.03	0.78	CcC-AB-130228-16
				446.000							
				456.700							
				470.000							
	PMNN4251AR	RLN5385B	PMMN4013A	430.000	4.63	-0.240	1.950	1.480	1.07	0.81	CcC-AB-130228-17
				446.000							
				456.700							
				470.000							
	PMNN4252AR	RLN5385B	PMMN4013A	430.000	4.56	-0.140	1.890	1.440	1.03	0.78	CcC-AB-130228-18
				446.000							
				456.700							
				470.000							

(Continued) TABLE 18

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.1 g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAE4003A	PMNN4253AR	RLN5385B	PMMN4013A	430.000	4.68	-0.890	1.770	1.350	1.11	0.85	CcC-AB-130228-19
				446.000							
				456.700							
				470.000							
	PMNN4254AR	RLN5385B	PMMN4013A	430.000	4.71	-0.060	1.720	1.310	0.89	0.68	CcC-AB-130228-21
				446.000							
				456.700							
				470.000							

Assessment at the Body with Body worn HLN6602A:

Assessment of offered antennas with the default battery and body worn accessory HLN6602A per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 13 for highest output power channel.

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.1 g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
NAE6483AR	NNTN4970A	HLN6602A	PMMN4013A	406.125	4.72	-0.070	5.920	4.340	3.06	2.24	PS-AB-130301-08
				419.600							
				438.000							
				456.700							
				470.000							
PMAE4016A	NNTN4970A	HLN6602A	PMMN4013A	406.125	4.75	-0.100	6.120	4.490	3.16	2.32	CcC-AB-130301-10
				419.600							
				438.000							
				456.700							
				470.000							
NAE6522AR	NNTN4970A	HLN6602A	PMMN4013A	438.000	4.68	-0.820	5.780	4.180	3.58	2.59	CcC-AB-130301-11
				446.000							
				456.700	4.75	-0.750	3.530	2.540	2.12	1.53	CcC-AB-130301-13
				470.000							
PMAE4003A	NNTN4970A	HLN6602A	PMMN4013A	430.000	4.65	-0.950	7.090	5.110	4.55	3.28	CcC-AB-130301-14
				446.000	4.69	-0.560	10.400	7.500	6.05	4.37	CcC-AB-130301-15
				456.700	4.76	-0.620	7.060	5.100	4.11	2.97	CcC-AB-130301-16
				470.000	4.76	-0.680	5.540	4.010	3.27	2.36	CcC-AB-130301-18
PMAE4002A	NNTN4970A	HLN6602A	PMMN4013A	406.125	4.69	-0.520	4.150	2.980	2.39	1.72	CcC-AB-130301-20
				419.600							
				433.000							
NAE6521A	NNTN4970A	HLN6602A	PMMN4013A	406.125	4.66	-0.190	4.310	3.110	2.32	1.67	CcC-AB-130304-03
				419.600							
				430.000							
				440.000							

(Continued) 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.1 g-SAR (W/kg)**	**Max Calc. 10g-SAR (W/kg)**	**Run#**
Assessments of the additional offered battery											
PMAE4003A	PMNN4072A	HLN6602A	PMMN4013A	430.000	4.56	-0.520	7.440	5.400	4.41	3.20	CcC-AB-130304-05
				446.000	4.58	-0.580	9.970	7.250	5.97	4.34	CcC-AB-130304-04
				456.700	4.78	-0.690	6.870	4.990	4.04	2.94	CcC-AB-130304-06
				470.000							
	NNTN4851A	HLN6602A	PMMN4013A	430.000	4.65	-0.570	7.370	5.340	4.34	3.14	CcC-AB-130304-08
				446.000	4.63	-0.550	9.770	7.110	5.75	4.18	CcC-AB-130304-07
				456.700	4.76	-0.680	6.960	5.070	4.10	2.99	CcC-AB-130304-09
				470.000							
	NNTN4852A	HLN6602A	PMMN4013A	430.000	4.46	-0.210	6.630	4.840	3.74	2.73	PS-AB-130304-11
				446.000	4.42	-0.520	8.880	6.500	5.44	3.98	PS-AB-130304-10
				456.700	4.60	-0.800	6.630	4.840	4.16	3.04	PS-AB-130304-12
				470.000							
	NNTN4497CR	HLN6602A	PMMN4013A	430.000	4.77	-0.140	7.340	5.370	3.81	2.79	PS-AB-130304-15
				446.000	4.77	-0.560	9.710	7.060	5.56	4.04	PS-AB-130304-13
				456.700	4.77	-0.400	7.670	5.590	4.23	3.08	PS-AB-130304-16
				470.000							
	PMNN4251AR	HLN6602A	PMMN4013A	430.000	4.52	-0.530	6.670	4.860	4.00	2.92	PS-AB-130304-18
				446.000	4.52	-0.520	9.600	7.010	5.75	4.20	PS-AB-130304-17
				456.700	4.57	-0.670	6.950	5.070	4.26	3.11	PS-AB-130304-19
				470.000							
	PMNN4252AR	HLN6602A	PMMN4013A	430.000	4.43	-0.430	6.960	5.050	4.16	3.02	PS-AB-130304-21
				446.000	4.40	-0.520	9.620	7.030	5.91	4.32	PS-AB-130304-20
				456.700	4.59	-0.870	6.520	4.770	4.17	3.05	PS-AB-130304-22
				470.000							
	PMNN4253AR	HLN6602A	PMMN4013A	430.000	4.62	-0.950	6.980	5.000	4.51	3.23	CcC-AB-130305-03
				446.000	4.69	-0.550	10.500	7.620	**6.10**	**4.43**	CcC-AB-130305-02
				456.700	4.68	-0.660	7.700	5.560	4.60	3.32	CcC-AB-130305-04
				470.000							
	PMNN4254AR	HLN6602A	PMMN4013A	430.000	4.68	-0.130	7.120	5.210	3.76	2.75	CcC-AB-130305-07
				446.000	4.75	-0.550	9.670	7.060	5.55	4.05	CcC-AB-130305-05
				456.700	4.78	-0.720	7.060	5.160	4.18	3.06	CcC-AB-130305-08
				470.000							

Assessment at the Body with Body worn RLN4815A:

Assessment of offered antennas with the default battery and body worn accessory RLN4815A per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 13 for highest output power channel.

TABLE 20

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.1 g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
NAE6483AR	NNTN4970A	RLN4815A	PMMN4013A	406.125	4.67	-0.130	3.460	2.610	1.83	1.38	CcC-AB-130305-10
				419.600							
				438.000							
				456.700							
				470.000							
PMAE4016A	NNTN4970A	RLN4815A	PMMN4013A	406.125	4.63	-1.040	3.070	2.300	2.02	1.51	CcC-AB-130305-11
				419.600							
				438.000							
				456.700							
				470.000							
NAE6522AR	NNTN4970A	RLN4815A	PMMN4013A	438.000	4.73	-0.820	3.920	2.930	2.40	1.80	PS-AB-130305-12
				446.000							
				456.700							
				470.000							
PMAE4003A	NNTN4970A	RLN4815A	PMMN4013A	430.000	4.65	-0.140	3.590	2.680	1.91	1.43	PS-AB-130305-14
				446.000							
				456.700							
				470.000							
PMAE4002A	NNTN4970A	RLN4815A	PMMN4013A	406.125	4.70	-0.570	2.660	1.980	1.55	1.15	PS-AB-130305-16
				419.600							
				433.000							
NAE6521A	NNTN4970A	RLN4815A	PMMN4013A	406.125	4.70	-0.190	2.620	1.950	1.40	1.04	PS-AB-130305-18
				419.600							
				430.000							
				440.000							
Assessments of the additional offered battery											
NAE6522AR	PMNN4072A	RLN4815A	PMMN4013A	438.000	4.67	-0.850	3.780	2.830	2.36	1.77	PS-AB-130305-19
				446.000							
				456.700							
				470.000							
	NNTN4851A	RLN4815A	PMMN4013A	438.000	4.64	-0.830	3.780	2.830	2.37	1.77	PS-AB-130305-20
				446.000							
				456.700							
				470.000							
	NNTN4852A	RLN4815A	PMMN4013A	438.000	4.41	-0.810	3.260	2.440	2.14	1.60	PS-AB-130305-21
				446.000							
				456.700							
				470.000							
	NNTN4497CR	RLN4815A	PMMN4013A	438.000	4.77	-0.830	3.530	2.650	2.15	1.61	PS-AB-130305-22
				446.000							
				456.700							
				470.000							
	PMNN4251AR	RLN4815A	PMMN4013A	438.000	4.53	-0.780	3.400	2.560	2.16	1.62	PS-AB-130305-23
				446.000							
				456.700							
				470.000							
	PMNN4252AR	RLN4815A	PMMN4013A	438.000	4.52	-0.860	3.340	2.490	2.16	1.61	CcC-AB-130306-02
				446.000							
				456.700							
				470.000							

(Continued) TABLE 20

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.1 g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
NAE6522AR	PMNN4253AR	RLN4815A	PMMN4013A	438.000	4.76	-0.820	4.130	3.060	**2.52**	**1.86**	CcC-AB-130306-03
				446.000							
				456.700							
				470.000							
	PMNN4254AR	RLN4815A	PMMN4013A	438.000	4.78	-0.740	3.380	2.520	2.01	1.50	CcC-AB-130306-04
				446.000							
				456.700							
				470.000							

Assessment at the Body with Body worn RLN5383A (fixed belt loop) with NTN5243A carry strap:

Assessment of the offered antennas with the default battery and body worn RLN5383A (fixed belt loop) with NTN5243A carry strap with additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 13 for highest output power channel.

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.1 g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
NAE6483AR	NNTN4970A	RLN5383A / NTN5243A	PMMN4013A	406.125	4.70	-0.010	1.250	0.953	0.64	0.49	CcC-AB-130306-06
				419.600							
				438.000							
				456.700							
				470.000							
PMAE4016A	NNTN4970A	RLN5383A / NTN5243A	PMMN4013A	406.125	4.68	0.050	1.320	1.010	0.68	0.52	CcC-AB-130306-08
				419.600							
				438.000							
				456.700							
				470.000							
NAE6522AR	NNTN4970A	RLN5383A / NTN5243A	PMMN4013A	438.000	4.66	-0.790	1.630	1.250	1.01	0.77	CcC-AB-130306-09
				446.000							
				456.700							
				470.000							
PMAE4003A	NNTN4970A	RLN5383A / NTN5243A	PMMN4013A	430.000	4.61	-0.120	1.990	1.520	1.07	0.81	PS-AB-130306-11
				446.000							
				456.700							
				470.000							
PMAE4002A	NNTN4970A	RLN5383A / NTN5243A	PMMN4013A	406.125	4.65	-0.970	1.180	0.897	0.76	0.58	PS-AB-130306-13
				419.600							
				433.000							
NAE6521A	NNTN4970A	RLN5383A / NTN5243A	PMMN4013A	406.125	4.68	-0.250	1.100	0.839	0.60	0.46	PS-AB-130306-15
				419.600							
				430.000							
				440.000							

(Continued) 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.1 g-SAR (W/kg)**	**Max Calc. 10g-SAR (W/kg)**	**Run#**
Assessments of the additional offered battery											
PMAE4003A	PMNN4072A	RLN5383A / NTN5243A	PMMN4013A	430.000	4.65	-0.670	1.930	1.470	1.16	0.89	PS-AB-130306-16
				446.000							
				456.700							
				470.000							
	NNTN4851A	RLN5383A / NTN5243A	PMMN4013A	430.000	4.57	-0.770	2.080	0.890	**1.30**	**0.56**	PS-AB-130306-17
				446.000							
				456.700							
				470.000							
	NNTN4852A	RLN5383A / NTN5243A	PMMN4013A	430.000	4.45	-0.560	1.630	0.740	1.00	0.45	PS-AB-130306-18
				446.000							
				456.700							
				470.000							
	NNTN4497CR	RLN5383A / NTN5243A	PMMN4013A	430.000	4.77	-0.140	1.750	1.340	0.91	0.70	PS-AB-130306-20
				446.000							
				456.700							
				470.000							
	PMNN4251AR	RLN5383A / NTN5243A	PMMN4013A	430.000	4.69	-0.870	1.640	1.260	1.03	0.79	PS-AB-130306-21
				446.000							
				456.700							
				470.000							
	PMNN4252AR	RLN5383A / NTN5243A	PMMN4013A	430.000	4.42	-0.250	1.820	1.390	1.05	0.80	CcC-AB-130307-02
				446.000							
				456.700							
				470.000							
	PMNN4253AR	RLN5383A / NTN5243A	PMMN4013A	430.000	4.63	-1.060	1.560	1.190	1.03	0.79	CcC-AB-130307-03
				446.000							
				456.700							
				470.000							
	PMNN4254AR	RLN5383A / NTN5243A	PMMN4013A	430.000	4.69	-0.090	1.740	1.330	0.91	0.69	CcC-AB-130307-05
				446.000							
				456.700							
				470.000							

Assessment at the Body with Body worn HLN9701B (fixed belt loop) with NTN5243A carry strap:

Assessment of the offered antennas with the default battery and body worn HLN9701B (fixed belt loop) with NTN5243A carry strap with additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 13 for highest output power channel.

TABLE 22

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.1 g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
NAE6483AR	NNTN4970A	HLN9701B / NTN5243A	PMMN4013A	406.125	4.66	-0.920	3.910	2.860	2.49	1.82	CcC-AB-130307-06
				419.600							
				438.000							
				456.700							
				470.000							
PMAE4016A	NNTN4970A	HLN9701B / NTN5243A	PMMN4013A	406.125	4.67	-0.170	4.770	3.500	2.55	1.87	Lee-AB-130307-08
				419.600							
				438.000							
				456.700							
				470.000							
NAE6522AR	NNTN4970A	HLN9701B / NTN5243A	PMMN4013A	438.000	4.68	-0.750	3.960	2.920	2.41	1.78	Lee-AB-130307-09
				446.000							
				456.700							
				470.000							
PMAE4003A	NNTN4970A	HLN9701B / NTN5243A	PMMN4013A	430.000	4.65	-0.130	4.490	3.290	2.39	1.75	Lee-AB-130307-10
				446.000							
				456.700							
				470.000							
PMAE4002A	NNTN4970A	HLN9701B / NTN5243A	PMMN4013A	406.125	4.65	-0.420	2.900	2.100	1.65	1.19	Lee-AB-130307-11
				419.600							
				433.000							
NAE6521A	NNTN4970A	HLN9701B / NTN5243A	PMMN4013A	406.125	4.66	-0.200	2.650	1.940	1.43	1.05	Lee-AB-130307-12
				419.600							
				430.000							
				440.000							
Assessments of the additional offered battery											
PMAE4016A	PMNN4072A	HLN9701B / NTN5243A	PMMN4013A	406.125	4.63	-0.560	4.470	3.290	**2.64**	**1.94**	Lee-AB-130307-13
				419.600							
				438.000							
				456.700							
				470.000							
	NNTN4851A	HLN9701B / NTN5243A	PMMN4013A	406.125	4.56	-0.530	4.010	2.960	2.38	1.76	Lee-AB-130308-02
				419.600							
				438.000							
				456.700							
				470.000							
	NNTN4852A	HLN9701B / NTN5243A	PMMN4013A	406.125	4.54	-0.210	3.600	2.660	2.00	1.48	Lee-AB-130308-03
				419.600							
				438.000							
				456.700							
				470.000							
	NNTN4497CR	HLN9701B / NTN5243A	PMMN4013A	406.125	4.66	-0.120	4.340	3.210	2.30	1.70	Lee-AB-130308-05
				419.600							
				438.000							
				456.700							
				470.000							

(Continued) TABLE 22

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.1 g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAE4016A	PMNN4251AR	HLN9701B / NTN5243A	PMMN4013A	406.125	4.58	-0.570	3.680	2.730	2.20	1.63	Lee-AB-130308-06
				419.600							
				438.000							
				456.700							
				470.000							
	PMNN4252AR	HLN9701B / NTN5243A	PMMN4013A	406.125	4.56	-0.200	3.920	2.880	2.16	1.59	Lee-AB-130308-07
				419.600							
				438.000							
				456.700							
				470.000							
	PMNN4253AR	HLN9701B / NTN5243A	PMMN4013A	406.125	4.65	-0.120	4.920	3.600	2.61	1.91	Lee-AB-130308-08
				419.600							
				438.000							
				456.700							
				470.000							
	PMNN4254AR	HLN9701B / NTN5243A	PMMN4013A	406.125	4.70	-0.100	4.410	3.270	2.30	1.71	Lee-AB-130308-09
				419.600							
				438.000							
				456.700							
				470.000							

Assessment at the Body with Body worn RLN5385B (no belt loop) with NTN5243A carry strap:

Assessment of the offered antennas with the default battery and body worn RLN5385B (no belt loop) with NTN5243A carry strap with additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 13 for highest output power channel.

TABLE 23

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.1 g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
NAE6483AR	NNTN4970A	RLN5385B / NTN5243A w/o belt loop	PMMN4013A	406.125	4.64	0.000	2.150	1.630	1.11	0.84	PS-AB-130311-08
				419.600							
				438.000							
				456.700							
				470.000							
PMAE4016A	NNTN4970A	RLN5385B / NTN5243A w/o belt loop	PMMN4013A	406.125	4.65	0.010	2.010	1.520	1.04	0.78	PS-AB-130311-09
				419.600							
				438.000							
				456.700							
				470.000							
NAE6522AR	NNTN4970A	RLN5385B / NTN5243A w/o belt loop	PMMN4013A	438.000	4.73	-0.760	2.660	2.000	1.61	1.21	CcC-AB-130311-10
				446.000							
				456.700							
				470.000							
PMAE4003A	NNTN4970A	RLN5385B / NTN5243A w/o belt loop	PMMN4013A	430.000	4.68	-0.100	3.020	2.270	1.58	1.19	CcC-AB-130311-11
				446.000							
				456.700							
				470.000							
PMAE4002A	NNTN4970A	RLN5385B / NTN5243A w/o belt loop	PMMN4013A	406.125	4.68	-0.770	1.700	1.280	1.04	0.78	CcC-AB-130311-12
				419.600							
				433.000							
NAE6521A	NNTN4970A	RLN5385B / NTN5243A w/o belt loop	PMMN4013A	406.125	4.67	-0.600	1.540	1.160	0.91	0.68	CcC-AB-130311-13
				419.600							
				430.000							
				440.000							
Assessments of the additional offered battery											
NAE6522AR	PMNN4072A	RLN5385B / NTN5243A w/o belt loop	PMMN4013A	438.000	4.56	-0.720	2.600	1.950	**1.62**	**1.21**	CcC-AB-130311-14
				446.000							
				456.700							
				470.000							
	NNTN4851A	RLN5385B / NTN5243A w/o belt loop	PMMN4013A	438.000	4.66	-0.780	2.530	1.910	1.56	1.18	CcC-AB-130311-15
				446.000							
				456.700							
				470.000							
	NNTN4852A	RLN5385B / NTN5243A w/o belt loop	PMMN4013A	438.000	4.48	-0.730	2.190	1.650	1.39	1.05	CcC-AB-130311-16
				446.000							
				456.700							
				470.000							
	NNTN4497CR	RLN5385B / NTN5243A w/o belt loop	PMMN4013A	438.000	4.78	-0.710	2.240	1.690	1.32	1.00	CcC-AB-130311-17
				446.000							
				456.700							
				470.000							
	PMNN4251AR	RLN5385B / NTN5243A w/o belt loop	PMMN4013A	438.000	4.59	-0.750	2.270	1.720	1.41	1.07	CcC-AB-130311-18
				446.000							
				456.700							
				470.000							

(Continued) TABLE 23

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.1 g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
NAE6522AR	PMNN4252AR	RLN5385B / NTN5243A w/o belt loop	PMMN4013A	438.000	4.56	-0.750	2.240	1.690	1.40	1.06	CcC-AB-130311-19
				446.000							
				456.700							
				470.000							
	PMNN4253AR	RLN5385B / NTN5243A w/o belt loop	PMMN4013A	438.000	4.76	-0.820	2.610	1.970	1.59	1.20	CcC-AB-130311-20
				446.000							
				456.700							
				470.000							
	PMNN4254AR	RLN5385B / NTN5243A w/o belt loop	PMMN4013A	438.000	4.75	-0.750	2.340	1.770	1.41	1.06	CcC-AB-130311-21
				446.000							
				456.700							
				470.000							

Assessment of other audio accessories at the body:

Assessment per KDB 643646 D01 Body SAR Test Considerations for Audio Accessories without Built-in Antenna.

TABLE 24

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.1 g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAE4003A	PMNN4253AR	HLN6602A	PMMN4092A	430.000	4.67	-0.930	7.270	5.190	4.63	3.30	PS-AB-130312-02
				446.000	4.70	-0.540	11.000	7.900	6.36	4.57	PS-AB-130312-03
				456.700	4.70	-0.630	7.880	5.650	4.65	3.34	PS-AB-130312-04
				470.000	4.73	-0.660	5.990	4.280	3.54	2.53	PS-AB-130312-06
			PMMN4013A / RLN4941A	430.000	4.68	-0.850	7.500	5.400	4.68	3.37	PS-AB-130312-07
				446.000	4.70	-0.540	11.500	8.310	6.65	4.81	PS-AB-130312-08
				456.700	4.72	-0.660	7.970	5.720	4.72	3.39	PS-AB-130312-09
				470.000	4.74	-0.81	5.620	4.070	3.43	2.48	PS-AB-130312-11
			PMLN6531A	430.000	4.64	-0.12	7.930	5.750	4.22	3.06	CcC-AB-130312-13
				446.000	4.71	-0.480	11.700	8.500	6.66	4.84	CcC-AB-130312-14
				456.700	4.78	-0.500	8.140	5.880	4.59	3.31	CcC-AB-130312-15
				470.000	4.68	-0.700	5.590	4.010	3.37	2.42	CcC-AB-130312-16
			PMLN6537A	430.000	4.68	-0.110	8.200	5.910	4.31	3.11	CcC-AB-130312-17
				446.000	4.70	-0.460	12.100	8.760	6.87	4.97	CcC-AB-130312-18
				456.700	4.78	-0.550	8.520	6.180	4.86	3.52	CcC-AB-130312-19
				470.000	4.78	-0.590	5.990	4.320	3.45	2.48	CcC-AB-130312-20
			PMLN6538A	430.000	4.62	-0.140	7.950	5.690	4.27	3.05	PS-AB-130313-02
				446.000	4.69	-0.430	11.300	8.060	6.38	4.55	PS-AB-130313-03
				456.700	4.70	-0.500	6.810	4.850	3.90	2.78	PS-AB-130313-04
				470.000	4.72	-0.670	5.920	4.250	3.51	2.52	PS-AB-130313-05
			PMLN6539A	430.000	4.60	-0.050	8.240	5.830	4.35	3.08	PS-AB-130313-06
				446.000	4.70	-0.460	12.300	8.840	**6.98**	**5.02**	PS-AB-130313-07
				456.700	4.65	-0.440	8.100	5.830	4.63	3.33	PS-AB-130313-08
				470.000	4.68	-0.660	5.330	3.840	3.18	2.29	CcC-AB-130313-09
			PMLN6540A	430.000	4.56	-0.100	7.810	5.620	4.21	3.03	CcC-AB-130313-10
				446.000	4.71	-0.400	11.300	8.170	6.31	4.56	CcC-AB-130313-11
				456.700	4.72	-0.460	8.310	6.010	4.70	3.40	CcC-AB-130313-12
				470.000	4.66	-0.710	5.320	3.830	3.23	2.32	CcC-AB-130313-13

(Continued) TABLE 24

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.1 g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAE4003A	PMNN4253AR	HLN6602A	PMLN6541A	430.000	4.58	-0.120	7.590	5.470	4.09	2.95	CcC-AB-130313-14
				446.000	4.70	-0.410	11.800	8.550	6.62	4.80	CcC-AB-130313-15
				456.700	4.72	-0.550	8.030	5.830	4.63	3.36	CcC-AB-130313-16
				470.000	4.74	-0.720	5.750	4.140	3.44	2.47	CcC-AB-130313-17
			PMLN6530A	430.000	4.58	-0.110	7.840	5.690	4.21	3.06	CcC-AB-130313-18
				446.000	4.66	-0.440	11.300	8.200	6.44	4.67	CcC-AB-130313-19
				456.700	4.72	-0.500	8.570	6.160	4.89	3.51	PS-AB-130314-02
				470.000	4.71	-0.680	5.950	4.250	3.55	2.53	PS-AB-130314-03

Assessment outside FCC Part 90 at the body:

Assessment using highest SAR configuration from Part 90 assessment above (Run# PS-AB-130313-07, Table 24) across the offered antennas if applicable for the assessment outside FCC Part 90.

TABLE 25

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
NAE6483AR	PMNN4253AR	HLN6602A	PMLN6539A	403.000	4.53	-0.270	6.330	4.610	**3.57**	**2.60**	CcC-AB-130318-03
PMAE4016A	PMNN4253AR	HLN6602A	PMLN6539A	403.000	4.52	-0.030	5.980	4.360	3.20	2.33	CcC-AB-130318-04
PMAE4002A	PMNN4253AR	HLN6602A	PMLN6539A	403.000	4.57	-1.130	4.490	3.250	3.06	2.21	CcC-AB-130318-06
NAE6521A	PMNN4253AR	HLN6602A	PMLN6539A	403.000	4.55	-0.450	4.690	3.420	2.74	2.00	CcC-AB-130318-07

13.2 Assessment at the Face:

The battery PMNN4254AR was selected as the default battery. The conducted power measurement for all test channels within Part 90 frequency range (406.1-470 MHz) using battery NNTN8386A is listed in Table 19. 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 26

Test Freq (MHz)	Power (W)
406.125	4.74
419.6	4.70
430	4.70
433	4.73
438	4.73
440	4.73
446	4.72
456.7	4.73
470	4.70

Assessment of each of the offered antennas with the default battery per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Head SAR Test Considerations. Refer to Table 26 for highest output power channel.

TABLE 27

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.1 g-SAR (W/kg)**	**Max Calc. 10g-SAR (W/kg)**	**Run#**
NAE6483AR	PMNN4254AR	NONE	NONE	406.125	4.64	-0.640	4.440	3.310	2.66	1.98	PS-FACE-130314-05
				419.600							
				438.000							
				456.700							
				470.000							
PMAE4016A	PMNN4254AR	NONE	NONE	406.125	4.60	-0.560	4.490	3.360	2.67	1.99	PS-FACE-130314-06
				419.600							
				438.000							
				456.700							
				470.000							
NAE6522AR	PMNN4254AR	NONE	NONE	438.000	4.68	-0.810	5.580	4.130	3.45	2.55	PS-FACE-130314-07
				446.000							
				456.700							
				470.000							
PMAE4003A	PMNN4254AR	NONE	NONE	430.000	4.68	-0.400	3.900	2.900	2.19	1.63	PS-FACE-130314-10
				446.000							
				456.700	4.75	-0.600	6.330	4.700	3.67	2.73	PS-FACE-130314-08
				470.000							
PMAE4002A	PMNN4254AR	NONE	NONE	406.125	4.68	-0.880	3.450	2.530	2.17	1.59	Lee-FACE-130314-12
				419.600							
				433.000							
NAE6521A	PMNN4254AR	NONE	NONE	406.125	4.67	-0.560	3.200	2.380	1.87	1.39	Lee-FACE-130314-14
				419.600							
				430.000							
				440.000							
Assessments of the additional offered battery											
PMAE4003A	PMNN4072A	NONE	NONE	430.000							
				446.000							
				456.700	4.64	-0.590	5.770	4.280	3.42	2.54	Lee-FACE-130314-15
				470.000							
	NNTN4851A	NONE	NONE	430.000							
				446.000							
				456.700	4.60	-0.600	5.770	4.270	3.46	2.56	Lee-FACE-130314-16
				470.000							
	NNTN4852A	NONE	NONE	430.000							
				446.000							
				456.700	4.45	-0.630	5.550	4.110	3.46	2.56	Lee-FACE-130314-17
				470.000							
	NNTN4970A	NONE	NONE	430.000							
				446.000							
				456.700	4.65	-0.530	6.030	4.470	3.52	2.61	Lee-FACE-130314-18
				470.000							
	NNTN4497CR	NONE	NONE	430.000							
				446.000							
				456.700	4.75	-0.630	6.390	4.740	**3.73**	**2.77**	Lee-FACE-130314-19
				470.000							

(Continued) TABLE 27

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.1 g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAE4003A	PMNN4251AR	NONE	NONE	430.000							
				446.000							
				456.700	4.58	-0.630	5.820	4.310	3.53	2.61	PS-FACE-130315-02
				470.000							
	PMNN4252AR	NONE	NONE	430.000							
				446.000							
				456.700	4.50	-0.620	5.580	4.130	3.43	2.54	PS-FACE-130315-03
				470.000							
	PMNN4253AR	NONE	NONE	430.000							
				446.000							
				456.700	4.70	-0.600	6.270	4.650	3.68	2.73	PS-FACE-130315-04
				470.000							

Assessment of outside FCC Part 90 at the Face:

Assessment using highest SAR configuration from Part 90 assessment above Run# Lee-FACE-130314-19, Table 27) across the offered antennas if applicable for the assessment outside FCC Part 90.

TABLE 28

Assessments at the Face (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
NAE6483AR	NNTN4497CR	NONE	NONE	403.000	4.62	-0.640	4.580	3.420	2.76	2.06	Lee-Face-130315-08
PMAE4016A	NNTN4497CR	NONE	NONE	403.000	4.63	-0.800	4.550	3.430	**2.84**	**2.14**	Lee-Face-130315-09
PMAE4002A	NNTN4497CR	NONE	NONE	403.000	4.63	-0.700	3.740	2.760	2.28	1.68	Lee-Face-130315-11
NAE6521A	NNTN4497CR	NONE	NONE	403.000	4.63	-0.420	3.520	2.630	2.01	1.50	Lee-Face-130315-12

13.3 Assessment for Industry Canada frequency range:

Based on the assessment results for body and face per KDB643646 D01, additional tests were not required for the Industry Canada frequency range (406.1 – 430 MHz and 450 – 470 MHz) as the testing performed is in compliance with Industry Canada frequency range.

13.4 Shorten 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 E demonstrate that the scaling methodology used to determine the calculated SAR results presented herein are valid. The both SAR results from the table below are provided in APPENDIX E.

TABLE 29

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Adj Calc. 1g-SAR (mW/g)	Adj Calc. 10g-SAR (mW/g)	Run#
Full scan											
PMAE4003A	PMNN4253AR	HLN6602A	PMLN6539A	446.000	4.70	-0.460	12.300	8.840	6.84	4.91	PS-AB-130313-07
Shorten scan											
PMAE4003A	PMNN4253AR	HLN6602A	PMLN6539A	446.000	4.68	-0.250	11.100	7.930	5.88	4.20	Lee-AB-130405-02

13.5 Variability Assessment:

The test configuration(s) with test results > 4.0mW/g were assessed per KDB 865664 D01 (10/24/2012). The below table includes test results of the original measurement(s), the repeated measurement(s), and the ratio (SAR_{high}/ SAR_{low}) for the applicable test configuration(s).

TABLE 30

Run#	Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Adj Calc. 1g-SAR (mW/g)	Ratio	Comments
PS-AB-130313-07 (Table 24, Full scan)	PMAE4003A	PMNN4253AR	HLN6602A	PMLN6539A	446.000	6.84	1.16	No additional repeated scans is required due to the Ratio (SAR_{high}/ SAR_{low}) < 1.20
Lee-AB-130405-02 (Table 29, Shorten scan)						5.88		

14.0 Simultaneous Transmission Exclusion:

NA

15.0 Conclusion:

Based on the test guidelines from KDB 643646 and satisfying the testing of additional frequencies within the FCC band to be in compliance with Industry Canada frequency range, the highest Operational Maximum Calculated 1-gram and 10-gram average SAR values found for this filing:

TABLE 31

Designator	Frequency band (MHz)	Max Calc at Body (W/kg)		Max Calc at Face (W/kg)	
		1g-SAR	10g-SAR	1g-SAR	10g-SAR
Overall	403-470	6.98	5.02	3.73	2.77
FCC	406.1-470	6.98	5.02	3.73	2.77
Industry Canada	406.1-430; 450-470	4.89	3.51	3.73	2.77

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.

APPENDIX A
Measurement Uncertainty

The Measurement Uncertainty tables indicated in this APPENDIX are applicable to the DUT test frequencies ranging from 300MHz to 550MHz and for Dipole test frequencies ranging from 300MHz to 550MHz. Therefore, the highest tolerance for the probe calibration uncertainty is indicated.

Table 1:

Uncertainty Budget for Device Under Test, for 300 MHz to 550 MHz

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*	*k*
Uncertainty Component	**IEEE 1528 section**	**Tol. (± %)**	**Prob Dist**	**Div.**	**c_i (1 g)**	**c_i (10 g)**	**1 g u_i (±%)**	**10 g u_i (±%)**	**v_i**
Measurement System									
Probe Calibration	E.2.1	6.7	N	1.00	1	1	6.7	6.7	∞
Axial Isotropy	E.2.2	4.7	R	1.73	0.707	0.707	1.9	1.9	∞
Hemispherical Isotropy	E.2.2	9.6	R	1.73	0.707	0.707	3.9	3.9	∞
Boundary Effect	E.2.3	1.0	R	1.73	1	1	0.6	0.6	∞
Linearity	E.2.4	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1.0	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	0.3	N	1.00	1	1	0.3	0.3	∞
Response Time	E.2.7	1.1	R	1.73	1	1	0.6	0.6	∞
Integration Time	E.2.8	1.1	R	1.73	1	1	0.6	0.6	∞
RF Ambient Conditions - Noise	E.6.1	3.0	R	1.73	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	E.6.1	0.0	R	1.73	1	1	0.0	0.0	∞
Probe Positioner Mech. Tolerance	E.6.2	0.4	R	1.73	1	1	0.2	0.2	∞
Probe Positioning w.r.t Phantom	E.6.3	1.4	R	1.73	1	1	0.8	0.8	∞
Max. SAR Evaluation (ext., int., avg.)	E.5	3.4	R	1.73	1	1	2.0	2.0	∞
Test sample Related									
Test Sample Positioning	E.4.2	3.2	N	1.00	1	1	3.2	3.2	29
Device Holder Uncertainty	E.4.1	4.0	N	1.00	1	1	4.0	4.0	8
SAR drift	6.6.2	5.0	R	1.73	1	1	2.9	2.9	∞
Phantom and Tissue Parameters									
Phantom Uncertainty	E.3.1	4.0	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity (target)	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (measurement)	E.3.3	3.3	N	1.00	0.64	0.43	2.1	1.4	∞
Liquid Permittivity (target)	E.3.2	5.0	R	1.73	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (measurement)	E.3.3	1.9	N	1.00	0.6	0.49	1.1	0.9	∞
Combined Standard Uncertainty			RSS				12	11	482
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k =2				23	23	

FCD-0558 Uncertainty Budget Rev.8.1

Table 2:

Uncertainty Budget for System Verification (dipole & flat phantom) for 300 MHz to 550 MHz

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

FCD-0558 Uncertainty Budget Rev.8.1

Notes for Tables 1 and 2

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

APPENDIX B
Probe Calibration Certificates

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client Motorola MY

Certificate No: ES3-3096_Nov12

CALIBRATION CERTIFICATE

Object	ES3DV3 - SN:3096
Calibration procedure(s)	QA CAL-01.v8, QA CAL-12.v7, QA CAL-23.v4, QA CAL-25.v4 Calibration procedure for dosimetric E-field probes
Calibration date:	November 13, 2012

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	29-Mar-12 (No. 217-01508)	Apr-13
Power sensor E4412A	MY41498087	29-Mar-12 (No. 217-01508)	Apr-13
Reference 3 dB Attenuator	SN: S5054 (3c)	27-Mar-12 (No. 217-01531)	Apr-13
Reference 20 dB Attenuator	SN: S5086 (20b)	27-Mar-12 (No. 217-01529)	Apr-13
Reference 30 dB Attenuator	SN: S5129 (30b)	27-Mar-12 (No. 217-01532)	Apr-13
Reference Probe ES3DV2	SN: 3013	29-Dec-11 (No. ES3-3013_Dec11)	Dec-12
DAE4	SN: 660	20-Jun-12 (No. DAE4-660_Jun12)	Jun-13
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: November 14, 2012

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z, VRx,y,z: A, B, C* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe ES3DV3

SN:3096

Manufactured: July 12, 2005
Calibrated: November 13, 2012

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3096

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.27	1.03	1.23	± 10.1 %
DCP (mV)[B]	100.2	99.4	100.3	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
0	CW	0.00	X	0.0	0.0	1.0	156.4	±3.5 %
			Y	0.0	0.0	1.0	141.0	
			Z	0.0	0.0	1.0	156.6	

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3096

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
300	45.3	0.87	6.75	6.75	6.75	0.25	1.04	± 13.4 %
450	43.5	0.87	6.31	6.31	6.31	0.17	1.93	± 13.4 %
750	41.9	0.89	6.18	6.18	6.18	0.78	1.15	± 12.0 %
900	41.5	0.97	5.90	5.90	5.90	0.40	1.55	± 12.0 %
1810	40.0	1.40	4.83	4.83	4.83	0.80	1.13	± 12.0 %
1950	40.0	1.40	4.60	4.60	4.60	0.62	1.33	± 12.0 %
2300	39.5	1.67	4.47	4.47	4.47	0.55	1.39	± 12.0 %
2450	39.2	1.80	4.26	4.26	4.26	0.79	1.24	± 12.0 %
2600	39.0	1.96	4.10	4.10	4.10	0.80	1.25	± 12.0 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3096

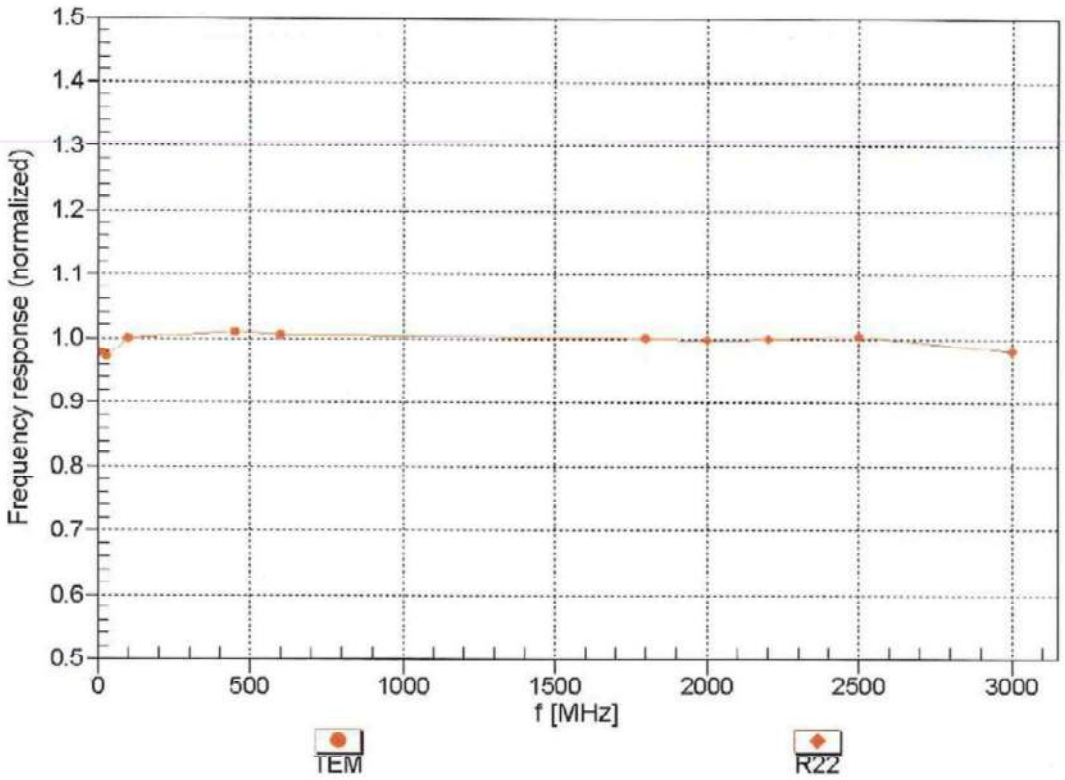
Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
300	58.2	0.92	6.56	6.56	6.56	0.22	1.78	± 13.4 %
450	56.7	0.94	6.79	6.79	6.79	0.11	1.15	± 13.4 %
750	55.5	0.96	5.91	5.91	5.91	0.46	1.45	± 12.0 %
900	55.0	1.05	5.82	5.82	5.82	0.77	1.17	± 12.0 %
1810	53.3	1.52	4.70	4.70	4.70	0.67	1.34	± 12.0 %
1950	53.3	1.52	4.66	4.66	4.66	0.43	1.79	± 12.0 %
2300	52.9	1.81	4.26	4.26	4.26	0.61	1.47	± 12.0 %
2450	52.7	1.95	4.12	4.12	4.12	0.64	1.18	± 12.0 %
2600	52.5	2.16	3.92	3.92	3.92	0.80	1.01	± 12.0 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

ES3DV3– SN:3096 November 13, 2012

Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)

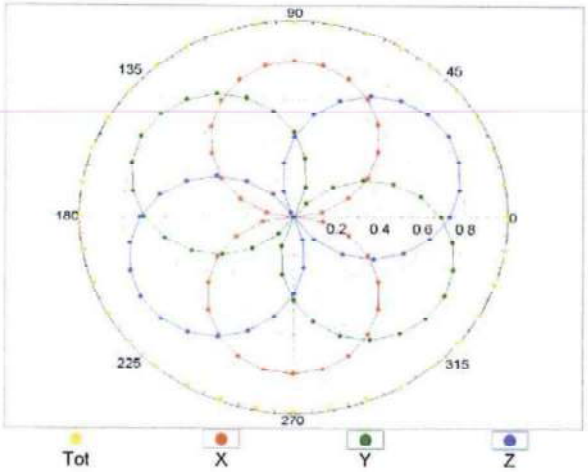


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

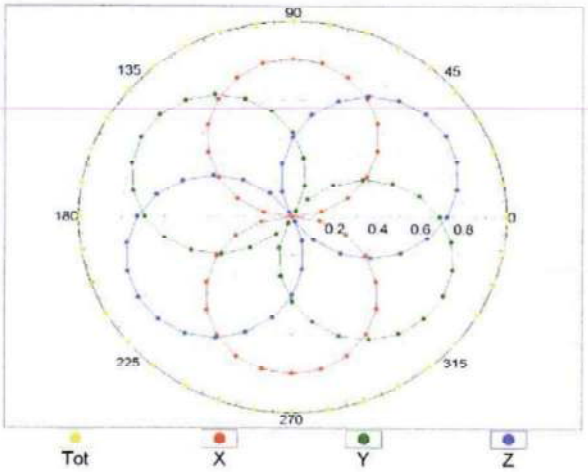
ES3DV3– SN:3096 November 13, 2012

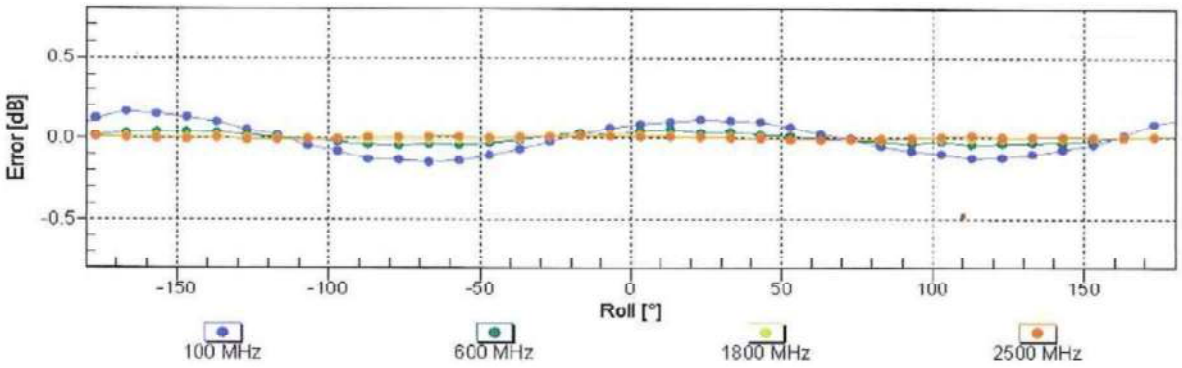
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



f=1800 MHz,R22

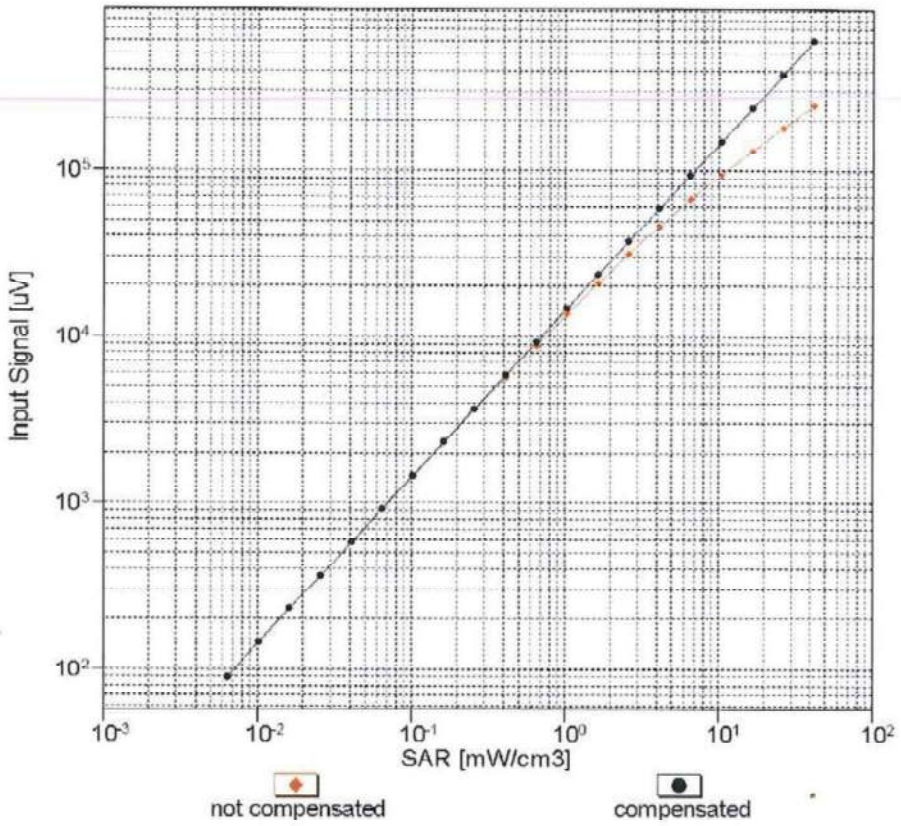


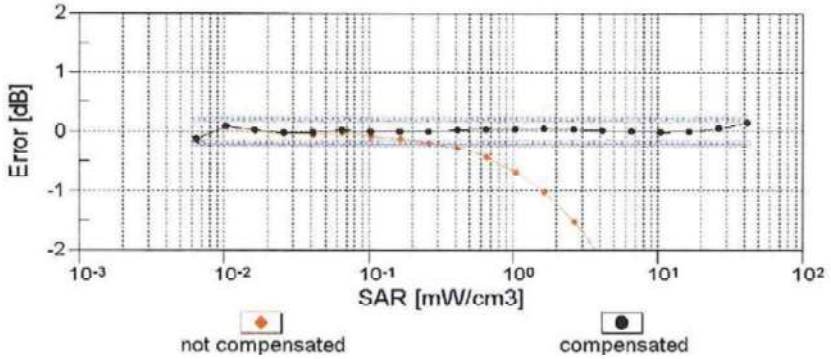


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

ES3DV3– SN:3096 November 13, 2012

Dynamic Range f(SAR$_{head}$)
(TEM cell , f = 900 MHz)



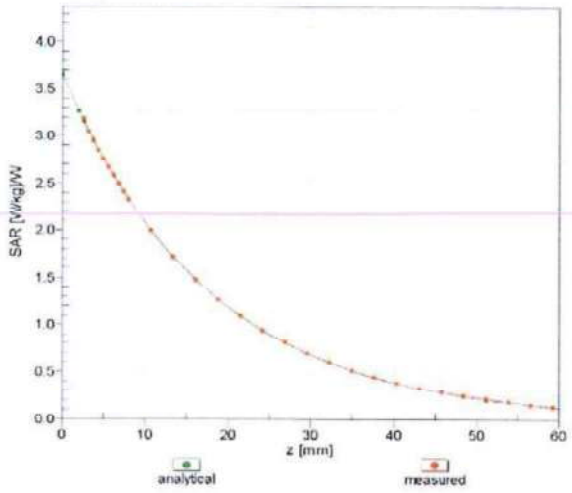


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

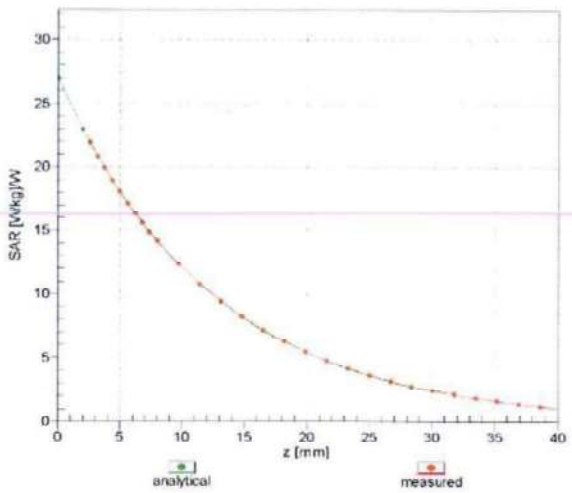
ES3DV3– SN:3096 November 13, 2012

Conversion Factor Assessment

f = 900 MHz,WGLS R9 (H_convF)

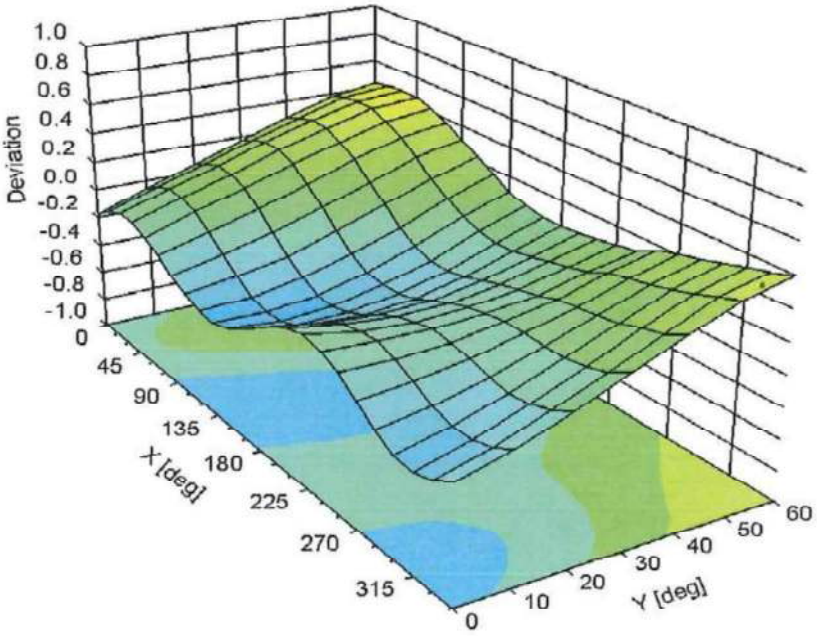


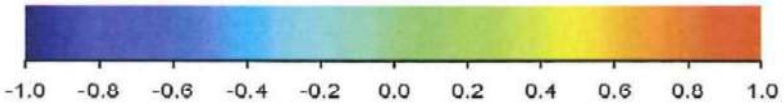
f = 1810 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3096

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	43.1
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm

Schmid & Partner Engineering AG

s p e a g

Zeughausstrasse 43, 8004 Zurich, Switzerland
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info@speag.com, http://www.speag.com

Additional Conversion Factors

for Dosimetric E-Field Probe

Type:	**ES3DV3**
Serial Number:	**3096**
Place of Assessment:	**Zurich**
Date of Assessment:	**November 15, 2012**
Probe Calibration Date:	**November 13, 2012**

Schmid & Partner Engineering AG hereby certifies that conversion factor(s) of this probe have been evaluated on the date indicated above. The assessment was performed using the FDTD numerical code SEMCAD of Schmid & Partner Engineering AG. Since the evaluation is coupled with measured conversion factors, it has to be recalculated yearly, i.e., following the re-calibration schedule of the probe. The uncertainty of the numerical assessment is based on the extrapolation from measured value at 450, 900 and at 1810 MHz.

Assessed by:

Schmid & Partner Engineering AG

s p e a g

Zeughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 44 245 9700, Fax +41 44 245 9779
info@speag.com, http://www.speag.com

Dosimetric E-Field Probe ES3DV3 SN:3096

Conversion factor (± standard deviation)

150 ± 50 MHz	*ConvF*	**8.0 ± 10%**	ε_r = 52.3 ±5% σ = 0.76 ±5% mho/m (head tissue)
150 ± 50 MHz	*ConvF*	**7.7 ± 10%**	ε_r = 61.9 ±5% σ = 0.80 ±5% mho/m (body tissue)

Important Note:

For numerically assessed probe conversion factors, parameters Alpha and Delta in the DASY software must have the following entries: Alpha = 0 and Delta = 1.

Please see also DASY Manual.

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client Motorola MY

Certificate No: ES3-3122_Apr12

CALIBRATION CERTIFICATE

Object ES3DV3 - SN:3122

Calibration procedure(s) QA CAL-01.v8, QA CAL-12.v7, QA CAL-23.v4, QA CAL-25.v4
Calibration procedure for dosimetric E-field probes

Calibration date: April 26, 2012

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	29-Mar-12 (No. 217-01508)	Apr-13
Power sensor E4412A	MY41498087	29-Mar-12 (No. 217-01508)	Apr-13
Reference 3 dB Attenuator	SN: S5054 (3c)	27-Mar-12 (No. 217-01531)	Apr-13
Reference 20 dB Attenuator	SN: S5086 (20b)	27-Mar-12 (No. 217-01529)	Apr-13
Reference 30 dB Attenuator	SN: S5129 (30b)	27-Mar-12 (No. 217-01532)	Apr-13
Reference Probe ES3DV2	SN: 3013	29-Dec-11 (No. ES3-3013_Dec11)	Dec-12
DAE4	SN: 660	10-Jan-12 (No. DAE4-660_Jan12)	Jan-13
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: April 27, 2012

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S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS) Accreditation No.: SCS 108
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z, VRx,y,z: A, B, C* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe ES3DV3

SN:3122

Manufactured: July 11, 2006
Calibrated: April 26, 2012

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3122

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.34	1.22	1.42	± 10.1 %
DCP (mV)[B]	102.0	100.9	99.8	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
0	CW	0.00	X	0.00	0.00	1.00	161.7	±3.0 %
			Y	0.00	0.00	1.00	154.6	
			Z	0.00	0.00	1.00	179.0	

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3122

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
300	45.3	0.87	6.94	6.94	6.94	0.25	1.10	± 13.4 %
450	43.5	0.87	6.41	6.41	6.41	0.14	1.67	± 13.4 %
750	41.9	0.89	6.55	6.55	6.55	0.25	2.02	± 12.0 %
900	41.5	0.97	6.22	6.22	6.22	0.20	2.33	± 12.0 %
1810	40.0	1.40	5.29	5.29	5.29	0.60	1.40	± 12.0 %
1950	40.0	1.40	5.16	5.16	5.16	0.61	1.39	± 12.0 %
2300	39.5	1.67	4.95	4.95	4.95	0.62	1.42	± 12.0 %
2450	39.2	1.80	4.60	4.60	4.60	0.80	1.19	± 12.0 %
2600	39.0	1.96	4.42	4.42	4.42	0.80	1.12	± 12.0 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3122

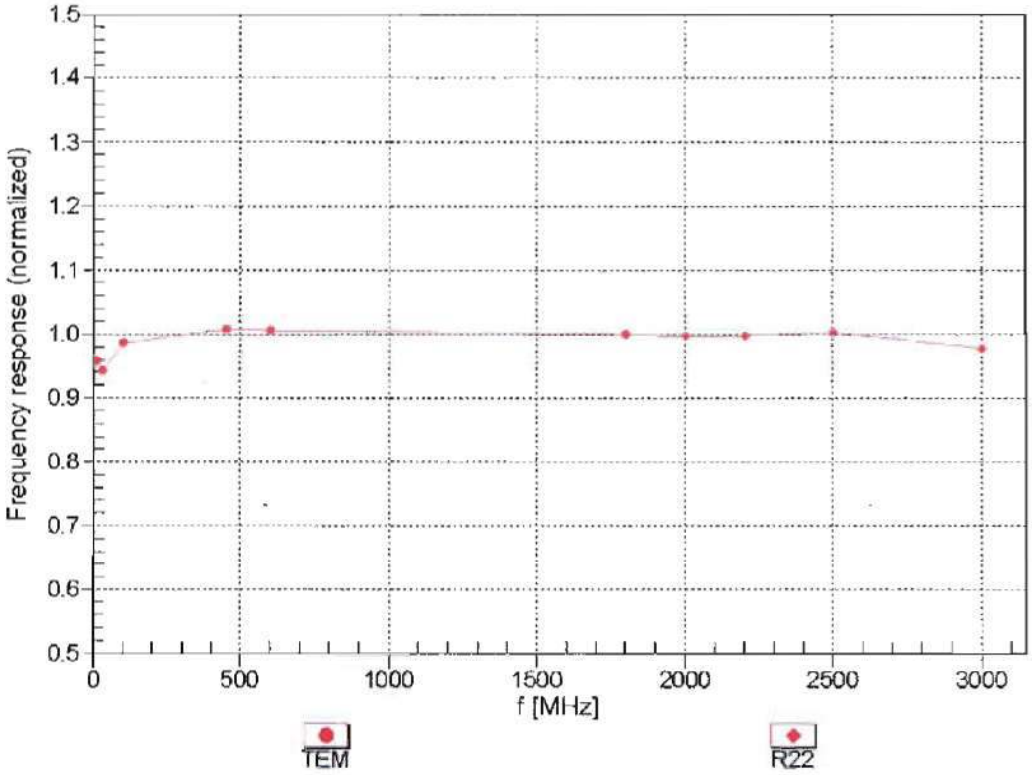
Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
300	58.2	0.92	6.58	6.58	6.58	0.23	1.88	± 13.4 %
450	56.7	0.94	6.82	6.82	6.82	0.09	1.00	± 13.4 %
750	55.5	0.96	6.19	6.19	6.19	0.29	1.92	± 12.0 %
900	55.0	1.05	6.06	6.06	6.06	0.38	1.60	± 12.0 %
1810	53.3	1.52	4.74	4.74	4.74	0.27	2.98	± 12.0 %
1950	53.3	1.52	4.64	4.64	4.64	0.42	1.99	± 12.0 %
2300	52.9	1.81	4.25	4.25	4.25	0.69	1.24	± 12.0 %
2450	52.7	1.95	4.16	4.16	4.16	0.80	0.61	± 12.0 %
2600	52.5	2.16	3.94	3.94	3.94	0.80	0.50	± 12.0 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

ES3DV3– SN:3122 April 26, 2012

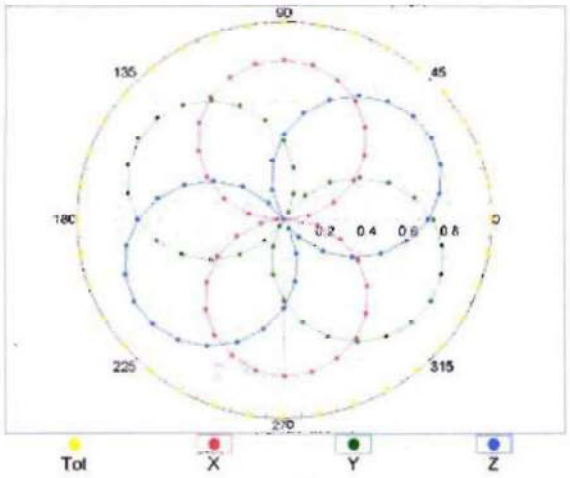
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



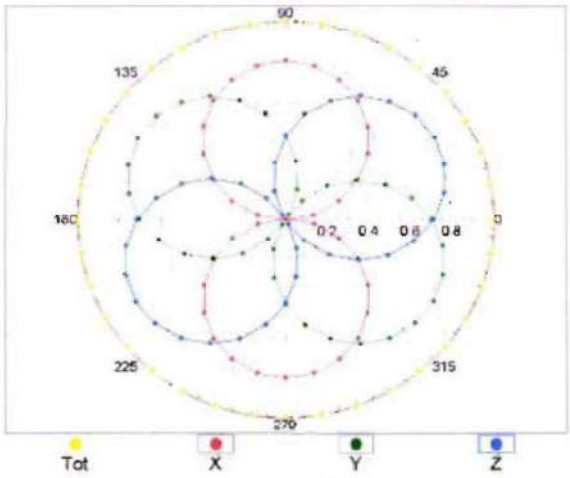
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

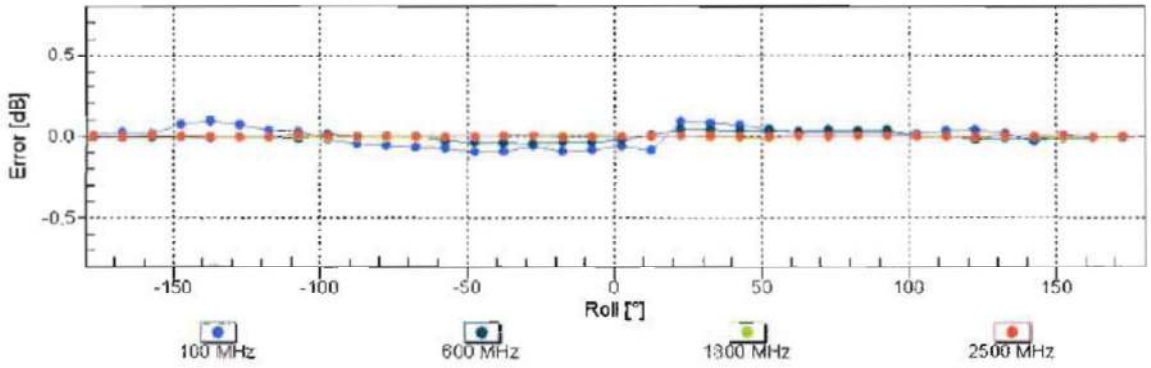
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



f=1800 MHz,R22





Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)