MOTOROLA SOLUTIONS

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TESTING CERT # 2518.05

DECLARATION OF COMPLIANCE SAR ASSESSMENT Part 1 of 2

Enterprise Mobility Solutions
EME Test Laboratory
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Date of Report: 03/29/13
Report Revision: O
Report ID: SAR rpt_PMUF1615A_Rev.O 130329_SR11131

Responsible Engineer:	Tan KaiYan (EME Engineer)
Report Author:	Tan KaiYan (EME Engineer)
Date/s Tested:	12/26/2012-03/29/2013
Manufacturer/Location:	Motorola, Penang
Sector/Group/Div.:	PCR
Date submitted for test:	12/11/12
DUT Description:	8/900 2.5W NKP GPS BT GOB/NKP BT; 8/900 2.5W FKP GPS BT GOB/FKP BT
Test TX mode(s):	CW (PTT)
Max. Power output:	3 W (8/900 band), 10 dBm (Bluetooth)
Nominal Power:	2.5 W (8/900 band), 2.5 dBm (Bluetooth)
Tx Frequency Bands:	806-825MHz, 851-870MHz, 896-902MHz, 935-941MHz, 2.402-2.480 GHz (Bluetooth)
Signaling type:	FM
Model(s) Tested:	PMUF1615A
Model(s) Certified:	PMUF1615A and PMUF1614A
Serial Number(s):	126TNX0235
Classification:	Occupational/Controlled
FCC ID:	ABZ99FT5014; Rule Part 90 (806-824 MHz, 851-869 MHz, 896-901 MHz, 935-940 MHz &); Rule Part 15 (2402-2480 MHz)
IC:	109AB-99FT5014; (806-824 MHz, 851-869 MHz, 896-901 MHz, 935-940 MHz & 2402-2480 MHz)

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

The test results clearly demonstrate compliance with FCC Occupational/Controlled RF Exposure limits of 8 W/kg averaged over 1 gram per the requirements of 47 CFR 2.1093(d). The 10 grams result is not applicable to FCC filing.
The test results clearly demonstrate compliance with ICNIRP (1998) Guidelines for limiting exposure in time-varying electric, magnetic, and electromagnetic fields (up to 300 GHz), Health Physics 74, 494-522 RF Exposure limits of 10 W/kg averaged over 10grams of contiguous tissue.

Based on the information and the testing results provided herein, the undersigned certifies that when used as stated in the operating instructions supplied, said product complies with the national and international reference standards and guidelines listed in section 3.0 of this report. This report shall not be reproduced without written approval from an officially designated representative of the Motorola Solutions Inc EME Laboratory.
I attest to the accuracy of the data and assume full responsibility for the completeness of these measurements. This reporting format is consistent with the suggested guidelines of the TIA TSB-150 December 2004. The results and statements contained in this report pertain only to the device(s) evaluated.

Dianna M Zakharia

EMS EME Lab Senior Resource Manager,
Laboratory Director
Approval Date: 4/3/2013

Certification Date: 4/3/2013

Certification No.: L1130309 & L1130306

Part 1 of 2

Report Revision History

Date	Revision	Comments
03/29/2013	O	Initial release

1.0 Introduction example

This report details the utilization, test setup, test equipment, and test results of the Specific Absorption Rate (SAR) measurements performed at the Motorola Solutions Inc. EME Test Laboratory for model number PMUF1615A.

2.0 Abbreviations / Definitions

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

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):

Models PMUF1614A and PMUF1615A operate using analog frequency modulation (FM) signaling incorporating traditional simplex two-way radio transmission protocol. These models are also wireless Bluetooth (BT) compatible.

These models intended use are to be 5-5-90 (5% TX, 5% RX and 90% standby), with a maximum duty cycle of 50%. BT modulation is GFSK, PI/4DPSK and 8DPSK with hopping 0-78 channels. Worst case duty cycle for BT is derived from a 5-slot packet type operation which consists of receiving on 1-slot and transmitting on 5-slots, and thus maximum duty cycle is 77% as defined by BT standard.

These models represented under this filing utilize removable antennas (8/900 band) capable of transmitting in the 806-825 MHz, 851-870 MHz, 896-902 MHz, 935-941 MHz, and an internal fixed BT antenna capable of transmitting at 2.402 - 2.480 GHz bands respectively. The nominal 8/900 band output power is 2.5 watts with maximum output power of 3 watts and nominal BT output power is 2.5 dBm and maximum output of 10 dBm, as defined by upper limit of the production line final test station. The intended operating positions are "at the face" with the DUT at least 1 inch from the mouth, and "at the body" by means of the offered body worn accessories. Body worn audio and PTT operation is accomplished by means of optional remote accessories that are connected to the radio. Operation at the body without an audio accessory attached is possible by means of offered wireless BT accessories.

Models PMUF1614A and PMUF1615A are being offered with the accessories listed in section 7.0.

7.0 Optional Accessories and Test Criteria:

These devices are offered with optional accessories. All accessories were individually evaluated during the test plan creation to determine if testing was required. 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 two antennas and one BT antenna offered for these models. The table below lists the antennas and their descriptions.

TABLE 2

Antenna Models	Description	Tested
PMAF4011A	806-870MHz; Whip Antenna; ½ wave; 1.0dBi	Yes
PMAF4012A	896-941MHz; Whip Antenna; ½ wave; 1.0dBi	Yes
0104039J80	2400-2480MHz; IFA Bluetooth; ¼ wave, 0dBi	Yes

7.2 Battery:

There are four batteries offered for these models. The table below lists the batteries and their description.

TABLE 3

Battery Models	Description	Tested	Comments
PMNN4409A	IMPRES Hi-Cap Li-ion, 2150mAh Battery	Yes	
NNTN8129A	IMPRES Hi-Cap Li-Ion,2300mAh Battery (FM)	Yes	
PMNN4406A	Core Slim Li-Ion, 1500mAh Battery	Yes	
PMNN4407A	IMPRES Li-Ion, 1500mAh Slim Battery	Yes	

7.3 Body worn Accessories:

All body worn accessories were considered. The table below lists the body worn accessories and their descriptions.

TABLE 4

Body worn Models	Description	Selected for Test	Tested	Comments
PMLN5846A	Hard Leather Case with 3 inch Swivel Belt Loop for NKP	Yes	Yes	
PMLN5843A	Hard Leather Case with 2.5 inch Swivel Belt Loop- no display	Yes	Yes	
PMLN5839A	Hard Leather Case with 3 inch Fixed Belt Loop - no display	Yes	Yes	
PMLN5845A	Nylon case with 3 inch fixed belt loop - no display	Yes	Yes	
PMLN7008A	Belt clip for 2-inch Belt Width	Yes	Yes	
PMLN4651A	Belt clip for 2.5-inch Belt Width	Yes	Yes	

TABLE 4

Body worn Models	Description	Selected for Test	Tested	Comments
RLN4570A	Break-A-Way Chest Pack	Yes	Yes	
RLN4815A	Radio pack UNIVERSAL RADIOPAK & UTILITY CASE	Yes	Yes	
HLN6602A	Universal Chest pack	Yes	Yes	
NTN5243A	Shoulder Strap	Yes	Yes	Tested with PMLN5843A, PMLN5845A and PMLN5839A; PMLN5846A similar to PMLN5843A
PMLN5610A	2.5 inch replacement swivel belt loop	No	No	Replacement part
PMLN5611A	3.0 inch replacement swivel belt loop	No	No	Replacement part
HLN9985B	Waterproof Bag	No	No	Not used when transmitting
4280384F89	Universal RadioPAK extension Belt	No	No	Replacement part
1505596Z02	Replacement Strap for RLN4570A and HLN6602A Chest Pack	No	No	Replacement part
4200865599	1.75-Inch Black Leather Belt	No	No	Replacement part
RLN4295A	Small clip, epaulet strap	No	No	Replacement part
15012157001	Accessory Dust Cover	No	No	Not used when transmitting

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
AARLN4885B	Receive only Earbud	Yes	Yes	Tested with PMMN4050A
MDRLN4885B	Receive-Only Earbud	No	No	Similar to AARLN4885B
PMLN4620B	D-shell Rx-only earpiece(3.5MM)	No	No	Similar to AARLN4885B
PMLN5096B	D-Shell Earset	Yes	Yes	
PMLN5097A	IMPRES 3 Wire Surveillance-Black	Yes	Yes	
PMLN5101A	IMPRES Temple Transducer with in-line push to-talk	Yes	Yes	
PMLN5102A	Ultra-Lite Headset	Yes	Yes	
PMLN5106A	IMPRES 3 Wire Surveillance-Beige	No	No	Similar to PMLN5097A
PMLN5275C	Heavy DutyNoise-Canceling Headset	Yes	Yes	
PMLN6123A	IMPRES 3-wire Surveillance with Clear, Comfortable acoustic tube - black	Yes	Yes	
PMLN6124A	IMPRES 3-wire Surveillance with Clear, Comfortable acoustic tube - beige	No	No	Similar to PMLN6123A
PMLN6125A	Receive-Only Surveillance Kit, Black (Single Wire)	No	No	
PMLN6126A	Receive-Only Surveillance Kit, Beige (Single Wire)	No	No	Similar to PMLN6125A
PMLN6127A	IMPRES 2 Wire Surveillance -black	No	No	Similar to PMLN6129A
PMLN6128A	IMPRES 2 Wire Surveillance - beige	No	No	Similar to PMLN6129A
PMLN6129A	IMPRES 2-wire Surveillance with acoustic tube - black	Yes	Yes	

TABLE 5

Audio Acc. Models	Description	Selected for Test	Tested	Comments
PMLN6130A	IMPRES 2-wire Surveillance with acoustic tube - beige	No	No	Similar to PMLN6129A
PMMN4024A	Remote Speaker Mic	Yes	Yes	
PMMN4025A	IMPRES Remote Speaker Mic	No	No	Similar to PMMN4024A
PMMN4040A	Remote Speaker Mic, Submersible (IP57)	Yes	Yes	
PMMN4046A	IMPRES large RSM w/ volume, IP57	No	No	Similar to PMMN4050A
PMMN4050A	IMPRES large RSM with Earjack, Noise Canceling	Yes	Yes	Tested with AARLN4885B
RLN4941A	Receive only Earpiece	No	No	Similar to AARLN4885B
RLN5882A	Impres 2-wire Surveillance Kit with Clear, Comfortable Acoustic Tube, Black	Yes	Yes	
RMN5058A	Lightweight Headset	Yes	Yes	
WADN4190B	Over the Ear Receiver for RSM	No	No	Similar to AARLN4885B
5080548E02	Replacement Boom mic Windscreen	No	No	Replacement part
1580376E32	Replacement Ear Seal Cloth Cover	No	No	Replacement part
3280376E35	Replacement Windscreen O-Ring	No	No	Replacement part
89409N	HK200Mobile Bluetooth Headset (non-secure)	No	No	BT device
ASMHK200-AU2A	Non-Secure HK200 Mobile Bluetooth Headset with Australia Plug	No	No	BT device
ASMHK200-CN2A	Non-Secure HK200 Mobile Bluetooth Headset with China	No	No	BT device
ASMHK200-GB3A	Non-Secure HK200 Mobile Bluetooth Headset with Euro Plug	No	No	BT device
ASMHK200-KR2A	Non-Secure HK200 Mobile Bluetooth Headset with Korea Plug	No	No	BT device
ASMHK200VP-GB2A	Non-Secure HK200 Mobile Bluetooth Headset with UK Plug	No	No	BT device
NNTN8125B	Non-Secure Wireless Headset & PTT device with PTT audio,12-Inch Cable	No	No	BT device
NNTN8126B	Non-Secure Wireless Headset & PTT device with PTT audio,, 9.5-Inch Cable	No	No	BT device
NNTN8127B	Non Secure Wireless PTT device	No	No	BT device
NNTN8189B	Non-Secure Wireless Headset & Push-to-Talk Device with Push-to-Talk audio, 12-Inch cable	No	No	BT device
NNTN8191C	Push-to-Talk Module, Without Charger	No	No	BT device
NNTN8294A	1-Wire Earbud,29cm Cord, Black	No	No	Replacement part
NNTN8295A	1-Wire Earbud,116cm Cord, Black	No	No	Replacement part
NNTN8316A	Replacement ear tips kit for wireless ear buds	No	No	Replacement part
NTN2572A	Replacement Earpiece 12'Cable (for NNTN8125B)	No	No	Replacement part
NTN2575A	Replacement Earpiece 9.5	No	No	Replacement part
NTN8821A	Wireless Earpiece Maintenance Kit	No	No	Maintenance kit
NTN8988A	Ear Straps for CommPort Earpiece (for Secure Attachment to Ear), Pack of 10	No	No	Replacement part
RLN4760A	Small Custom Earpiece for Surveillance Kits, Right Ear	No	No	Secondary device
RLN4761A	Medium Custom Earpiece for Surveillance Kits, Right Ear	No	No	Secondary device
RLN4762A	Large Custom Earpiece for Surveillance Kits, Right Ear	No	No	Secondary device
RLN4763A	Small Custom Earpiece for Surveillance Kits, Left Ear	No	No	Secondary device

TABLE 5

Audio Acc. Models	Description	Selected for Test	Tested	Comments
RLN4764A	Medium Custom Earpiece for Surveillance Kits, Left Ear	No	No	Secondary device
RLN4765A	Large Custom Earpiece for Surveillance Kits, Left Ear	No	No	Secondary device
RLN5037A	Replacement Ear Tubes for CommPort Earpiece, Pack of 10	No	No	Replacement part
RLN5886A	Surveillance Low Noise Kit	No	No	Secondary device
RLN5887A	Surveillance High Noise Kit	No	No	Secondary device
RLN6074A	RSM Replacement Coil Cord Kit for PMMN4024A & PMMN4040A	No	No	Replacement part
RLN6075A	RSM Replacement Coil Cord Kit for PMMN4025A, PMMN4046A and PMMN4050A	No	No	Replacement part
RLN6242A	Low Noise Kit with Translucent Tube and 1 Clear Rubber Ear tip	No	No	Replacement part
RLN6279A	Standard Earpiece-Black	No	No	Replacement part
RLN6280A	Standard Earpiece-Beige	No	No	Replacement part
RLN6281A	Replacement Foam Plugs - 50/pak	No	No	Replacement part
RLN6282A	Replacement Ear Tips, Clear - 50/pak	No	No	Replacement part
RLN6283A	Replacement Foam Ear pad and Windscreen Kit	No	No	Replacement part
RLN6284A	Earpiece w/ Acoustic Tube Assm-Beige	No	No	Replacement part
RLN6285A	Earpiece w/ Acoustic Tube Assm-Black	No	No	Replacement part
RLN6288A	Earpiece w/High Noise Kit -Beige	No	No	Replacement part
RLN6289A	Earpiece w/High Noise Kit -Black	No	No	Replacement 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 1050 ELI5 1150 ELI4 1028 ELI5 1147					

8.3 Description of Simulated Tissue:

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

The simulated tissue mixture was mixed based on the Simulated Tissue Composition indicated in Table 8 below for 900 MHz and 2450 MHz. During the daily testing of this product, the applicable mixture was used to measure the Di-electric parameters at each of the tested frequencies to verify that the Di-electric parameters were within the tolerance of the tissue specifications.

Simulated Tissue Composition (by mass)

TABLE 8

Reference Standards	% of Listed Ingredients	900 MHz		2450 MHz	
		Head	Body	Head	Body
FCC Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97-01) IEEE 1528 - 2003 IEC62209-1 (2005) CENELEC EN62209-1 (2006)	Sugar	56.5	44.9	0	0
	Diacetin	0	0	51.0	34.5
	De ionized -Water	40.95	53.06	48.75	65.20
	Salt	1.45	0.94	0.15	0.20
	HEC	1.0	1.0	0	0
	Bact.	0.1	0.1	0.1	0.1

Reference section 10.1 for target parameters

9.0 Additional Test Equipment:

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

TABLE 9

Equipment Type	Model Number	Serial Number	Calibration Date	Calibration Due Date
Power Meter	E4416A	MY50001037	1/10/2012	1/10/2013*
Power Sensor	N8481B	MY51450002	4/5/2012	4/5/2013**
Power Meter	E4418B	MY45100911	6/25/2012	6/25/2013
Power Sensor	8481B	MY41091243	6/26/2012	6/26/2013
Power Meter	E4418B	MY45101014	10/31/2012	10/31/2013
Power Sensor	8481B	SG41090248	11/6/2012	11/6/2013
Power Meter	E4418B	MY45100532	11/14/2012	11/14/2013
Power Sensor	8481B	MY41091170	11/6/2012	11/6/2013
Power Meter	E4418B	MY45100739	7/12/2012	7/12/2013
Power Sensor	8481B	SG41090258	6/26/2012	6/26/2013
Signal Generator	E4438C	MY45091014	11/2/2012	11/2/2014
Amplifier	10W1000C	312858	CNR†	CNR†
Amplifier	5S1G4	312988	CNR†	CNR†
NARDA Bi-Directional Coupler	3020A	41935	8/24/2012	8/24/2013
NARDA Bi-Directional Coupler	3022	81639	7/31/2012	7/31/2013
Temperature Recording Equipment				
Thermometer	HH806AU	080307	11/14/2012	11/14/2013
Thermometer	HH202A	35882	7/24/2012	7/24/2013
Therm. Probe	80PK-22	9135	7/24/2012	7/24/2013
Therm. Probe	80PK-22	8765	12/18/2012	12/18/2013
Dickson Temp & RH Data Logger	TM320	06153216	7/6/2012	7/6/2013
Tissue Station				
Network Analyzer	E5071B	MY42403147	11/1/2012	11/1/2013
Dielectric Probe Kit (HP)	85070E	MY44300183	CNR†	CNR†
Dipole				
Speag Dipole	D900V2	1d025	4/14/2011 (Body--5/16/2012)	4/14/2013 (Body--5/16/2014)
Speag Dipole	D900V2	1d026	11/18/2011 (Body--8/6/2012)	11/18/2013 (Body--8/6/2014)
Speag Dipole	D2450V2	782	11/22/2011 (Body--5/15/2012)	11/22/2013 (Body--5/15/2014)

***Out for calibration; replaced with MY45100739 for continued testing.**

****Out for calibration; replace with SG41090258 for continued testing.**

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

10.0 SAR Measurement System Verification:

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

10.1 Equivalent Tissue Test Results:

Simulated tissue prepared for SAR measurements is measured daily and within 24 hours prior to actual SAR testing to verify that the tissue is within +/- 5% of target parameters at the center of the transmit band. This measurement is done using the applicable equipment indicated in section 9.0. Table 10 below summarizes the measured tissue parameters used for the SAR assessment.

TABLE 10

Frequency (MHz)	Tissue Type	Conductivity Target & Range (S/m)	Dielectric Constant Target & Range	Conductivity Meas. (S/m)	Dielectric Constant Meas.	Tested Date
816	FCC Body	0.97 (0.92-1.02)	55.27 (52.51-58.03)	0.98	53.60	12/26/12
				0.98	53.50	12/27/12
				0.98	55.70	01/15/13
				0.98	55.80	01/16/13
				0.98	55.60	01/17/13
				0.97	55.40	01/18/13
				0.98	55.60	01/21/13
				0.96	53.60	02/05/13
				0.98	53.60	02/22/13
				0.97	53.60	03/28/13
	IEEE / IEC Head	0.90 (0.86-0.94)	41.60 (39.52-43.68)	0.89	41.00	01/23/13
851	FCC Body	0.99 (0.94-1.04)	55.15 (52.39-57.91)	1.02	55.20	01/21/13
				1.01	54.80	01/22/13
				1.01	54.50	01/23/13
				0.99	53.20	02/04/13
				1.01	53.20	02/22/13
				1.01	53.20	02/25/13
				1.00	53.30	03/29/13
	IEEE / IEC Head	0.92 (0.87-0.97)	41.50 (39.42-43.58)	0.93	40.40	01/23/13
896	FCC Body	1.05 (1.00-1.10)	55.01 (52.26-57.76)	1.05	53.90	01/25/13
				1.05	53.70	01/29/13
				1.05	52.80	02/25/13
				1.05	53.00	02/26/13
	IEEE / IEC Head	0.97 (0.92-1.02)	41.50 (39.42-43.58)	0.97	40.80	02/04/13
899	FCC Body	1.05 (1.00-1.10)	55.00 (52.25-57.75)	1.05	53.70	01/29/13
				1.05	53.30	01/30/13
				1.04	52.70	02/05/13
				1.05	52.80	03/28/13

TABLE 10

Frequency (MHz)	Tissue Type	Conductivity Target & Range (S/m)	Dielectric Constant Target & Range	Conductivity Meas. (S/m)	Dielectric Constant Meas.	Tested Date
900	FCC Body	1.05 (1.00-1.10)	55.00 (52.25-57.75)	1.07	52.70	12/26/12
				1.07	52.60	12/27/12
				1.06	54.90	01/15/13
				1.06	54.90	01/16/13
				1.06	54.80	01/17/13
				1.06	54.50	01/18/13
				1.07	54.70	01/21/13
				1.06	54.30	01/22/13
				1.06	54.00	01/23/13
				1.06	53.90	01/25/13
				1.05	53.70	01/29/13
				1.05	53.30	01/30/13
				1.05	53.00	01/31/13
				1.05	53.10	02/01/13
				1.04	52.70	02/04/13
				1.04	52.70	02/05/13
				1.07	52.70	02/22/13
				1.06	52.80	02/25/13
				1.05	52.90	02/26/13
				1.06	52.70	03/28/13
				1.05	52.80	03/29/13
	IEEE/ IEC Head	0.97 (0.92-1.02)	41.50 (39.42-43.58)	0.97	39.80	01/23/13
				0.98	40.80	02/04/13
901	FCC Body	1.05 (1.00-1.10)	55.00 (52.25-57.75)	1.05	53.70	01/29/13
				1.05	53.30	01/30/13
935	IEEE / IEC Head	0.98 (0.93-1.03)	41.44 (39.37-43.51)	1.01	40.30	02/04/13
938	FCC Body	1.07 (1.02-1.12)	54.94 (52.19-57.69)	1.09	52.90	01/30/13
				1.09	52.70	01/31/13
				1.09	52.80	02/01/13
				1.08	52.30	02/04/13
				1.08	52.40	02/05/13
				1.09	52.60	02/26/13
				1.09	52.50	03/29/13
2450	FCC Body	1.95 (1.85-2.05)	52.71 (50.07-55.35)	2.01	47.50	02/26/13
				2.01	47.60	03/26/13
2441	FCC Body	1.94 (1.84-2.04)	52.71 (50.10-55.30)	2.00	47.50	02/26/13
				2.00	47.60	03/26/13

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 D900V2 / 1d025	11.00 +/- 10%	2.67	10.66	02/04/13
				2.63	10.50	02/05/13
	IEEE /IEC Head	SPEAG D900V2 / 1d025	11.40 +/- 10%	2.64	10.56	02/04/13
3122	FCC Body	SPEAG D900V2 / 1d025	11.00 +/- 10%	2.72	10.88	12/26/12
				2.74	10.96	12/27/12
				2.66	10.64	01/15/13
				2.62	10.48	01/16/13
				2.63	10.52	01/17/13
				2.63	10.52	01/18/13
				2.65	10.60	01/21/13
				2.64	10.56	01/22/13
				2.65	10.60	01/23/13
				2.64	10.56	01/25/13
				2.60	10.40	01/29/13
				2.66	10.64	01/30/13
				2.63	10.52	01/31/13
				2.63	10.52	02/01/13
	IEEE /IEC Head	SPEAG D900V2 / 1d025	11.40 +/- 10%	2.54	10.16	01/23/13
3274	FCC Body	SPEAG D2450V2 / 782	50.60 +/- 10%	13.30	53.20	02/26/13
				13.50	54.00	03/26/13
		SPEAG D900V2 / 1d026	10.80 +/- 10%	2.62	10.48	02/22/13
				2.61	10.44	02/25/13
				2.60	10.40	02/26/13
				2.63	10.52	03/28/13
				2.60	10.40	03/29/13

11.0 Environmental Test Conditions:

The EME Laboratory's ambient environment is well controlled resulting in very stable simulated tissue temperature and therefore stable dielectric properties. Simulated tissue temperature is measured prior to each scan to insure it is within +/ - 2^{o}C of the temperature at which the dielectric properties were determined. The liquid depth within the phantom used for measurements was at least 15cm. Additional precautions are routinely taken to ensure the stability of the simulated tissue such as covering the phantoms when scans are not actively in process in order to minimize evaporation. The lab environment is continuously monitored. The table below presents the range and average environmental conditions during the SAR tests reported herein:

TABLE 12

	Target	Measured
Ambient Temperature	18 - 25 ˚C	Range: 21.4-23.8˚C Avg. 22.7˚C
Relative Humidity	30 - 70 %	Range: 42.9-56.0% Avg. 46.9%
Tissue Temperature	NA	Range: 20-21.5˚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 or without the offered audio accessories as applicable.

12.3.2 Head

Not applicable.

12.3.3 Face

The DUT was positioned with its' front side separated 2.5cm from the phantom.

12.4 DUT Test Channels:

The number of test channels was determined by using the following IEEE 1528 equation. The use of this equation produces the same or more test channels compared to the FCC KDB 447498 number of test channels formula.

$$N_c = 2 * roundup[10 * (f_{high} - f_{low}) / f_c] + 1$$

Where
N_c = Number of channels
F_{high} = Upper channel
F_{low} = Lower channel
F_c = Center channel

12.5 DUT Test Plan:

The guidelines and requirements outlined in "SAR Test Reduction Considerations for Occupational PTT Radios" FCC KDB 643646 D01 dated 4/4/11 for head (face) and body were used to assess compliance of this device. All modes of operation identified in section 6.0 were considered during the development of the test plan.

All tests were performed in 100% CW mode and then 50% duty cycle was applied to the final results. The initial powers measured are within the range of 95% to 100% of the max power.

13.0 DUT Test Data

13.1 Assessment at the Body for 806-824 MHz:

The battery PMNN4407A was selected as the default battery to assess at the Body (refer to Exhibit 7B for the dimension of the battery). The conducted power measurement for all test channels within Part 90 frequency range (806-824 MHz) using the battery PMNN4407A 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)
806.000	2.95
815.500	2.96
824.000	2.95

13.1.1 Assessment at the Body with Body worn PMLN5846A:

Assessment of offered antennas with the default battery, body worn PMLN5846A, and 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 the highest output power channel.

TABLE 14

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4011A	PMNN4407A	PMLN5846A	PMMN4024A	806.000							
				815.500	2.94	-0.523	0.236	0.181	**0.14**	**0.10**	Lee-AB-121226-02
				824.000							
Assessments of the additional offered battery											
PMAF4011A	PMNN4406A	PMLN5846A	PMMN4024A	806.000							
				815.500	2.93	-0.498	0.228	0.174	0.13	0.10	Lee-AB-121226-03
				824.000							
	PMNN4409A	PMLN5846A	PMMN4024A	806.000							
				815.500	2.89	-0.442	0.199	0.152	0.11	0.09	Lee-AB-121226-04
				824.000							
	NNTN8129A	PMLN5846A	PMMN4024A	806.000							
				815.500	2.89	-0.456	0.207	0.159	0.12	0.09	PS-AB-121226-05
				824.000							

13.1.2 Assessment at the Body with Body worn PMLN5843A:

Assessment of offered antennas with the default battery, body worn PMLN5843A, and 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 15

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4011A	PMNN4407A	PMLN5843A	PMMN4024A	806.000							
				815.500	2.92	-0.486	0.216	0.166	0.12	0.10	PS-AB-121226-06
				824.000							
Assessments of the additional offered battery											
PMAF4011A	PMNN4406A	PMLN5843A	PMMN4024A	806.000							
				815.500	2.93	-0.526	0.237	0.181	**0.14**	**0.10**	PS-AB-121226-07
				824.000							
	PMNN4409A	PMLN5843A	PMMN4024A	806.000							
				815.500	2.88	-0.459	0.202	0.155	0.12	0.09	PS-AB-121226-08
				824.000							
	NNTN8129A	PMLN5843A	PMMN4024A	806.000							
				815.500	2.89	-0.43	0.194	0.148	0.11	0.08	PS-AB-121226-09
				824.000							

13.1.3 Assessment at the Body with Body worn PMLN5845A:

Assessment of offered antennas with the default battery, body worn PMLN5845A, and 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 16

Assessments at the Body (CW mode)											
Antenna	**Battery**	**Carry Accessory**	**Cable Accessory**	**Test Freq. (MHz)**	**Initial Power (W)**	**SAR Drift (dB)**	**Meas. 1g-SAR (W/kg)**	**Meas. 10g-SAR (W/kg)**	**Max Calc. 1g-SAR (W/kg)**	**Max Calc. 10g-SAR (W/kg)**	**Run#**
PMAF4011A	PMNN4407A	PMLN5845A	PMMN4024A	806.000							
				815.500	2.95	-0.595	1.960	1.450	1.14	0.85	CcC-AB-121227-02
				824.000							
Assessments of the additional offered battery											
PMAF4011A	PMNN4406A	PMLN5845A	PMMN4024A	806.000							
				815.500	2.95	-0.588	1.970	1.450	**1.15**	**0.84**	CcC-AB-121227-03
				824.000							
	PMNN4409A	PMLN5845A	PMMN4024A	806.000							
				815.500	2.96	-0.694	1.620	1.200	0.96	0.71	Lee-AB-121227-04
				824.000							
	NNTN8129A	PMLN5845A	PMMN4024A	806.000							
				815.500	2.92	-0.627	1.900	1.410	1.13	0.84	Lee-AB-121227-05
				824.000							

13.1.4 Assessment at the Body with Body worn PMLN5839A:

Assessment of offered antennas with the default battery, body worn PMLN5839A, and 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 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. 1g-SAR (W/kg)**	**Max Calc. 10g-SAR (W/kg)**	**Run#**
PMAF4011A	PMNN4407A	PMLN5839A	PMMN4024A	806.000							
				815.500	2.95	-0.575	0.636	0.481	0.37	0.28	Lee-AB-121227-06
				824.000							
Assessments of the additional offered battery											
PMAF4011A	PMNN4406A	PMLN5839A	PMMN4024A	806.000							
				815.500	2.96	-0.61	0.636	0.482	**0.37**	**0.28**	Lee-AB-121227-07
				824.000							
	PMNN4409A	PMLN5839A	PMMN4024A	806.000							
				815.500	2.93	-0.532	0.582	0.441	0.34	0.26	Lee-AB-121227-08
				824.000							
	NNTN8129A	PMLN5839A	PMMN4024A	806.000							
				815.500	2.94	-0.525	0.519	0.395	0.30	0.23	Lee-AB-121227-09
				824.000							

13.1.5 Assessment at the Body with Body worn PMLN7008A:

Assessment of offered antennas with the default battery, body worn PMLN7008A, and 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 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. 1g-SAR (W/kg)**	**Max Calc. 10g-SAR (W/kg)**	**Run#**
PMAF4011A	PMNN4407A	PMLN7008A	PMMN4024A	806.000							
				815.500	2.95	-0.623	1.930	1.430	**1.13**	**0.84**	Lee-AB-121227-10
				824.000							
Assessments of the additional offered battery											
PMAF4011A	PMNN4406A	PMLN7008A	PMMN4024A	806.000							
				815.500	2.96	-0.632	1.910	1.410	1.12	0.83	Lee-AB-121227-11
				824.000							
	PMNN4409A	PMLN7008A	PMMN4024A	806.000							
				815.500	2.90	-0.538	1.450	1.080	0.85	0.63	Lee-AB-121227-12
				824.000							
	NNTN8129A	PMLN7008A	PMMN4024A	806.000							
				815.500	2.93	-0.622	1.437	1.074	0.85	0.63	PS-AB-130115-02
				824.000							

13.1.6 Assessment at the Body with Body worn PMLN4651A:

Assessment of offered antennas with the default battery, body worn PMLN4651A, and 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 19

Assessments at the Body (CW mode)											
Antenna	**Battery**	**Carry Accessory**	**Cable Accessory**	**Test Freq. (MHz)**	**Initial Power (W)**	**SAR Drift (dB)**	**Meas. 1g-SAR (W/kg)**	**Meas. 10g-SAR (W/kg)**	**Max Calc. 1g-SAR (W/kg)**	**Max Calc. 10g-SAR (W/kg)**	**Run#**
PMAF4011A	PMNN4407A	PMLN4651A	PMMN4024A	806.000							
				815.500	2.94	-0.672	1.919	1.425	**1.14**	**0.85**	PS-AB-130115-03
				824.000							
Assessments of the additional offered battery											
PMAF4011A	PMNN4406A	PMLN4651A	PMMN4024A	806.000							
				815.500	2.96	-0.658	1.879	1.395	1.11	0.82	PS-AB-130115-04
				824.000							
	PMNN4409A	PMLN4651A	PMMN4024A	806.000							
				815.500	2.94	-0.584	1.607	1.194	0.94	0.70	PS-AB-130115-05
				824.000							
	NNTN8129A	PMLN4651A	PMMN4024A	806.000							
				815.500	2.92	-0.589	1.547	1.154	0.91	0.68	PS-AB-130115-06
				824.000							

13.1.7 Assessment at the Body with Body worn RLN4570A:

Assessment of offered antennas with the default battery, body worn RLN4570A, and 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 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. 1g-SAR (W/kg)**	**Max Calc. 10g-SAR (W/kg)**	**Run#**
PMAF4011A	PMNN4407A	RLN4570A	PMMN4024A	806.000							
				815.500	2.96	-0.664	6.399	4.527	**3.78**	**2.67**	PS-AB-130115-07
				824.000							
Assessments of the additional offered battery											
PMAF4011A	PMNN4406A	RLN4570A	PMMN4024A	806.000							
				815.500	2.97	-0.619	6.118	4.356	3.56	2.54	PS-AB-130115-08
				824.000							
	PMNN4409A	RLN4570A	PMMN4024A	806.000							
				815.500	2.96	-0.561	5.521	3.958	3.18	2.28	PS-AB-130116-02
				824.000							
	NNTN8129A	RLN4570A	PMMN4024A	806.000							
				815.500	2.93	-0.567	4.888	3.526	2.85	2.06	PS-AB-130116-03
				824.000							

13.1.8 Assessment at the Body with Body worn RLN4815A:

Assessment of offered antennas with the default battery, body worn RLN4815A, and 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. 1g-SAR (W/kg)**	**Max Calc. 10g-SAR (W/kg)**	**Run#**
PMAF4011A	PMNN4407A	RLN4815A	PMMN4024A	806.000							
				815.500	2.96	-0.696	1.931	1.426	1.15	0.85	PS-AB-130116-04
				824.000							
Assessments of the additional offered battery											
PMAF4011A	PMNN4406A	RLN4815A	PMMN4024A	806.000							
				815.500	2.96	-0.723	2.072	1.537	**1.24**	**0.92**	PS-AB-130116-05
				824.000							
	PMNN4409A	RLN4815A	PMMN4024A	806.000							
				815.500	2.95	-0.61	1.589	1.185	0.93	0.69	PS-AB-130116-06
				824.000							
	NNTN8129A	RLN4815A	PMMN4024A	806.000							
				815.500	2.93	-0.594	1.599	1.185	0.94	0.70	PS-AB-130116-07
				824.000							

13.1.9 Assessment at the Body with Body worn HLN6602A:

Assessment of offered antennas with the default battery, body worn HLN6602A, and 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. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4011A	PMNN4407A	HLN6602A	PMMN4024A	806.000							
				815.500	2.95	-0.630	5.933	4.229	3.49	2.49	PS-AB-130116-09
				824.000							
Assessments of the additional offered battery											
PMAF4011A	PMNN4406A	HLN6602A	PMMN4024A	806.000							
				815.500	2.94	-0.599	7.045	4.954	**4.13**	**2.90**	PS-AB-130117-02
				824.000							
	PMNN4409A	HLN6602A	PMMN4024A	806.000							
				815.500	2.92	-0.530	5.238	3.761	3.04	2.18	PS-AB-130117-03
				824.000							
	NNTN8129A	HLN6602A	PMMN4024A	806.000							
				815.500	2.92	-0.570	5.961	4.252	3.49	2.49	PS-AB-130117-04
				824.000							

13.1.10 Assessment at the Body with Body worn PMLN5843A (no belt-loop) with Carry Strap NTN5243A:

Assessment of offered antennas with the default battery, body worn PMLN5843A (no belt loop) with NTN5243A carry strap, and 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. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4011A	PMNN4407A	PMLN5843A w/ NTN5243A Back of radio w/o belt loop	PMMN4024A	806.000							
				815.500	2.96	-0.600	0.746	0.564	**0.43**	**0.33**	Lee-AB-130222-05
				824.000							
Assessments of the additional offered battery											
PMAF4011A	PMNN4406A	PMLN5843A w/ NTN5243A Back of radio w/o belt loop	PMMN4024A	806.000							
				815.500	2.94	-0.570	0.735	0.553	0.43	0.32	PS-AB-130205-09
				824.000							
	PMNN4409A	PMLN5843A w/ NTN5243A Back of radio w/o belt loop	PMMN4024A	806.000							
				815.500	2.95	-0.530	0.652	0.497	0.37	0.29	Lee-AB-130222-06
				824.000							
	NNTN8129A	PMLN5843A w/ NTN5243A Back of radio w/o belt loop	PMMN4024A	806.000							
				815.500	2.92	-0.510	0.649	0.493	0.37	0.28	Lee-AB-130222-07
				824.000							

13.1.11 Assessment at the Body with Body worn PMLN5845A (fixed belt-loop) with Carry Strap NTN5243A:

Assessment of offered antennas with the default battery and body worn PMLN5845A (fixed belt-loop) with NTN5243A carry strap, and 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 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. 1g-SAR (W/kg)**	**Max Calc. 10g-SAR (W/kg)**	**Run#**
PMAF4011A	PMNN4407A	PMLN5845A w/ NTN5243A Back of radio w/fixed belt loop	PMMN4024A	806.000							
				815.500	2.93	-0.650	1.780	1.320	1.06	0.78	Lee-AB-130222-08
				824.000							
Assessments of the additional offered battery											
PMAF4011A	PMNN4406A	PMLN5845A w/ NTN5243A Back of radio w/fixed belt loop	PMMN4024A	806.000							
				815.500	2.94	-0.643	2.181	1.605	**1.29**	**0.95**	PS-AB-130205-10
				824.000							
	PMNN4409A	PMLN5845A w/ NTN5243A Back of radio w/fixed belt loop	PMMN4024A	806.000							
				815.500	2.91	-0.550	1.160	0.870	0.68	0.51	Lee-AB-130222-09
				824.000							
	NNTN8129A	PMLN5845A w/ NTN5243A Back of radio w/fixed belt loop	PMMN4024A	806.000							
				815.500	2.90	-0.580	1.830	1.370	1.08	0.81	Lee-AB-130222-10
				824.000							

13.1.12 Assessment at the Body with Body worn PMLN5839A (fixed belt-loop) with Carry Strap NTN5243A:

Assessment of offered antennas with the default battery and body worn PMLN5839A (fixed belt loop) with NTN5243A carry strap, and 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 25

Assessments at the Body (CW mode)											
Antenna	**Battery**	**Carry Accessory**	**Cable Accessory**	**Test Freq. (MHz)**	**Initial Power (W)**	**SAR Drift (dB)**	**Meas. 1g-SAR (W/kg)**	**Meas. 10g-SAR (W/kg)**	**Max Calc. 1g-SAR (W/kg)**	**Max Calc. 10g-SAR (W/kg)**	**Run#**
PMAF4011A	PMNN4407A	PMLN5839A w/ NTN5243A Back of radio w/fixed belt loop	PMMN4024A	806.00							
				815.50	2.95	-0.66	0.535	0.407	**0.32**	**0.24**	PS-AB-130222-11
				824.00							
Assessments of the additional offered battery											
PMAF4011A	PMNN4406A	PMLN5839A w/ NTN5243A Back of radio w/fixed belt loop	PMMN4024A	806.00							
				815.50	2.94	-0.51	0.521	0.393	0.30	0.23	PS-AB-130205-11
				824.00							

TABLE 25

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4011A	PMNN4409A	PMLN5839A w/ NTN5243A Back of radio w/fixed belt loop	PMMN4024A	806.00							
				815.50	2.95	-0.52	0.457	0.350	0.26	0.20	PS-AB-130222-12
				824.00							
	NNTN8129A	PMLN5839A w/ NTN5243A Back of radio w/fixed belt loop	PMMN4024A	806.00							
				815.50	2.92	-0.49	0.432	0.330	0.25	0.19	PS-AB-130222-13
				824.00							

13.1.13 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 26

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4011A	PMNN4406A	HLN6602A	PMMN4040A	806.000							
				815.500	2.96	-0.612	6.312	4.473	3.68	2.61	PS-AB-130117-05
				824.000							
			PMMN4050A w/ AARLN4885B	806.000							
				815.500	2.93	-0.642	6.814	4.814	**4.04**	**2.86**	PS-AB-130117-06
				824.000							
			PMLN5101A	806.000							
				815.500	2.94	-0.580	6.563	4.643	3.83	2.71	PS-AB-130117-07
				824.000							
			RLN5882A	806.000							
				815.500	2.96	-0.495	6.473	4.533	3.68	2.57	PS-AB-130117-08
				824.000							
			PMLN5102A	806.000							
				815.500	2.96	-0.608	6.372	4.493	3.71	2.62	PS-AB-130117-09
				824.000							
			RMN5058A	806.000							
				815.500	2.96	-0.599	6.559	4.635	3.82	2.70	PS-AB-130118-02
				824.000							
			PMLN5096B	806.000							
				815.500	2.97	-0.462	5.517	3.874	3.10	2.18	PS-AB-130118-03
				824.000							
			PMLN5275C	806.000							
				815.500	2.96	-0.626	6.599	4.655	3.86	2.72	PS-AB-130118-04
				824.000							
			PMLN6129A	806.000							
				815.500	2.93	-0.564	6.228	4.395	3.63	2.56	PS-AB-130118-06
				824.000							
			PMLN5097A	806.000							
				815.500	2.93	-0.599	6.399	4.535	3.76	2.67	PS-AB-130118-07
				824.000							
			PMLN6123A	806.000							
				815.500	2.96	-0.686	5.409	3.851	3.21	2.29	Lee-AB-130121-02
				824.000							

13.1.14 Assessment of wireless BT configuration at the Body:

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

TABLE 27

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4011A	PMNN4406A	HLN6602A	NONE	806.000							
				815.500	2.99	-0.510	6.990	4.970	3.94	2.80	CcC-AB-130328-02
				824.000							

13.2 Assessment at the Body for 851-869 MHz:

The battery PMNN4407A was selected as the default battery to assess at the Body (refer to Exhibit 7B for the dimension of the battery). The conducted power measurement for all test channels within Part 90 frequency range (851-869 MHz) using the battery PMNN4407A is indicated in Table 28. 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 28

Test Freq (MHz)	Power (W)
851.000	2.93
860.500	2.93
869.000	2.92

13.2.1 Assessment at the Body with Body worn PMLN5846A:

Assessment of offered antennas with the default battery, body worn PMLN5846A, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 28 for the highest output power channel.

TABLE 29

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4011A	PMNN4407A	PMLN5846A	PMMN4024A	851.000	2.97	-0.666	0.211	0.161	**0.12**	**0.09**	Lee-AB-130121-03
				860.500							
				869.000							
Assessments of the additional offered battery											
PMAF4011A	PMNN4406A	PMLN5846A	PMMN4024A	851.000	2.97	-0.613	0.200	0.152	0.12	0.09	Lee-AB-130121-04
				860.500							
				869.000							
	PMNN4409A	PMLN5846A	PMMN4024A	851.000	2.94	-0.588	0.188	0.143	0.11	0.08	Lee-AB-130121-05
				860.500							
				869.000							
	NNTN8129A	PMLN5846A	PMMN4024A	851.000	2.94	-0.409	0.191	0.146	0.11	0.08	Lee-AB-130121-06
				860.500							
				869.000							

13.2.2 Assessment at the Body with Body worn PMLN5843A:

Assessment of offered antennas with the default battery, body worn PMLN5843A, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 28 for highest output power channel.

TABLE 30

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4011A	PMNN4407A	PMLN5843A	PMMN4024A	851.000	2.96	-0.580	0.187	0.143	0.11	0.08	Lee-AB-130121-07
				860.500							
				869.000							
Assessments of the additional offered battery											
PMAF4011A	PMNN4406A	PMLN5843A	PMMN4024A	851.000	2.95	-0.604	0.187	0.142	0.11	0.08	Lee-AB-130121-08
				860.500							
				869.000							
	PMNN4409A	PMLN5843A	PMMN4024A	851.000	2.93	-0.562	0.176	0.135	0.10	0.08	Lee-AB-130121-09
				860.500							
				869.000							
	NNTN8129A	PMLN5843A	PMMN4024A	851.000	2.93	-0.542	0.191	0.145	**0.11**	**0.08**	Lee-AB-130121-10
				860.500							
				869.000							

13.2.3 Assessment at the Body with Body worn PMLN5845A:

Assessment of offered antennas with the default battery, body worn PMLN5845A, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 28 for highest output power channel.

TABLE 31

Assessments at the Body (CW mode)											
Antenna	**Battery**	**Carry Accessory**	**Cable Accessory**	**Test Freq. (MHz)**	**Initial Power (W)**	**SAR Drift (dB)**	**Meas. 1g-SAR (W/kg)**	**Meas. 10g-SAR (W/kg)**	**Max Calc. 1g-SAR (W/kg)**	**Max Calc. 10g-SAR (W/kg)**	**Run#**
PMAF4011A	PMNN4407A	PMLN5845A	PMMN4024A	851.000	2.96	-0.683	1.650	1.210	0.98	0.72	Lee-AB-130122-02
				860.500							
				869.000							
Assessments of the additional offered battery											
PMAF4011A	PMNN4406A	PMLN5845A	PMMN4024A	851.000	2.97	-0.706	1.770	1.300	**1.05**	**0.77**	Lee-AB-130122-03
				860.500							
				869.000							
	PMNN4409A	PMLN5845A	PMMN4024A	851.000	2.94	-0.635	1.400	1.030	0.83	0.61	Lee-AB-130122-04
				860.500							
				869.000							
	NNTN8129A	PMLN5845A	PMMN4024A	851.000	2.94	-0.615	1.510	1.120	0.89	0.66	Lee-AB-130122-05
				860.500							
				869.000							

13.2.4 Assessment at the Body with Body worn PMLN5839A:

Assessment of offered antennas with the default battery, body worn PMLN5839A, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 28 for highest output power channel.

TABLE 32

Assessments at the Body (CW mode)											
Antenna	**Battery**	**Carry Accessory**	**Cable Accessory**	**Test Freq. (MHz)**	**Initial Power (W)**	**SAR Drift (dB)**	**Meas. 1g-SAR (W/kg)**	**Meas. 10g-SAR (W/kg)**	**Max Calc. 1g-SAR (W/kg)**	**Max Calc. 10g-SAR (W/kg)**	**Run#**
PMAF4011A	PMNN4407A	PMLN5839A	PMMN4024A	851.000	2.96	-0.633	0.468	0.353	0.27	0.21	Lee-AB-130122-06
				860.500							
				869.000							
Assessments of the additional offered battery											
PMAF4011A	PMNN4406A	PMLN5839A	PMMN4024A	851.000	2.98	-0.624	0.488	0.368	**0.28**	**0.21**	Lee-AB-130122-07
				860.500							
				869.000							
	PMNN4409A	PMLN5839A	PMMN4024A	851.000	2.94	-0.559	0.389	0.294	0.23	0.17	Lee-AB-130122-08
				860.500							
				869.000							
	NNTN8129A	PMLN5839A	PMMN4024A	851.000	2.93	-0.562	0.408	0.308	0.24	0.18	Lee-AB-130122-09
				860.500							
				869.000							

13.2.5 Assessment at the Body with Body worn PMLN7008A:

Assessment of offered antennas with the default battery, body worn PMLN7008A, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 28 for highest output power channel.

TABLE 33

Assessments at the Body (CW mode)											
Antenna	**Battery**	**Carry Accessory**	**Cable Accessory**	**Test Freq. (MHz)**	**Initial Power (W)**	**SAR Drift (dB)**	**Meas. 1g-SAR (W/kg)**	**Meas. 10g-SAR (W/kg)**	**Max Calc. 1g-SAR (W/kg)**	**Max Calc. 10g-SAR (W/kg)**	**Run#**
PMAF4011A	PMNN4407A	PMLN7008A	PMMN4024A	851.000	2.95	-0.679	1.460	1.070	**0.87**	**0.64**	Lee-AB-130122-10
				860.500							
				869.000							
Assessments of the additional offered battery											
PMAF4011A	PMNN4406A	PMLN7008A	PMMN4024A	851.000	2.96	-0.656	1.460	1.070	0.86	0.63	Lee-AB-130122-11
				860.500							
				869.000							
	PMNN4409A	PMLN7008A	PMMN4024A	851.000	2.95	-0.615	1.200	0.890	0.70	0.52	Lee-AB-130122-12
				860.500							
				869.000							
	NNTN8129A	PMLN7008A	PMMN4024A	851.000	2.93	-0.631	1.210	0.894	0.72	0.53	PS-AB-130122-13
				860.500							
				869.000							

13.2.6 Assessment at the Body with Body worn PMLN4651A:

Assessment of offered antennas with the default battery, body worn PMLN4651A, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 28 for highest output power channel.

TABLE 34

Assessments at the Body (CW mode)											
Antenna	**Battery**	**Carry Accessory**	**Cable Accessory**	**Test Freq. (MHz)**	**Initial Power (W)**	**SAR Drift (dB)**	**Meas. 1g-SAR (W/kg)**	**Meas. 10g-SAR (W/kg)**	**Max Calc. 1g-SAR (W/kg)**	**Max Calc. 10g-SAR (W/kg)**	**Run#**
PMAF4011A	PMNN4407A	PMLN4651A	PMMN4024A	851.000	2.95	-0.684	1.520	1.120	0.90	0.67	PS-AB-130122-14
				860.500							
				869.000							
Assessments of the additional offered battery											
PMAF4011A	PMNN4406A	PMLN4651A	PMMN4024A	851.000	2.95	-0.667	1.540	1.130	**0.91**	**0.67**	PS-AB-130122-15
				860.500							
				869.000							
	PMNN4409A	PMLN4651A	PMMN4024A	851.000	2.90	-0.620	1.240	0.923	0.74	0.55	PS-AB-130122-16
				860.500							
				869.000							
	NNTN8129A	PMLN4651A	PMMN4024A	851.000	2.92	-0.619	1.260	0.932	0.75	0.55	PS-AB-130122-17
				860.500							
				869.000							

13.2.7 Assessment at the Body with Body worn RLN4570A:

Assessment of offered antennas with the default battery, body worn RLN4570A, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 28 for highest output power channel.

TABLE 35

Assessments at the Body (CW mode)											
Antenna	**Battery**	**Carry Accessory**	**Cable Accessory**	**Test Freq. (MHz)**	**Initial Power (W)**	**SAR Drift (dB)**	**Meas. 1g-SAR (W/kg)**	**Meas. 10g-SAR (W/kg)**	**Max Calc. 1g-SAR (W/kg)**	**Max Calc. 10g-SAR (W/kg)**	**Run#**
PMAF4011A	PMNN4407A	RLN4570A	PMMN4024A	851.000	2.92	-0.654	5.450	3.820	**3.25**	**2.28**	PS-AB-130122-18
				860.500							
				869.000							
Assessments of the additional offered battery											
PMAF4011A	PMNN4406A	RLN4570A	PMMN4024A	851.000	2.96	-0.669	5.260	3.690	3.11	2.18	CcC-AB-130123-02
				860.500							
				869.000							
	PMNN4409A	RLN4570A	PMMN4024A	851.000	2.94	-0.801	4.560	3.240	2.80	1.99	CcC-AB-130123-03
				860.500							
				869.000							
	NNTN8129A	RLN4570A	PMMN4024A	851.000	2.92	-0.592	4.750	3.370	2.80	1.98	CcC-AB-130123-04
				860.500							
				869.000							

13.2.8 Assessment at the Body with Body worn RLN4815A:

Assessment of offered antennas with the default battery, body worn RLN4815A, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 28 for highest output power channel.

TABLE 36

Assessments at the Body (CW mode)											
Antenna	**Battery**	**Carry Accessory**	**Cable Accessory**	**Test Freq. (MHz)**	**Initial Power (W)**	**SAR Drift (dB)**	**Meas. 1g-SAR (W/kg)**	**Meas. 10g-SAR (W/kg)**	**Max Calc. 1g-SAR (W/kg)**	**Max Calc. 10g-SAR (W/kg)**	**Run#**
PMAF4011A	PMNN4407A	RLN4815A	PMMN4024A	851.000	2.97	-0.652	1.510	1.110	0.89	0.65	Lee-AB-130123-05
				860.500							
				869.000							
Assessments of the additional offered battery											
PMAF4011A	PMNN4406A	RLN4815A	PMMN4024A	851.000	2.95	-0.651	1.590	1.160	**0.94**	**0.69**	Lee-AB-130123-06
				860.500							
				869.000							
	PMNN4409A	RLN4815A	PMMN4024A	851.000	2.94	-0.618	1.340	0.994	0.79	0.58	Lee-AB-130123-07
				860.500							
				869.000							
	NNTN8129A	RLN4815A	PMMN4024A	851.000	2.93	-0.576	1.410	1.040	0.82	0.61	Lee-AB-130123-08
				860.500							
				869.000							

13.2.9 Assessment at the Body with Body worn HLN6602A:

Assessment of offered antennas with the default battery, body worn HLN6602A, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 28 for highest output power channel.

TABLE 37

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4011A	PMNN4407A	HLN6602A	PMMN4024A	851.000	2.95	-0.957	4.750	3.350	3.01	2.12	Lee-AB-130123-09
				860.500							
				869.000							
Assessments of the additional offered battery											
PMAF4011A	PMNN4406A	HLN6602A	PMMN4024A	851.000	2.96	-0.637	5.480	3.850	**3.22**	**2.26**	Lee-AB-130123-10
				860.500							
				869.000							
	PMNN4409A	HLN6602A	PMMN4024A	851.000	2.94	-0.657	4.560	3.240	2.71	1.92	Lee-AB-130123-11
				860.500							
				869.000							
	NNTN8129A	HLN6602A	PMMN4024A	851.000	2.94	-0.605	5.210	3.670	3.06	2.15	Lee-AB-130123-12
				860.500							
				869.000							

13.2.10 Assessment at the Body with Body worn PMLN5843A (no belt-loop) with Carry Strap NTN5243A:

Assessment of offered antennas with the default battery, body worn PMLN5843A (no belt loop) with NTN5243A carry strap, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 28 for highest output power channel.

TABLE 38

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4011A	PMNN4407A	PMLN5843A w/ NTN5243A Back of radio w/o belt loop	PMMN4024A	851.000	2.97	-0.700	0.741	0.564	**0.44**	**0.33**	PS-AB-130222-14
				860.500							
				869.000							
Assessments of the additional offered battery											
PMAF4011A	PMNN4406A	PMLN5843A w/ NTN5243A Back of radio w/o belt loop	PMMN4024A	851.000	2.97	-0.650	0.568	0.428	0.33	0.25	PS-AB-130225-02
				860.500							
				869.000							
	PMNN4409A	PMLN5843A w/ NTN5243A Back of radio w/o belt loop	PMMN4024A	851.000	2.95	-0.610	0.533	0.402	0.31	0.24	PS-AB-130225-03
				860.500							
				869.000							
	NNTN8129A	PMLN5843A w/ NTN5243A Back of radio w/o belt loop	PMMN4024A	851.000	2.93	-0.510	0.532	0.401	0.31	0.23	PS-AB-130225-04
				860.500							
				869.000							

13.2.11 Assessment at the Body with Body worn PMLN5845A (fixed belt-loop) with Carry Strap NTN5243A:

Assessment of offered antennas with the default battery and body worn PMLN5845A (fixed belt-loop) with NTN5243A carry strap, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 28 for highest output power channel.

TABLE 39

Assessments at the Body (CW mode)											
Antenna	**Battery**	**Carry Accessory**	**Cable Accessory**	**Test Freq. (MHz)**	**Initial Power (W)**	**SAR Drift (dB)**	**Meas. 1g-SAR (W/kg)**	**Meas. 10g-SAR (W/kg)**	**Max Calc. 1g-SAR (W/kg)**	**Max Calc. 10g-SAR (W/kg)**	**Run#**
PMAF4011A	PMNN4407A	PMLN5845A w/ NTN5243A Back of radio w/ fixed belt loop	PMMN4024A	851.000	2.94	-0.693	1.760	1.290	**1.05**	**0.77**	Lee-AB-130204-15
				860.500							
				869.000							
Assessments of the additional offered battery											
PMAF4011A	PMNN4406A	PMLN5845A w/ NTN5243A Back of radio w/ fixed belt loop	PMMN4024A	851.000	2.96	-0.660	1.620	1.190	0.96	0.70	PS-AB-130225-05
				860.500							
				869.000							
	PMNN4409A	PMLN5845A w/ NTN5243A Back of radio w/ fixed belt loop	PMMN4024A	851.000	2.94	-0.710	1.440	1.070	0.87	0.64	PS-AB-130225-06
				860.500							
				869.000							
	NNTN8129A	PMLN5845A w/ NTN5243A Back of radio w/ fixed belt loop	PMMN4024A	851.000	2.91	-0.710	1.490	1.100	0.90	0.67	PS-AB-130225-07
				860.500							
				869.000							

13.2.12 Assessment at the Body with Body worn PMLN5839A (fixed belt-loop) with Carry Strap NTN5243A:

Assessment of offered antennas with the default battery and body worn PMLN5839A (fixed belt-loop) with NTN5243A carry strap, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 28 for highest output power channel.

TABLE 40

Assessments at the Body (CW mode)											
Antenna	**Battery**	**Carry Accessory**	**Cable Accessory**	**Test Freq. (MHz)**	**Initial Power (W)**	**SAR Drift (dB)**	**Meas. 1g-SAR (W/kg)**	**Meas. 10g-SAR (W/kg)**	**Max Calc. 1g-SAR (W/kg)**	**Max Calc. 10g-SAR (W/kg)**	**Run#**
PMAF4011A	PMNN4407A	PMLN5839A w/ NTN5243A Back of radio w/ fixed belt loop	PMMN4024A	851.000	2.94	-0.618	0.470	0.353	0.28	0.21	Lee-AB-130204-16
				860.500							
				869.000							
Assessments of the additional offered battery											
PMAF4011A	PMNN4406A	PMLN5839A w/ NTN5243A Back of radio w/ fixed belt loop	PMMN4024A	851.000	2.95	-0.760	0.468	0.354	**0.28**	**0.21**	PS-AB-130225-08
				860.500							
				869.000							
	PMNN4409A	PMLN5839A w/ NTN5243A Back of radio w/ fixed belt loop	PMMN4024A	851.000	2.96	-0.580	0.413	0.313	0.24	0.18	PS-AB-130225-09
				860.500							
				869.000							
	NNTN8129A	PMLN5839A w/ NTN5243A Back of radio w/ fixed belt loop	PMMN4024A	851.000	2.93	-0.580	0.393	0.298	0.23	0.17	PS-AB-130225-10
				860.500							
				869.000							

13.2.13 Assessment of other audio accessories at the body:

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

13.2.14 Assessment of wireless BT configuration at the Body:

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

TABLE 41

Assessments at the Body (CW mode)											
Antenna	**Battery**	**Carry Accessory**	**Cable Accessory**	**Test Freq. (MHz)**	**Initial Power (W)**	**SAR Drift (dB)**	**Meas. 1g-SAR (W/kg)**	**Meas. 10g-SAR (W/kg)**	**Max Calc. 1g-SAR (W/kg)**	**Max Calc. 10g-SAR (W/kg)**	**Run#**
PMAF4011A	PMNN4407A	RLN4570A	NONE	851.000	2.99	-0.660	5.600	3.950	3.27	2.31	PS-AB-130329-02
				860.500							
				869.000							

13.3 Assessment at the Body for 896-901 MHz:

The battery PMNN4407A was selected as the default battery to assess at the Body (refer to Exhibit 7B for the dimension of the battery). The conducted power measurement for all test channels within Part 90 frequency range (896-901 MHz) using the battery PMNN4407A is indicated in Table 42. 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 42

Test Freq (MHz)	Power (W)
896.000	2.93
899.000	2.93
901.000	2.90

13.3.1 Assessment at the Body with Body worn PMLN5846A:

Assessment of offered antennas with the default battery, body worn PMLN5846A, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 42 for the highest output power channel.

TABLE 43

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4012A	PMNN4407A	PMLN5846A	PMMN4024A	896.000	2.98	-0.654	0.357	0.269	0.21	0.16	CcC-AB-130125-02
				899.000							
				901.000							
Assessments of the additional offered battery											
PMAF4012A	PMNN4406A	PMLN5846A	PMMN4024A	896.000	2.98	-0.573	0.373	0.281	**0.21**	**0.16**	CcC-AB-130125-03
				899.000							
				901.000							
	PMNN4409A	PMLN5846A	PMMN4024A	896.000	2.94	-0.604	0.313	0.237	0.18	0.14	CcC-AB-130125-04
				899.000							
				901.000							
	NNTN8129A	PMLN5846A	PMMN4024A	896.000	2.95	-0.664	0.357	0.269	0.21	0.16	Lee-AB-130125-05
				899.000							
				901.000							

13.3.2 Assessment at the Body with Body worn PMLN5843A:

Assessment of offered antennas with the default battery, body worn PMLN5843A, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 42 for highest output power channel.

TABLE 44

Assessments at the Body (CW mode)											
Antenna	**Battery**	**Carry Accessory**	**Cable Accessory**	**Test Freq. (MHz)**	**Initial Power (W)**	**SAR Drift (dB)**	**Meas. 1g-SAR (W/kg)**	**Meas. 10g-SAR (W/kg)**	**Max Calc. 1g-SAR (W/kg)**	**Max Calc. 10g-SAR (W/kg)**	**Run#**
PMAF4012A	PMNN4407A	PMLN5843A	PMMN4024A	896.000	2.96	-0.721	0.353	0.266	**0.21**	**0.16**	Lee-AB-130125-06
				899.000							
				901.000							
Assessments of the additional offered battery											
PMAF4012A	PMNN4406A	PMLN5843A	PMMN4024A	896.000	2.98	-0.660	0.325	0.246	0.19	0.14	Lee-AB-130125-07
				899.000							
				901.000							
	PMNN4409A	PMLN5843A	PMMN4024A	896.000	2.97	-0.652	0.300	0.227	0.18	0.13	Lee-AB-130125-08
				899.000							
				901.000							
	NNTN8129A	PMLN5843A	PMMN4024A	896.000	2.94	-0.629	0.298	0.225	0.18	0.13	Lee-AB-130125-09
				899.000							
				901.000							

13.3.3 Assessment at the Body with Body worn PMLN5845A:

Assessment of offered antennas with the default battery, body worn PMLN5845A, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 42 for highest output power channel.

TABLE 45

Assessments at the Body (CW mode)											
Antenna	**Battery**	**Carry Accessory**	**Cable Accessory**	**Test Freq. (MHz)**	**Initial Power (W)**	**SAR Drift (dB)**	**Meas. 1g-SAR (W/kg)**	**Meas. 10g-SAR (W/kg)**	**Max Calc. 1g-SAR (W/kg)**	**Max Calc. 10g-SAR (W/kg)**	**Run#**
PMAF4012A	PMNN4407A	PMLN5845A	PMMN4024A	896.000	2.95	-0.750	3.030	2.180	**1.83**	**1.32**	Lee-AB-130125-10
				899.000							
				901.000							
Assessments of the additional offered battery											
PMAF4012A	PMNN4406A	PMLN5845A	PMMN4024A	896.000	2.96	-0.775	2.970	2.140	1.80	1.30	Lee-AB-130125-11
				899.000							
				901.000							
	PMNN4409A	PMLN5845A	PMMN4024A	896.000	2.97	-0.784	2.280	1.650	1.38	1.00	Lee-AB-130125-12
				899.000							
				901.000							
	NNTN8129A	PMLN5845A	PMMN4024A	896.000	2.94	-0.728	2.220	1.620	1.34	0.98	Lee-AB-130125-13
				899.000							
				901.000							

13.3.4 Assessment at the Body with Body worn PMLN5839A:

Assessment of offered antennas with the default battery, body worn PMLN5839A, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 42 for highest output power channel.

TABLE 46

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4012A	PMNN4407A	PMLN5839A	PMMN4024A	896.000	2.97	-0.748	0.696	0.518	**0.42**	**0.31**	Lee-AB-130125-14
				899.000							
				901.000							
Assessments of the additional offered battery											
PMAF4012A	PMNN4406A	PMLN5839A	PMMN4024A	896.000	2.96	-0.740	0.675	0.504	0.41	0.30	Lee-AB-130125-15
				899.000							
				901.000							
	PMNN4409A	PMLN5839A	PMMN4024A	896.000	2.96	-0.667	0.553	0.415	0.33	0.25	PS-AB-130129-02
				899.000							
				901.000							
	NNTN8129A	PMLN5839A	PMMN4024A	896.000	2.93	-0.703	0.562	0.421	0.34	0.25	PS-AB-130129-03
				899.000							
				901.000							

13.3.5 Assessment at the Body with Body worn PMLN7008A:

Assessment of offered antennas with the default battery, body worn PMLN7008A, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 42 for highest output power channel.

TABLE 47

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4012A	PMNN4407A	PMLN7008A	PMMN4024A	896.000	2.98	-0.731	2.490	1.810	1.48	1.08	PS-AB-130129-04
				899.000							
				901.000							
Assessments of the additional offered battery											
PMAF4012A	PMNN4406A	PMLN7008A	PMMN4024A	896.000	2.97	-0.735	2.530	1.840	**1.51**	**1.10**	Lee-AB-130129-05
				899.000							
				901.000							
	PMNN4409A	PMLN7008A	PMMN4024A	896.000	2.97	-0.672	1.780	1.300	1.05	0.77	Lee-AB-130129-06
				899.000							
				901.000							
	NNTN8129A	PMLN7008A	PMMN4024A	896.000	2.94	-0.674	1.820	1.330	1.08	0.79	Lee-AB-130129-07
				899.000							
				901.000							

13.3.6 Assessment at the Body with Body worn PMLN4651A:

Assessment of offered antennas with the default battery, body worn PMLN4651A, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 42 for highest output power channel.

TABLE 48

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4012A	PMNN4407A	PMLN4651A	PMMN4024A	896.000	2.95	-0.740	2.570	1.860	**1.55**	**1.12**	Lee-AB-130129-08
				899.000							
				901.000							
Assessments of the additional offered battery											
PMAF4012A	PMNN4406A	PMLN4651A	PMMN4024A	896.000	2.95	-0.710	2.480	1.800	1.48	1.08	Lee-AB-130129-09
				899.000							
				901.000							
	PMNN4409A	PMLN4651A	PMMN4024A	896.000	2.96	-0.684	1.910	1.400	1.13	0.83	Lee-AB-130129-10
				899.000							
				901.000							
	NNTN8129A	PMLN4651A	PMMN4024A	896.000	2.95	-0.673	1.870	1.370	1.11	0.81	Lee-AB-130129-11
				899.000							
				901.000							

13.3.7 Assessment at the Body with Body worn RLN4570A:

Assessment of offered antennas with the default battery, body worn RLN4570A, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 42 for highest output power channel.

TABLE 49

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4012A	PMNN4407A	RLN4570A	PMMN4024A	896.000	2.96	-0.726	8.670	6.010	5.19	3.60	Lee-AB-130129-12
				899.000	2.97	-0.777	8.820	6.090	**5.33**	**3.68**	Lee-AB-130129-13
				901.000	2.94	-0.800	7.662	5.331	4.70	3.27	Lee-AB-130129-14
Assessments of the additional offered battery											
PMAF4012A	PMNN4406A	RLN4570A	PMMN4024A	896.000							
				899.000	2.96	-0.812	8.530	5.900	5.21	3.60	Lee-AB-130129-15
				901.000							
	PMNN4409A	RLN4570A	PMMN4024A	896.000							
				899.000	2.95	-0.789	7.030	4.920	4.29	3.00	Lee-AB-130129-16
				901.000							
	NNTN8129A	RLN4570A	PMMN4024A	896.000							
				899.000	2.96	-0.770	5.520	3.900	3.34	2.36	Lee-AB-130129-17
				901.000							

13.3.8 Assessment at the Body with Body worn RLN4815A:

Assessment of offered antennas with the default battery, body worn RLN4815A, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 42 for highest output power channel.

TABLE 50

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4012A	PMNN4407A	RLN4815A	PMMN4024A	896.000	2.97	-0.757	2.100	1.540	1.26	0.93	CcC-AB-130129-18
				899.000							
				901.000							
Assessments of the additional offered battery											
PMAF4012A	PMNN4406A	RLN4815A	PMMN4024A	896.000	2.94	-0.647	2.240	1.630	**1.33**	**0.97**	CcC-AB-130129-19
				899.000							
				901.000							
	PMNN4409A	RLN4815A	PMMN4024A	896.000	2.94	-0.671	1.820	1.330	1.08	0.79	CcC-AB-130129-20
				899.000							
				901.000							
	NNTN8129A	RLN4815A	PMMN4024A	896.000	2.94	-0.732	1.680	1.230	1.01	0.74	CcC-AB-130129-21
				899.000							
				901.000							

13.3.9 Assessment at the Body with Body worn HLN6602A:

Assessment of offered antennas with the default battery, body worn HLN6602A, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 42 for highest output power channel.

TABLE 51

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4012A	PMNN4407A	HLN6602A	PMMN4024A	896.000	2.97	-0.739	7.800	5.430	4.67	3.25	CcC-AB-130129-22
				899.000	2.98	-0.786	7.930	5.510	4.78	3.32	PS-AB-130130-02
				901.000	2.96	-0.795	8.272	5.721	**5.03**	**3.48**	PS-AB-130130-03
Assessments of the additional offered battery											
PMAF4012A	PMNN4406A	HLN6602A	PMMN4024A	896.000							
				899.000							
				901.000	2.96	-0.842	8.012	5.561	4.93	3.42	PS-AB-130130-04
	PMNN4409A	HLN6602A	PMMN4024A	896.000							
				899.000							
				901.000	2.94	-0.706	6.852	4.791	4.11	2.88	PS-AB-130130-05
	NNTN8129A	HLN6602A	PMMN4024A	896.000							
				899.000							
				901.000	2.95	-0.669	5.402	3.821	3.20	2.27	Lee-AB-130130-06

13.3.10 Assessment at the Body with Body worn PMLN5843A (no belt-loop) with Carry Strap NTN5243A:

Assessment of offered antennas with the default battery, body worn PMLN5843A (no belt loop) with NTN5243A carry strap, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 42 for highest output power channel.

TABLE 52

Assessments at the Body (CW mode)											
Antenna	**Battery**	**Carry Accessory**	**Cable Accessory**	**Test Freq. (MHz)**	**Initial Power (W)**	**SAR Drift (dB)**	**Meas. 1g-SAR (W/kg)**	**Meas. 10g-SAR (W/kg)**	**Max Calc. 1g-SAR (W/kg)**	**Max Calc. 10g-SAR (W/kg)**	**Run#**
PMAF4012A	PMNN4407A	PMLN5843A w/ NTN5243A Back of radio w/o belt loop	PMMN4024A	896.000	2.96	-0.700	1.080	0.796	**0.64**	**0.47**	CcC-AB-130225-13
				899.000							
				901.000							
Assessments of the additional offered battery											
PMAF4012A	PMNN4406A	PMLN5843A w/ NTN5243A Back of radio w/o belt loop	PMMN4024A	896.000	2.99	-0.740	1.080	0.804	0.64	0.48	CcC-AB-130225-14
				899.000							
				901.000							
	PMNN4409A	PMLN5843A w/ NTN5243A Back of radio w/o belt loop	PMMN4024A	896.000	2.99	-0.660	0.870	0.647	0.51	0.38	CcC-AB-130225-15
				899.000							
				901.000							
	NNTN8129A	PMLN5843A w/ NTN5243A Back of radio w/o belt loop	PMMN4024A	896.000	2.99	-0.680	0.880	0.655	0.52	0.38	CcC-AB-130225-16
				899.000							
				901.000							

13.3.11 Assessment at the Body with Body worn PMLN5845A (fixed belt-loop) with Carry Strap NTN5243A:

Assessment of offered antennas with the default battery and body worn PMLN5845A (fixed belt-loop) with NTN5243A carry strap, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 42 for highest output power channel.

TABLE 53

Assessments at the Body (CW mode)											
Antenna	**Battery**	**Carry Accessory**	**Cable Accessory**	**Test Freq. (MHz)**	**Initial Power (W)**	**SAR Drift (dB)**	**Meas. 1g-SAR (W/kg)**	**Meas. 10g-SAR (W/kg)**	**Max Calc. 1g-SAR (W/kg)**	**Max Calc. 10g-SAR (W/kg)**	**Run#**
PMAF4012A	PMNN4407A	PMLN5845A w/ NTN5243A Back of radio w/ fixed belt loop	PMMN4024A	896.000	2.99	-0.730	2.640	1.920	1.57	1.14	CcC-AB-130225-17
				899.000							
				901.000							
Assessments of the additional offered battery											
PMAF4012A	PMNN4406A	PMLN5845A w/ NTN5243A Back of radio w/ fixed belt loop	PMMN4024A	896.000	2.99	-0.720	2.730	1.980	**1.62**	**1.17**	CcC-AB-130225-18
				899.000							
				901.000							

TABLE 53

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4012A	PMNN4409A	PMLN5845A w/ NTN5243A Back of radio w/ fixed belt loop	PMMN4024A	896.000	2.99	-0.760	2.200	1.600	1.31	0.96	CcC-AB-130225-19
				899.000							
				901.000							
	NNTN8129A	PMLN5845A w/ NTN5243A Back of radio w/ fixed belt loop	PMMN4024A	896.000	2.98	-0.680	2.210	1.610	1.30	0.95	CcC-AB-130225-20
				899.000							
				901.000							

13.3.12 Assessment at the Body with Body worn PMLN5839A (fixed belt-loop) with Carry Strap NTN5243A:

Assessment of offered antennas with the default battery and body worn PMLN5839A (fixed belt-loop) with NTN5243A carry strap, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 42 for highest output power channel.

TABLE 54

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4012A	PMNN4407A	PMLN5839A w/ NTN5243A Back of radio w/ fixed belt loop	PMMN4024A	896.000	2.99	-0.780	0.845	0.630	**0.51**	**0.38**	CcC-AB-130225-21
				899.000							
				901.000							
Assessments of the additional offered battery											
PMAF4012A	PMNN4406A	PMLN5839A w/ NTN5243A Back of radio w/ fixed belt loop	PMMN4024A	896.000	2.98	-0.740	0.805	0.600	0.48	0.36	CcC-AB-130225-22
				899.000							
				901.000							
	PMNN4409A	PMLN5839A w/ NTN5243A Back of radio w/ fixed belt loop	PMMN4024A	896.000	2.98	-0.790	0.686	0.514	0.41	0.31	PS-AB-130226-02
				899.000							
				901.000							
	NNTN8129A	PMLN5839A w/ NTN5243A Back of radio w/ fixed belt loop	PMMN4024A	896.000	2.97	-0.800	0.613	0.460	0.37	0.28	PS-AB-130226-03
				899.000							
				901.000							

13.3.13 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 55

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4012A	PMNN4407A	RLN4570A	PMMN4040A	896.000							
				899.000	2.96	-0.839	9.260	6.400	**5.69**	**3.93**	Lee-AB-130130-07
				901.000							
			PMMN4050A w/ AARLN4885B	896.000							
				899.000	2.95	-0.765	6.560	4.610	3.98	2.80	Lee-AB-130130-08
				901.000							
			PMLN5101A	896.000							
				899.000	2.97	-0.802	7.340	5.140	4.46	3.12	Lee-AB-130130-09
				901.000							
			RLN5882A	896.000							
				899.000	2.96	-0.817	7.310	5.100	4.47	3.12	Lee-AB-130130-10
				901.000							
			PMLN5102A	896.000							
				899.000	2.98	-0.845	8.870	6.130	5.42	3.75	Lee-AB-130130-11
				901.000							
			RMN5058A	896.000							
				899.000	2.95	-0.907	8.860	6.110	5.55	3.83	Lee-AB-130130-12
				901.000							
			PMLN5096B	896.000							
				899.000	2.96	-0.793	8.080	5.610	4.91	3.41	Lee-AB-130130-13
				901.000							
			PMLN5275C	896.000							
				899.000	2.95	-0.774	6.900	4.830	4.19	2.94	Lee-AB-130130-14
				901.000							
			PMLN6129A	896.000							
				899.000	2.97	-0.765	7.300	5.090	4.40	3.07	Lee-AB-130130-16
				901.000							
			PMLN5097A	896.000							
				899.000	2.96	-0.780	7.540	5.250	4.57	3.18	Lee-AB-130130-17
				901.000							
			PMLN6123A	896.000							
				899.000	2.95	-0.822	7.520	5.270	4.62	3.24	CcC-AB-130130-18
				901.000							

13.3.14 Assessment of wireless BT configuration at the Body:

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

TABLE 56

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4012A	PMNN4407A	RLN4570A	NONE	896.000							
				899.000	2.99	-0.720	9.330	6.490	5.52	3.84	CcC-AB-130228-04
				901.000							

13.4 Assessment at the Body for 935-940 MHz:

The battery PMNN4407A was selected as the default battery to assess at the Body (refer to Exhibit 7B for the dimension of the battery). The conducted power measurement for all test channels within Part 90 frequency range (935-940 MHz) using the battery PMNN4407A is indicated in Table 57. 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 57

Test Freq (MHz)	Power (W)
935.000	2.92
938.000	2.93
940.000	2.90

13.4.1 Assessment at the Body with Body worn PMLN5846A:

Assessment of offered antennas with the default battery, body worn PMLN5846A, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 57 for the highest output power channel.

TABLE 58

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4012A	PMNN4407A	PMLN5846A	PMMN4024A	935.000							
				938.000	2.92	-0.859	0.200	0.149	0.13	0.09	CcC-AB-130130-19
				940.000							
Assessments of the additional offered battery											
PMAF4012A	PMNN4406A	PMLN5846A	PMMN4024A	935.000							
				938.000	2.96	-0.909	0.201	0.150	**0.13**	**0.09**	CcC-AB-130130-20
				940.000							
	PMNN4409A	PMLN5846A	PMMN4024A	935.000							
				938.000	2.96	-0.857	0.189	0.141	0.12	0.09	CcC-AB-130130-21
				940.000							
	NNTN8129A	PMLN5846A	PMMN4024A	935.000							
				938.000	2.95	-0.939	0.187	0.140	0.12	0.09	CcC-AB-130130-22
				940.000							

13.4.2 Assessment at the Body with Body worn PMLN5843A:

Assessment of offered antennas with the default battery, body worn PMLN5843A, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 57 for highest output power channel.

TABLE 59

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4012A	PMNN4407A	PMLN5843A	PMMN4024A	935.000							
				938.000	2.96	-0.979	0.198	0.148	**0.13**	**0.09**	PS-AB-130131-02
				940.000							
Assessments of the additional offered battery											
PMAF4012A	PMNN4406A	PMLN5843A	PMMN4024A	935.000							
				938.000	2.96	-0.937	0.189	0.141	0.12	0.09	PS-AB-130131-03
				940.000							
	PMNN4409A	PMLN5843A	PMMN4024A	935.000							
				938.000	2.95	-0.891	0.179	0.134	0.11	0.08	PS-AB-130131-04
				940.000							
	NNTN8129A	PMLN5843A	PMMN4024A	935.000							
				938.000	2.93	-0.835	0.179	0.134	0.11	0.08	Lee-AB-130131-05
				940.000							

13.4.3 Assessment at the Body with Body worn PMLN5845A:

Assessment of offered antennas with the default battery, body worn PMLN5845A, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 57 for highest output power channel.

TABLE 60

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4012A	PMNN4407A	PMLN5845A	PMMN4024A	935.000							
				938.000	2.96	-1.060	1.790	1.280	1.16	0.83	Lee-AB-130131-07
				940.000							
Assessments of the additional offered battery											
PMAF4012A	PMNN4406A	PMLN5845A	PMMN4024A	935.000							
				938.000	2.97	-1.040	1.810	1.290	**1.16**	**0.83**	Lee-AB-130131-09
				940.000							
	PMNN4409A	PMLN5845A	PMMN4024A	935.000							
				938.000	2.96	-0.951	1.440	1.030	0.91	0.65	Lee-AB-130131-10
				940.000							
	NNTN8129A	PMLN5845A	PMMN4024A	935.000							
				938.000	2.96	-0.911	1.420	1.020	0.89	0.64	Lee-AB-130131-11
				940.000							

13.4.4 Assessment at the Body with Body worn PMLN5839A:

Assessment of offered antennas with the default battery, body worn PMLN5839A, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 57 for highest output power channel.

TABLE 61

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4012A	PMNN4407A	PMLN5839A	PMMN4024A	935.000							
				938.000	2.97	-0.896	0.394	0.291	**0.24**	**0.18**	Lee-AB-130131-12
				940.000							
PMAF4012A	PMNN4406A	PMLN5839A	PMMN4024A	935.000							
				938.000	2.98	-0.919	0.373	0.275	0.23	0.17	Lee-AB-130131-13
				940.000							
	PMNN4409A	PMLN5839A	PMMN4024A	935.000							
				938.000	2.96	-0.852	0.318	0.235	0.20	0.14	Lee-AB-130131-14
				940.000							
	NNTN8129A	PMLN5839A	PMMN4024A	935.000							
				938.000	2.94	-0.830	0.320	0.237	0.20	0.15	Lee-AB-130131-15
				940.000							

13.4.5 Assessment at the Body with Body worn PMLN7008A:

Assessment of offered antennas with the default battery, body worn PMLN7008A, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 57 for highest output power channel.

TABLE 62

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4012A	PMNN4407A	PMLN7008A	PMMN4024A	935.000							
				938.000	2.96	-1.020	1.500	1.070	0.96	0.69	Lee-AB-130131-16
				940.000							
Assessments of the additional offered battery											
PMAF4012A	PMNN4406A	PMLN7008A	PMMN4024A	935.000							
				938.000	2.97	-1.020	1.530	1.100	**0.98**	**0.70**	CcC-AB-130131-17
				940.000							
	PMNN4409A	PMLN7008A	PMMN4024A	935.000							
				938.000	2.95	-0.994	1.160	0.839	0.74	0.54	CcC-AB-130131-18
				940.000							
	NNTN8129A	PMLN7008A	PMMN4024A	935.000							
				938.000	2.96	-0.955	1.150	0.828	0.73	0.52	CcC-AB-130131-19
				940.000							

13.4.6 Assessment at the Body with Body worn PMLN4651A:

Assessment of offered antennas with the default battery, body worn PMLN4651A, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 57 for highest output power channel.

TABLE 63

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4012A	PMNN4407A	PMLN4651A	PMMN4024A	935.000							
				938.000	2.97	-0.959	1.580	1.130	1.00	0.71	CcC-AB-130131-20
				940.000							
Assessments of the additional offered battery											
PMAF4012A	PMNN4406A	PMLN4651A	PMMN4024A	935.000							
				938.000	2.95	-0.962	1.590	1.140	**1.01**	**0.72**	CcC-AB-130131-21
				940.000							
	PMNN4409A	PMLN4651A	PMMN4024A	935.000							
				938.000	2.94	-0.806	1.230	0.886	0.76	0.54	CcC-AB-130131-22
				940.000							
	NNTN8129A	PMLN4651A	PMMN4024A	935.000							
				938.000	2.95	-1.010	1.200	0.867	0.77	0.56	PS-AB-130201-02
				940.000							

13.4.7 Assessment at the Body with Body worn RLN4570A:

Assessment of offered antennas with the default battery, body worn RLN4570A, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 57 for highest output power channel.

TABLE 64

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4012A	PMNN4407A	RLN4570A	PMMN4024A	935.000							
				938.000	2.97	-1.040	5.800	3.930	**3.72**	**2.52**	PS-AB-130201-03
				940.000							
Assessments of the additional offered battery											
PMAF4012A	PMNN4406A	RLN4570A	PMMN4024A	935.000							
				938.000	2.97	-1.090	5.720	3.890	3.71	2.53	PS-AB-130201-04
				940.000							
	PMNN4409A	RLN4570A	PMMN4024A	935.000							
				938.000	2.95	-1.070	4.740	3.270	3.08	2.13	PS-AB-130201-05
				940.000							
	NNTN8129A	RLN4570A	PMMN4024A	935.000							
				938.000	2.94	-1.030	4.290	2.970	2.77	1.92	PS-AB-130201-06
				940.000							

13.4.8 Assessment at the Body with Body worn RLN4815A:

Assessment of offered antennas with the default battery, body worn RLN4815A, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 57 for highest output power channel.

TABLE 65

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4012A	PMNN4407A	RLN4815A	PMMN4024A	935.000							
				938.000	2.96	-1.020	1.330	0.954	**0.85**	**0.61**	PS-AB-130201-07
				940.000							
Assessments of the additional offered battery											
PMAF4012A	PMNN4406A	RLN4815A	PMMN4024A	935.000							
				938.000	2.97	-1.060	1.310	0.940	0.84	0.61	PS-AB-130201-08
				940.000							
	PMNN4409A	RLN4815A	PMMN4024A	935.000							
				938.000	2.96	-0.961	1.160	0.838	0.73	0.53	PS-AB-130201-09
				940.000							
	NNTN8129A	RLN4815A	PMMN4024A	935.000							
				938.000	2.96	-0.974	1.150	0.828	0.73	0.53	PS-AB-130201-10
				940.000							

13.4.9 Assessment at the Body with Body worn HLN6602A:

Assessment of offered antennas with the default battery, body worn HLN6602A, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 57 for highest output power channel.

TABLE 66

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4012A	PMNN4407A	HLN6602A	PMMN4024A	935.000							
				938.000	2.97	-1.030	5.430	3.710	3.48	2.38	Lee-AB-130201-11
				940.000							
Assessments of the additional offered battery											
PMAF4012A	PMNN4406A	HLN6602A	PMMN4024A	935.000							
				938.000	2.96	-1.070	5.440	3.720	**3.53**	**2.41**	Lee-AB-130201-12
				940.000							
	PMNN4409A	HLN6602A	PMMN4024A	935.000							
				938.000	2.98	-0.972	3.380	2.370	2.13	1.49	Lee-AB-130201-13
				940.000							
	NNTN8129A	HLN6602A	PMMN4024A	935.000							
				938.000	2.94	-0.944	3.320	2.330	2.11	1.48	Lee-AB-130201-14
				940.000							

13.4.10 Assessment at the Body with Body worn PMLN5843A (no belt-loop) with Carry Strap NTN5243A:

Assessment of offered antennas with the default battery, body worn PMLN5843A (no belt-loop) with NTN5243A carry strap, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 57 for highest output power channel.

TABLE 67

Assessments at the Body (CW mode)											
Antenna	**Battery**	**Carry Accessory**	**Cable Accessory**	**Test Freq. (MHz)**	**Initial Power (W)**	**SAR Drift (dB)**	**Meas. 1g-SAR (W/kg)**	**Meas. 10g-SAR (W/kg)**	**Max Calc. 1g-SAR (W/kg)**	**Max Calc. 10g-SAR (W/kg)**	**Run#**
PMAF4012A	PMNN4407A	PMLN5843A w/ NTN5243A Back of radio w/o belt loop	PMMN4024A	935.000							
				938.000	2.96	-1.090	0.566	0.414	**0.37**	**0.27**	PS-AB-130204-20
				940.000							
Assessments of the additional offered battery											
PMAF4012A	PMNN4406A	PMLN5843A w/ NTN5243A Back of radio w/o belt loop	PMMN4024A	935.000							
				938.000	2.99	-0.850	0.565	0.411	0.34	0.25	PS-AB-130226-04
				940.000							
	PMNN4409A	PMLN5843A w/ NTN5243A Back of radio w/o belt loop	PMMN4024A	935.000							
				938.000	2.99	-0.710	0.452	0.332	0.27	0.20	PS-AB-130226-05
				940.000							
	NNTN8129A	PMLN5843A w/ NTN5243A Back of radio w/o belt loop	PMMN4024A	935.000							
				938.000	2.97	-0.420	0.519	0.382	0.29	0.21	PS-AB-130226-07
				940.000							

13.4.11 Assessment at the Body with Body worn PMLN5845A (fixed belt-loop) with Carry Strap NTN5243A:

Assessment of offered antennas with the default battery and body worn PMLN5845A (fixed belt-loop) with NTN5243A carry strap, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 57 for highest output power channel.

TABLE 68

Assessments at the Body (CW mode)											
Antenna	**Battery**	**Carry Accessory**	**Cable Accessory**	**Test Freq. (MHz)**	**Initial Power (W)**	**SAR Drift (dB)**	**Meas. 1g-SAR (W/kg)**	**Meas. 10g-SAR (W/kg)**	**Max Calc. 1g-SAR (W/kg)**	**Max Calc. 10g-SAR (W/kg)**	**Run#**
PMAF4012A	PMNN4407A	PMLN5845A w/ NTN5243A Back of radio w/ fixed belt loop	PMMN4024A	935.000							
				938.000	2.96	-1.090	1.380	0.988	**0.90**	**0.64**	PS-AB-130204-21
				940.000							
Assessments of the additional offered battery											
PMAF4012A	PMNN4406A	PMLN5845A w/ NTN5243A Back of radio w/ fixed belt loop	PMMN4024A	935.000							
				938.000	2.97	-0.630	1.520	1.100	0.89	0.64	PS-AB-130226-09
				940.000							

TABLE 68

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4012A	PMNN4409A	PMLN5845A w/ NTN5243A Back of radio w/ fixed belt loop	PMMN4024A	935.000							
				938.000	2.98	-0.710	1.370	0.992	0.81	0.59	CcC-AB-130226-11
				940.000							
	NNTN8129A	PMLN5845A w/ NTN5243A Back of radio w/ fixed belt loop	PMMN4024A	935.000							
				938.000	2.98	-1.020	1.270	0.916	0.81	0.58	CcC-AB-130226-12
				940.000							

13.4.12 Assessment at the Body with Body worn PMLN5839A (fixed belt-loop) with Carry Strap NTN5243A:

Assessment of offered antennas with the default battery and body worn PMLN5839A (fixed belt-loop) with NTN5243A carry strap, and additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to Table 57 for highest output power channel.

TABLE 69

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4012A	PMNN4407A	PMLN5839A w/ NTN5243A Back of radio w/fixed belt loop	PMMN4024A	935.000							
				938.000	2.98	-0.911	0.426	0.313	**0.26**	**0.19**	CcC-AB-130205-02
				940.000							
Assessments of the additional offered battery											
PMAF4012A	PMNN4406A	PMLN5839A w/ NTN5243A Back of radio w/ fixed belt loop	PMMN4024A	935.000							
				938.000	2.99	-0.900	0.424	0.313	0.26	0.19	CcC-AB-130226-13
				940.000							
	PMNN4409A	PMLN5839A w/ NTN5243A Back of radio w/ fixed belt loop	PMMN4024A	935.000							
				938.000	2.99	-0.820	0.373	0.276	0.23	0.17	CcC-AB-130226-14
				940.000							
	NNTN8129A	PMLN5839A w/ NTN5243A Back of radio w/ fixed belt loop	PMMN4024A	935.000							
				938.000	2.99	-0.820	0.379	0.280	0.23	0.17	CcC-AB-130226-15
				940.000							

13.4.13 Assessment of other audio accessories at the body:

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

13.4.14 Assessment of wireless BT configuration at the Body:

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

TABLE 70

Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4012A	PMNN4407A	RLN4570A	NONE	935.000							
				938.000	2.96	-0.620	7.110	4.860	4.16	2.84	PS-AB-130329-04
				940.000							

13.5 Assessment at the Face for 806-824 MHz:

The battery NNTN8129A was selected as the default battery. The conducted power measurement for all test channels within Part 90 frequency range (806-824 MHz) using battery NNTN8129A is listed in Table 71. 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 71

Test Freq (MHz)	Power (W)
806.000	2.91
815.500	2.92
824.000	2.90

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 71 for highest output power channel.

TABLE 72

Assessments at the Face (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4011A	NNTN8129A	NONE	NONE	806.000							
				815.500	2.91	-0.405	1.931	1.415	1.09	0.80	PS-FACE-130123-18
				824.000							
Assessments of the additional offered battery											
PMAF4011A	PMNN4409A	NONE	NONE	806.000							
				815.500	2.91	-0.407	2.011	1.475	**1.14**	**0.84**	PS-FACE-130123-19
				824.000							
	PMNN4407A	NONE	NONE	806.000							
				815.500	2.93	-0.451	1.880	1.374	1.07	0.78	PS-FACE-130123-20
				824.000							
	PMNN4406A	NONE	NONE	806.000							
				815.500	2.96	-0.481	1.870	1.374	1.06	0.78	PS-FACE-130123-21
				824.000							

13.6 Assessment at the Face for 851-869 MHz:

The battery NNTN8129A was selected as the default battery. The conducted power measurement for all test channels within Part 90 frequency range (851-869 MHz) using battery NNTN8129A is listed in Table 73. 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 73

Test Freq (MHz)	Power (W)
851.000	2.89
860.500	2.89
869.000	2.87

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 73 for highest output power channel.

TABLE 74

Assessments at the Face (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4011A	NNTN8129A	NONE	NONE	851.000	2.91	-0.580	1.530	1.110	**0.90**	**0.65**	Lee-FACE-130123-14
				860.500							
				869.000							
Assessments of the additional offered battery											
PMAF4011A	PMNN4409A	NONE	NONE	851.000	2.95	-0.629	1.530	1.110	0.90	0.65	Lee-FACE-130123-15
				860.500							
				869.000							
	PMNN4407A	NONE	NONE	851.000	2.94	-0.634	1.450	1.060	0.86	0.63	PS-FACE-130123-16
				860.500							
				869.000							
	PMNN4406A	NONE	NONE	851.000	2.94	-0.655	1.490	1.080	0.88	0.64	PS-FACE-130123-17
				860.500							
				869.000							

13.7 Assessment at the Face for 896-901 MHz:

The battery NNTN8129A was selected as the default battery. The conducted power measurement for all test channels within Part 90 frequency range (896-901 MHz) using battery NNTN8129A is listed in Table 75. 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 75

Test Freq (MHz)	Power (W)
896.000	2.93
899.000	2.93
901.000	2.88

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 75 for highest output power channel.

TABLE 76

Assessments at the Face (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4012A	NNTN8129A	NONE	NONE	896.000	2.96	-0.557	2.680	1.920	1.54	1.11	CcC-FACE-130204-02
				899.000							
				901.000							
Assessments of the additional offered battery											
PMAF4012A	PMNN4409A	NONE	NONE	896.000	2.98	-0.542	2.830	2.030	1.61	1.16	CcC-FACE-130204-03
				899.000							
				901.000							
	PMNN4407A	NONE	NONE	896.000	2.98	-0.562	2.800	2.010	1.60	1.15	CcC-FACE-130204-04
				899.000							
				901.000							
	PMNN4406A	NONE	NONE	896.000	2.96	-0.593	2.900	2.070	**1.68**	**1.20**	CcC-FACE-130204-05
				899.000							
				901.000							

13.8 Assessment at the Face for 935-940 MHz:

The battery NNTN8129A was selected as the default battery. The conducted power measurement for all test channels within Part 90 frequency range (935-940 MHz) using battery NNTN8129A is listed in Table 77. 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 77

Test Freq (MHz)	Power (W)
935.000	2.91
938.000	2.89
940.000	2.90

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 77 for highest output power channel.

TABLE 78

Assessments at the Face (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4012A	NNTN8129A	NONE	NONE	935.000	2.95	-0.852	1.840	1.310	1.14	0.81	CcC-FACE-130204-06
				938.000							
				940.000							
Assessments of the additional offered battery											
PMAF4012A	PMNN4409A	NONE	NONE	935.000	2.96	-0.976	1.810	1.290	1.15	0.82	CcC-FACE-130204-07
				938.000							
				940.000							

TABLE 78

Assessments at the Face (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
PMAF4012A	PMNN4407A	NONE	NONE	935.000	2.96	-0.950	1.860	1.320	1.17	0.83	CcC-FACE-130204-08
				938.000							
				940.000							
	PMNN4406A	NONE	NONE	935.000	2.95	-1.070	1.860	1.320	**1.21**	**0.86**	CcC-FACE-130204-09
				938.000							
				940.000							

13.9 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 (806-824 MHz, 851-869 MHz, 896-901 MHz, and 935-940 MHz) as the testing performed is in compliance with Industry Canada frequency range.

13.10 Assessment for Bluetooth

The DUT was tested at the center of the BT band using the highest overall SAR configuration from each of the primary bands (806-825MHz, 851-870MHz, 896-902MHz, and 935-941MHz) without the audio accessory cable attached. The highest SAR result from the table below (bolded) is included in Appendix E-G.

TABLE 79

BT Assessments at the Body (CW mode)											
Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Initial Power (W)	SAR Drift (dB)	Meas. 1g-SAR (W/kg)	Meas. 10g-SAR (W/kg)	Max Calc. 1g-SAR (W/kg)	Max Calc. 10g-SAR (W/kg)	Run#
806-825 MHz											
BT and PMAF4011A	PMNN4406A	HLN6602A	NONE	2441.000	0.01	0.26	0.00638	0.00311	0.004	0.002	CcC-AB-130326-02
851-870 MHz											
BT and PMAF4011A	PMNN4407A	RLN4570A	NONE	2441.000	0.01	-0.46	0.00747	0.00352	**0.006**	**0.003**	CcC-AB-130326-03
896-902 MHz											
BT and PMAF4012A	PMNN4407A	RLN4570A	NONE	2441.000	0.01	-0.55	0.00682	0.00295	0.006	0.003	CcC-AB-130226-17
935-941 MHz*											
BT and PMAF4012A	PMNN4407A	RLN4570A	NONE	2441.000	0.01	-0.55	0.00682	0.00295	0.006	0.003	CcC-AB-130226-17

* Bands 896-902MHz and 935-941MHz have the same configurations.

13.11 Shorten Scan Assessment:

A "shortened" scan using the highest SAR configuration overall from above was performed to validate the SAR drift of the full DASY4™ coarse and zoom scans. Note that the shortened scan represents the zoom scan performance result; this is obtained by first running a coarse scan to find the peak area and then, using a newly charged battery, a zoom scan only was performed. The results of the shortened cube scan presented in APPENDIX E demonstrate that the scaling methodology used to determine the calculated SAR results presented herein are valid. The both SAR results from the table below are provided in Appendix E.

TABLE 80

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											
PMAF4012A	PMNN4407A	RLN4570A	PMMN4040A	899.000	2.96	-0.839	9.260	6.400	5.62	3.88	Lee-AB-130130-07
Shorten scan											
PMAF4012A	PMNN4407A	RLN4570A	PMMN4040A	899.000	2.97	-0.467	10.755	7.403	5.99	4.12	PS-AB-130205-13

13.12 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 81

Run#	Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq. (MHz)	Adj Calc. 1g-SAR (W/kg)	Ratio	Comments
Lee-AB-130130-07 (Table 80, full scan)	PMAF4012A	PMNN4407A	RLN4570A	PMMN4040A	899.000	5.62	1.07	No additional repeated scans is required due to the Ratio (SAR_{high}/SAR_{low}) < 1.10
PS-AB-130205-13 (Table 80, shorten scan)						5.99		

14.0 Simultaneous Transmission:

Simultaneous Transmission applies. See section 15.0.

15.0 Conclusion:

Based on the test guidelines from KDB 643646 and satisfying 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 82

Designator	Frequency band (MHz)	BODY				FACE	
		Max Calc (W/kg)		Simultaneous Calc (W/kg)		Max Calc (W/kg)	
		1g-SAR	10g-SAR	1g-SAR	10g-SAR	1g-SAR	10g-SAR
Overall	806-825	4.13	2.90	4.13	2.90	1.14	0.84
	851-870	3.27	2.31	3.28	2.31	0.90	0.65
	896-902	5.69	3.93	5.70	3.94	1.68	1.20
	935-941	4.16	2.84	4.16	2.84	1.21	0.86
FCC / Industry Canada	806-824	4.13	2.90	4.13	2.90	1.14	0.84
	851-869	3.27	2.31	3.28	2.31	0.90	0.65
	896-901	5.69	3.93	5.70	3.94	1.68	1.20
	935-940	4.16	2.84	4.16	2.84	1.21	0.86

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 800MHz to 3GHz and for Dipole test frequencies ranging from 800MHz to 3GHz. Therefore, the highest tolerance for the probe calibration uncertainty is indicated.

Table 1:
Uncertainty Budget for Device Under Test, for 800 MHz to 3 GHz

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*	*k*
Uncertainty Component	*IEEE 1528 section*	**Tol. (± %)**	**Prob Dist**	**Div.**	**c_i (1 g)**	**c_i (10 g)**	**1 g u_i (±%)**	**10 g u_i (±%)**	**v_i**
Measurement System									
Probe Calibration	E.2.1	6.0	N	1.00	1	1	6.6	6.6	∞
Axial Isotropy	E.2.2	4.7	R	1.73	0.707	0.707	1.9	1.9	∞
Hemispherical Isotropy	E.2.2	9.6	R	1.73	0.707	0.707	3.9	3.9	∞
Boundary Effect	E.2.3	1.0	R	1.73	1	1	0.6	0.6	∞
Linearity	E.2.4	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1.0	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	0.3	N	1.00	1	1	0.3	0.3	∞
Response Time	E.2.7	1.1	R	1.73	1	1	0.6	0.6	∞
Integration Time	E.2.8	1.1	R	1.73	1	1	0.6	0.6	∞
RF Ambient Conditions - Noise	E.6.1	3.0	R	1.73	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	E.6.1	0.0	R	1.73	1	1	0.0	0.0	∞
Probe Positioner Mech. Tolerance	E.6.2	0.4	R	1.73	1	1	0.2	0.2	∞
Probe Positioning w.r.t Phantom	E.6.3	1.4	R	1.73	1	1	0.8	0.8	∞
Max. SAR Evaluation (ext., int., avg.)	E.5	3.4	R	1.73	1	1	2.0	2.0	∞
Test sample Related									
Test Sample Positioning	E.4.2	3.2	N	1.00	1	1	3.2	3.2	29
Device Holder Uncertainty	E.4.1	4.0	N	1.00	1	1	4.0	4.0	8
SAR drift	6.6.2	5.0	R	1.73	1	1	2.9	2.9	∞
Phantom and Tissue Parameters									
Phantom Uncertainty	E.3.1	4.0	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity (target)	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (measurement)	E.3.3	3.3	N	1.00	0.64	0.43	2.1	1.4	∞
Liquid Permittivity (target)	E.3.2	5.0	R	1.73	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (measurement)	E.3.3	1.9	N	1.00	0.6	0.49	1.1	0.9	∞
Combined Standard Uncertainty			RSS				11	11	472
Expanded Uncertainty (95% CONFIDENCE LEVEL)			*k*=2				23	22	

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Table 2:
Uncertainty Budget for System Verification (dipole & flat phantom) for 800 MHz to 3 GHz

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*	*k*
Uncertainty Component	**IEEE 1528 section**	**Tol. (± %)**	**Prob. Dist.**	**Div.**	**c_i (1 g)**	**c_i (10 g)**	**1 g u_i (±%)**	**10 g u_i (±%)**	**v_i**
Measurement System									
Probe Calibration	E.2.1	6.0	N	1.00	1	1	6.6	6.6	∞
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	18	

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
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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: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	166.4	±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

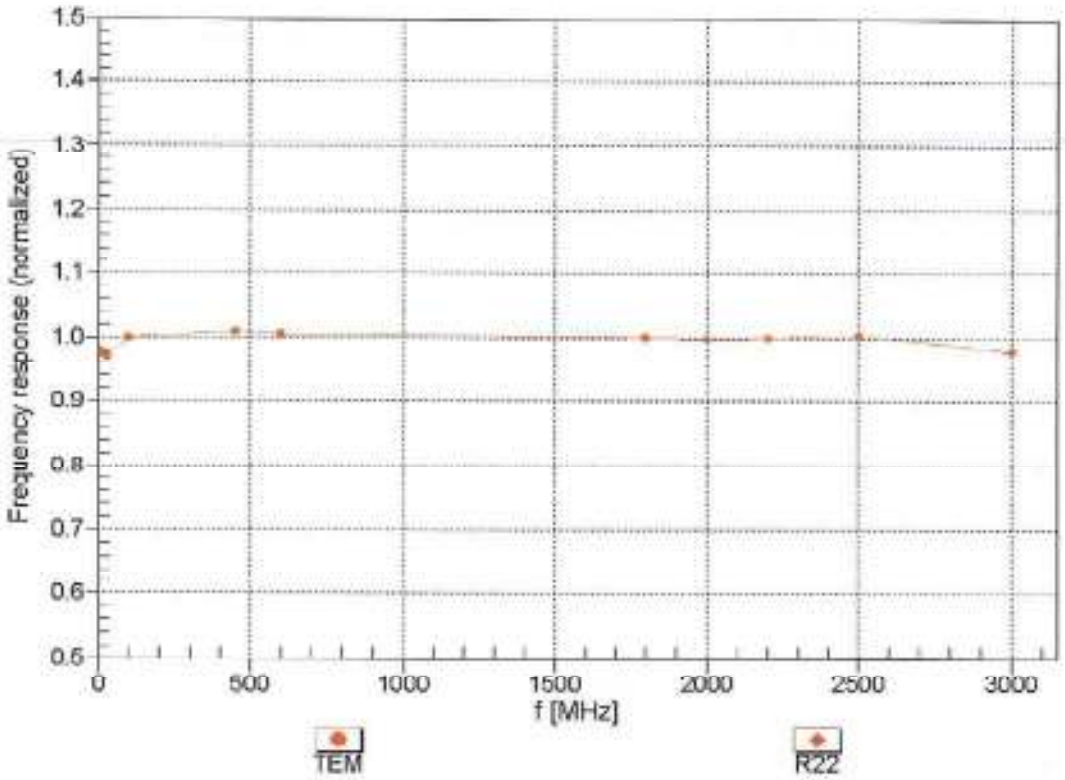
f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
300	58.2	0.92	6.56	6.56	6.56	0.22	1.78	± 13.4 %
450	56.7	0.94	6.79	6.79	6.79	0.11	1.15	± 13.4 %
750	55.5	0.96	5.91	5.91	5.91	0.46	1.45	± 12.0 %
900	55.0	1.05	5.82	5.82	5.82	0.77	1.17	± 12.0 %
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

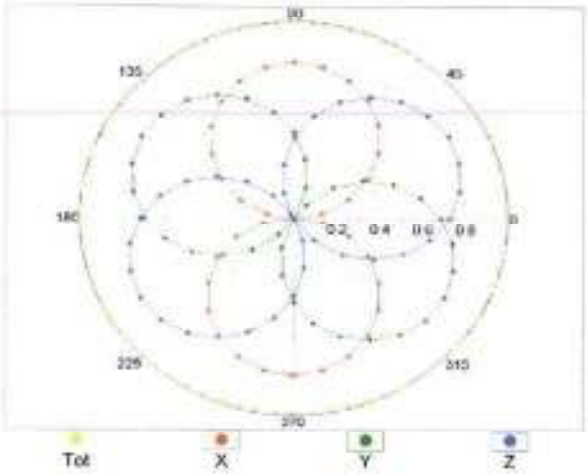
(TEM-Cell:ifi110 EXX, Waveguide: R22)



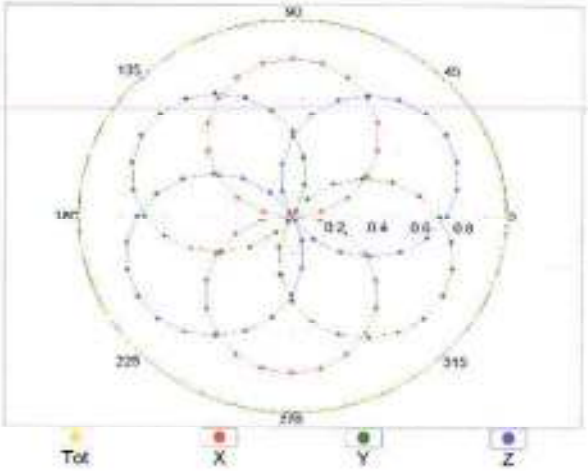
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

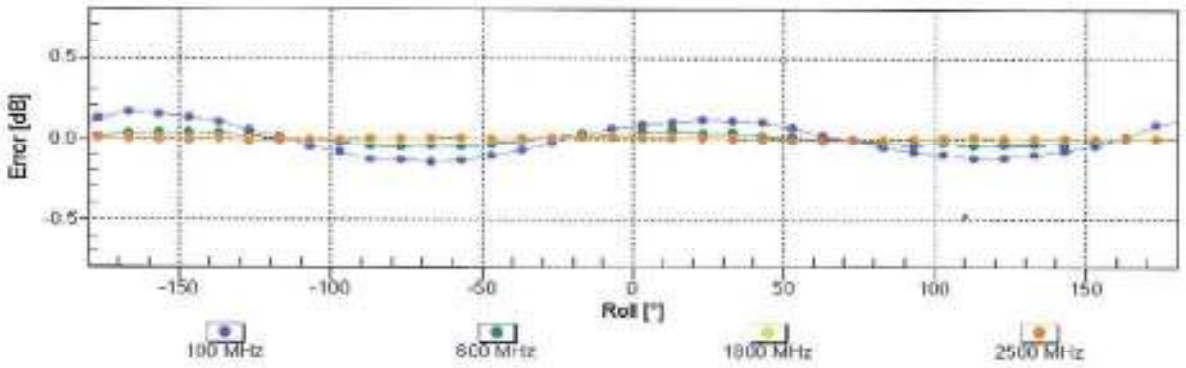
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



f=1800 MHz,R22

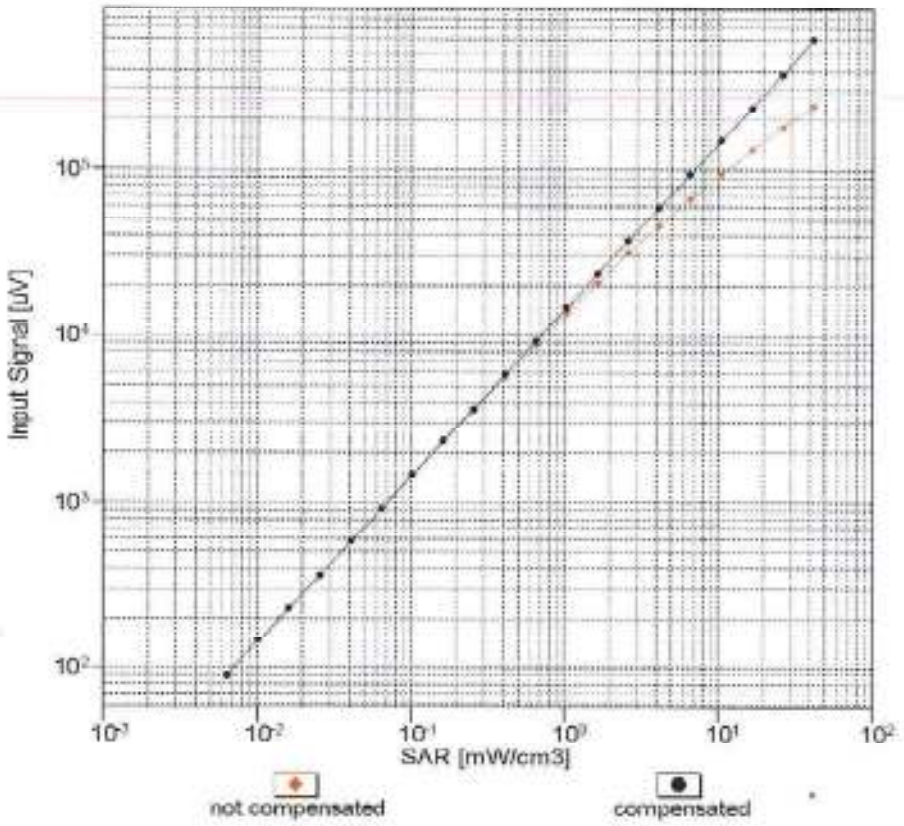


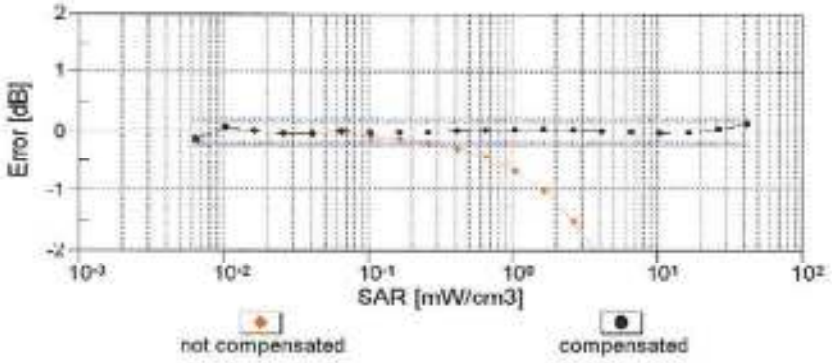


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

(TEM cell , f = 900 MHz)



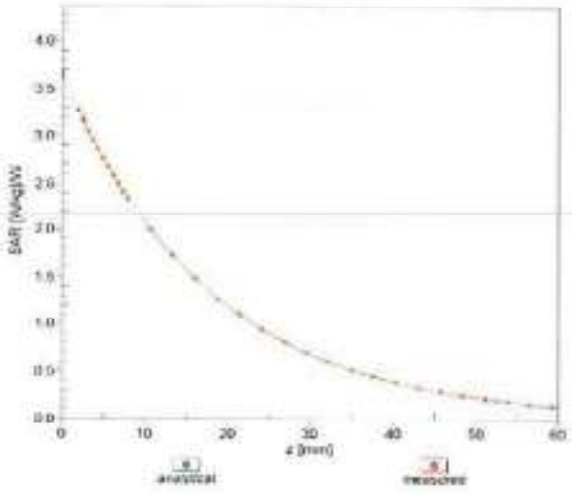


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

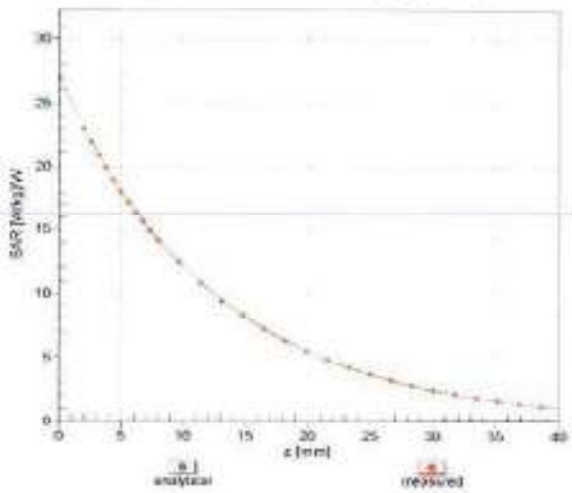
ES3DV3– SN:3096 November 13, 2012

Conversion Factor Assessment

f = 900 MHz,WGLS R9 (H_convF)

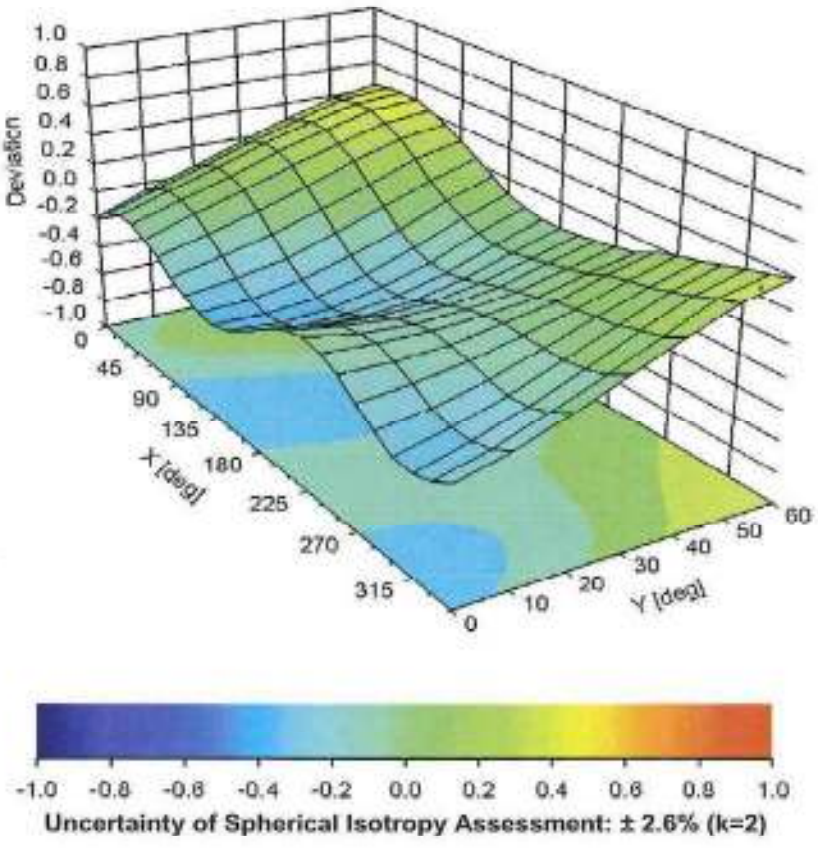


f = 1810 MHz,WGLS R22 (H_convF)



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

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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

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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.

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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

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

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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

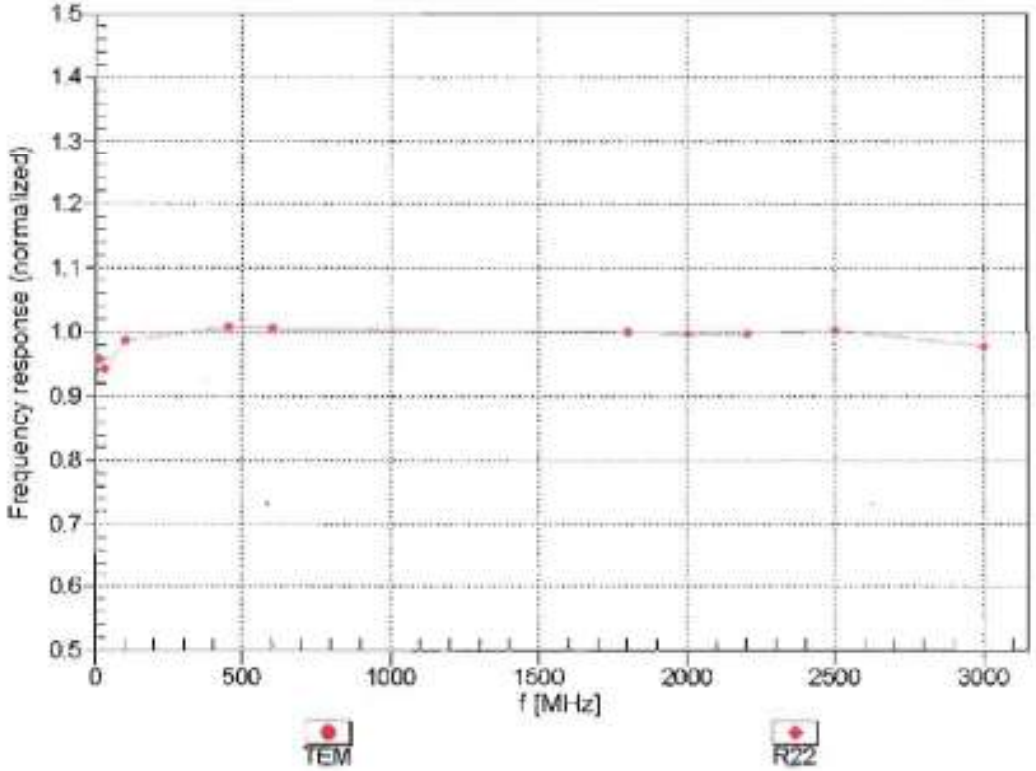
f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
300	58.2	0.92	6.58	6.58	6.58	0.23	1.88	± 13.4 %
450	56.7	0.94	6.82	6.82	6.82	0.09	1.00	± 13.4 %
750	55.5	0.96	6.19	6.19	6.19	0.29	1.92	± 12.0 %
900	55.0	1.05	6.06	6.06	6.06	0.38	1.60	± 12.0 %
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.

Frequency Response of E-Field

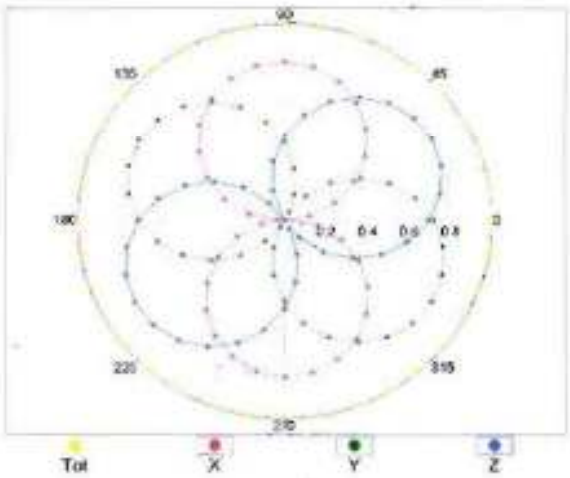
(TEM-Cell:ifi110 EXX, Waveguide: R22)



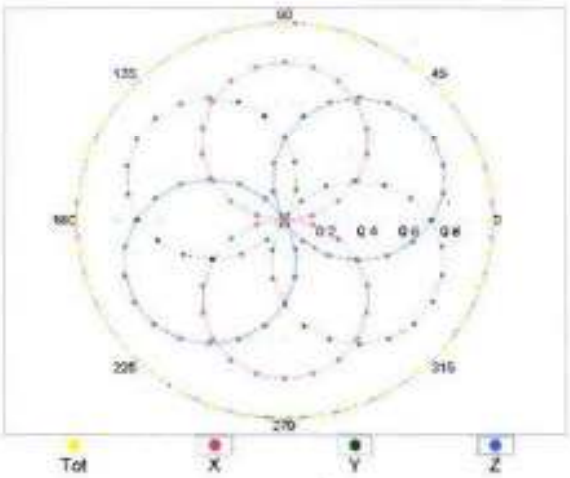
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

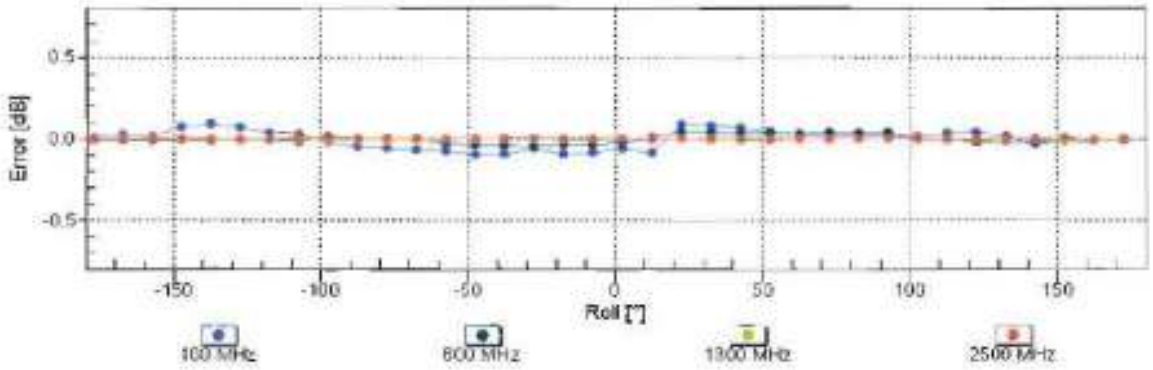
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



f=1800 MHz,R22

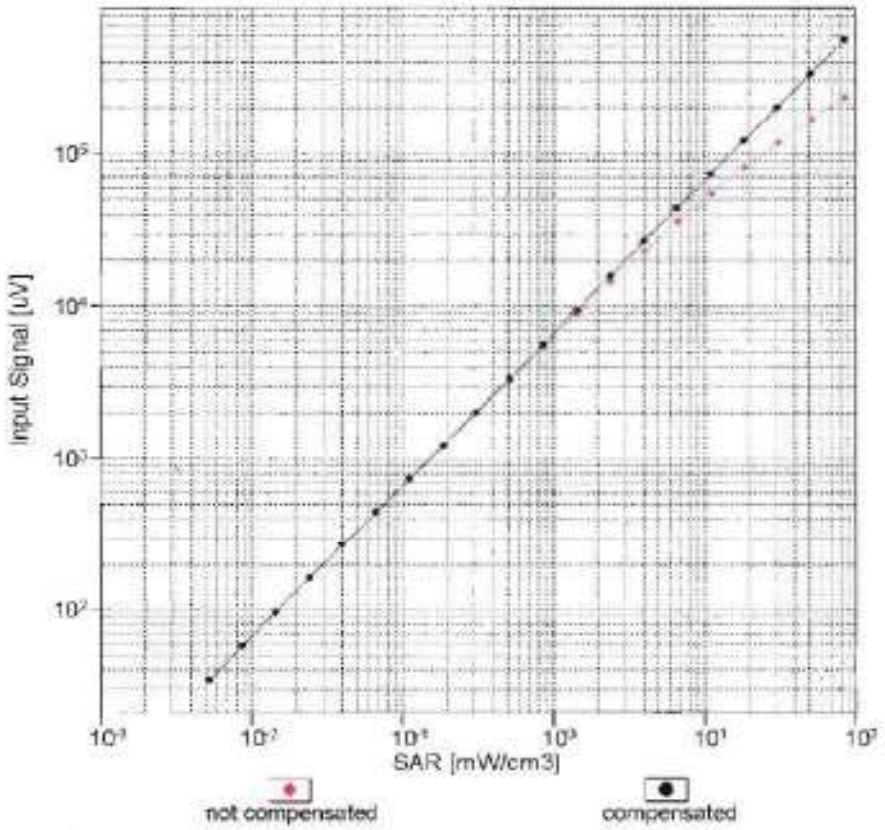


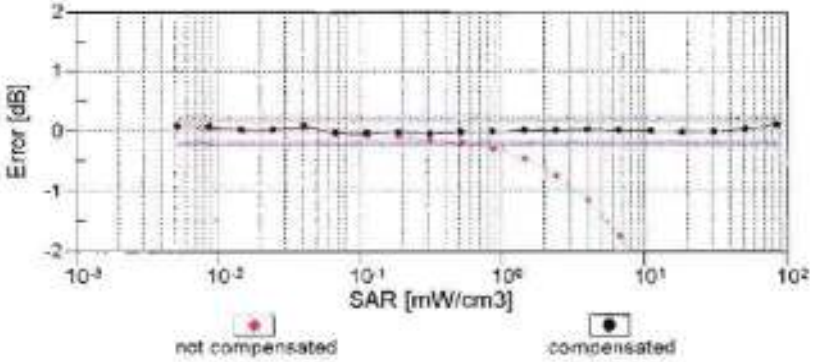


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

(TEM cell , f = 900 MHz)

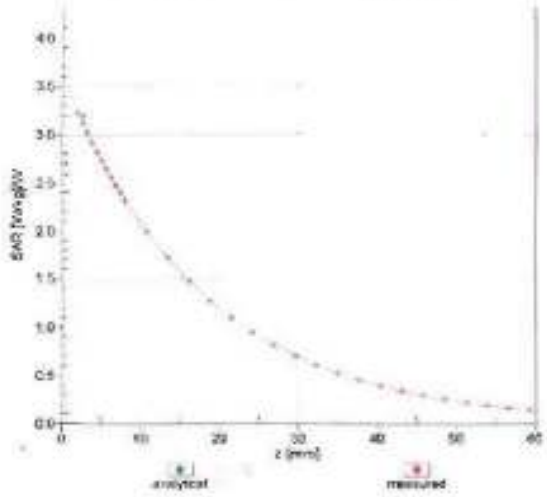




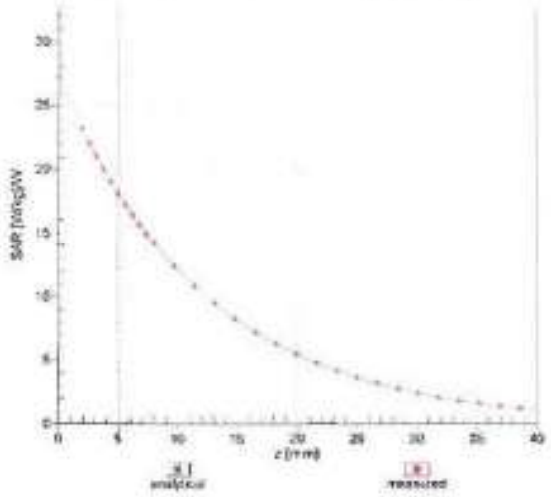
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 900 MHz,WGLS R9 (H_convF)

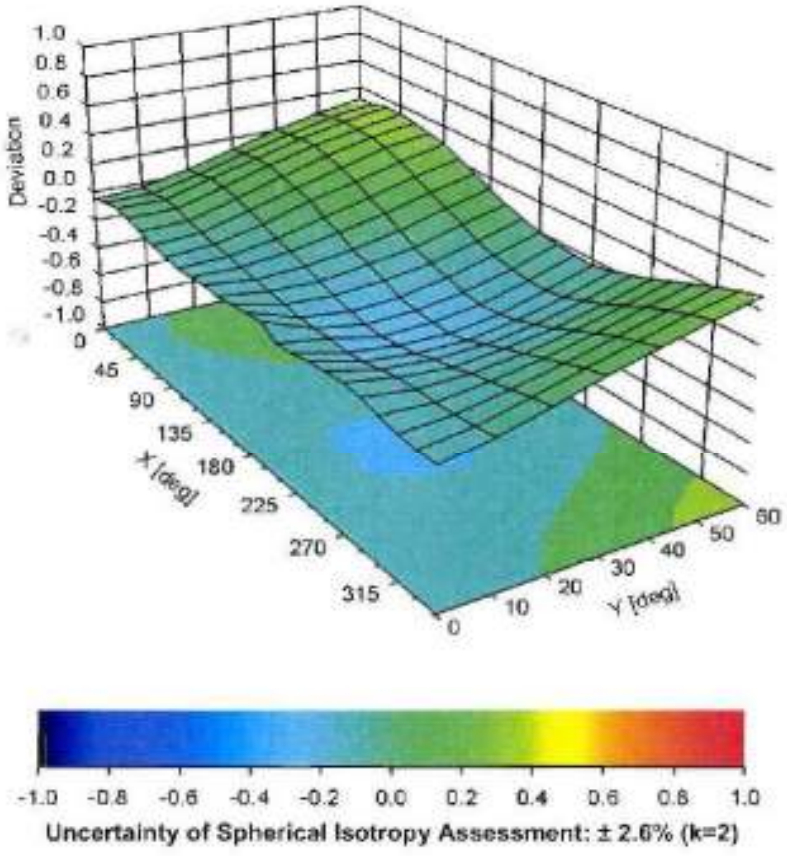


f = 1810 MHz,WGLS R22 (H_convF)



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:3122

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	22.4
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

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Additional Conversion Factors

for Dosimetric E-Field Probe

Type:	**ES3DV3**
Serial Number:	**3122**
Place of Assessment:	**Zurich**
Date of Assessment:	**April 28, 2012**
Probe Calibration Date:	**April 26, 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 MHz or 1810 MHz.

Assessed by:

Schmid & Partner Engineering AG

s p e a g

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info@speag.com, http://www.speag.com

Dosimetric E-Field Probe ES3DV3 SN:3122

Conversion factor (+ standard deviation)

150 ± 50 MHz	*ConvF*	8.5 ± 10%	ε_r = 52.3 ± 5% σ = 0.76 ± 5% mho/m (head tissue)
250 ± 50 MHz	*ConvF*	7.9 ± 10%	ε_r = 47.6 ± 5% σ = 0.83 ± 5% mho/m (head tissue)
150 ± 50 MHz	*ConvF*	8.2 ± 10%	ε_r = 61.9 ± 5% σ = 0.80 ± 5% mho/m (body tissue)
250 ± 50 MHz	*ConvF*	7.7 ± 10%	ε_r = 59.4 ± 5% σ = 0.88 ± 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

Schweizerischer Kalibrierdienst
Service suisse d'étalonnage
Servizio svizzero di taratura
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: **ES3-3274_Nov12**

CALIBRATION CERTIFICATE

Object **ES3DV3 - SN:3274**

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. 217-01501)	Apr-13
Reference 30 dB Attenuator	SN: A5056 (30b)	27-Mar-12 (No. 217-01502)	Apr-13
Reference 30 dB Attenuator	SN: 66136 (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 Rastoli	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: November 14, 2012

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

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 E²-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:3274

Manufactured: February 25, 2010
Calibrated: November 13, 2012

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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3274

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.22	1.13	1.19	± 10.1 %
DCP (mV)[B]	99.7	99.3	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	151.5	±3.8 %
			Y	0.0	0.0	1.0	148.1	
			Z	0.0	0.0	1.0	152.3	

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:3274

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	7.05	7.05	7.05	0.26	1.08	± 13.4 %
450	43.5	0.87	6.50	6.50	6.50	0.16	1.89	± 13.4 %
750	41.9	0.89	6.39	6.39	6.39	0.30	1.97	± 12.0 %
900	41.5	0.97	6.13	6.13	6.13	0.63	1.27	± 12.0 %
1810	40.0	1.40	5.20	5.20	5.20	0.45	1.51	± 12.0 %
1950	40.0	1.40	4.98	4.98	4.98	0.51	1.52	± 12.0 %
2300	39.5	1.67	4.81	4.81	4.81	0.80	1.19	± 12.0 %
2450	39.2	1.80	4.53	4.53	4.53	0.62	1.47	± 12.0 %
2600	39.0	1.96	4.32	4.32	4.32	0.79	1.32	± 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:3274

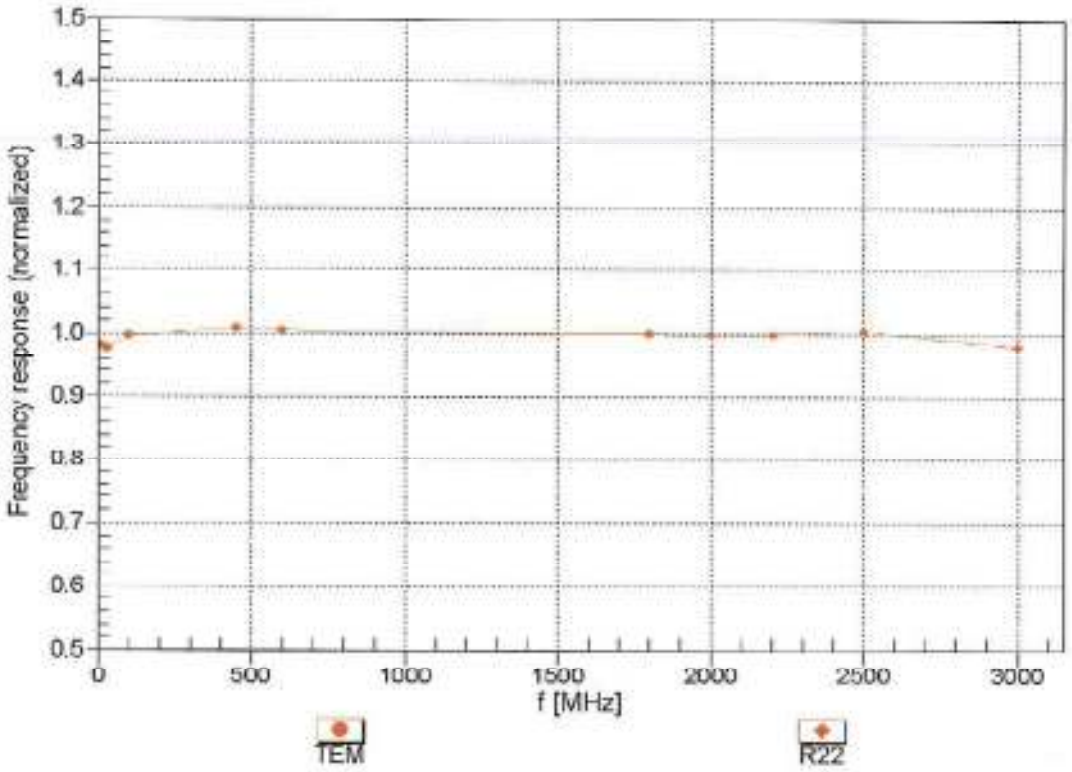
Calibration Parameter Determined in Body Tissue Simulating Media

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	6.72	6.72	6.72	0.22	1.77	± 13.4 %
450	56.7	0.94	7.02	7.02	7.02	0.10	1.15	± 13.4 %
750	55.5	0.96	6.13	6.13	6.13	0.80	1.15	± 12.0 %
900	55.0	1.05	5.98	5.98	5.98	0.44	1.66	± 12.0 %
1810	53.3	1.52	4.89	4.89	4.89	0.52	1.51	± 12.0 %
1950	53.3	1.52	4.82	4.82	4.82	0.45	1.72	± 12.0 %
2300	52.9	1.81	4.44	4.44	4.44	0.76	1.29	± 12.0 %
2450	52.7	1.95	4.27	4.27	4.27	0.80	1.14	± 12.0 %
2600	52.5	2.16	4.05	4.05	4.05	0.80	1.07	± 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:3274 November 13, 2012

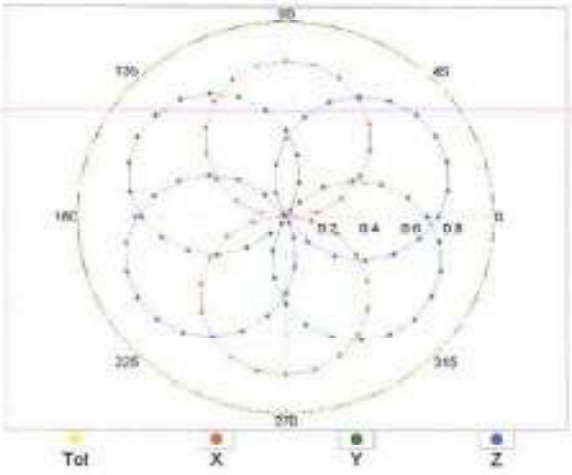
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



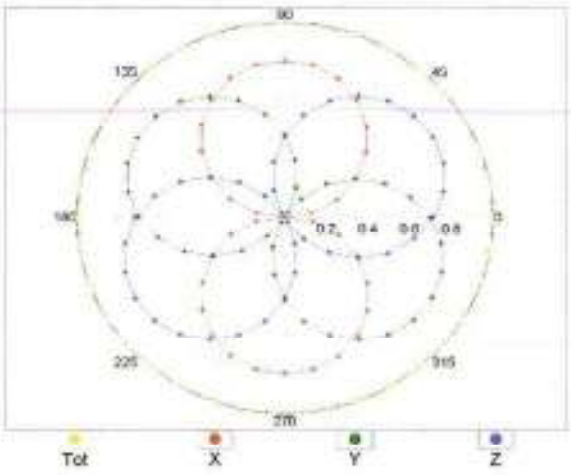
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

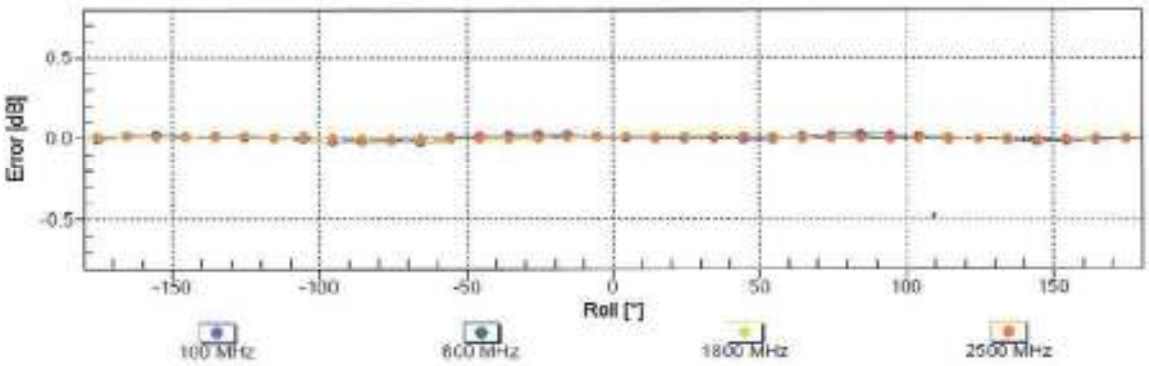
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



f=1800 MHz,R22

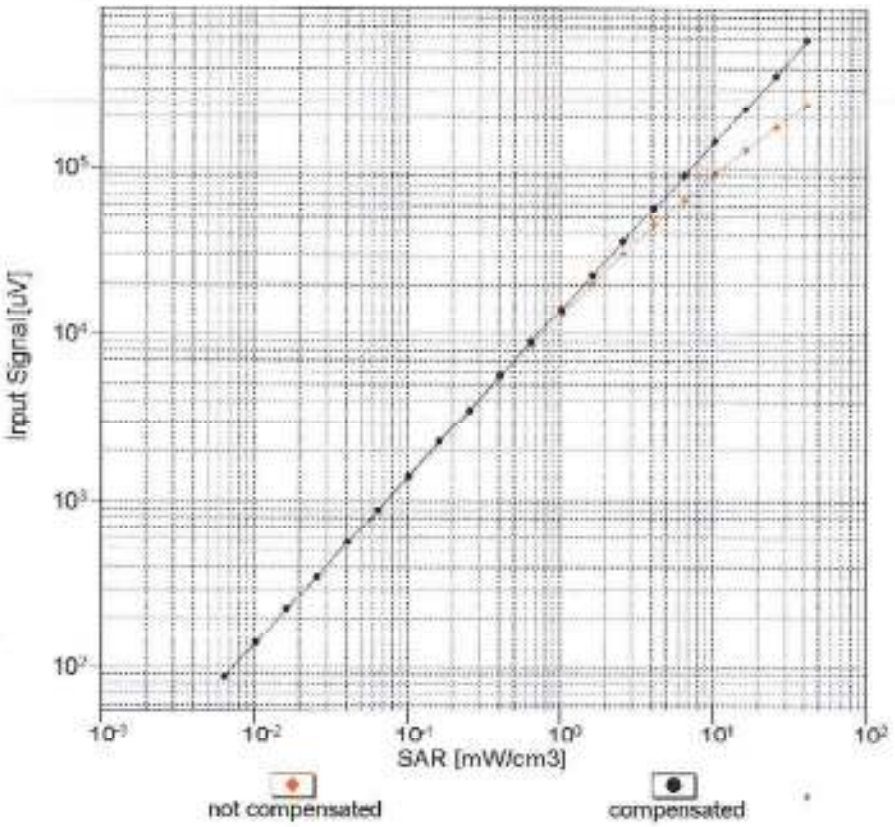


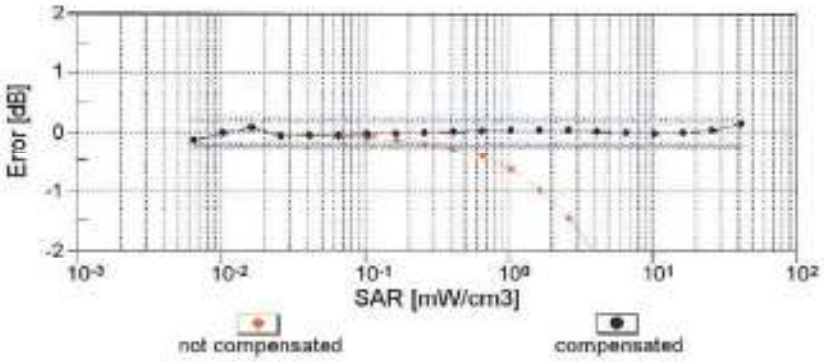


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

ES3DV3– SN:3274 November 13, 2012

Dynamic Range f(SAR_{head})
(TEM cell , f = 900 MHz)



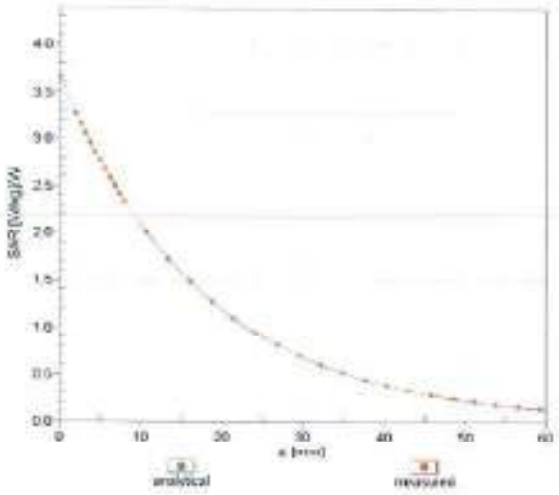


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

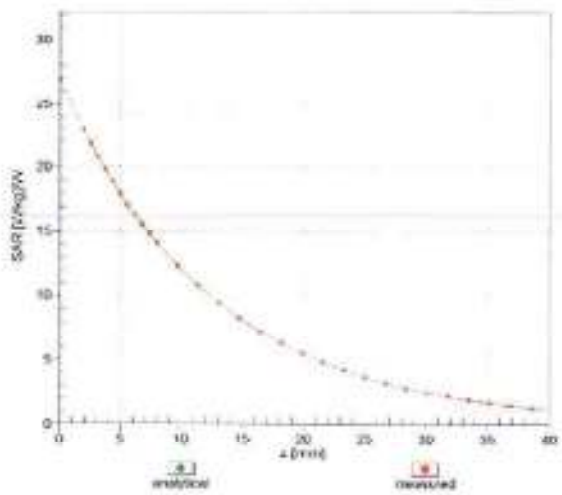
ES3DV3- SN:3274 November 13, 2012

Conversion Factor Assessment

f = 900 MHz,WGLS R9 (H_convF)

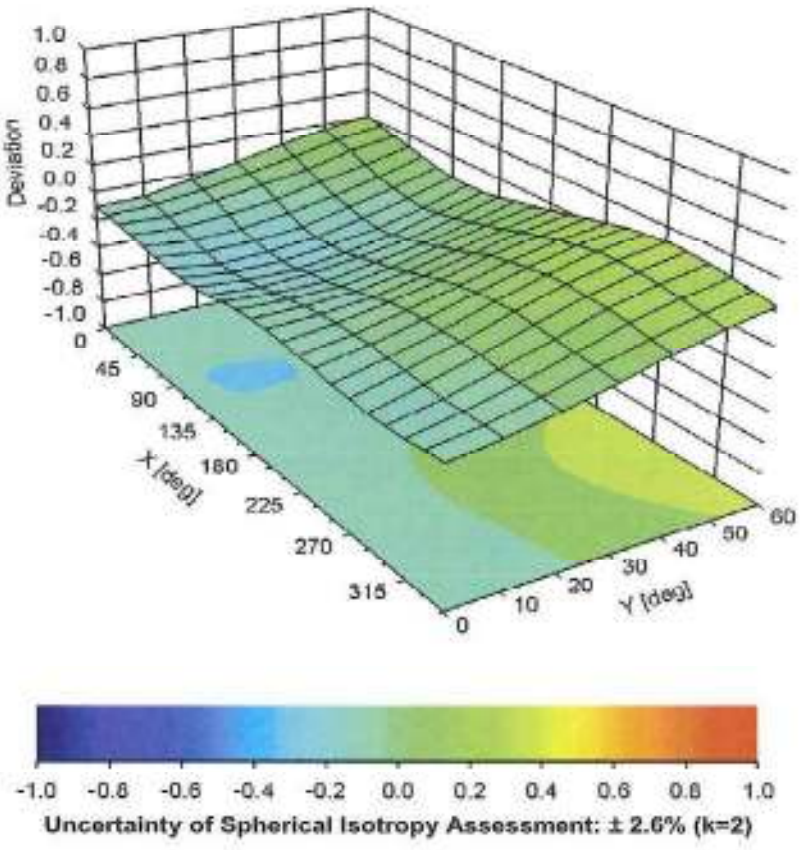


f = 1810 MHz,WGLS R22 (H_convF)



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:3274

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	54.6
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

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Phone +41 44 245 9700, Fax +41 44 245 9779
info@speag.com, http://www.speag.com

Additional Conversion Factors

for Dosimetric E-Field Probe

Type:	**ES3DV3**
Serial Number:	**3274**
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:

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Dosimetric E-Field Probe ES3DV3 SN:3274

Conversion factor (± standard deviation)

150 ± 50 MHz	*ConvF*	8.3 ± 10%	ε_r = 52.3 ±5% σ = 0.76 ±5% mho/m (head tissue)
150 ± 50 MHz	*ConvF*	8.0 ± 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.

APPENDIX C
Dipole Calibration Certificates

Calibration Laboratory of
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Zeughausstrasse 43, 8004 Zurich, Switzerland

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S Swiss Calibration Service

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Accreditation No.: **SCS 108**

Client **Motorola MY (Precision)** Certificate No: **D900V2-1d025_Apr11**

CALIBRATION CERTIFICATE

Object D900V2 - SN: 1d025

Calibration procedure(s) QA CAL-05.v8
Calibration procedure for dipole validation kits

Calibration date: April 14, 2011

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 EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: 5086 (20g)	29-Mar-11 (No. 217-01368)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	30-Apr-10 (No. ES3-3205_Apr10)	Apr-11
DAE4	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: April 15, 2011

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Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

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
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.2 °C	41.5	0.97 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.9 ± 6 %	0.94 mho/m ± 6 %
Head TSL temperature during test	(22.0 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.80 mW / g
SAR normalized	normalized to 1W	11.2 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**11.4 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.80 mW / g
SAR normalized	normalized to 1W	7.20 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**7.28 mW /g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.7 Ω - 6.6 jΩ
Return Loss	- 23.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.408 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	February 08, 2005

DASY5 Validation Report for Head TSL

Date/Time: 14.04.2011 15:55:06

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:1d025

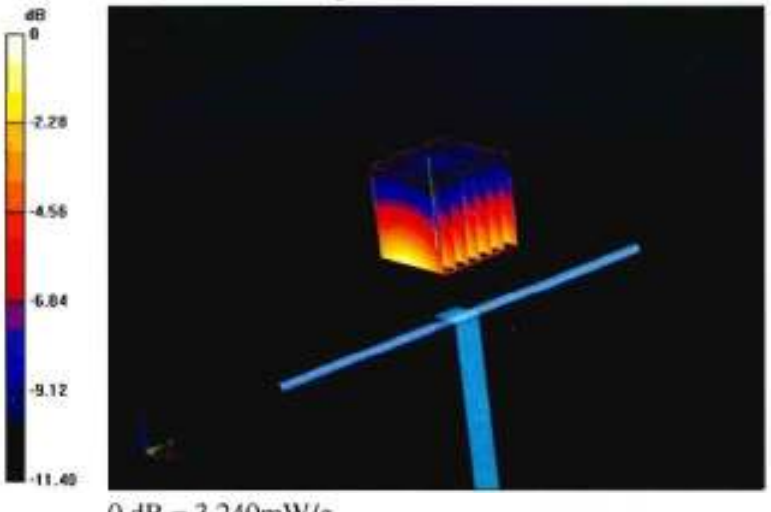
Communication System: CW; Frequency: 900 MHz; Duty Cycle: 1:1
Medium: HSL900
Medium parameters used: f = 900 MHz; σ = 0.94 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.88, 5.88, 5.88); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.4 Build (2829)

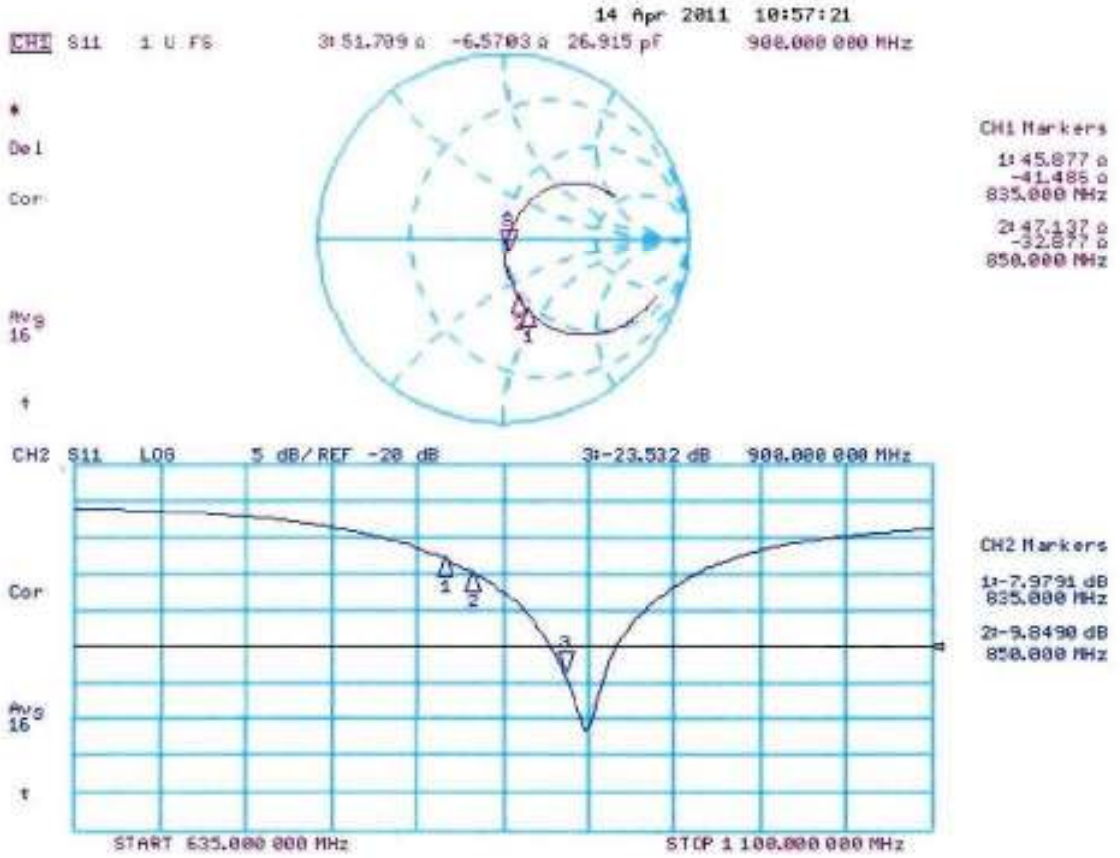
Head/d=15mm, Pin=250 mW/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 60.148 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 4.227 W/kg
SAR(1 g) = 2.8 mW/g; SAR(10 g) = 1.8 mW/g
Maximum value of SAR (measured) = 3.238 mW/g



0 dB = 3.240mW/g

Impedance Measurement Plot for Head TSL



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Accreditation No.: **SCS 108**

Client **Motorola MY (Precision)** Certificate No: **D900V2-1d025_May12**

CALIBRATION CERTIFICATE

Object	D900V2 - SN: 1d025
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	May 16, 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 EPM-442A	GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5058 (20k)	27-Mar-12 (No. 217-01530)	Apr-13
Type-N mismatch combination	SN: 5047.2 / 06327	27-Mar-12 (No. 217-01533)	Apr-13
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

	Name	Function	Signature
Calibrated by:	Israe El-Naouq	Laboratory Technician	Israe El-Naouq
Approved by:	Katja Pokovic	Technical Manager	

Issued: May 16, 2012

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Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

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
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

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%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.1
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	900 MHz ± 1 MHz	

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.0	1.05 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.7 ± 6 %	1.06 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	---	---

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.79 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**11.0 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.79 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**7.10 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.5 Ω - 8.3 jΩ
Return Loss	- 21.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.400 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	February 06, 2005

DASY5 Validation Report for Body TSL

Date: 16.05.2012

Test Laboratory: SPEAG, Zurich, Switzerland

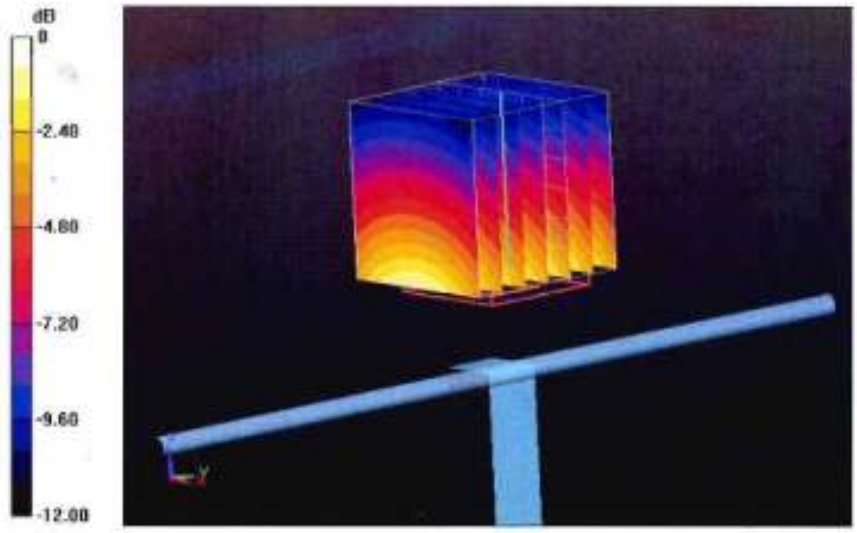
DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN: 1d025

Communication System: CW; Frequency: 900 MHz
Medium parameters used: f = 900 MHz; σ = 1.06 mho/m; ε_r = 53.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

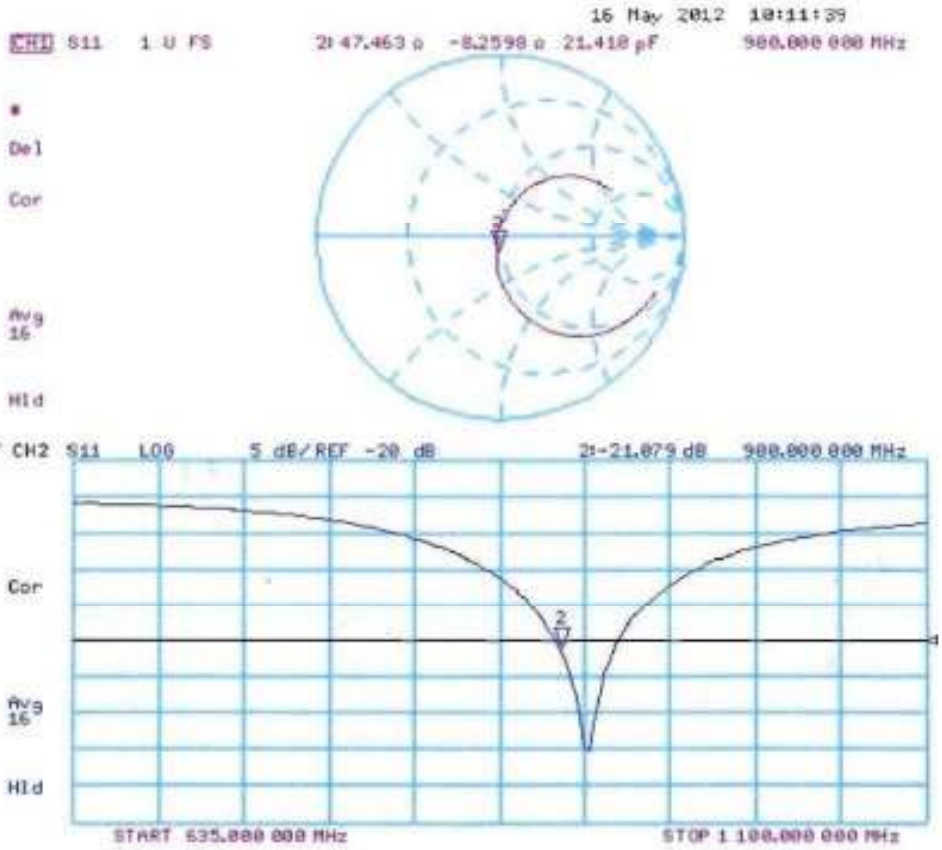
- Probe: ES3DV3 - SN3205; ConvF(5.94, 5.94, 5.94); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.762 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 4.247 mW/g
SAR(1 g) = 2.79 mW/g; SAR(10 g) = 1.79 mW/g
Maximum value of SAR (measured) = 3.27 mW/g



0 dB = 3.27 mW/g = 10.29 dB mW/g

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 108

Client Motorola MY

Certificate No: D900V2-1d026_Nov11

CALIBRATION CERTIFICATE

Object: D900V2 - SN: 1d026

Calibration procedure(s): QA CAL-05.v8
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: November 18, 2011

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 EPM-442A	GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5086 (20g)	29-Mar-11 (No. 217-01368)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	29-Apr-11 (No. ES3-3205_Apr11)	Apr-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

	Name	Function	Signature
Calibrated by:	Dimce Iliev	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: November 18, 2011

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Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

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
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.97 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.6 ± 6 %	0.95 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.67 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**10.8 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.71 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**6.90 mW /g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.7 Ω - 7.5 jΩ
Return Loss	- 22.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.399 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	February 08, 2005

DASY5 Validation Report for Head TSL

Date: 18.11.201

Test Laboratory: SPEAG, Zurich, Switzerland

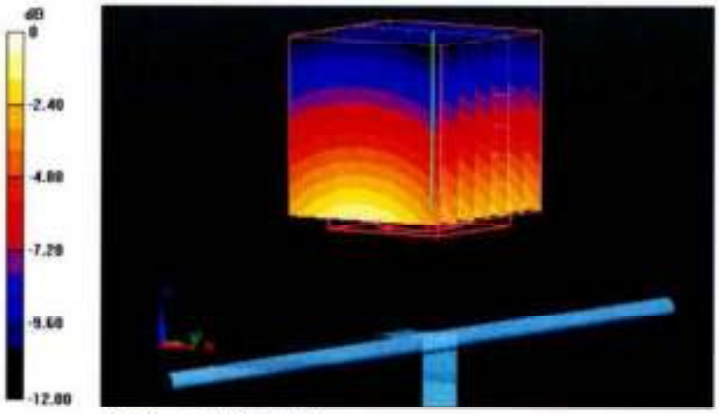
DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN: 1d026

Communication System: CW; Frequency: 900 MHz
Medium parameters used: f = 900 MHz; σ = 0.95 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

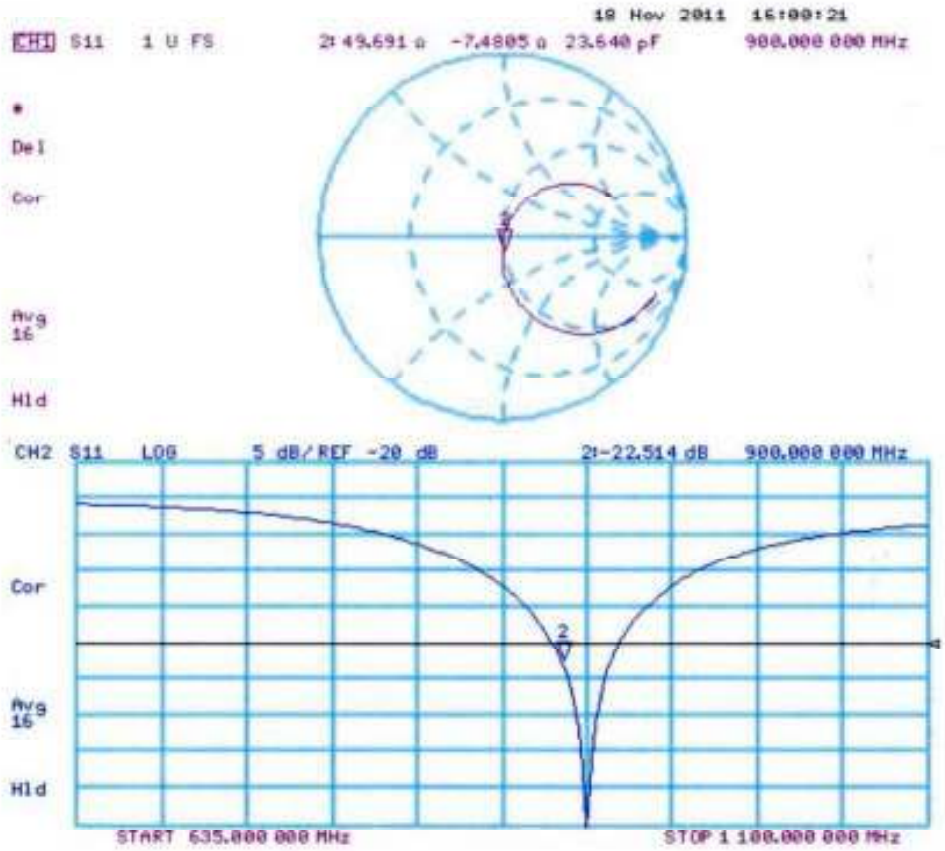
- Probe: ES3DV3 - SN3205; ConvF(5.97, 5.97, 5.97); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 59.051 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 3.992 W/kg
SAR(1 g) = 2.67 mW/g; SAR(10 g) = 1.71 mW/g
Maximum value of SAR (measured) = 3.121 mW/g



0 dB = 3.120mW/g

Impedance Measurement Plot for Head TSL



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Accreditation No.: SCS 108

Client **Motorola MY**

Certificate No: **D900V2-1d026_Aug12**

CALIBRATION CERTIFICATE

Object	D900V2 - SN: 1d026
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	August 06, 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 EPM-442A	GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5058 (20k)	27-Mar-12 (No. 217-01530)	Apr-13
Type-N mismatch combination	SN: 5047.2 / 06327	27-Mar-12 (No. 217-01533)	Apr-13
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	27-Jun-12 (No. DAE4-601_Jun12)	Jun-13

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

	Name	Function	Signature
Calibrated by:	Israe El-Naouq	Laboratory Technician	Israe El-Naouq
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 6, 2012

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Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

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
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

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%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	900 MHz ± 1 MHz	

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.0	1.05 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.7 ± 6 %	1.05 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.73 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**10.8 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.75 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**6.96 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.1 Ω - 3.8 jΩ
Return Loss	- 26.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.397 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	February 08, 2005

DASY5 Validation Report for Body TSL

Date: 06.08.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN: 1d026

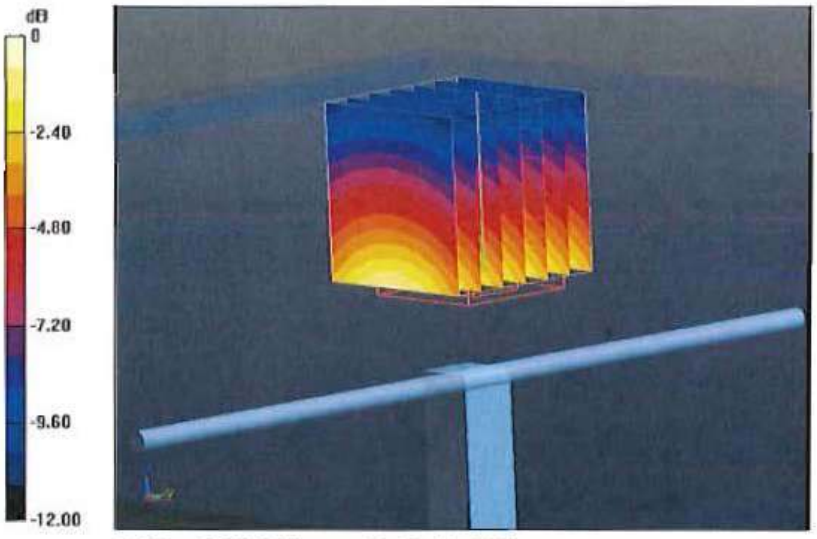
Communication System: CW; Frequency: 900 MHz
Medium parameters used: f = 900 MHz; σ = 1.05 mho/m; ε_r = 52.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.94, 5.94, 5.94); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.2(961); SEMCAD X 14.6.6(6816)

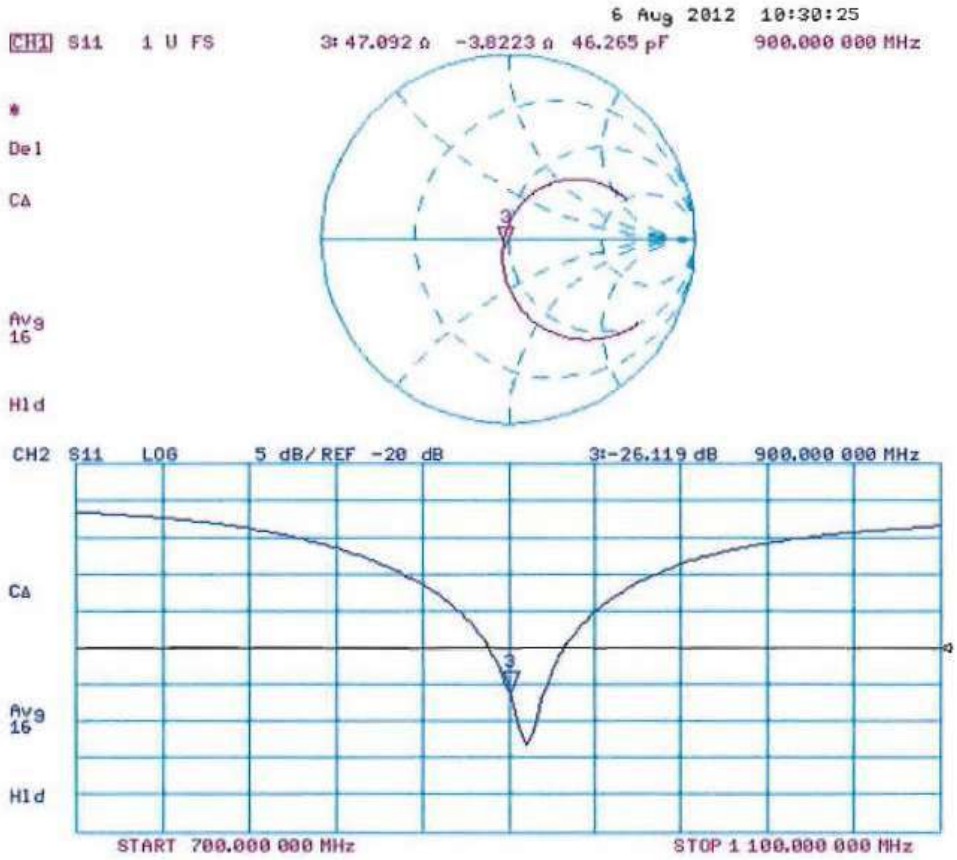
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.621 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 4.184 mW/g
SAR(1 g) = 2.73 mW/g; SAR(10 g) = 1.75 mW/g
Maximum value of SAR (measured) = 3.22 W/kg



0 dB = 3.22 W/kg = 10.16 dB W/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 108

Client Motorola MY

Certificate No: D2450V2-782_Nov11

CALIBRATION CERTIFICATE

Object: D2450V2 - SN: 782

Calibration procedure(s): QA CAL-05.v8
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: November 22, 2011

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 EPM-442A	GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5086 (20g)	29-Mar-11 (No. 217-01368)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	29-Apr-11 (No. ES3-3205_Apr11)	Apr-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	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: November 22, 2011

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Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

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
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.7 ± 6 %	1.84 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.9 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**54.5 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.40 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**25.3 mW /g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.7 Ω + 3.6 jΩ
Return Loss	- 26.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.170 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	May 06, 2005

DASY5 Validation Report for Head TSL

Date: 22.11.2011

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 782

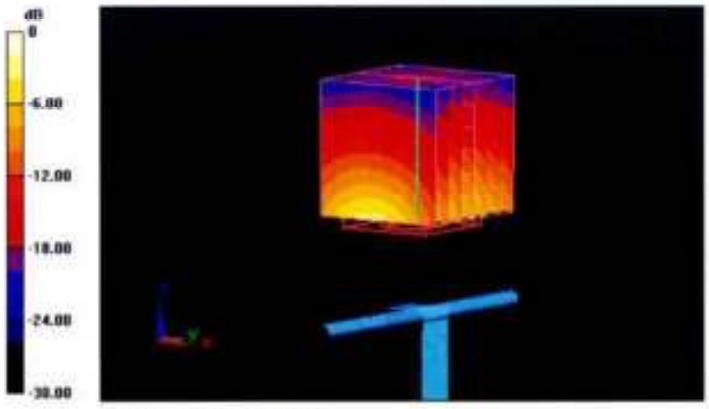
Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.84 mho/m; ε_r = 37.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.45, 4.45, 4.45); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

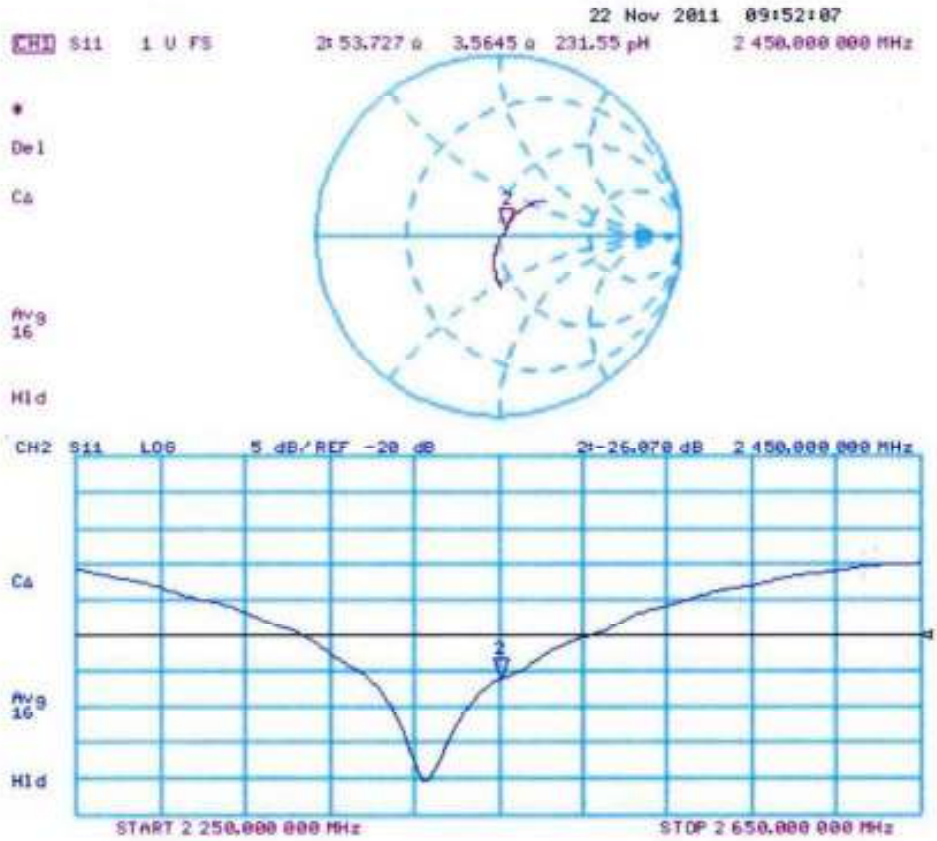
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 102.3 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 28.984 W/kg
SAR(1 g) = 13.9 mW/g; SAR(10 g) = 6.4 mW/g
Maximum value of SAR (measured) = 17.769 mW/g



0 dB = 17.770mW/g

Impedance Measurement Plot for Head TSL



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Accreditation No.: SCS 108

Client Motorola MY (Precision)

Certificate No: D2450V2-782_May12

CALIBRATION CERTIFICATE

Object D2450V2 - SN: 782

Calibration procedure(s) QA CAL-05.v8
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: May 15, 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 EPM-442A	GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5058 (20k)	27-Mar-12 (No. 217-01530)	Apr-13
Type-N mismatch combination	SN: 5047.2 / 06327	27-Mar-12 (No. 217-01533)	Apr-13
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

	Name	Function	Signature
Calibrated by:	Dimce Iliev	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: May 15, 2012

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Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

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
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

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%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.1
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.3 ± 6 %	1.99 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	---	---

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	12.8 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**50.6 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.96 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**23.7 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.3 Ω + 3.8 jΩ
Return Loss	- 28.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.155 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	May 06, 2005

DASY5 Validation Report for Body TSL

Date: 15.05.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 782

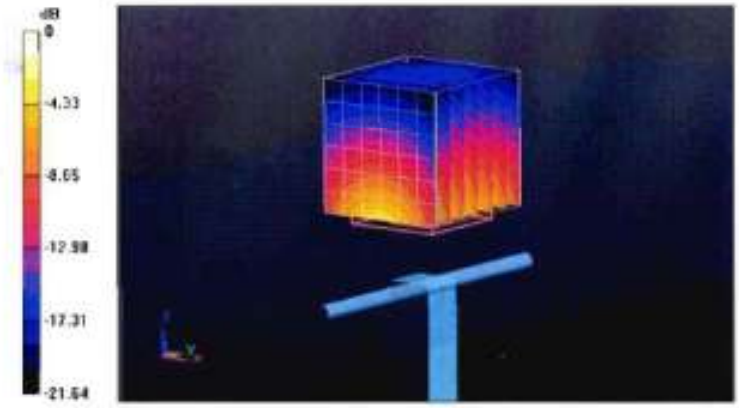
Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.99 mho/m; ε_r = 52.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.26, 4.26, 4.26); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.115 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 25.974 mW/g
SAR(1 g) = 12.8 mW/g; SAR(10 g) = 5.96 mW/g
Maximum value of SAR (measured) = 16.8 mW/g



0 dB = 16.8 mW/g = 24.51 dB mW/g

Impedance Measurement Plot for Body TSL