MOTOROLA SOLUTIONS

ACCREDITED
TESTING CERT # 2518.01

DECLARATION OF COMPLIANCE SAR ASSESSMENT Part 1 of 2

Motorola Solutions Inc.
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Date of Report: 7/28/11
Report Revision: O
Report ID: PMUD2904A_PMUD2906A_Rev.O 110728_SR9661/9662

Responsible Engineer:	Michael Sailsman (Senior Staff Eng.)
Report Author:	Michael Sailsman (Senior Staff Eng.)
Date/s Tested:	6/27/11-7/20/11
Manufacturer/Location:	Penang, Malaysia
Sector/Group/Div.:	GTDG
Date submitted for test:	6/3/11
DUT Description:	136-174 MHz, 5W, 12.5/20/25 kHz, 2.402-2.480 GHz (Bluetooth), VHF NKP/FKP with GPS, GOB
Test TX mode(s):	CW (PTT); BT (CW)
Max. Power output:	6.0 W (VHF); 10mW (BT)
Nominal Power:	5.0 W (VHF); 2.5mW (BT)
Tx Frequency Bands:	136-174 MHz (VHF); 2.402-2.480 GHz (BT)
Signaling type:	FM; FHSS(BT)
Model(s) Tested:	PMUD2904A, PMUD2906A
Model(s) Certified:	PMUD2904A, PMUD2906A
Serial Number(s):	871TMK0074, 807TMK0042
Classification:	Occupational/Controlled
FCC ID:	ABZ99FT3085; Rule part 90 (150.8-173.4 MHz); Rule part 15 (2402-2480MHz)
IC:	109AB-99FT3085

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

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

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

Deanna M. Zakharia
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Deanna Zakharia
EMS EME Lab Senior Resource Manager, Laboratory Director
Approval Date: 7/29/2011

Certification Date: 7/29/2011

Certification No.: L1110749 & L1110750

Part 1 of 2

APPENDICES

Part 2 of 2

Report Revision History

Date	Revision	Comments
7/28/11	O	Initial release

1.0 Introduction

This report details the utilization, test setup, test equipment, and test results of the Specific Absorption Rate (SAR) measurements performed at the Motorola Solutions Inc. EME Test Laboratory for model numbers PMUD2904A and PMUD2906A.

2.0 Abbreviations / Definitions

CNR: Calibration Not Required
EME: Electromagnetic Energy
IFA: Inverted F antenna
NKP: No Keypad
FKP: Full Keypad
DQPSK**:** Differential Quadrature Phase-Shift Keying
GFSK: Gaussian Frequency Shift Keying
BT: Bluetooth
GOB: Generic option board
GPS: Global Positioning System
CW: Continuous Wave
DUT: Device Under Test
DC: Duty Cycle
FM: Frequency Modulation/Factory Mutual
NA: Not Applicable
PTT: Push to Talk
RSM: Remote Speaker Microphone
SAR: Specific Absorption Rate

Audio accessories: These accessories allow communication while the DUT is worn on the body.
Body worn accessories: These accessories allow the DUT to be worn on the body of the user.
Maximum Power: Defined as the upper limit of the production line final test station.

3.0 Referenced Standards and Guidelines

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

- IEC62209-1*(2005) Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)
- United States Federal Communications Commission, Code of Federal Regulations; Rule Part 47CFR § 2.1093 sub-part J:1999
- Federal Communications Commission, “Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields”, OET Bulletin 65, Supplement C (Edition 01-01), FCC, Washington, D.C.: June 2001.
- IEEE 1528*(2003), Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques

- American National Standards Institute (ANSI) / Institute of Electrical and Electronics Engineers (IEEE) C95. 1-1992
- Institute of Electrical and Electronics Engineers (IEEE) C95.1-2005
- International Commission on Non-Ionizing Radiation Protection (ICNIRP) 1998
- Ministry of Health (Canada) Safety Code 6 (2009), Limits of Human Exposure to Radio frequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz
- Australian Communications Authority Radio communications (Electromagnetic Radiation - Human Exposure) Standard (2003)
- ANATEL, Brazil Regulatory Authority, Resolution No. 303 of July 2, 2002 "Regulation of the limitation of exposure to electrical, magnetic, and electromagnetic fields in the radio frequency range between 9 kHz and 300 GHz." and "Attachment to resolution # 303 from July 2, 2002"
- IEC62209-2 Edition 1.0 2010-03, Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures – Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz).

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

4.0 SAR Limits

TABLE 1

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

5.0 SAR Result Scaling Methodology:

The calculated 1-gram and 10-gram averaged SAR results indicated as "Max Calc. 1g-SAR" and "Max Calc.10g-SAR" in the data tables is determined by scaling the measured

SAR to account for power leveling variations and power slump. A table and graph of output power versus time is provided in APPENDIX H. For this device the "Max Calc. 1g-SAR" and "Max Calc.10g-SAR" are scaled using the following formula:

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

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

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

Additional SAR scaling was applied using the methodologies outlined in FCC KDB450824 using tissue sensitivity values. SAR was scaled for conditions where the tissue permittivity was measured above the nominal target and for tissue conductivity that was measured below the nominal target.

6.0 Description of Device Under Test (DUT):

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

The device is intended to be used with a maximum duty cycle of 50%. Bluetooth operation is as follows: Supports Bluetooth 2.1 + EDR (Class 2 BT device), offers HCI compliant solutions. The modulation frequency is pi/4 dqpsk and 8dpsk (GFSK modulation with hopping 79 (1MHz) channel). The worst case duty cycle is derived from a 5-slot packet type operation which consists of receiving on 1-slot and transmitting on 5 slots. The maximum duty cycle is 77% as defined by the BT standard.

The model represented under this filing utilizes removable antennas (VHF) and an internal fixed antenna (BT) capable of transmitting in the 136-174 MHz and 2.402-2.480 GHz bands respectively. The nominal VHF output power is 5.0 watts with maximum output power of 6.0 watts and nominal BT output power of 0.0025 watts and maximum output power of 0.010 watts 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.

7.0 Optional Accessories and Test Criteria:

This device is offered with optional accessories. All accessories were individually evaluated during the test plan creation to determine if testing was required. The following

sections identify the test criteria and details for each accessory category.

7.1 Antennas:

There are six VHF antennas and one BT antenna offered for this product. The table below lists their descriptions.

TABLE 2

Antenna Models	Description	*Tested
PMAD4116A	VHF helical (144-165MHz) ½ wave, -12dBi	Yes
PMAD4117A	VHF helical (136-155 MHz) ½ wave, -12dBi	Yes
PMAD4118A	VHF helical (152-174MHz) ½ wave, -12dBi	Yes
PMAD4119A	VHF stubby (136-148MHz) ¼ wave, -9.5dBi	Yes
PMAD4120A	VHF stubby (146-160MHz) ¼ wave, -9.5dBi	Yes
PMAD4121A	VHF stubby (160-174MHz) ¼ wave, -9.5dBi	Yes
0104039J80	IFA Bluetooth (2402-2481 MHz) ¼ wave, -0dBi	Yes

*Refer to Exhibit 7B for antenna separation distances**.** Note PMAD4119A bandwidth is outside FCC PT90

7.2 Batteries:

There are five batteries offered for this product. The table below lists the batteries, and battery description.

TABLE 3

Battery Models	Description	*Tested	Comments
PMNN4409A	IMPRES Hi-Cap Li Ion non FM 2150mAh	Yes	
NNTN8129A	IMPRES Hi-Cap Li-Ion FM 2300mAh	Yes	
PMNN4406A	Slim Li-Ion 1500mAh	Yes	
PMNN4412A	NiMH 1300mAh	Yes	
PMNN4407A	IMPRES Slim Li-Ion 1500mAh	Yes	

*Refer to Exhibit 7B for antenna separation distances**.**

7.3 Body worn Accessories:

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

TABLE 4

Body worn Models	Description	*Tested	Comments
PMLN5842A	Hard leather case w/ 2.5” swivel belt loop (FKP)	Yes	
PMLN5840A	Hard leather case w/ 3.0” swivel belt loop (FKP)	No	Separation and metal content similar to PMLN5842A
PMLN5844A	Nylon case with 3” fixed belt loop (FKP)	Yes	
PMLN5838A	Hard leather case w/ 3” fixed belt loop (FKP)	Yes	
PMLN5843A	Hard leather case w/ 2.5” swivel belt loop (NKP)	No	Similar to PMLN5842A
PMLN5845A	Nylon case with 3” fixed belt loop (NKP)	No	Similar to PMLN5844A

TABLE 4 (Continued)

Body worn Models	Description	*Tested	Comments
PMLN5846A	Hard leather case w/ 3.0" swivel belt loop (NKP)	No	Separation and metal content similar to PMLN5843A
PMLN5839A	Hard leather case w/ 3" fixed belt loop (NKP)	No	Similar to PMLN5838A
PMLN7008A	2.5" belt clip	Yes	
PMLN4651A	2.0" belt clip	Yes	
RLN4570A	Break-a-way chest pack	Yes	
RLN4815A	Universal RadioPak utility case	Yes	
HLN6602A	Chest pack	Yes	
NTN5243A	Carrying strap	Yes	
4280384F89	RadioPak lengthener	No	Lengthener for RLN4815A
RLN4295A	Small clip epaulet strap	No	Used for securing RSM cord
HLN9985B	Waterproof Bag	No	Not intended for Tx while in bag.

*Refer to Exhibit 7B for antenna separation distances**.**

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	*Tested	Comments
RMN5058A	Core Lightweight headset w/PTT & Vox	Yes	
PMLN5102A	Core Ultra-Lite Headset	Yes	
PMLN5096A	Core Earset – D Shell	Yes	
PMLN5275C	Heavy Duty headset	Yes	
RLN5879A	Core 1 wire surveillance – beige	No	Similar to RLN5878A
RLN5878A	Core 1 wire surveillance – black	Yes	
RLN5881A	IMPRES 2-wire Surveillance-beige	No	Similar to RLN5880A
RLN5880A	IMPRES 2-wire Surveillance - black	Yes	
RLN5882A	IMPRES 2-wire Surveillance with acoustic tube- black	Yes	
RLN5883A	IMPRES 2-wire Surveillance with acoustic tube- beige	No	Similar to RLN5882A
PMLN5097A	IMPRES 3-wire Surveillance with acoustic tube- black	Yes	
PMLN5106A	IMPRES 3-wire Surveillance with acoustic tube- beige	No	Similar to PMLN5097A
PMLN5111A	IMPRES 3-wire Surveillance with acoustic tube-black	Yes	
PMLN5112A	IMPRES 3-wire Surveillance with acoustic tube beige	No	Similar to PMLN5111A

TABLE 5 (Continued)

Audio Acc. Models	Description	*Tested	Comments
PMLN5101A	IMPRES Temple Transducer	Yes	
PMMN4046A	IMPRES large RSM w/ volume, emergency programmable button, IP57	No	Similar to PMMN4050A
PMMN4050A	IMPRES large RSM with ear jack, Noise Canceling	Yes	Tested with AARLN4885B
AARLN4885B	Receive only Ear bud	Yes	Tested with PMMN4050A
PMMN4024A	Remote speaker mic.	Yes	
PMMN4025A	IMPRES Remote speaker mic	No	Similar to PMMN4024A
PMMN4040A	Submersible Remote Speaker Mic	Yes	
RLN6288A	Ear piece w/High Noise Kit-Beige	No	Ear piece no test required
RLN6289A	Ear piece w/High Noise Kit-Black	No	Ear piece - no test required
RLN6279A	Standard Earpiece-Black	No	Ear piece - no test required
RLN6280A	Standard Earpiece-Beige	No	Ear piece - no test required
RLN6284A	Ear piece w/ Acoustic Tube-Beige	No	Ear piece - no test required
RLN6285A	Ear piece w/ Acoustic Tube-Black	No	Ear piece - no test required
RLN6281A	Replacement Foam Plugs - 25/pak	No	Ear piece - no test required
RLN4760A	Clear comfortable ear piece SR	No	Ear piece - no test required
RLN4761A	Clear comfortable ear piece MR	No	Ear piece - no test required
RLN4762A	Clear comfortable ear piece LR	No	Ear piece - no test required
RLN4763A	Clear comfortable ear piece SL	No	Ear piece - no test required
RLN4764A	Clear comfortable ear piece ML	No	Ear piece - no test required
RLN4765A	Clear comfortable ear piece LL	No	Ear piece - no test required
RLN4941A	Receive only Earpiece w/translucent tube and ear tip - OTTO	No	Receive only
WADN4190B	Over the Ear Receiver for RSM	No	Similar to AARLN4885B
PMLN4620A	D-shell Rx-only earpiece(3.5MM)	No	Receive only
RLN5886A	Surveillance Low Noise Kit	No	Ear piece - no test required
RLN5887A	Surveillance High Noise Kit	No	Ear piece - no test required

8.0 Description of Test System:

8.1 Descriptions of Robotics/Probes/Readout Electronics:

The laboratory utilizes a Dosimetric Assessment System (DASY5™) SAR measurement system Version 52.6.2.424 manufactured by Schmid & Partner Engineering AG (SPEAG™), of Zurich Switzerland. The test system consists of a Stäubli RX90L robot, DAE3 and ES3DV3 E-field probe. The DASY5™ system is operated per the instructions in the DASY5™ Users Manual. The complete manual is available directly from SPEAG™. All measurement equipment used to assess 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)

8.2.1 Dual Flat Phantom

Not Applicable

8.2.2 SAM Phantom

Not Applicable

8.2.3 Elliptical Phantom

TABLE 6

Phantom ID (s)	Material Parameters	Phantom Dimensions LxWxD (mm)	Material Thickness (mm)	Support Structure Material	Loss Tangent (wood)
OVAL1018 OVAL1109 OVAL1022	300MHz -6GHz; Er = 4+/- 1, Loss Tangent = ≤0.05	600x400x190	2mm +/- 0.2mm	Wood	< 0.05

8.3 Description of Simulated Tissue:

The simulated tissue used is compliant to that specified in FCC Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97-01) and IEEE Std 1528 - 2003 "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques". The simulated tissue used is also compliant to that specified in IEC62209-1 (2005) and adopted by CENELEC as EN62209-1 (2006).

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 7 below for 300 MHz and 2450MHz. During the daily testing of this product, the applicable mixture was used to measure the Di-electric parameters at 300, 136, 141, 144, 146, 148, 151, 152, 155, 158, 160, 165, 167, 173 MHz frequencies to verify that the Di-electric parameters were within the tolerance of the tissue specifications.

Simulated Tissue Composition (by mass)

TABLE 7

% of listed ingredients	300MHz		2450MHz	
	Head	Body	Head	Body
Sugar	56.0	47.1	NA	NA
Diacetin	0	0	51.0	34.5
De ionized -Water	37.5	49.48	48.75	65.20
Salt	5.4	2.32	0.15	0.20
HEC	1.0	1.0	NA	NA
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 8

Equipment Type	Model Number	Serial Number	Calibration Date	Calibration Due Date
Power Meter (Agilent)	E4419B	MY45103725	4/6/2011	4/6/2012
Power Meter (Agilent)	E4418B	US39251267	2/24/2011	2/24/2012
E-Series Avg. Power Sensor (Agilent)	E9301B	MY41495593	2/19/2011	2/19/2012
E-Series Avg. Power Sensor (Agilent)	E9301B	MY41495594	2/4/2011	2/4/2012
Power Sensor (Agilent)	8482B	3318A07393	2/4/2011	2/4/2012
Bi-Directional Coupler (NARDA)	3020A	40295	6/3/2010	6/3/2012
Bi-Directional Coupler (NARDA)	3022	77115	3/3/2010	3/3/2012
Signal Generator (Agilent)	E4428C	MY47381119	6/24/2011	6/24/2013
AMP (Amplifier Research)	10WD1000	28782	CNR	CNR
Dickson Temperature Recorder	TM125	1195889	3/9/2011	3/9/2012
Omega Digital Thermometer with J Type TC Probe	HH200A	20857	9/20/2010	9/20/2011
Omega Digital Thermometer with J Type TC Probe	HH202A	18800	11/17/2010	11/17/2011
Omega Digital Thermometer with J Type TC Probe	HH202A	18801	5/18/2011	5/18/2012
Omega Digital Thermometer with J Type TC Probe	HH202A	18812	5/3/2011	5/3/2012
Agilent PNA-L Network Analyzer	N5230A	MY45001092	6/9/2011	6/9/2012
Dielectric Probe Kit (HP)	85070C	US99360076	CNR	CNR
Speag Dipole	D300V3	1014	1/11/2011	1/11/2013
Speag Dipole	D2450V2	704	11/25/2010	11/25/2012

10.0 SAR Measurement System Verification:

The SAR measurements were conducted with probe model/serial number ES3DV3/SN3185. 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.

Dipole validation scans using head tissue equivalent medium are provided in APPENDIX D. The EMS EME lab validated the dipole to the applicable IEEE 1528-2003 system performance targets. Within the same day system validation was performed using FCC body tissue parameters to generate the system performance target values for body at the applicable frequency. The results of the EMS EME system performance validation are provided herein.

10.1 Equivalent Tissue Test Results:

Simulated tissue prepared for SAR measurements is measured daily and within 24 hours prior to actual SAR testing to verify that the tissue is within +/- 5% of target parameters at the center of the transmit band. This measurement is done using the applicable equipment indicated in section 9.0. The table below summarizes the measured tissue parameters used for the SAR assessment. Frequencies in blue are outside FCC Part 90.

TABLE 9

Frequency (MHz)	Tissue Type	Conductivity Target (S/m)	Dielectric Constant Target	Conductivity Meas. (S/m)	Dielectric Constant Meas.	Tested Date
136	FCC Body	0.79 (0.75-0.83)	62.3 (59.2-65.4)	0.77	61.4	7/13/11
				0.76	61.2	7/14/11
136	IEEE/ IEC Head	0.75 (0.71-0.79)	53.0 (50.4-55.7)	0.74	53.8	7/14/11
				0.72	53.9	7/15/11
141	FCC Body	0.79 (0.75-0.83)	62.1 (59.0-65.2)	0.78	61.3	7/13/11
				0.77	61.1	7/14/11
141	IEEE/ IEC Head	0.75 (0.71-0.79)	52.7 (50.1-55.3)	0.75	53.5	7/14/11
				0.73	53.5	7/15/11
144	FCC Body	0.80 (0.76-0.84)	62.1 (59.0-65.2)	0.78	61.2	7/13/11
144	IEEE/ IEC Head	0.76 (0.72-0.80)	52.6 (50.0-55.2)	0.75	53.3	7/14/11
				0.73	53.3	7/15/11
146	FCC Body	0.80 (0.76-0.84)	62.0 (58.9-65.1)	0.77	60.9	7/14/11
146	IEEE/ IEC Head	0.76 (0.72-0.80)	52.5 (49.9-55.1)	0.75	53.2	7/14/11
				0.73	53.2	7/15/11
148	FCC Body	0.80 (0.76-0.84)	62.0 (58.9-65.1)	0.78	61.1	7/13/11
				0.77	60.9	7/14/11
148	IEEE/ IEC Head	0.76 (0.72-0.80)	52.4 (49.8-55.0)	0.75	53.1	7/14/11
				0.73	53.0	7/15/11

TABLE 9 (continue)

Frequency (MHz)	Tissue Type	Conductivity Target (S/m)	Dielectric Constant Target	Conductivity Meas. (S/m)	Dielectric Constant Meas.	Tested Date
151	FCC Body	0.80 (0.76-0.84)	61.9 (58.8-65.0)	0.82	64.3	6/29/11
				0.82	64.1	6/30/11
				0.81	64.0	7/1/11
				0.83	64.1	7/5/11
				0.80	64.0	7/6/11
				0.79	63.8	7/7/11
				0.80	61.5	7/11/11
				0.78	60.6	7/12/11
				0.78	61.0	7/13/11
151	IEEE/ IEC Head	0.76 (0.72-0.80)	52.3 (49.6-55.9)	0.76	53.4	7/7/11
				0.75	52.8	7/11/11
152	FCC Body	0.80 (0.76-0.84)	61.9 (58.8-64.9)	0.83	64.4	6/28/11
				0.82	64.0	6/30/11
				0.81	64.0	7/1/11
				0.83	64.1	7/5/11
				0.80	64.0	7/6/11
				0.80	61.5	7/11/11
				0.78	60.6	7/12/11
152	IEEE/ IEC Head	0.76 (0.72-0.80)	52.2 (49.6-54.8)	0.76	53.3	7/7/11
155	FCC Body	0.80 (0.76-0.84)	61.8 (58.7-64.9)	0.84	60.7	6/27/11
165	FCC Body	0.81 (0.77-0.85)	61.5 (58.4-64.6)	0.84	63.7	6/28/11
				0.83	63.3	6/30/11
				0.82	63.3	7/1/11
				0.85	63.5	7/5/11
				0.81	63.3	7/6/11
				0.81	61.2	7/11/11
				0.82	61.2	7/12/11
167	FCC Body	0.81 (0.77-0.85)	61.5 (58.4-64.6)	0.84	63.6	6/28/11
				0.83	63.4	6/29/11
				0.83	63.2	6/30/11
				0.82	63.2	7/1/11
				0.85	63.5	7/5/11
				0.81	63.2	7/6/11
				0.81	63.0	7/7/11
				0.81	61.1	7/11/11
				0.82	61.2	7/12/11
				0.79	60.7	7/13/11
173	IEEE/ IEC Head	0.78 (0.74-0.82)	51.2 (48.6-53.8)	0.78	52.2	7/7/11

TABLE 9 (continue)

Frequency (MHz)	Tissue Type	Conductivity Target (S/m)	Dielectric Constant Target	Conductivity Meas. (S/m)	Dielectric Constant Meas.	Tested Date
300	FCC Body	0.92 (0.87-0.97)	58.2 (55.3-61.1)	0.94	56.8	6/27/11
				0.94	58.4	6/28/11
				0.93	58.3	6/29/11
				0.93	58.1	6/30/11
				0.92	58.0	7/1/11
				0.95	58.3	7/5/11
				0.91	58.0	7/6/11
				0.91	57.8	7/7/11
				0.92	57.0	7/12/11
				0.90	56.3	7/13/11
				0.88	56.1	7/14/11
300	IEEE/ IEC Head	0.87 (0.83-0.91)	45.3 (43.0-47.6)	0.88	45.6	7/11/11
				0.86	45.5	7/15/11
2450	FCC Body	1.95 (1.76-2.15)	52.7 (47.4-60.0)	2.03	53.9	7/20/11
2441	FCC Body	1.94 (1.75-2.13)	52.7 (47.4-60.0)	2.02	53.9	7/20/11

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 explains how the targets were set and 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 10

Probe Serial #	Tissue Type	Dipole Kit / Serial #	Reference SAR @ 1W (W/kg)	System Check Test Results when normalized to 1W (W/kg)	Tested Date
3185	FCC Body	SPEAG D300V3 /1014	2.73 +/- 10%	2.73	6/27/11
				2.77	6/28/11
				2.80	6/29/11
				2.77	6/30/11
				2.75	7/1/11
				2.80	7/5/11
				2.67	7/6/11
				2.72	7/7/11
				2.78	7/12/11
				2.71	7/13/11
				2.72	7/14/11
3185	IEEE/ IEC Head	SPEAG D300V3 /1014	2.83 +/- 10%	2.80	7/11/11
				2.78	7/15/11
3185	FCC Body	SPEAG D2450V2 /704	52.2 +/- 10%	50.00	7/20/11

Note: See APPENDIX D for an explanation of the reference SAR targets stated above.

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 11

	Target	Measured
Ambient Temperature	18 - 25 ˚C	Range: 20.8-22.5˚C Avg. 22.0˚C
Relative Humidity	30 - 70 %	Range: 51.4-65.3% Avg. 55.3%
Tissue Temperature	NA	Range: 20.9-21.7˚C Avg. 21.3C

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 coarse and 5x5x7 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 accessory as well as with and without the offered audio accessories as applicable.

12.3.2 Head:

Not applicable.

12.3.3 Face:

The DUT was positioned with its' front 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. Tests at the body without the offered audio accessory are to satisfy intended use operation with offered wireless BT accessories. In some cases the initial power listed herein may exceed the reported maximum power due to software step size tuning limitations. However, the initial powers measured are not greater than the allowed 5% of the reported maximum power. BT tests were performed in CW mode and the final results were scaled to the max duty cycle of 77% noted in section 6.0.
Note that test results that are outside the relevant FCC frequency allocations are presented herein in blue font. Tests outside Part 90 allocation were performed using the highest configuration from both body and face. The offered antenna PMAD4119A has bandwidth that is outside FCC Part 90 band.

13.0 DUT Test Data

13.1 Assessment at the Body:

The battery PMNN4407A was selected as default battery to assess at the Body since it is the thinnest battery (refers to Exhibit 7B for the dimension of the battery). The conducted power measurement for all test channels within part 90 frequency range (150.8-173.4MHz) using the battery PMMN4407A is indicated in the table 12. The channel with highest conducted power will be identified as default channel per KDB 643646 D01 SAR Test for PTT Radios v01r01. SAR plots of the highest results per table (bolded) are presented in appendices E-G.

Table 12

Test Freq (MHz)	Power (W)
150.8	6.17
152.5	6.20
155	6.11
157.9	6.04
160	6.11
165	6.20
167	6.27
173.4	6.22

13.2 Assessments at the Body with Body worn RLN4570A:

Assessment of offered antennas with the default battery and body worn accessory RLN4570A per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to table 12 for highest output power channel.

Table 13

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4116A (144-165MHz)	PMNN4407A	RLN4570A	PMMN4024A	150.80							
				157.90							
				165.00	6.27	-0.410	0.543	0.386	0.30	0.21	JsT-Ab-110628-02
PMAD4117A (136-155MHz)	PMNN4407A	RLN4570A	PMMN4024A	150.80							
				152.50	6.29	-0.150	0.799	0.577	0.41	0.30	JsT-Ab-110628-03
				155.00							

Table 13 (Continued)

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4118A (152-174MHz)	PMNN4407A	RLN4570A	PMMN4024A	152.50							
				157.90							
				165.00							
				167.00	6.30	-0.440	0.839	0.592	0.46	0.33	JsT-Ab-110628-04
				173.40							
PMAD4120A (146-160MHz)	PMNN4407A	RLN4570A	PMMN4024A	150.80	6.19	-0.730	1.69	0.958	**1.00**	0.57	JsT-Ab-110629-02
				155.00							
				160.00							
PMAD4121A (160-174MHz)	PMNN4407A	RLN4570A	PMMN4024A	160.00							
				167.00	6.25	-0.590	0.993	0.588	0.57	0.34	JsT-Ab-110629-03
				173.40							

Assessment of the worst case antenna from above with body worn accessory RLN4570A with additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories.

Table 14

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4120A (146-160MHz)	PMNN4412A	RLN4570A	PMMN4024A	150.80	6.08	-0.830	1.03	0.700	0.62	0.42	JsT-Ab-110629-04
	PMNN4406A				6.12	-1.10	1.22	0.797	**0.79**	0.51	JsT-Ab-110629-05
	PMNN4409A				6.09	-0.860	0.905	0.626	0.55	0.38	JsT-Ab-110629-07
	NNTN8129A				6.07	-1.00	1.07	0.747	0.67	0.47	JsT-Ab-110629-08

13.3 Assessments at the Body with Body worn RLN4815A:

Assessment of offered antennas with the default battery and body worn accessory RLN4815A per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to table 12 for highest output power channel.

Table 15

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4116A (144-165MHz)	PMNN4407A	RLN4815A	PMMN4024A	150.80							
				157.90							
				165.00	6.24	-0.540	0.462	0.348	0.26	0.20	JsT-Ab-110629-09
PMAD4117A (136-155MHz)	PMNN4407A	RLN4815A	PMMN4024A	150.80							
				152.50	6.22	-0.220	0.658	0.501	0.35	0.26	JsT-Ab-110629-10
				155.00							
PMAD4118A (152-174MHz)	PMNN4407A	RLN4815A	PMMN4024A	152.50							
				157.90							
				165.00							
				167.00	6.23	-0.710	0.788	0.593	**0.46**	0.35	JsT-Ab-110629-11
				173.40							
PMAD4120A (146-160MHz)	PMNN4407A	RLN4815A	PMMN4024A	150.80	6.28	-0.900	0.637	0.461	0.39	0.28	JsT-Ab-110629-12
				155.00							
				160.00							
PMAD4121A (160-174MHz)	PMNN4407A	RLN4815A	PMMN4024A	160.00							
				167.00	6.26	-1.10	0.408	0.297	0.26	0.19	JsT-Ab-110629-13
				173.40							

Assessment of the worst case antenna from above with body worn accessory RLN4815A with additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories.

Table 16

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4118A (152-174MHz)	PMNN4412A	RLN4815A	PMMN4024A	167.00	5.94	-0.610	0.662	0.505	0.38	0.29	CM-Ab-110629-15
	PMNN4406A				6.30	-0.700	0.855	0.639	**0.50**	0.38	CM-Ab-110629-16
	PMNN4409A				6.15	-0.700	0.677	0.513	0.40	0.30	CM-Ab-110629-17
	NNTN8129A				6.14	-0.690	0.709	0.540	0.42	0.32	CM-Ab-110629-18

13.4 Assessments at the Body with Body worn PMLN4651A:

Assessment of offered antennas with the default battery and body worn accessory PMLN4651A per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to table 12 for highest output power channel.

Table 17

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4116A (144-165MHz)	PMNN4407A	PMLN4651A	PMMN4024A	150.80							
				157.90							
				165.00	6.12	-0.520	0.579	0.385	0.33	0.22	JsT-Ab-110630-02
PMAD4117A (136-155MHz)	PMNN4407A	PMLN4651A	PMMN4024A	150.80							
				152.50	6.15	-0.170	0.946	0.604	0.49	0.31	JsT-Ab-110630-03
				155.00							

Table 17 (Continued)

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4118A (152-174MHz)	PMNN4407A	PMLN4651A	PMMN4024A	152.50							
				157.90							
				167.00	6.27	-0.710	1.19	0.777	**0.70**	0.46	JsT-Ab-110630-04
				165.00							
				173.40							
PMAD4120A (146-160MHz)	PMNN4407A	PMLN4651A	PMMN4024A	150.80	6.08	-1.20	0.914	0.578	0.60	0.38	JsT-Ab-110630-05
				155.00							
				160.00							
PMAD4121A (160-174MHz)	PMNN4407A	PMLN4651A	PMMN4024A	160.00							
				167.00	6.28	-1.30	0.669	0.441	0.45	0.30	JsT-Ab-110630-06
				173.40							

Assessment of the worst case antenna from above with body worn accessory RLN4815A with additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories.

Table 18

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4118A (152-174MHz)	PMNN4412A	RLN4815A	PMMN4024A	167.00	5.93	-0.510	1.15	0.727	**0.65**	0.41	JsT-Ab-110630-07
	PMNN4406A				6.29	-0.650	1.02	0.671	0.59	0.39	JsT-Ab-110630-08
	PMNN4409A				6.12	-0.660	0.942	0.624	0.55	0.36	JsT-Ab-110630-09
	NNTN8129A				5.99	-0.670	1.07	0.683	0.63	0.40	JsT-Ab-110630-10

13.5 Assessments at the Body with Body worn PMLN7008A:

Assessment of offered antennas with the default battery and body worn accessory PMLN7008A per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to table 12 for highest output power channel.

Table 19

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4116A (144-165MHz)	PMNN4407A	PMLN7008A	PMMN4024A	150.80							
				157.90							
				165.00	6.21	-0.530	0.640	0.417	0.36	0.24	JsT-Ab-110630-11
PMAD4117A (136-155MHz)	PMNN4407A	PMLN7008A	PMMN4024A	150.80							
				152.50	6.19	-0.180	0.993	0.628	0.52	0.33	JsT-Ab-110630-12
				155.00							
PMAD4118A (152-174MHz)	PMNN4407A	PMLN7008A	PMMN4024A	152.50							
				157.90							
				165.00							
				167.00	6.29	-0.600	1.21	0.802	**0.69**	0.46	JsT-Ab-110630-13
				173.40							
PMAD4120A (146-160MHz)	PMNN4407A	PMLN7008A	PMMN4024A	150.80	6.12	-1.00	0.939	0.591	0.59	0.37	JsT-Ab-110701-02
				155.00							
				160.00							
PMAD4121A (160-174MHz)	PMNN4407A	PMLN7008A	PMMN4024A	160.00							
				167.00	6.17	-1.10	0.693	0.451	0.45	0.29	JsT-Ab-110701-03
				173.40							

Assessment of the worst case antenna from above with body worn accessory PMLN7008A with additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories.

Table 20

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4118A (152-174MHz)	PMNN4412A	PMLN7008A	PMMN4024A	167.00	5.81	-0.490	1.20	0.756	0.69	0.44	JsT-Ab-110701-04
	PMNN4406A				6.20	-0.630	1.20	0.785	0.69	0.45	JsT-Ab-110701-05
	PMNN4409A				6.04	-0.670	0.980	0.643	0.57	0.38	JsT-Ab-110701-06
	NNTN8129A				5.96	-0.700	1.23	0.781	**0.73**	0.46	JsT-Ab-110701-07

13.6 Assessments at the Body with Body worn PMLN5844A:

Assessment of offered antennas with the default battery and body worn accessory PMLN5844A per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to table 12 for highest output power channel.

Table 21

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4116A (144-165MHz)	PMNN4407A	PMLN5844A	PMMN4024A	150.80							
				157.90							
				165.00	6.14	-0.560	0.514	0.387	0.29	0.22	JsT-Ab-110701-08
PMAD4117A (136-155MHz)	PMNN4407A	PMLN5844A	PMMN4024A	150.80							
				152.50	6.18	-0.220	0.720	0.547	0.38	0.29	JsT-Ab-110701-09
				155.0							

Table 21 (Continued)

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4118A (152-174MHz)	PMNN4407A	PMLN5844A	PMMN4024A	152.50							
				157.90							
				165.00							
				167.00	6.24	-0.760	0.938	0.707	**0.56**	0.42	JsT-Ab-110701-10
				173.40							
PMAD4120A (146-160MHz)	PMNN4407A	PMLN5844A	PMMN4024A	150.80	6.10	-1.10	0.696	0.517	0.45	0.33	JsT-Ab-110701-11
				155.00							
				160.00							
PMAD4121A (160-174MHz)	PMNN4407A	PMLN5844A	PMMN4024A	160.00							
				167.00	6.20	-1.40	0.528	0.395	0.36	0.27	JsT-Ab-110701-12
				173.40							

Assessment of the worst case antenna from above with body worn accessory PMLN5844A with additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories.

Table 22

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4118A (152-174MHz)	PMNN4412A	PMLN5844A	PMMN4024A	167.00	5.77	-0.360	0.821	0.622	0.46	0.35	JsT-Ab-110701-13
	PMNN4406A				6.27	-0.750	0.933	0.705	**0.55**	0.42	JsT-Ab-110701-14
	PMNN4409A				6.10	-0.750	0.775	0.589	0.46	0.35	JsT-Ab-110701-15
	NNTN8129A				5.95	-0.740	0.892	0.679	0.53	0.41	JsT-Ab-110705-02

13.7 Assessments at the Body with Body worn PMLN5842A:

Assessment of offered antennas with the default battery and body worn accessory PMLN5842A per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to table 12 for highest output power channel.

Table 23

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4116A (144-165MHz)	PMNN4407A	PMLN5842A	PMMN4024A	150.80							
				157.90							
				165.00	6.17	-0.650	0.140	0.109	0.08	0.06	JsT-Ab-110705-03
PMAD4117A (136-155MHz)	PMNN4407A	PMLN5842A	PMMN4024A	150.80							
				152.50	6.10	-0.560	0.140	0.110	0.08	0.06	JsT-Ab-110705-06
				155.00							
PMAD4118A (152-174MHz)	PMNN4407A	PMLN5842A	PMMN4024A	152.50							
				157.90							
				165.00							
				167.00	6.23	-1.50	0.237	0.185	**0.17**	0.13	JsT-Ab-110705-05
				173.40							
PMAD4120A (146-160MHz)	PMNN4407A	PMLN5842A	PMMN4024A	150.80	6.10	-0.560	0.140	0.110	0.08	0.06	JsT-Ab-110705-06
				155.00							
				160.00							
PMAD4121A (160-174MHz)	PMNN4407A	PMLN5842A	PMMN4024A	160.00							
				167.00	6.17	-1.60	0.155	0.117	0.11	0.08	JsT-Ab-110705-08
				173.40							

Assessment of the worst case antenna from above with body worn accessory PMLN5842A with additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories.

Table 24

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4118A (152-174MHz)	PMNN4412A	PMLN5842A	PMMN4024A	167.00	5.97	-0.710	0.252	0.197	0.15	0.12	JsT-Ab-110705-09
	PMNN4406A				6.24	-1.50	0.226	0.176	**0.16**	0.12	JsT-Ab-110705-10
	PMNN4409A				6.02	-0.770	0.158	0.125	0.09	0.07	JsT-Ab-110705-11
	NNTN8129A				5.91	-0.790	0.251	0.196	0.15	0.12	JsT-Ab-110705-12

13.8 Assessments at the Body with Body worn HLN6602A

Assessment of offered antennas with the default battery and body worn accessory HLN6602A per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to table 12 for highest output power channel.

Table 25

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4116A (144-165MHz)	PMNN4407A	HLN6602A	PMMN4024A	150.80							
				157.90							
				165.00	6.12	-0.450	0.542	0.392	0.30	0.22	JsT-Ab-110705-13
PMAD4117A (136-155MHz)	PMNN4407A	HLN6602A	PMMN4024A	150.80							
				152.50	6.03	-0.100	0.762	0.556	0.39	0.28	JsT-Ab-110705-14
				155.00							
PMAD4118A (152-174MHz)	PMNN4407A	HLN6602A	PMMN4024A	152.50							
				157.90							
				165.00							
				167.00	6.12	-0.430	0.824	0.595	0.45	0.33	JsT-Ab-110706-02
				173.40							

Table 25 (Continued)

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4120A (146-160MHz)	PMNN4407A	HLN6602A	PMMN4024A	150.80	6.11	-0.800	1.06	0.655	**0.64**	0.39	JsT-Ab-110706-03
				155.00							
				160.00							
PMAD4121A (160-174MHz)	PMNN4407A	HLN6602A	PMMN4024A	160.00							
				167.00	6.22	-0.660	0.683	0.430	0.40	0.25	JsT-Ab-110706-04
				173.40							

Assessment of the worst case antenna from above with body worn accessory HLN6602A with additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories.

Table 26

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4120A (146-150MHz)	PMNN4412A	HLN6602A	PMMN4024A	150.80	5.99	-0.840	0.980	0.620	0.60	0.38	JsT-Ab-110706-05
	PMNN4406A				6.16	-0.740	1.14	0.680	**0.68**	0.40	JsT-Ab-110706-06
	PMNN4409A				6.02	-1.00	0.795	0.527	0.50	0.33	JsT-Ab-110706-07
	NNTN8129A				5.98	-1.10	0.806	0.531	0.52	0.34	JsT-Ab-110706-08

13.9 Assessments at the Body with Body worn PMLN5838A:

Assessment of offered antennas with the default battery and body worn accessory PMLN5838A per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to table 12 for highest output power channel.

Table 27

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4116A (144-165MHz)	PMNN4407A	PMLN5838A	PMMN4024A	150.80							
				157.90							
				165.00	6.14	-0.610	0.299	0.173	0.17	0.10	JsT-Ab-110706-09
PMAD4117A (136-155MHz)	PMNN4407A	PMLN5838A	PMMN4024A	150.80							
				152.50	6.12	-0.260	0.613	0.349	0.33	0.19	JsT-Ab-110706-10
				155.00							
PMAD4118A (152-174MHz)	PMNN4407A	PMLN5838A	PMMN4024A	152.50							
				157.90							
				165.00							
				167.00	6.18	-0.760	0.682	0.391	**0.41**	0.23	JsT-Ab-110706-11
				173.40							
PMAD4120A (146-160MHz)	PMNN4407A	PMLN5838A	PMMN4024A	150.80	6.10	-0.720	0.471	0.271	0.28	0.16	JsT-Ab-110706-12
				155.00							
				160.00							
PMAD4121A (160-174MHz)	PMNN4407A	PMLN5838A	PMMN4024A	160.00							
				167.00	6.24	-1.70	0.333	0.195	0.25	0.14	JsT-Ab-110706-13
				173.40							

Assessment of the worst case antenna from above with body worn accessory PMLN5838A with additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories.

Table 28

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4118A (152-174MHz)	PMNN4412A	PMLN5838A	PMMN4024A	167.00	5.96	-0.680	0.839	0.483	0.49	0.28	JsT-Ab-110706-14
	PMNN4406A				6.23	-0.870	0.622	0.361	0.38	0.22	JsT-Ab-110706-15
	PMNN4409A				6.08	-0.800	0.807	0.443	0.49	0.27	JsT-Ab-110706-16
	NNTN8129A				5.92	-0.830	0.943	0.525	**0.58**	0.32	JsT-Ab-110707-02

13.10 Assessments of wireless BT configurations:

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

Table 29

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4120A	PMNN4407A	RLN4570A	None	150.80	6.10	-0.970	2.07	1.26	**1.29**	0.79	JsT-Ab-110707-03

13.11 Assessments of accessory PMLN5842A with carry strap NTN5243A:

Assessment of offered antennas with the overall worst case audio cable configuration, default battery and body worn accessories PMLN5842A/NTN5243A per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to table 12 for highest output power channel.

Table 30

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4116A (144-165MHz)	PMNN4407A	PMLN5842A /NTN5243A	None	150.80							
				157.90							
				165.00	6.05	-0.780	1.28	0.747	0.77	0.45	JsT-Ab-110711-04
PMAD4117A (136-155MHz)	PMNN4407A	PMLN5842A /NTN5243A	None	150.80							
				152.50	6.12	-0.300	1.63	0.919	0.87	0.49	JsT-Ab-110711-05
				155.00							
PMAD4118A (152-174MHz)	PMNN4407A	PMLN5842A /NTN5243A	None	152.50							
				157.90							
				165.00							
				167.00	6.14	-0.790	2.52	1.76	**1.51**	1.06	JsT-Ab-110711-06
				173.40							
PMAD4120A (146-160MHz)	PMNN4407A	PMLN5842A /NTN5243A	None	150.80	6.06	-0.340	1.19	0.685	0.64	0.37	JsT-Ab-110711-07
				155.00							
				160.00							
PMAD4121A (160-174MHz)	PMNN4407A	PMLN5842A /NTN5243A	None	160.00							
				167.00	6.13	-1.60	1.57	0.904	1.13	0.65	JsT-Ab-110711-08
				173.40							

Assessment of the worst case antenna from above with body worn accessory PMLN5842A/NTN5243A and the additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories.

Table 31

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4118A (152-174MHz)	PMNN4412A	PMLN5842A /NTN5243A	None	167.00	5.88	-0.770	2.83	1.57	1.72	0.96	JsT-Ab-110711-09
	PMNN4406A				6.23	-0.650	2.25	1.39	1.31	0.81	JsT-Ab-110711-10
	PMNN4409A				6.04	-0.430	2.34	1.37	1.29	0.76	JsT-Ab-110711-11
	NNTN8129A				5.98	-0.890	3.27	1.85	**2.01**	1.14	JsT-Ab-110712-02

13.12 Assessments of accessory PMLN5844A with carry strap NTN5243A:

Assessment of offered antennas with the overall worst case audio cable configuration, default battery and body worn accessories PMLN5844A/NTN5243A per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to table 12 for highest output power channel.

Table 32

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4116A (144-165MHz)	PMNN4407A	PMLN5844A /NTN5243A	None	150.80							
				157.90							
				165.00	6.12	-0.780	1.32	1.01	0.79	0.60	JsT-Ab-110712-03
PMAD4117A (136-155MHz)	PMNN4407A	PMLN5844A /NTN5243A	None	150.80							
				152.50	6.17	-0.220	1.33	1.01	0.70	0.53	JsT-Ab-110712-04
				155.00							

Table 32 (Continued)

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4118A (152-174MHz)	PMNN4407A	PMLN5844A /NTN5243A	None	152.50							
				157.90							
				165.00							
				167.00	6.17	-1.00	2.96	2.25	1.86	1.42	JsT-Ab-110712-05
				173.40							
PMAD4120A (146-160MHz)	PMNN4407A	PMLN5844A /NTN5243A	None	150.80	6.01	-0.600	1.24	0.925	0.71	0.53	JsT-Ab-110712-06
				155.00							
				160.00							
PMAD4121A (160-174MHz)	PMNN4407A	PMLN5844A /NTN5243A	None	160.00							
				167.00	6.18	-2.50	2.17	1.51	**1.93**	1.34	JsT-Ab-110712-08
				173.40							

Assessment of the worst case antenna from above with body worn accessory PMLN5844A/NTN5243A and the additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories.

Table 33

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4121A (160-174MHz)	PMNN4412A	PMLN5844A /NTN5243A	None	167.00	5.94	-1.70	1.33	1.00	0.99	0.75	JsT-Ab-110712-09
	PMNN4406A				6.18	-2.20	1.59	1.19	**1.32**	0.99	JsT-Ab-110712-10
	PMNN4409A				6.14	-1.60	1.35	1.01	0.98	0.73	JsT-Ab-110712-11
	NNTN8129A				5.92	-2.00	1.45	1.10	1.16	0.88	JsT-Ab-110712-12

13.13 Assessments of accessory PMLN5838A with carry strapNTN5243A:

Assessment of offered antennas with the overall worst case audio cable configuration, default battery and body worn accessories PMLN5838A/NTN5243A per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories. Refer to table 12 for highest output power channel.

Table 34

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4116A (144-165MHz)	PMNN4407A	PMLN5838A /NTN5243A	None	150.80							
				157.90							
				165.00	6.17	-0.930	1.78	1.02	1.10	0.63	JsT-Ab-110712-13
PMAD4117A (136-155MHz)	PMNN4407A	PMLN5838A /NTN5243A	None	150.80							
				152.50	6.08	-0.220	1.60	0.933	0.84	0.49	JsT-Ab-110712-14
				155.00							
PMAD4118A (152-174MHz)	PMNN4407A	PMLN5838A /NTN5243A	None	152.50							
				157.90							
				165.00							
				167.00	6.12	-0.500	3.25	1.88	**1.82**	1.05	JsT-Ab-110712-15
				173.40							
PMAD4120A (146-160MHz)	PMNN4407A	PMLN5838A /NTN5243A	None	150.80	6.09	-0.280	1.21	0.693	0.65	0.37	JsT-Ab-110713-02
				155.00							
				160.00							
PMAD4121A (160-174MHz)	PMNN4407A	PMLN5838A /NTN5243A	None	160.00							
				167.00	6.22	-1.40	1.72	1.00	1.19	0.69	JsT-Ab-110713-03
				173.40							

Assessment of the worst case antenna from above with body worn accessory

PMLN5838A/NTN5243A and the additional offered batteries per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Body SAR Test Considerations for Body worn Accessories.

Table 35

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4118A (152-174MHz)	PMNN4412A	PMLN5838A /NTN5243A	None	167.00	5.98	-0.740	2.94	1.73	1.75	1.03	JsT-Ab-110713-04
	PMNN4406A				6.21	-0.490	3.07	1.80	1.72	1.01	JsT-Ab-110713-05
	PMNN4409A				6.06	-0.410	3.17	1.80	1.74	0.99	JsT-Ab-110713-06
	NNTN8129A				5.89	-0.680	3.93	2.24	**2.34**	1.33	JsT-Ab-110713-07

13.14 Assessments outside FCC Part 90 at the body:

Assessment using highest SAR configuration from Part 90 assessment above (Run # JsT-Ab-110713-07) across the outside Part 90 band width of each antenna.

Table 36

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4116A (144-165MHz)	NNTN8129A	PMLN5838A /NTN5243A	None	144.00	5.86	-0.250	1.72	1.00	0.93	0.54	JsT-Ab-110713-12
				146.00	5.89	-0.360	2.50	1.39	**1.38**	0.77	JsT-Ab-110714-02
				148.00	5.91	-0.240	1.72	0.994	0.92	0.53	JsT-Ab-110714-03

Table 37

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4117A (136-155MHz)	NNTN8129A	PMLN5838A /NTN5243A	None	136.00	5.87	-0.200	1.56	0.866	0.83	0.46	JsT-Ab-110713-08
				141.00	5.88	-0.290	2.35	1.34	**1.26**	0.72	JsT-Ab-110713-09
				144.00	5.93	-0.610	2.05	1.22	1.19	0.71	JsT-Ab-110713-10
				148.00	5.85	-0.400	1.57	0.957	0.88	0.54	JsT-Ab-110713-11

Table 38

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4120A (146-160MHz)	NNTN8129A	PMLN5838A /NTN5243A	None	146.00	5.92	-0.150	1.44	0.841	0.76	0.44	JsT-Ab-110714-04
				148.00	5.89	-0.560	1.37	0.797	**0.79**	0.46	JsT-Ab-110714-05

Table 39

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4119A (136-148MHz)	NNTN8129A	PMLN5838A /NTN5243A	None	136.00	5.90	-0.032	1.04	0.612	0.53	0.31	JsT-Ab-110714-06
				141.00	5.93	-1.30	1.67	0.983	**1.14**	0.67	JsT-Ab-110714-07
				148.00	5.90	-1.20	0.917	0.546	0.61	0.37	JsT-Ab-110714-08

13.15 Assessments at the Face:

The highest capacity battery NNTN8129A was selected as the default battery. The conducted power measurement for all test channels within Part 90 frequency range (150.8-173.4MHz) using battery NNTN8129A is listed in the table 40. The channel with 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 appendices E-G.

Table 40

Test Freq (MHz)	Power (W)
150.8	6.00
152.5	6.00
155	5.83
157.9	5.76
160	5.80
165	5.83
167	5.88
173.4	5.92

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 41 for highest output power channel.

Table 41

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4116A (144-165MHz)	NNTN8129A	None	None	150.80	5.93	-0.390	1.14	0.874	0.63	0.48	JsT-Face-110707-05
				157.90							
				165.00							
PMAD4117A (136-155MHz)	NNTN8129A	None	None	150.80	5.95	-0.410	1.46	1.11	**0.81**	0.62	JsT-Face-110707-06
				152.50							
				155.00							
PMAD4118A (152-174MHz)	NNTN8129A	None	None	152.50	5.97	-0.410	0.710	0.548	0.39	0.30	JsT-Face-110707-07
				157.90							
				165.00							
				167.00							
				173.40							
PMAD4120A (146-160MHz)	NNTN8129A	None	None	150.80	5.92	-0.190	0.937	0.715	0.50	0.38	JsT-Face-110707-08
				155.00							
				160.00							
PMAD4121A (160-174MHz)	NNTN8129A	None	None	160.00							
				167.00							
				173.40	5.95	-1.20	0.648	0.492	0.43	0.33	JsT-Face-110707-09

Assessment of additional offered batteries using the highest SAR antenna from face assessment above per KDB 643646 D01 SAR Test for PTT Radios v01r01 – Head SAR Test Considerations.

Table 42

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4117A (136-155MHz)	PMNN4407A	None	None	150.80	6.10	-0.490	1.46	1.12	**0.82**	0.63	JsT-Face-110707-10
	PMNN4412A				5.86	-0.340	1.36	1.04	0.75	0.58	JsT-Face-110707-11
	PMNN4406A				6.08	-0.590	1.42	1.08	0.81	0.62	JsT-Face-110711-02
	PMNN4409A				5.98	-0.420	1.37	1.05	0.76	0.58	JsT-Face-110711-03

13.16 Assessment of outside FCC Part 90 at the face:

Assessment using highest SAR configuration from Part 90 assessment above (Run # JsT-Face-110707-10) across the outside Part 90 band width of each antenna.

Table 43

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4116A (144-165MHz)	PMNN4407A	None	None	144.00	5.94	-0.210	0.912	0.706	0.48	0.37	CM-Face-110714-15
				146.00	5.89	-0.200	1.32	1.02	**0.70**	0.54	CM-Face-110714-16
				148.00	5.88	-0.360	1.24	0.961	0.69	0.53	CM-Face-110714-17

Table 44

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4117A (136-155MHz)	PMNN4407A	None	None	136.00	5.87	-0.240	0.706	0.546	0.38	0.29	JsT-Face-110714-11
				141.00	5.90	-0.270	1.12	0.872	0.61	0.47	JsT-Face-110714-12
				144.00	6.28	-0.700	1.66	1.28	**0.98**	0.752	HvH-Face-110715-08
				148.00	5.88	-0.430	1.25	0.967	0.70	0.54	JsT-Face-110714-14

Table 45

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4120A (146-160MHz)	PMNN4407A	None	None	146.00	5.86	0.780	0.899	0.686	0.46	0.35	HvH-Face-110715-02
				148.00	5.78	-0.410	0.925	0.705	**0.53**	0.40	HvH-Face-110715-03

Table 46

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4119A (136-148MHz)	PMNN4407A	None	None	136.00	5.79	0.160	0.595	0.454	0.31	0.24	HvH-Face-110715-06
				141.00	5.83	-0.530	1.18	0.902	**0.69**	0.52	HvH-Face-110715-05
				148.00	5.78	-1.29	0.747	0.565	0.52	0.39	HvH-Face-110715-07

13.17 Assessment of the BT band:

Assessment of the BT band at center frequency using the overall worst case configuration from both body and face assessments herein. The max calc SAR is added to the overall highest SAR result of the primary transmitter to obtain the simultaneous result in section 15.0.

Table 47

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
BT 0104039J80 (2402-2481 MHz)	NNTN8129A	PMLN5838A /NTN5243	None	2441.00	0.01	-1.50	0.0046	0.0025	0.0050	0.0027	JsT-Ab-110720-02

13.18 Shorten Scan Assessment:

Short scan assessment: A "shortened" scan was performed to validate the SAR drift of the full DASY4™ coarse and 5x5x7 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 5x5x7 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. Both SAR results from the table below are provided in APPENDIX E.

TABLE 48

Antenna	Battery	Carry Accessory	Cable Accessory	Test Freq (MHz)	Init Pwr (W)	SAR Drift (dB)	Meas. 1g-SAR (mW/g)	Meas. 10g-SAR (mW/g)	Max Calc. 1g-SAR (mW/g)	Max Calc. 10g-SAR (mW/g)	Run#
PMAD4118A (152-174MHz)	NNTN8129A	PMLN5838A /NTN5243A	None	167.00	5.91	-0.260	4.10	2.26	**2.21**	1.22	JsT-Ab-110714-10

14.0 Simultaneous Transmission Exclusion:

Simultaneous Transmission applies. See section 15.0.

15.0 Conclusion:

The highest Operational Maximum Calculated 1-gram and 10-gram average SAR values found for this filing: Models PMUD2904A and PMUD2906A.

Results for FCC Part 90 (150.8-173.4 MHz)

TABLE 49

	Max Calc at Body (W/kg)		Simultaneous Tx	
Frequency Range (MHz)	1g-SAR	10g-SAR	1g-SAR	10g-SAR
150.8 – 173.4	2.34	1.33	2.35	1.33

Table 50

	Max Calc at Face (W/kg)		Simultaneous Tx	
Frequency Range (MHz)	1g-SAR	10g-SAR	1g-SAR	10g-SAR
150.8 – 173.4	0.82	0.63	NA	NA

Results for outside Part 90 (136-174 MHz)

TABLE 51

Frequency Range (MHz)	Max Calc at Body (W/kg)		Simultaneous Tx	
	1g-SAR	10g-SAR	1g-SAR	10g-SAR
136-174	2.34	1.33	2.35	1.33

TABLE 52

Frequency Range (MHz)	Max Calc at Face (W/kg)		Simultaneous Tx	
	1g-SAR	10g-SAR	1g-SAR	10g-SAR
136-174	0.98	0.75	NA	NA

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.

APPENDIX A
Measurement Uncertainty

The Measurement Uncertainty tables indicated in this APPENDIX are applicable to the DUT test frequencies ranging from 100MHz to 800MHz, 800MHz to 3GHz and for Dipole test frequencies ranging from 300MHz to 800MHz and 800MHZ to 3GHz. Therefore, the highest tolerance for the probe calibration uncertainty is indicated.

Table A1:

Uncertainty Budget for Device Under Test, for 100 MHz to 800 MHz

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*
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 (±%)**
Measurement System								
Probe Calibration	E.2.1	10.0	N	1.00	1	1	10.0	10.0
Axial Isotropy	E.2.2	4.7	R	1.73	0.707	0.707	1.9	1.9
Hemispherical Isotropy	E.2.2	9.6	R	1.73	0.707	0.707	3.9	3.9
Boundary Effect	E.2.3	1.0	R	1.73	1	1	0.6	0.6
Linearity	E.2.4	4.7	R	1.73	1	1	2.7	2.7
System Detection Limits	E.2.5	1.0	R	1.73	1	1	0.6	0.6
Readout Electronics	E.2.6	0.3	N	1.00	1	1	0.3	0.3
Response Time	E.2.7	1.1	R	1.73	1	1	0.6	0.6
Integration Time	E.2.8	1.1	R	1.73	1	1	0.6	0.6
RF Ambient Conditions - Noise	E.6.1	3.0	R	1.73	1	1	1.7	1.7
RF Ambient Conditions - Reflections	E.6.1	0.0	R	1.73	1	1	0.0	0.0
Probe Positioner Mech. Tolerance	E.6.2	0.4	R	1.73	1	1	0.2	0.2
Probe Positioning w.r.t Phantom	E.6.3	1.4	R	1.73	1	1	0.8	0.8
Max. SAR Evaluation (ext., int., avg.)	E.5	3.4	R	1.73	1	1	2.0	2.0
Test sample Related								
Test Sample Positioning	E.4.2	3.2	N	1.00	1	1	3.2	3.2
Device Holder Uncertainty	E.4.1	4.0	N	1.00	1	1	4.0	4.0
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				14	13
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=2				27	27

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Table A2:

Uncertainty Budget for System Validation (dipole & flat phantom) for 300 MHz to 800 MHz

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*
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 (±%)**
Measurement System								
Probe Calibration	E.2.1	9.0	N	1.00	1	1	9.0	9.0
Axial Isotropy	E.2.2	4.7	R	1.73	1	1	2.7	2.7
Spherical Isotropy	E.2.2	9.6	R	1.73	0	0	0.0	0.0
Boundary Effect	E.2.3	1.0	R	1.73	1	1	0.6	0.6
Linearity	E.2.4	4.7	R	1.73	1	1	2.7	2.7
System Detection Limits	E.2.5	1.0	R	1.73	1	1	0.6	0.6
Readout Electronics	E.2.6	0.3	N	1.00	1	1	0.3	0.3
Response Time	E.2.7	1.1	R	1.73	1	1	0.6	0.6
Integration Time	E.2.8	0.0	R	1.73	1	1	0.0	0.0
RF Ambient Conditions - Noise	E.6.1	3.0	R	1.73	1	1	1.7	1.7
RF Ambient Conditions - Reflections	E.6.1	0.0	R	1.73	1	1	0.0	0.0
Probe Positioner Mechanical Tolerance	E.6.2	0.4	R	1.73	1	1	0.2	0.2
Probe Positioning w.r.t. Phantom	E.6.3	1.4	R	1.73	1	1	0.8	0.8
Max. SAR Evaluation (ext., int., avg.)	E.5	3.4	R	1.73	1	1	2.0	2.0
Dipole								
Dipole Axis to Liquid Distance	8, E.4.2	2.0	R	1.73	1	1	1.2	1.2
Input Power and SAR Drift Measurement	8, 6.6.2	5.0	R	1.73	1	1	2.9	2.9
Phantom and Tissue Parameters								
Phantom Uncertainty	E.3.1	4.0	R	1.73	1	1	2.3	2.3
Liquid Conductivity (target)	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2
Liquid Conductivity (measurement)	E.3.3	3.3	R	1.73	0.64	0.43	1.2	0.8
Liquid Permittivity (target)	E.3.2	5.0	R	1.73	0.6	0.49	1.7	1.4
Liquid Permittivity (measurement)	E.3.3	1.9	R	1.73	0.6	0.49	0.6	0.5
Combined Standard Uncertainty			RSS				11	11
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=2				22	22

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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	5.9	N	1.00	1	1	5.9	5.9	∞
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	411
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=2				22	22	

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

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*	*k*
Uncertainty Component	IEEE 1528 section	**Tol. (± %)**	**Prob. Dist.**	**Div.**	c_i (1 g)	c_i (10 g)	**1 g** u_i (±%)	**10 g** u_i (±%)	v_i
Measurement System									
Probe Calibration	E.2.1	5.9	N	1.00	1	1	5.9	5.9	∞
Axial Isotropy	E.2.2	4.7	R	1.73	1	1	2.7	2.7	∞
Spherical Isotropy	E.2.2	9.6	R	1.73	0	0	0.0	0.0	∞
Boundary Effect	E.2.3	1.0	R	1.73	1	1	0.6	0.6	∞
Linearity	E.2.4	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1.0	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	0.3	N	1.00	1	1	0.3	0.3	∞
Response Time	E.2.7	1.1	R	1.73	1	1	0.6	0.6	∞
Integration Time	E.2.8	0.0	R	1.73	1	1	0.0	0.0	∞
RF Ambient Conditions - Noise	E.6.1	3.0	R	1.73	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	E.6.1	0.0	R	1.73	1	1	0.0	0.0	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.4	R	1.73	1	1	0.2	0.2	∞
Probe Positioning w.r.t. Phantom	E.6.3	1.4	R	1.73	1	1	0.8	0.8	∞
Max. SAR Evaluation (ext., int., avg.)	E.5	3.4	R	1.73	1	1	2.0	2.0	∞
Dipole									
Dipole Axis to Liquid Distance	8, E.4.2	2.0	R	1.73	1	1	1.2	1.2	∞
Input Power and SAR Drift Measurement	8, 6.6.2	5.0	R	1.73	1	1	2.9	2.9	∞
Phantom and Tissue Parameters									
Phantom Uncertainty	E.3.1	4.0	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity (target)	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (measurement)	E.3.3	3.3	R	1.73	0.64	0.43	1.2	0.8	∞
Liquid Permittivity (target)	E.3.2	5.0	R	1.73	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (measurement)	E.3.3	1.9	R	1.73	0.6	0.49	0.6	0.5	∞
Combined Standard Uncertainty			RSS				9	9	99999
Expanded Uncertainty (95% CONFIDENCE LEVEL)			*k*=2				18	17	

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Notes for Tables 1, 2, 3 and 4
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
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 CGISS

Certificate No: ES3-3185_Nov09

CALIBRATION CERTIFICATE

Object	ES3DV3 - SN:3185
Calibration procedure(s)	QA CAL-01.v6, QA CAL-12.v6, QA CAL-14.v3, QA CAL-23.v3 and QA CAL-25.v2 Calibration procedure for dosimetric E-field probes
Calibration date:	November 23, 2009

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	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41495277	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41498087	1-Apr-09 (No. 217-01030)	Apr-10
Reference 3 dB Attenuator	SN: S5054 (3c)	31-Mar-09 (No. 217-01026)	Mar-10
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-09 (No. 217-01028)	Mar-10
Reference 30 dB Attenuator	SN: S5129 (30b)	31-Mar-09 (No. 217-01027)	Mar-10
Reference Probe ES3DV2	SN: 3013	2-Jan-09 (No. ES3-3013_Jan09)	Jan-10
DAE4	SN: 660	29-Sep-09 (No. DAE4-660_Sep09)	Sep-10

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-09)	In house check: Oct10

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Niels Kuster	Quality Manager	

Issued: November 23, 2009

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

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

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

Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect 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.
- *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:3185

Manufactured:	March 25, 2008
Last calibrated:	November 18, 2008
Recalibrated:	November 23, 2009

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ES3DV3 SN:3185

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.36	1.27	1.11	± 10.1%
DCP (mV)[B]	93.1	92.7	92.9	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dBuV	C	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	300	± 1.5%
			Y	0.00	0.00	1.00	300	
			Z	0.00	0.00	1.00	300	

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 maximum deviation from linear response applying recatangular distribution and is expressed for the square of the field value.

DASY - Parameters of Probe: ES3DV3 SN:3185

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz]	Validity [MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
300	± 50 / ± 100	45.3 ± 5%	0.87 ± 5%	6.68	6.68	6.68	0.24	0.92 ± 13.3%
450	± 50 / ± 100	43.5 ± 5%	0.87 ± 5%	6.08	6.08	6.08	0.22	1.49 ± 13.3%
750	± 50 / ± 100	41.9 ± 5%	0.89 ± 5%	5.96	5.96	5.96	0.92	1.04 ± 11.0%
900	± 50 / ± 100	41.5 ± 5%	0.97 ± 5%	5.63	5.63	5.63	0.64	1.21 ± 11.0%
1810	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	4.83	4.83	4.83	0.41	1.71 ± 11.0%
1950	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	4.65	4.65	4.65	0.55	1.44 ± 11.0%
2300	± 50 / ± 100	39.5 ± 5%	1.67 ± 5%	4.53	4.53	4.53	0.40	1.83 ± 11.0%
2450	± 50 / ± 100	39.2 ± 5%	1.80 ± 5%	4.22	4.22	4.22	0.41	1.87 ± 11.0%
2600	± 50 / ± 100	39.0 ± 5%	1.96 ± 5%	4.17	4.17	4.17	0.44	1.89 ± 11.0%
3500	± 50 / ± 100	37.9 ± 5%	2.91 ± 5%	3.99	3.99	3.99	0.85	1.21 ± 13.1%
3700	± 50 / ± 101	37.7 ± 5%	3.12 ± 5%	3.64	3.64	3.64	0.85	1.21 ± 13.1%

[C] The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

DASY - Parameters of Probe: ES3DV3 SN:3185

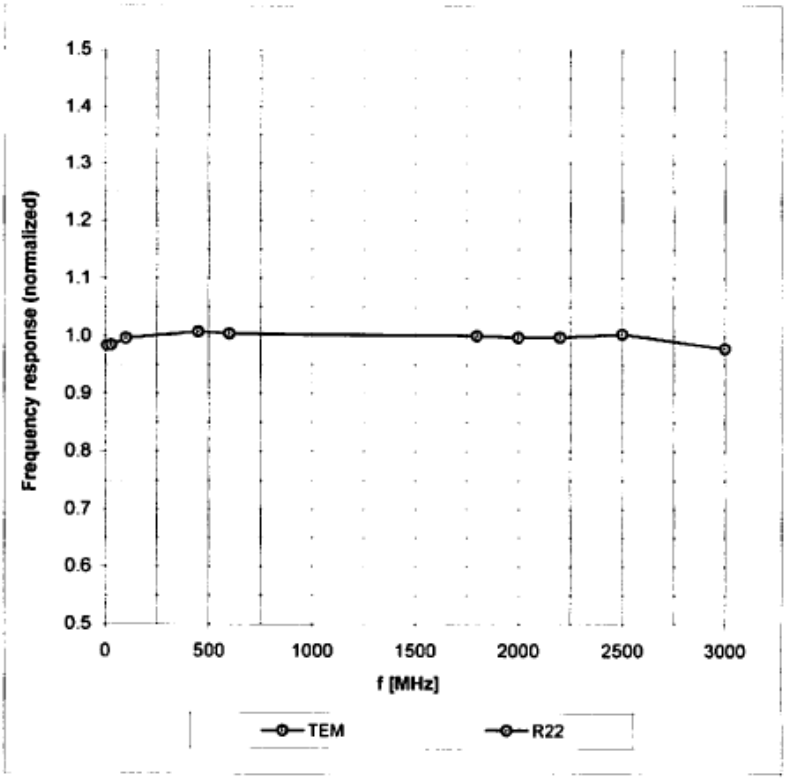
Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz]	Validity [MHz][c]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth	Unc (k=2)
450	± 50 / ± 100	56.7 ± 5%	0.94 ± 5%	6.55	6.55	6.55	0.17	1.00	± 13.3%
750	± 50 / ± 100	55.5 ± 5%	0.96 ± 5%	5.60	5.60	5.60	0.76	1.15	± 11.0%
900	± 50 / ± 100	55.0 ± 5%	1.05 ± 5%	5.48	5.48	5.48	0.94	1.10	± 11.0%
1810	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	4.57	4.57	4.57	0.29	2.39	± 11.0%
1950	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	4.52	4.52	4.52	0.30	2.70	± 11.0%
2300	± 50 / ± 100	52.8 ± 5%	1.85 ± 5%	4.21	4.21	4.21	0.46	1.74	± 11.0%
2450	± 50 / ± 100	52.7 ± 5%	1.95 ± 5%	4.02	4.02	4.02	0.58	1.44	± 11.0%
2600	± 50 / ± 100	52.5 ± 5%	2.16 ± 5%	3.92	3.92	3.92	0.82	1.20	± 11.0%
3500	± 50 / ± 100	51.3 ± 5%	3.31 ± 5%	3.33	3.33	3.33	0.90	1.32	± 13.1%
3700	± 50 / ± 101	51.0 ± 5%	3.55 ± 5%	3.26	3.26	3.26	0.90	1.46	± 13.1%

[c] The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

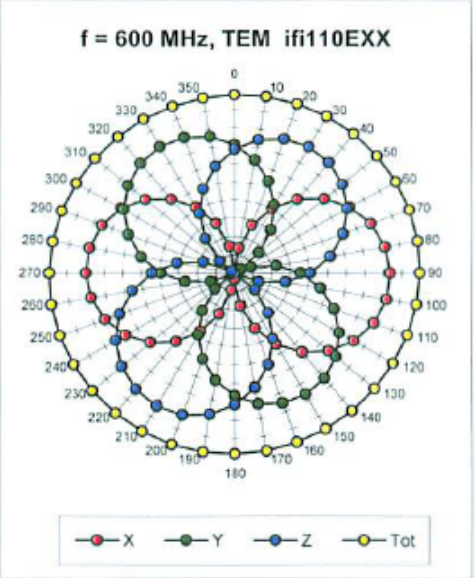
Frequency Response of E-Field

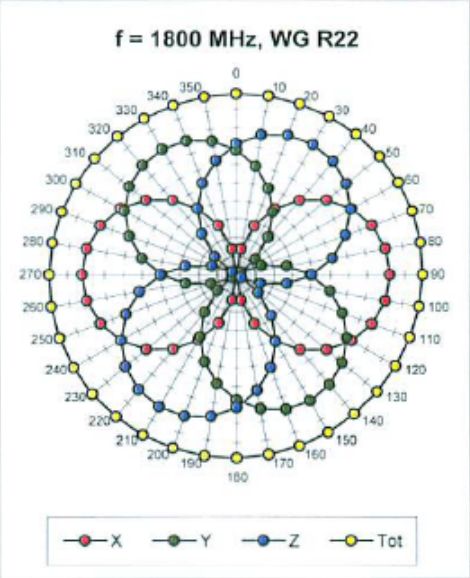
(TEM-Cell:ifi110 EXX, Waveguide: R22)

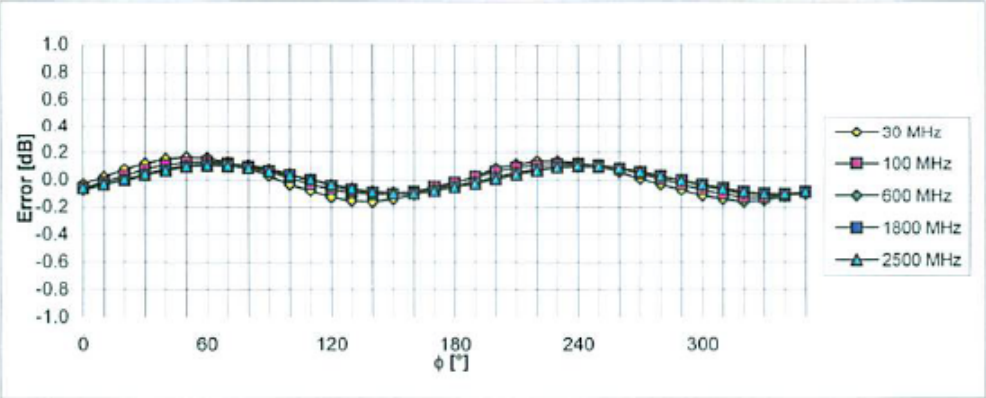


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



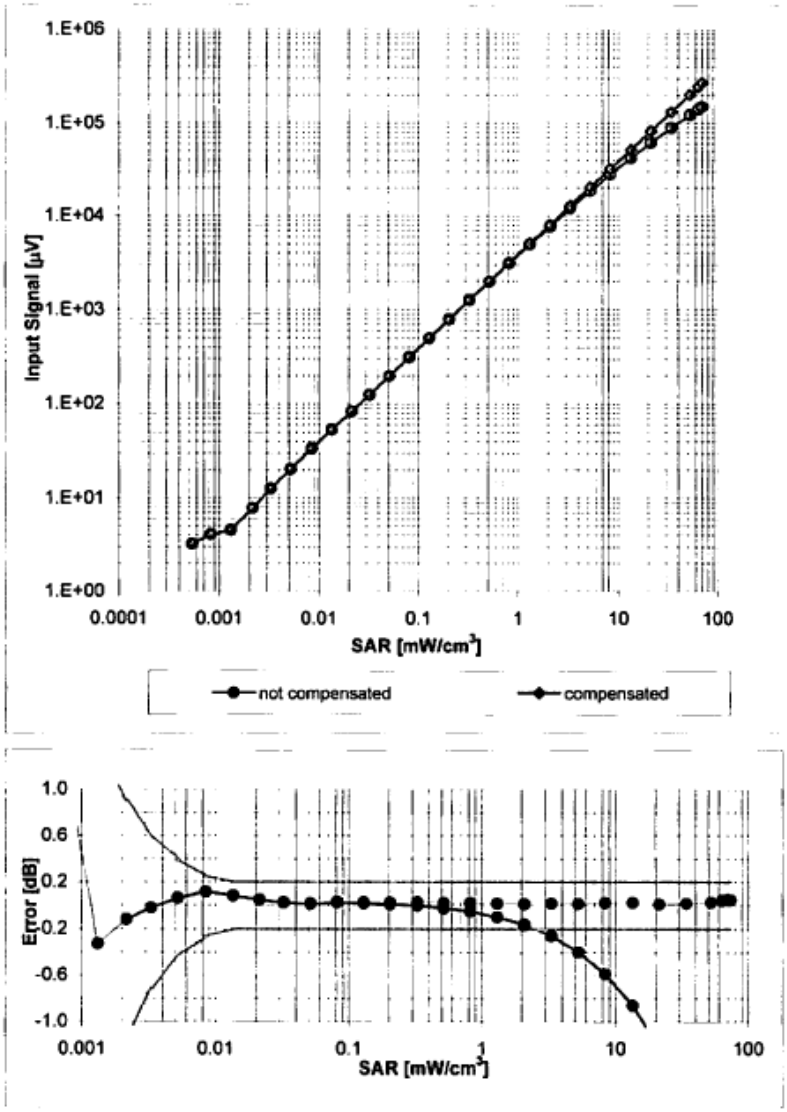




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

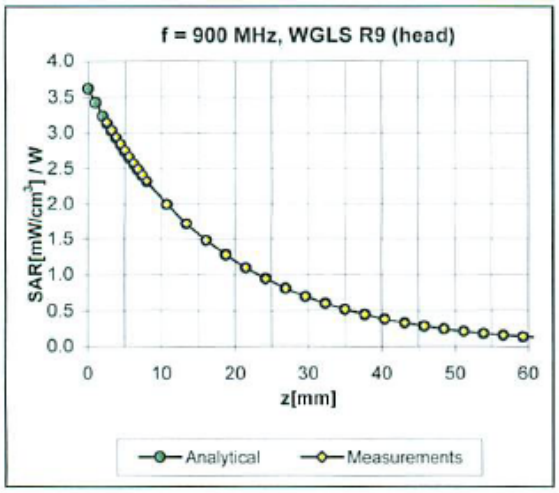
Dynamic Range f(SAR_{head})

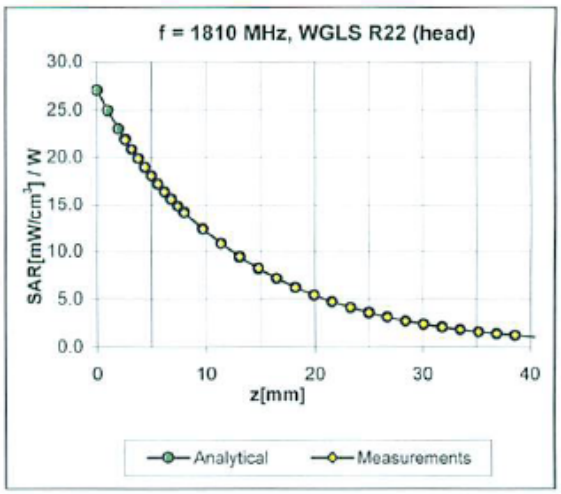
(Waveguide R22, f = 1800 MHz)



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

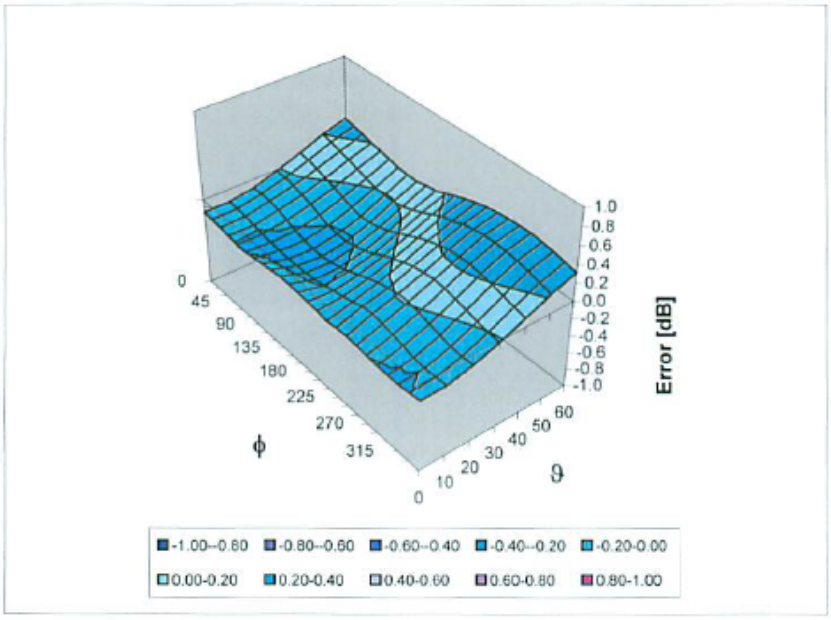
Conversion Factor Assessment





Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



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

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
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	4.0 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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info@speag.com, http://www.speag.com

Additional Conversion Factors

for Dosimetric E-Field Probe

Type:	**ES3DV3**
Serial Number:	**3185**
Place of Assessment:	**Zurich**
Date of Assessment:	**November 26, 2009**
Probe Calibration Date:	**November 23, 2009**

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 900 MHz or at 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:3185

Conversion factor (± standard deviation)

150 MHz	*ConvF*	**7.7 ± 10%**	ε_r = 52.3 σ = 0.76 mho/m (head tissue)
250 MHz	*ConvF*	**7.0 ± 10%**	ε_r = 47.6 σ = 0.83 mho/m (head tissue)
150 MHz	*ConvF*	**7.4 ± 10%**	ε_r = 61.9 σ = 0.80 mho/m (body tissue)
250 MHz	*ConvF*	**7.0 ± 10%**	ε_r = 59.4 σ = 0.88 mho/m (body tissue)
300 MHz	*ConvF*	**6.9 ± 9%**	ε_r = 58.2 σ = 0.92 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 Section 4.7 of the DASY4 Manual.

APPENDIX C
Dipole Calibration Certificates

Calibration Laboratory of
Schmid & Partner
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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 EME

Certificate No: D300V3-1014_Jan11

CALIBRATION CERTIFICATE

Object: D300V3 - SN: 1014

Calibration procedure(s): QA CAL-15.v5
Calibration Procedure for dipole validation kits below 800 MHz

Calibration date: January 11, 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 (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41495277	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41498087	1-Apr-10 (No. 217-01136)	Apr-11
Reference 3 dB Attenuator	SN: S5054 (3c)	30-Mar-10 (No. 217-01159)	Mar-11
Reference 20 dB Attenuator	SN: S5086 (20b)	30-Mar-10 (No. 217-01161)	Mar-11
Type-N mismatch combination	SN: 5047.3 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe ET3DV6	SN: 1507	30-Apr-10 (No. ET3-1507_Apr10)	Apr-11
DAE4	SN: 654	23-Apr-10 (No. DAE4-654_Apr10)	Apr-11

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	04-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:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 13, 2011

Calibration Laboratory of
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Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
ConF	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
Extrapolation	Advanced Extrapolation	
Phantom	ELI4 Flat Phantom	Shell thickness: 2 ± 0.2 mm
Distance Dipole Center - TSL	15 mm	with Spacer
Area Scan Resolution	dx, dy = 15 mm	
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	300 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	45.3	0.87 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	45.9 ± 6 %	0.90 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	398 mW input power	1.20 mW / g
SAR normalized	normalized to 1W	3.02 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**2.94 mW / g ± 18.1 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	398 mW input power	0.79 mW / g
SAR normalized	normalized to 1W	1.98 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**1.93 mW / g ± 17.6 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	58.2	0.92 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	58.8 ± 6 %	0.91 mho/m ± 6 %
Body TSL temperature during test	(22.0 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	condition	
SAR measured	398 mW input power	1.16 mW / g
SAR normalized	normalized to 1W	2.91 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**2.95 mW / g ± 18.1 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	398 mW input power	0.79 mW / g
SAR normalized	normalized to 1W	1.74 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**1.99 mW / g ± 17.6 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	56.4 Ω - 5.5 jΩ
Return Loss	- 22.1 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	51.8 Ω - 9.8 jΩ
Return Loss	- 20.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.742 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	November 30, 2010

DASY5 Validation Report for Head TSL

Date/Time: 11.01.2011 14:40:33

Test Laboratory: SPEAG, Zurich, Switzerland

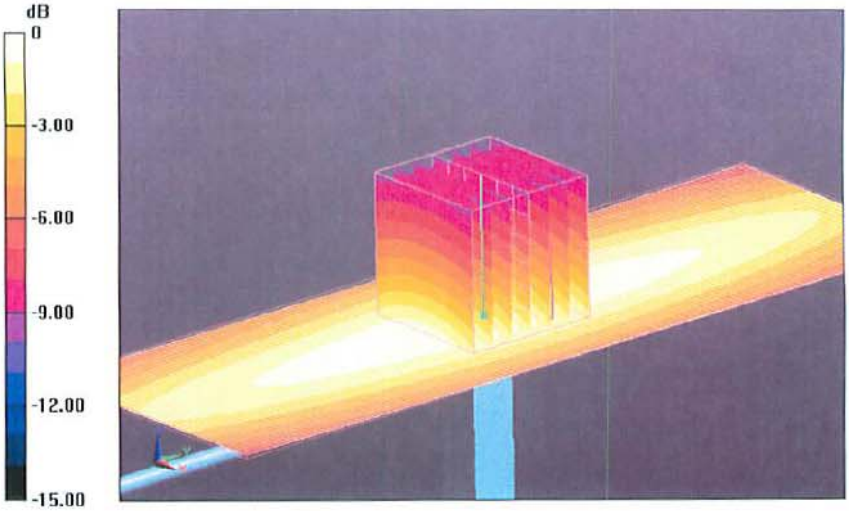
DUT: Dipole 300 MHz; Type: D300V3; Serial: D300V3 - SN:1014

Communication System: CW; Frequency: 300 MHz; Duty Cycle: 1:1
Medium: HSL300
Medium parameters used: f = 300 MHz; σ = 0.9 mho/m; ε_r = 45.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

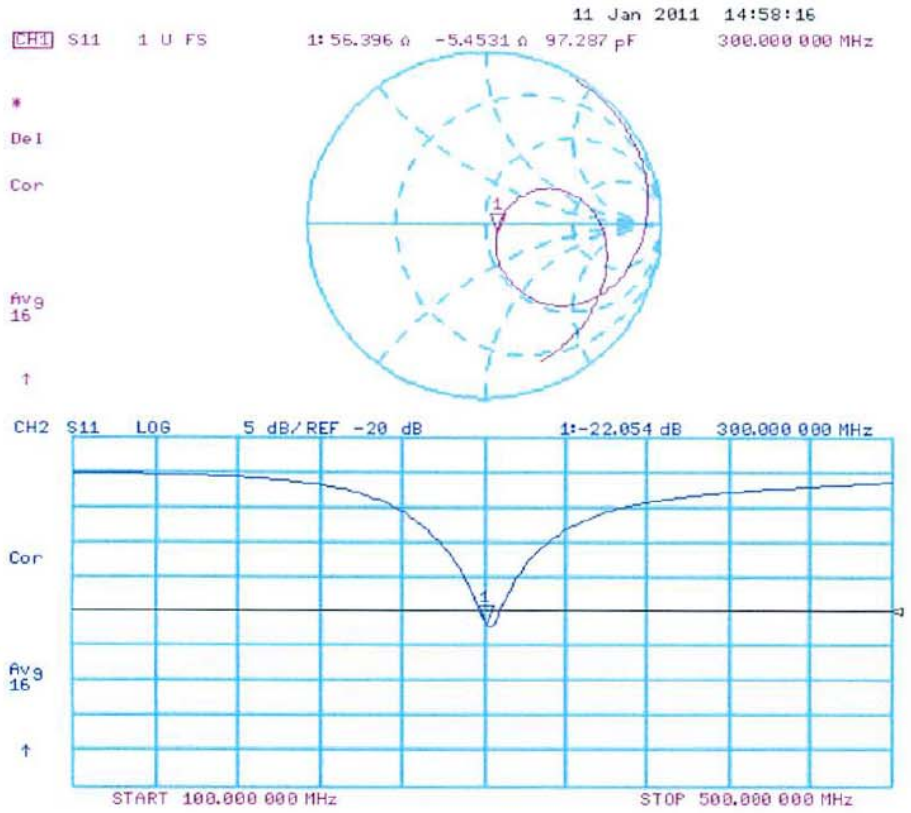
- Probe: ET3DV6 - SN1507; ConvF(7.39, 7.39, 7.39); Calibrated: 30.04.2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn654; Calibrated: 23.04.2010
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1002
- Measurement SW: DASY52, V52.6.1 Build (408)
- Postprocessing SW: SEMCAD X, V14.4.2 Build (2595)

Pin=398mW/d=15mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 38.229 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.986 W/kg
SAR(1 g) = 1.2 mW/g; SAR(10 g) = 0.788 mW/g
Maximum value of SAR (measured) = 1.266 mW/g



0 dB = 1.270mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date/Time: 11.01.2011 16:14:30

Test Laboratory: SPEAG, Zurich, Switzerland

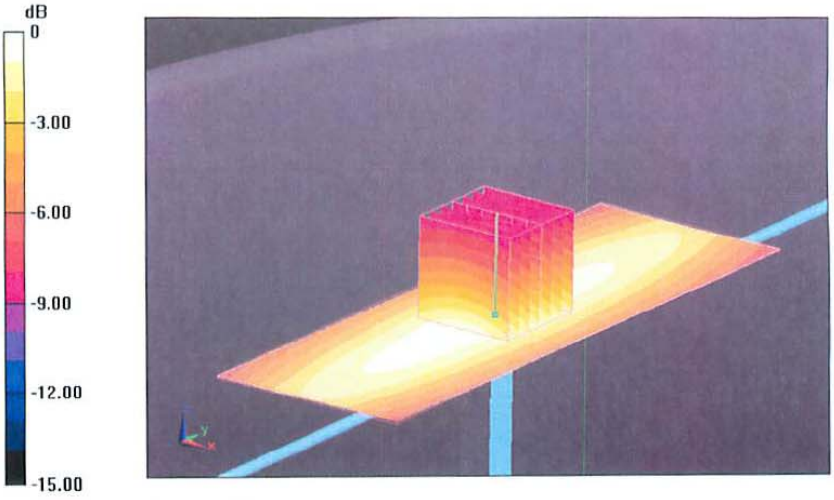
DUT: Dipole 300 MHz; Type: D300V3; Serial: D300V3 - SN:1007

Communication System: CW; Frequency: 300 MHz; Duty Cycle: 1:1
Medium: MSL300
Medium parameters used: f = 300 MHz; σ = 0.9 mho/m; ε_r = 60; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

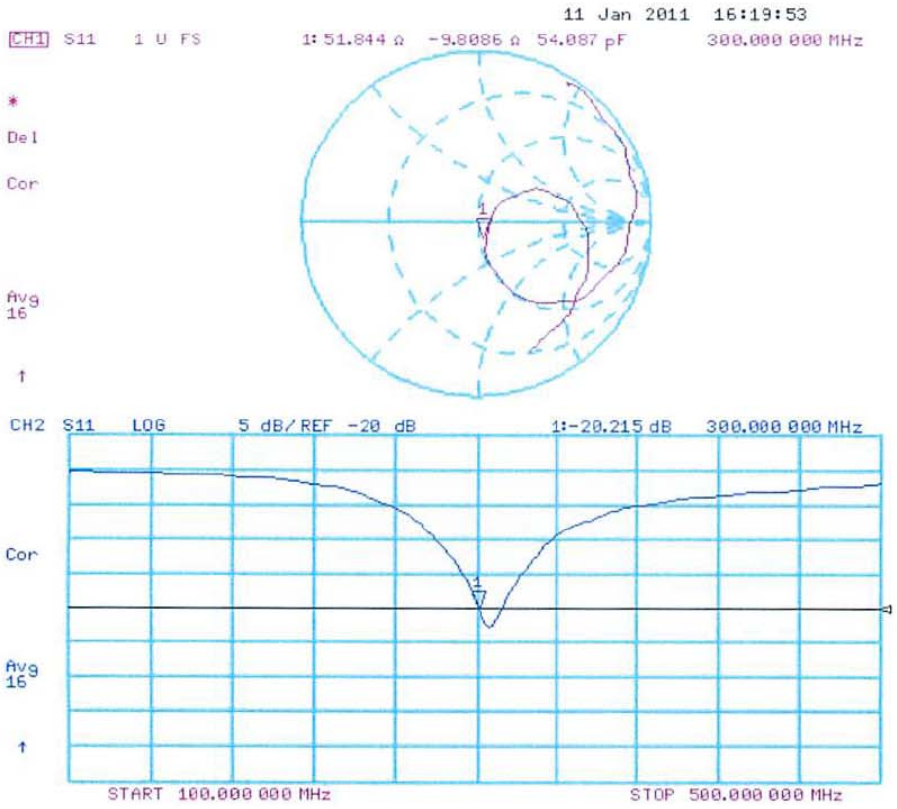
- Probe: ET3DV6 - SN1507; ConvF(6.88, 6.88, 6.88) Calibrated: 30.04.2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn654; Calibrated: 23.04.2010
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1002
- Measurement SW: DASY52, V52.6.1 Build (408)
- Postprocessing SW: SEMCAD X, V14.4.2 Build (2595)

Pin=398mW/d=15mm, Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 38.325 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.735 W/kg
SAR(1 g) = 1.16 mW/g; SAR(10 g) = 0.786 mW/g
Maximum value of SAR (measured) = 1.235 mW/g



0 dB = 1.240mW/g

Impedance Measurement Plot for Body TSL



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Accreditation No.: **SCS 108**

Client **Motorola EME**

Certificate No: **D2450V2-704_Nov10**

CALIBRATION CERTIFICATE

Object: D2450V2 - SN: 704

Calibration procedure(s): QA CAL-05.v7
Calibration procedure for dipole validation kits

Calibration date: November 25, 2010

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)	30-Mar-10 (No. 217-01158)	Mar-11
Type-N mismatch combination	SN: 5047.2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
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:	Dimce Iliev	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: November 25, 2010

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

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

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

Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
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	V52.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
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	38.8 ± 6 %	1.72 mho/m ± 6 %
Head TSL temperature during test	(21.5 ± 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	13.1 mW / g
SAR normalized	normalized to 1W	52.4 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**53.4 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.15 mW / g
SAR normalized	normalized to 1W	24.6 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**24.7 mW /g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	55.2 Ω + 0.4 jΩ
Return Loss	- 26.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.152 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	March 22, 2001

DASY5 Validation Report for Head TSL

Date/Time: 25.11.2010 14:18:31

Test Laboratory: SPEAG, Zurich, Switzerland

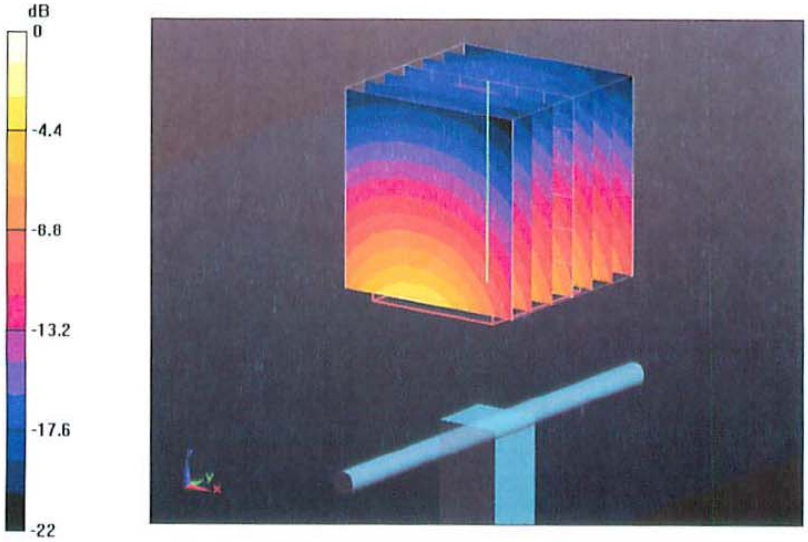
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:704

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: HSL U12 BB
Medium parameters used: f = 2450 MHz; σ = 1.72 mho/m; ε_r = 38.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.53, 4.53, 4.53); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

Pin=250 mW/d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 101.6 V/m; Power Drift = 0.037 dB
Peak SAR (extrapolated) = 26.8 W/kg
SAR(1 g) = 13.1 mW/g; SAR(10 g) = 6.15 mW/g
Maximum value of SAR (measured) = 16.5 mW/g



0 dB = 16.5mW/g

Impedance Measurement Plot for Head TSL