Certificate Number: 1449-01

MOTOROLA

ACCREDITED

CGISS EME Test Laboratory
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S.A.R. EME Compliance Test Report Part 1 of 2

Date of Report:	June 2, 2004
Report Revision:	Rev. O
Manufacturer:	Motorola
Product Description:	PR400; Portable VHF 136-162 MHz 1-5W; 64 Channel w/ display and full keypad
FCC ID:	**ABZ99FT3039**
Device Model:	PMUD1985A

Test Period:	5/15/04-5/21/04
Technician:	Ed Church (EME Technician Electronics II)
Responsible Eng:	Deanna Zakharia (Elect. Principle Staff Eng.)
Author:	Michael Sailsman (Global EME Regulatory Affairs Liaison)

Note: 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 2.0 of this report.

Signature on File — 6/3/04

Ken Enger
Senior Resource Manager, Laboratory Director, CGISS EME Lab

Date Approved

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REVISION HISTORY

Date	Revision	Comments
6/2/04	O	Release of Prototype results

1.0 Introduction

This report details the utilization, test setup, test equipment, and test results of the Specific Absorption Rate (S.A.R.) measurements performed at the CGISS EME Test Lab for model number PMUD1985A, FCC ID: ABZ99FT3039.

The applicable exposure environment is Occupational/Controlled.

2.0 Reference Standards and Guidelines

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

- United States Federal Communications Commission, Code of Federal Regulations; 47CFR part 2 sub-part J
- 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 Electronic Engineers (IEEE) C95. 1-1992
- Institute of Electrical and Electronic Engineers (IEEE) C95.1-1999 Edition
- International Commission on Non-Ionizing Radiation Protection (ICNIRP) 1998
- Ministry of Health (Canada) Safety Code 6. Limits of Human Exposure to Terminal frequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz, 1999
- Australian Communications Authority Radiocommunications (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 9KHz and 300 GHz." and “Attachment to resolution # 303 from July 2, 2002”

3.0 Description of Test Sample

The portable handheld transceiver model PMUD1985A, FCC ID: ABZ99FT3039, operates using frequency modulation (FM) and incorporates traditional simplex two-way radio transmission protocol. The intended operating positions are “at the face” with the microphone 1 to 2 inches from the mouth, and “at the abdomen” by means of the offered body-worn accessories. Audio and PTT operation while the radio is at the abdomen is accomplished by means of optional remote accessories that connect to the radio. This device will be marketed to and used by employees solely for work-related operations, such as public safety agencies, e.g. police, fire and emergency medical. User training is the responsibility of these agencies, who can be expected to employ the usage instructions, safety information and operational cautions set forth in the user's manual, instructional sessions or other means. Motorola also makes available to its customers training classes on the proper use of two-way radios and wireless data devices.

FCC ID: ABZ99FT3039 is capable of operating in the 136-162 MHz band. The rated power is 1-5 watts with a maximum output capability of 5.8 watts as defined by the upper limit of the production line final test station.

FCC ID: ABZ99FT3039 is offered with the following options and accessories:

Antenna	**Description**
HAD9338AR	Heliflex 136-162MHz ¼ wave antenna; 16cm, -10dBi

Optional Antennas

NAD6502AR	Heliflex 146-174MHz ¼ wave antenna; 15cm; -10dBi
HAD9742A	Stubby 146-162MHz ¼ wave antenna; 7.6cm; -11dBi
PMAD4012A	Helical 136-155MHz ¼ wave antenna; 9cm; -9.85dBi
PMAD4014A	Helical 136-155MHz ¼ wave antenna; 14cm; -7.85dBi
NAD6579A	Whip 148-161MHz ¼ wave antenna; 19cm; -1dBi

Batteries

NNTN4497AR	1800 mAh Lithium Ion
NNTN4496AR	1100 mAh NiCd
NNTN4851A	1500 mAh NiMh
NNTN4970A	Slim Lithium Ion battery
NNTN4852A	1300 mAh FM NiMh

Body-worn Accessories

HLN8255B	3 inch Spring Action Belt Clip
RLN5644A	2” belt clip
RLN5383A	Leather carry case with belt loop and D-shaped rings
RLN5384A	Leather carry case with high activity 2.5” swivel belt loop
RLN5385A	Leather carry case with high activity 3” swivel belt loop
HLN9701B	Nylon carry case short DTMF
NTN5243A	Shoulder Carry Strap, attaches to D-Shaped Rings on Carry Case
HLN6602A	Universal Chest Pack
RLN4570A	Break-A-Way Chest Pack
HLN9985B	Waterproof Bag
RLN5496A	Hard Leather Case, Full DTMF 2.5 with 2.5 inch Swivel Belt Loop
RLN5497A	Hard Leather Case, Full DTMF with 3 inch Swivel Belt Loop
RLN5498A	Hard Leather Case with Belt Loop

A**pplicable Audio accessories**

HMN9030A	Remote Speaker Microphone
PMMN4008A	Remote Speaker Microphone (Mag One)
PMLN4442A	Earbud w/ Microphone & PTT combined w/ VOX (Mag One)
PMLN4443A	Flexible Ear Receiver w/ Microphone & PTT combined (Mag One)
PMLN4445A	Ultra Lightweight headset w/ Boom Microphone (Mag One)

PMLN4294C	Earbud w/ Microphone & PTT combined (Mag One)
BDN6646C	Standard 95dB Ear Microphone w/ PTT Interface Module
BDN6706B	Standard 95dB Ear Microphone w/ VOX and PTT Interface Module
0180358B38	Ring PTT Switch for Ear Mic System
0180300E83	Body PTT switch for Ear Mic System (works w/ BDN6646C, BDN6706B)
0180358B33	Medium Earholder for Ear Microphone System
HMN9727B	Earpiece without Volume Control - 1 Wire (Beige)
RLN4894A	Earpiece without Volume Control – 1 wire (Black)
HMN9752B	Earpiece with Volume Control - 1 Wire (Beige)
HMN9754D	Earpiece with Microphone & PTT Combined - 2 Wire (Beige)
RLN4895A	Earpiece with Microphone & PTT Combined – 2 Wire (Black)
HMN9036A	Earbud with Microphone & PTT Combined
HLN9132A	Earbud Single Wire Receive Only
RLN5198AP	2 Wire Surveillance Kit w/ Clear Comfortable Acoustic Tube Included (includes HMN9754D and NTN8371A)
BDN6720A	Flexible Ear Receiver
NTN8370A	Extreme noise kit (mechanical piece)
NTN8371A	Low noise kit (mechanical piece)
PMMN4001A	Ultra-Lite Earset with Mic and PTT
RMN4016A	Lightweight Headset with In-Line PTT
RLN5238A	Lightweight Headset with In-Line PTT, NFL style
HMN9021A	Medium Weight Over-The-Head Dual Muff Headset
HMN9022A	Medium Weight Behind-The-Head Dual Muff Headset
BDN6647F	Medium Weight Single Speaker Headset
BDN6648C	Heavy Duty, Dual Muff Headset with Noise Canceling Mic
RMN5015A	Heavy Duty, Dual Muff, Racing Headset (requires RKN4090A Headset Adapter Cable)
RMN4051B	2-way Hard Hat Mount, Black, Noise Reduction Rating = 22dB(Requires RKN4094A adapter cable)
RKN4094A	In-Line PTT adapter (Use w/ RMN4051B, RMN4052A, RMN4053A)
RMN4054B	Receive-Only Hard Hat Mount Headset with 3.5mm right angle plug
RMN4055A	Receive only Headband Style Headset w/ 3.5mm right angle plug
HLN9133A	VOX adapter kit (for use w/ PMLN4442A, PMLN4443A, PMLN4444A, PMLN4445A, BDN6706B, HMN9013A, HMN9021A, HMN9022A, BDN6647A, BDN6648C)
RKN4090A	In-Line PTT Adapter (Use with RMN5015A)
RLN5411A	Ultra-Lite Breeze Behind the Head Headset
RLN4764A	Medium Custom Earpiece, Left Ear
HMN9013A	Lightweight Headset

Misc. options

5886627Z01	Antenna adaptor for use with standard and optional antennas

3.1 Test Signal

Test Mode	X	Call Simulator		Simulator	

Test Signal mode:

Transmission Mode:

CW	**X**
Native Transmission	
TDMA	
Other	

3.2 Test Output Power

A table of the characteristic power slump versus time is provided in Appendix A for all tested batteries.

4.0 Description of Test Equipment

4.1 Descriptions of S.A.R. Measurement System

The laboratory utilizes a Dosimetric Assessment System (DASY3™) S.A.R. measurement system manufactured by Schmid & Partner Engineering AG (SPEAG™), of Zurich Switzerland. The test system consists of a Stäubli RX90L robot with ET3DV6 and EX3DV3 E-Field probes. Please reference the SPEAG user manual and application notes for detailed probe, robot, and S.A.R. computational procedures.
The S.A.R. measurements were conducted with probe model/serial number ET3DV6/SN1547. The system performance check was conducted daily and within 24 hours prior to testing. DASY output files of the system performance test results and the probe/dipole calibration certificates are included in appendices C and D respectively. The table below summarizes the system performance check results normalized to 1W.

Probe Serial #	Tissue Type	Probe Cal Date	Dipole Kit / Serial #	System Perf. 1-g S.A.R. Result when normalized to 1W (mW/g)	Reference 1-g S.A.R @ 1W (mW/g)	Test Date(s)
1547	FCC Body	9/23/03	D300V2/1001	2.805 +/- 0.095	2.72 +/- 10%	5/15/04-5/20/04 6 test days
1547	IEEE Head	9/23/03	D300V2/1001	2.970 +/- 0.000	2.81 +/- 10%	5/20/04-5/21/04 1 test day

Note: System performance results reflects the median performance +/- ½ of the test date(s) performance ranges

The DASY3™ system is operated per the instructions in the DASY3™ Users Manual. The complete manual is available directly from SPEAG™. All measurement equipment used to assess S.A.R. EME compliance was calibrated according to 17025 A2LA guidelines.

4.2 Description of Phantom

4.2.1 Flat Phantom

A rectangular shaped box made of high density polyethylene (HDPE) material. The phantom is mounted on a wooden supporting structure that has a loss tangent of < 0.05. The structure has a 68.58 cm x 25.4 cm opening at its center to allow positioning the DUT to the phantom's surface. The flat phantom dimensions used for S.A.R. performance assessment are L = 80cm, W = 60cm, H = 20cm, Surface Thickness = 0.2cm.

4.2.2 SAM Phantom

NA

4.3 Simulated Tissue Properties

4.3.1 Type 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 1528, 2003 "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques"

Simulated Tissue	Body Position
FCC Body	Torso
IEEE Head	Head/Face

4.3.2 Simulated Tissue Composition

% of listed ingredients	300MHz		150MHz	
	Head	Body	Head	Body
Sugar	56.0	47.1	55.4	49.7
DGBE (Glycol)	NA	NA	NA	NA
Diacetin	NA	NA	NA	NA
De ionized -Water	37.5	49.48	38.35	46.2
Salt	5.4	2.32	5.15	2.8
HEC	1	1	1	1

Bact.	0.1	0.1	0.1	0.1

Characterization of simulated tissue materials and ambient conditions:
Simulated tissue prepared for S.A.R. measurements is measured daily and within 24 hours prior to actual S.A.R. 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 Agilent (HP) probe kit model 85070C and a HP8753D Network Analyzer.

Target tissue parameters

FCC Body				
Frequency (MHz)	**Di-electric Constant Target**	**Di-electric Constant Meas. (Range)**	**Conductivity Target S/m**	**Conductivity Meas. (Range) S/m**
300	58.2	56.2-57.1	0.92	0.89-0.90
150	61.9	60.3-61.0	0.80	0.78-0.80

IEEE Head				
Frequency (MHz)	**Di-electric Constant Target**	**Di-electric Constant Meas. (Range)**	**Conductivity Target S/m**	**Conductivity Meas. (Range) S/m**
300	45.3	46.3-47.2	0.87	0.87-0.88
150	52.3	51.9-53.0	0.76	0.75-0.76

4.4 Test conditions

The EME Laboratory ambient environment is well controlled resulting in very stable simulated tissue temperature and therefore stable dielectric properties. Simulated tissue temperature is measured prior to each scan to insure it is within +/- 2°C of the temperature at which the dielectric properties were determined. The liquid depth in the phantom used for measurements was 15cm +/- 0.5cm. 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 S.A.R. tests reported herein:

	Target	**Measured**
Ambient Temperature	20 - 25 ˚C	Range: 20.9-23,2˚C Avg. 22.2˚C
Relative Humidity	30 - 70 %	Range: 44.8-55.7% Avg. 48.4%
Tissue Temperature	NA	Range: 20.9-19.9˚C Avg. 20.36˚C

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 S.A.R scans are repeated. However, the lab environment is sufficiently protected such that no S.A.R. impacting interference has been experienced to date.

5.0 Probe Scan Procedures

The E-field probe first scans a coarse grid over a large area inside the phantom in order to locate the interpolated maximum S.A.R. 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.

5.1 Shortened scan rationale

APPENDIX A presents relevant shortened S.A.R. cube scans to assess the validity of the calculated results presented herein. The results of the shortened cube scans demonstrate that the scaling methodology used to determine the calculated S.A.R. results presented herein are valid.

5.2 Device test positions

Reference Figure 1 for the device orientation and position which exhibited the highest S.A.R. performance.

5.2.1 Body

The DUT was positioned such that the carry case was centered against the flat phantom with the applicable accessory attachments. The DUT was positioned with its' front, back, and antenna (back towards the phantom) separated 2.5cm from the flat phantom.

5.2.2 Head

NA

5.2.3 Face

The DUT was placed with 2.5cm separation from the flat phantom.

5.3 Description of Test Procedure

All options and accessories listed in section 3.0 were considered in order to develop the S.A.R. test plan for this product. S.A.R. measurements were performed using a flat phantom with applicable tissue simulant to assess performance at the body and in front of the face in CW transmission modes.

Assessment at the body w/ offered antennas [Pages 21-22 of 26; Table 1]

The DUT was assessed with body-worn accessory model HLN8255B against the phantom, at the center frequency of antenna model HAD9338AR, in CW mode, using each of the offered battery, with audio accessory model HMN9030A attached.

The DUT was assessed with body worn accessory model HLN8255B against the phantom, at the antenna band edges, in CW mode, using the worst case test configuration from above.

The DUT was assessed with body worn accessory model HLN8255B against the phantom, across the TX band of each of the remaining offered antennas, in CW mode, using the worst case test configuration from above.

Assessment was also performed with the offered antenna adapter, in CW mode using the worst case test configuration observed from above.

Assessment at the body w/ offered body worn accessories [Page 22 of 26; Table 1]

The DUT was assessed using the worst case test configuration from above, in CW mode, with each of the remaining offered body worn accessories against the phantom.

Assessments at the body w/ offered audio accessories [Page 23 of 26; Table 1]

The DUT was assessed using the worst case test configuration from above (excluding body worn models RLN5497A and RLN5498A), in CW mode, using each of the applicable offered audio accessories.
Note that body worn models RLN5497A and RLN5498A were tested subsequent to the above assessment using the worst case test configuration.

Assessments at the body w/ 2.5cm separation [Page 24 of 26; Table 1]

The DUT was assessed using the worst case test configuration from above, in CW mode, with its' back, front, and antenna (w/ back towards the phantom) separated 2.5cm from the phantom.

Assessments at the face with offered antennas [Pages 24-25 of 26; Table 2]

The DUT was assessed with 2.5cm separation from the phantom, at the center frequency of antenna model HAD9338AR, in CW mode, using each of the offered battery.

The DUT was assessed with 2.5cm separation from the phantom, at the band edges of antenna model HAD9338AR, in CW mode, using worst case battery from above.

The DUT was assessed with 2.5cm separation from the phantom, across the TX band, with each of the remaining offered antennas, in CW mode, using the worst case test configuration from above.

Assessments at the face w/ offered audio accessories [Page 25 of 26; Table 2]

The DUT was assessed using the worst case test configuration from the face assessment above, in CW mode, using each of the applicable offered audio accessories.

Shortened scan assessment at the body [APPENDIX A]
A "shortened" scan was performed using the test configuration that produced the highest S.A.R. results overall at the body.

Shortened scan assessment at the face [APPENDIX A]
A "shortened" scan was performed using the test configuration that produced the highest S.A.R. results overall at the face.

5.4 Test Position Photographs

Figure 1: Highest S.A.R. Test Position (@ body)
DUT with carry case model RLN5498A against the phantom
With worst case antenna model HAD9338AR and attached audio accessory model HMN9030A

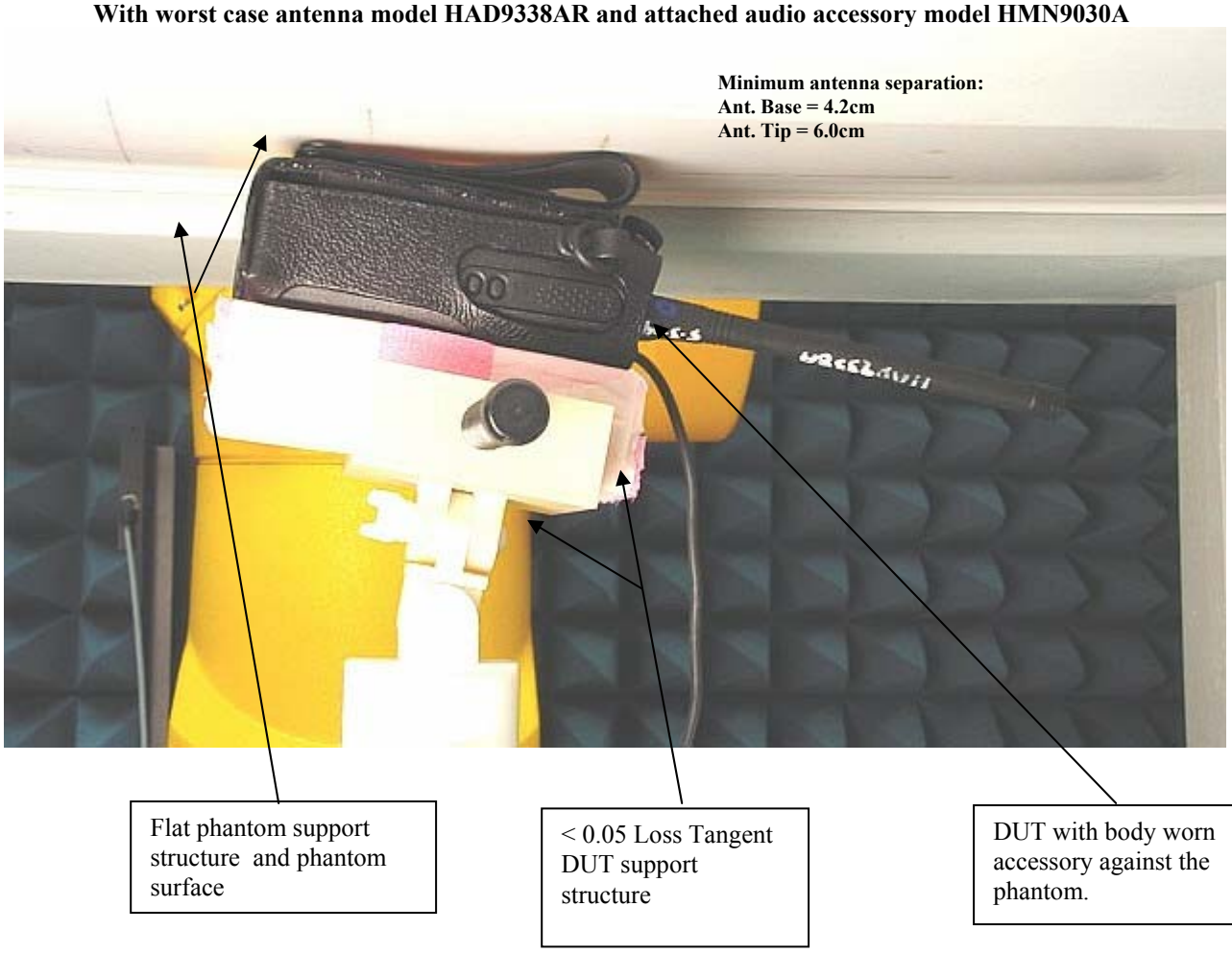


Figure 2. Assessment @ the body
DUT with body worn accessory model HLN8255B against the phantom
(same position used for each offered antenna, each offered audio accessories, and antenna adaptor)

Figure 3. Assessment @ the body
DUT with body worn accessory model HLN6602A against the phantom
With attached audio accessory model HMN9030A

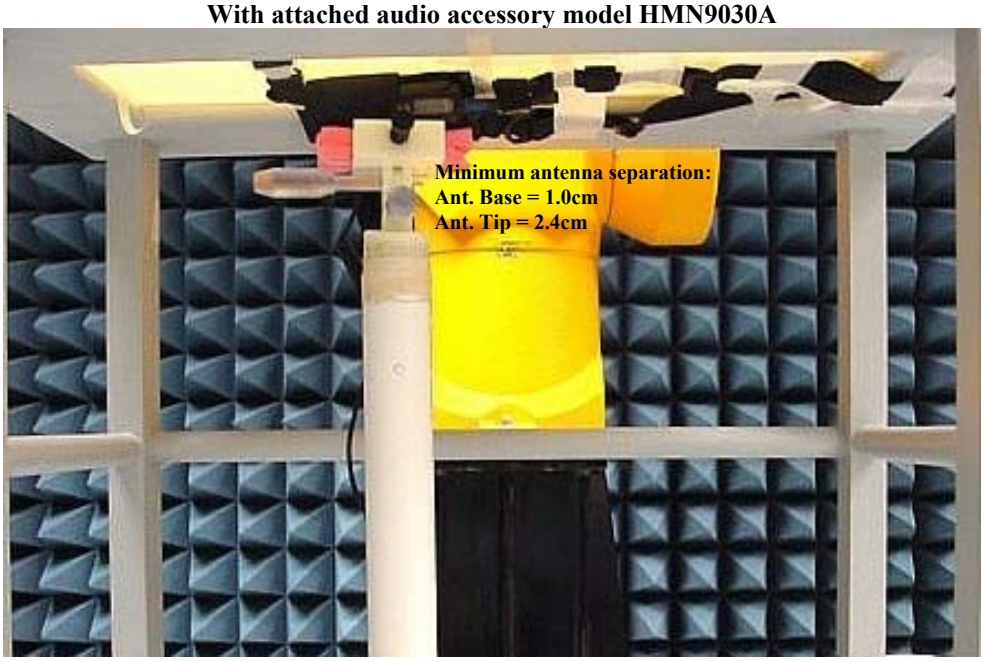


Figure 4. Assessment @ body
DUT with body worn accessory model HLN9701B against the phantom
With attached audio accessory model HMN9030A

Figure 5. Assessment @ body
DUT with body worn accessory model NTN5243A & RLN5383A against the phantom
With attached audio accessory model HMN9030A

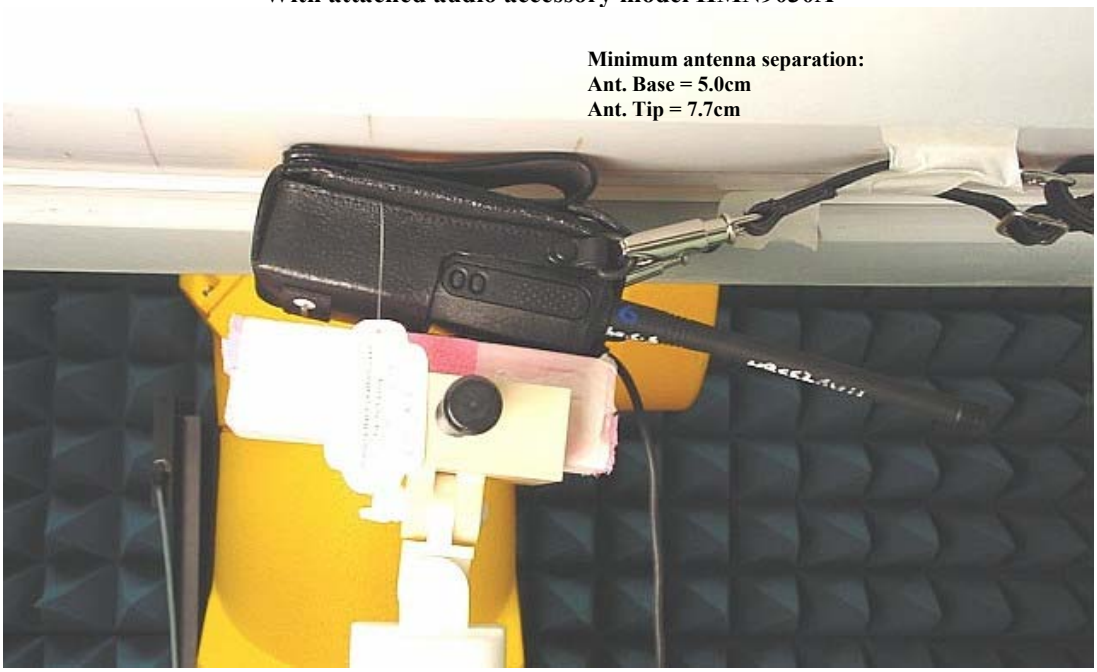


Figure 6. Assessment @ the body
DUT with body worn accessory model RLN5385A against the phantom

With attached audio accessory model HMN9030A

Figure 7. Assessment @ Body
DUT with body worn accessory model RLN5644A against the phantom
With attached audio accessory model HMN9030A

Figure 8. Assessment @ Body
DUT with body worn accessory model RLN5497A against the phantom
With attached audio accessory model HMN9030A

Figure 9. Assessment at the Body w/ back housing @ 2.5cm

With attached audio accessory model HMN9030A

Figure 10. Assessment at the Body w/ back towards phantom and antenna @ 2.5cm
With attached audio accessory model HMN9030A

Figure 11. Assessment at the Body w/ front housing @ 2.5cm
With attached audio accessory model HMN9030A

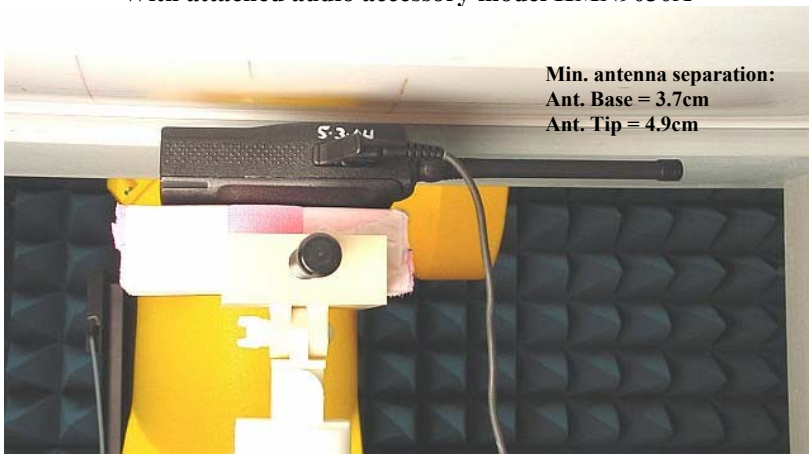


Figure 12. Assessment at the Face
DUT front with 2.5cm separation from phantom

(Same position used for each offered antennas and applicable audio accessories)

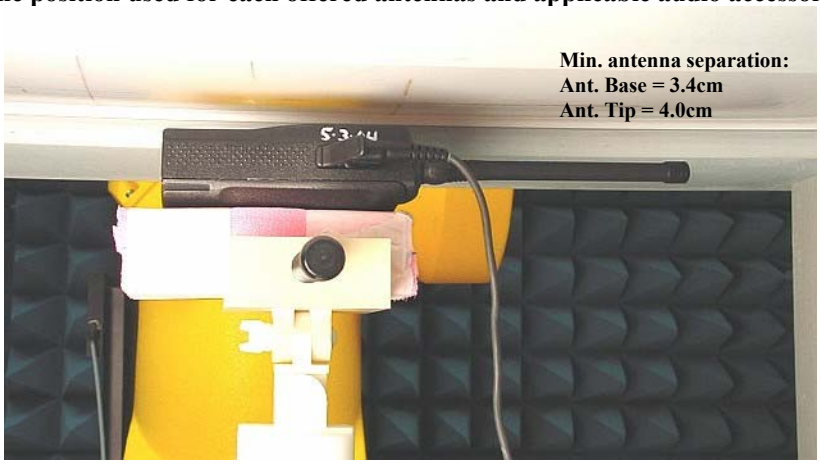
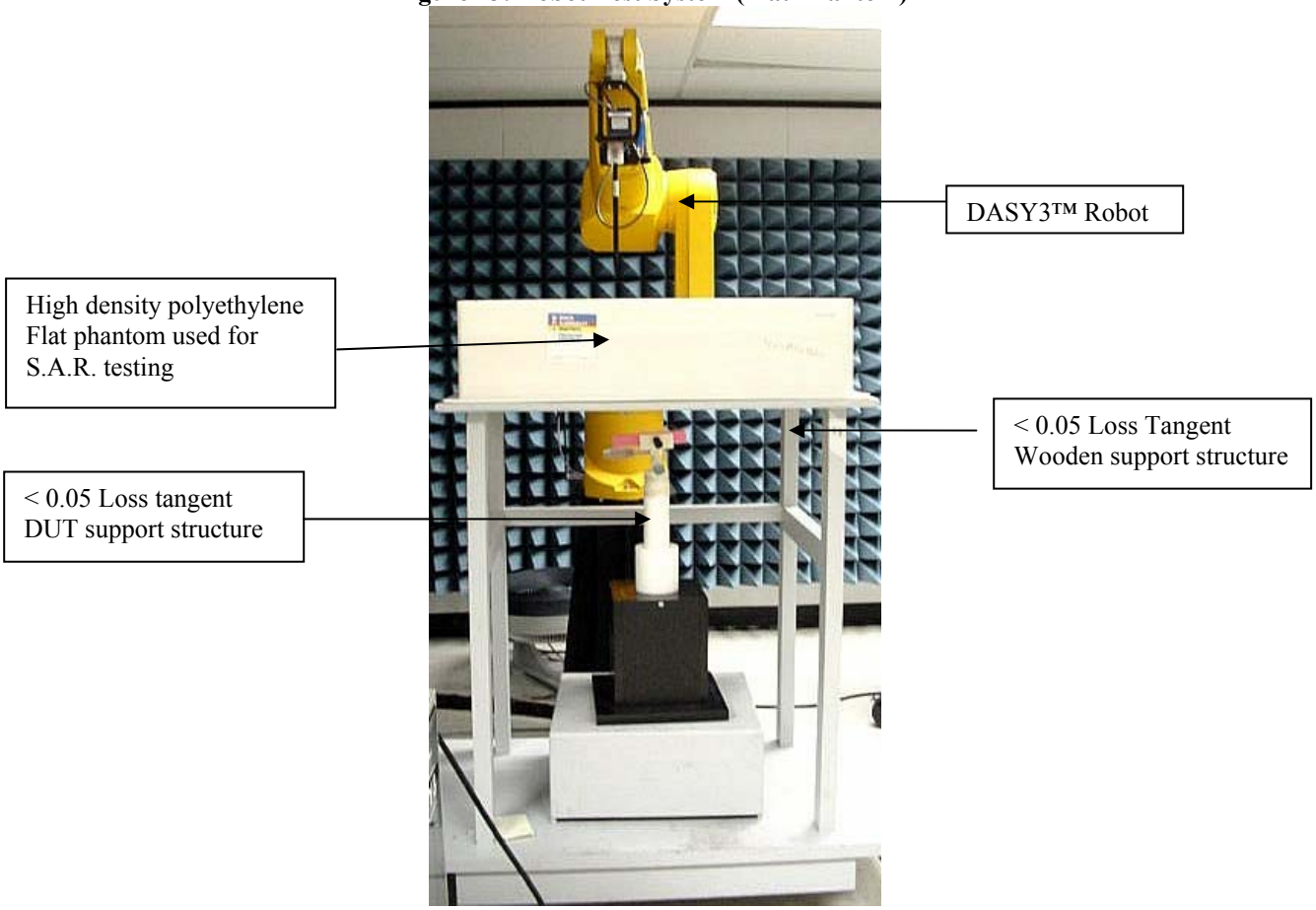


Figure 13: Robot Test System (Flat Phantom)



6.0 Measurement Uncertainty

Table 1: Uncertainty Budget for Device Under Test: 75 – 3000 MHz

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*	*k*
Uncertainty Component	**IEEE 1528 section**	**Tol. (± %)**	**Prob Dist**	**Div.**	**c_i (1 g)**	**c_i (10 g)**	**1 g u_i (±%)**	**10 g u_i (±%)**	**v_i**
Measurement System									
Probe Calibration	E.2.1	4.8	N	1.00	1	1	4.8	4.8	∞
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	1.0	N	1.00	1	1	1.0	1.0	∞
Response Time	E.2.7	0.8	R	1.73	1	1	0.5	0.5	∞
Integration Time	E.2.8	1.3	R	1.73	1	1	0.8	0.8	∞
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	1.0	R	1.73	1	1	0.6	0.6	∞
Probe Positioning w.r.t Phantom	E.6.3	4.0	R	1.73	1	1	2.3	2.3	∞
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	3.4	N	1.00	1	1	3.4	3.4	29
Device Holder Uncertainty	E.4.1	3.8	N	1.00	1	1	3.8	3.8	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	6.5	N	1.00	0.64	0.43	4.2	2.8	∞
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	4.0	N	1.00	0.6	0.49	2.4	2.0	∞
Combined Standard Uncertainty			RSS				12	11	601
Expanded Uncertainty (95% CONFIDENCE LEVEL)			*k*=2				23	22	

Table 2: Uncertainty Budget for System Check: 75 – 3000 MHz

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*	*k*
Uncertainty Component	IEEE 1528 section	Tol. (± %)	Prob. Dist.	Div.	c_i (1 g)	c_i (10 g)	1 g u_i (±%)	10 g u_i (±%)	v_i
Measurement System									
Probe Calibration	E.2.1	4.8	N	1.00	1	1	4.8	4.8	∞
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	1.0	N	1.00	1	1	1.0	1.0	∞
Response Time	E.2.7	0.8	R	1.73	1	1	0.5	0.5	∞
Integration Time	E.2.8	1.3	R	1.73	1	1	0.8	0.8	∞
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	6.0	R	1.73	0.64	0.43	2.2	1.5	∞
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	6.0	R	1.73	0.6	0.49	2.1	1.7	∞
Combined Standard Uncertainty			RSS				9	8	99999
Expanded Uncertainty (95% CONFIDENCE LEVEL)			*k*=2				17	17	

Notes for Tables 1 and 2
a) Column headings *a-k* are given for reference.
b) Tol. - tolerance in influence quantity.
c) Prob. Dist. – Probability distribution
d) N, R - normal, rectangular probability distributions
e) Div. - divisor used to translate tolerance into normally distributed standard uncertainty
f) *ci* - sensitivity coefficient that should be applied to convert the variability of the uncertainty component into a variability of SAR.
g) *ui* – SAR uncertainty
h) *vi* - degrees of freedom for standard uncertainty and effective degrees of freedom for the expanded uncertainty.

7.0 S.A.R. Test Results

All S.A.R. results obtained by the tests described in Section 5.0 are listed in section 7.1 below. The bolded result indicates the highest observed S.A.R. performances for the relevant test configuration. DASY3™ S.A.R. measurement scans are provided in APPENDIX B for the highest observed S.A.R. performances.

7.1 S.A.R. results

Table1

DUT assessment at the body; CW mode												
Run Number/ SN	**Antenna model**	**Freq. (MHz)**	**Battery**	**Test position**	**Carry Case**	**Additional attachments**	**Initial Power (W)**	**S.A.R. Drift (dB)**	**Meas. 1g-S.A.R. (mW/g)**	**Meas. 10g-S.A.R. (mW/g)**	**Max Calc. 1g-S.A.R. (mW/g)**	**Max Calc. 10g-S.A.R. (mW/g)**
Assessment of offered batteries with antenna model HAD9338AR including band edges												
EC-Ab-R1-040515-04/018BBCD001	HAD9338AR	149.00	NNTN4497AR	Against phantom	HLN8255B	HMN9030A	6.25	-1.10	1.26	0.959	0.81	0.62
EC-Ab-R1-040515-10/018BBCD001	HAD9338AR	149.00	NNTN4496AR	Against phantom	HLN8255B	HMN9030A	6.25	-0.90	1.39	0.951	0.86	0.58
EC-Ab-R1-040515-11/018BBCD001	HAD9338AR	149.00	NNTN4851A	Against phantom	HLN8255B	HMN9030A	6.19	-0.72	1.40	0.936	0.83	0.55
EC-Ab-R1-040515-12/018BBCD001	HAD9338AR	149.00	NNTN4852A	Against phantom	HLN8255B	HMN9030A	6.08	-0.74	1.16	0.786	0.69	0.47
EC-Ab-R1-040516-02/018BBCD001	HAD9338AR	149.00	NNTN4970A	Against phantom	HLN8255B	HMN9030A	6.29	-0.82	1.36	0.954	0.82	0.58
EC-Ab-R1-040516-03/018BBCD001	HAD9338AR	136.00	NNTN4496AR	Against phantom	HLN8255B	HMN9030A	6.43	-0.86	4.19	2.800	**2.55**	1.71
EC-Ab-R1-040516-04/018BBCD001	HAD9338AR	162.00	NNTN4496AR	Against phantom	HLN8255B	HMN9030A	6.44	-0.37	0.989	0.752	0.54	0.41
Assessment across the TX band of antenna model NAD6579A												
EC-Ab-R1-040516-05/018BBCD001	NAD6579A	148.00	NNTN4496AR	Against phantom	HLN8255B	HMN9030A	6.40	-0.93	1.26	0.862	**0.78**	0.53
EC-Ab-R1-040516-06/018BBCD001	NAD6579A	154.00	NNTN4496AR	Against phantom	HLN8255B	HMN9030A	6.26	-0.35	0.860	0.603	0.47	0.33
EC-Ab-R1-040516-07/018BBCD001	NAD6579A	161.00	NNTN4496AR	Against phantom	HLN8255B	HMN9030A	6.49	-0.38	1.040	0.794	0.57	0.43
Assessment across the TX band of antenna model PMAD4014A												
EC-Ab-R1-040516-09/018BBCD001	PMAD4014A	136.00	NNTN4496AR	Against phantom	HLN8255B	HMN9030A	6.44	-0.44	1.180	0.792	**0.65**	0.44
EC-Ab-R1-040516-10/018BBCD001	PMAD4014A	145.50	NNTN4496AR	Against phantom	HLN8255B	HMN9030A	6.29	-0.97	0.898	0.609	0.56	0.38
EC-Ab-R1-040516-11/018BBCD001	PMAD4014A	155.00	NNTN4496AR	Against phantom	HLN8255B	HMN9030A	6.29	-0.55	0.580	0.405	0.33	0.23

Table 1 (Continued)

DUT assessment at the body; CW mode												
Run Number/ SN	**Antenna model**	**Freq. (MHz)**	**Battery**	**Test position**	**Carry Case**	**Additional attachments**	**Initial Power (W)**	**S.A.R. Drift (dB)**	**Meas. 1g-S.A.R. (mW/g)**	**Meas. 10g-S.A.R. (mW/g)**	**Max Calc. 1g-S.A.R. (mW/g)**	**Max Calc. 10g-S.A.R. (mW/g)**
Assessment across the TX band of antenna model PMAD4012A												
EC-Ab-R1-040516-12/018BBCD001	PMAD4012A	136.00	NNTN4496AR	Against phantom	HLN8255B	HMN9030A	6.55	1.05	1.47	0.978	**0.74**	0.49
EC-Ab-R1-040516-13/018BBCD001	PMAD4012A	145.50	NNTN4496AR	Against phantom	HLN8255B	HMN9030A	6.32	0.07	0.673	0.459	0.34	0.23
EC-Ab-R1-040516-14/018BBCD001	PMAD4012A	155.00	NNTN4496AR	Against phantom	HLN8255B	HMN9030A	6.41	-0.67	0.455	0.314	0.27	0.18
Assessment across the TX band of antenna model HAD9742A												
EC-Ab-R1-040517-02/018BBCD001	HAD9742A	146.00	NNTN4496AR	Against phantom	HLN8255B	HMN9030A	6.30	-0.08	0.806	0.553	**0.41**	0.28
EC-Ab-R1-040517-03/018BBCD001	HAD9742A	154.00	NNTN4496AR	Against phantom	HLN8255B	HMN9030A	6.37	-0.78	0.652	0.453	0.39	0.27
EC-Ab-R1-040517-04/018BBCD001	HAD9742A	162.00	NNTN4496AR	Against phantom	HLN8255B	HMN9030A	6.37	-0.59	0.397	0.297	0.23	0.17
Assessment across the TX band of antenna model NAD6502AR												
EC-Ab-R1-040517-05/018BBCD001	NAD6502AR	146.00	NNTN4496AR	Against phantom	HLN8255B	HMN9030A	6.26	-0.01	1.040	0.707	0.52	0.35
EC-Ab-R1-040517-06/018BBCD001	NAD6502AR	154.00	NNTN4496AR	Against phantom	HLN8255B	HMN9030A	6.22	-0.49	1.120	0.780	0.63	0.44
EC-Ab-R1-040517-07/018BBCD001	NAD6502AR	162.00	NNTN4496AR	Against phantom	HLN8255B	HMN9030A	6.40	-0.44	1.530	1.160	**0.85**	0.64
Assessment of offered antenna adaptor with worst case antenna from above												
EC-Ab-R1-040518-03/018BBCD001	HAD9338AR w/ 5886627Z01	136.00	NNTN4496AR	Against phantom	HLN8255B	HMN9030A	6.48	-1.13	3.60	2.450	**2.33**	1.59
Assessment of offered body worn accessories with worst case configuration from above. Note model RLN5497A and RLN5498A were tested after the audio accessories assessments below as noted in section 5.0												
EC-Ab-R1-040517-08/018BBCD001	HAD9338AR	136.00	NNTN4496AR	Against phantom	HLN6602A	HMN9030A	6.43	0.19	1.040	0.501	0.52	0.25
EC-Ab-R1-040517-09/018BBCD001	HAD9338AR	136.00	NNTN4496AR	Against phantom	HLN9701B	HMN9030A	6.48	-1.16	2.500	1.880	1.63	1.23
EC-Ab-R1-040517-11/018BBCD001	HAD9338AR	136.00	NNTN4496AR	Against phantom	RLN5383A	HMN9030A	6.45	-0.56	3.460	1.300	1.97	0.74
EC-Ab-R1-040517-12/018BBCD001	HAD9338AR	136.00	NNTN4496AR	Against phantom	RLN5385A	HMN9030A	6.50	-1.63	1.330	0.876	0.97	0.64
EC-Ab-R1-040517-13/018BBCD001	HAD9338AR	136.00	NNTN4496AR	Against phantom	NTN5243A & RLN5383A	HMN9030A	6.49	-0.59	3.320	1.350	1.90	0.77
EC-Ab-R1-040518-02/018BBCD001	HAD9338AR	136.00	NNTN4496AR	Against phantom	RLN5644A	HMN9030A	6.46	-1.17	3.670	2.530	2.40	1.66
EC-Ab-R1-040520-06/018BBCD001	HAD9338AR	136.00	NNTN4496AR	Against phantom	RLN5497A	HMN9030A	6.43	-0.56	1.110	0.866	0.63	0.49
EC-Ab-R1-040520-07/018BBCD001	HAD9338AR	136.00	NNTN4496AR	Against phantom	RLN5498A	HMN9030A	6.43	-0.77	5.780	2.120	3.45	1.27
EC-Ab-R1-040520-09/018BBCD001 (Shortened scan)	HAD9338AR	136.00	NNTN4496AR	Against phantom	RLN5498A	HMN9030A	6.44	-0.49	6.210	2.170	**3.48**	1.21

Table 1 (Continued)

DUT assessment at the body; CW mode												
Run Number/ SN	**Antenna model**	**Freq. (MHz)**	**Battery**	**Test position**	**Carry Case**	**Additional attachments**	**Initial Power (W)**	**S.A.R. Drift (dB)**	**Meas. 1g-S.A.R. (mW/g)**	**Meas. 10g-S.A.R. (mW/g)**	**Max Calc. 1g-S.A.R. (mW/g)**	**Max Calc. 10g-S.A.R. (mW/g)**
Assessment of offered audio accessories with overall worst case test configuration from above Note the worst case test configuration used excluded models RLN5497A and RLN5498A as noted in section 5.0												
EC-Ab-R1-040518-04/018BBCD001	HAD9338AR	136.00	NNTN4496AR	Against phantom	HLN8255B	PMLN4442A	6.45	-0.77	3.650	2.450	2.18	1.46
EC-Ab-R1-040518-05/018BBCD001	HAD9338AR	136.00	NNTN4496AR	Against phantom	HLN8255B	PMLN4443A w/ HLN9133A	6.49	0.48	1.520	0.958	0.76	0.48
EC-Ab-R1-040518-06/018BBCD001	HAD9338AR	136.00	NNTN4496AR	Against phantom	HLN8255B	PMLN4445A	6.45	-0.52	1.120	0.847	0.63	0.48
EC-Ab-R1-040518-08/018BBCD001	HAD9338AR	136.00	NNTN4496AR	Against phantom	HLN8255B	PMMN4008A	6.40	-0.43	3.920	2.690	2.16	1.48
EC-Ab-R1-040518-09/018BBCD001	HAD9338AR	136.00	NNTN4496AR	Against phantom	HLN8255B	PMLN4294C	6.42	-0.95	3.250	2.210	2.02	1.38
EC-Ab-R1-040518-10/018BBCD001	HAD9338AR	136.00	NNTN4496AR	Against phantom	HLN8255B	HMN9754D	6.43	-0.72	3.220	2.140	1.90	1.26
EC-Ab-R1-040518-11/018BBCD001	HAD9338AR	136.00	NNTN4496AR	Against phantom	HLN8255B	BDN6706B w/ 0180358B38	6.44	0.04	2.060	1.320	1.03	0.66
EC-Ab-R1-040518-12/018BBCD001	HAD9338AR	136.00	NNTN4496AR	Against phantom	HLN8255B	PMMN4001A	6.47	-0.68	2.300	1.650	1.34	0.96
EC-Ab-R1-040518-13/018BBCD001	HAD9338AR	136.00	NNTN4496AR	Against phantom	HLN8255B	HMN9013A	6.46	-0.74	2.330	1.660	1.38	0.98
EC-Ab-R1-040518-14/018BBCD001	HAD9338AR	136.00	NNTN4496AR	Against phantom	HLN8255B	RMN4016A	6.48	-0.71	2.750	1.880	1.62	1.11
EC-Ab-R1-040518-15/018BBCD001	HAD9338AR	136.00	NNTN4496AR	Against phantom	HLN8255B	RLN5238A	6.51	0.04	0.418	0.245	0.21	0.12
EC-Ab-R1-040519-02/018BBCD001	HAD9338AR	136.00	NNTN4496AR	Against phantom	HLN8255B	HMN9021A	6.45	-0.15	1.660	1.140	0.86	0.59
EC-Ab-R1-040519-03/018BBCD001	HAD9338AR	136.00	NNTN4496AR	Against phantom	HLN8255B	BDN6647F	6.48	-0.97	3.370	2.260	2.11	1.41
EC-Ab-R1-040519-04/018BBCD001	HAD9338AR	136.00	NNTN4496AR	Against phantom	HLN8255B	BDN6648C	6.49	-0.15	2.700	1.780	1.40	0.92
EC-Ab-R1-040519-05/018BBCD001	HAD9338AR	136.00	NNTN4496AR	Against phantom	HLN8255B	RMN5015A with RKN4090A	6.52	-0.48	1.730	1.230	0.97	0.69
EC-Ab-R1-040519-06/018BBCD001	HAD9338AR	136.00	NNTN4496AR	Against phantom	HLN8255B	RMN4051B w/RKN4094A	6.43	-1.08	3.810	2.550	**2.44**	1.63
EC-Ab-R1-040519-07/018BBCD001	HAD9338AR	136.00	NNTN4496AR	Against phantom	HLN8255B	RMN4054B	6.51	-0.99	3.860	2.550	2.42	1.60
EC-Ab-R1-040519-08/018BBCD001	HAD9338AR	136.00	NNTN4496AR	Against phantom	HLN8255B	RMN4055A	6.51	-0.17	3.370	2.130	1.75	1.11
EC-Ab-R1-040519-09/018BBCD001	HAD9338AR	136.00	NNTN4496AR	Against phantom	HLN8255B	RLN5411A	6.42	-0.37	0.974	0.737	0.53	0.40

Table 1 (Continued)

DUT assessment at the body; 2.5cm separation; CW mode												
Run Number/ SN	**Antenna model**	**Freq. (MHz)**	**Battery**	**Test position**	**Carry Case**	**Additional attachments**	**Initial Power (W)**	**S.A.R. Drift (dB)**	**Meas. 1g-S.A.R. (mW/g)**	**Meas. 10g-S.A.R. (mW/g)**	**Max Calc. 1g-S.A.R. (mW/g)**	**Max Calc. 10g-S.A.R. (mW/g)**
EC-Ab-R1-040519-11/018BBCD001	HAD9338AR	136.00	NNTN4496AR	DUT back to phantom ant. 2.5cm	None	HMN9030A	6.48	-0.59	3.09	2.32	**1.77**	1.33
EC-Ab-R1-040519-13/018BBCD001	HAD9338AR	136.00	NNTN4496AR	DUT back to phantom 2.5cm	None	HMN9030A	6.45	-0.45	1.61	1.24	0.89	0.69
EC-Ab-R1-040519-14/018BBCD001	HAD9338AR	136.00	NNTN4496AR	DUT front to phantom 2.5cm	None	HMN9030A	6.47	-0.71	2.15	1.64	1.27	0.97

Table 2

DUT assessment at the face; CW mode												
Run Number/ SN	**Antenna model**	**Freq. (MHz)**	**Battery**	**Test position**	**Carry Case**	**Additional attachments**	**Initial Power (W)**	**S.A.R. Drift (dB)**	**Meas. 1g-S.A.R. (mW/g)**	**Meas. 10g-S.A.R. (mW/g)**	**Max Calc. 1g-S.A.R. (mW/g)**	**Max Calc. 10g-S.A.R. (mW/g)**
Assessment of offered batteries with antenna model HAD9338AR												
EC-Face-R1-040520-10/018BBCD001	HAD9338AR	149.00	NNTN4497AR	DUT front 2.5cm	None	None	6.29	0.11	1.05	0.800	0.53	0.40
EC-Face-R1-040520-11/018BBCD001	HAD9338AR	149.00	NNTN4496AR	DUT front 2.5cm	None	None	6.25	0.20	1.03	0.787	0.52	0.39
EC-Face-R1-040520-12/018BBCD001	HAD9338AR	149.00	NNTN4851A	DUT front 2.5cm	None	None	6.21	0.30	1.08	0.826	0.54	0.41
EC-Face-R1-040520-13/018BBCD001	HAD9338AR	149.00	NNTN4852A	DUT front 2.5cm	None	None	6.09	0.25	1.14	0.867	0.57	0.43
EC-Face-R1-040520-14/018BBCD001	HAD9338AR	149.00	NNTN4970A	DUT front 2.5cm	None	None	6.15	0.21	1.10	0.840	0.55	0.42
EC-Face-R1-040520-15/018BBCD001	HAD9338AR	136.00	NNTN4852A	DUT front 2.5cm	None	None	6.38	-0.92	1.45	1.110	0.90	0.69
EC-Face-R1-040520-16/018BBCD001	HAD9338AR	162.00	NNTN4852A	DUT front 2.5cm	None	None	6.30	-0.63	1.56	1.180	**0.90**	0.68
Assessment across the TX band of antenna model NAD6579A												
EC-Face-R1-040520-17/018BBCD001	NAD6579A	148.00	NNTN4852A	DUT front 2.5cm	None	None	6.260	0.44	1.19	0.912	0.60	0.46
EC-Face-R1-040520-18/018BBCD001	NAD6579A	154.00	NNTN4852A	DUT front 2.5cm	None	None	6.130	-0.74	0.932	0.709	0.55	0.42
EC-Face-R1-040520-19/018BBCD001	NAD6579A	161.00	NNTN4852A	DUT front 2.5cm	None	None	6.300	-0.54	1.45	1.100	**0.82**	0.62
Assessment across the TX band of antenna model PMAD4014A												
EC-Face-R1-040520-20/018BBCD001	PMAD4014A	136.00	NNTN4852A	DUT front 2.5cm	None	None	6.390	-0.71	2.61	1.990	1.54	1.17
EC-Face-R1-040521-20/018BBCD001 (Shortened Scan)	PMAD4014A	136.00	NNTN4852A	DUT front 2.5cm	None	None	6.360	-0.48	2.84	2.170	**1.59**	1.21

Table 2 (Continued)

DUT assessment at the face; CW mode												
Run Number/ SN	**Antenna model**	**Freq. (MHz)**	**Battery**	**Test position**	**Carry Case**	**Additional attachments**	**Initial Power (W)**	**S.A.R. Drift (dB)**	**Meas. 1g-S.A.R. (mW/g)**	**Meas. 10g-S.A.R. (mW/g)**	**Max Calc. 1g-S.A.R. (mW/g)**	**Max Calc. 10g-S.A.R. (mW/g)**
EC-Face-R1-040520-21/018BBCD001	PMAD4014A	145.50	NNTN4852A	DUT front 2.5cm	None	None	6.220	0.50	0.832	0.629	0.42	0.31
EC-Face-R1-040521-05/018BBCD001	PMAD4014A	155.00	NNTN4852A	DUT front 2.5cm	None	None	6.110	-0.45	0.588	0.445	0.33	0.25
Assessment across the TX band of antenna model PMAD4012A												
EC-Face-R1-040521-06/018BBCD001	PMAD4012A	136.00	NNTN4852A	DUT front 2.5cm	None	None	6.350	0.87	0.415	0.304	0.21	0.15
EC-Face-R1-040521-07/018BBCD001	PMAD4012A	145.50	NNTN4852A	DUT front 2.5cm	None	None	6.140	-0.10	0.656	0.483	**0.34**	0.25
EC-Face-R1-040521-08/018BBCD001	PMAD4012A	155.00	NNTN4852A	DUT front 2.5cm	None	None	6.050	-0.52	0.485	0.359	0.27	0.20
Assessment across the TX band of antenna model HAD9742A												
EC-Face-R1-040521-09/018BBCD001	HAD9742A	146.00	NNTN4852A	DUT front 2.5cm	None	None	6.180	-0.28	0.723	0.543	**0.39**	0.29
EC-Face-R1-040521-10/018BBCD001	HAD9742A	154.00	NNTN4852A	DUT front 2.5cm	None	None	6.100	-0.49	0.702	0.525	0.39	0.29
EC-Face-R1-040521-11/018BBCD001	HAD9742A	162.00	NNTN4852A	DUT front 2.5cm	None	None	6.280	-0.64	0.602	0.448	0.35	0.26
Assessment across the TX band of antenna model NAD6502AR												
EC-Face-R1-040521-12/018BBCD001	NAD6502AR	146.00	NNTN4852A	DUT front 2.5cm	None	None	6.220	-0.24	0.913	0.697	0.48	0.37
EC-Face-R1-040521-13/018BBCD001	NAD6502AR	154.00	NNTN4852A	DUT front 2.5cm	None	None	6.090	-0.59	1.200	0.910	0.69	0.52
EC-Face-R1-040521-14/018BBCD001	NAD6502AR	162.00	NNTN4852A	DUT front 2.5cm	None	None	6.210	-0.53	1.280	0.973	**0.72**	0.55
Assessment of offered audio accessories with worst case configuration from above												
EC-Face-R1-040521-15/018BBCD001	PMAD4014A	136.00	NNTN4852A	DUT front 2.5cm	None	HMN9727B	6.340	-0.65	0.835	0.629	0.48	0.37
EC-Face-R1-040521-16/018BBCD001	PMAD4014A	136.00	NNTN4852A	DUT front 2.5cm	None	HMN9752B	6.360	-0.34	0.906	0.682	0.49	0.37
EC-Face-R1-040521-17/018BBCD001	PMAD4014A	136.00	NNTN4852A	DUT front 2.5cm	None	HLN9132A	6.360	-0.45	0.837	0.629	0.46	0.35
EC-Face-R1-040521-18/018BBCD001	PMAD4014A	136.00	NNTN4852A	DUT front 2.5cm	None	BDN6720A	6.300	-0.70	1.060	0.796	**0.62**	0.47

7.2 Peak S.A.R. location

Refer to APPENDIX B for detailed S.A.R. scan distributions.

7.3 Highest S.A.R. results calculation methodology

The calculated maximum 1-gram and 10-gram averaged S.A.R. values are determined by scaling the measured S.A.R. to account for power leveling variations and power slump. For this device the Maximum Calculated 1-gram and 10-gram averaged peak S.A.R. is calculated using the following formula:

Max. Calc. 1-g Avg. SAR = ((S.A.R. meas. / (10^(Pdrift/10))*(Pmax/Pint))* DC%
P_{max} = Maximum Power (W)
P_{int} = Initial Power (W)
Pdrift = DASY drift results (dB)
$SAR_{meas.}$ = Measured 1 gram averaged peak S.A.R. (mW/g)
DC % = Transmission mode duty cycle in % where applicable
Note that the use of the above formula should consider the relationship between the initial power, max power, and drift. Also, a 50% duty cycle is applied for PTT operation.

8.0 Conclusion

The highest Operational Maximum Calculated 1-gram and 10-gram average S.A.R. values found for FCC ID: ABZ99FT3039 model PMUD1985A.

At the Body: **1-g Avg. = 3.48 mW/g; 10-g Avg. = 1.22 mW/g**
At the Face: **1-g Avg. = 1.59 mW/g; 10-g Avg. = 1.21 mW/g**

These test results clearly demonstrate compliance with FCC Occupational/Controlled RF Exposure limits of **8.0 mW/g** per the requirements of 47 CFR 2.1093(d).