



**MOTOROLA**



**CGISS EME Test Laboratory**

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Fort Lauderdale, FL. 33322

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

**Attention:** FCC  
**Date of Report:** February 21, 2003  
**Report Revision:** Rev. A  
**Manufacturer:** Motorola  
**Product Description:** Portable 438-470 MHz 1-4W  
16 Channel  
**FCC ID:** ABZ99FT4056  
**Device Model:** AAH50RDC9AA2AN

**Test Period:** 1/31/03 – 2/19/03

**Test Engineer:** Stephen Whalen  
Sr. EME Engineer

**Author:** Michael Sailsman  
EME Regulatory Affairs

**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

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

2/21/03

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Date Approved

**Note:** This report shall not be reproduced without written approval from an officially designated representative of the Motorola EME Laboratory.

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## REVISION HISTORY

Date	Revision	Comments
10/10/02	O	Initial release Prototype results
2/21/03	A	Disclosure of Pilot results

## **1.0 Introduction**

This report details the utilization, test setup, test equipment, and updated test results of the Specific Absorption Rate (S.A.R.) measurements performed at the CGISS EME Test Lab for model number AAH50RDC9AA2AN, FCC ID: ABZ99FT4056.

The applicable exposure environment is Occupational/Controlled.

The test results included herein represent the highest S.A.R. levels applicable to this product and clearly demonstrate compliance with FCC Occupational/Controlled RF Exposure limits of 8.0 mW/g per the requirements of 47 CFR 2.1093(d).

## **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
- 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 Terminal communications (Electromagnetic Radiation - Human Exposure) Standard 2001
- ANATEL, Brazil Regulatory Authority, Resolution 256 (April 11, 2001) "additional requirements for SMR, cellular and PCS product certification."

### 3.0 Description of Test Sample



The portable handheld transceiver, FCC ID: ABZ99FT4056, 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: ABZ99FT4056 is capable of operating in the 438-470 MHz band. The rated power is 1-4 watts with a maximum output capability of 4.6 watts as defined by the upper limit of the production line final test station.

FCC ID: ABZ99FT4056 is offered with the following options and accessories:

### **Antenna**

NAE6483AR	Whip 403-520 MHz ¼ wave; -0.0 dBi
NAE6522AR	HeliFlex 438-470 MHz ¼ wave; -2.0 dBi

### **Batteries**

NNTN4497AR	Lithium Ion Battery 1800 mAh
NNTN4496AR	NiCd Battery 1100 mAh

### **Body-worn Accessories**

HLN6602A	Universal Chest Pack
1505596Z02	Replacement Strap for HLN6602 Universal Chest Pack
RLN4570A	Break-A-Way Chest Pack
RLN4815A	Universal Radio Pak
4280384F89	Replacement Belt Lengthener for RLN4815
NTN5243A	Shoulder Carry Strap, attaches to D-Shaped Rings on Carry Case
HLN8255B	3 inch Spring Action Belt Clip
HLN9701B	Nylon Carry Case with Belt Loop and D-Shaped Rings
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

### **Audio attachments**

HMN9030A	Remote Speaker Microphone
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 HMN9754 and NTN8371)
BDN6720A	Flexible Ear Receiver
PMMN4001A	Ultra-Lite Earset with Mic and PTT
HMN9013A	Lightweight Headset
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 RKN4090 Headset Adapter Cable)
RKN4090A	In-Line PTT Adapter (Use with RMN5015)
RLN5411A	Ultra-Lite Breeze Behind the Head Headset

### 3.1 Test Signal

#### Test Signal mode:

Test Mode	<input checked="" type="checkbox"/>	Base Station	<input type="checkbox"/>	Simulator	<input type="checkbox"/>
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#### Transmission Mode:

CW	<input checked="" type="checkbox"/>
Native Transmission	<input type="checkbox"/>
TDM:	<input type="checkbox"/>
Other	<input type="checkbox"/>

### 3.2 Test Output Power

Output power was measured before each test. The DASY 3 system's S.A.R. drift function was used to determine the power slump characteristic of the device. A characteristic power slump table based on 50 ohms measurements is provided in APPENDIX A for the batteries producing the highest S.A.R. results.

## 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 an ET3DV6 E-Field probe. Please reference the following websites for detailed specifications of the robot and E-Field probe: [http://www.speag.com/robot\\_acc.html](http://www.speag.com/robot_acc.html), <http://www.speag.com/probes.html>.

The S.A.R. measurements were conducted with probe model/serial number ET3DV6/SN1545. 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. Result when normalized to 1W (mW/g)	Reference S.A.R @ 1W (mW/g)	Test Date(s)
1545	FCC Body	5/21/02	SPEAG D450V2 MHz /1002	4.74 +/- 0.1	4.52 +/- 10%	1/31/03-2/5/03 5 test days
1545	IEEE Head	5/21/02	SPEAG D450V2 MHz /1002	4.81 +/- 0.08	4.70 +/- 10%	2/6/03-2/19/03 4 test days

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 EME S.A.R. 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) with a dielectric constant of 2.26 and a loss tangent of less than 0.00031. 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 table below shows the flat phantom dimensions used for S.A.R. performance assessment at the abdomen and face.

	Abdomen	Face
Length	80cm	80cm
Width	60cm	30cm
Height	20cm	20cm
Surface Thickness	0.2cm	0.2cm

### 4.2.2 SAM Phantom

SAM Phantom assessment was not applicable for this filing.

## 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).

Simulated Tissue	Body Position
FCC Body	Abdomen
IEEE Head	Face



### 4.3.2 Simulated Tissue Composition

Tissue Ingredient (%) @ 450 MHz		
	Head	Body
Sugar	56	46.5
DGBE (Glycol)	-	-
De ionized -Water	39.1	50.53
Salt	3.8	1.87
HEC	1.0	1.0
Bact.	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
450	56.7	55.1-55.7	0.94	0.92-0.94
454	56.7	55.1-55.7	0.94	0.92-0.94

IEEE Head				
Frequency (MHz)	Di-electric Constant Target	Di-electric Constant Meas. (Range)	Conductivity Target S/m	Conductivity Meas. S/m
450	43.5	42.9-44.0	0.87	0.84-0.89
454	43.5	43.6-44.0	0.87	0.89-0.89

### 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  $\pm 2^{\circ}\text{C}$  of the temperature at which the dielectric properties were determined. 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: 22.1-24.3°C Avg. 23.20°C
Relative Humidity	30 - 70 %	Range: 31.6-53.3% Avg. 46.30%
Tissue Temperature	NA	Range: 20.6-22.0°C Avg. 21.11°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 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 to assess performance at the abdomen and face. All assessments were done using the flat phantom with the DUT in CW mode.

To determine the antenna and battery that exhibited the highest S.A.R. results at the abdomen, each of the offered batteries and antennas were tested at the center of the respective antenna transmit band. The measurements were performed with the carry case that provided the minimum separation distance from the phantom and that offered the best positioning repeatability. The standard remote speaker microphone (RSM) was also included in this assessment.

Using the battery that produced the highest S.A.R. results from above, the DUT was assessed at the center of the transmit band of each respective antenna along with the applicable carry case accessories and the standard RSM.

The DUT was assessed at the band edges of the transmit range of the DUT for each antenna using the configuration that produced the highest S.A.R. results from the center of the antenna transmit band assessment.

The DUT was assessed at the abdomen with the applicable offered audio accessories using the configuration from above that produced the highest S.A.R. results.

The back and front of the DUT was assessed at 2.5 cm separation distance from the flat phantom using the antenna and battery that produced the highest S.A.R. from above along with BDN6648C audio headset.

The DUT was assessed at the face with the offered batteries and antennas at the center of the transmit band of each respective antenna. The transmission band edges of DUT were performed using the battery that produced the highest S.A.R. results for each respective antenna.

## 5.1 Device Test Positions

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

### 5.1.1 Abdomen

The DUT was positioned such that it was centered against the flat phantom with the applicable body-worn accessories or with 2.5cm separation distance from the phantom.

### 5.1.2 Head

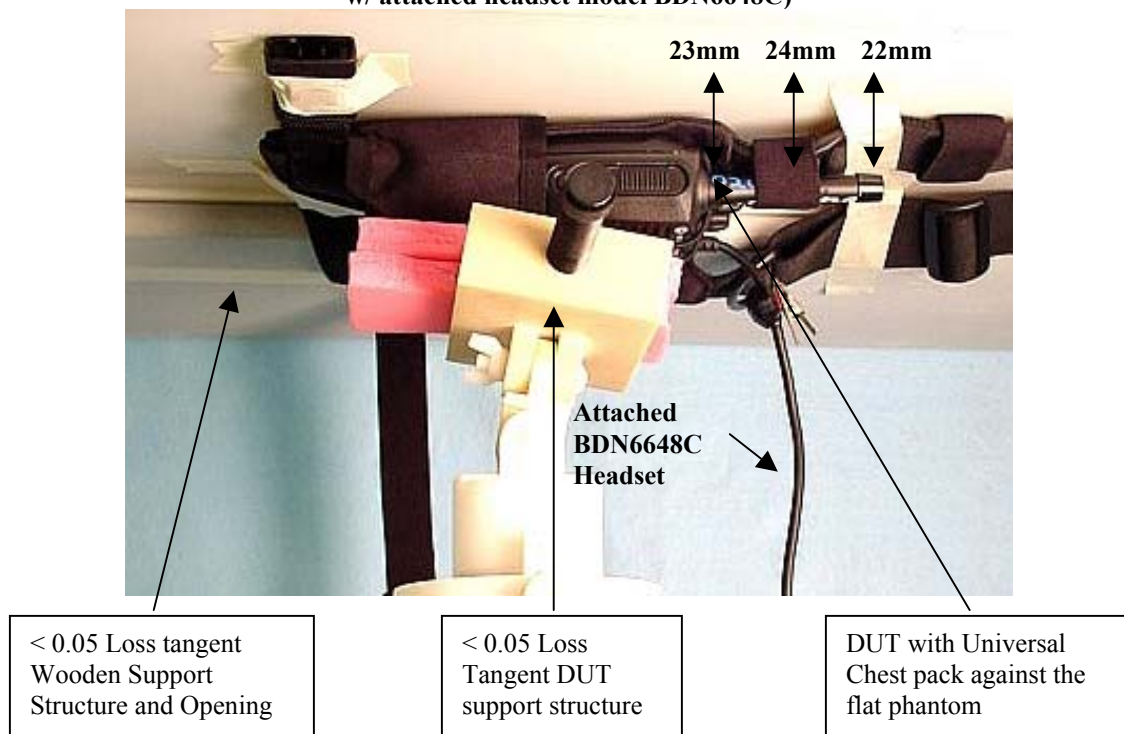
Assessments at the head was not applicable for this filing

### 5.1.3 Face

The DUT was positioned at the center of the flat phantom with a 2.5cm separation distance from the microphone.

## 5.2 Test Position Photographs

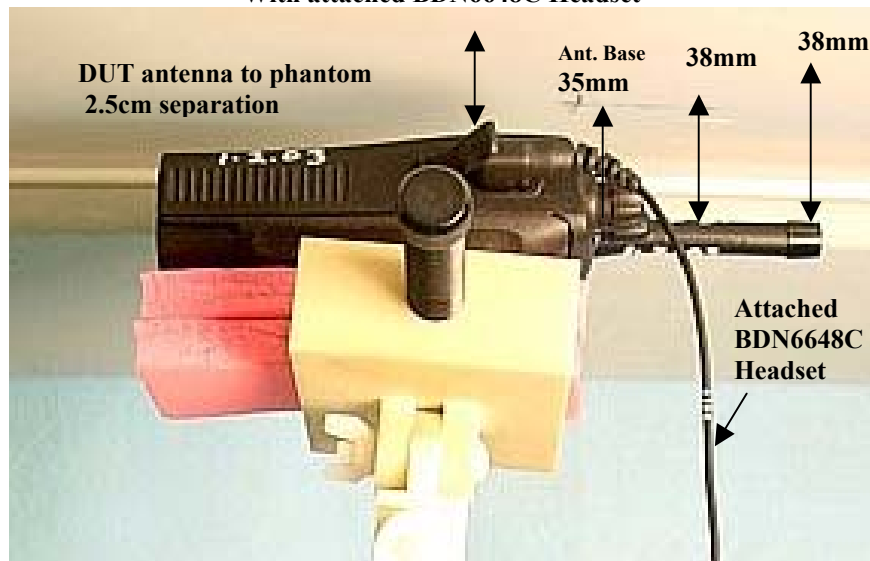
**Figure 1: Highest S.A.R. Test Position**  
(DUT with Universal Chest Pack model HLN6602A against the flat phantom w/ attached headset model BDN6648C)



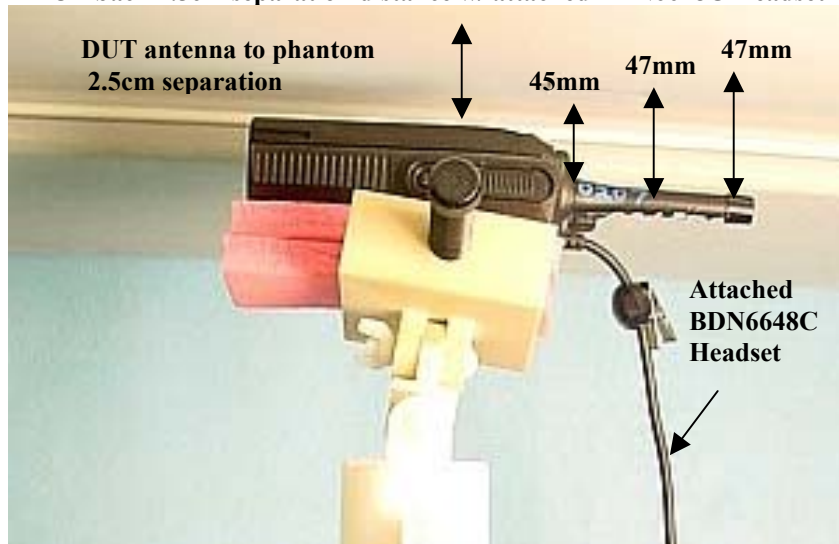
**Figure 2. Assessment @ the face; DUT microphone 2.5cm separation distance**



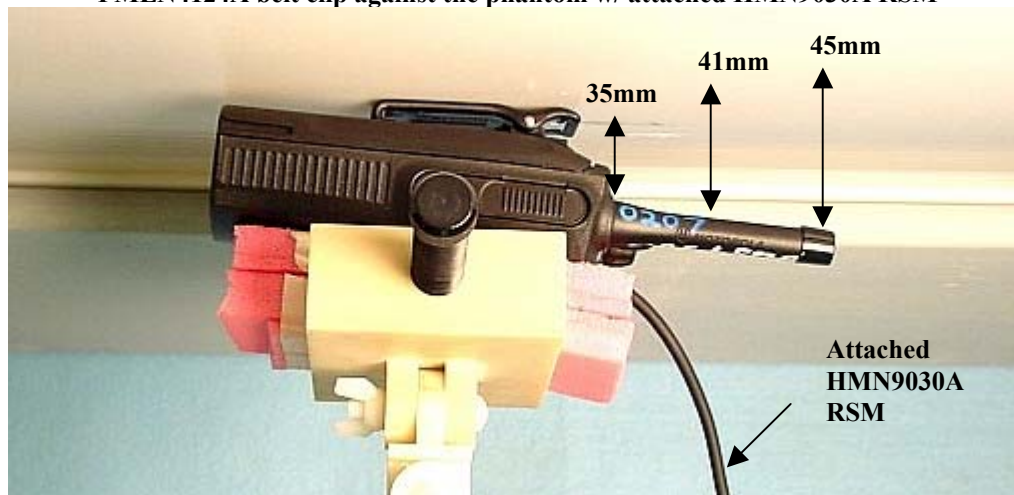
**Figure 3. Assessment @ the Abdomen; DUT front 2.5cm separation distance  
With attached BDN6648C Headset**



**Figure 4: Assessment @ the Abdomen;  
DUT back 2.5cm separation distance w/ attached BDN6648C Headset**



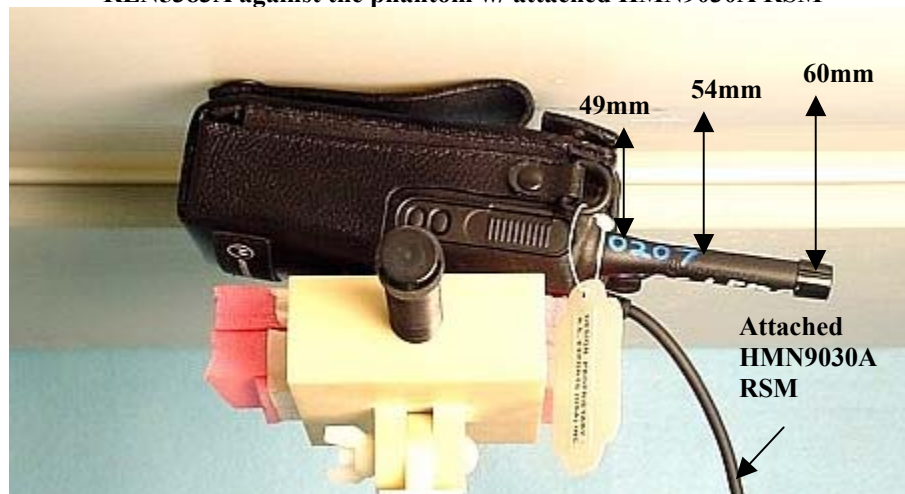
**Figure 5: Assessment @ the Abdomen; DUT w/  
PMLN4124A belt clip against the phantom w/ attached HMN9030A RSM**



**Figure 6: Assessment @ the Abdomen; DUT w/ belt clip  
HLN8255B against the phantom w/ attached HMN9030A RSM**

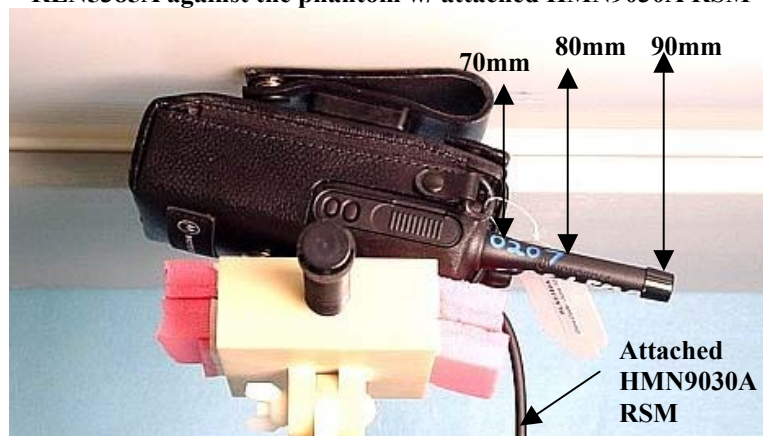


**Figure 7: Assessment @ the Abdomen; DUT w/ carry accessory  
RLN5383A against the phantom w/ attached HMN9030A RSM**





**Figure 8: Assessment @ the Abdomen; DUT w/ carry accessory RLN5385A against the phantom w/ attached HMN9030A RSM**



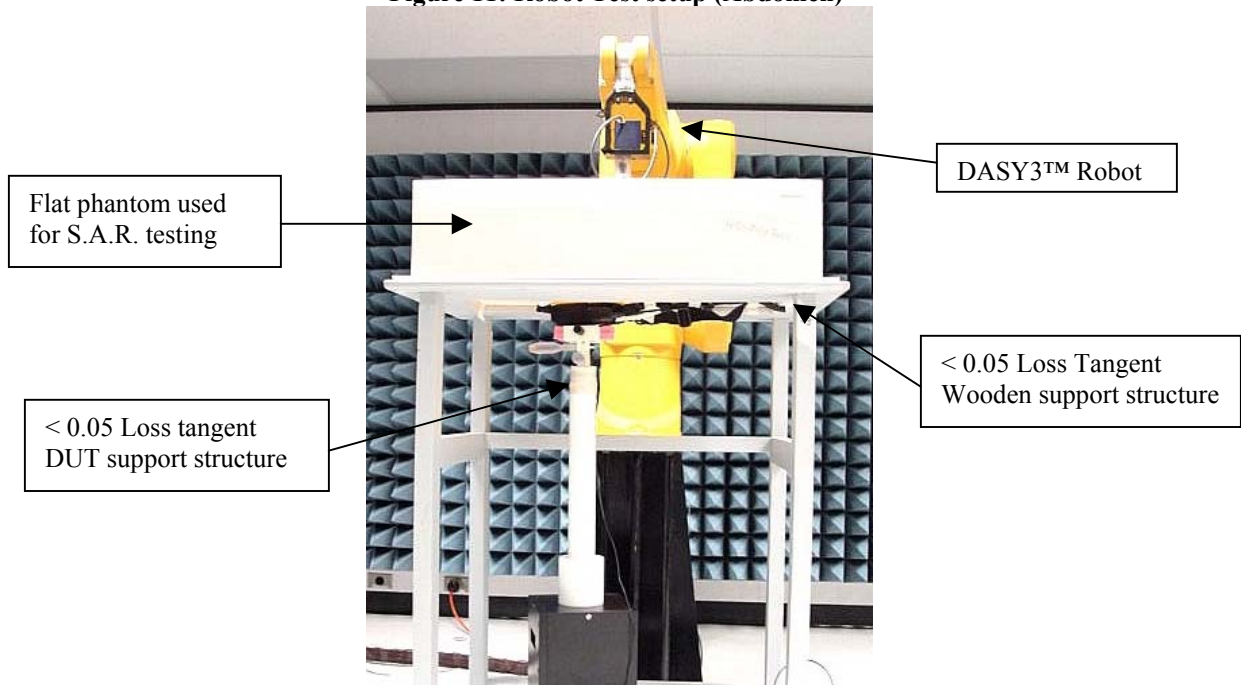
**Figure 9: Assessment @ the Abdomen; DUT w/ carry accessory HLN9701B against the phantom w/ attached HMN9030A RSM, and NTN5243A shoulder strap**



**Figure 10: Assessment @ the Abdomen; DUT w/ carry accessory RLN4815A against the phantom w/ attached HMN9030A RSM,**



**Figure 11: Robot Test setup (Abdomen)**



**Figure 12: Robot Test Setup (Face)**





### 5.3 Probe Scan Procedures

The E-field probe is first scanned in 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.

### 6.0 Measurement Uncertainty

**Table 1: Uncertainty Budget for Device Under Test**

<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e = f(d,k)</i>	<i>f</i>	<i>g</i>	<i>h =</i> <i>c x f / e</i>	<i>i =</i> <i>c x g / e</i>	<i>k</i>
Uncertainty Component	Section of IEEE P1528	Tol. (± %)	Prob. Dist.	Divisor	<i>c<sub>i</sub></i> (1 g)	<i>c<sub>i</sub></i> (10 g)	1 g <i>u<sub>i</sub></i> (±%)	10 g <i>u<sub>i</sub></i> (±%)	<i>v<sub>i</sub></i>
<b>Measurement System</b>									
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	∞
Spherical Isotropy	E.2.2	9.6	R	1.73	0.707	0.707	3.9	3.9	∞
Boundary Effect	E.2.3	5.8	R	1.73	1	1	3.3	3.3	∞
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	E.6.1	3.0	R	1.73	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.3	R	1.73	1	1	0.2	0.2	∞
Probe Positioning with respect to Phantom Shell	E.6.3	1.1	R	1.73	1	1	0.6	0.6	∞
Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	E.5	3.9	R	1.73	1	1	2.3	2.3	∞
<b>Test sample Related</b>									
Test Sample Positioning	E.4.2	3.6	N	1.00	1	1	3.6	3.6	29
Device Holder Uncertainty	E.4.1	2.8	N	1.00	1	1	2.8	2.8	8
Output Power Variation - SAR drift measurement	6.6.2	5.0	R	1.73	1	1	2.9	2.9	∞
<b>Phantom and Tissue Parameters</b>									
Phantom Uncertainty (shape and thickness tolerances)	E.3.1	4.0	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity - deviation from target values	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity - measurement uncertainty	E.3.3	10.0	R	1.73	0.64	0.43	3.7	2.5	∞
Liquid Permittivity - deviation from target values	E.3.2	10.0	R	1.73	0.6	0.49	3.5	2.8	∞
Liquid Permittivity - measurement uncertainty	E.3.3	5.0	R	1.73	0.6	0.49	1.7	1.4	∞
<b>Combined Standard Uncertainty</b>			RSS				11.72	11.09	1363
<b>Expanded Uncertainty (95% CONFIDENCE LEVEL)</b>			<i>k</i> =2				22.98	21.75	

**Table 2: Uncertainty Budget for System Performance Check**

<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i> = <i>f</i> ( <i>d</i> , <i>k</i> )	<i>f</i>	<i>g</i>	<i>h</i> = <i>c</i> <i>x</i> <i>f</i> / <i>e</i>	<i>i</i> = <i>c</i> <i>x</i> <i>g</i> / <i>e</i>	<i>k</i>
	Section of IEEE P1528	Tol. (± %)	Prob. Dist.		<i>c<sub>i</sub></i> (1 g)	<i>c<sub>i</sub></i> (10 g)	1 g <i>u<sub>i</sub></i> (±%)	10 g <i>u<sub>i</sub></i> (±%)	
Uncertainty Component				Div.					<i>v<sub>i</sub></i>
<b>Measurement System</b>									
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	5.8	R	1.73	1	1	3.3	3.3	∞
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	0.0	R	1.73	1	1	0.0	0.0	∞
Integration Time	E.2.8	0.0	R	1.73	1	1	0.0	0.0	∞
RF Ambient Conditions	E.6.1	3.0	R	1.73	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.3	R	1.73	1	1	0.2	0.2	∞
Probe Positioning with respect to Phantom Shell	E.6.3	1.1	R	1.73	1	1	0.6	0.6	∞
Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	E.5	3.9	R	1.73	1	1	2.3	2.3	∞
<b>Dipole</b>									
Dipole Axis to Liquid Distance	8, E.4.2	1.0	R	1.73	1	1	0.6	0.6	∞
Input Power and SAR Drift Measurement	8, 6.6.2	4.7	R	1.73	1	1	2.7	2.7	∞
<b>Phantom and Tissue Parameters</b>									
Phantom Uncertainty (shape and thickness tolerances)	E.3.1	4.0	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity - deviation from target values	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity - measurement uncertainty	E.3.3	10.0	R	1.73	0.64	0.43	3.7	2.5	∞
Liquid Permittivity - deviation from target values	E.3.2	10.0	R	1.73	0.6	0.49	3.5	2.8	∞
Liquid Permittivity - measurement uncertainty	E.3.3	5.0	R	1.73	0.6	0.49	1.7	1.4	∞
<b>Combined Standard Uncertainty</b>			RSS				10.16	9.43	∞
<b>Expanded Uncertainty</b> (95% CONFIDENCE LEVEL)			<i>k</i> =2				19.92	18.48	

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) *c<sub>i</sub>* - sensitivity coefficient that should be applied to convert the variability of the uncertainty component into a variability of SAR.

g) *u<sub>i</sub>* – SAR uncertainty

h) *v<sub>i</sub>* - 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. performance. DASY3™ S.A.R. measurement scans are provided in APPENDIX B for the highest observed S.A.R.

APPENDIX A presents a shortened S.A.R. cube scan to assess the validity of the calculated results presented herein. Note that the results of the shortened cube scans presented in Appendix A demonstrate that the scaling methodology used to determine the calculated S.A.R. results presented herein are valid.

### 7.1 S.A.R. results

Compliance assessment at the abdomen CW mode										
Run Number/ SN	Freq. (MHz)	Antenna	Battery	Test position	Carry Case	Additional attachments	Initial Power (mW)	DASY Drift (dB)	Measured 1g-S.A.R. (mW/g)	DASY Drift Max Calc. 1g-S.A.R. (mW/g)
Assessment at the abdomen (Battery search)										
Ab R1 030131-04/ 018TCW0217	461	NAE6483AR	NNTN4496A	Against phantom	HLN8255B	HMN9030A	4.52	-1.24	2.77	1.88
Ab R1 030131-03/ 018TCW0217	461	NAE6483AR	NNTN4497A	Against phantom	HLN8255B	HMN9030A	4.68	-1.14	2.61	1.67
Ab R1 030131-05/ 018TCW0217	454	NAE6522AR	NNTN4497A	Against phantom	HLN8255B	HMN9030A	4.69	-1.33	3.41	2.27
Ab R1 030131-06/ 018TCW0217	454	NAE6522AR	NNTN4496A	Against phantom	HLN8255B	HMN9030A	4.62	-1.09	3.54	<b>2.27</b>
Assessment at abdomen; (Carry cases w/ antenna NAE6483A)										
Ab R1 030203-13/ 018TCW0217	461	NAE6483AR	NNTN4496A	Against phantom	HLN9701B	HMN9030A	4.85	-1.14	1.87	1.15
Ab R1 030203-11/ 018TCW0217	461	NAE6483AR	NNTN4496A	Against phantom	RLN5383A	HMN9030A	4.70	-0.95	1.17	0.71
Ab R1 030203-12/ 018TCW0217	461	NAE6483AR	NNTN4496A	Against phantom	RLN5385A	HMN9030A	4.69	-0.95	0.77	0.47
Ab R1 030203-14/ 018TCW0217	461	NAE6483AR	NNTN4496A	Against phantom	NTN5243A HLN9701B	HMN9030A	4.86	-0.95	1.84	1.08
Ab R1 030203-15/ 018TCW0217	461	NAE6483AR	NNTN4496A	Against phantom	RLN4815A	HMN9030A	4.83	-1.06	1.91	1.16
Ab R1 030203-16/ 018TCW0217	461	NAE6483AR	NNTN4496A	Against phantom	HLN6602A	HMN9030A	4.88	-0.92	3.77	2.20
Ab R1 030204-02/ 018TCW0217	438	NAE6483AR	NNTN4496A	Against phantom	HLN6602A	HMN9030A	4.67	-1.07	6.46	<b>4.07</b>
Ab R1 030204-03/ 018TCW0217	470	NAE6483AR	NNTN4496A	Against phantom	HLN6602A	HMN9030A	4.73	-1.36	3.38	2.25

Run Number/ SN	Freq. (MHz)	Antenna	Battery	Test position	Carry Case	Additional attachments	Initial Power (mW)	DASY Drift (dB)	Measured 1g-S.A.R. (mW/g)	DASY Drift Max Calc. 1g-S.A.R. (mW/g)
<b>Assessment at abdomen; (Carry cases w/ antenna NAE6522A)</b>										
Ab R1 030203-03/ 018TCW0217	454	NAE6522AR	NNTN4496A	Against phantom	HLN9701B	HMN9030A	4.62	-1.35	2.43	1.65
Ab R1 030203-04/ 018TCW0217	454	NAE6522AR	NNTN4496A	Against phantom	RLN5383A	HMN9030A	4.64	-1.23	1.96	1.29
Ab R1 030203-05/ 018TCW0217	454	NAE6522AR	NNTN4496A	Against phantom	RLN5385A	HMN9030A	4.69	-1.05	1.06	0.66
Ab R1 030203-06/ 018TCW0217	454	NAE6522AR	NNTN4496A	Against phantom	NTN5243A HLN9701B	HMN9030A	4.76	-1.51	2.53	1.73
Ab R1 030203-07/ 018TCW0217	454	NAE6522AR	NNTN4496A	Against phantom	RLN4815A	HMN9030A	4.62	-1.18	2.39	1.56
Ab R1 030204-04/ 018TCW0217	454	NAE6522AR	NNTN4496A	Against phantom	HLN6602A	HMN9030A	4.80	-0.99	3.86	2.32
Ab R1 030204-05/ 018TCW0217	438	NAE6522AR	NNTN4496A	Against phantom	HLN6602A	HMN9030A	4.70	-0.96	7.42	4.53
Ab R1 030205-06/ 018TCW0207	438	NAE6522AR	NNTN4496A	Against phantom	HLN6602A	BDN6648C	4.57	-1.41	7.70	<b>5.36</b>
Ab R1 030204-06/ 018TCW0217	470	NAE6522AR	NNTN4496A	Against phantom	HLN6602A	HMN9030A	4.79	-1.09	2.27	1.40
<b>Assessment @ the abdomen (audio accessories) w/ chest pack</b>										
Ab R1 030204-07/ 018TCW0217	438	NAE6522AR	NNTN4496A	Against phantom	HLN6602A	HMN9754D	4.71	-0.90	7.10	4.27
Ab R1 030204-08/ 018TCW0217	438	NAE6522AR	NNTN4496A	Against phantom	HLN6602A	PMMN4001A	4.86	-0.90	6.74	3.92
Ab R1 030204-09/ 018TCW0217	438	NAE6522AR	NNTN4496A	Against phantom	HLN6602A	BDN6647F	4.81	-0.71	6.95	3.91
Ab R1 030204-10/ 018TCW0217	438	NAE6522AR	NNTN4496A	Against phantom	HLN6602A	RMN5015A & RKN4090A	4.78	-0.77	6.97	4.00
Ab R1 030204-11/ 018TCW0217	438	NAE6522AR	NNTN4496A	Against phantom	HLN6602A	RLN5238A	4.90	-0.99	7.48	4.41
Ab R1 030204-12/ 018TCW0217	438	NAE6522AR	NNTN4496A	Against phantom	HLN6602A	HMN9013A	4.83	-0.68	7.15	3.98
Ab R1 030205-02/ 018TCW0217	438	NAE6522AR	NNTN4496A	Against phantom	HLN6602A	RLN5411A	4.71	-0.90	7.91	4.75
Ab R1 030205-03/ 018TCW0217	438	NAE6522AR	NNTN4496A	Against phantom	HLN6602A	RMN4016A	4.70	-1.13	8.02	5.09
Ab R1 030205-04/ 018TCW0217	438	NAE6522AR	NNTN4496A	Against phantom	HLN6602A	HMN9021A	4.67	-1.10	7.65	4.85
Ab R1 030205-05/ 018TCW0217	438	NAE6522AR	NNTN4496A	Against phantom	HLN6602A	BDN6648C	4.69	-1.25	7.95	<b>5.20</b>

Run Number/ SN	Freq. (MHz)	Antenna	Battery	Test position	Carry Case	Additional attachments	Initial Power (mW)	DASY Drift (dB)	Measured 1g-S.A.R. (mW/g)	DASY Drift Max Calc. 1g-S.A.R. (mW/g)
<b>Assessment @ the abdomen (audio accessories) Continued</b>										
Ab-R1-030218-02/ 018TCW0217	438	NAE6522AR	NNTN4496A	DUT back 2.5cm	None	BDN6648C	4.72	-0.94	4.57	2.77
Ab-R1-030218-03/ 018TCW0217	438	NAE6522AR	NNTN4496A	DUT front 2.5cm	None	BDN6648C	4.65	-0.85	6.07	<b>3.65</b>

<b>Compliance assessment at the Face (Flat phantom); CW mode</b>										
Run Number/ SN	Freq. (MHz)	Antenna	Battery	Test position	Carry Case	Additional attachments	Initial Power (mW)	Dasy Drift (dB)	Measured 1g-S.A.R. (mW/g)	DASY Drift Max Calc. 1g-S.A.R. (mW/g)
<b>Assessment with NAE6483A</b>										
Face-030206-04/ 018TCW0217	461	NAE6483AR	NNTN4496A	Radio Mic 2.5cm separation	None	None	4.73	-0.69	3.25	1.85
Face-030207-02/ 018TCW0217	461	NAE6483AR	NNTN4497A	Radio Mic 2.5cm separation	None	None	4.84	-1.02	3.35	2.01
Face-030219-02/ 018TCW0207	438	NAE6483AR	NNTN4497A	Radio Mic 2.5cm separation	None	None	4.66	-0.99	5.56	<b>3.45</b>
Face-030219-03/ 018TCW0207	470	NAE6483AR	NNTN4497A	Radio Mic 2.5cm separation	None	None	4.85	-1.09	2.59	1.58
<b>Assessment with NAE6522A</b>										
Face-030207-05/ 018TCW0217	454	NAE6522AR	NNTN4496A	Radio Mic 2.5cm separation	None	None	4.67	-1.17	3.95	2.55
Face-030207-06/ 018TCW0217	454	NAE6522AR	NNTN4497A	Radio Mic 2.5cm separation	None	None	4.83	-1.19	4.14	2.59
Face-030210-03/ 018TCW0217	438	NAE6522AR	NNTN4497A	Radio Mic 2.5cm separation	None	None	4.72	-0.86	6.99	<b>4.15</b>
Face-030207- 09/018TCW0207	438	NAE6522AR	NNTN4497A	Radio Mic 2.5cm separation	None	None	4.75	-0.87	6.91	4.09
Face-030207-08/ 018TCW0217	470	NAE6522AR	NNTN4497A	Radio Mic 2.5cm separation	None	None	4.85	-1.22	2.22	1.39

## 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 averaged S.A.R. value is determined by scaling the measured S.A.R. to account for power leveling variations and power output slump below the reported maximum power during the S.A.R. measurements. For this device the Maximum Calculated 1-gram averaged peak S.A.R. is calculated using the following formula:

$$\text{Max. Calc. 1-g Avg. SAR} = ((\text{S.A.R. meas.} / (10^{(\text{Pdrift}/10)})) * (\text{Pmax}/\text{Pint})) * \text{DC}\%$$

$P_{\text{max}}$  = Maximum Power (W)

$P_{\text{int}}$  = Initial Power (W)

Pdrift = DASY drift results (dB)

SAR<sub>meas.</sub> = Measured 1 gram averaged peak S.A.R. (mW/g)

DC % = Transmission mode duty cycle in % where applicable

### 8.0 Conclusion

The highest Operational Maximum Calculated 1-gram average S.A.R. values found for FCC ID: ABZ99FT4056

**At the abdomen:** 5.36 mW/g

**At the Face:** 4.15 mW/g

**At the Head:** N/A

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)