Certificate Number: 1449-02

**CGISS EME Test Laboratory**
8000 West Sunrise Blvd
Fort Lauderdale, FL. 33322

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

| | |
|---|---|
| **Attention:** | FCC |
| **Date of Report:** | October 10, 2002 |
| **Report Revision:** | Rev. O |
| **Manufacturer:** | Motorola |
| **Product Description:** | Portable 438-470 MHz 1-4W<br>16 Channel |
| **FCC ID:** | **ABZ99FT4056** |
| **Device Model:** | AAH50RDC9AA2AN |

**Test Period:** 9/18/02 – 10/04/02

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

| | |
|---|---|
| /s/ Ken Enger | 10/11/02 |
| Ken Enger<br>Senior Resource Manager, Laboratory Director, CGISS EME Lab | Date Approved |

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# REVISION HISTORY

| Date | Revision | Comments |
|---|---|---|
| 10/10/02 | O | Initial release 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 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. This product is intended for land mobile business users. 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.

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 |
| 8505816K25 | 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 |
| PMLN4124A | 2.5 inch Spring Belt Clip |
| 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 | X | Base Station | | Simulator | |
|---|---|---|---|---|---|

**Transmission Mode:**

| | |
|---|---|
| **CW** | **X** |
| **Native Transmission** | |
| **TDM:** | |
| **Other** | |

## 3.2 Test Output Power

Output power was measured before and after each test. A characteristic power slump table is provided in Appendix A for the battery 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/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 | CGISS 450 MHz /002 | 4.725 +/- 0.095 | 4.82 +/- 10% | 9/18/02 to 10/2/02 7 test days |
| 1545 | IEEE Head | 5/21/02 | CGISS 450 MHz /002 | 4.965 +/- 0.015 | 4.79 +/- 10% | 10/3/02 & 10/4/02 2 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 supporting structure is assembled with wooden pegs and glue. The table below shows the flat phantom dimensions used for S.A.R. performance assessment.

| | |
|---|---|
| Length | 80cm |
| Width | 60cm |
| Height | 20cm |
| Surface Thickness | 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 | 54.1 – 55.8 | 0.94 | 0.90 – 0.93 |
| 454 | 56.7 | 54.0 - 55.7 | 0.94 | 0.90 – 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 | 42.4 - 43.1 | 0.87 | 0.88 - 0.90 |
| 454 | 43.5 | 42.3 – 43.1 | 0.87 | 0.88 - 0.90 |

### 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$^{o}$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: 21.1 - 24.0˚C<br>Avg. 22.5 ˚C |
| **Relative Humidity** | 30 - 70 % | Range: 44.8 - 54.3%<br>Avg. 49.6% |
| **Tissue Temperature** | NA | Range: 21.0 - 21.6˚C<br>Avg. 21.27˚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 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 as well as with 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 RLN5411A 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. Band edge assessments at the face 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 and attached headset model RLN5411A against the flat phantom)**

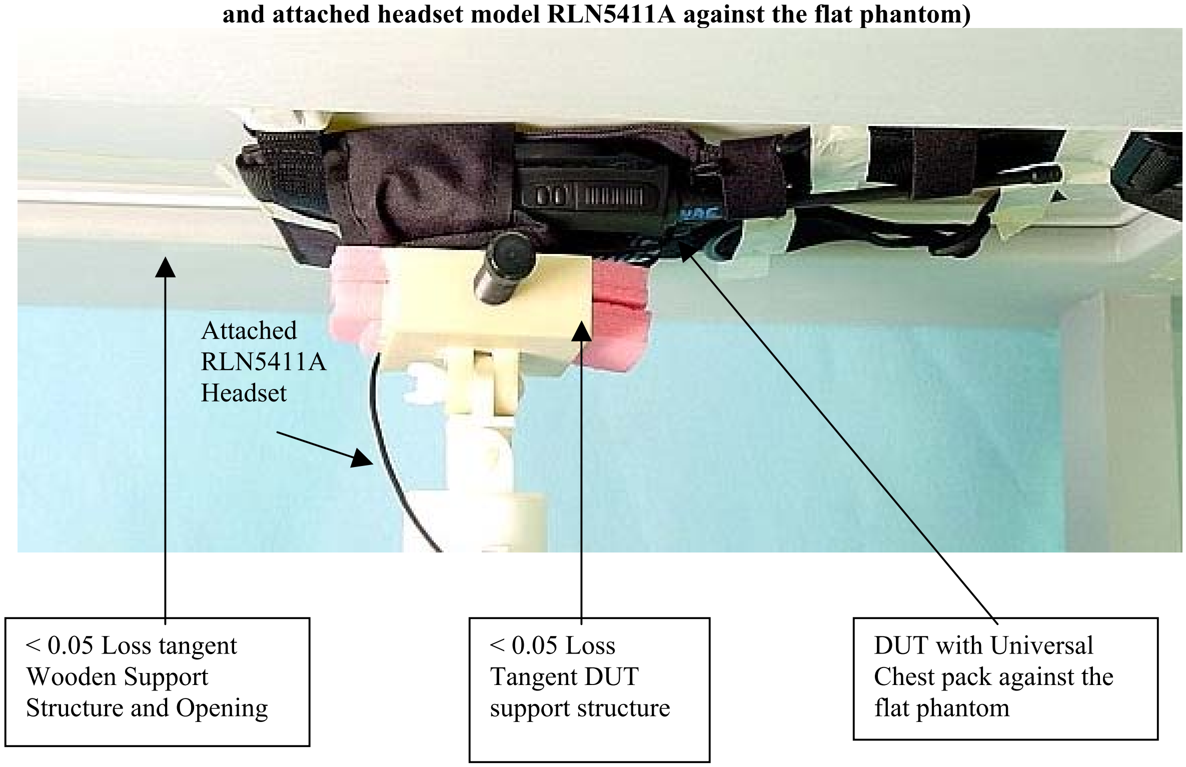
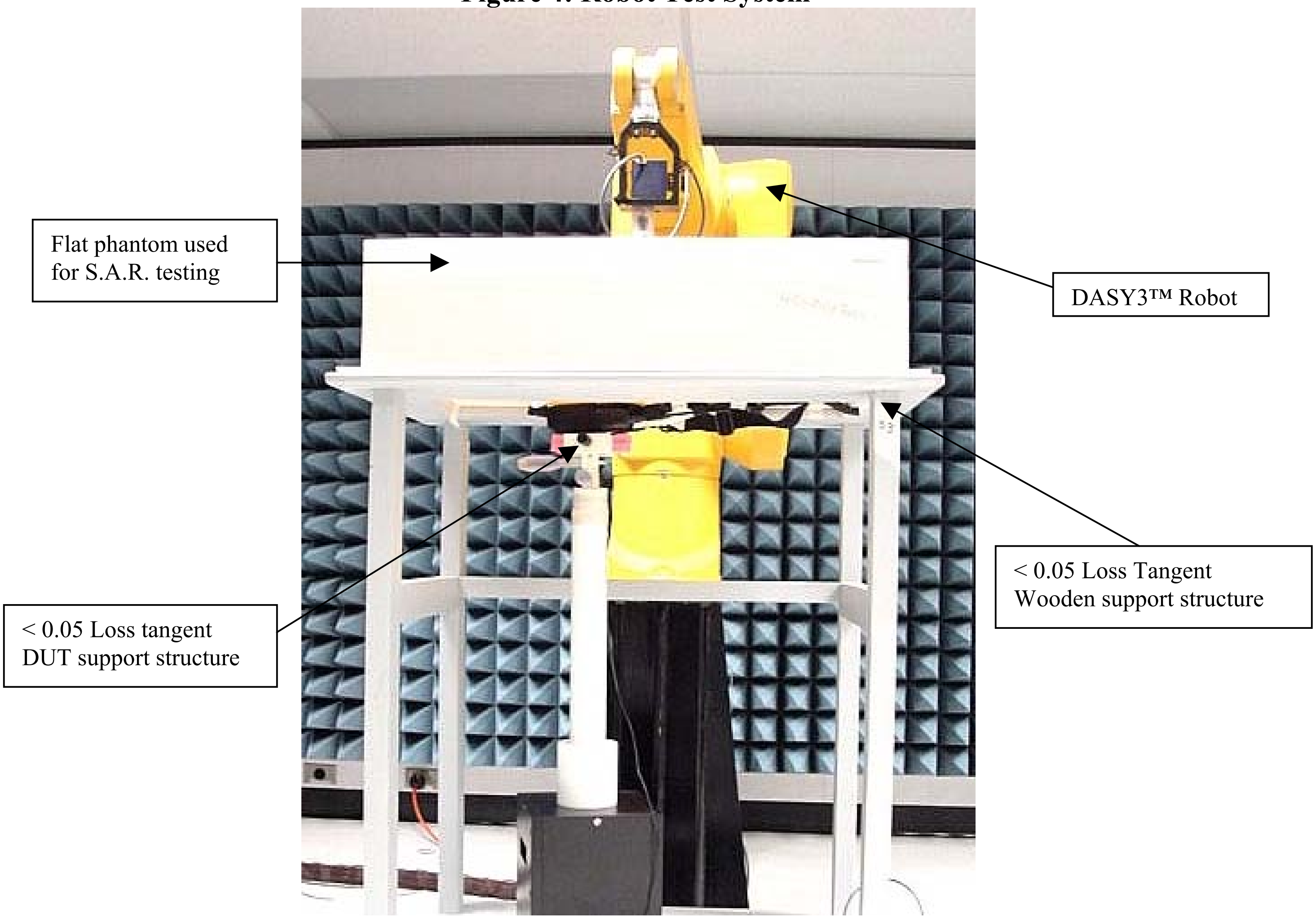


**Figure 2. Assessment @ the face; DUT 2.5cm separation distance**


**Figure 3. Assessment @ the Abdomen; DUT 2.5cm separation distance With attached RLN5411A Headset**

**Figure 4: Robot Test System**




## 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

| *a* | *b* | *c* | *d* | *e* = *f*(*d*,*k*) | *f* | *g* | *h* = *c* x *f* / *e* | *i* = *c* x *g* / *e* | *k* |
|---|---|---|---|---|---|---|---|---|---|
| **Uncertainty Component** | **Section of IEEE P1528** | **Tol. (± %)** | **Prob. Dist.** | **Divisor** | $c_i$ (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 | ∞ |
| 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 | ∞ |
| **Test sample Related** | | | | | | | | | |
| 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 | ∞ |
| **Phantom and Tissue Parameters** | | | | | | | | | |
| 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 | ∞ |
| **Combined Standard Uncertainty** | | | RSS | | | | 11.72 | 11.09 | 1363 |
| **Expanded Uncertainty** (95% CONFIDENCE LEVEL) | | | *k*=2 | | | | 22.98 | 21.75 | |

## Table 2: Uncertainty Budget for System Performance Check

| *a* | *b* | *c* | *d* | *e* = *f(d,k)* | *f* | *g* | *h* = *c x f / e* | *i* = *c x g / e* | *k* |
|---|---|---|---|---|---|---|---|---|---|
| **Uncertainty Component** | **Section of IEEE P1528** | **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 | 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 | ∞ |
| **Dipole** | | | | | | | | | |
| 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 | ∞ |
| **Phantom and Tissue Parameters** | | | | | | | | | |
| 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 | ∞ |
| **Combined Standard Uncertainty** | | | RSS | | | | 10.16 | 9.43 | ∞ |
| **Expanded Uncertainty** (95% CONFIDENCE LEVEL) | | | *k*=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) *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. 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)** | **End Power (mW)** | **Measured 1g-S.A.R. (mW/g)** | **Max Calc. 1g-S.A.R. (mW/g)** |
| **Search for highest S.A.R. producing Battery /Antenna** | | | | | | | | | | |
| Ab-R1-020918-05/ WDEXF3WQ | 461 | NAE6483AR | NNTN4497AR Li-ion | Against | HLN8255B beltclip | HMN9030A RSM | 4.46 | 3.37 | 3.06 | 2.09 |
| Ab-R1-020919-03/ WDEXF3WQ | 461 | NAE6483AR | NNTN4496AR NiCd | Against | HLN8255B beltclip | HMN9030A RSM | 4.52 | 3.05 | 3.03 | **2.29** |
| Ab-R1-020919-04/ WDEXF3WQ | 454 | 8505816K25 | NNTN4497AR Li-ion | Against | HLN8255B beltclip | HMN9030A RSM | 4.97 | 3.67 | 1.32 | 0.83 |
| Ab-R1-020919-05/ WDEXF3WQ | 454 | 8505816K25 | NNTN4496AR NiCd | Against | HLN8255B beltclip | HMN9030A RSM | 4.93 | 3.39 | 1.33 | 0.90 |
| **Assessment of Carry case Accessories w/ NAE6483AR antenna** | | | | | | | | | | |
| Ab-R1-020920-02/ WDEXF3WQ | 461 | NAE6483AR | NNTN4496AR NiCd | Against | PMLN4124A beltclip | HMN9030A RSM | 4.49 | 3.36 | 2.85 | 1.95 |
| Ab-R1-020920-03/ WDEXF3WQ | 461 | NAE6483AR | NNTN4496AR NiCd | Against | HLN9701B nylon | HMN9030A RSM | 4.52 | 3.46 | 2.41 | 1.60 |
| Ab-R1-020920-04/ WDEXF3WQ | 461 | NAE6483AR | NNTN4496AR NiCd | Against | RLN5383A leather | HMN9030A RSM | 4.54 | 3.49 | 1.72 | 1.13 |
| Ab-R1-020920-05/ WDEXF3WQ | 461 | NAE6483AR | NNTN4496AR NiCd | Against | RLN5385A leather | HMN9030A RSM | 4.39 | 3.02 | 0.21 | 0.16 |
| Ab-R1-020920-06/ WDEXF3WQ | 461 | NAE6483AR | NNTN4496AR NiCd | Against | NTN5243A HLN9701B | HMN9030A RSM | 4.56 | 3.44 | 2.49 | 1.66 |
| Ab-R1-020919-12/ WDEXF3WQ | 461 | NAE6483AR | NNTN4496AR NiCd | Against | RLN4815A radio pak | HMN9030A RSM | 4.62 | 3.49 | 2.39 | 1.58 |
| Ab-R1-020920-07/ WDEXF3WQ | 461 | NAE6483AR | NNTN4496AR NiCd | Against | HLN6602A chest pak | HMN9030A RSM | 4.55 | 3.55 | 5.66 | 3.67 |
| Ab-R1-020920-08/ WDEXF3WQ | 438 | NAE6483AR | NNTN4496AR NiCd | Against | HLN6602A chest pak | HMN9030A RSM | 4.72 | 3.85 | 7.11 | 4.25 |
| Ab-R1-020920-09/ WDEXF3WQ | 470 | NAE6483AR | NNTN4496AR NiCd | Against | HLN6602A chest pak | HMN9030A RSM | 5.05 | 3.73 | 7.08 | **4.37** |
| **Assessment of Carry case Accessories w/ 8505816K25 antenna** | | | | | | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Ab-R1-020919-06/ WDEXF3WQ | 454 | 8505816K25 | NNTN4496AR NiCd | Against | PMLN4124A beltclip | HMN9030A RSM | 4.90 | 3.82 | 1.32 | 0.79 |
| Ab-R1-020919-07/ WDEXF3WQ | 454 | 8505816K25 | NNTN4496AR NiCd | Against | HLN9701B nylon | HMN9030A RSM | 4.78 | 3.78 | 1.07 | 0.65 |
| Ab-R1-020919-08/ WDEXF3WQ | 454 | 8505816K25 | NNTN4496AR NiCd | Against | RLN5383A leather | HMN9030A RSM | 4.95 | 3.89 | 0.85 | 0.50 |
| Ab-R1-020919-09/ WDEXF3WQ | 454 | 8505816K25 | NNTN4496AR NiCd | Against | RLN5385A leather | HMN9030A RSM | 4.95 | 3.83 | 0.60 | 0.36 |
| Ab-R1-020919-10/ WDEXF3WQ | 454 | 8505816K25 | NNTN4496AR NiCd | Against | NTN5243A HLN9701B | HMN9030A RSM | 4.89 | 3.79 | 1.05 | 0.64 |
| Ab-R1-020919-11/ WDEXF3WQ | 454 | 8505816K25 | NNTN4496AR NiCd | Against | RLN4815A radio pak | HMN9030A RSM | 4.97 | 3.82 | 1.08 | 0.65 |
| Ab-R1-020920-10/ WDEXF3WQ | 454 | 8505816K25 | NNTN4496AR NiCd | Against | HLN6602A chest pak | HMN9030A RSM | 4.84 | 3.76 | 1.81 | 1.11 |
| Ab-R1-020920-11/ WDEXF3WQ | 438 | 8505816K25 | NNTN4496AR NiCd | Against | HLN6602A chest pak | HMN9030A RSM | 4.73 | 3.83 | 2.79 | **1.68** |
| Ab-R1-020920-12/ WDEXF3WQ | 470 | 8505816K25 | NNTN4496AR NiCd | Against | HLN6602A chest pak | HMN9030A RSM | 4.89 | 3.89 | 2.52 | 1.49 |
| **Assessment of applicable audio accessories** | | | | | | | | | | |
| Ab-R1-020923-02/ WDEXF3WQ | 470 | NAE6483AR | NNTN4496AR NiCd | Against | HLN6602A chest pak | HMN9754D ear piece | 4.98 | 3.64 | 7.20 | 4.55 |
| Ab-R1-020923-03/ WDEXF3WQ | 470 | NAE6483AR | NNTN4496AR NiCd | Against | HLN6602A chest pak | PMMN4001 A earset | 4.97 | 3.75 | 7.44 | 4.56 |
| Ab-R1-020923-04/ WDEXF3WQ | 470 | NAE6483AR | NNTN4496AR NiCd | Against | HLN6602A chest pak | BDN6647F headset | 5.04 | 3.74 | 7.59 | 4.67 |
| Ab-R1-020923-05/ WDEXF3WQ | 470 | NAE6483AR | NNTN4496AR NiCd | Against | HLN6602A chest pak | RMN5015A & RKN4090A | 5.08 | 3.91 | 7.29 | 4.29 |
| Ab-R1-020930-03/ WDEXF3WQ | 470 | NAE6483AR | NNTN4496AR NiCd | Against | HLN6602A chest pak | RLN5238A headset | 5.02 | 3.72 | 7.49 | 4.63 |
| Ab-R1-020930-04/ WDEXF3WQ | 470 | NAE6483AR | NNTN4496AR NiCd | Against | HLN6602A chest pak | HMN9013A headset | 4.94 | 4.01 | 7.55 | 4.33 |
| Ab-R1-020930-05/ WDEXF3WQ | 470 | NAE6483AR | NNTN4496AR NiCd | Against | HLN6602A chest pak | RLN5411A headset | 4.93 | 3.15 | 6.80 | **4.97** |
| Ab-R1-020930-06/ WDEXF3WQ | 470 | NAE6483AR | NNTN4496AR NiCd | Against | HLN6602A chest pak | RMN4016A headset | 4.92 | 3.81 | 7.07 | 4.27 |
| Ab-R1-020930-07/ WDEXF3WQ | 470 | NAE6483AR | NNTN4496AR NiCd | Against | HLN6602A chest pak | HMN9021A headset | 4.93 | 3.91 | 7.41 | 4.36 |
| Ab-R1-020930-08/ WDEXF3WQ | 470 | NAE6483AR | NNTN4496AR NiCd | Against | HLN6602A chest pak | BDN6648C headset | 5.02 | 3.71 | 7.20 | 4.46 |
| **Assessment at 2.5 cm separation distance from phantom** | | | | | | | | | | |
| Ab-R1-021002-02/ WDEXF3WQ | 470 | NAE6483AR | NNTN4496AR NiCd | Back of radio w/ ant. 2.5cm | None | RLN5411A headset | 5.02 | 3.89 | 5.97 | 3.53 |
| Ab-R1-021002-03/ WDEXF3WQ | 470 | NAE6483AR | NNTN4496AR NiCd | Font of radio w/ ant. 2.5cm | None | RLN5411A headset | 4.98 | 3.79 | 5.94 | **3.61** |

| Compliance assessment at the Face (Flat phantom); CW mode | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Run Number/ SN | Freq. (MHz) | Antenna | Battery | Test position | Carry Case | Additional attachments | Initial Power (mW) | End Power (mW) | Measured 1g-S.A.R. (mW/g) | Max Calc. 1g-S.A.R. 50% DC (mW/g) |
| Face-R1-021003-03/ WDEXF3WQ | 461 | NAE6483AR | NNTN4496AR NiCd | 2.5 cm separation | None | None | 4.47 | 3.32 | 2.93 | 2.03 |
| Face-R1-021003-04/ WDEXF3WQ | 461 | NAE6483AR | NNTN4497AR NiCd | 2.5 cm separation | None | None | 4.77 | 3.34 | 3.09 | 2.13 |
| Face-R1-021003-05/ WDEXF3WQ | 438 | NAE6483AR | NNTN4497AR NiCd | 2.5 cm separation | None | None | 4.73 | 3.85 | 4.48 | **2.68** |
| Face-R1-021003-06/ WDEXF3WQ | 470 | NAE6483AR | NNTN4497AR NiCd | 2.5 cm separation | None | None | 5.00 | 3.72 | 3.51 | 2.17 |
| Face-R1-021003-07/ WDEXF3WQ | 454 | 8505816K25 | NNTN4496AR NiCd | 2.5 cm separation | None | None | 4.81 | 3.32 | 1.13 | 0.78 |
| Face-R1-021003-08/ WDEXF3WQ | 454 | 8505816K25 | NNTN4497AR NiCd | 2.5 cm separation | None | None | 4.94 | 3.56 | 1.25 | 0.81 |
| Face-R1-021004-02/ WDEXF3WQ | 438 | 8505816K25 | NNTN4497AR NiCd | 2.5 cm separation | None | None | 4.73 | 3.81 | 2.01 | 1.21 |
| Face-R1-021004-03/ WDEXF3WQ | 470 | 8505816K25 | NNTN4497AR NiCd | 2.5 cm separation | None | None | 4.99 | 3.65 | 1.31 | 0.83 |

### 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:

Max. Calc. 1-g Avg. SAR = (Pmax/Pint) x ((Pint/Pend) x DC % x S.A.R. meas.)
$P_{max}$ = Maximum Power (W)
$P_{int}$ = Initial Power (W)
$P_{end}$ = End Power (W)
$SAR_{meas.}$ = Measured 1 gram averaged peak S.A.R. (mW/g)
DC % = Transmission mode duty cycle in % where applicable

**Highest Max. Calc. 1-g Avg. SAR = (4.6/4.93) x ((4.93/3.15) x 0.50 x 6.80) = 4.97 mW/g**

## 8.0 Conclusion

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

**At the abdomen: 4.97 mW/g**
**At the Face: 2.68 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)