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 3

Attention:	FCC
Date of Report:	December 8, 2003
Report Revision:	Rev. B
Manufacturer:	Motorola China
Product Description:	1.0 Watt fixed antenna UHF/RBR/ 4 channel; 300mW 2.4GHz cordless phone; w/ display; Fixed antenna
FCC ID:	**AZ489FT4863**
Device Model:	HCUE1112A

Test Period:	9/10/03-10/03/03
EME Technician:	Clint Miller (EME Technician)
EME Engineer:	Stephen Whalen (Sr. EME Engineer)
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 — 12/08/03

Ken Enger
Senior Resource Manager, Product Safety and EME Director

Date Approved

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REVISION HISTORY

Date	Revision	Comments
10/8/03	O	Release of Prototype Results
10/29/03	A	Corrected incorrect maximum calculated 1 and 10 gram results in sec 7.1 and 8.0. Corrected incorrect scan presented on page 9 of 66 in Appendix B. Corrected oversight typographical errors discovered in sections 4.2, 5.0, 5.3, Appendix A, B and C. Added attached tested audio accessories to 2.5cm photos on page 12 of 13. Inserted a better representative test position photo for right ear cheek touch presented on page 14 of 22. Corrected incorrect run # stated in section 7.1 Split report into 3 parts to meet FCC file size requirements.
12/8/03	B	Revised language in section 4.3.2 regarding tissue tolerance

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 HCUE1112A, FCC ID: AZ489FT4863.

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 Terminal communications (Electromagnetic Radiation - Human Exposure) Standard 2003
- ANATEL, Brazil Regulatory Authority, Resolution 256 (April 11, 2001) "additional requirements for SMR, cellular and PCS product certification."

3.0 Description of Test Sample

FCC ID: AZ489FT4863 is a wireless communication device that allows two-way operation in one-to-one or group communication using Zero IF analog FM technology. The device also incorporates a 2.4GHz cordless phone that utilizes a Cordless Voice Module (CVM) proprietary frequency hopping technology developed by RTX that uses Gausian Frequency Shift Keying (GFSK) modulation. The maximum PTT transmission duty cycle of the two-way UHF transmitter is 50%. The maximum transmission duty cycle of the cordless phone 2.4GHz transmitter is 8.3%. The intended operating positions are “at the face” in a vertical position 1 to 2 inches from the mouth of the user, at the sides of the head while in cordless phone mode, and at the body by means of the offered body-worn accessories. Audio and PTT operation while at the body 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 restaurants, retail stores, and small businesses. User training is the responsibility of these entities, 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: AZ489FT4863 operates in the 461.0375-469.5625 MHz band and the 2.400–2.482 GHz band. The rated and maximum power in the UHF band is 1.0 watt. The rated power in the 2.4 GHz band is 300 mW with a maximum power of 350 mW. The maximum power reported reflects the final test station upper limit.

FCC ID: AZ489FT4863 is offered with the following options and accessories:

Antenna

Fixed	461-470MHz ¼ wave UHF Helical antenna; -2dBi
Fixed	2.4-2.5GHz PIFA ¼ wave; 0dBi

Batteries

SNN5571A	3.6V CLS Lithium Ion Battery
AAA	Standard AAA Alkaline batteries

Body-worn Accessories

HCLN4019A	Holster

Other attachments

HMN9026B	Remote Speaker Microphone (53862)
HMN9039B	Earpiece w/ microphone (953863)
HMN9038A	Headset w/ Swivel Boom Mic (53865)
HMN9025B	Ear bud w/ PTT Mic (53866)
NTN9159C	Headset w/ Boom Mic RBR (53815)
HCLE4105A	Earpiece w/PTT (56517)
HCSN4001A	Earpiece w/PTT (56518)

3.1 Test Signal

Test Signal mode:

Test Mode	X	Base Station		Simulator	

Transmission Mode:

CW	**X**
Native Transmission	
TDMA:	
Other: CVM 12:1	**X**

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 an ET3DV6 E-Field probe. 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/SN1384. 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/ Freq	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)
1384	FCC Body/ 450MHz	5/15/03	D450V2/1001	4.555 +/- 0.065	4.41+/- 10%	9/10/03-9/12/03; 10/01/03-10/03/03 6 test days
1384	IEEE Head/ 450MHz	5/15/03	D450V2/1001	4.820 +/- 0.040	4.63 +/- 10%	9/11/03-9/18/03 3 test days
1384	FCC Body/ 2450MHz	5/15/03	D2450V2/704	50.33 +/- 0.000	51.32 +/- 10%	9/15/03
1384	IEEE Head 2450MHz	5/15/03	D2450V2/704	55.545 +/- 1.515	52.64 +/- 10%	9/16/03-9/17/03 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 (flat phantom) made of high-density polyethylene (HDPE) with a dielectric constant of 2.26 and a loss tangent of less than 0.00031 was used for assessments at the body and face. Reference the table below for the dimensions of the phantom used according to body position and transmission frequency band. The phantoms are mounted on a wooden supporting structure that has a loss tangent of < 0.05. The wooden structures have openings at their centers to allow placement of the DUT. Two different structures were used for assessments at the body in the UHF band. Another structure was used for assessments at the face in the UHF band. The phantom stand opening dimensions used for the UHF band assessments at the body were: 68.58 cm x 20.32 cm and 68.58 cm x 25.4. The phantom stand opening dimensions used for the UHF band assessment at the face was 68.58 cm x 20.32. The phantom stand opening dimensions used for assessments in the 2.4GHz band at the body was 60.96 cm x 15.24 cm. The table below shows the flat phantom dimensions used for S.A.R. performance assessment.

	UHF		**2.4Ghz**
	Body (cm)	**Face (cm)**	**Body (cm)**
Length	80 / 80	80cm	40cm
Width	30 / 60	30cm	30cm
Height	20 / 20	20cm	20cm
Surface Thickness	0.2 / 0.2	0.2cm	0.2cm

4.2.2 SAM Phantom

A SAM Phantom model SAMTP1209 supplied by SPEAG was used for compliance assessment against the head.

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	Torso
IEEE Head	Face/Head

4.3.2 Simulated Tissue Composition

	Tissue Ingredients (%)					
	450 MHz		2.4GHz		NA	
	Head	Body	Head	Body	Head	Body
Sugar	56	46.5	NA	NA	NA	NA
DGBE (Glycol)	NA	NA	NA	30	NA	NA
Diacetin	NA	NA	51	NA	NA	NA
De ionized -Water	39.1	50.53	48.8	70	NA	NA
Salt	3.8	1.87	0.1	NA	NA	NA
HEC	1	1	0.1	NA	NA	NA
Bact.	0.1	0.1	NA	NA	NA	NA

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 for both body and head assessments. For the frequency range between 2-3GHz using the tissue simulant ingredients stated in section 4.3.2 a 10 percent tolerance is allowed per the guidelines of FCC Supplement C Appendix C. This measurement is done using the Agilent (HP) probe kit model 85070C and a HP8753D Network Analyzer.

Target tissue parameters

FCC Body				
Frequency(GHz)	Di-electric Constant Target	Di-electric Constant Meas. (Range)	Conductivity Target S/m	Conductivity Meas. (Range) S/m
0.450	56.7	54.2-55.9	0.94	0.90-0.92
0.465	56.6	54.0-55.6	0.94	0.91-0.93
2.440	52.7	56.2-56.2	1.94	2.03-2.03
2.450	52.7	56.1-56.1	1.95	2.04-2.04
IEEE Head				
Frequency(GHz)	Di-electric Constant Target	Di-electric Constant Meas. (Range)	Conductivity Target S/m	Conductivity Meas. (Range) S/m
0.450	43.5	43.8-44.2	0.87	0.86-0.88
0.465	43.4	43.5-44.0	0.87	0.87-0.89
2.440	39.2	39.3-39.5	1.79	1.82-1.85
2.450	39.2	39.3-39.5	1.80	1.83-1.86

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. 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 SAR tests reported herein.

	Target	Measured
Ambient Temperature	20 - 25 ˚C	Range: 20.4-23.6˚C Avg. 22.55˚C
Relative Humidity	30 - 70 %	Range: 39.9-48.2% Avg. 43.65%
Tissue Temperature	NA	Range: 20.0-21.5˚C Avg. 20.79 ˚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 body and face, and a SAM phantom for assessments at the head. A flat phantom containing the respective FCC body and IEEE head tissue simulant was used for assessments at the body and face. Note that Glycol tissue simulant was used for body assessments at 2.4 GHz, and Diacetin tissue simulant was used for head assessments at 2.4 GHz. A SAM phantom containing IEEE head tissue simulant was used for assessments at the head. Assessments in the UHF band were performed with the DUT in CW mode. Assessments in the 2.4GHz band were performed in the DUT's Cordless Voice Module (CVM) 12:1 mode. Note that the assessments performed in CVM 12:1 mode were performed with its proprietary frequency hopping disabled in order to assess the frequencies of interest.

DUT assessment at the body in the UHF band with the offered batteries; Band edges with worst case configuration.

- The DUT was assessed at 464.550MHz of the UHF band, using a flat phantom with the offered belt clip and RSM to determine the worst-case battery.
- The DUT was assessed at the band edges using the test configuration above that produced the

highest S.A.R. results from above.

DUT assessment at the body in the UHF band with the offered audio accessories
- The DUT was assessed using the worst-case test configuration from the UHF body assessment above with each of the offered audio accessories.

DUT assessment at the body in the UHF band with 2.5cm separation distance
- The DUT was assessed with its back and front housing separated 2.5cm from the phantom, using the worst-case test configuration from above

DUT assessment at the face in the UHF band with the offered batteries; Band edges with worst-case configuration
- The DUT was assessed at 464.550MHz with its front separated 2.5cm from the phantom to determine the worst-case battery performance.
- The DUT was assessed at the edges of the transmission band using the worst-case battery from above.

DUT assessment at the body in the 2.4Ghz band with the offered batteries; Band edges with worst-case configuration.
- The DUT was assessed at 2.44GHz band, using a flat phantom with the offered belt clip and RSM to determine the worst-case battery.
- The DUT was assessed at the transmission band edges using the test configuration above that produced the highest S.A.R. results.

DUT assessment at the body in the 2.4GHz band with the offered audio accessories
- The DUT was assessed using the worst-case test configuration from the 2.4GHz body assessment above with each of the offered audio accessories.

DUT assessment at the body in the 2.4GHz band with 2.5cm separation distance
- The DUT was assessed with its back and front housing separated 2.5cm from the phantom, using the worst-case test configuration from above

DUT assessment at the head in the 2.4Ghz band
- The DUT was assessed at the left ear of the SAM phantom, at 2.44GHz of the 2.4GHz band using the offered battery accessories.
- The DUT was assessed at the left ear, in the cheek touch and 15° degree tilt positions, across the transmission band, using the worst-case battery from above.
- The DUT was assessed at the right ear, in the cheek touch and 15° tilt positions, across the transmission band, using the worst-case battery from above.

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 Body

The DUT and the offered body-worn accessory were positioned such that the body-worn accessory was centered against the flat phantom. The DUT's back and front housing were positioned with a 2.5cm separation distance from the flat phantom.

5.1.2 Head

The DUT was position at the right and left ear of the SAM phantom in both the cheek touch and 15° tilt positions.

5.1.3 Face

The DUT was positioned with a 2.5cm separation distance from the flat phantom.

5.2 Test Position Photographs

Figure 1: Highest S.A.R. Test Position (Face)
DUT's front toward the phantom with a 2.5cm separation distance

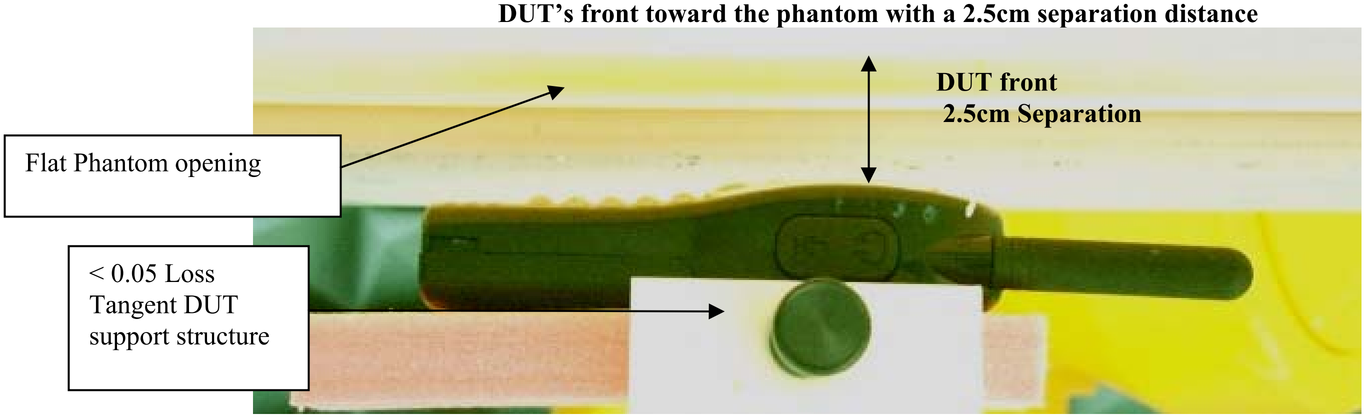

Figure 2. Assessment at body;
DUT's back towards the phantom w/ 2.5cm separation
(The same position used for audio accessory NTN9159C assessment)

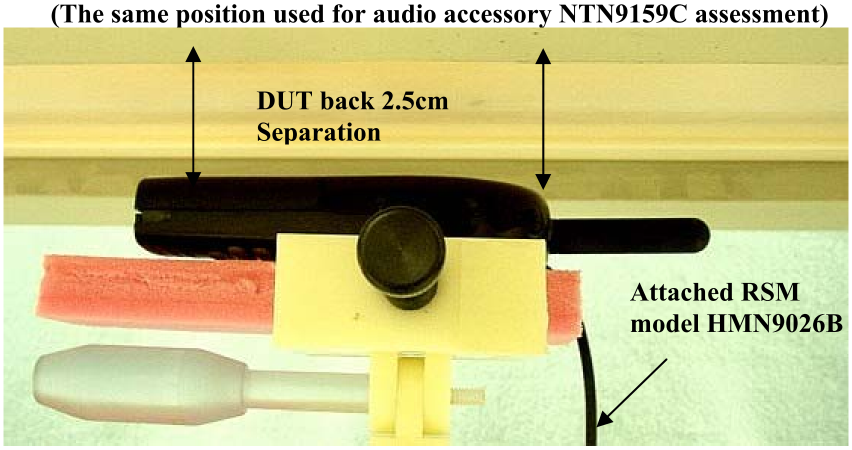

Figure 3. Assessment at the body;
DUT's front towards the phantom w/ 2.5cm separation
(The same position used for audio accessory NTN9159C assessment)

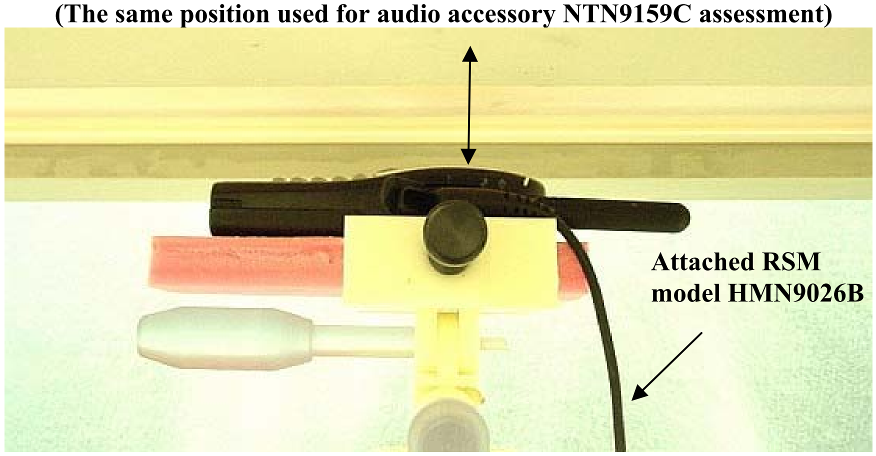

Figure 4. Assessment at the body;
Belt clip against the phantom with attached HMN9039B audio accessory
(same position used for all other offered audio accessories)

Figure 5. Assessment at the Left ear 15° tilt

Figure 6. Assessment at the Left ear cheek touch

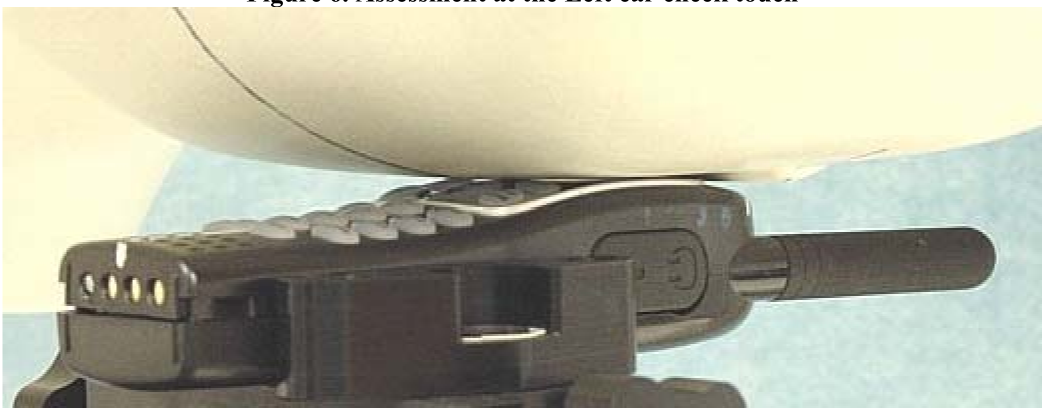

Figure 7. Assessment at the right ear 15° tilt

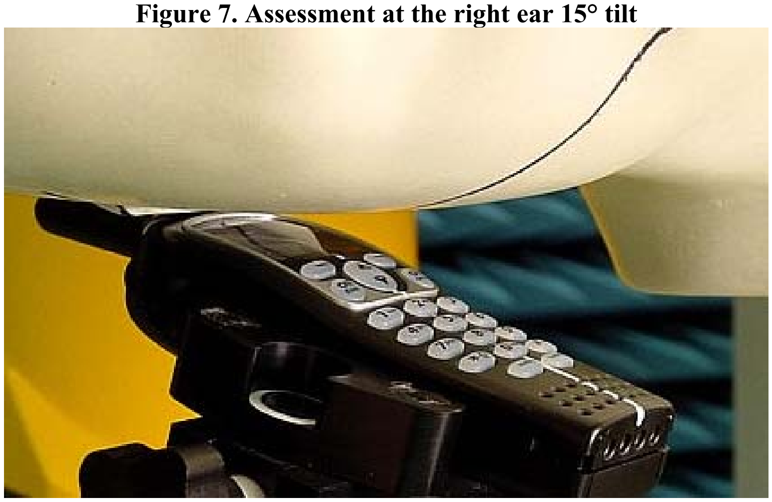

Figure 8. Assessment at the right ear Cheek touch

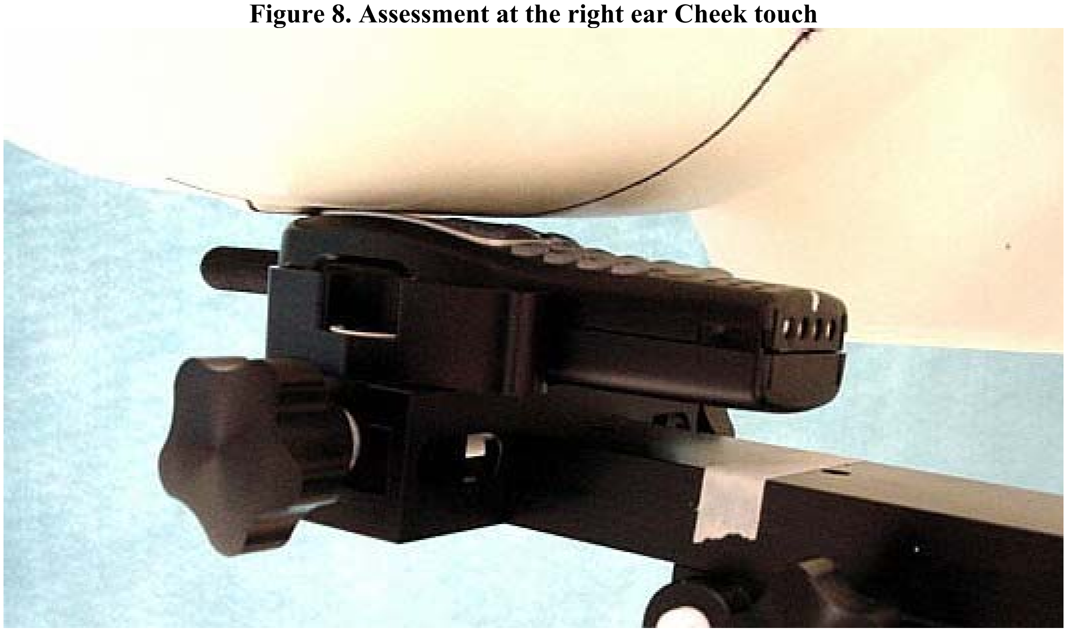

Figure 9: Robot Test Setup UHF band (Body/Face)

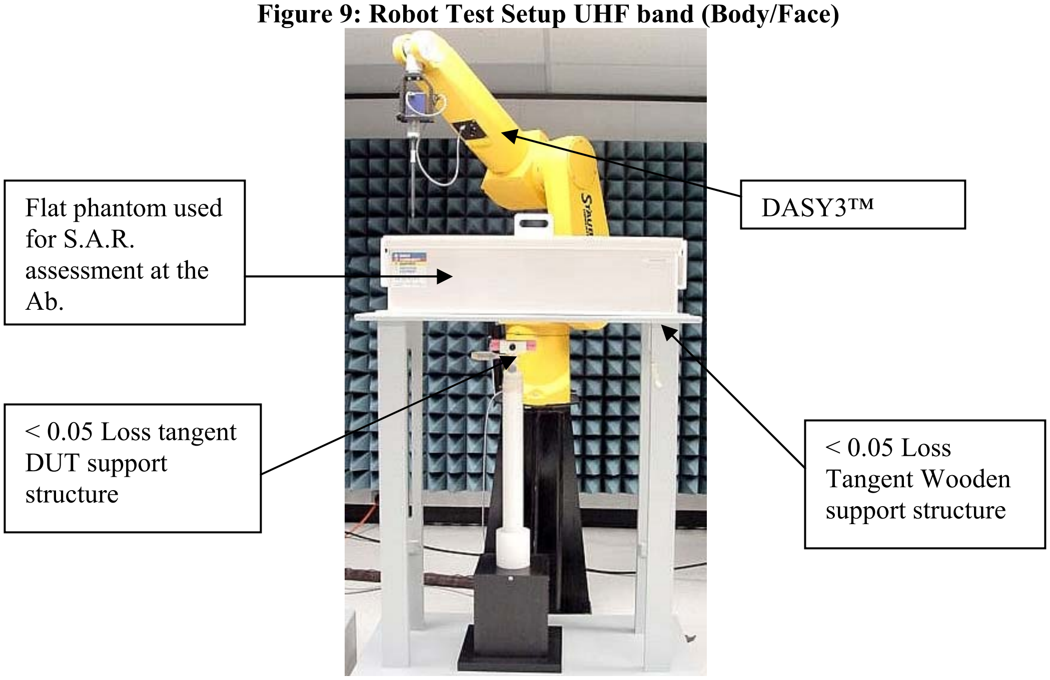

Figure 10: Robot Test Setup 2.4GHz band (Body)

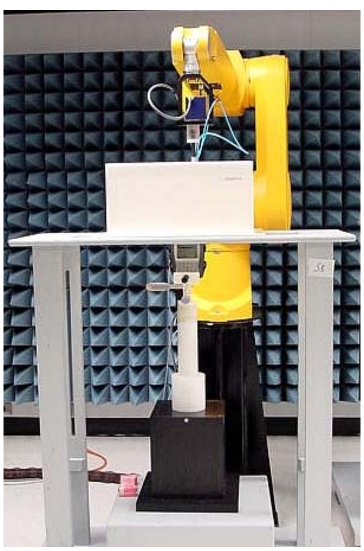

Figure 11: Robot Test Setup 2.4GHz band (Head)

5.3 Probe Scan Procedures

The E-field probe initially scans 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

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.**	**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	∞
Spherical Isotropy	E.2.2	9.6	R	1.73	0.707	0.707	3.9	3.9	∞
Boundary Effect	E.2.3	5.7	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				12	11	1361
Expanded Uncertainty (95% CONFIDENCE LEVEL)			*k*=2				23	22	

Uncertainty Budget for System Performance Check (dipole & flat phantom)

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h* = *c x f / e*	*i* = *c x g / e*	*k*
Uncertainty Component	Sec.	**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	5.7	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	9.4	99999
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=2				20	18	

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: 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

DUT assessment at the body in the UHF band; CW mode												
Run Number/ SN	**Freq. (MHz)**	**Antenna //Pos.**	**Battery**	**Test position**	**Body- worn Acc.**	**Additional attachments**	**Initial Power (W)**	**S.A.R. Drift (dB)**	**Measured 1g-S.A.R. (mW/g)**	**Max Calc. 1g-S.A.R. (mW/g)**	**Meas. 10g-S.A.R. (mW/g)**	**Max Calc. 10g-S.A.R. (mW/g)**
DUT assessment at the body in the UHF band with the offered batteries; Band edges with worst-case configuration												
SW-Ab-R1-031001-02/451ABC0001	464.5500	Fixed	SNN5571A	Against phantom	HCLN4019A	HMN9026B	1.047	-0.460	1.280	0.71	0.93	0.52
CM-Ab-R1-030911-02/451ABC0001	464.5500	Fixed	AAA Alkaline w/1564200W18	Against phantom	HCLN4019A	HMN9026B	0.969	-1.850	1.120	0.89	0.82	0.65
CM-Ab-R1-030910-10/451ABC0001	461.0375	Fixed	AAA Alkaline w/1564200W18	Against phantom	HCLN4019A	HMN9026B	0.939	-1.490	1.220	**0.92**	0.90	0.68
CM-Ab-R1-030911-03/451ABC0001	469.5625	Fixed	AAA Alkaline w/1564200W18	Against phantom	HCLN4019A	HMN9026B	0.955	-1.020	1.060	0.70	0.77	0.51
DUT assessment at the body in the UHF band with the offered audio accessories												
SW-Ab-R1-031001-03/451ABC0001	461.0375	Fixed	AAA Alkaline w/1564200W18	Against phantom	HCLN4019A	HMN9039B	0.939	-1.330	0.745	0.54	0.54	0.39
SW-Ab-R1-031002-02/451ABC0001	461.0375	Fixed	AAA Alkaline w/1564200W18	Against phantom	HCLN4019A	HMN9038A	0.939	-1.020	0.886	0.60	0.63	0.42
SW-Ab-R1-031002-03/451ABC0001	461.0375	Fixed	AAA Alkaline w/1564200W18	Against phantom	HCLN4019A	HMN9025B	0.939	-1.100	0.632	0.43	0.45	0.31
CM-Ab-R1-031002-04/451ABC0001	461.0375	Fixed	AAA Alkaline w/1564200W18	Against phantom	HCLN4019A	NTN9159C	0.939	-1.010	0.698	0.47	0.49	0.33
CM-Ab-R1-031002-05/451ABC0001	461.0375	Fixed	AAA Alkaline w/1564200W18	Against phantom	HCLN4019A	HCLE4105A	0.939	-1.170	0.693	0.48	0.51	0.35
CM-Ab-R1-031002-06/451ABC0001	461.0375	Fixed	AAA Alkaline w/1564200W18	Against phantom	HCLN4019A	HCSN4001A	0.939	-1.700	0.786	**0.62**	0.56	0.44
DUT assessment at the body in the UHF band with 2.5cm separation distance												
CM-Ab-R1-031002-07/451ABC0001	461.0375	Fixed	AAA Alkaline w/1564200W18	DUT back 2.5cm	None	HMN9026B	0.939	-1.060	0.696	0.47	0.50	0.34
CM-Ab-R1-031002-08/451ABC0001	461.0375	Fixed	AAA Alkaline w/1564200W18	DUT front 2.5cm	None	HMN9026B	0.939	-1.210	0.714	**0.50**	0.52	0.36

DUT assessment at the face in the UHF band; CW mode

Run Number/ SN	Freq. (MHz)	Antenna //Pos.	Battery	Test position	Body- worn Acc.	Additional attachments	Initial Power (W)	S.A.R. Drift (dB)	Measured 1g-S.A.R. (mW/g)	Max Calc. 1g-S.A.R. (mW/g)	Meas. 10g-S.A.R. (mW/g)	Max Calc. 10g-S.A.R. (mW/g)
DUT assessment at the face in the UHF band with the offered batteries; Band edges with worst-case configuration												
CM-Face-R1-030911-10/451ABC0001	464.5500	Fixed	SNN5571A	Against phantom	None	None	1.047	-0.570	1.540	0.88	1.110	0.63
CM-Face-R1-030911-11/451ABC0001	464.5500	Fixed	AAA Alkaline w/1564200W18	Against phantom	None	None	0.969	-1.480	1.380	1.00	0.988	0.72
CM-Face-R1-030911-12/451ABC0001	461.0375	Fixed	AAA Alkaline w/1564200W18	Against phantom	None	None	0.939	-1.700	1.440	**1.13**	1.030	0.81
CM-Face-R1-030911-13/451ABC0001	469.5625	Fixed	AAA Alkaline w/1564200W18	Against phantom	None	None	0.955	-1.360	1.280	0.92	0.923	0.66

DUT assessment at the body in the 2.4GHz band; 12:1 mode

Run Number/ SN	Freq. (GHz)	Antenna //Pos.	Battery	Test position	Body- worn Acc.	Additional attachments	Initial Power (W)	S.A.R. Drift (dB)	Measured 1g-S.A.R. (mW/g)	Max Calc. 1g-S.A.R. (mW/g)	Meas. 10g-S.A.R. (mW/g)	Max Calc. 10g-S.A.R. (mW/g)
DUT assessment at the body in the 2.4Ghz band with the offered batteries; Band edges with worst-case configuration.												
CM-Ab-R1-030915-02/451ABC0002	2.44	Fixed	SNN5571A	Against phantom	HCLN4019A Belt Clip	HMN9026B	0.316	-0.170	0.0167	0.0192	0.0100	0.0115
CM-Ab-R1-030915-03/451ABC0002	2.44	Fixed	AAA Alkaline w/1564200W18	Against phantom	HCLN4019A Belt Clip	HMN9026B	0.372	-0.370	0.0152	0.0166	0.0091	0.0099
CM-Ab-R1-030915-04/451ABC0002	2.4	Fixed	SNN5571A	Against phantom	HCLN4019A Belt Clip	HMN9026B	0.324	-0.310	0.0234	**0.0271**	0.0138	0.0160
CM-Ab-R1-030915-05/451ABC0002	2.48	Fixed	SNN5571A	Against phantom	HCLN4019A Belt Clip	HMN9026B	0.316	0.000	0.0179	0.0198	0.0105	0.0116
DUT assessment at the body in the 2.4GHz band with the offered audio accessories												
CM-Ab-R1-030915-06/451ABC0002	2.4	Fixed	SNN5571A	Against phantom	HCLN4019A	HMN9039B	0.324	-0.300	0.0253	0.0293	0.0148	0.0171
CM-Ab-R1-030915-07/451ABC0002	2.4	Fixed	SNN5571A	Against phantom	HCLN4019A	HMN9038A	0.324	-0.230	0.0243	0.0277	0.0143	0.0163
CM-Ab-R1-030915-08/451ABC0002	2.4	Fixed	SNN5571A	Against phantom	HCLN4019A	HMN9025B	0.324	-0.210	0.0254	0.0288	0.0149	0.0169
CM-Ab-R1-030915-09/451ABC0002	2.4	Fixed	SNN5571A	Against phantom	HCLN4019A	NTN9159C	0.324	-0.060	0.0276	**0.0302**	0.0161	0.0176
CM-Ab-R1-030915-10/451ABC0002	2.4	Fixed	SNN5571A	Against phantom	HCLN4019A	HCLE4105A	0.324	-0.210	0.0235	0.0266	0.0139	0.0158
CM-Ab-R1-030915-11/451ABC0002	2.4	Fixed	SNN5571A	Against phantom	HCLN4019A	HCSN4001A	0.324	-0.070	0.0263	0.0289	0.0155	0.0170
DUT assessment at the body in the 2.4GHz band with 2.5cm separation distance												
CM-Ab-R1-030915-13/451ABC0002	2.4	Fixed	SNN5571A	DUT back 2.5cm	None	NTN9159C	0.324	-0.160	0.0117	**0.0131**	0.0073	0.0082
CM-Ab-R1-030915-14/451ABC0002	2.4	Fixed	SNN5571A	DUT front 2.5cm	None	NTN9159C	0.324	-1.160	0.0057	0.0080	0.0035	0.0049

DUT assessment at the head in the 2.4Ghz band; 12:1 mode												
Run Number/ SN	**Freq. (MHz)**	**Antenna //Pos.**	**Battery**	**Test position**	**Body- worn Acc.**	**Additional attachments**	**Initial Power (W)**	**S.A.R. Drift (dB)**	**Measured 1g-S.A.R. (mW/g)**	**Max Calc. 1g-S.A.R. (mW/g)**	**Meas. 10g-S.A.R. (mW/g)**	**Max Calc. 10g-S.A.R. (mW/g)**
DUT assessment at the left ear in the 2.4Ghz band with the offered batteries												
CM-LEAR-R1-030916-02/451ABC0002	2.44	Fixed	SNN5571A	Cheek touch	None	None	0.316	-0.060	0.0218	0.0245	0.0128	0.0144
CM-LEAR-R1-030916-03/451ABC0002	2.44	Fixed	AAA ALKALINE W/1564200W18	Cheek touch	None	None	0.372	-0.400	0.0250	**0.0274**	0.0145	0.0159
DUT assessment at the left ear in the 2.4Ghz band in touch and tilt positions												
CM-LEAR-R1-030916-04/451ABC0002	2.44	Fixed	AAA ALKALINE W/1564200W18	15 degree tilt	None	None	0.372	-0.280	0.0270	0.0288	0.0152	0.0162
SW-LEAR-R1-030917-02/451ABC0002	2.4	Fixed	AAA ALKALINE W/1564200W18	Touch	None	None	0.380	-0.510	0.0317	0.0356	0.0184	0.0207
CM-LEAR-R1-030917-03/451ABC0002	2.4	Fixed	AAA ALKALINE W/1564200W18	15 degree tilt	None	None	0.380	-0.220	0.0406	**0.0427**	0.0225	0.0237
CM-LEAR-R1-030917-04/451ABC0002	2.48	Fixed	AAA ALKALINE W/1564200W18	Touch	None	None	0.372	-0.280	0.0271	0.0289	0.0158	0.0169
CM-LEAR-R1-030917-05/451ABC0002	2.48	Fixed	AAA ALKALINE W/1564200W18	15 degree tilt	None	None	0.372	-0.720	0.0305	0.0360	0.0172	0.0203
DUT assessment at the right ear in the 2.4Ghz band in touch and tilt positions												
CM-REAR-R1-030917-06/451ABC0002	2.4	Fixed	AAA ALKALINE W/1564200W18	Cheek touch	None	None	0.380	-0.650	0.0346	0.0402	0.0207	0.0240
CM-REAR-R1-030917-07/451ABC0002	2.4	Fixed	AAA ALKALINE W/1564200W18	15 degree tilt	None	None	0.380	-0.650	0.0407	**0.0473**	0.0234	0.0272
CM-REAR-R1-030917-08/451ABC0002	2.44	Fixed	AAA ALKALINE W/1564200W18	Cheek touch	None	None	0.372	-0.440	0.0241	0.0267	0.0151	0.0167
CM-REAR-R1-030917-09/451ABC0002	2.44	Fixed	AAA ALKALINE W/1564200W18	15 degree tilt	None	None	0.372	-0.590	0.0274	0.0314	0.0167	0.0191
CM-REAR-R1-030917-10/451ABC0002	2.48	Fixed	AAA ALKALINE W/1564200W18	Cheek touch	None	None	0.372	-0.520	0.0285	0.0321	0.0174	0.0196
CM-REAR-R1-030917-11/451ABC0002	2.48	Fixed	AAA ALKALINE W/1564200W18	15 degree tilt	None	None	0.372	-0.610	0.0324	0.0373	0.0191	0.0220

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 = ((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.

8.0 Conclusion

The highest Operational Maximum Calculated 1-gram and 10-gram average S.A.R. values observed for FCC ID: AZ489FT4863 are:

At the Body: 1-gram Avg. = 0.916 mW/g; 10-gram Avg. = 0.677 mW/g
At the Face: 1-gram Avg. = 1.130 mW/g; 10-gram Avg. = 0.810 mW/g
At the Head: 1-gram Avg. = 0.047 mW/g; 10-gram Avg. = 0.027 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)