Certificate Number: 1449-01

MOTOROLA

ACCREDITED

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

Date of Report:	August 6, 2004
Report Revision:	Rev. O
Manufacturer:	Motorola
Product Description:	XTS Portable UHF digital; 380-470MHz, 1.0-5.0 watts nominal
FCC ID:	**AZ489FT4865**
Device Model:	H66QDC9PW5AN

Test Period:	7/27/04 - 8/02/04
EME Tech:	Ed Church
Responsible Eng:	Deanna Zakharia (Elect. Principle Staff Eng.)
Author:	Michael Sailsman (Global EME Regulatory Affairs Liaison)

Note: Based on the information and the testing results provided herein, the undersigned certifies that when used as stated in the operating instructions supplied, said product complies with the national and international reference standards and guidelines listed in section 2.0 of this report.

Signature on file — 8/9/04

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

Date Approved

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REVISION HISTORY

Date	Revision	Comments
8/9/04	O	Release of Pilot 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 H66QDC9PW5AN, FCC ID: AZ489FT4865.

The applicable exposure environment is Occupational/Controlled.

2.0 Reference Standards and Guidelines

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

- United States Federal Communications Commission, Code of Federal Regulations; 47CFR part 2 sub-part J
- IEEE 1528, 2003 "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques"
- American National Standards Institute (ANSI) / Institute of Electrical and Electronic Engineers (IEEE) C95. 1-1992
- Institute of Electrical and Electronic Engineers (IEEE) C95.1-1999 Edition
- International Commission on Non-Ionizing Radiation Protection (ICNIRP) 1998
- Ministry of Health (Canada) Safety Code 6. Limits of Human Exposure to Terminal frequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz, 1999
- Australian Communications Authority Radiocommunications (Electromagnetic Radiation - Human Exposure) Standard 2003
- ANATEL, Brazil Regulatory Authority, Resolution No. 303 of July 2, 2002 "Regulation of the limitation of exposure to electrical, magnetic, and electromagnetic fields in the radio frequency range between 9KHz and 300 GHz." and “Attachment to resolution # 303 from July 2, 2002”

3.0 Description of Test Sample

FCC ID: AZ489FT4865 is capable of APCO 25 (C4FM) digital voice frequency modulated PTT device. The intended operating positions are “at the face” with the DUT 1 to 2 inches from the mouth, and “at the body” by means of the offered body-worn accessories. Audio and PTT operation while the radio is at the body is accomplished by means of optional remote accessories that connect to the radio. The maximum transmit duty cycle is a conservative 50% and is controlled by the user via the PTT function.
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, which 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: AZ489FT4865 is capable of operating in the 380-470 MHz band. The nominal conducted output power is 1 to 5 watts and the maximum conducted output power is 5.9 watts. The stated maximum output powers are as defined by the upper limit of the production line final test station.

FCC ID: AZ489FT4865 is offered with the following options and accessories:

Antenna	**Description**
NAE6549AR	¼ wave Whip antenna; 380-520 MHz; 13.3 cm; -5.15 dBi
NAE6547AR	¼ wave Helical antenna; 435-470 MHz; 7.8 cm; -8.0 dBi
NAE6546AR	¼ wave Helical antenna; 380-435 MHz; 8.3 cm; -7.0 dBi

Batteries

NTN9857A	1800 mAh NiMH Ultra-Hi capacity FM Intrinsically Safe
NTN9816A	1525 mAh NiCad high capacity FM Intrinsically Safe
NTN9815A	1525 mAh NiCad high capacity
NTN9858A	1800 mAh NiMH Ultra-high capacity
NTN9857B	1800 mAh NiMH Ultra-Hi capacity FM Intrinsically Safe
NTN9816B	1525 mAh NiCad high capacity FM Intrinsically Safe
NTN9815B	1525 mAh NiCad high capacity
NTN9858B	1800 mAh NiMH Ultra-high capacity

Body-worn Accessories

NNTN4115A	Bonded case 3 inch loop with swivel
NNTN4116A	Bonded case 2.5 inch loop with swivel
NNTN4117A	Bonded case 3 inch belt loop
HLN9844A	1.5 inch belt clip
HLN6853A	2.25 inch belt clip
TDN9675A	Wrist strap for carrying only
NLN6349A	Shoulder strap for carrying only
NTN5243A	Shoulder strap for carrying only

A**pplicable Audio accessories**

BDN6676D	Jedi Adapter 3.5mm w/PTT switch
BDN6671B	PTT & VOX Interface Module
BDN6708B	PTT Interface Module
BDN6673B	Headset adapter cable
NMN6193C	Remote Speaker Microphone
BDN6665A	Earpiece w/ extra loud earphone (exceeds OSHA limits)
BDN6666A	Earpiece w/ Volume Control
BDN6667A	Earpiece, Mic & PTT Combo
BDN6668A	Earpiece, Mic & PTT Separate
BDN6780A	Earbud Single w/ Mic & PTT
NTN1624A	Commport w/ Palm PTT NTN8819A & NKN6510A
BDN6677A	Standard Ear Microphone 95dB (Black)
BDN6678A	Standard Ear Microphone 95dB (Beige)

BDN6635C	Heavy-duty Boom Mic Headset w/ Vox
BDN6636C	Heavy-duty Throat Mic Headset w/ Vox
NMN6245A	Light Weight Headset
NMN6259A	Med. Weight Dual Headset w/ NC Mic
NMN1020A	Safety Helmet Headset
RMN4049A	Temple Transducer
NMN6191C	RSM Noise Canceling Includes: 6.0' coiled cord assembly, 3.5mm ear jack, swivel clip, quick disconnect
NNTN4285A	Remote speaker microphone adapter
BDN6664A	Earpiece with standard earpiece BEIGE
BDN6726A	Earpiece with standard earpiece BLACK
BDN6727A	Earpiece with extra loud earphone BLACK (exceeds OSHA limits)
BDN6728A	Earpiece with volume control BLACK
BDN6729A	Earpiece, Mic and PTT combined BLACK
BDN6730A	Earpiece, Mic and PTT separate BLACK
BDN6669A	Earpiece, Mic and PTT combined with extra loud earpiece BEIGE (exceeds OSHA limits)
BDN6731A	Earpiece, Mic and PTT combined with extra loud earpiece BLACK (exceeds OSHA limits)
BDN6670A	Earpiece, Mic and PTT separate with extra loud earpiece BEIGE (exceeds OSHA limits)
BDN6732A	Earpiece, Mic and PTT separate with extra loud earpiece BLACK (exceeds OSHA limits)
BDN6781A	Earbud, single, receive only, black
NTN1625A	Commport ear mic, with PTT for noise levels up to 100 dB (ship w/ BDN6676 adapter)
NTN1663A	Commport ear mic, with Ring PTT for noise levels up to 100 dB (ship w/ BDN6676 adapter)
NTN1736A	Commport ear mic, with Snap-On Side PTT for noise levels up to 100 dB (ship w/ BDN6676 adapter)
BDN6641A	Ear mic, high noise level up to 105dB, Black (must order interface module)
BDN6645A	Noise-Canceling Boom Mic Headset with PTT on earcup (ship w/BDN6673B adaptor)
NMN6246B	Ultralite Headset w/Boom Microphone
NMN6258A	Over the Head Headset w/ In Line PTT
ZMN6031A	SPKR MIC 3 PIECE
ZMN6032A	SPKR MIC 2 PIECE
ZMN6038A	SPKR MIC 2 PC XL
ZMN6039A	SPKR MIC 3 PC XL
BDN6719A	Ear pad w/3.5mm threaded plug

Other applicable options:

0180300E83	Remote Push-To-Talk Body Switch
NTN8613A	Surveillance accessory adapter
NTN7660C	Tilt/man down switch

3.1 Test Signal

Test Signal mode:

Test Mode	X	Base Station		Simulator	

Transmission Mode:

CW	**X**
Native Transmission	
TDMA:	
Other:	

3.2 Test Output Power

A table of the characteristic power slump versus time is provided in Appendix A for the worst case tested battery.

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 ET3DV6R/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	Probe Cal Date	Dipole Kit / Serial #	System Perf. 1-g S.A.R. Result when normalized to 1W (mW/g)	Reference 1-g S.A.R @ 1W (mW/g)	Test Date(s)
1384	FCC Body	5/27/04	D450V2/1002	4.74 +/- 0.11	4.71 +/- 10%	7/27/04-7/31/04 5 test days
1384	IEEE Head	5/27/04	D450V2/1002	4.93 +/- 0.06	4.73 +/- 10%	8/1/04-8/2/04

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

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

4.2 Description of Phantom

4.2.1 Flat Phantom

A rectangular shaped box made of high-density polyethylene (HDPE) with a dielectric constant of 2.26 and a loss tangent of less than 0.00031. Two phantoms were used for this assessment, one for body and one for face. The phantoms were mounted on wooden supporting structures having loss tangents of < 0.05. The structure used for body assessment has a 68.58 cm x 25.4 cm opening at its center while the one used for face assessment has a 68.58 cm x 20.32 opening to allow positioning the DUT to the phantom's surface. The flat phantom dimensions used are L = 80cm, W = 60cm, H = 20cm, Surface Thickness = 0.2cm, and L = 80cm, W = 30cm, H = 20cm, Surface Thickness = 0.2cm for body and face assessments respectively.

4.2.2 SAM Phantom

NA

4.3 Simulated Tissue Properties

4.3.1 Type of Simulated Tissue

The simulated tissues used are 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	Head/Face

4.3.2 Simulated Tissue Composition (System Performance)

	Tissue Ingredients (%)					
	450MHz		NA		NA	
	Head	Body	Head	Body	Head	Body
Sugar	56.0	46.5	NA	NA	NA	NA
DGBE (Glycol)	NA	NA	NA	NA	NA	NA
De ionized -Water	39.1	50.53	NA	NA	NA	NA
Salt	3.8	1.87	NA	NA	NA	NA
HEC	1	1	NA	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. This measurement is done using the Agilent (HP) probe kit model 85070C and a HP8753D Network Analyzer.

Tested Tissue Target 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	54.7-55.4	0.94	0.93-0.97
425	57.0	54.8-55.9	0.94	0.91-0.95

IEEE Head				
Frequency (MHz)	**Di-electric Constant Target**	**Di-electric Constant Meas. (Range)**	**Conductivity Target S/m**	**Conductivity Meas. (Range) S/m**
450	43.5	44.1-44.7	0.87	0.86-0.89
425	43.8	44.7-45.1	0.87	0.84-0.86

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°C of the temperature at which the dielectric properties were determined. The liquid depth in the phantom used for measurements was 15cm +/- 0.5cm. Additional precautions are routinely taken to ensure the stability of the simulated tissue such as covering the phantoms when scans are not actively in process in order to minimize evaporation. The lab environment is continuously monitored. The table below presents the range and average environmental conditions during the S.A.R. tests reported herein:

	Target	**Measured**
Ambient Temperature	20 - 25 ˚C	Range: 20.3-22.7˚C Avg. 21.81˚C
Relative Humidity	30 - 70 %	Range: 47.2-57.4% Avg. 51.89%
Tissue Temperature	NA	Range: 20.3-21.1˚C Avg. 20.66 ˚C

The EME Lab RF environment uses a Spectrum Analyzer to monitor for extraneous large signal RF contaminants that could possibly affect the test results. If such unwanted signals are discovered the S.A.R scans are repeated. However, the lab environment is sufficiently

protected such that no S.A.R. impacting interference has been experienced to date.

5.0 Probe Scan Procedures

The E-field probe first scans a coarse grid over a large area inside the phantom in order to locate the interpolated maximum S.A.R. distribution. After the coarse scan measurement, the probe is automatically moved to a position at the interpolated maximum. The subsequent scan can directly use this position as reference for the cube evaluations.

5.1 Shortened scan rationale

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

5.2 Device test positions

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

5.2.1 Body

The DUT was positioned such that the body worn accessory was centered against the flat phantom with the applicable audio accessory attachments. The DUT was positioned with its' front, and back separated 2.5cm from the flat phantom.

5.2.2 Head

NA

5.2.3 Face

The DUT was placed with its front housing separated 2.5 cm from the flat phantom

5.3 Description of Test Procedure

All options and accessories listed in section 3.0 were considered in order to develop the S.A.R. test plan for this product. S.A.R. measurements were performed using a flat phantom to assess performance at the body and in front of the face in CW mode.
Note that a coarse-to-cube approximation methodology was utilized to determine the worst-case S.A.R. performance configuration for each applicable body location. The test configurations that produced the highest S.A.R. results for each body position using the coarse-to-cube approximation methodology were assessed using the full DASY3™ coarse and 7x7x7 cube scans.
The coarse-to-cube approximation is determined using a Motorola derived and SPEAG accepted software tool to predict a mass average S.A.R. value based on measured coarse

scans. Note also that this software tool is part of the latest proposal by Motorola for inclusion into the IEC 62209 part II standard.

Assessments at the body (380-470MHz) **[Page 19&20 of 22; Table 1]**

The DUT was assessed at the center frequency of the offered antenna model NAE6546AR, in CW mode, using each of the offered battery models, along with belt clip model HLN9844A, and RSM model NMN6191C. The DUT was then assessed at the band edges using the worst case battery from above.

The DUT was assessed across the transmit band of each offered antenna using the worst case battery from above, with belt clip model HLN9844A, and RSM model NMN6191C.

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

The DUT was assessed using the worst case configuration from above, in CW mode, with each of the offered audio accessories attached and allowed to hang from the device during the assessment.

The DUT was assessed using the worst case configuration from above with the DUT ‘s back and front housing separated 2.5 cm from the flat phantom.

Assessments at the face (380-470MHz) **[Page 21 of 22; Table 2]**

The DUT was assessed at the center frequency of the offered antenna model NAE6546AR, in CW mode, with the front housing separated 2.5 cm from the phantom, using each of the offered batteries. The DUT was then assessed at the band edges using the worst case battery from above.

The DUT was assessed across the transmit band of each of the other offered antennas, in CW mode, with the front housing separated 2.5 cm from the phantom, using the worst case battery from above.

The DUT was assessed using the worst case configuration from above, in CW mode, with the front housing separated 2.5 cm from the phantom, along with each of the applicable (no PTT features; receive only) offered audio accessories.

Shortened scan assessment at the Body **[Appendix A]**

A “shortened” scan assessment was done using the test configuration from above that produced the highest S.A.R. results overall at the body.

Shortened scan assessment at the Face **[Appendix A]**

A “shortened” scan assessment was done using the test configuration from above that produced the highest S.A.R. results overall at the face.

5.4 Test Position Photographs

**Figure 1. Highest SAR Test Position. Assessment @ the body w/ antenna model NAE6546AR.
DUT with belt clip model HLN6853A against the phantom with attached audio accessory NTN1625A
Same position used with all other applicable audio accessories attached**

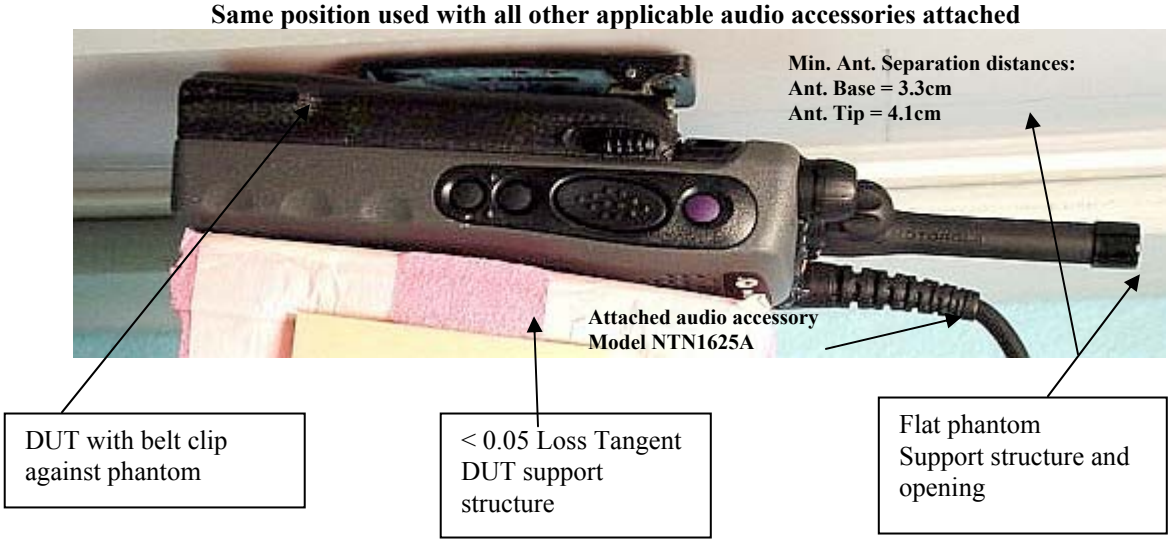

**Figure 2. Assessment @ the body w/ antenna model NAE6546AR.
DUT with belt clip accessory model HLN9844A against the phantom,
with attached audio accessory NMN6191C**

**Figure 3. Assessment @ body w/ antenna model NAE6546AR.
DUT with carry case accessory model NNTN4115A against the phantom
with attached audio accessory model NMN6191C.**

Figure 4. Assessment @ the body w/ antenna model NAE6546AR.
DUT with carry case accessory model NNTN4116A against the phantom
with attached audio accessory model NMN6191C

Figure 5. Assessment @ the body w/ antenna model NAE6546AR.
DUT with carry case accessory model NNTN4117A against the phantom
with attached audio accessory model NMN6191C

Figure 6. Assessment @ the body with antenna NAE6546AR.
DUT with front separated 2.5cm from the phantom.
with attached audio accessory model NTN1625A

Figure 7. Assessment @ the body with antenna NAE6546AR.
DUT with back separated 2.5cm from the phantom.
with attached audio accessory model NTN1625A

Figure 8. Assessment @ the face w/ antenna model NAE6546AR.
DUT with front housing separated 2.5cm from the phantom
Same position used for attached audio accessories

Figure 9: Robot Test System (Flat Phantom used for body)

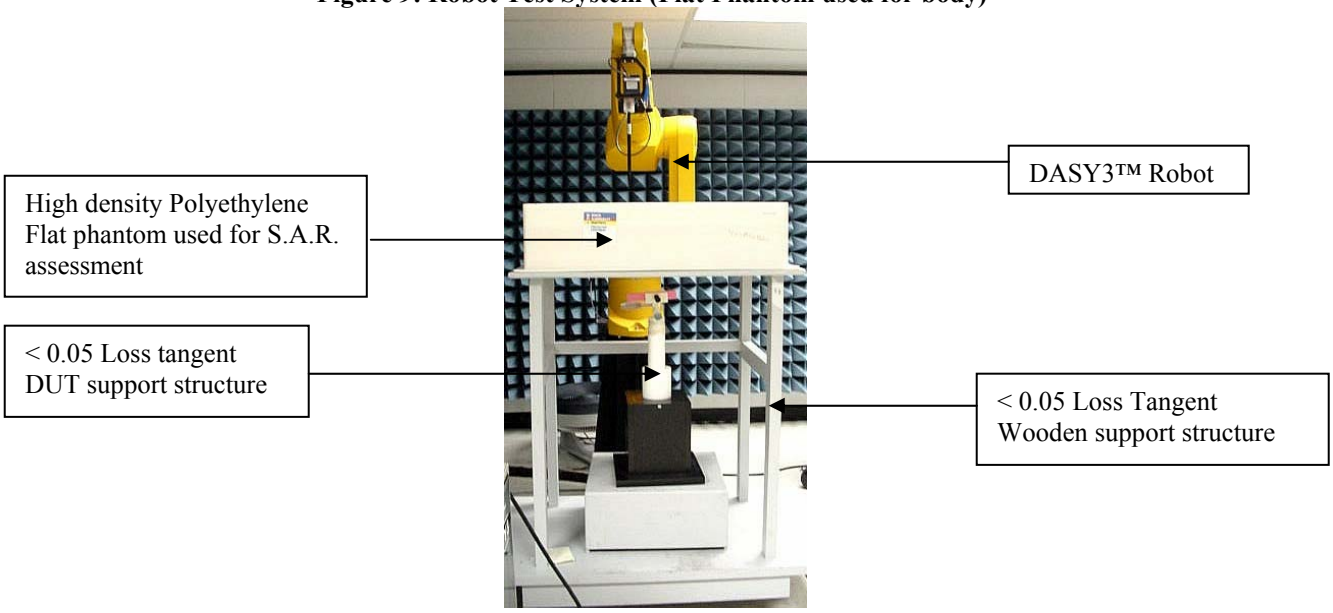

Figure 10: Robot Test System (Flat Phantom used for face)

6.0 Measurement Uncertainty

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

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*	*k*
Uncertainty Component	IEEE 1528 section	**Tol. (± %)**	**Prob Dist**	**Div.**	c_i **(1 g)**	c_i **(10 g)**	**1 g** u_i **(±%)**	**10 g** u_i **(±%)**	v_i
Measurement System									
Probe Calibration	E.2.1	4.8	N	1.00	1	1	4.8	4.8	∞
Axial Isotropy	E.2.2	4.7	R	1.73	0.707	0.707	1.9	1.9	∞
Hemispherical Isotropy	E.2.2	9.6	R	1.73	0.707	0.707	3.9	3.9	∞
Boundary Effect	E.2.3	1.0	R	1.73	1	1	0.6	0.6	∞
Linearity	E.2.4	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1.0	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	1.0	N	1.00	1	1	1.0	1.0	∞
Response Time	E.2.7	0.8	R	1.73	1	1	0.5	0.5	∞
Integration Time	E.2.8	1.3	R	1.73	1	1	0.8	0.8	∞
RF Ambient Conditions - Noise	E.6.1	3.0	R	1.73	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	E.6.1	0.0	R	1.73	1	1	0.0	0.0	∞
Probe Positioner Mech. Tolerance	E.6.2	1.0	R	1.73	1	1	0.6	0.6	∞
Probe Positioning w.r.t Phantom	E.6.3	4.0	R	1.73	1	1	2.3	2.3	∞
Max. SAR Evaluation (ext., int., avg.)	E.5	3.4	R	1.73	1	1	2.0	2.0	∞
Test sample Related									
Test Sample Positioning	E.4.2	3.4	N	1.00	1	1	3.4	3.4	29
Device Holder Uncertainty	E.4.1	3.8	N	1.00	1	1	3.8	3.8	8
SAR drift	6.6.2	5.0	R	1.73	1	1	2.9	2.9	∞
Phantom and Tissue Parameters									
Phantom Uncertainty	E.3.1	4.0	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity (target)	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (measurement)	E.3.3	6.5	N	1.00	0.64	0.43	4.2	2.8	∞
Liquid Permittivity (target)	E.3.2	5.0	R	1.73	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (measurement)	E.3.3	4.0	N	1.00	0.6	0.49	2.4	2.0	∞
Combined Standard Uncertainty			RSS				12	11	601
Expanded Uncertainty (95% CONFIDENCE LEVEL)			*k*=2				23	22	

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

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*	*k*
		Tol.	Prob.		c_i	c_i	1 g	10 g	
	IEEE 1528	(± %)	Dist.		(1 g)	(10 g)	u_i	u_i	
Uncertainty Component	section			Div.			(±%)	(±%)	v_i
Measurement System									
Probe Calibration	E.2.1	4.8	N	1.00	1	1	4.8	4.8	∞
Axial Isotropy	E.2.2	4.7	R	1.73	1	1	2.7	2.7	∞
Spherical Isotropy	E.2.2	9.6	R	1.73	0	0	0.0	0.0	∞
Boundary Effect	E.2.3	1.0	R	1.73	1	1	0.6	0.6	∞
Linearity	E.2.4	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1.0	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	1.0	N	1.00	1	1	1.0	1.0	∞
Response Time	E.2.7	0.8	R	1.73	1	1	0.5	0.5	∞
Integration Time	E.2.8	1.3	R	1.73	1	1	0.8	0.8	∞
RF Ambient Conditions - Noise	E.6.1	3.0	R	1.73	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	E.6.1	0.0	R	1.73	1	1	0.0	0.0	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.4	R	1.73	1	1	0.2	0.2	∞
Probe Positioning w.r.t. Phantom	E.6.3	1.4	R	1.73	1	1	0.8	0.8	∞
Max. SAR Evaluation (ext., int., avg.)	E.5	3.4	R	1.73	1	1	2.0	2.0	∞
Dipole									
Dipole Axis to Liquid Distance	8, E.4.2	2.0	R	1.73	1	1	1.2	1.2	∞
Input Power and SAR Drift Measurement	8, 6.6.2	5.0	R	1.73	1	1	2.9	2.9	∞
Phantom and Tissue Parameters									
Phantom Uncertainty	E.3.1	4.0	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity (target)	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (measurement)	E.3.3	6.0	R	1.73	0.64	0.43	2.2	1.5	∞
Liquid Permittivity (target)	E.3.2	5.0	R	1.73	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (measurement)	E.3.3	6.0	R	1.73	0.6	0.49	2.1	1.7	∞
Combined Standard Uncertainty			RSS				9	8	99999
Expanded Uncertainty (95% CONFIDENCE LEVEL)			*k*=2				17	17	

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

7.0 S.A.R. Test Results

All S.A.R. results obtained by the tests described in Section 5.0 are listed in section 7.1 below. As noted in section 5.3, a coarse-to-cube approximation methodology, which has been accepted by SPEAG, was utilized to ascertain the worst-case test configuration for each body location. The worst case test configurations observed for each body location were then assessed using the full DASY3™ coarse and 7x7x7 cube methodology, and they are presented as bolded results in section 7.1. The associated S.A.R. plots are provided in APPENDIX B.
Appendix A presents shortened S.A.R. cube scans 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

Table 1

DUT assessment at the body; CW mode; 380-470 MHz (Run # EC-Ab-R1-040730-22 used full coarse and 7x7x7 cube scans)												
Run Number/ SN	**Antenna model**	**Freq. (MHz)**	**Battery**	**Test position**	**Carry Case**	**Additional attachments**	**Initial Power (W)**	**S.A.R. Drift (dB)**	**Meas. 1g-S.A.R. (mW/g)**	**Meas. 10g-S.A.R. (mW/g)**	**Max Calc. 1g-S.A.R. (mW/g)**	**Max Calc. 10g-S.A.R. (mW/g)**
Assessment at center frequency of antenna model NAE6546AR w/ each of the offered batteries; assessment at band edges with worst case configuration; along with RSM model NMN6191C												
EC-Ab-R1-040727-04/407TDY7007	NAE6546AR	407.225	NTN9857B	Against phantom	HLN9844A	NMN6191C	5.98	-0.92	8.912	6.543	5.51	4.04
EC-Ab-R1-040728-02/407TDY7007	NAE6546AR	407.225	NTN9858B	Against phantom	HLN9844A	NMN6191C	6.19	-0.68	9.111	6.790	5.33	3.97
EC-Ab-R1-040728-03/407TDY7007	NAE6546AR	407.225	NTN9815B	Against phantom	HLN9844A	NMN6191C	6.21	-0.67	8.950	6.563	5.22	3.83
EC-Ab-R1-040728-04/407TDY7007	NAE6546AR	407.225	NTN9816B	Against phantom	HLN9844A	NMN6191C	6.23	-0.75	9.167	6.745	5.45	4.01
EC-Ab-R1-040728-05/407TDY7007	NAE6546AR	380.225	NTN9857B	Against phantom	HLN9844A	NMN6191C	6.10	-0.73	6.568	4.827	3.89	2.86
EC-Ab-R1-040728-06/407TDY7007	NAE6546AR	434.9875	NTN9857B	Against phantom	HLN9844A	NMN6191C	6.02	-0.46	4.783	3.488	2.66	1.94
Assessment of offered antenna model NAE6547AR across the transmit band using the worst case configuration from above												
EC-Ab-R1-040729-02/407TDY7007	NAE6547AR	435.225	NTN9857B	Against phantom	HLN9844A	NMN6191C	6.09	-0.94	7.489	5.460	4.65	3.39
EC-Ab-R1-040729-03/407TDY7007	NAE6547AR	452.225	NTN9857B	Against phantom	HLN9844A	NMN6191C	6.04	-0.22	7.786	5.642	4.10	2.97
EC-Ab-R1-040729-04/407TDY7007	NAE6547AR	469.9875	NTN9857B	Against phantom	HLN9844A	NMN6191C	6.07	-1.09	5.197	3.870	3.34	2.49
Assessment of offered antenna model NAE6549AR across the transmit band using the worst case configuration from above												
EC-Ab-R1-040729-05/407TDY7007	NAE6549AR	380.225	NTN9857B	Against phantom	HLN9844A	NMN6191C	6.15	-0.31	5.213	3.809	2.80	2.05
EC-Ab-R1-040729-06/407TDY7007	NAE6549AR	425.225	NTN9857B	Against phantom	HLN9844A	NMN6191C	6.06	-0.35	7.753	5.687	4.20	3.08
EC-Ab-R1-040729-07/407TDY7007	NAE6549AR	469.9875	NTN9857B	Against phantom	HLN9844A	NMN6191C	6.10	-0.82	8.006	5.982	4.83	3.61

Table 1 (continued)

DUT assessment at the body; CW mode; 380-470 MHz												
Run Number/ SN	**Antenna model**	**Freq. (MHz)**	**Battery**	**Test position**	**Carry Case**	**Additional attachments**	**Initial Power (W)**	**S.A.R. Drift (dB)**	**Meas. 1g-S.A.R. (mW/g)**	**Meas. 10g-S.A.R. (mW/g)**	**Max Calc. 1g-S.A.R. (mW/g)**	**Max Calc. 10g-S.A.R. (mW/g)**
Assessment of other body worn accessories with worst case configuration from above												
EC-Ab-R1-040729-08/407TDY7007	NAE6546AR	407.225	NTN9857B	Against phantom	HLN6853A	NMN6191C	6.14	-0.97	8.861	6.552	5.54	4.10
EC-Ab-R1-040729-09/407TDY7007	NAE6546AR	407.225	NTN9857B	Against phantom	NNTN4115A	NMN6191C	6.12	-0.80	3.517	2.659	2.11	1.60
EC-Ab-R1-040729-10/407TDY7007	NAE6546AR	407.225	NTN9857B	Against phantom	NNTN4116A	NMN6191C	6.16	-0.82	2.942	2.227	1.78	1.34
EC-Ab-R1-040729-11/407TDY7007	NAE6546AR	407.225	NTN9857B	Against phantom	NNTN4117A	NMN6191C	6.09	-0.70	2.989	2.262	1.76	1.33
Assessment of other audio accessories with worst case configuration from above.												
EC-Ab-R1-040729-12/407TDY7007	NAE6546AR	407.225	NTN9857B	Against phantom	HLN6853A	BDN6671B tested w/ BDN6641A &0180300E83	6.12	-1.06	7.999	5.918	5.11	3.78
EC-Ab-R1-040729-13/407TDY7007	NAE6546AR	407.225	NTN9857B	Against phantom	HLN6853A	BDN6645A w/ BDN6673B	6.17	-0.88	8.176	6.072	5.01	3.72
EC-Ab-R1-040729-14/407TDY7007	NAE6546AR	407.225	NTN9857B	Against phantom	HLN6853A	BDN6729A w/ BDN6676D	6.13	-0.89	8.421	6.227	5.17	3.82
EC-Ab-R1-040729-15/407TDY7007	NAE6546AR	407.225	NTN9857B	Against phantom	HLN6853A	BDN6730A w/ BDN6676D	6.07	-0.91	7.972	5.895	4.92	3.63
EC-Ab-R1-040729-16/407TDY7007	NAE6546AR	407.225	NTN9857B	Against phantom	HLN6853A	NMN6245A w/ BDN6676D	6.11	-0.86	9.314	6.878	5.68	4.19
EC-Ab-R1-040729-17/407TDY7007	NAE6546AR	407.225	NTN9857B	Against phantom	HLN6853A	NMN6246B w/ BDN6676D	6.12	-0.77	8.237	6.091	4.92	3.64
DZ-Ab-R1-040730-02/407TDY7007	NAE6546AR	407.225	NTN9857B	Against phantom	HLN6853A	NMN6258A	6.10	-0.75	8.911	6.589	5.30	3.92
DZ-Ab-R1-040730-03/407TDY7007	NAE6546AR	407.225	NTN9857B	Against phantom	HLN6853A	RMN4049A	6.13	-0.77	8.602	6.395	5.14	3.82
DZ-Ab-R1-040730-04/407TDY7007	NAE6546AR	407.225	NTN9857B	Against phantom	HLN6853A	NMN1020A	6.11	-0.95	8.079	5.983	5.03	3.72
DZ-Ab-R1-040730-05/407TDY7007	NAE6546AR	407.225	NTN9857B	Against phantom	HLN6853A	NTN1625A	6.15	-0.66	9.847	7.289	5.73	4.24
EC-Ab-R1-040730-23/407TDY7007 (Shortened scan)	NAE6546AR	407.225	NTN9857B	Against phantom	HLN6853A	NTN1625A	6.09	-0.43	10.800	7.770	5.96 *	4.29
DZ-Ab-R1-040730-06/407TDY7007	NAE6546AR	407.225	NTN9857B	Against phantom	HLN6853A	ZMN6032A NTN8613A	6.10	-0.73	8.400	6.201	4.97	3.67
DZ-Ab-R1-040730-07/407TDY7007	NAE6546AR	407.225	NTN9857B	Against phantom	HLN6853A	ZMN6031A NTN8613A	6.15	-0.59	8.678	6.412	4.97	3.67
Assessment at 2.5 cm separation from phantom												
EC-Ab-R1-040730-09/407TDY7007	NAE6546AR	407.225	NTN9857B	DUT Back 2.5cm	None	NTN1625A	6.07	-0.53	8.678	6.412	4.90	3.62
EC-Ab-R1-040730-11/407TDY7007	NAE6546AR	407.225	NTN9857B	DUT Front 2.5cm	None	NTN1625A	6.14	-0.45	6.406	4.818	3.55	2.67
***Assessment with the worst case test configuration at the body using the full DASY coarse and 7x7x7 cube scan measurement**												

EC-Ab-R1-040730-22/407TDY7007	NAE6546AR	407.225	NTN9857B	Against phantom	HLN6853A	NTN1625A	6.16	-1.11	8.630	6.240	**5.57**	4.03

Table 2

DUT assessment at the Face; 2.5cm separation; 380-470 MHz (Run # DZ-Face-R1-040802-02 used full coarse and 7x7x7 cube scans)												
Run Number/ SN	**Antenna model**	**Freq. (MHz)**	**Battery**	**Test position**	**Carry Case**	**Additional attachments**	**Initial Power (W)**	**S.A.R. Drift (dB)**	**Meas. 1g-S.A.R. (mW/g)**	**Meas. 10g-S.A.R. (mW/g)**	**Max Calc. 1g-S.A.R. (mW/g)**	**Max Calc. 10g-S.A.R. (mW/g)**
Assessment at center frequency of antenna model NAE6546AR w/ each of the offered batteries; assessment at band edges with worst case configuration												
EC-Face-R1-040731-20/407TDY7007	NAE6546AR	407.225	NTN9857B	DUT front 2.5cm	None	None	6.18	-0.14	8.316	6.254	4.29 *	3.23
EC-Face-R1-040731-21/407TDY7007	NAE6546AR	407.225	NTN9858B	DUT front 2.5cm	None	None	6.09	-0.46	7.654	5.757	4.25	3.20
EC-Face-R1-040731-22/407TDY7007	NAE6546AR	407.225	NTN9815B	DUT front 2.5cm	None	None	5.88	-0.07	8.200	6.160	4.18	3.14
EC-Face-R1-040731-23/407TDY7007	NAE6546AR	407.225	NTN9816B	DUT front 2.5cm	None	None	5.83	-0.18	8.134	6.114	4.29	3.22
EC-Face-R1-040801-02/407TDY7007	NAE6546AR	380.225	NTN9857B	DUT front 2.5cm	None	None	6.18	-0.59	3.715	2.779	2.13	1.59
EC-Face-R1-040801-03/407TDY7007	NAE6546AR	434.9875	NTN9857B	DUT front 2.5cm	None	None	5.92	-0.38	4.424	3.326	2.41	1.82
Assessment across the transmit band of antenna model NAE6547A with worst case battery from above												
EC-Face-R1-040801-04/407TDY7007	NAE6547AR	435.225	NTN9857B	DUT front 2.5cm	None	None	5.65	-0.71	6.538	4.915	4.02	3.02
EC-Face-R1-040801-05/407TDY7007	NAE6547AR	452.225	NTN9857B	DUT front 2.5cm	None	None	6.16	-0.44	6.031	4.530	3.34	2.51
EC-Face-R1-040801-06/407TDY7007	NAE6547AR	469.9875	NTN9857B	DUT front 2.5cm	None	None	6.10	-1.12	3.705	2.785	2.40	1.80
Assessment across the transmit band of antenna model NAE6549A with worst case battery from above												
EC-Face-R1-040801-07/407TDY7007	NAE6549AR	380.225	NTN9857B	DUT front 2.5cm	None	None	6.150	-0.17	2.965	2.220	1.54	1.15
EC-Face-R1-040801-08/407TDY7007	NAE6549AR	425.225	NTN9857B	DUT front 2.5cm	None	None	6.140	-0.26	6.592	4.952	3.50	2.63
EC-Face-R1-040801-09/407TDY7007	NAE6549AR	469.9875	NTN9857B	DUT front 2.5cm	None	None	5.890	-0.38	5.723	4.298	3.13	2.35
Assessment of other offered audio accessories with worst case test configuration from above												
EC-Face-R1-040801-10/407TDY7007	NAE6546AR	407.225	NTN9857B	DUT front 2.5cm	None	BDN6665A	6.090	-0.65	6.606	4.954	3.84	2.88
EC-Face-R1-040801-11/407TDY7007	NAE6546AR	407.225	NTN9857B	DUT front 2.5cm	None	BDN6666A	6.130	-0.32	7.235	5.433	3.89	2.92
EC-Face-R1-040801-12/407TDY7007	NAE6546AR	407.225	NTN9857B	DUT front 2.5cm	None	BDN6781A	6.160	-0.68	6.057	4.539	3.54	2.65
***Assessment with the worst case test configuration at the face using the full DASY coarse and 7x7x7 cube scan measurement**												
DZ-Face-R1-040802-02/407TDY7007	NAE6546AR	407.225	NTN9857B	DUT front 2.5cm	None	None	6.15	-0.39	7.630	5.670	**4.17**	3.10

7.2 Peak S.A.R. location

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

7.3 Highest S.A.R. results calculation methodology

The calculated maximum 1-gram and 10-gram averaged S.A.R. results reported herein for the full DASY ™ coarse and 7x7x7 cube measurements are determined by scaling the measured S.A.R. to account for power leveling variations and power slump. For this device the Maximum Calculated 1-gram and 10-gram averaged peak S.A.R. is calculated using the following formula:

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

8.0 Conclusion

The highest Operational Maximum Calculated 1-gram and 10-gram average S.A.R. values found for FCC ID: AZ489FT4865 model H66QDC9PW5AN.

At the Body: **1-g Avg. = 5.96 mW/g; 10-g Avg. = 4.29 mW/g**
At the Face: **1-g Avg. = 4.17 mW/g; 10-g Avg. = 3.10 mW/g**

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