



Certificate Number: 1449-01

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

Date of Report: October 26, 2004
Report Revision: Rev. O
Manufacturer: Motorola
Product Description: Distributed Input Output System (DIOS); 100mW UHF 450-470MHz 12.5KHz
FCC ID: AZ489FT4871
Device Model: F4614A (Piccolo XR), F4604A (PIU Controller)

Test Period: 9/17/04-10/22/04

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

10/27/04

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

Date Approved

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REVISION HISTORY

Date	Revision	Comments
10/26/04	0	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 F4614A (Piccolo XR), F4604A (Piccolo Interface unit – PIU Controller), FCC ID: AZ489FT4871.

The applicable exposure environment is General Population/Uncontrolled.

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



Piccolo XLR



PIU

FCC ID: AZ489FT4871 is a self-sustained distributed I/O system (DIOS) that operates as part of a monitor and control system such as the IRRInet field unit irrigation control system. The DIOS consists of an IRRInet Field unit, the Piccolo Interface unit, and the Piccolo XR unit. The PIU connects to the IRRInet via RS232 or RS485 and uses RF communications to link to the Piccolo XR units that are typically mounted in the field. The DIOS automatically builds communications network utilizing the Store and Forward (S&F) technology enabling larger coverage than is possible with a single radio communicating with the PIU. Up to 256 Piccolo XR units are supported by each PIU device. Using the DIOS, the IRRInet field unit manually or automatically opens and closes stations, reads dry contact input status, calculates flow rate, and accumulates pulses from water meters.

The PIU device does not have inherent monitor and control features. Monitor and control features are provided either locally by the Piccolo XR units or by the IRRInet field units.

FCC ID: AZ489FT4871 will be marketed to and used by the general population and is tested to ensure compliance to applicable RF exposure levels. The typical intended use is with the Piccolo XR units mounted in the field and the PIU device used as an interface/controller either in a fixed location or as a portable device with or without the offered carry case accessory. Note that both the PIU and the Piccolo XR can be used as portable handheld devices.

FCC ID: AZ489FT4871 is capable of operating in the 450-470 MHz band. The rated power is 100mW. The maximum output is 120mW as defined by the upper limit of the production line final test station.

FCC ID: AZ489FT4871 is offered with the following options and accessories:

Antenna	Description
FAE5532A-8588540V01	Piccolo XR ¼ wave whip antenna 450-470MHz; 16.5cm; 0dBi
FAE5533A-8588540V01	PIU ¼ wave whip antenna 450-470MHz; 16.5cm; 0dBi

Batteries

9V Off the shelf battery (PIU)

Body-worn Accessories

5687511V73 Holster (PIU)

Other applicable options:

FKN8171A	RS232 Radio programming cable (PIU/Piccolo XR)
FTN6597A	RS232 ASYNC adaptor (PIU)
FTN6625A	T.B. 3 pin w/ ESD cover
FKN8199A	User 17 pin cable
FCN6538A	PIU DC adaptor
FKN8203A	PIU to PIU cable
FKN8204A	3 pin battery cable
FKN8250A	DC power cable

3.1 Test Signal

Test Mode Call Simulator Simulator

Test Signal mode:

Transmission Mode:

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

3.2 Test Output Power

A table of the characteristic power slump versus time is provided in Appendix A for the 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 ET3DV6 and EX3DV3 E-Field probes. Please reference the SPEAG user manual and application notes for detailed probe, robot, and S.A.R. computational procedures.

The S.A.R. measurements were conducted with probe model/serial number ET3DV6/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	D450V2/1001	4.605 +/- 0.125	4.58 +/- 10%	10/20/04-10/22/04 3 test days
1384	FCC Body	5/27/04	D450V2/1002	4.605 +/- 0.195	4.71 +/- 10%	9/17/04 – 9/22/04 3 test days

Note: System performance results reflects the median performance +/- 1/2 of the test date(s) performance ranges

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

4.2 Description of Phantom

4.2.1 Flat Phantom

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

4.2.2 SAM Phantom

NA

4.3 Simulated Tissue Properties

4.3.1 Type of Simulated Tissue

The simulated tissue used is compliant to that specified in FCC Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97-01) and IEEE 1528, 2003 "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques"

Simulated Tissue	Body Position
FCC Body	Torso

4.3.2 Simulated Tissue Composition

% of listed ingredients	450MHz			
	Head	Body	Head	Body
Sugar	NA	46.5	NA	NA
DGBE (Glycol)	NA	NA	NA	NA
Diacetin	NA	NA	NA	NA
De ionized -Water	NA	50.53	NA	NA
Salt	NA	1.87	NA	NA
HEC	NA	1	NA	NA
Bact.	NA	0.1	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.

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	54.3-56.7	0.94	0.92-0.97
460	56.7	54.1-56.5	0.94	0.92-0.97

4.4 Test conditions

The EME Laboratory ambient environment is well controlled resulting in very stable simulated tissue temperature and therefore stable dielectric properties. Simulated tissue temperature is measured prior to each scan to insure it is within +/- 2°C of the temperature at which the dielectric properties were determined. The liquid depth in the phantom used for measurements was 15cm +/- 0.5cm. Additional precautions are routinely taken to ensure the stability of the simulated tissue such as covering the phantoms when scans are not actively in process in order to minimize evaporation. The lab environment is continuously monitored. The table below presents the range and average environmental conditions during the S.A.R. tests reported herein:

	Target	Measured
Ambient Temperature	20 - 25 °C	Range: 20.9-23.2°C Avg. 22.5°C
Relative Humidity	30 - 70 %	Range: 45.5-54.2% Avg. 48.10%
Tissue Temperature	NA	Range: 20.6-21.5°C Avg. 21.1°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 PIU and Piccolo XR devices were positioned with their front, back, left, and right sides centered against the flat phantom. The offered carry case was assessed with the PIU's back side towards the phantom. The PIU and Piccolo XR devices were positioned with their front, back, and antenna (back towards phantom) separated 2.5cm from the flat phantom.

5.2.2 Head

NA

5.2.3 Face

NA

5.3 Description of Test Procedure

All options and accessories listed in section 3.0 were considered in order to develop the S.A.R. test plan for this product. S.A.R. measurements were performed using a flat phantom with applicable tissue simulant to assess performance at the body using the applicable transmission 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 hand/body (PIU) [Pages 18-19 of 20; Table 1]

The DUT was assessed across the TX band, against the phantom (body assessment), in CW transmission mode with the offered carry case accessory. The DUT was assessed at the TX center frequency without the offered carry case.

The DUT was assessed at the TX center frequency of the band, in CW mode, with the back, left, and right sides against the phantom (hand assessment).

The DUT was assessed at the band edges using the worst case hand assessment configuration above.

Assessments at the hand/body (Piccolo XR) [Page 19 of 20; Table 2]

The DUT was assessed across the TX band, with the front side against the phantom (body assessment), in CW transmission mode.

The DUT was assessed at the TX center frequency of the band, in CW mode, with the back, left, and right sides against the phantom (hand assessment).



The DUT was assessed at the band edges using the worst case hand assessment configuration above.

Assessments at the body (@ 2.5cm) [Page 18-19 of 20; Table 1 & 2]

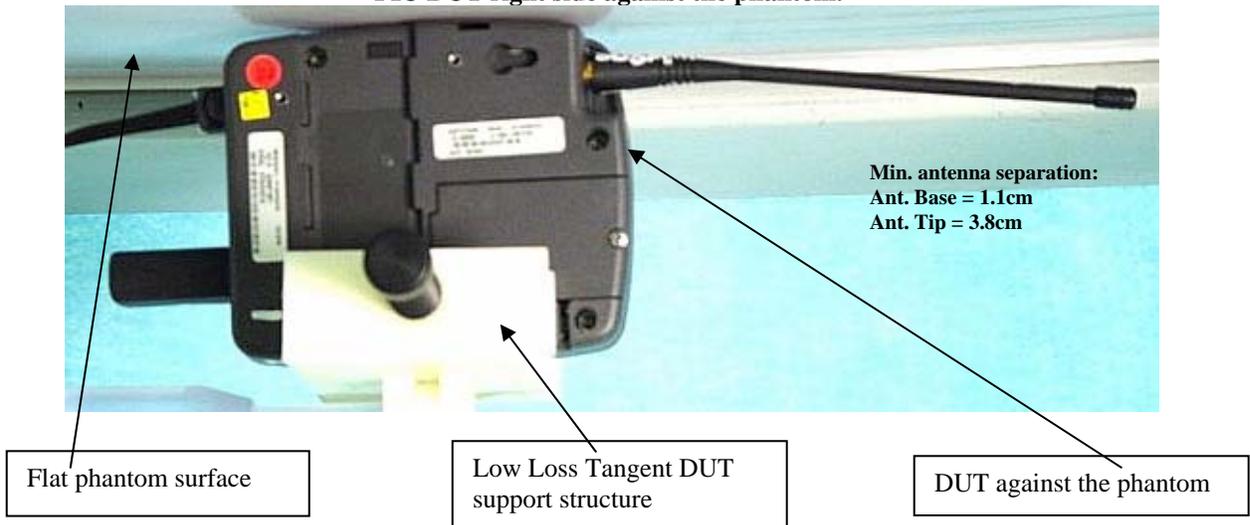
The PIU and Piccolo XR devices were assessed using the worst case frequency from their respective body assessments, in CW transmission mode, with their front, back, and antenna (back towards the phantom) separated 2.5cm from the phantom.

Shortened scan assessment at the body [APPENDIX A]

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

5.4 Test Position Photographs

**Figure 1: Highest S.A.R. Test Position (@ the hand)
PIU DUT right side against the phantom.**



**Figure 2. Assessment @ the hand
PIU device left side against the phantom**



**Figure 3. Assessment @ the body
PIU device front side against the phantom**



**Figure 4. Assessment @ the hand
PIU device back side against the phantom**



**Figure 5. Assessment @ 2.5cm separation
PIU device front towards the phantom**



**Figure 6. Assessment @ 2.5cm separation
PIU device back towards the phantom**



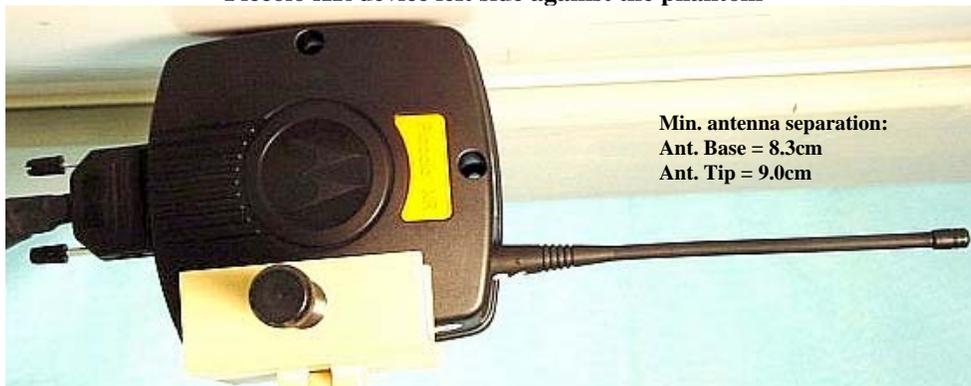
**Figure 7. Assessment @ 2.5cm separation (antenna)
PIU device back towards the phantom**



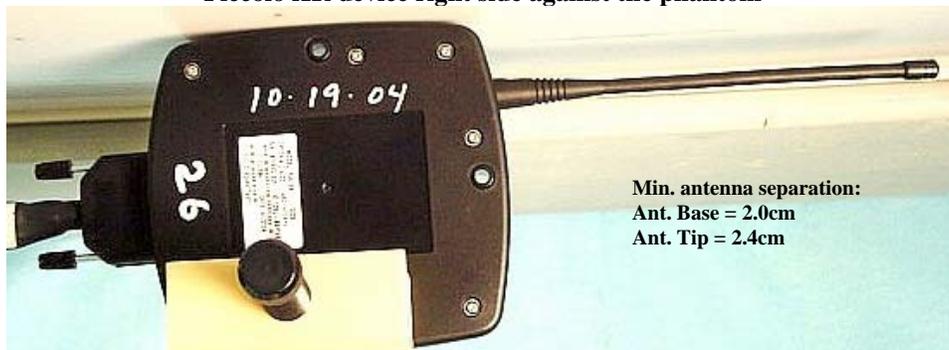
**Figure 8. Assessment @ body with carry case
PIU device back towards the phantom**



**Figure 9. Assessment @ the hand
Piccolo XR device left side against the phantom**



**Figure 10. Assessment @ the hand
Piccolo XR device right side against the phantom**



**Figure 11. Assessment @ the body
Piccolo XR device front against the flat phantom.**



**Figure 12. Assessment @ the hand
Piccolo XR device back against the flat phantom.**



**Figure 13. Assessment @ 2.5cm separation
Piccolo XR device back towards the flat phantom.**



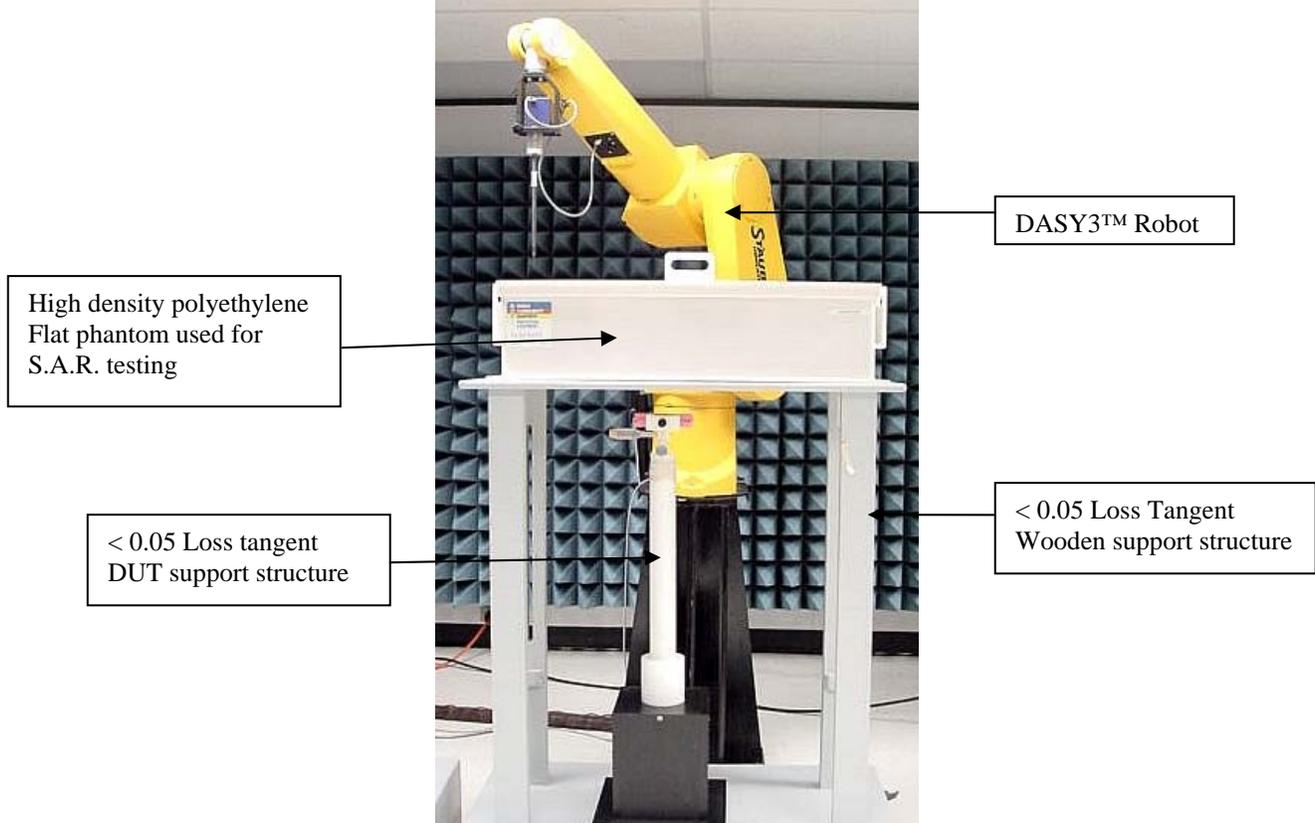
**Figure 14. Assessment @ 2.5cm separation
Piccolo XR device front 2 towards the flat phantom.**



**Figure 15. Assessment @ 2.5cm separation (antenna)
 Piccolo XR device back towards the flat phantom.**



Figure 16: Robot Test System (Flat Phantom)



6.0 Measurement Uncertainty

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

<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e = f(d,k)</i>	<i>f</i>	<i>g</i>	<i>h =</i>	<i>i =</i>	<i>k</i>
							<i>c x f / e</i>	<i>c x g / e</i>	
Uncertainty Component	IEEE 1528 section	Tol.	Prob	Div.	<i>c_i</i>	<i>c_i</i>	1 g	10 g	<i>v_i</i>
		(± %)	Dist		(1 g)	(10 g)	<i>u_i</i>	<i>u_i</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)			<i>k=2</i>				23	22	



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

a	b	c	d	e = f(d,k)	f	g	h =		k
							c x f / e	i =	
Uncertainty Component	IEEE 1528 section	Tol.	Prob.	Div.	c _i	c _i	1 g	10 g	v _i
		(± %)	Dist.		(1 g)	(10 g)	u _i	u _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) c_i - sensitivity coefficient that should be applied to convert the variability of the uncertainty component into a variability of SAR.
- g) u_i – SAR uncertainty
- h) v_i - 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 a shortened S.A.R. cube scan to assess the validity of the calculated results presented herein. Note: The results of the shortened cube scan 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

Note: (Run #s EC-Ab-R1-040920-11, EC-Ab-R1-041021-10 used full coarse and 7x7x7 cube scans)

Table 1

PIU assessment; CW Transmission mode; 450-470MHz band												
Run Number/ SN	Antenna	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 for body exposure												
EC-Ab-R1-040920-02/870SEQ2516	8588540V01	450	9V	Back Against Phantom	5687511V73	FTN6597A FTN6625A	0.114	-0.070	0.166	0.124	0.18	0.13
EC-Ab-R1-040920-03/870SEQ2516	8588540V01	460	9V	Back Against Phantom	5687511V73	FTN6597A FTN6625A	0.123	-0.030	0.163	0.122	0.16	0.12
EC-Ab-R1-040920-04/870SEQ2516	8588540V01	470	9V	Back Against Phantom	5687511V73	FTN6597A FTN6625A	0.123	-0.030	0.152	0.113	0.15	0.11
EC-Ab-R1-041022-02/870SEQ2516	8588540V01	460	9V	Front Against Phantom	None	FTN6597A FTN6625A	0.123	0.020	0.269	0.199	0.27	0.20
Assessment at 2.5cm separation												
EC-Ab-R1-040922-12/870SEQ2516	8588540V01	460	9V	Back towards phantom Ant. 2.5cm	None	FTN6597A FTN6625A	0.114	-0.070	0.134	0.100	0.14	0.11
EC-Ab-R1-040922-13/870SEQ2516	8588540V01	460	9V	Back 2.5cm	None	FTN6597A FTN6625A	0.114	-0.060	0.086	0.065	0.09	0.07
EC-Ab-R1-040922-14/870SEQ2516	8588540V01	460	9V	Front 2.5cm	None	FTN6597A FTN6625A	0.114	-0.010	0.088	0.066	0.09	0.07
Assessment for hand exposure (4.0mW/g limit 10 gram average)												
EC-Ab-R1-040920-05/870SEQ2516	8588540V01	460	9V	Back Against Phantom	None	FTN6597A FTN6625A	0.123	-0.060	0.288	0.210	0.29	0.21
EC-Ab-R1-040920-06/870SEQ2516	8588540V01	460	9V	Left side Against Phantom	None	FTN6597A FTN6625A	0.122	-0.010	0.058	0.043	0.06	0.04
*EC-Ab-R1-040920-07/870SEQ251	8588540V01	460	9V	Right side Against Phantom	None	FTN6597A FTN6625A	0.123	-0.020	0.330	0.238	0.33	0.24

Table 1 (continued)

Run Number/ SN	Antenna	Freq. (MHz)	Battery	Test position	Carry Case	Additional attachments	Initial Power (W)	S.A.R. Drift (dB)	Meas. 1g-S.A.R. (mW/g)	Meas. 10g-S.A.R. (mW/g)	Max Calc. 1g-S.A.R. (mW/g)	Max Calc. 10g-S.A.R. (mW/g)
EC-Ab-R1-040920-08/870SEQ251	8588540V01	450	9V	Right side Against Phantom	None	FTN6597A FTN6625A	0.114	-0.020	0.299	0.220	0.32	0.23
EC-Ab-R1-040920-09/870SEQ251	8588540V01	470	9V	Right side Against Phantom	None	FTN6597A FTN6625A	0.123	-0.030	0.272	0.200	0.27	0.20
*Assessment with the worst case test configuration from above using the full DASY coarse and 7x7x7 cube scan measurements.												
EC-Ab-R1-040920-10/870SEQ251	8588540V01	460	9V	Right side Against Phantom	None	FTN6597A FTN6625A	0.123	-0.010	0.318	0.212	0.32	0.21

Table 2

Piccolo XR assessment; CW Transmission mode; 450-470MHz band												
Run Number/ SN	Antenna	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 for body exposure												
EC-Ab-R1-041021-02/870SEQ1926	8588540V01	450	6V power supply	Front Against Phantom	None	FKN8171A	0.114	0.000	0.250	0.184	0.26	0.19
EC-Ab-R1-041021-03/870SEQ1926	8588540V01	460	6V power supply	Front Against Phantom	None	FKN8171A	0.125	0.010	0.266	0.196	0.27	0.20
EC-Ab-R1-041021-04/870SEQ1926	8588540V01	470	6V power supply	Front Against Phantom	None	FKN8171A	0.124	0.030	0.271	0.200	0.27	0.20
Assessment at 2.5cm separation												
EC-Ab-R1-041021-11/870SEQ1926	8588540V01	460	6V power supply	Back towards phantom Ant. 2.5cm	None	FKN8171A	0.125	-0.010	0.160	0.119	0.16	0.12
EC-Ab-R1-041021-12/870SEQ1926	8588540V01	460	6V power supply	Back 2.5cm	None	FKN8171A	0.125	0.040	0.079	0.060	0.08	0.06
EC-Ab-R1-041021-13/870SEQ1926	8588540V01	460	6V power supply	Front 2.5cm	None	FKN8171A	0.125	-0.060	0.087	0.066	0.09	0.07
Assessment for hand exposure (4.0mW/g limit 10 gram average)												
EC-Ab-R1-041021-05/870SEQ1926	8588540V01	460	6V power supply	Back Against Phantom	None	FKN8171A	0.125	-0.050	0.309	0.227	0.31	0.23
EC-Ab-R1-041021-06/870SEQ1926	8588540V01	460	6V power supply	Left side Against Phantom	None	FKN8171A	0.125	0.020	0.040	0.030	0.04	0.03
EC-Ab-R1-041021-07/870SEQ1926	8588540V01	460	6V power supply	Right side Against Phantom	None	FKN8171A	0.125	0.020	0.199	0.147	0.20	0.15
EC-Ab-R1-041021-08/870SEQ1926	8588540V01	450	6V power supply	Back side Against Phantom	None	FKN8171A	0.114	-0.030	0.280	0.205	0.30	0.22
*EC-Ab-R1-041021-09/870SEQ1926	8588540V01	470	6V power supply	Back side Against Phantom	None	FKN8171A	0.124	-0.020	0.309	0.226	0.31	0.23
*Assessment with the worst case test configuration from above using the full DASY coarse and 7x7x7 cube scan measurements.												
EC-Ab-R1-041021-10/870SEQ1926	8588540V01	460	6V power supply	Back side Against Phantom	None	FKN8171A	0.125	-0.030	0.307	0.210	0.31	0.21

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 DASYSTM coarse and 7x7x7 cube measurements are determined by scaling the measured S.A.R. to account for power leveling variations and power slump. For these devices the Maximum Calculated 1-gram and 10-gram averaged peak S.A.R. is calculated using the following formula:

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

P_{max} = Maximum Power (W)

P_{int} = Initial Power (W)

Pdrift = DASYS 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: AZ489FT4871 models F4604A/F4614A.

1-g Avg. = 0.32 mW/g; 10-g Avg. = 0.21 mW/g

These test results clearly demonstrate compliance with FCC General Population/Uncontrolled 1 gram average RF Exposure limits of **1.6 mW/g** per the requirements of 47 CFR 2.1093(d) and also demonstrate compliance with the localized 10g average FCC General Population/Uncontrolled Environment RF Exposure hand Limit of **4.0mW/g** per the requirements of 47 CFR 2.1093(d)(2).