TEST REPORT

Reference No:	WTS14S1019245E				
FCC ID:	XBAZW074				
Applicant:	Aeon Labs LLC.				
Address:	121 Buckingham Drive Unit 36 Santa Claras California United States				
Manufacturer:	Fantem Technologies (Shenzhen) Co.,Ltd				
Address:	North,3/F, Yitoa Technology Industrial Park,Baihua Yuan Rd.,The Second Industrial Area,Guangming Sub-district Office,Guangming New District,Shenzhen, Guangdong, China				
Product Name	MultiSensor Gen5				
Model No	ZW074-A				
Trade Mark:	AEON LABS/AEOTEC				
Standards:	FCC CFR47 Part 15 Section 15.249: 2014				
Date of Receipt sample :	Oct.19, 2014				
Date of Test:	Oct.21~29, 2014				
Date of Issue:	Nov. 04, 2014				
Test Result:	Pass *				
reproduced, except in full, without	ort refer only to the sample(s) tested, this test report cannot be it prior written permission of the company. The report would be invalid tute and the signatures of compiler and approver.				
	Prepared By: Valtek Services (Shenzhen) Co., Ltd. ing, West Baima Road, Songgang Street, Baoan District, Shenzhen, Guangdong, China Testing location: The same as above Tel:+86-755-83551033 Fax:+86-755-83552400				
Compiled by:	Approved by:				
Ou 7	This zhous				
Zero.zhou / Project Engine	er Philo Zhong / Manager				

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2 Test Summary

Test Items	Test Requirement	Result
Conducted Emissions	15.207	PASS
	15.249(a)	
Radiated Emission	15.209	PASS
	15.205(a)	
Periodic Operation	15.35(c)	PASS
	15.249	
Outside of Band Emission	15.205	PASS
	15.209	
20dB Bandwidth	15:215(c)	PASS
Antenna Requirement	15.203	PASS

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4 General Information

4.1 General Description of E.U.T.

Product Name : MultiSensor Gen5

Model No. : ZW074-A

Model Differences : N/A
Type of Modulation : FSK

Frequency Range : 908.40MHz, 908.42MHz

The Lowest Oscillator : 32MHz

Antenna installation : Integrated Antenna

4.2 Details of E.U.T.

Technical Data : DC 6V by batteries(1.5V*4 Size"AAA")

4.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• IC - Registration No.:7760A-1

Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration number 7760A-1, July 12, 2012.

FCC – Registration No.: 880581

Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 880581, April 29, 2014.

4.3.1 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Test mode	Lower channel	Middle channel	Upper channel
Transmitting	908.40MHz	1	908.42MHz

5 Equipment Used during Test

5.1 Equipments List

3m Se	m Semi-anechoic Chamber for Radiation					
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	EMC Analyzer	Agilent	E7405A	MY4511494 3	Sep.15,2014	Sep.14,2015
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	Apr.19,2014	Apr.18,2015
3	Coaxial Cable (below 1GHz)	Тор	TYPE16(13M)	-	Sep.15,2014	Sep.14,2015
4	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	Apr.19,2014	Apr.18,2015
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	Apr.19,2014	Apr.18,2015
6	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	Mar.17,2014	Mar.16,2015
7	Coaxial Cable (above 1GHz)	Тор	1GHz-25GHz	EW02014-7	Apr.10,2014	Apr.09,2015
RF Co	nducted Testing					
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMC Analyzer (9k~26.5GHz)	Agilent	E7405A	MY4511494 3	Sep.15,2014	Sep.14,2015
2.	Spectrum Analyzer (9k-6GHz)	R&S	FSL6	100959	Sep.15,2014	Sep.14,2015
3.	Humidity Chamber	GF	GTH-225-40-	IAA061213	May 16,2014	May 15,2015

5.2 Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-6}$
RF Power	± 1.0 dB
RF Power Density	± 2.2 dB
	± 5.03 dB
Radiated Spurious	(Bilog antenna 30M~1000MHz)
Emissions test	± 5.47 dB
	(Horn antenna 1000M~25000MHz)

5.3 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

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6 Radiation Emission Test

Test Requirement: FCC Part15 Paragraph 15.249

Test Method: ANSI 63.4: 2003

Measurement Distance: 3m

Test Result: PASS

15.249(a)Limit:

Fundamental frequency	Field strength	of fundamental	tal Field strength of harmonic		
	mV/m	dBuV/m	uV/m	dBuV/m	
902-928 MHz	50	94	500	54	
2400-2483.5 MHz	50	94	500	54	
5725-5875 MHz	50	94	500	54	
24.0-24.25 GHz	250	108	2500	68	

15.209 Limit:

_	Field Stren	ngth	Field Strength Limit at 3m Measurement Dist		
Frequency (MHz)	uV/m	Distance (m)	uV/m	dBuV/m	
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	20log ^{(2400/F(kHz))} + 80	
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	20log ^{(24000/F(kHz))} + 40	
1.705 ~ 30	30	30	100 * 30	20log ⁽³⁰⁾ + 40	
30 ~ 88	100	3	100	20log ⁽¹⁰⁰⁾	
88 ~ 216	150	3	150	20log ⁽¹⁵⁰⁾	
216 ~ 960	200	3	200	20log ⁽²⁰⁰⁾	
Above 960	500	3	500	20log ⁽⁵⁰⁰⁾	

Note: RF Voltage(dBuV)=20 log₁₀ RF Voltage(uV)

6.1 EUT Operation

Operating Environment:

Temperature: 23.5 °C
Humidity: 51.1 % RH
Atmospheric Pressure: 101.2kPa

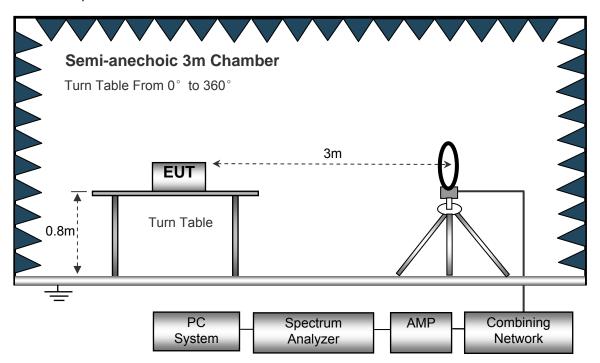
EUT Operation:

The test was performed in transmitting mode, the test data were shown in the report.

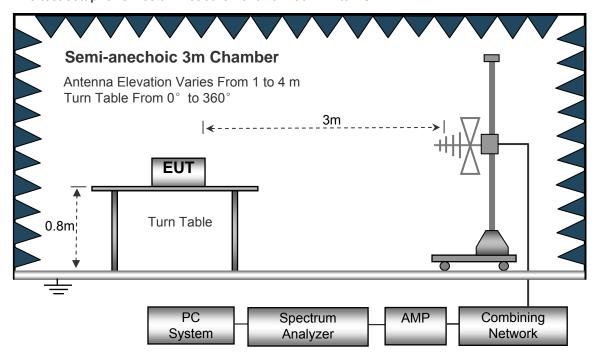
6.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4: 2003.

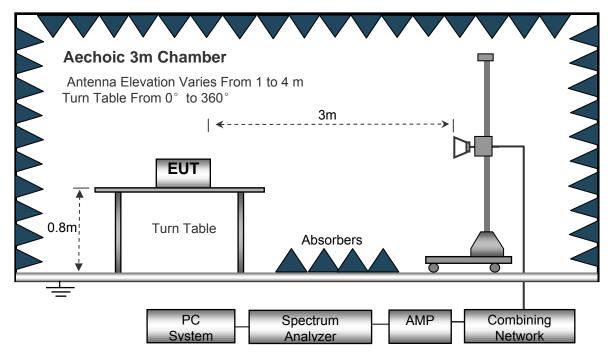
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30MHz to 1GHz.



The test setup for emission measurement above 1 GHz.



6.3 Spectrum Analyzer Setup

Below 30MHz		
	Sweep Speed IF Bandwidth Video Bandwidth	.10kHz
	Resolution Bandwidth	.10kHz
30MHz ~ 1GHz	z	
	Sweep Speed	. Auto
	Detector	.PK
	Resolution Bandwidth	.100kHz
	Video Bandwidth	.300kHz
Above 1GHz		
	Sweep Speed	. Auto
	Detector	.PK
	Resolution Bandwidth	.1MHz
	Video Bandwidth	.3MHz
	Detector	.Ave.
	Resolution Bandwidth	.1MHz
	Video Bandwidth	.10Hz
	Resolution Bandwidth	.1MHz

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6.4 Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane.

- 2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
- 3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions. The spectrum was investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
- 4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- 6. Repeat above procedures until the measurements for all frequencies are complete.
- 7. The radiation measurements are tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.

6.5 Test Result

AV = Peak +20Log10(duty cycle) =PK+(-0.36) [refer to section 8 for more detail]

Test Frequency: 30MHz ~ 10GHz

Test Mode: Transmitting

	Receiver	Turn	RX An	tenna	Correcte	Corrected	FCC F 15.249/2	
Frequency	Reading (PK)	table Angle	Height	Polar	d Factor	Amplitude (PK)	Limit	Margi n
(MHz)	(dBµV)	Degree	(m)	(H/V)	(dB)	(dBµV/m)	(dBµV/m)	(dB)
76.93	15.22	26	1.8	V	8.63	23.85	40.00	-16.15
491.77	14.23	190	1.6	V	21.65	35.88	46.00	-10.12
908.42	63.60	271	1.2	Н	27.26	90.86	114.00	-23.14
908.42	62.45	74	1.3	V	27.26	89.71	114.00	-24.29
2728.10	51.34	68	1.3	Н	-14.78	36.56	74.00	-37.44
2728.10	50.43	328	1.2	V	-14.78	35.65	74.00	-38.35
4546.30	52.19	279	1.8	Н	-3.42	48.77	74.00	-25.23
4546.30	48.36	30	1.9	V	-3.42	44.94	74.00	-29.06
6364.23	47.89	74	1.0	Н	-0.20	47.69	74.00	-26.31
6364.23	46.65	245	1.5	V	-0.20	46.45	74.00	-27.55

		RX Duty cyclo Co		Calculated	FCC Part 15.249/209/205		
Frequency	PK	Antenn a Polar	Duty cycle Factor	AV	Limit	Margin	
(MHz)	(dBµV/m)	(H/V)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
908.42	90.86	Н	-0.36	90.50	94.00	-3.50	
908.42	89.71	V	-0.36	89.35	94.00	-4.65	
2728.10	36.56	Н	-0.36	36.20	54.00	-17.80	
2728.10	35.65	V	-0.36	35.29	54.00	-18.71	
4546.30	48.77	Н	-0.36	48.41	54.00	-5.59	
4546.30	44.94	V	-0.36	44.58	54.00	-9.42	
6364.23	47.69	Н	-0.36	47.33	54.00	-6.67	
6364.23	46.45	V	-0.36	46.09	54.00	-7.91	

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7 Periodic Operation

The duty cycle was determined by the following equation:

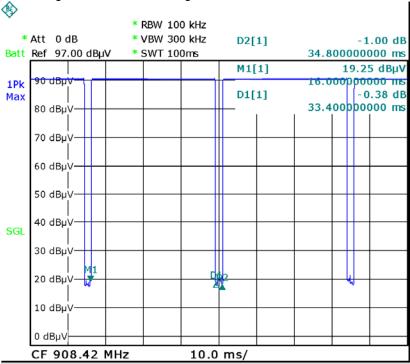
To calculate the actual field intensity, the duty cycle correction factor in decibel is needed for later use and can be obtained from following conversion

Duty Cycle(%)=Total On interval in a complete pulse train/ Length of a complete pulse train * % Duty Cycle Correction Factor(dB)=20 * Log₁₀(Duty Cycle(%))

Total transmission time(ms)	33.4
Length of a complete transmission period(ms)	34.8
Duty Cycle(%)	95.98
Duty Cycle Correction Factor(dB)	-0.36

Refer to the duty cycle plot (as below), This device meets the FCC requirement. Length of a complete pulse train:

Remark: FCC part15.35(c) required that a complete pulse train is more than 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.



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8 Outside of Band Emission

Test Requirement: 15.249(d):Emissions radiated outside of the specified frequency

bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated

emission limits in §15.209, whichever is the lesser attenuation.

Test Method: ANSI C63.4:2003

Test Mode: Transmitting

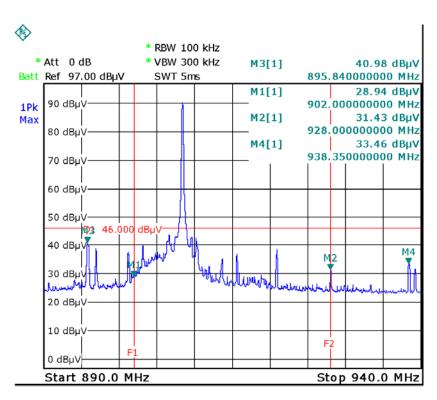
8.1 Test Procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;

Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz, Sweep = auto
 Detector function = peak, Trace = max hold

8.2 Test Result

Test plots



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9 20 dB Bandwidth Measurement

Test Requirement: FCC CFR47 Part 15 Section 15.215(c)

Test Method: ANSI C63.4:2003

Test Mode: Transmitting

9.1 Test Procedure

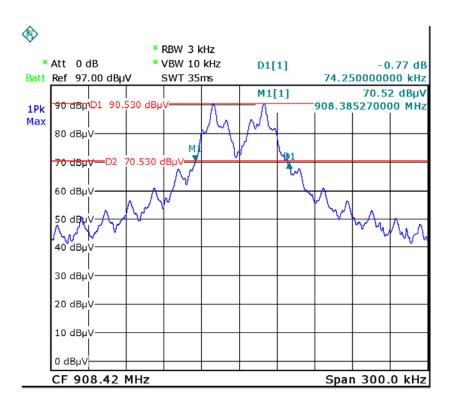
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;

2. Set the spectrum analyzer: RBW = 3kHz, VBW = 10kHz

9.2 Test Result

Test Frequency	Bandwidth
908.42MHz	74.25kHz

Test plots



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10 Antenna Requirement

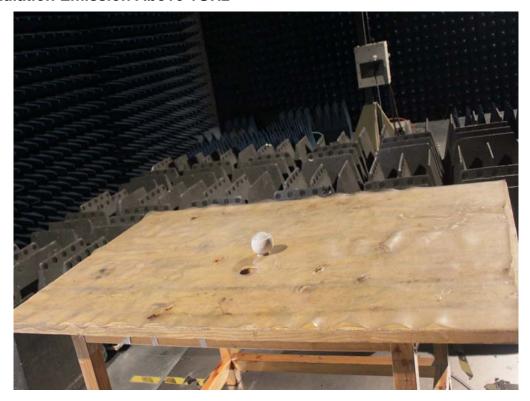
According to the FCC Part 15 Paragraph 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. This product has a Integrated Antenna fulfil the requirement of this section.

11 Photographs- Model ZW074-A Test Setup

11.1 Radiation Emission From 30MHz-1GHz



11.2 Radiation Emission Above 1GHz



12 Photographs - Constructional Details

12.1 ZW074-A - External View





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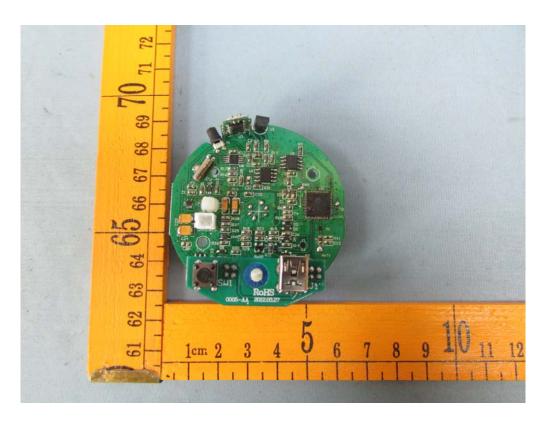
12.2 ZW074-A - Internal View



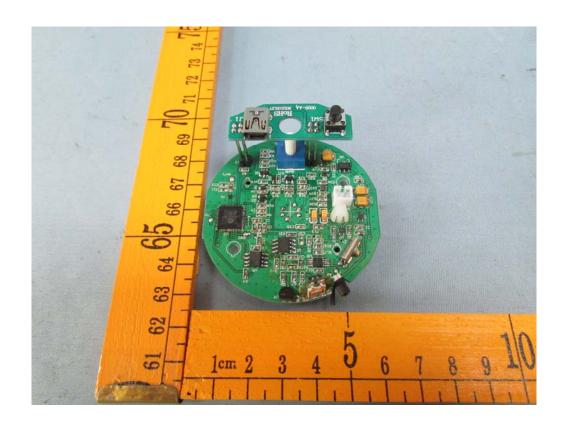


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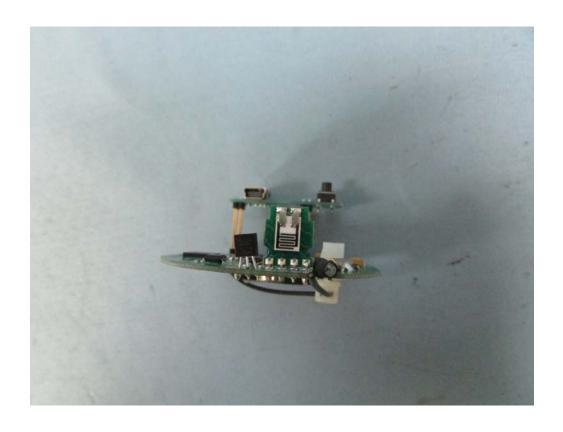


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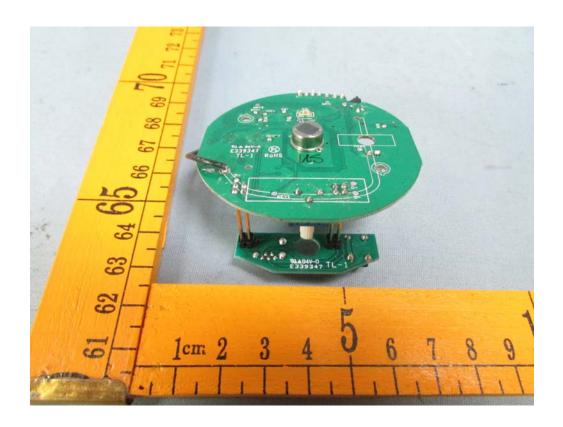


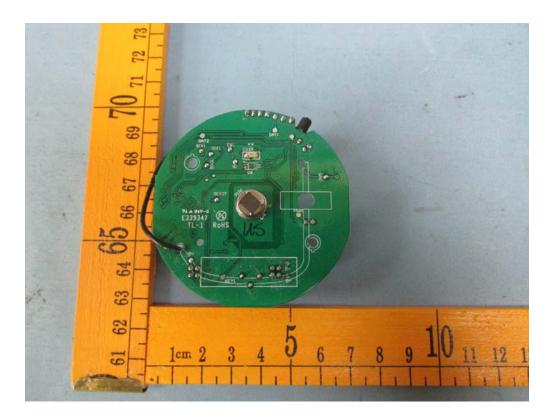


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=====End of Report=====