Electromagnetic Emission

FCC MEASUREMENT REPORT

CERTIFICATION OF COMPLIANCE

FCC Part 15 Certification Measurement

PRODUCT	:	Radar Detector
MODEL/TYPE NO	:	A0101 / Proto-type
FCC ID	:	VWV-A0101
MULTIPLE MODEL	:	-
BRAND NAME	:	-
APPLICANT	:	Adaptiv Technologies, LLC 1639 11th Street, Suite 156, Santa Monica, CA 90404, U.S.A. Attn.: Adam Gold / Director
MANUFACTURER	:	Willtronics Co., Ltd. 301 Kwanlidong, KwangMyung Industrial Complex, 201 Haan-3-Dong, KwangMyung, Kyungki, Korea, 423-063
FCC CLASSIFICATION	:	Unintentional Radiators CRD - Part 15 Radar Detector
RULE PART(S)	:	FCC Part 15 Subpart B
TEST PROCEDURE	:	ANSI C63.4-2003
TEST REPORT No.	:	ETLE110708.0604
DATES OF TEST	:	July 11, 2011
REPORT ISSUE DATE	:	July 19, 2011
TEST LABORATORY	:	ETL Inc. (FCC Designation Number: KR0022)

This Radar Detector, Model A0101 has been tested in accordance with the measurement procedures specified in ANSI C63.4-2003 at the ETL/EMC Test Laboratory and has been shown to be complied with the electromagnetic radiated emission limits specified in FCC Rule Part15 Subpart B:
I attest to the accuracy of data. All measurement herein was performed by me or was made under my supervision and is correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.
The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Prepared by:
Kug Kyoung, Yoon (Test Engineer)
July 19, 2011

Reviewed by:
Yo Han, Park (Chief Engineer)
July 19, 2011

ETL Inc.
#371-51, Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea
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FCC MEASUREMENT REPORT

Scope – *Measurement and determination of electromagnetic emission(EME) of radio frequency devices including intentional radiators and/or unintentional radiators for compliance with the technical rules and regulations of the U.S Federal Communications Commission(FCC)*

General Information

Applicant Name : Adaptiv Technologies, LLC

Address : 1639 11th Street, Suite 156, Santa Monica, CA 90404, U.S.A.

Attention : Adam Gold / Director

- **EUT Type :** Radar Detector
- **Model Number :** A0101
- **FCC ID :** VWV-A0101
- **S/N :** Proto-type
- **Frequency Range :** -
- **Rule Part(s) :** FCC Part 15 Subpart B
- **Test Procedure :** ANSI C63.4-2003
- **FCC Classification :** Unintentional Radiators

  CRD - Part 15 Radar Detector
- **Dates of Tests :** July 11, 2011
- **Place of Tests :** ETL Inc. Testing Lab. (FCC Designation Number : KR0022)

  Radiated Emission test;
  #499-1, Sagot-ri, Seosin-myeon, Hwaseong-si,
  Gyeonggi-do, 445-882, Korea

  Conducted Emission test;
  ETL Inc. Testing Lab. (FCC Designation Number : KR0022)
  371-51, Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea
- **Test Report No. :** ETLE110708.0604

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1. INTRODUCTION

The measurement tests for radiated and conducted emission test were conducted at the ETL Inc. The site is constructed in conformance with the requirements of the ANSI C63.4-2003 and CISPR Publication 16. The ETL has site descriptions on file with the FCC for 3 m and 10 m site configurations. Detailed description of test facility was found to be in compliance with FCC Rules according to the ANSI C63.4-2003 and registered to the Federal Communications Commission (FCC Designation Number : KR0022).

The measurement procedure described in American National Standard for Method of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (ANSI C63.4-2003) was used in determining radiated and conducted emissions from the Adaptiv Technologies, LLC, Model: A0101.

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2. PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the Radar Detector (model: A0101).

2.2 General Specification

General		
Dimensions	65 mm (W) x 118 mm (L) x 42 mm (H)	
Weight	185 g	
Power Requirement	CAR Battery 12 V DC	
Temperature Range	Operating	(30 ± 50) ℃
	Storage	(30 ± 70) ℃
Laser Detector		
Receiver Type	Pulse Laser Signal Receiver	
Sensor Front End	Convex Condenser Lens	
Detector Type	Pulse Width Discriminator	
Receiver Bandwidth	30 MHz	
Spectral Response	800 nm – 1 100 nm	
Radar Detector		
Receiver Type	Double Conversion Super heterodyne	
Detector Type	Scanning Frequency Discriminator	
Antenna Type	Linear Polarization	
Frequency of Operation	10.525 GHz ± 50 MHz (X Band)	
	24.150 GHz ± 100 MHz (K Band)	
	34.700 GHz ± 1 300 MHz (Ka Band)	
Transmitter Frequency (Tx)		
Transmitter	Manual Tx & Semi Auto	
	418.00 MHz	
Modulation	ASK (Amplitude shift keying)	
Transmitter used in device	SAW (surface acoustic wave) RESONATOR	
	NDR4047	
Transmission power	Typ. -25 dBm (< -20 dBm)	
Tolerance of transmission frequency	± 20 ppm	
Modulation contents	Digital data	
Data rate	16 bit/70 ms	

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3. DESCRIPTION OF TESTS

3.1 Radiated Emission Measurement

Radiated emission measurements were made in accordance with section 12, “Measurement of unintentional radiators other than ITE" of ANSI C63.4-2003. The measurements were performed over the frequency range of 11.7 GHz to 12.2 GHz using antenna as the input transducer to a spectrum analyzer. The measurements were made with the detector set for "peak" within a bandwidth of 1 MHz.

Preliminary measurements were made at 3 m using broadband antennas, and spectrum analyzer to determined the frequency producing the maximum emission in shielded room. Appropriate precaution was taken to ensure that all emission from the EUT were maximized and investigated. The system configuration, mode of operation, turntable azimuth and height with respect to the antenna were noted for each frequency found. The spectrum was scanned from Above 1 GHz; linearly polarized double ridge horn antennas were used. Final measurements were made open site at 3 m. A search was made of spectrum from 11.7 GHz to 12.2 GHz the measurements indicate that the unit meets the FCC requirements. Measurements in the 11.7 GHz to 12.2 GHz band were made with a Standard Gain Horn. The measurements in the 11.7 GHz to 12.2 GHz band represent the ambient noise levels. The attached plots were made with peak detector with the analyzer in a maximum hold for 2 minutes. The test equipment was laced on a wooden turn-table. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-examined by manual. The detector function was set to CISPR Quasi-peak mode and the bandwidth of the receiver was set to 120 kHz or 1 MHz depending on the frequency of type of signal. The EUT, support equipment and interconnecting cables were re-configured to the set-up producing the maximum emission for the frequency and were placed on top of a 0.8 m high nonmetallic 1.0 m x 1.5 m table. The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each emission. The turntable containing the system was rotated; the antenna height was varied 1 m to 4 m and stopped at the azimuth or height producing the maximum emission. Each emission was maximized by: varying the mode of operation to the EUT and/or support equipment and changing the polarity of the antenna, whichever determined the worst-case emission.

Photographs of the worst-case emission can be seen in Photographs of the worst-case emission test setup can be seen in Appendix B.

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4. TEST CONDITION

4.1 Test Configuration

The device was configured for testing in a typical fashion (as a customer would normally use it). During the tests, the EUT and the supported equipments were installed to meet FCC requirement and operated in a manner and which tends to maximize its emission level in a typical application.

4.2 EUT operation

- The EUT was connected as user's guide. And during the test executed EUT is operating on the following:

Operating Mode
Stand-by mode
X Band: 10.525 GHz ± 50 MHz
K Band: 24.150 GHz ± 100 MHz
Ka Band (Super-wide): 34.700 GHz ± 1 300 MHz
Laser: 800 nm ~ 1 100 nm

4.3 Support Equipment Used

Description	Model Name	Serial No.	Manufacturer
Laser Generator	NONE	NONE	NONE
Speaker	NONE	NONE	NONE
LED	NONE	NONE	NONE
DC Power Supply	DP30-05A	0300266	Toyo Tech

4.4 Type of Cables Used

Device from	Device to	Type of I/O port	Length[m]	Type of shield
EUT	Speaker	Speaker Line	1.2	Unshielded
EUT	LED	Line	1.2	Unshielded
EUT	Car battery	DC port	1.5	Unshielded
Laser Generator	DC Power Supply	DC port	1.2	Unshielded
DC Power Supply	Power socket	AC Input	1.0	Unshielded

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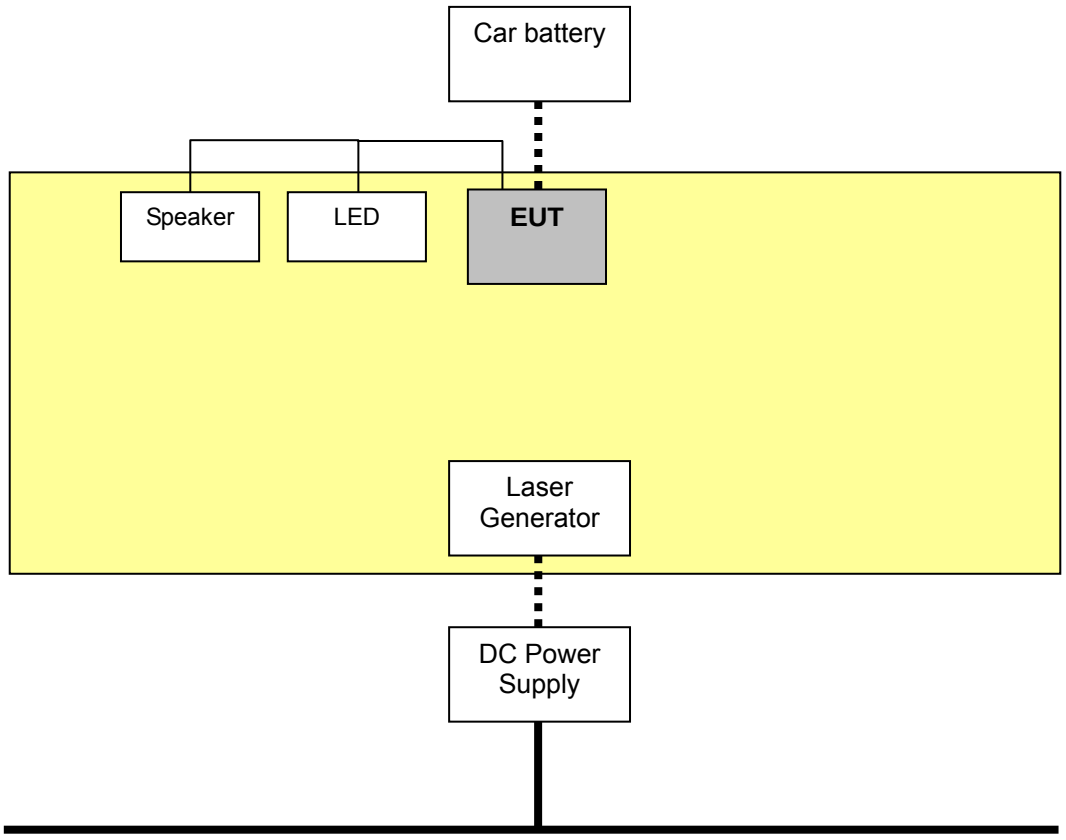
4.5 The setup drawing(s)



: Data Line
: AC Power Line
: DC Power Line
: Adapter

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5. TEST RESULTS

5.1 Summary of Test Results

The measurement results were obtained with the EUT tested in the conditions described in this report. Detailed measurement data and plots showing the maximum emission of the EUT are reported.

FCC Rule	Measurement Required	Result
15.109(h)	Radiated Emission Measurement	**Passed by 12.70 dB**

The data collected shows that the **Adaptiv Technologies, LLC / Radar Detector / A0101** complied with technical requirements of above rules part 15.109(h).

The equipment is not modified anything, mechanical or circuits to improve EMI status during a measurement. No EMI suppression device(s) was added and/or modified during testing.

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5.2 Radiated Emissions Measurement

5.2.1 Radiated Emissions Data

EUT	Radar Detector / A0101 (S/N: Proto-type)
Limit apply to	FCC Part 15.109(h)
Test Date	July 11, 2011
Operating Condition	Operating on the following Bands (X, K, Ka, Laser bands)
Result	Passed by 12.70 dB

Radiated Emission Test Data

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.
Detector mode: Peak mode (Bandwidth: 1 MHz)

Frequency [MHz]	Reading [dB(μV)]	Polarization (*H/**V)	Ant. Factor [dB/m]	Cable Loss [dB]	AMP [dB]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
12 184.00	27.40	V	39.00	13.50	38.60	41.30	54.00	12.70

NOTES:

1. *** H : Horizontal polarization , ** V : Vertical polarization**
2. **Result = Reading + Antenna factor + Cable loss - AMP**
3. **Margin value = Limit - Result**
4. **The measurement was performed for the frequency range 11.7 GHz ~ 12.2 GHz according to the FCC Part 15.109(h).**

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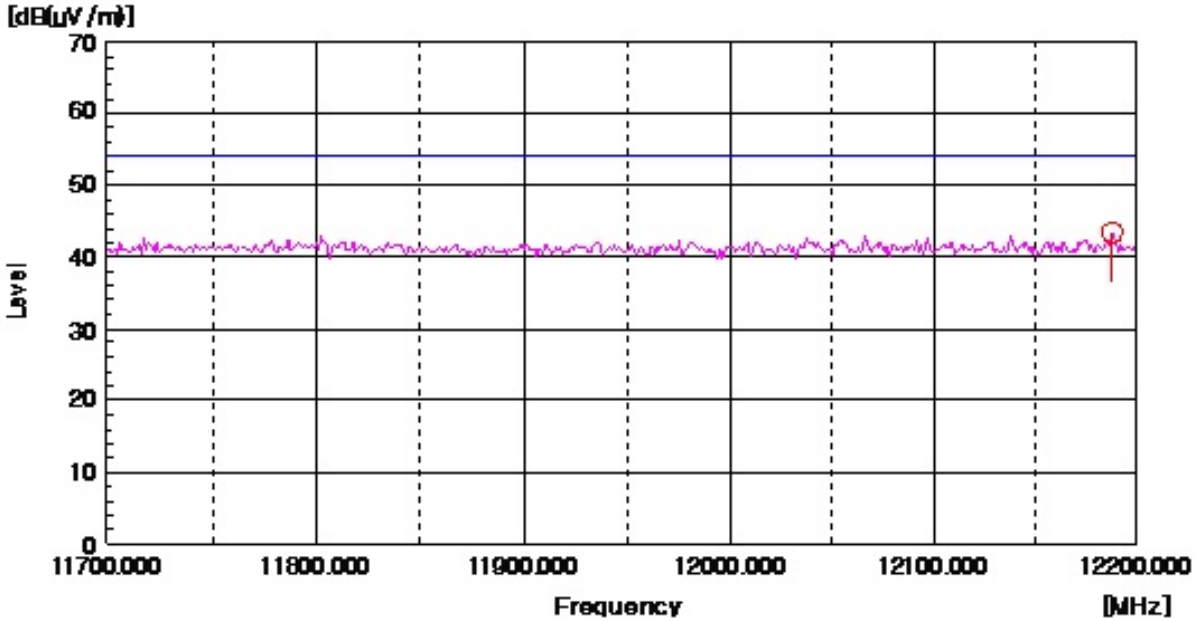
: Limit



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6. SAMPLE CALCULATION

Sample Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and Minus AMP.
The basic equation with a sample calculation is as follows:

FS = RA + AF + CF – AMP

Where FS = Field Strength
RA = Receiver Amplitude
AF = Antenna Factor
CF = Cable Attenuation Factor
AMP = Amp Factor

$dB(\mu V) = 20 \log_{10} (\mu V)$
$dB(\mu V) = dBm + 107$

Example : @ 12 184.00 MHz

Limit = 54.00 dB(μV/m)

Reading = 27.40 dB(μV)

Antenna Factor + Cable Loss – AMP = 39.00 + 13.50 – 38.60 = 13.90 dB(μV/m)

Total = 41.30 dB(μV/m)

Margin = 54.00 – 41.30 = 12.70 dB

= 12.70 dB below Limit

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7. List of test equipments used for measurements

Test Equipment		Model	Mfg.	Serial No.	Cal. Date	Cal. Due Date
☒	Horn Antenna	BBHA 9120D	Schwarzbeck	227	11.03.22	13.03.22
☒	Spectrum Analyzer	E7405A	H.P.	US41160290	10.09.17	11.09.17
☒	Amplifier	AFS42-01001800-28-10P-42	MITEQ Inc.	1565819	11.02.14	12.02.14
☒	Turn-Table	MFT-120S	Max-Full Antenna Corp	-	N/A	N/A
☒	Antenna Master	MFA-440E	Max-Full Antenna Corp	-	N/A	N/A

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