Electromagnetic Emission

F C C M E A S U R E M E N T R E P O R T

CERTIFICATION OF COMPLIANCE

FCC Part 15 Certification Measurement

PRODUCT	:	RADAR DETECTOR
MODEL/TYPE NO	:	TRAXX
FCC ID	:	UCDACDET
APPLICANT	:	K.A.T. Inc. 301 W. Overland Ave., El Paso, TX 79901 United States Attn.: Mr. Michael B Churchman / President
MANUFACTURER	:	ATTOWAVE 1005, 10F Leader's Tower 60-15, Gasan-dong, Geumchun-gu, Seoul, 153-801, Korea
FCC CLASSIFICATION	:	Unintentional Radiators Radar Detector – CRD
FCC RULE PART(S)	:	FCC Part 15 Subpart B
FCC PROCEDURE	:	Certification
TEST REPORT No.	:	ETLE061201.547
DATES OF TEST	:	December 02, 2006
REPORT ISSUE DATE	:	December 13, 2006
TEST LABORATORY	:	ETL Inc. (FCC Registration Number : 95422)

This RADAR DETECTOR, Model TRAXX 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.

Chon Sik, Kim / Chief Engineer

ETL Inc.
#584 Sangwhal-ri, Ganam-myeon, Yoju-gun, Gyeonggi-do, 469-885, Korea
Tel : 82-2-858-0786 Fax : 82-2-858-0788

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Head Office: # 371-51 Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea Tel : 82-2-858-0786 Fax : 82-2-858-0788
EMC Lab : #584 Sangwhal-ri, Ganam-myeon, Yoju-gun, Gyeonggi-do, 469-885, Korea

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 : K.A.T. Inc.

Address : 301 W. Overland Ave., El Paso, TX 79901 United States

Attention : Michael B Churchman / President

- **EUT Type :** RADAR DETECTOR
- **Model Number :** TRAXX
- **FCC ID :** UCDACDET
- **S/N :** N/A
- **FCC Rule Part(s) :** FCC Part 15 Subpart B
- **Test Procedure :** ANSI C63.4-2003
- **FCC Classification :** Unintentional Radiators

  Radar Detector (CRD)
- **Dates of Tests :** December 02, 2006
- **Place of Tests :** ETL Inc.
  EMC Testing Lab. (FCC Registration Number : 95422)
  #584, Sangwhal-ri, Ganam-myeon, Yoju-gun,
  Gyeonggi-do, 469-885, Korea
  Tel : 82-2-858-086 Fax : 82-2-858-0788
- **Test Report No. :** ETLE061201.547

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1. INTRODUCTION

The measurement test for radiated and conducted emission test were conducted at the open area test site of ETL Inc. facility located at #584, Sangwhal-ri, Ganam-myeon, Yoju-gun, Gyeonggi-do, 469-885, Korea. 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 the requirements of Section 2.948 FCC Rules according to the ANSI C63.4-2003 and registered to the Federal Communications Commission (Registration Number : 95422).

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 K.A.T. Inc., Model: TRAXX.

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2. PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the K.A.T. Inc., Model: TRAXX.

2.2 General Specification

RADAR

Receiver Type:	Dual Conversion Superheterodyne
Antenna Type:	Linear Polarized. Self-Contained Antenna
Device Type:	Frequency Discriminator
Frequency of Operation:	10.525GHz/±50MHz(X-Band) 24.150GHz/±100MHz(K-Band) 34.700GHz/±1,300MHz (Ka Super Wideband)

LASER

Receiver Type:	Pulsed Laser Signal Receiver
Device Type:	Digital Signal Processor
Opto Sensor:	Photo Diode with Convex Condenser Lens

ACCELEROMETER SENSOR

3-axis(x,y,z) with error compensation : +/-2g

GENERAL

Temperature Range:	-20°C to + 70°C
Power Requirements:	12~15V DC, 150mA (Negative Ground)
Dimensions HxWxD:	1.2 〃 X 2.9 〃 X 4.6 〃
Weight:	appr. 4.0ounces

*Specifications are typical. Individual units might vary.
Specifications are subject to change without notice.

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3. DESCRIPTION OF TESTS

3.1 Radiated Emission Measurement

Radiated emission measurements were made in accordance with section 11, "Measurement of Information Technology Equipment" of ANSI C63.4-2003. The measurements were performed over the frequency ranges of 30 MHz to 1 GHz and 11,7 GHz to 12,2 GHz using antenna as the input transducer to a spectrum analyzer or a field intensity meter. The measurements were made with the detector set for "Quasi-peak" within a bandwidth of 120 kHz or 1 MHz.

Preliminary measurements were made at 3 m using broadband antennas, and spectrum analyzer to determined the frequency producing the max 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 30 MHz to 1 000 MHz using SchwarzBeck Log-Bicon antenna. Above 1 GHz, linearly polarized double Schwarz Beck broad-band horn antennas were used. Final measurements were made open site at 3 m. A search was made of spectrum from 30 MHz to 1 000 MHz and 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 placed 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 max. Emission for the frequency and were placed on top of a 0,8 m high nonmetallic 1 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 max 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.

Head Office: # 371-51 Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea Tel : 82-2-858-0786 Fax : 82-2-858-0788
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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 Bands: 10,525 GHz ± 50 MHz (X-Band), 24,150 GHz ± 100 MHz (K-Band),
34,700 GHz ± 1 300 MHz (Ka-Band(super-wide))

Operating Mode	The worst operating condition
Stand-by mode	X
10,525 GHz ± 50 MHz (X-Band),	X
24,150 GHz ± 100 MHz (K-Band)	◎
34,700 GHz ± 1 300 MHz (Ka-Band(super-wide))	X

◎: Worst case investigated during the test.

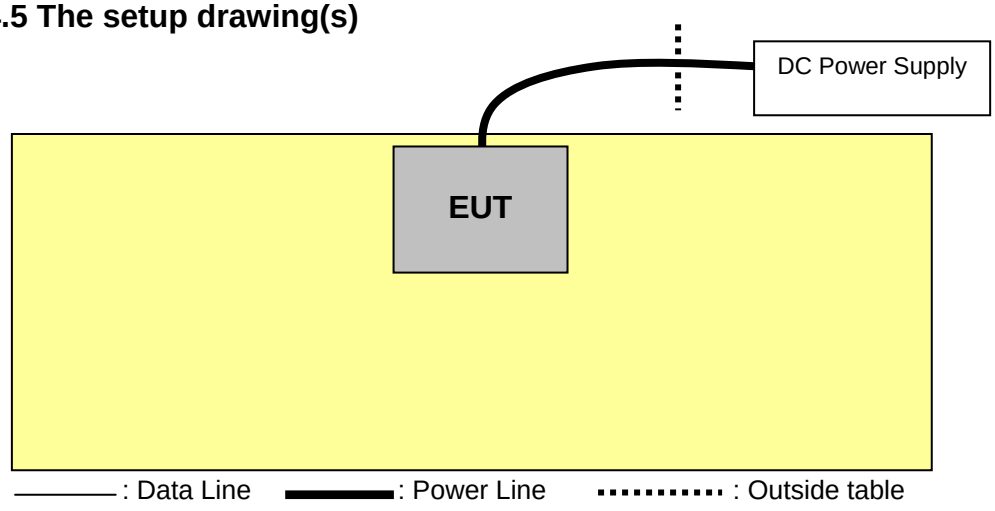
4.3 Support Equipment Used

Description	Model Name	Serial No.	Manufacturer	FCC ID
EUT	TRAXX	NONE	ATTOWAVE	UCDACDET

4.4 Type of Cables Used

Device from	Device to	Type of Cable	Length(m)	Type of shield
EUT	DC Power Supply	DC Input	1,5	Unshielded

4.5 The setup drawing(s)



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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	Radiated Emission Measurement	**No Signal Detected**

The data collected shows that the **K.A.T. Inc. / RADAR DETECTOR / TRAXX** complied with technical requirements of above rules part 15.109.

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. TEST RESULTS

5.3. Radiated Emissions Measurement

EUT	RADAR DETECTOR / TRAXX (SN :N/A)
Limit apply to	FCC Part 15. 109(h)
Test Date	December 02, 2006
Operating Condition	Operating on the following Bands (X,K & Ka bands)
Result	Passed

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 [dBμV]	Polarization (*H/**V)	Ant. Factor [dB/m]	Cable Loss [dBμV]	Emission Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]

No signal detected

NOTES :*** H : Horizontal polarization , ** V : Vertical polarization**

1. **Result = Reading + Antenna factor + Cable loss**
2. **Margin value = Limit - Result level**
3. **The measurement was performed for the frequency range 11,7 GHz – 12,2 GHz according to the FCC Part 15.109(h)**
4. **No signal detected of 11,7 GHz – 12,2 GHz, Refer to plot data**

Test Engineer: Kug Kyoung, Yoon

Head Office: # 371-51 Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea Tel : 82-2-858-0786 Fax : 82-2-858-0788
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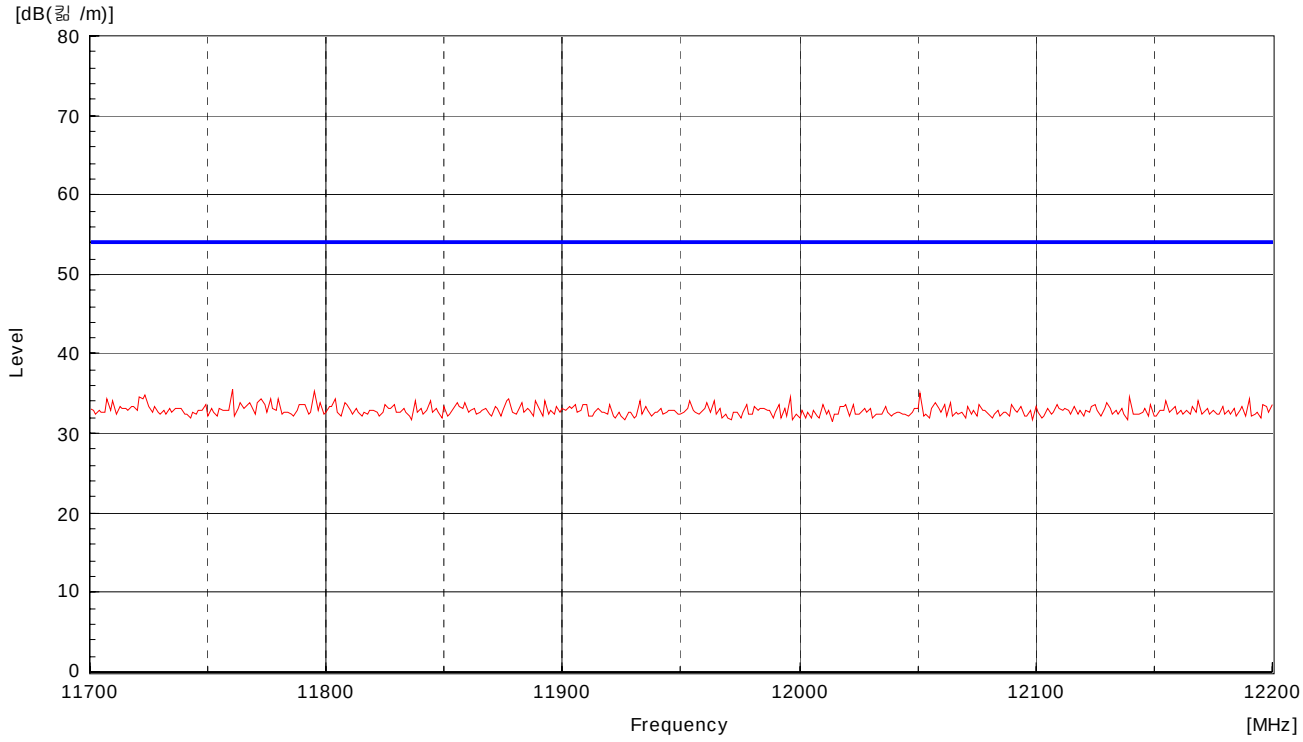
Plot data (Radiated Emissions Measurement of 11,7 GHz ~ 12,2 GHz)



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6. SAMPLE CALCULATION

Sample Field Strength Calculation

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

FS = RA + AF + CF

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

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

Example 1 : @ MHz

Class B Limit

Reading

Antenna Factor + Cable Loss

Total

Margin

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7. List of test equipments used for measurements

Test Equipment		Model	Mfg.	Serial No.	Cal. Due Date
☒	Spectrum Analyzer	E7405A	H.P	US41160290	07-10-17
☒	Horn Antenna	BBHA9120D	Schwarzbeck	227	07-03-31
☒	Turn-Table	DETT-03	Daeil EMC	-	N/A
☒	Antenna Master	DEAM-03	Daeil EMC	-	N/A

End of Test Report

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