EMI TEST REPORT

FCC EVALUATION REPORT FOR CERTIFICATION

KOREA Standard Technology

Test report No.: KST-FCC0633

Applicant's Name	**:**	**AIR WOLF COMPANY INC.**
Applicant's Address	**:**	**2F, 972 Hoge-3dong, dongan-gu, anyang-si, kyonggi-do, S. Korea**
Manufacturer's Name	**:**	**AIR WOLF COMPANY INC.**
Manufacturer's Address	**:**	**2F, 972 Hoge-3dong, dongan-gu, anyang-si, kyonggi-do, S. Korea**

EUT's:

FCC ID	**:**	**TOKAIR-X5100R**
Product Name	**:**	**One Way Car Alarm System**
Model Number(s)	**:**	**Air-X5100R**
Product Options	**:**	**N/A**
Category	**:**	**FCC Part15, Subpart C – Intentional Radiator**

Supplementary Information

The device bearing the brand name and FCC ID specified above has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with measurement procedures specified in ANSI C63.4-2003.

I attest to the accuracy of data and all measurements reported herein were performed by or were made under my supervision and are 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.

Test Date : October 5, 2006	**Issued Date : October 11, 2006**
Tested by: 	**Approved by:** 
Choi, Jae-Rock	**Lee, Weon-Woo**

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Specifications.

1. Description of Device

1) Kind of equipment:	One Way Car Alarm System
2) FCC ID:	TOKAIR-X5100R
3) Model Name:	Air-X5100R
4) Serial No.:	None
5) Type of Sample Tested:	Pre-production
6) High Frequency Used:	8.000 MHz, 433.925 MHz
7) Communication;	FM One-Way
8) Operating Frequency;	FM 433.925 MHz
9) Modulation Type & Deviation;	FSK
10) Power Rating:	DC 3 V DC Battery
11) RF Sensitivity;	-120dBm
12) Tested Power supply:	DC 3 V
13) Dimension;	25(W) x 10(H) x 53(T) mm
14) Date of Manufacture:	October, 2006
15) Manufacture:	AIR WOLF COMPANY INC.
16) Description of Operating:	Pulse code signal with manually
17) Dates of Test:	October 5, 2006
18) Place of Tests:	Korea Standard Technology EMC site
19) Test Report No:	KST-FCC0633

2. Test Facility

The open field test site and conducted measurement facility are used for these testing, where are located following address and drawing. This site was fully described in a report dated November 14, 2002, that was submitted to the FCC.

Korea Standard Technology (KOSTEC Co., Ltd)

Head office & Test Lab ;

:180-254, Annyung-Ri, Taean-Yup, Hwasung-shi, Kyunggi-do, Korea

Telephone Number : 82-31-222-4251
Facsimile Number: 82-31-222-4252

MIC(Ministry of Information and Communication) Number: **KR0041**

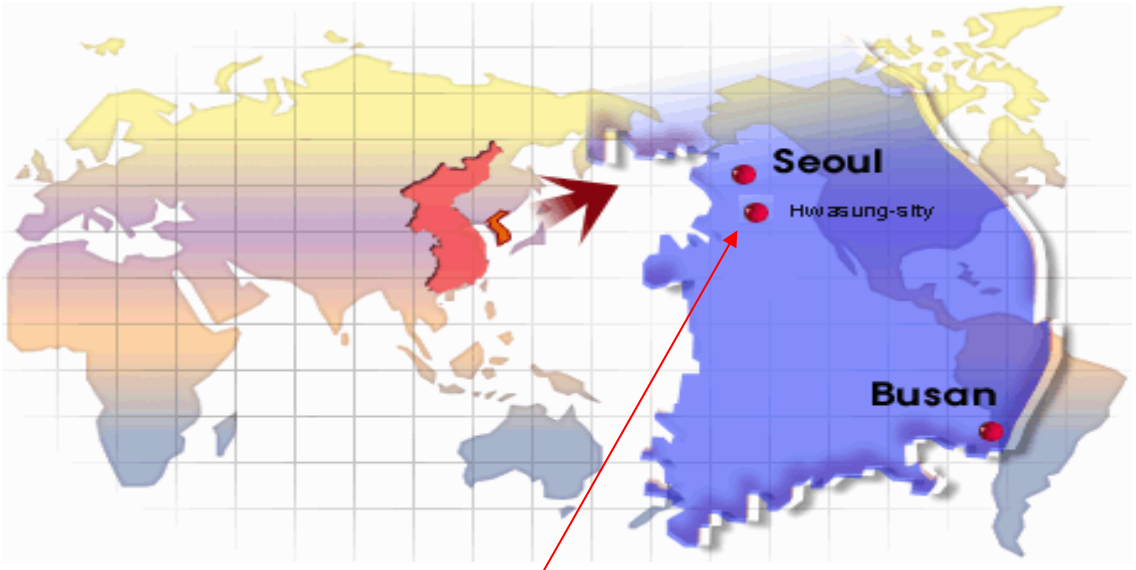
FCC Filing Number. : **525762**

VCCI Membership Number : **2005**

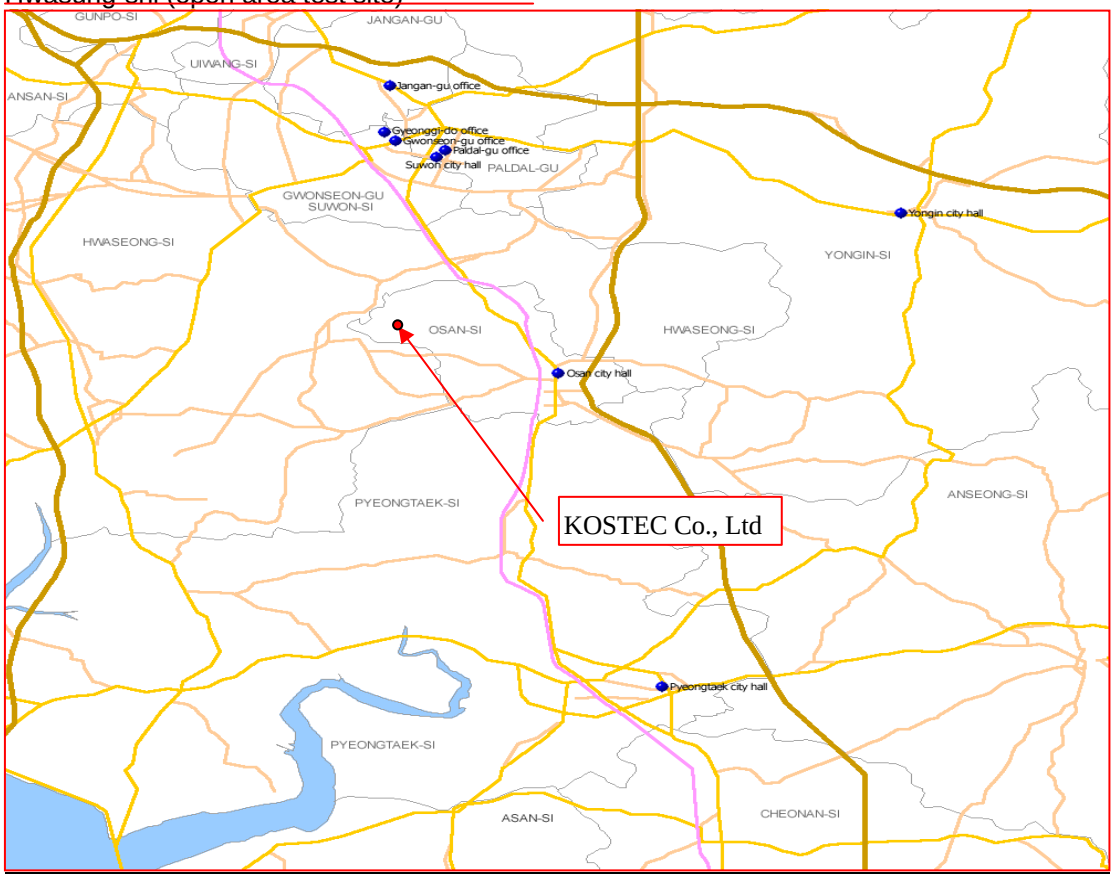
VCCI Registration Number : **R-1657 / C-1763**

3. Route Map of Measurement Facility

Korea



Hwasung-shi (open area test site)



4. Test System Configuration

Operation Environment

Ambient	Temperature (° C)	Humidity (%)	Pressure (hPa)
10 m Open Area site	26	44	1009
Shielded room:	24	41	1009

Test site
These testing were performed following locations ;

Shielded room : Conducted Emission,

10 m Open Area Site: Radiated Emission

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC.
The factors contributing to uncertainties are test receiver, Cable loss, antenna factor calibration, Antenna directivity, antenna factor variation with height, antenna phase center variation, antenna frequency interpolation, measurement distance variation, site imperfection, mismatch, and system repeatability.
Based on NIS 80,81, The measurement uncertainty level with a 95% confidence level were applied.

sample calculation

Conducted emission

The field strength is calculated by adding the LISN factor, cable loss from the measured reading.
The sample calculation is as follows:

FS = MR + LF + CL
MR = Meter Reading
LF = LISN Factor
CL = Cable Loss

If MR is 30 dB, LISN Factor 1 dB, CL 1 dB
The result (MR) is
30 + 1 + 1 = 32 dBuV

7. TEST RESULTS

7.1 Conducted emission

Measurement procedure

Mains
The measurements were performed in a shielded room. EUT was placed on a non-metallic table height of 0.4 m above the reference ground plane. They were folded back and forth forming a bundle 30 cm to 40 cm long and were hanged at a 40 cm height to the ground plane.
Each EUT power lead, except ground (safety) lead, were individually connected through a LISN to input power source.
Both lines of power cord, hot and neutral, were measured.

Used equipment

Equipment	Model no.	Serial no.	Makers	Next cal date	Used
Test receiver	ESPI3	100109	R&S	2007.3.3	●
L.I.S.N.	ESH2-Z5	100044	R&S	2007.5.1	●
	ESH3-Z5	100147	R&S	2007.8.11	●

Measurement uncertainty

Conducted Emission measurement : ± 2.4 (K=2)

Test data

- **Not Application**
- Use to DC 3 V Battery.

7.2 Radiated Emission

Measurement procedure

A pretest was performed at 3 m distances in a semi-anechoic chamber for searching correct frequency.
The final test was done at a 10 m open area test site with a quasi-peak detector.
EUT was placed on a non-metallic table height of 0.8 m above the reference ground plane.
Cables connected to EUT were fixed to cause maximum emission.
Test was made with the antenna positioned in both the horizontal and vertical planes of polarization.
The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.

Used equipment

Equipment	Model no.	Serial no.	Makers	Next cal date
Test receiver	ESCS30	100111	R&S	2007.3.06
Ultra broadband antenna	HL562	100075	R&S	2007.3.23
Matching network	RAM	358.5414.02	R&S	-
Antenna Mast	AT14	none	Daeil EMC	-
Turn Table	TT15	none	Daeil EMC	-
10m Open area site	none	none	KOSTEC Lab	-
chamber(3 m)	none	none	FRANCONIA	-

Measurement uncertainty

Radiated Emission measurement :

30-300 MHz +3.96 dB / -4.04 dB

300-1000 MHz +3.04 dB / -3.00 dB

Radiated Limits per section 15.231 ;

Fundamental Frequency (MHz)	Field Strength of Fundamental (microvolts/meter) μV	Field Strength of Spurious Emissions (microvolts / meter) μV
40.66 ~ 40.70	2250	225
70 ~ 130	1250	125
130 ~ 174	1250 ~ 3750	125 ~ 375
174 ~ 260	3750	375
260 ~ 470	3750 ~ 12500	375 ~ 1250
470 & above	12500	1250

Test data

< Part 15.231 – TX Mode >

Freq (MHz)	Reading (dBμV/m)	P (H/V)	Antenna (dB)	Cable Loss (dB)	Result(P) (dBμV/m)	Result(A) (dBμV/m)	Limit (dBμV/m)	Margin (dB)
433.925	47.28	H	14.19	7.73	69.80	69.20	80.8	11.60
867.850	21.66	H	20.17	11.27	54.10	53.10	60.8	7.70
1301.775	11.00	H	24.60	13.40	50.10	49.00	54.0	5.00
1735.700	9.50	H	26.30	15.80	53.70	51.60	60.8	9.20
2169.625	8.40	H	28.10	17.90	58.60	54.40	60.8	6.40
2603.550	6.60	H	30.10	20.30	57.90	57.00	60.8	3.80

Reading = Test receiver reading / P= antenna Polarization / H=antenna H
A=turn table Angle / Antenna = antenna factor / Cable loss = used cable loss
Result = reading + antenna + loss / Margin = Limit - result
* Receiving Antenna Mode: Horizontal, Vertical / * Test site: 3 m Open area site

Note ; These frequencies fall under restricted bands according to section 15.205.

The field strength of emissions at these frequencies does not exceed the limits specified in Section 15.205.

dBuV = 20log10(μV/m)

dBuV = dBm + 107

Calculation of Limit at 434 MHz per Section 15.231 as follows;

260 MHz - 3750 μV/m / 470 MHz - 12500 μV/m

$$\frac{12500-3750}{470-260} = \frac{8750}{210}$$

$$\frac{(434-260)\times(8750)}{210} = 7250\ \mu V/m$$

7250 + 3750 = 11000 μV/m (80.8 dBμV) Limit at 434 MHz.

7.3 Occupied Bandwidth Measurement

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz.
The bandwidth is determined at the points 20 dB down from the modulated carrier.

Carrier Frequency - 400 MHz

400 MHz x 0.0025 = 1.085 MHz

Graph is as follows;

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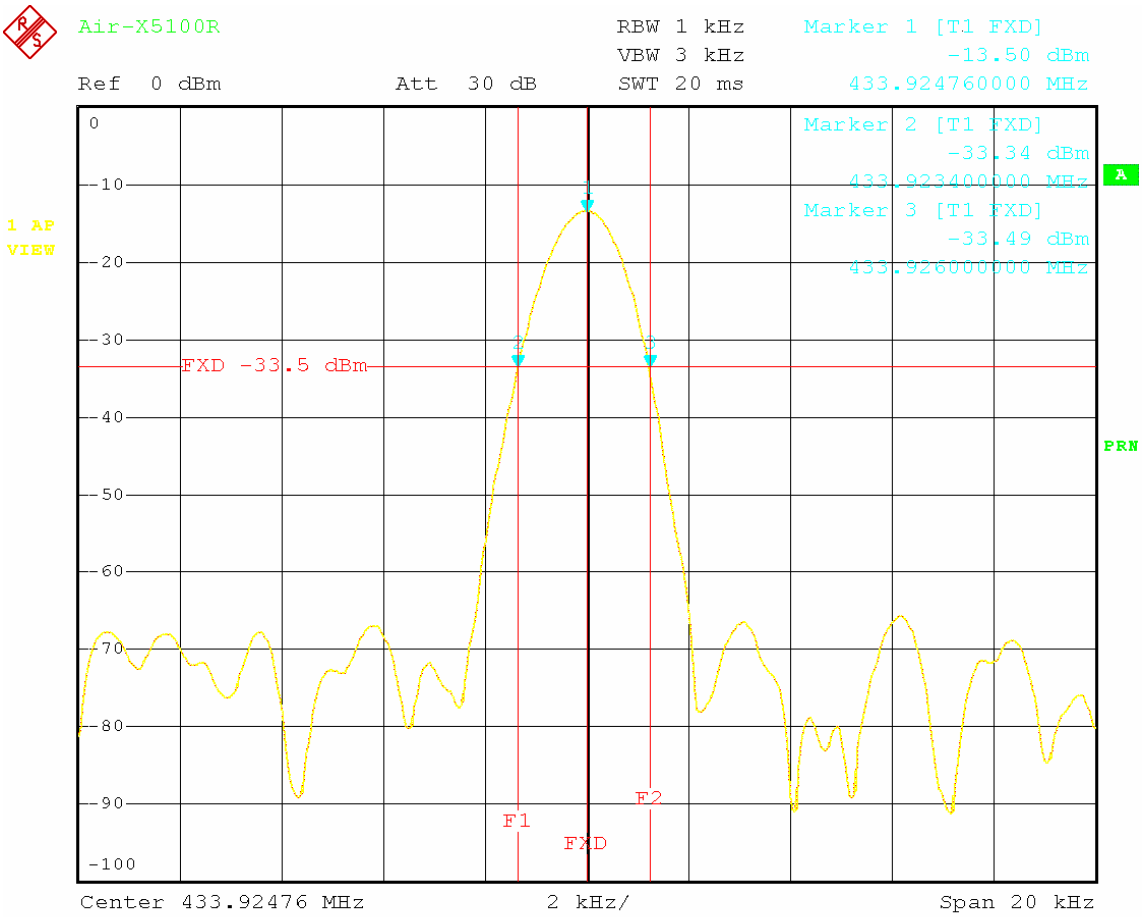
Occupied Bandwidth



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