

TEST REPORT For FCC

Test Report No. : TK-FR10007

Date of Issue : 02/04/2010

Description of Product : EAS(Electronic Article Surveillance)

Model No. : AM-MS1

Applicant : **YOUNGIL ELECTRONICS CO., LTD.**
898-27 Hogae-Dong, Dongan-Gu, Anyang-City,
Kyunggi-Do, Korea

Manufacturer : **YOUNGIL ELECTRONICS CO., LTD.**
898-27 Hogae-Dong, Dongan-Gu, Anyang-City,
Kyunggi-Do, Korea


Standards : FCC Part 15 Subpart C

Test Date : 01/27/2010 ~ 02/04/2010

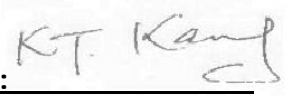
Test Results : ☒ PASS ☐ FAIL

The test results relate only to the items tested.

Tested by:


Kyu-Chul Shin
Test Engineer
Date:02/04/2010

Reviewed by:


KT Kang
Technical Manager
Date: 02/04/2010

THRU-KES CO.,LTD.

477-6, Hager-Ri, Yaju-Up, Yaju-Gun Kyunggi-Do, 469-803, Korea
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1.0 General Product Description

Product	: EAS(Electronic Article Surveillance)
Equipment model name	: AM-MSC1
Serial number	: Prototype
Antenna designation	: Internal Fixed Antenna
Antenna type	: Loop Antenna
Frequency Range	: 58KHz
Number of channels	: 1
Operating Voltage	: AC 115V

1.1 Model Differences

Not applicable

1.2 Device Modifications

Not applicable

1.3 EUT Configuration(s)

The following peripheral devices and/or interface cables were connected during the measurement:

☒ Peripheral Devices

Device	Manufacturer	Model No.	Serial No.	FCC ID or DoC
EUT	YOUNGIL ELECTRONICS CO., LTD.	AM-MS1	-	-

1.4 EUT Exercise

The calibrated antennas used to sample the radiated field strength are mounted on a non-conductive, motorized antenna mast 3 or 10 meters from the leading edge of the turntable.

1.5 EUT Operating Mode(s)

Equipment under test was operated during the measurement under the following conditions:

- | | |
|--|--|
| <input type="checkbox"/> Standby | <input type="checkbox"/> Scrolling 'H' |
| <input type="checkbox"/> Display circles pattern | <input type="checkbox"/> Read / Write |
| <input checked="" type="checkbox"/> Practice operation | |

1.6 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable to the Korea Research Institute of Standards and Science (KRISS), therefore, all test data recorded in this report is traceable to KRISS.

1.7 Test Facility

THRU-KES Co.,Ltd. (Test Site # : 343818)
477-6, Hager-Ri, Yoju-Up, Yoju-Gun Kyunggi-Do,469-803, Korea

1.8 Measurement Procedure

Preliminary radiated emissions test were performed open site (Distance of antenna and EUT was 3 m). To find worst mode, several typical mode and typical cable position were tested and peak level and frequency were recorded.

Final radiated emissions test was performed Open Area Test Site. Based on the preliminary tests of the EUT, final test was proceeded worst case test mode and cable configuration.

* Measurement procedures was In accordance with ANSI C63.4,ANSI C63.7

2.0 Emissions Test Regulations

The emissions tests were performed according to following regulations:

- | | | |
|---|--|--|
| <input type="checkbox"/> EN 61000-6-3:2001 | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> EN 61000-6-4:2001 | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> EN 50083-2:2001 | | |
| <input type="checkbox"/> EN 55011:1998 +A1:1999 +A2:2002 | <input type="checkbox"/> Group 1
<input type="checkbox"/> Class A | <input type="checkbox"/> Group 2
<input type="checkbox"/> Class B |
| <input type="checkbox"/> EN 55013:2001 +A1:2003 | | |
| <input type="checkbox"/> EN 55014-1:2000 +A1:2001 +A2:2002 | | |
| <input type="checkbox"/> EN 55015:2000 +A1:2001 +A2:2002 | | |
| <input type="checkbox"/> EN 61204-3:2000 | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> EN 55022:1994 +A1:1995 +A2:1997 | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> EN 55022:1998 | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> EN 55022:1998 +A1:2000 | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> EN 55022:1998 +A1:2000 +A2:2003 | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> EN 61000-3-2:2000 | | |
| <input type="checkbox"/> EN 61000-3-3:1995 +A1:2001 | | |
| <input type="checkbox"/> VCCI V-3/2004.04 | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> AS/NZS 3548:1995 +A1:1997 +A2:1997 | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input checked="" type="checkbox"/> FCC Part 15 Subpart C | | |
| <input type="checkbox"/> CISPR 22:1997 | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> CISPR 22:1997 +A1:2000 | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |

The unit was tested to CISPR 22 and complied with the alternate methods allowed by FCC under paragraphs 15.107 and 15.109.

2.1 Radiated Electric Field Emissions

TEST PROCEDURE

ANSI C63.4

The highest clock frequency generated or used in the is 20MHz, therefore the frequency range was investigated from 9KHz to 1000MHz

LIMIT

15.209(a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Limits for radiated disturbance of an intentional radiator		
Frequency range(MHz)	Limits($\mu\text{V}/\text{m}$)	Measurement Distance(m)
0.009-0.490	2400/F(KHz)	300
0.490-1.705	24000/F(KHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72MHz 76-88MHz, 174-216MHz or 470-806MHz, However, operation within these frequency bands is permitted under other sections of this part, e.g. §§ 15.231 and 15.241.

§15.209(b) In the emission table above, the tighter limit applies at the band edges.

In addition:

§15.209(d) The emission limits shown the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90KHz, 110-490KHz and above 1000MHz.

Radiated emissions limits in these three bands are based on measurements employing an average detector

§15.209(d) The provisions in §§15.31, 15.33, and 15.35 for measuring emissions at distances other than the distances specified in the above table, determining the frequency range over which radiated emissions are to be measured, and limiting peak emissions apply to all devices operated under this part.

RESULTS

No non-compliance noted:

SPURIOUS EMISSIONS 30 TO 1000MHz

Test Results

EUT	EAS(Electronic Article Surveillance)	Measurement Detail	
Model	AM-MS1	Frequency Range	Below 1000MHz
Channel	Normal linking	Detector function	Quasi-Peak

The requirements are:

☒ Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
442.80	38.3	7.7	Quasi-Peak

Test Data

No	Emission Frequency (MHz)	Meter Reading dBuV/m	Ant. Polarity	Correction Factor dB	Cable Loss dB	Field Strength (dBuV/m)	Margin (dBuV)	Limit (dBuV/m)
1	74.10	18.0	H	10.2	3.1	31.3	8.7	40.0
2	86.52	19.0	H	9.4	2.4	30.8	9.2	40.0
3	118.50	21.1	V	12.1	2.4	35.5	8.0	43.5
4	135.80	16.8	H	13.2	2.5	32.4	11.1	43.5
5	194.00	20.5	V	10.3	2.8	33.5	10.0	43.5
6	209.80	20.8	V	10.1	2.9	33.8	12.2	46.0
7	283.50	18.9	H	12.4	3.2	34.5	11.5	46.0
8	283.50	18.7	V	12.4	3.2	34.3	11.7	46.0
9	291.30	18.5	H	12.6	3.3	34.3	11.7	46.0
10	307.30	18.5	H	12.9	3.4	34.7	11.3	46.0
11	403.50	19.4	V	14.8	4.0	38.2	7.8	46.0
12	442.80	18.7	H	15.6	4.0	38.3	7.7	46.0

SPURIOUS EMISSIONS 0.009 TO 30MHz

Test Results

EUT	EAS(Electronic Article Surveillance)	Measurement Detail	
Model	AM-MS1	Frequency Range	0.009KHz ~ 30MHz
Channel	Normal linking	Detector function	Pk/AV

The requirements are:

☒ Complies

Frequency (MHz) PK/AV	Measured Data (dBuV/m) PK/AV	Margin(dB) PK/AV	Remark
442.80	38.3	7.7	PK/AV

Test Data

*Loop Antenna Face On

Frequency [MHz]	Reading PK [dBuV]	Reading AV [dBuV]	PK Limit [dBuV/m]	AV Limit [dBuV/m]	Margin PK [dBuV/m]	Margin AV [dBuV/m]	Notes
0.058	43.56	21.46	52.34	32.34	8.78	10.88	Extrapolated to 300m
0.115	5.36	-5.84	46.39	26.39	41.03	32.23	10m distance
0.174	5.66	-7.94	42.79	22.79	37.13	30.73	10m distance
0.231	-3.94	-14.01	40.33	20.33	44.27	34.34	10m distance
0.289	-5.04	-15.74	38.38	18.38	43.42	34.12	10m distance
0.346	-11.44	-18.74	36.83	16.83	48.27	35.57	10m distance

2.2 Conducted Voltage Emissions – 15.207

TEST PROCEDURE

ANSI C63.4

LIMIT

§15.207 (a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN).

Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

Test Results

The requirements are:

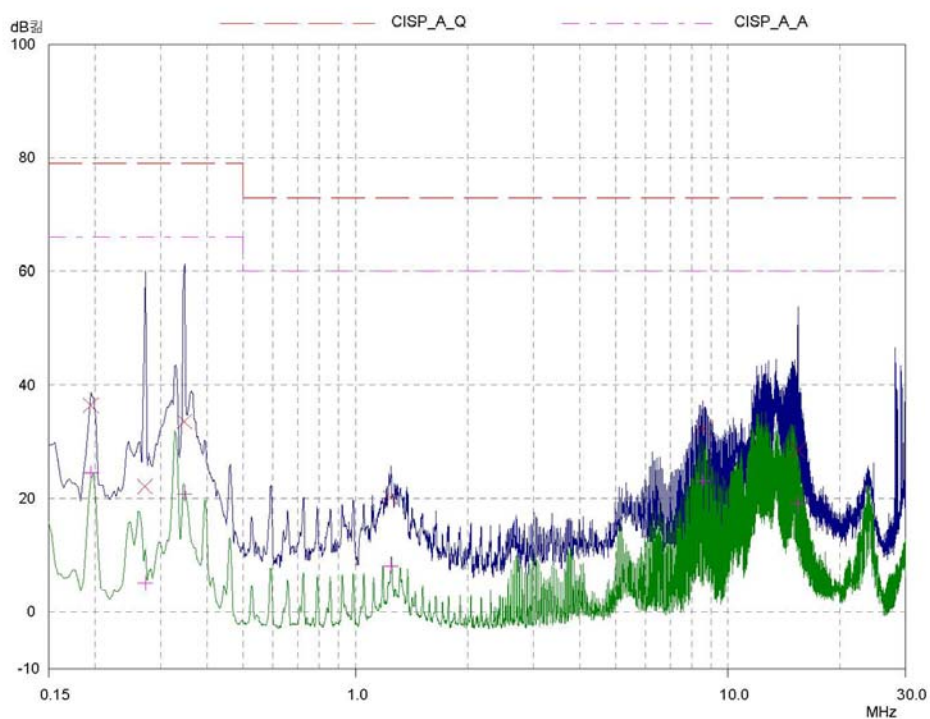
☒ Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
0.15	48.25	5.77	Quasi-Peak

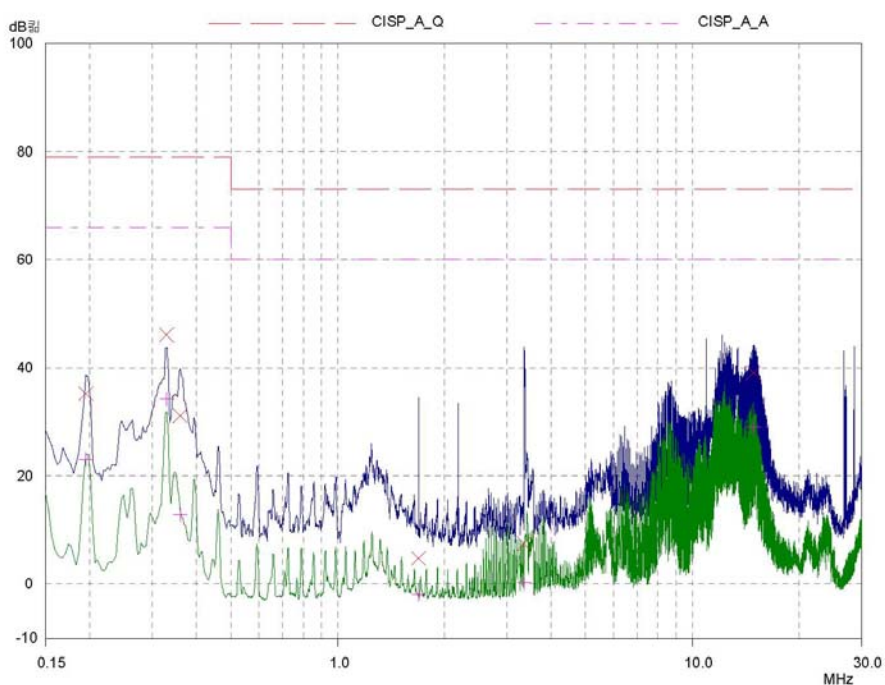
Test Data

Frequency [MHz]	Correction Factor		Line	Quasi-peak			Average		
	LISN	Cable		Limit	Reading	Result	Limit	Reading	Result
0.150	0.08	0.10	H	56.0	48.07	48.25	46.0	28.59	28.77
0.150	0.12	0.10	N	56.0	50.01	50.23	46.0	30.61	30.83
0.357	0.05	0.10	H	56.0	37.89	38.04	46.0	26.64	26.79
0.363	0.06	0.10	N	56.0	38.11	38.27	46.0	27.79	27.95
0.495	0.05	0.10	H	56.0	32.82	32.97	46.0	13.25	13.40
0.495	0.05	0.10	N	56.0	34.26	34.41	46.0	16.10	16.25
0.840	0.05	0.04	N	56.0	38.48	38.57	46.0	21.74	21.83
1.431	0.06	0.03	H	56.0	38.77	38.86	46.0	20.35	20.44
1.875	0.06	0.01	H	56.0	36.63	36.70	46.0	19.24	19.31
2.142	0.07	0.04	N	56.0	39.69	39.80	46.0	20.46	20.57
2.145	0.06	0.04	H	56.0	40.85	40.95	46.0	22.82	22.92
3.000	0.08	0.10	N	56.0	36.98	37.16	46.0	17.93	18.11
6.798	0.17	0.09	H	60.0	29.81	30.07	50.0	17.60	17.86
8.661	0.27	0.02	H	60.0	28.44	28.73	50.0	23.08	23.37
8.661	0.28	0.02	N	60.0	28.16	28.46	50.0	21.74	22.04
15.033	0.56	0.10	N	60.0	28.15	28.81	50.0	19.46	20.12
15.456	0.52	0.10	H	60.0	27.49	28.11	50.0	18.98	19.60
24.006	1.13	0.12	N	60.0	27.15	28.40	50.0	24.30	25.55

[HOT]



[NEUTRAL]



APPWNDIX A –Test Equipment Used For Tests

No	Description	Manufacturer	Model No.	Serial No.	Due Cal.
1	Test Receiver	Rohde & Schwarz	ESHS 10	862970/018	2010.06.11
2	Test Receiver	Rohde & Schwarz	ESVS 10	826008/014	2010.05.20
3	Spectrum Analyzer	Hewlett Packard	8566B	2311A02394	2010.05.15
4	Spectrum Analyzer	Advantest	R3273	101008536	2010.05.15
5	Modulation Analyzer	Hewlett Packard	8901B	3438A05094	2010.05.15
6	Audio analyzer	Hewlett Packard	8903B	3011A12915	2010.05.15
7	Preamplifier	Hewlett Packard	8447F	2805A02570	2010.05.15
8	Preamplifier	A.H. Systems	PAM-0118	164	2010.04.17
9	Signal Generator	Hewlett Packard	8673D	2708A00448	2010.05.15
10	Power Meter	Hewlett Packard	437B	312U24787	2010.04.21
11	Power Sensor	Hewlett Packard	8482B	3318A06943	2010.05.15
12	Loop Antenna	Rohde & Schwarz	HFH2-Z2.335.4711.52	826532/006	2011.02.06
13	Dipole Antenna	Rohde & Schwarz	VHAP	574	2010.07.07
14	Dipole Antenna	Rohde & Schwarz	VHAP	575	2010.07.17
15	Dipole Antenna	Rohde & Schwarz	UHAP	545	2010.07.17
16	Dipole Antenna	Rohde & Schwarz	UHAP	546	2010.07.07
17	Biconical Antenna	Eaton Corp.	94455-1	0977	2010.07.03
18	Biconical Antenna	EMCO	3104C	9111-2468	2010.07.03
19	Log Periodic Antenna	EMCO	3146	2051	2010.06.05
20	Log Periodic Antenna	EMCO	3146	8901-2320	2010.07.03
21	Horn Antenna	A.H. Systems	SAS-571	414	2011.03.16
22	LISN	EMCO	3810/2	2228	2010.05.156
23	Waveform Generator	Hewlett Packard	33120A	US34001190	2010.05.15
24	Digital Oscilloscope	Tektronix	TDS 340A	B012287	2010.05.15
25	Dummy Load	Bird Electronics	8251	11511	2010.04.17