



# ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR FCC CERTIFICATION

Test report file number : E039R-035

Applicant : KI RYUNG ELECTRONICS CO., LTD.

Address : 219-6 Gasan-Dong, Kumchun-Ku, Seoul, 153-023, KOREA

Manufacturer : KI RYUNG ELECTRONICS CO., LTD.

Address : 219-6 Gasan-Dong, Kumchun-Ku, Seoul, 153-023, KOREA

Type of Equipment : FM Modulator for Sirius Satellite Receiver

FCC ID. : P3HKPA-H2CFM

Model Name : KPA-H2CFM

Multiple Model Name : N/A

Serial number : N/A

Total page of Report : 14 pages (including this page)

Date of Incoming : September 15, 2003

Date of Issuing : September 24, 2003

## SUMMARY

The equipment complies with the regulation of **FCC CRF 47 PART 15, SUBPART C, SECTION 15.239**.

This test report contains only the results of a single test of the sample supplied for the examination. It is not a general valid assessment of the features of the respective products of the mass-production.

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FCC-003 (Rev.0)

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**CONTENTS**

	Page
<b>1. VERIFICATION OF COMPLIANCE .....</b>	<b>3</b>
<b>2. GENERAL INFORMATION.....</b>	<b>4</b>
<b>2.1 PRODUCT DESCRIPTION.....</b>	<b>4</b>
<b>2.2 MODEL DIFFERENCES.....</b>	<b>4</b>
<b>2.3 RELATED SUBMITTAL(S) / GRANT(S) .....</b>	<b>4</b>
<b>2.4 TEST SYSTEM DETAILS .....</b>	<b>4</b>
<b>2.5 TEST METHODOLOGY .....</b>	<b>5</b>
<b>2.6 TEST FACILITY .....</b>	<b>5</b>
<b>3. SYSTEM TEST CONFIGURATION.....</b>	<b>6</b>
<b>3.1 JUSTIFICATION .....</b>	<b>6</b>
<b>3.2 EUT EXERCISE SOFTWARE .....</b>	<b>6</b>
<b>3.3 CABLE DESCRIPTION .....</b>	<b>6</b>
<b>3.4 NOISE SUPPRESSION PARTS ON CABLE .....</b>	<b>6</b>
<b>3.5 EQUIPMENT MODIFICATIONS .....</b>	<b>7</b>
<b>3.6 CONFIGURATION OF TEST SYSTEM .....</b>	<b>7</b>
<b>3.7 ANTENNA REQUIREMENT .....</b>	<b>7</b>
<b>4. PRELIMINARY TEST .....</b>	<b>8</b>
<b>4.1 AC POWER LINE CONDUCTED EMISSION TEST .....</b>	<b>8</b>
<b>4.2 RADIATED EMISSION TEST .....</b>	<b>8</b>
<b>5. FINAL RESULT OF MEASUREMENT .....</b>	<b>9</b>
<b>5.1 RADIATED EMISSION TEST (WITHIN THE PERMITTED 200KHZ BAND).....</b>	<b>9</b>
<b>5.2 RADIATED EMISSION TEST (OUTSIDE OF THE SPECIFIED 200KHZ BAND) .....</b>	<b>10</b>
<b>5.3 BANDWIDTH OF THE OPERATING FREQUENCY .....</b>	<b>11</b>
<b>6. FIELD STRENGTH CALCULATION .....</b>	<b>13</b>
<b>7. LIST OF TEST EQUIPMENT .....</b>	<b>14</b>

**1. VERIFICATION OF COMPLIANCE**

- . APPLICANT : KI RYUNG ELECTRONICS CO., LTD.  
- . ADDRESS : 219-6 Gasan-Dong, Kumchun-Ku, Seoul, 153-023, KOREA  
- . CONTACT PERSON : Mr. In-Kyoung, Kim / Q.C Assistant Manager  
- . TELEPHONE NO : +82-2-3282-2264  
- . FCC ID : P3HKPA-H2CFM  
- . MODEL NO/NAME : KPA-H2CFM  
- . SERIAL NUMBER : N/A  
- . DATE : September 24, 2003

DEVICE TYPE	Low Power Communication Device Transmitter
E.U.T. DESCRIPTION	FM Modulator for Sirius Satellite Receiver
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	Charter 13 of ANSI C63.4: 1992
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	CERTIFICATION
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SECTION 15.239
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	No
FINAL TEST WAS CONDUCTED ON	3 METER OPEN AREA TEST SITE

- . This device has shown compliance with the conducted emissions limits in 15.107 adopted under FCC 02-107 (ET Docket 98-80). The device may be marketed after July 11, 2005 affected by the 15.37(j) transition provisions.
- . The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.



## 2. GENERAL INFORMATION

### 2.1 Product Description

The KI RYUNG ELECTRONICS CO., LTD., Model KPA-H2CFM (referred to as the EUT in this report) is FM Modulator for Sirius Satellite Receiver that can transmit from 88.1 MHz to 88.7 MHz for audio signal of FM radio receiver. Product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Plastic
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	7.6MHz
POWER REQUIREMENT	DC12V from a Car Battery
TX FREQUENCY RANGE	88.1 MHz ~ 88.7 MHz
NUMBER OF LAYERS	2 Layers
EXTERNAL CONNECTOR	Ant. Input (TERR, SAT(MAIN)), Audio Out, DC In, FM Output, I/O connector

### 2.2 Model Differences

- The difference(s) compared to the EUT is as follows: none

### 2.3 Related Submittal(s) / Grant(s)

- Original submittal only

### 2.4 Test System Details

The model numbers for all the equipments which were used in the tested system is:

Model	Manufacturer	FCC ID	Description	Connected to
KPA-H2CFM	KI RYUNG ELECTRONICS CO., LTD.	P3HKPA-H2CFM	FM Modulator for Sirius Satellite Receiver(EUT)	-
-	-	N/A	BATTERY for Vehicle	EUT
-	-	N/A	External Antenna	EUT
-	-	N/A	Headphone	EUT



## 2.5 Test Methodology

Radiated testing was performed according to the procedures in chapter 13 of ANSI C63.4: 1992. Radiated testing was performed at a distance of 3 meters from EUT to the antenna.

## 2.6 Test Facility

The open area test site and conducted measurement facilities are located on at 426-1 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-080 Korea. Description details of test facilities were submitted to the Commission on January 18, 2002. (Registration Number: 92819)



### 3. SYSTEM TEST CONFIGURATION

#### 3.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
KPA-H2CFM Board	KI RYUNG ELECTRONICS CO., LTD.	FM TRANSMITTER	N/A
KPA-H2CFM I/O Board	KI RYUNG ELECTRONICS CO., LTD.	FM-TRANS	N/A

#### 3.2 EUT exercise Software

The Model: KPA-H2CFM is a transmitter designed to function at 88.1, 88.3, 88.5, and 88.7 MHz. When a 12 VDC supply voltage is connected, the transmitter is activated.

88.3 MHz was measured as the highest output power. Data from this channel was determined to be worst case.

#### 3.3 Cable Description

Product Name	Power Cord Shielded (Y/N)	I/O cable Shielded (Y/N)	Length (M)
FM Modulator for Sirius Satellite Receiver(EUT)	Y	-	1.8(P)
Headphone	N/A	N	1.5(D)
External Antenna	N/A	N	1.8(D)
Battery	N/A	N (DC Out)	1.8(D) (Coiled)

\* The marked "(D)" means the Data Cable and "(P)" means the Power Cable.

#### 3.4 Noise Suppression Parts on Cable

Product Name	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
FM Modulator for Sirius Satellite Receiver(EUT)	N	N/A	Y	EUT END
Headphone	N	N/A	Y	EUT END
External Antenna	N	N/A	N	N/A
Battery	N	N/A	N	N/A



### 3.5 Equipment Modifications

To achieve compliance to FCC part 15 rules, the following change(s) was made by ONETECH Corp. during compliance testing:

“There was no Modified items during EMI test”

### 3.6 Configuration of Test System

**Line Conducted Test:** It needs not to test this requirement, because the EUT supplies from a car battery.

**Radiated Emission Test:** Preliminary radiated emissions test were conducted using the procedure in ANSI C63.4/1992 8.3.1.1 and 13.1.4.1 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 meter open area test site.

**Occupied Bandwidth Measurement:**

This measurement is performed with the antenna located close enough to give a full-scale deflection of the modulated carrier on the spectrum analyzer.

### 3.7 Antenna Requirement

For intentional device, according to section 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.

**Antenna Construction:**

FM transmitter antenna of the EUT is fixed inside the EUT, no consideration of replacement by the user.



## 4. PRELIMINARY TEST

### 4.1 AC Power line Conducted Emission Test

During Preliminary Test, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
N/A	N/A
It is not need to test this requirement, because the power of the EUT is supplied from a Car battery.	

### 4.2 Radiated Emission Test

During Preliminary Test, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
Transmit RF Signal continuously	X



## 5. FINAL RESULT OF MEASUREMENT

Preliminary test was done in normal operation mode. And the final measurement was selected for the maximized emission level

### 5.1 Radiated Emission Test (Within the permitted 200kHz band)

The following table shows the highest levels of radiated emission on both polarizations of horizontal and vertical.

Humidity Level	: <u>52 %</u>	Temperature : <u>22 °C</u>
Limits apply to	: <u>FCC CFR 47, PART 15, SUBPART C, SECTION 15.239</u>	
Type of Test	: <u>Low Power Communication Device Transmitter</u>	
Result	: <u>PASSED BY – 5.02 dB at 88.30 MHz</u>	

EUT	: FM Modulator for Sirius Satellite Receiver	Date: September 16, 2003
Operating Condition	: Transmit the RF signal.	
Distance	: 3 Meter	

Radiated Emission			Ant	Correction Factors		Total	Limit (dBuV/m)	Margin (dB)
Freq. (MHz)	Amp. (dBuV)	Detect Mode	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)		
88.30	32.50	Peak	H	10.10	0.38	42.98	48.00	-5.02
88.30	32.50	Average	H	10.10	0.38	42.90	48.00	-5.02

#### Radiated Emission Tabulated Data

Remark: Per 15.31(m), because the EUT's frequency range is less than 1MHz, one channel was tested. Because the EUT has 4 channels, the two "middle" channels were checked, and the channel with the highest output power was used for testing.

Tested by: Sue-Young, Lee/ Test Engineer

**5.2 Radiated Emission Test (Outside of the specified 200kHz band)**

The following table shows the highest levels of radiated emission on both polarizations of horizontal and vertical.

Humidity Level	: <u>50 %</u>	Temperature : <u>22 °C</u>
Limits apply to	: <u>FCC CFR 47, PART 15, SUBPART C, SECTION 15.209</u>	
Type of Test	: <u>Low Power Communication Device Transmitter</u>	
Result	: <u>PASSED BY -6.48dB at 261.80MHz</u>	

EUT	: FM Modulator for Sirius Satellite Receiver	Date: September 16, 2003
Operating Condition	: Transmit the RF signal.	
Frequency range	: 30MHz – 1000MHz	
Detector	: CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)	
Distance	: 3 Meter	
Remark	: Other emissions	

Radiated Emission		Ant	Correction Factors		Total	FCC	
Freq. (MHz)	Amp. (dBuV)	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
162.90	12.20	H	8.15	0.41	20.76	43.52	-22.76
212.40	16.90	H	10.80	0.67	28.37	43.52	-15.15
232.70	14.90	H	11.73	0.64	27.27	46.02	-18.75
261.80	26.60	H	12.23	0.71	39.54	46.02	-6.48
278.30	15.20	H	12.81	0.64	28.65	46.02	-17.37
294.80	15.10	H	13.22	0.65	28.97	46.02	-17.05
299.70	13.50	H	13.33	0.66	27.49	46.02	-18.53
885.50	10.80	H	22.00	1.08	33.88	46.02	-12.14

Note: Harmonic radiated emissions were not observed during the testing.

Tested by: Sue-Young, Lee/ Test Engineer



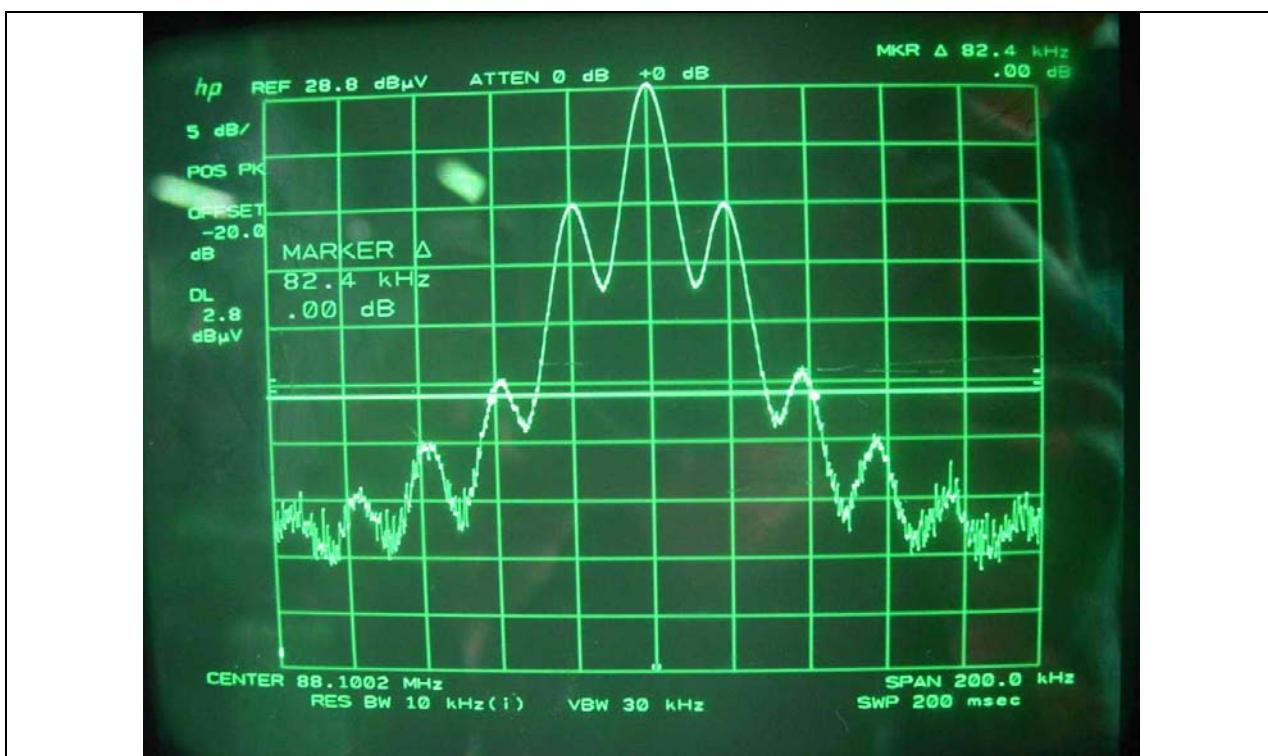
### 5.3 Bandwidth of the operating frequency

Humidity Level	: <u>49 %</u>	Temperature : <u>21 °C</u>
Limits apply to	: <u>FCC CFR 47, PART 15, SUBPART C, SECTION 15.239</u>	
Result	: <u>PASSED</u>	

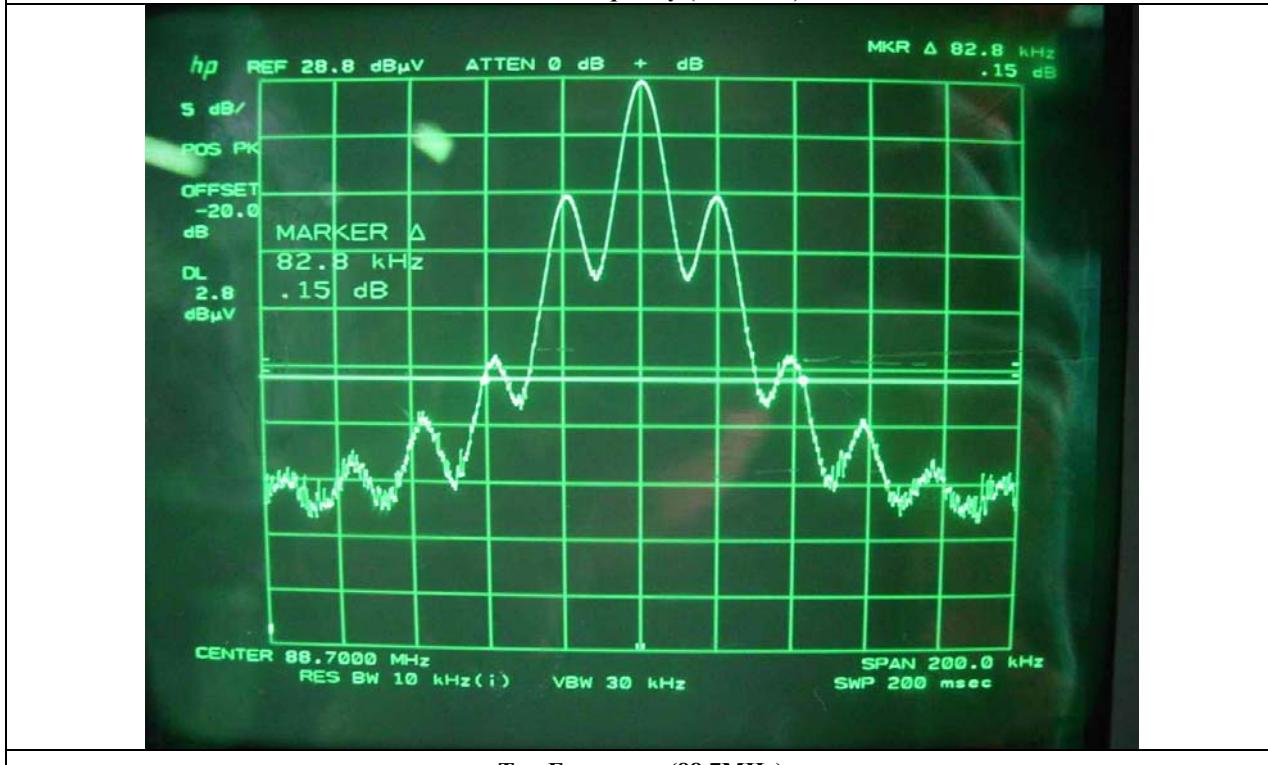
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EUT	: FM Modulator for Sirius Satellite Receiver	Date: September 16, 2003
Operating Condition	: Transmit the RF signal.	
Minimum Resolution		
Bandwidth	: 10 kHz	
Remark	: Refer to test data in next page.	

Tested by: Sue-Young, Lee/ Test Engineer



Bottom Frequency (88.1MHz)



Top Frequency (88.7MHz)



## 6. FIELD STRENGTH CALCULATION

Meter readings are compared to the specification limit correcting for antenna and cable losses

+ Meter reading (dBuV)

+ Cable Loss (dB)

+ Antenna Factor (Loss) (dB/meter)

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= Corrected Reading (dBuV/meter)

- Specification Limit (dBuV/meter)

= dB Relative to Spec (+/- dB)

**7. LIST OF TEST EQUIPMENT**

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUe CAL	USE
1.	Test receiver	R/S	ESVS 10	827864/005	NOV/03	12MONTH	■
2.	Test receiver	R/S	ESHS 10	834467/007	APR/03	12MONTH	
3.	Spectrum analyzer	HP	8566B	3407A08547	MAY/03	12MONTH	■
4.	Spectrum analyzer	HP	8568B	3109A05456	MAY/03	12MONTH	■
5.	RF preselector	HP	85685A	3107A01264	MAY/03	12MONTH	■
6.	Quasi-Peak Adapter	HP	85650A	3107A01542	MAY/03	12MONTH	■
7.	TRILOG Broadband Antenna	Schwarzbeck	VULB9163	VULB9163 166	FEB/03	12MONTH	
8.	Biconical antenna	EMCO	3104C	9109-4443 9109-4444 91031852	MAY/03 JUL/03 AUG/02	12MONTH	■
9.	Log Periodic antenna	EMCO	3146	9109-3213 9109-3214 9109-3217 9108-A(494)	AUG/02 JUL/03 MAY/03 62281001	12MONTH	■
10.	LISN	EMCO	3825/2	9109-1867 9109-1869	AUG/02 OCT/02	12MONTH	
11.	Position Controller	EMCO	1090	9107-1038	N/A	N/A	■
12.	Turn Table	EMCO	1080-1.21	9109-1576	N/A	N/A	■
13.	Antenna Master	EMCO	1070-1	9109-1624	N/A	N/A	■