



**ONETECH**

*Testing & Evaluation Lab.*

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FCC ID. : P3HSIRCR  
File No. : E042R-065

# ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR FCC CERTIFICATION

**Test report file number** : E042R-065  
**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.** : P3HSIRCR  
**Model Name** : SIRCR  
**Multiple Model Name** : N/A  
**Serial number** : N/A  
**Total page of Report** : 16 pages (including this page)  
**Date of Incoming** : January 28, 2004  
**Date of Issuing** : February 26, 2004

## 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.

Prepared by:

Young-Min, Choi/ Project Engineer  
EMC Div.  
ONETECH Corp.

Reviewed by:

Ge-Won, Lee / Chief Engineer  
EMC Div.  
ONETECH Corp.

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FCC-003 (Rev.0)

**HEAD OFFICE** : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-121, Korea  
(TEL: +82-31-746-8500, FAX: +82-31-746-8700)

**EMC Testing Dept** : 426-1 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: +82-31-765-8289, FAX: +82-31-766-2904)



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## 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 : P3HSIRCR  
- . MODEL NO/NAME : SIRCR  
- . SERIAL NUMBER : N/A  
- . DATE : February 26, 2004

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 7, 13 of ANSI C63.4: 2001
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 SIRCR (referred to as the EUT in this report) is FM Modulator for Sirius Satellite Receiver that can transmit from 88.1MHz to 91.3MHz for audio signal of FM radio receiver. Product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Non-Metal
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	7.6MHz
POWER REQUIREMENT	DC12V from vehicle battery or AC/DC adapter
TX FREQUENCY RANGE	88.1MHz ~ 89.9MHz (Step freq.: 200kHz), 91.1MHz and 91.3MHz
NUMBER OF LAYERS	4 Layers
EXTERNAL CONNECTOR	Ant. Input, Audio Out, FM Output, DC In

### 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
SIRCR	KI RYUNG ELECTRONICS CO., LTD.	P3HSIRCR	EUT	-
NL20-120200-11	I.T.E. POWER SUPPLY	N/A	AC/DC Adapter	EUT
SIRPNP	KI RYUNG ELECTRONICS CO., LTD.	N/A	Satellite Radio Receiver	EUT
-	KENWOOD	N/A	Satellite ANT.	EUT
SMS-015N	SUNGIL	N/A	Speaker	EUT



## 2.5 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4: 2001. 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
Main Board	KI RYUNG ELECTRONICS CO., LTD.	CLARION_CRADLE_REV_D	N/A
Sub Board	KI RYUNG ELECTRONICS CO., LTD.	Clarion_Cradle_rev.d	N/A

#### 3.2 EUT exercise Software

The Model: SIRCR is a transmitter designed to transmit from 88.1MHz to 91.3MHz. When a 12 VDC supply voltage is connected, the transmitter is activated.

#### 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)	N	-	1.0(P), 1.5(D), 3.0(D)
Satellite Radio Receiver	-	-	-
Speaker	N/A	N	1.5(D)
Satellite ANT.	N/A	N	3.0(D)
AC/DC Adapter	N	N (DC Out)	1.5(P), 1.0(D)

\* 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
Satellite Radio Receiver	N	N/A	-	-
Speaker	N	N/A	Y	EUT END
Satellite ANT.	N	N/A	Y	EUT END
AC/DC Adapter	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 were no Modified items during EMI test”

### 3.6 Configuration of Test System

**Line Conducted Test:** The EUT was connected to AC/DC adapter and power line of the adapter was connected to LISN. All supporting equipments were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.4: 2001 7.2.3 to determine the worse operating conditions.

**Radiated Emission Test:** Preliminary radiated emissions test were conducted using the procedure in ANSI C63.4: 2001 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)
Transmit RF Signal continuously	X

### 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 MEASURMENT

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

### 5.1 Conducted Emission Test

Humidity Level : 49 % Temperature: 19 °C  
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.207(a)  
 Type of Test : Low Power Communication Device Transmitter  
 Result : PASSED BY -14.10 dB at 3.20 MHz (at peak mode)

EUT : FM Modulator for Sirius Satellite Receiver Date: February 20, 2004

Operating Condition : Transmit the RF signal

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

Frequency (MHz)	Line	Peak (dBuV)		Margin (dB)
		Emission level	Q.P Limits	
3.20	H	41.90	56.00	-14.10
3.26	N	40.81	56.00	-15.19
6.59	N	44.57	60.00	-15.43
6.34	H	45.23	60.00	-14.77
11.90	H	41.75	60.00	-18.25
12.20	N	41.93	60.00	-18.07
Frequency (MHz)	Line	Average (dBuV)		Margin (dB)
		Emission level	Limits	
-				
-				

Line Conducted Emissions Tabulated Data

Remark : "H": Hot Line, "N": Neutral line, "Q.P": Quasi-Peak detect

Average data was not recorded, because Peak values were under the Average limit.

See next page for an overview sweep performed with peak and average detector.

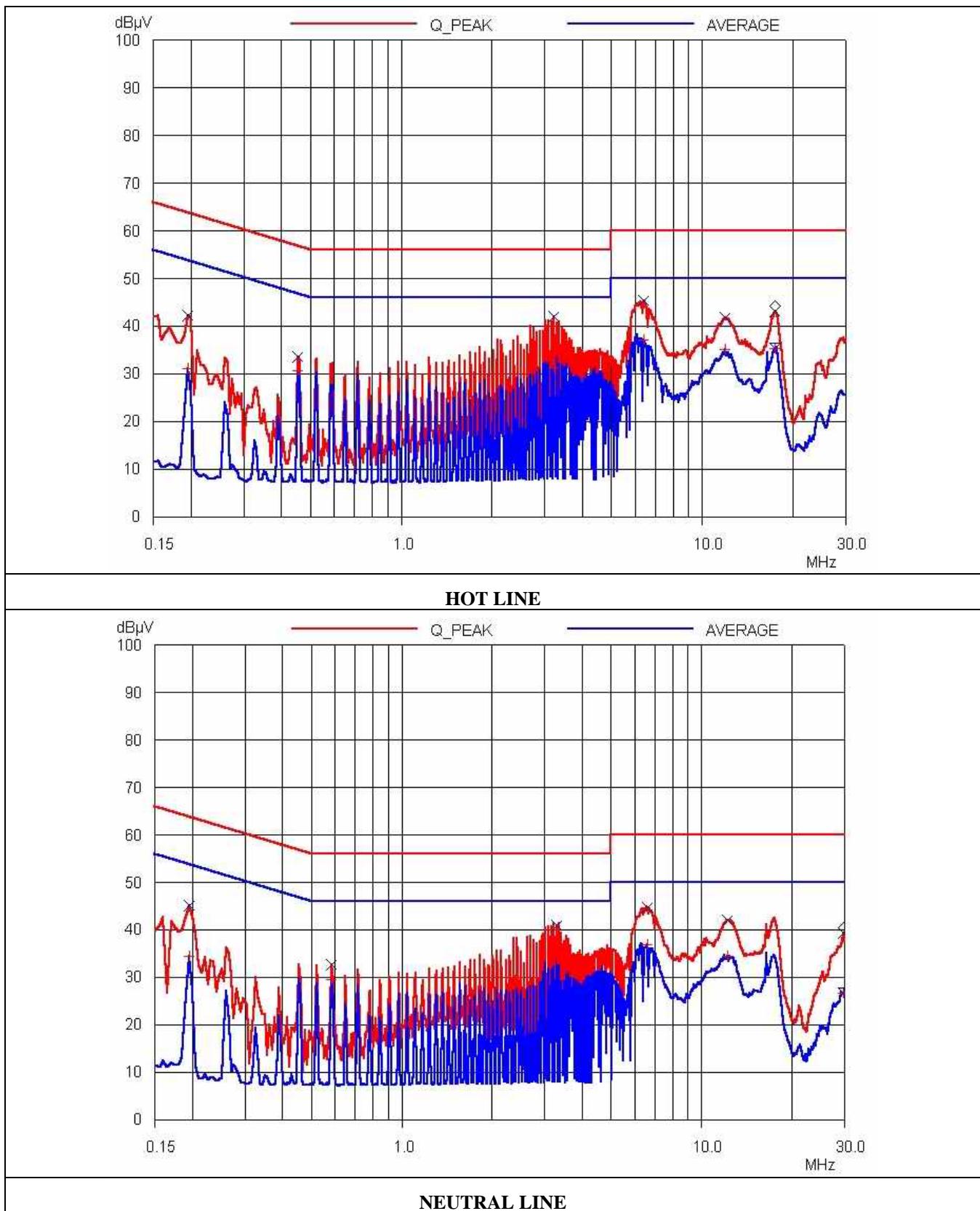
Tested by: Sue-Young, Lee/ Test Engineer



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**EMC Testing Dept** : 426-1 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: +82-31-765-8289, FAX: +82-31-766-2904)



## 5.2 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>50 %</u>	Temperature: <u>19 °C</u>
Limits apply to	: <u>FCC CFR 47, PART 15, SUBPART C, SECTION 15.239(b)</u>	
Type of Test	: <u>Low Power Communication Device Transmitter</u>	
Result	: <u>PASSED BY – 12.10dB at 88.10 MHz</u>	

EUT	: FM Modulator for Sirius Satellite Receiver	Date: February 25, 2004
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)		
88.10	25.86	Peak	V	10.04	0.00	35.90	48.00	-12.10
91.30	21.42	Peak	H	10.88	0.00	32.30	48.00	-15.70

### Radiated Emission Tabulated Data

Remark: (1) Per ANSI C63.4: 2001, 13.1.1, because the EUT's frequency range is between 1MHz and 10MHz, two channel (near top and near bottom) was tested.

(2) Average detector mode was not measured, because Peak emission values were under the Average limit.

Tested by: Sue-Young, Lee/ Test Engineer

**5.3 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	: 48 %	Temperature: 18 °C
Limits apply to	: FCC CFR 47, PART 15, SUBPART C, SECTION 15.209 (a)	
Type of Test	: Low Power Communication Device Transmitter	
Result	: PASSED BY -3.40dB at 279.04MHz	

EUT	: FM Modulator for Sirius Satellite Receiver	Date: February 25, 2004
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)		Ant. (dBuV/m)	Cable (dB)		Limit (dBuV/m)	Margin (dB)
65.85	20.79	H	9.11	0.00	29.90	40.00	-10.10
155.01	26.54	H	7.76	0.42	34.72	43.52	-8.80
*169.54	24.82	H	8.42	0.78	34.02	43.52	-9.50
229.62	29.66	H	11.58	0.68	41.92	46.02	-4.10
*262.57	24.31	H	12.26	1.05	37.62	46.02	-8.40
*279.04	28.44	H	12.84	1.34	42.62	46.02	-3.40
*608.51	17.40	H	19.35	2.27	39.02	46.02	-7.00
689.91	18.06	H	19.71	2.65	40.42	46.02	-5.60
878.86	9.01	H	21.93	3.68	34.62	46.02	-11.40
895.33	8.81	H	22.11	3.80	34.72	46.02	-11.30

Remark: (1) Harmonic radiated emissions were not observed during the testing.

(2) \* Denotes emission frequency which appearing within the Restricted Band specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.

**Tested by: Sue-Young, Lee/ Test Engineer**

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## 5.4 Bandwidth of the operating frequency

Humidity Level : 49 % Temperature: 20 °C  
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.239(a)  
Result : PASSED

---

EUT : FM Modulator for Sirius Satellite Receiver Date: February 25, 2004  
Operating Condition : Transmit the RF signal.  
Minimum Resolution  
Bandwidth : 10 kHz  
Remark : Refer to test data in next page.

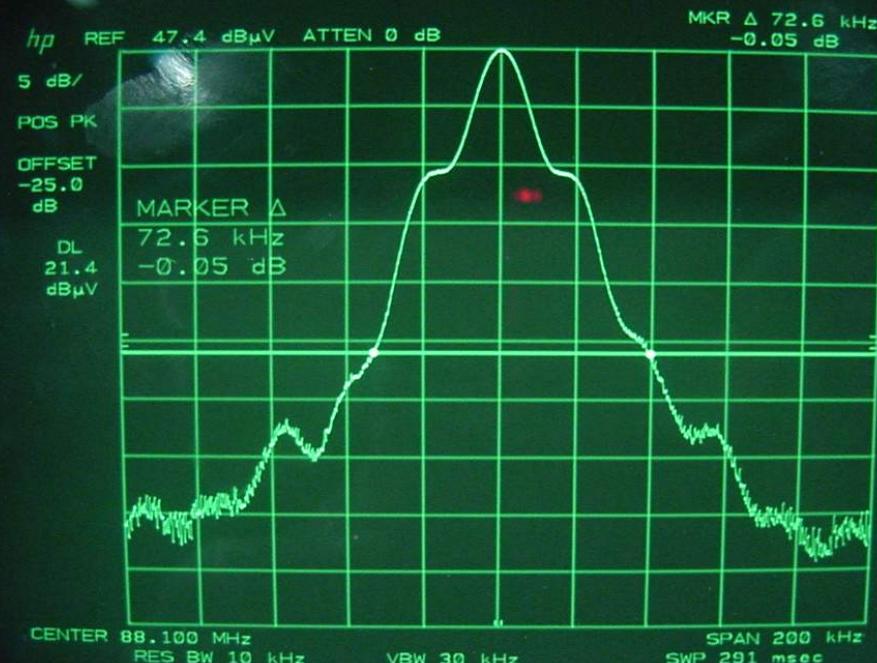
Tested by: Sue-Young, Lee/ Test Engineer



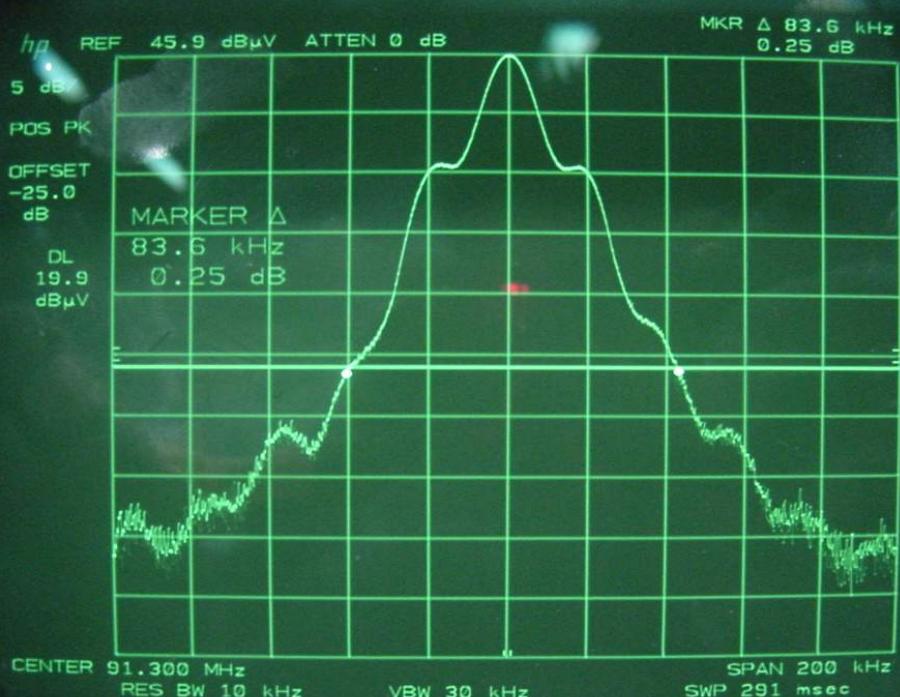
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Bottom Frequency (88.1MHz)



Top Frequency (91.3MHz)

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## 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)

---

= 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/04	12MONTH	■
8.	Biconical antenna	EMCO	3104C	9109-4443	MAY/03	12MONTH	
				9109-4444	JUL/03	12MONTH	■
		Schwarzbeck	VHA9103	91031852	JAN/04	12MONTH	
9.	Log Periodic antenna	EMCO	3146	9109-3214	JUL/03	12MONTH	■
				9109-3217	MAY/03	12MONTH	
		Schwarzbeck	9108-A(494)	62281001	JAN/04	12MONTH	
10.	LISN	EMCO	3825/2	9109-1867	AUG/03	12MONTH	■
				9109-1869	OCT/03	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	■