ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR FCC CERTIFICATION

Test Report No.	**: E052R-012**
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	**: Satellite Radio Receiver**
FCC ID.	**: P3HCALYPSO**
Model Name	**: CALYPSO**
Serial number	**: N/A**
Total page of Report	**: 17 pages (including this page)**
Date of Incoming	**: January 25, 2005**
Date of Issuing	**: February 04, 2005**

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:

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EMC Div.
ONETECH Corp.

Reviewed by:

G. W. Lee / Chief Engineer
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ONETECH Corp.

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

CONTENTS

Page

1. VERIFICATION OF COMPLIANCE **3**

2. GENERAL INFORMATION **4**

2.1 PRODUCT DESCRIPTION 4
2.2 MODEL DIFFERENCES 4
2.3 RELATED SUBMITTAL(S) / GRANT(S) 4
2.4 TEST SYSTEM DETAILS 4
2.5 TEST METHODOLOGY 5
2.6 TEST FACILITY 5

3. SYSTEM TEST CONFIGURATION **6**

3.1 JUSTIFICATION 6
3.2 EUT EXERCISE SOFTWARE 6
3.3 CABLE DESCRIPTION 6
3.4 NOISE SUPPRESSION PARTS ON CABLE 6
3.5 EQUIPMENT MODIFICATIONS 6
3.6 CONFIGURATION OF TEST SYSTEM 7
3.7 ANTENNA REQUIREMENT 7

4. PRELIMINARY TEST **7**

4.1 AC POWER LINE CONDUCTED EMISSION TEST 7
4.2 RADIATED EMISSION TEST 7

5. FINAL RESULT OF MEASURMENT **8**

5.1 CONDUCTED EMISSION TEST 8
5.2 RADIATED EMISSION TEST (WITHIN THE PERMITTED 200 KHZ BAND) 10
5.3 RADIATED EMISSION TEST (OUTSIDE OF THE SPECIFIED 200 KHZ BAND) 11
5.4 BANDWIDTH OF THE OPERATING FREQUENCY 12

6. FIELD STRENGTH CALCULATION **15**

7. LIST OF TEST EQUIPMENT **16**

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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
-. BRAND NAME : Clarion / CALYPSO
-. FCC ID : P3HCALYPSO
-. MODEL NAME : CALYPSO
-. SERIAL NUMBER : N/A
-. DATE : February 04, 2005

DEVICE TYPE	Low Power Communication Device Transmitter
E.U.T. DESCRIPTION	Satellite Radio Receiver
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	Charter 7 and 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.

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2. GENERAL INFORMATION

2.1 Product Description

The KI RYUNG ELECTRONICS CO., LTD., Model CALYPSO (referred to as the EUT in this report) is Satellite Radio Receiver that has the FM transmitter from 88.1 MHz to 107.9 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)	Main Board : 7.3728 MHz and 7.6 MHz JM Module Board : 12.288 MHz, 7.3728 MHz
POWER REQUIREMENT	DC 12V from an AC/DC Adaptor
TX FREQUENCY RANGE	88.1 MHz ~ 107.9 MHz
NUMBER OF LAYERS	Main Board : 6 Layers JM RF Module Board : 8 Layers
EXTERNAL CONNECTOR	Antenna Input, Car Tuner Output, Audio input, Power (DC 9V-16V)

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
CALYPSO	KI RYUNG ELECTRONICS CO., LTD.	P3HCALYPSO	Satellite Radio Receiver(EUT)	-
DSA-0131F-12	Dee Van Enterprise Co., Ltd.	N/A	AC/DC Adaptor	EUT
-	-	N/A	External Antenna	EUT
SMS-015N	Sungil Precision Co., Ltd.	N/A	Speaker	EUT

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2.5 Test Methodology

Both conducted and radiated testing was performed according to the procedures in chapter 7, 13 of 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 307-51 Daessangryung-Ri, Chowol-Myun, Kwangju-City, Kyunggi-Do 464-080 Korea. Description details of test facilities were submitted to the Commission on April 04, 2003. (Registration Number: 340658)

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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.	N/A	N/A
RF Module Board	KI RYUNG ELECTRONICS CO., LTD.	JUPITER2.5D	N/A

3.2 EUT exercise Software

The Model, CALYPSO is included a FM transmitter designed to operate on function in the 88.1 ~ 107.9 MHz. The EUT doest not have audio input port, so the internal 1 kHz modulation signal was transmitted with maximum audio level.
107.9 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)
Satellite Radio Receiver(EUT)	Y	-	1.8(P)
External Antenna	N/A	N	1.8(D)
AC/DC Adaptor	N/A	N	1.2 (D)
SPEAKER	N/A	N	1.2(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
Satellite Radio Receiver(EUT)	N	N/A	Y	EUT END
External Antenna	N	N/A	N	N/A
AC/DC Adaptor	Y	EUT END	Y	EUT END
SPEAKER	N	N/A	Y	BOTH END

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"

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3.6 Configuration of Test System

Line Conducted Test: The EUT was connected to AC/DC adaptor and AC/DC adaptor 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 a probe 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 the 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 the RF Signal continuously	X

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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 : 39 % Temperature: 20 °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 –3.89 dB at 0.20 MHz

EUT : Satellite Radio Receiver Date: January 25, 2005

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	
0.20	N	59.72	63.61	-3.89
0.30	N	48.20	60.24	-12.04
0.31	H	48.58	60.11	-11.53
1.90	N	42.53	56.00	-13.47
3.93	N	45.46	56.00	-10.54
3.94	H	43.61	56.00	-12.39
Frequency (MHz)	**Line**	**Average (dBuV)**		**Margin (dB)**
		Emission level	**Limits**	
0.2	N	33.90	53.61	-19.71
0.31	H	28.80	50.11	-21.31
3.93	N	23.82	46.00	-22.18
3.94	H	22.37	46.00	-23.63

Line Conducted Emission Tabulated Data

Remark : "H": Hot Line, "N": Neutral line

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

Tested by: Sue-Yong, Lee / Test Engineer

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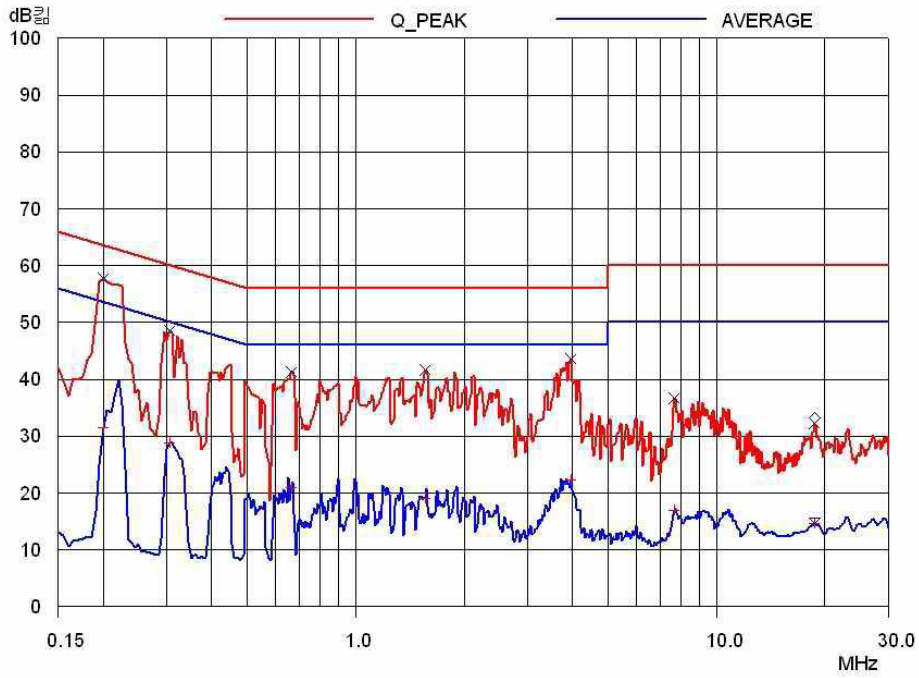
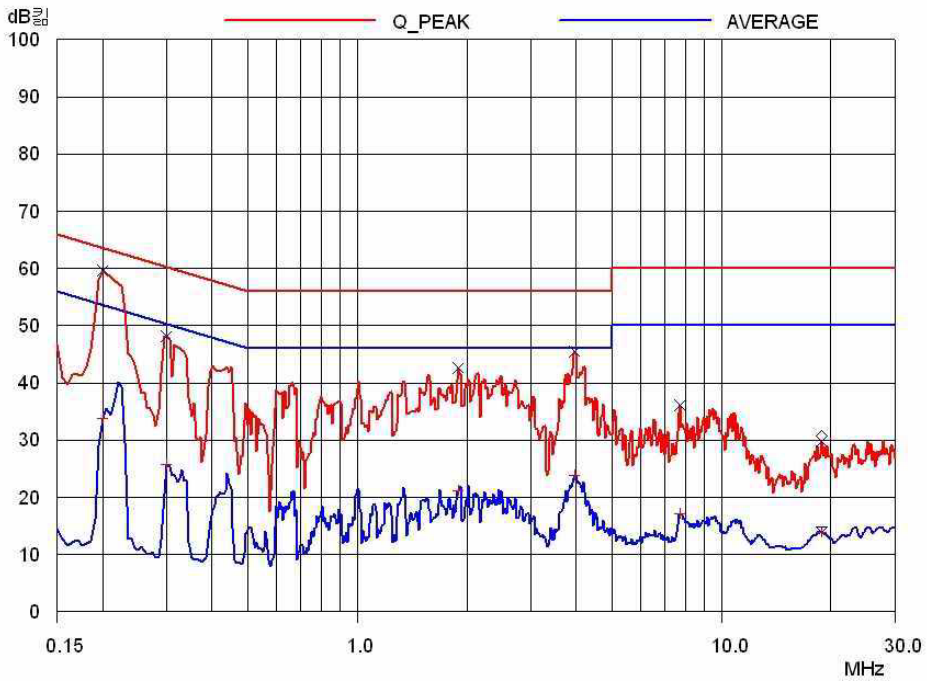


HOT LINE



NEUTRAL LINE

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5.2 Radiated Emission Test (Within the permitted 200 kHz band)

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

Humidity Level : 43 % Temperature: 18 °C
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.239 (b)
Type of Test : Low Power Communication Device Transmitter
Result : PASSED BY – 4.44 dB at 88.14 MHz

EUT : Satellite Radio Receiver Date: January 28, 2005
Operating Condition : Transmit the RF signal.
Distance : 3 Meter

Radiated Emission			Ant	Correction Factors		Total	Limit	Margin
Freq. (MHz)	Amp. (dBuV)	Detect Mode	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)	(dBuV/m)	(dB)
88.14	33.79	Peak	V	7.94	1.83	43.56	48	-4.44
97.10	30.60	Peak	V	9.89	1.78	42.27	48	-5.73
107.90	29.00	Peak	V	11.48	1.90	42.38	48	-5.62

Radiated Emission Tabulated Data

Remark: Per 15.31(m), because the EUT's frequency range is more than 10 MHz, three channels (near top, near middle and near bottom) were tested.

Average detector mode was not measured, because peak emission values were under average limit.

Tested by: Sue-Young, Lee/ Test Engineer

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5.3 Radiated Emission Test (Outside of the specified 200 kHz 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 –3.72dB at 107.52MHz

EUT : Satellite Radio Receiver Date: January 28, 2005
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)
64.89	25.97	H	5.89	1.40	33.26	40.00	-6.74
107.52	26.47	H	11.43	1.90	39.80	43.52	-3.72
502.89	15.19	V	17.74	3.71	36.64	46.02	-9.38
719.95	15.53	V	21.13	4.34	41.00	46.02	-5.02

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5.4 Bandwidth of the operating frequency

Humidity Level	: 48 %	Temperature: 18 °C
Limits apply to	: FCC CFR 47, PART 15, SUBPART C, SECTION 15.239 (a)	
Result	: PASSED	

EUT	: Satellite Radio Receiver	Date: January 28, 2005
Operating Condition	: Transmit the RF signal.	
Minimum Resolution Bandwidth	: 10 kHz	
Remark	: Refer to test data in next page.	

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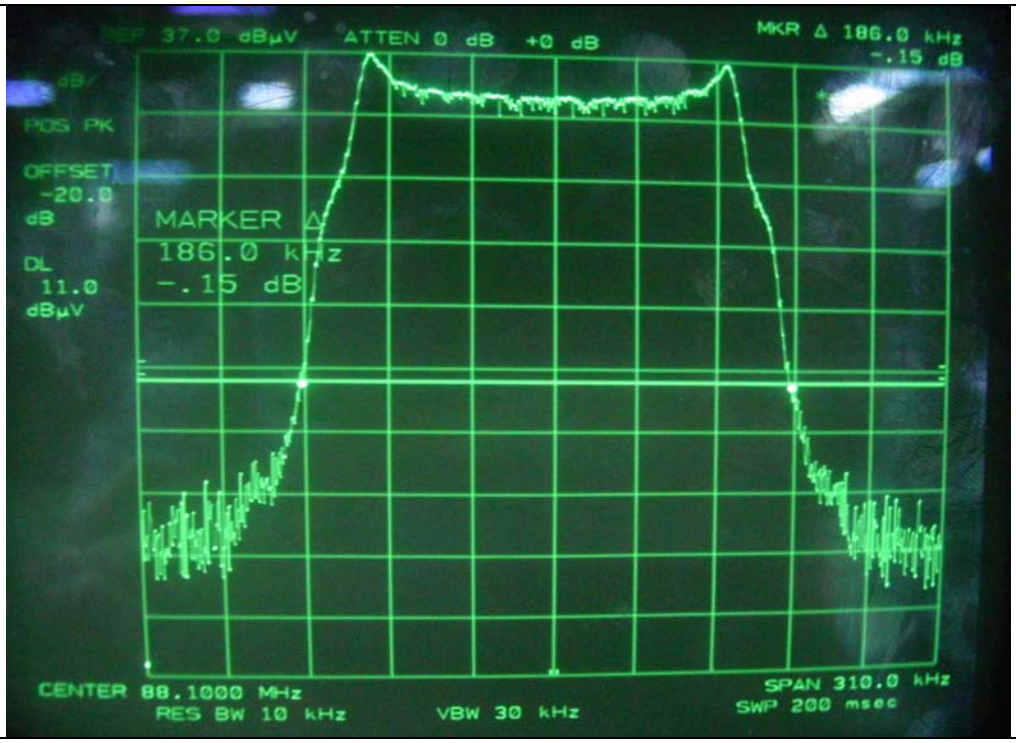
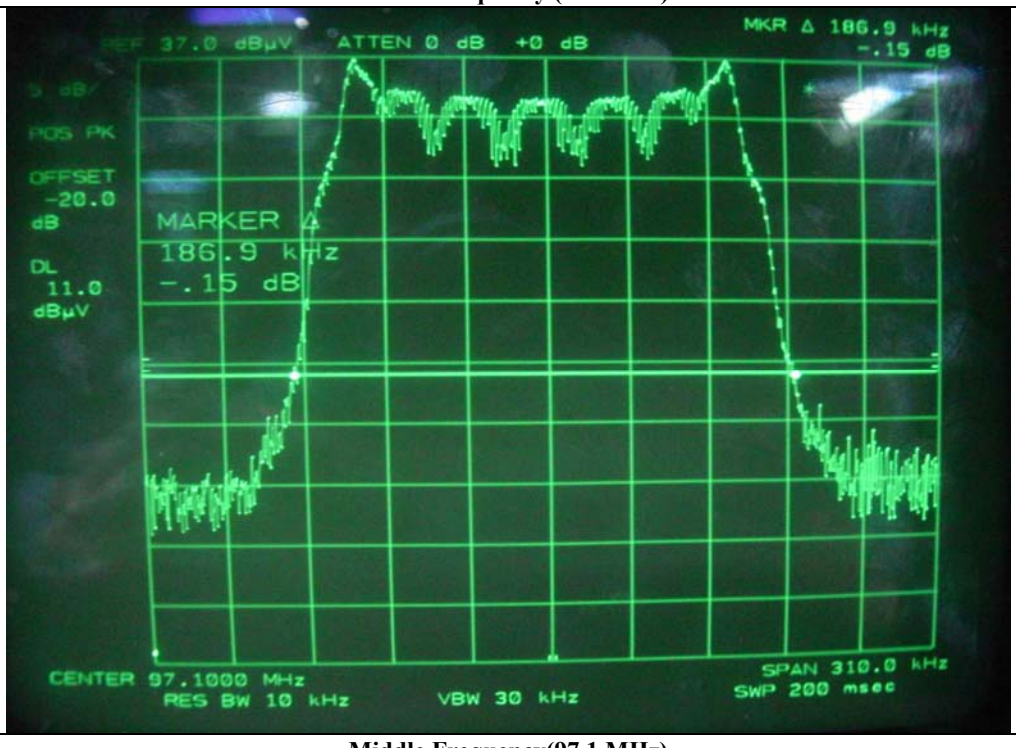


Bottom Frequency (88.1MHz)



Middle Frequency(97.1 MHz)

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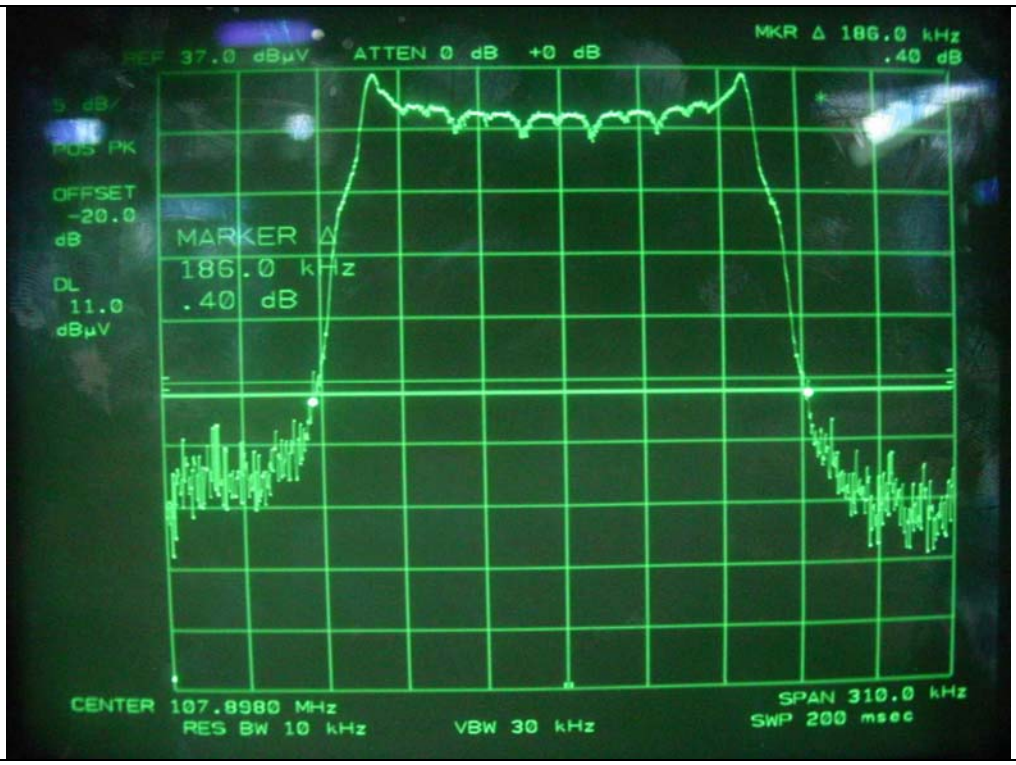

Top Frequency(107.9 MHz)

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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)

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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	DEC/04	12MONTH	■
2.	Test receiver	R/S	ESHS 10	834467/007	MAY/04	12MONTH	■
3.	Spectrum analyzer	HP	8566B	3407A08547	JUL/04	12MONTH	
4.	Spectrum analyzer	HP	8568B	3109A05456	JUL/04	12MONTH	■
5.	RF preselector	HP	85685A	3107A01264	APR/04	12MONTH	■
6.	Quasi-Peak Adapter	HP	85650A	3107A01542	JUL/04	12MONTH	■
7.	TRILOG Broadband Antenna	Schwarzbeck	VULB9163	VULB9163 166	FEB/04	12MONTH	
8.	Biconical antenna	EMCO	3104C	9109-4443	MAY/04	12MONTH	■
		Schwarzbeck	VHA9103	91031852	JAN/04		
9.	Log Periodic antenna	EMCO	3146	9109-3213	FEB/04	12MONTH	
				9109-3217	MAY/04		■
		Schwarzbeck	9108-A(494)	62281001	JAN/04		
10.	LISN	EMCO	3825/2	9109-1867	JUL/04	12MONTH	■
				9109-1869	OCT/04		
11.	Position Controller	HD GmbH	HD100	N/A	N/A	N/A	■
12.	Turn Table	HD GmbH	DS420S	N/A	N/A	N/A	■
13.	Antenna Master	HD GmbH	MA240	N/A	N/A	N/A	■

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