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ELECTROMAGNETIC EMISSION COMPLIANCE REPORT

Test report file number : E009R-035

Applicant : WILTRON CO., LTD.
Address : #408, Hi-tech Venture Town, 198-53, Hupyung-Dong, Chuncheon, Korea

Manufacturer : WILTRON CO., LTD.
Address : #408, Hi-tech Venture Town, 198-53, Hupyung-Dong, Chuncheon, Korea

Type of Equipment : TV TUNERN UNIT (Low Power Communication Device Transmitter)

FCC ID. : O83WCR100U

Model / Type No. : WCR-100U

Serial number : N/A

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

Date of Incoming : July 12, 2000

Date of issuing : September 22, 2000

SUMMARY

The equipment complies with the regulation; FCC PART 15 SUBPART C §15.239

This test report contains only the result 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:

G. W. Lee/ Ass. Chief Engineer

Reviewed by:

Y. K. Kwon/ Chief Engineer

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(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 : WILTRON CO., LTD.
 ADDRESS : #408, Hi-tech Venture Town, 198-53, Hupyung-Dong, Chuncheon, Korea
 CONTACT PERSON : J. G. Kim / Manager
 TELEPHONE NO : 82-33-258-6881
 FCC ID : O83WCR100U
 MODEL NO/NAME : WCR-100U
 SERIAL NUMBER : N/A
 DATE : September 22, 2000

DEVICE TYPE	Low Power Communication Device Transmitter-Intentional Radiator
E.U.T. DESCRIPTION	TV TUNERN UNIT
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 §15.239
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	No
FINAL TEST WAS CONDUCTED ON	3 METER OPEN AREA TEST SITE

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 WILTRON CO., LTD., Model WCR-100U (referred to as the EUT in this report) is a TV TUNERN UNIT that can transmit from 88.1 MHz to 89.5 MHz for audio signal of FM radio receiver on its AV mode only. Product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Metal
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	7.2MHz, 14.32MHz
POWER REQUIREMENT	DC 12V from a Car Battery
TX FREQUENCY RANGE	88.1 MHz ~ 89.5 MHz (1.4 MHz Spacing)
NUMBER OF LAYERS	2 Layers
EXTERNAL TERMINALS	Antenna Input (4), AV1, 2 (Audio L/R, /Video Input), External A/V out, Display out, Power supply

Model Differences:

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

2.2 Related Submittal(s) / Grant(s)

Original submittal only

2.3 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
WCR-100U	WILTRON CO., LTD.	O83WCR100U	TV TUNERN UNIT(EUT)	-
WCM-680D	WILTRON CO., LTD.	N/A	LCD MONITOR	EUT
CTV-1010XK	KEC	N/A	TV	EUT
GHV-S9990	GoldStar	N/A	VCP	EUT

2.4 Test Methodology

Both conducted and 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.

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2.5 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 12, 1999. (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	WILTRON	WCR-100U	N/A

3.2 EUT exercise Software

The TV Tuner Unit under test continuously transmitted set RF signal in its AV operating mode for the purpose of the measurements.

3.2 Cable Description

Product Name	Power Cord Shielded (Y/N)	I/O cable Shielded (Y/N)	Length (M)
TV TUNER UNIT(EUT)	N	-	1.0 (P)
LCD MONITOR	N	N	1.2(P), 1.0(D)
TV	N	N	1.5(P), 1.2(D)
VTR	N	N	1.5(P), 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
TV TUNER UNIT(EUT)	N	N/A	-	-
LCD MONITOR	N	N/A	Y	EUT END
TV	N	N/A	Y	BOTH END
VTR	N	N/A	Y	BOTH END

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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 3meter open area test site.

The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.

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. The plot is taken at 20kHz/division frequency span, 10kHz resolution bandwidth and 10dB/division logarithmic display from an 8568B spectrum analyzer.

3.7 Antenna Requirement

For intentional device, according to §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:

The FM transmitter antenna of the EUT uses a unique connector, no consideration of replacement by the user.

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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)
-	-

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 audio signal on AV mode	X



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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 Conducted Emission Test

Humidity Level : % Temperature : ____

Limits apply to : FCC CFR 47, PART 15, SUBPART C

Type of Test :

Result : PASSED BY dB at MHz

EUT : TV TUNERN UNIT

Date:

Operating Condition :

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

Power Line Conducted Emission			FCC CLASS B	
Frequency (MHz)	Amplitude (dBuV)	Conductor	Limit (dBuV)	Margin (dB)
“It is not need to test this requirement, because the EUT supplies from a Car battery”				

Line Conducted Emission Tabulated Data



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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 : 56 % Temperature : 25
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.239
 Type of Test : Low Power Communication Device Transmitter
 Result : PASSED BY -9.9 dB at 89.53 MHz

EUT : TV TUNERN UNIT Date: August 23, 2000
 Operating Condition : Transmit audio signal on AV mode
 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)		
88.13	23.8	Peak	V	8.04	1.10	32.94	48.0	-15.1
88.13	20.4	Average	V	8.04	1.10	29.54	48.0	-18.5
89.53	28.6	Peak	V	8.38	1.10	38.08	48.0	-9.9
89.53	24.5	Average	V	8.38	1.10	33.98	48.0	-14.0

Radiated Emission Tabulated Data

Remark: Measurements were performed 1 near top and 1 near bottom location in the frequency range of operation according to the section 15.31 (m).

Measuring by: Seung Hyun, Nam / Test Engineer



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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 : 56 % Temperature : 25
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209
 Type of Test : Low Power Communication Device Transmitter
 Result : PASSED BY dB at MHz

EUT : TV TUNERN UNIT Date: August 23, 2000
 Operating Condition : Transmit audio signal on AV mode
 Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)
 Distance : 3 Meter

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)
It were not observed any emissions more than 20dB below the limit during the above test							

Radiated Emission Tabulated Data

Measuring by: Seung Hyun, Nam / Test Engineer

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5.4 Bandwidth of the operating frequency

Humidity Level : 56 % Temperature : 25
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.239
Result : PASSED

EUT : TV TUNERN UNIT Date: August 23, 2000
Operating Condition : Transmit audio signal on AV mode
Minimum Resolution
Bandwidth : 10 KHz

Freq. (MHz)	Bandwidth of the emission. (kHz)	Limit (kHz)	Remark
88.13	70	200	-
89.53	60.2	200	-

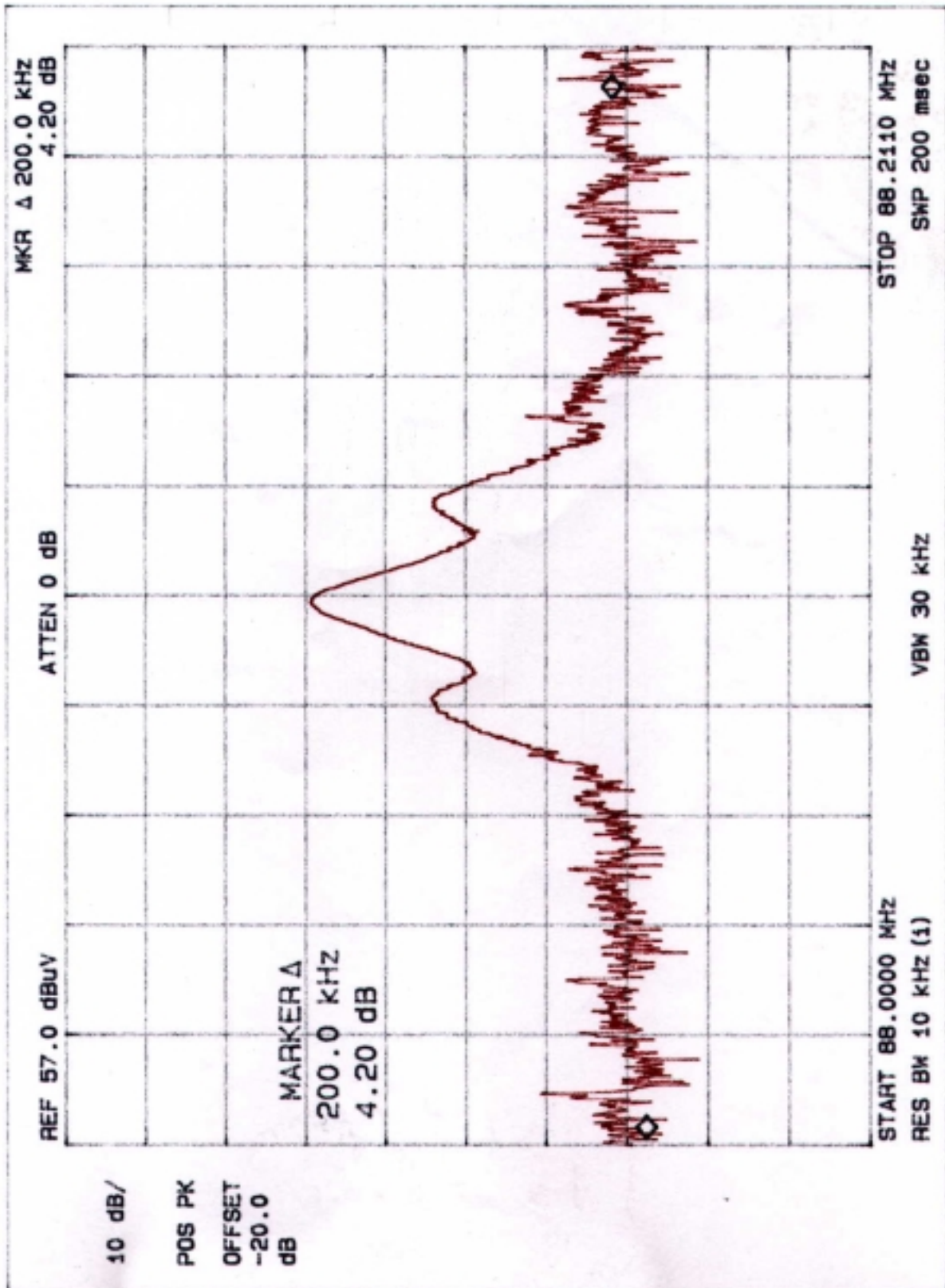
Remark: Measurements were performed 1 near top and 1 near bottom location in the frequency range of operation according to the section 15.31 (m).

Refer to Plot #2 Test Data in next page.



Measuring by: Seung Hyun, Nam / Test Engineer

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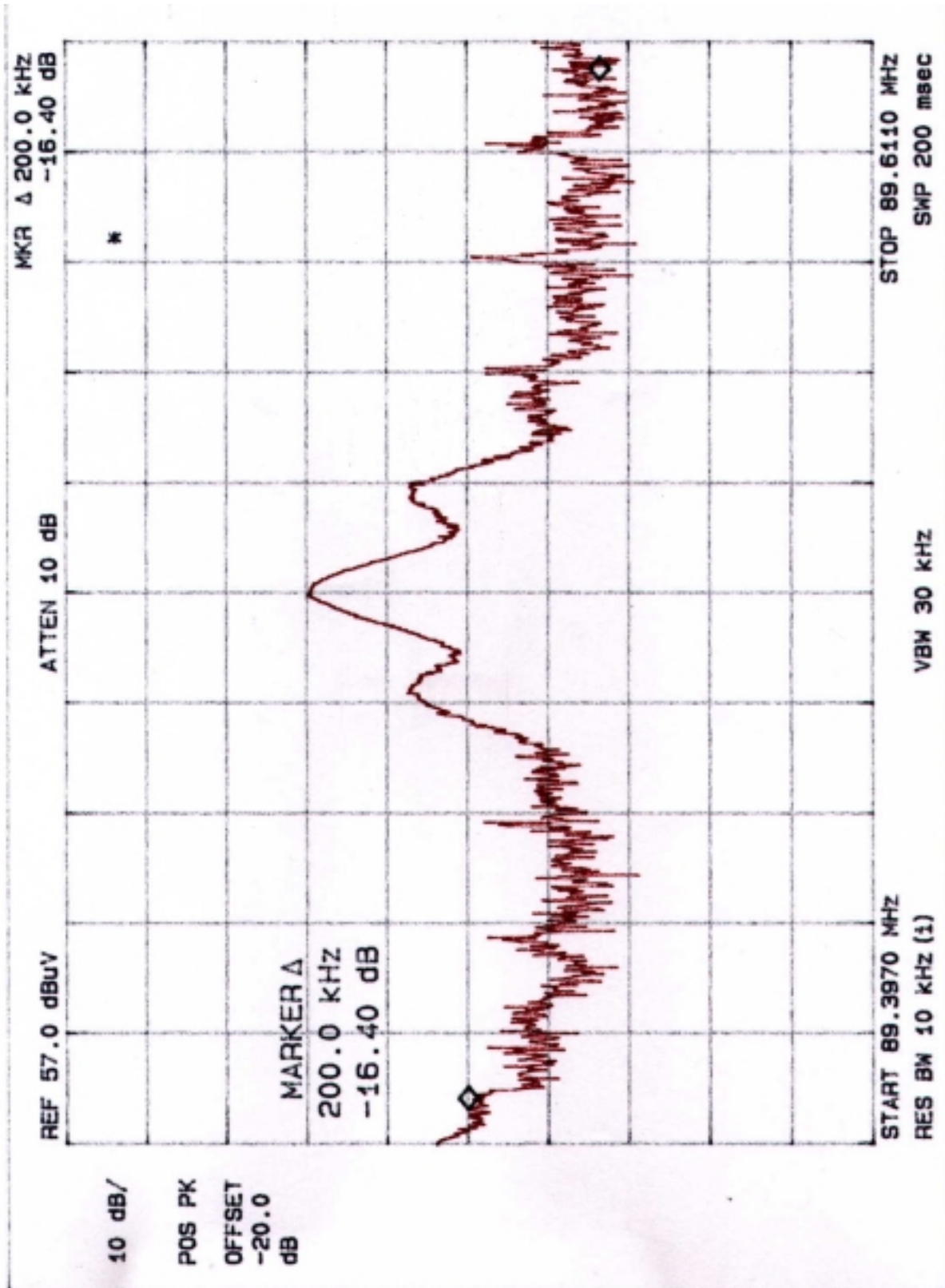
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6. FIELD STRENGTH CALCULATION

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

$$\begin{aligned}
 &+ \text{ Meter reading} && (\text{dBuV}) \\
 &+ \text{ Cable Loss} && (\text{dB}) \\
 &+ \text{ Antenna Factor (Loss)} && (\text{dB/meter}) \\
 \hline
 &= \text{ Corrected Reading} && (\text{dBuV/meter}) \\
 &- \text{ Specification Limit} && (\text{dBuV/meter}) \\
 &= \text{ dB Relative to Spec} && (+/- \text{ dB})
 \end{aligned}$$



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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	SEP/99	12MONTH	■
2.	Test receiver	R/S	ESHS10	834467/007	APRIL/00	12MONTH	
3.	Spectrum analyzer	HP	8568B	3026A0226	SEP/99	12MONTH	■
4.	RF preselector	HP	85685A	3107A01264	SEP/99	12MONTH	■
5.	Quasi-Peak Adapter	HP	85650A	3107A01542	SEP/99	12MONTH	■
6.	Dipole Antenna	EMCO	3121C	9107-745	JUN/00	12MONTH	
7.	Biconical antenna	EMCO	3104C	9109-4441 9109-4443 9109-4444	MAR/00	12MONTH	■
8.	Log Periodic antenna	EMCO	3146	9109-3213 9109-3214 9109-3217	MAR/00	12MONTH	■
9.	LISN	EMCO	3825/2	9109-1867 9109-1869	FEB/00	12MONTH	
10.	RF Amplifier	HP	8447F	3113A04554	JUN/00	N/A	
11.	Spectrum Analyzer	HP	8591A	3131A02312	APR/00	12MONTH	
12.	Computer System	HP	98581C	98543A	N/A	N/A	■
	Hard disk drive		9153C	CMC762Z9153	N/A	N/A	■
13.	Plotter	HP	7475A	30052 22986	N/A	N/A	■
14.	Position Controller	EMCO	1090	9107-1038	N/A	N/A	■
15.	Turn Table	EMCO	1080-1.21	9109-1576	N/A	N/A	■
16.	Antenna Master	EMCO	1070-1	9109-1624	N/A	N/A	■