ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR REMOTE CONTROL/SECURITY DEVICE TRANSCEIVER

Test report file number	**: E037R-043**
Applicant	**: OMNITRONIC IND.**
Address	**: 2Fl. DongIl B/D, #40 Kuro5-Dong, Guro-Gu, Seoul, 152-055, Korea**
Manufacturer	**: OMNITRONIC IND.**
Address	**: 2Fl. DongIl B/D, #40 Kuro5-Dong, Guro-Gu, Seoul, 152-055, Korea**
Type of Equipment	**: REMOTE KEYLESS ENTRY SYSTEM**
FCC ID	**: P43RCA2003**
Model Name	**: 5000RS2W**
Multiple Model Name	**: ASTRA777, PG-6000**
Serial number	**: N/A**
Total page of Report	**: 17 pages (including this page)**
Date of Incoming	**: July 07, 2003**
Date of Issuing	**: July 22, 2003**

SUMMARY

The equipment complies with the requirements of **FCC CFR 47 PART 15 SUBPART C, SECTION 15.231.**
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/ Chief Engineer
EMC Div.
ONETECH Corp.

Reviewed by: Y. K. Kwon/ Director
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ONETECH Corp.

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1. VERIFICATION OF COMPLIANCE

-. APPLICANT : OMNITRONIC IND.

-. ADDRESS : 2Fl. DongIl B/D, #40 Kuro5-Dong, Guro-Gu, Seoul, 152-055, Korea

-. CONTACT PERSON : Mr. John Kim / President

-. TELEPHONE NO : +82-2-854-8618

-. FCC ID : P43RCA2003

-. MODEL NO/NAME : 5000RS2W

-. SERIAL NUMBER : N/A

-. DATE : July 22, 2003

DEVICE TYPE	REMOTE CONTROL/SECURITY DEVICE TRANSCEIVER
E.U.T. DESCRIPTION	Car Alarm - TRANSCEIVER
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	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 SUBPART C, 15.231
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 OMNITRONIC IND., Model 5000RS2W(referred to as the EUT in this report) is a transceiver that it controls locking and unlocking the door, panic, remote start and the trunk opening of a vehicle by wireless remote controller. The product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Plastic
TX/RX FREQUENCY	433.92 MHz / 423.22 MHz
MODULATION	FM
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	433.92 MHz, 423.22 MHz on RF Board, 4 MHz on Control Board
ANTENNA TYPE	Built-in on the PCB in the EUT
TRANSMITTING TIME	Periodic < 5 sec
RATED SUPPLY VOLTAGE	DC1.5V (Alkaline Battery)
NUMBER OF LAYERS	2 LAYERS

2.2 Model Differences:

The difference(s) compared to the EUT is as follows:

	Model Name	Model Difference
Basic Model	5000RS2W	
Multiple Model	ASTRA777 PG-6000	Only type designation

2.3 Related Submittal(s) / Grant(s)

-. None

2.4 Test System Details

The EUT was tested with the following all equipment used in the tested systems are: none

2.5 Test Methodology

Radiated testing was performed according to the procedures in 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)

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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
CONTROL BOARD	OMNITRONIC IND.	KC-DS1 0252	N/A
RTX BOARD	OMNITRONIC IND.	AM-RF	N/A

3.2 EUT exercise Software

-. To get a maximum radiated emission from the EUT at transmitter mode, the button on the EUT was continuously pressed to transmit the signal. Also, for getting maximum emission from the EUT at Receiver mode, the signal generator set to transmit at 433.92 MHz and the EUT receives the signal.

3.3 Equipment Modifications

-. None

3.4 Configuration of Test System

Line Conducted Test: It needs not to test this requirement, because the EUT supplies from a DC 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 5dB/division logarithmic display from an 8568B spectrum analyzer.

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3.5 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 transmitter antenna of the EUT is built-in on the PCB in the EUT, no consideration of replacement by the user.

4. PRELIMINARY TEST

4.1 AC Power line Conducted Emissions Tests

During Preliminary Tests, 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 DC battery.	

4.2 Radiated Emissions Tests

During Preliminary Tests, the following operating modes were investigated

Operation Mode	The Worse operating condition (Please check one only)
RX mode	
TX mode	X

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5. FINAL RESULT OF MEASURMENT

5.1 Maximum Modulation Percentage (MMP)

In order to determine possible Maximum Modulation percentage, alternations are made to the EUT.

We measured the duty cycle according to the clause I4 (10) in ANSI C63.4/1992.

The pulse train from the EUT was consisting of long and short pulse. The calculation of measured values is as follows.

Average Reading = Peak Reading (dBuV/m) + 20log (Duty Cycle)

Long Pulse (LP)	Short Pulse (SP)	Total sum of LP	Total sum of SP	Pulse Width
0.86ms	0.24ms	9	15	42.5ms
Duty Cycle		(9 x 0.86 + 15 x 0.24) / 42.5 = 0.267		
Maximum Modulation Percentage(MMP)		Duty Cycle x 100 % = 26.7 %		
Average Level Factor		-11.47 dB		

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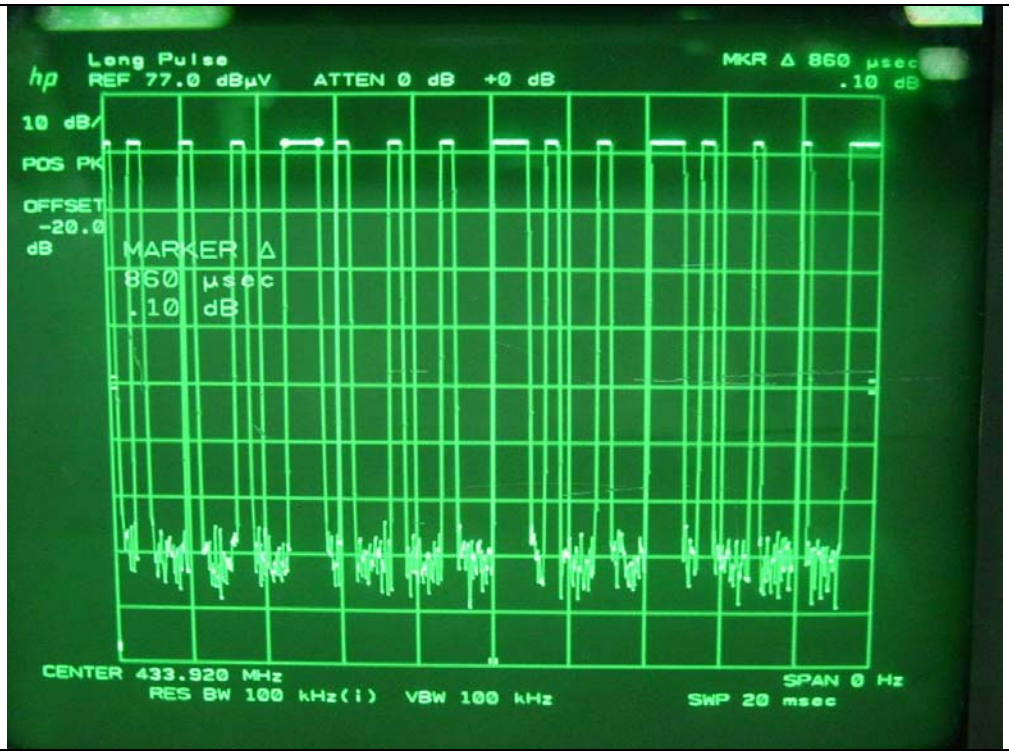
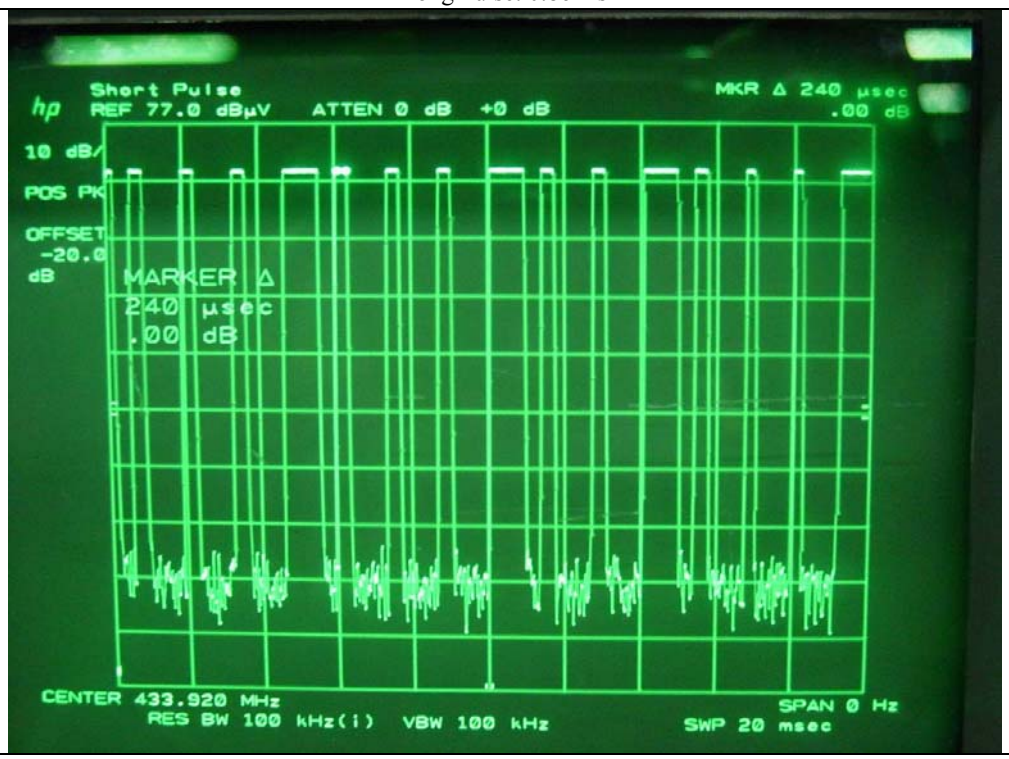


Long Pulse: 0.86 ms



Short Pulse: 0.24ms

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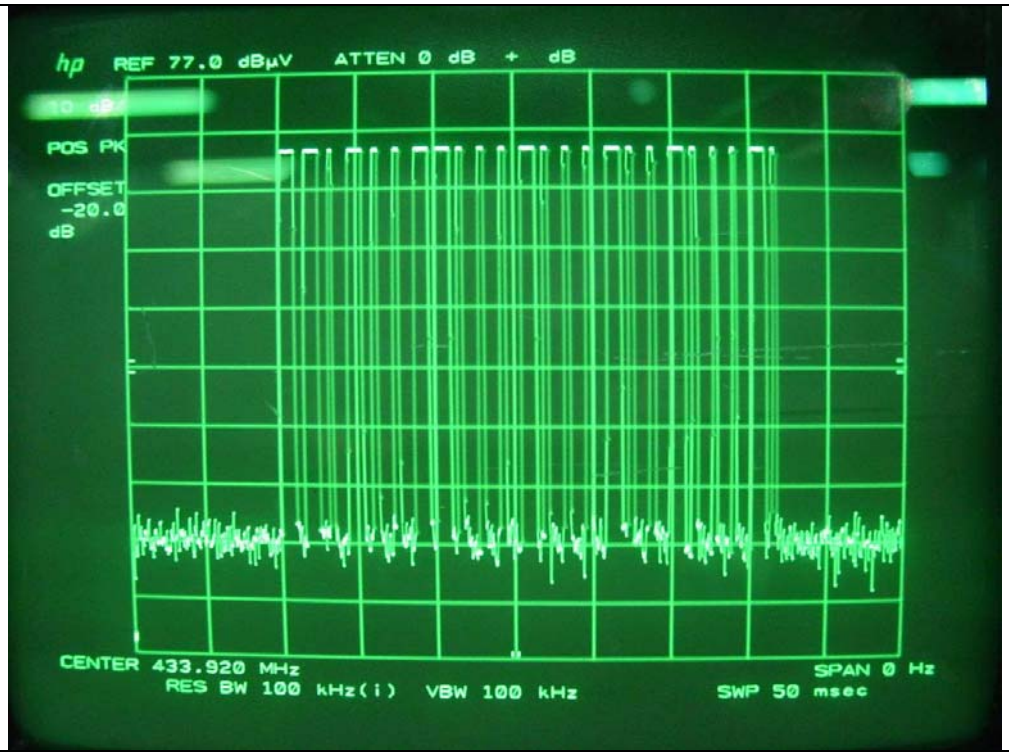
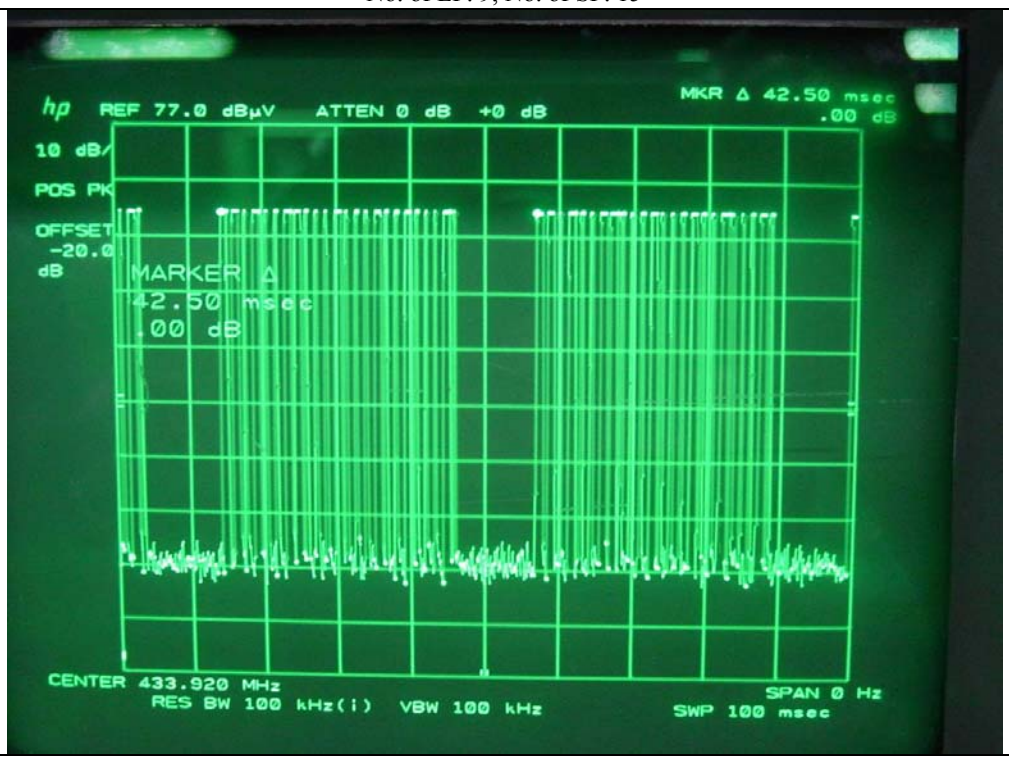


No. of LP: 9, No. of SP: 15



Pulse Width: 42.5ms

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5.2 Field Strength of the Carrier Test

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

Humidity Level : 50 % Temperature: 23 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231(b)

Type of Test : Transmitter

Result : PASSED BY –23.19 dB

EUT : Car Alarm Date: July 11, 2003

Operating Condition : TX mode

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)

Distance : 3 Meter

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Carrier Freq. (MHz)	Pk Rdg (dBuV)	Av Rdg (dBuV)	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
433.94	52.50	41.03	H	16.17	0.44	57.64	80.83	-23.19

Remark: To get a maximum emission level from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes.

Tested by: In-Sub, Youn / Test Engineer

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5.3 Spurious Emission Test

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

Humidity Level : 50 % Temperature : 23 °C
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231(b)
Type of Test : Transmitter
Result : PASSED BY –27.12dB at 1301.80 MHz

EUT : Car Alarm Date: July 11, 2003
Operating Condition : TX mode
Detector : Below 1GHz, Quasi-Peak/Peak (RBW: 120 kHz)
Above 1GHz, Average/Peak (RBW: 1MHz)
Distance : 3 Meter

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit(dBuV/m)	
Freq. (MHz)	Pk Rdg (dBuV)	Av Rdg (dBuV)	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)	Limit	Margin (dB)
424.80	13.30	1.83	H	16.11	0.44	18.38	60.83	-42.45
1301.80	18.20	6.73	V	25.86	1.12	33.71	60.83	-27.12
1735.70	14.30	2.83	H	27.84	1.22	31.89	60.83	-28.94
Other spurious frequencies were not found up to 4500 MHz.								

Remark: To get a maximum emission level from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes.

Tested by: In-Sub, Youn / Test Engineer

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5.4 Radiated Emission Test

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

Humidity Level : 48 % Temperature : 13°C
Limits apply to : FCC CFR 47, PART 15, SUBPART B
Type of Test : Receiver
Result : PASSED BY –15.25dB at 286.2 MHz

EUT : Car Alarm Date: July 11, 2003
Operating Condition : RX mode
Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)
Distance : 3 Meter

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit(dBuV/m)	
Freq. (MHz)	Amp. (dBuV)	Detect Mode	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)	Limit	Margin (dB)
86.30	6.80	Peak	H	9.46	0.17	16.43	40.00	-23.57
283.20	6.20	Peak	H	12.95	0.63	19.78	46.02	-26.24
324.90	16.30	Peak	H	13.90	0.64	30.84	46.02	-15.18
424.80	11.20	Peak	H	16.11	0.44	27.75	46.02	-18.27
517.90	4.20	Peak	V	17.68	0.79	22.67	46.02	-23.35
849.70	5.40	Peak	H	21.61	0.92	27.93	46.02	-18.09

*Remark: To get a maximum emission level from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes.

Tested by: In-Sub, Youn / Test Engineer

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5.5 Bandwidth of the operating frequency

Humidity Level : 51 % Temperature: 19 °C
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231 (c)
Type of Test : Transmitter
Result : PASSED

EUT : Car Alarm Date: July 11, 2003
Operating Condition : TX mode
Minimum Resolution Bandwidth : 10 kHz

Carrier Freq. (MHz)	Bandwidth of the emission. (kHz)	Limit (kHz)	Remark
433.92	38.0 (Refer to next page)	433.94 x 0.25% = 1084.85	The point 20dB down from the modulated carrier

Tested by: In-Sub, Youn / Test Engineer

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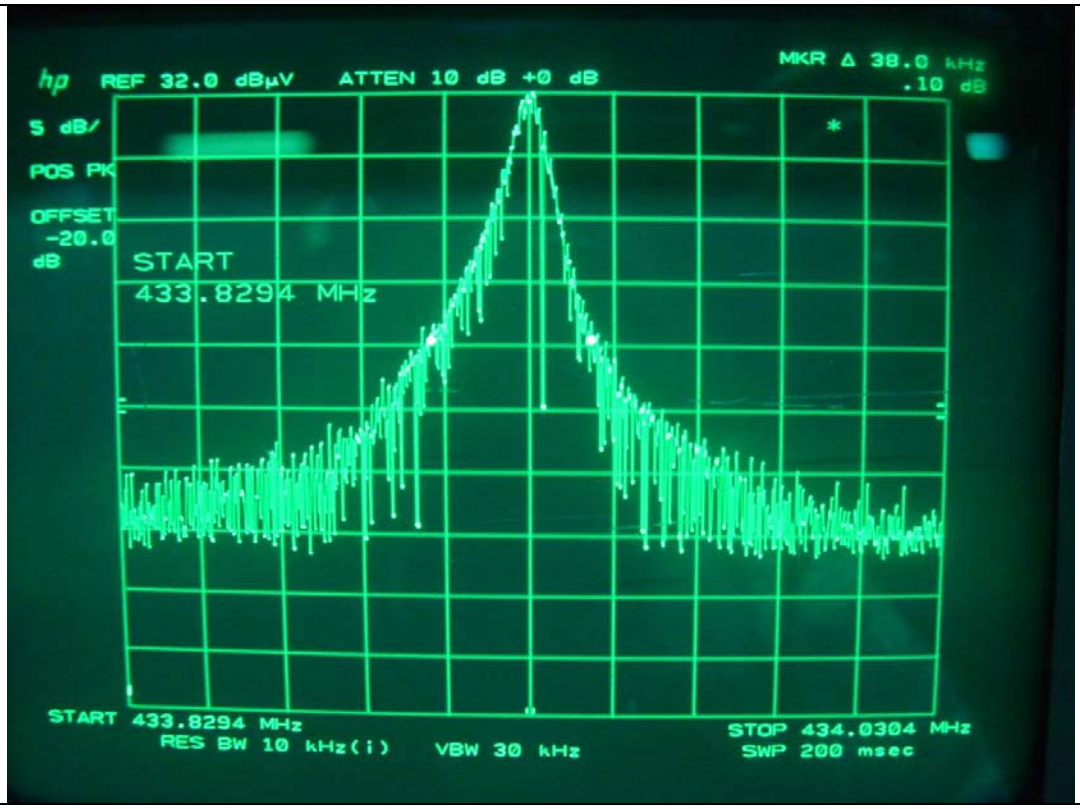

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6. FIELD STRENGTH CALCULATION

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

+	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	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 Schwarzbeck	3104C VHA9103	9109-4443 9109-4444 91031852	MAY/03 JUL/03 AUG/02	12MONTH	■
9.	Log Periodic antenna	EMCO Schwarzbeck	3146 9108-A(494)	9109-3213 9109-3214 9109-3217 62281001	AUG/02 JUL/03 MAY/03 AUG/02	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	■

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