

Technical Information

APPLICANT	MANUFACTURER
Name: Magnetek / Enrange	Name: Magnetek / Enrange
Address: 5 Coins Drive	Address: 5 Coins Drive
City, State, Zip: Canonsburg, PA 15317	City, State, Zip: Canonsburg, PA 15317
Date: August 27, 2012	

FILING TYPE: Original Application - Limited Modular Approval

TEST SPECIFICATION: FCC Rules and Regulations Part 90.257

TEST PROCEDURE: FCC Part 2

TEST SAMPLE DESCRIPTION

TEST SAMPLE:	VHF Transmitter
BRANDNAME:	Pulse Star
MODEL	XLTX
FCC ID:	TNE-7276LMA1
TYPE:	Wireless Radio Remote Control
POWER REQUIREMENTS:	4.5 VDC Derived from (3) 1.5 V Alkaline Batteries
FREQUENCY OF OPERATION:	72.0236 to 75.9938 MHz
CONFIGURATION:	The VHF Transmitter was tested in a stand alone configuration and connected to a remote control assembly, which was used as support equipment.
EMISSIONS DESIGNATOR:	TNB

The module complies with the requirements for a limited modular approval under Section 90.257 of the FCC Rules.

Tests Performed

The test methods performed on the VHF Transmitter are shown below:

FCC Part 90 Section	FCC Part 2 Section	Test Method
90.205	2.1046	RF Power Output
90.209	2.1049	Occupied Bandwidth
90.210	2.1051	Spurious Emissions at Antenna Terminals
90.210	2.1053	Field Strength of Spurious Radiation
90.213	2.1055	Frequency Stability

GENERAL REQUIREMENTS

1. All user accessible controls were adjusted to produce maximum emissions.
2. The unit operates at the following frequencies:
 - 72.0236 – 75.9938 MHz
3. The unit was tested at the following frequencies:
 - Channel 0: 72.0236 MHz
 - Channel 2: 75.9938 MHz
4. The frequency range was scanned from 9 kHz to 760 MHz. All emissions not reported were more than 20 dB below the specified limit.

Certification and Signatures

We certify that this report is a true representation of the results obtained from the tests of the equipment stated. We further certify that the measurements shown in this report were made in accordance with the procedures indicated and vouch for the qualifications of all Retlif Testing Laboratories personnel taking them.



Dean Landers
EMC Test Engineer



Richard J. Reitz
Corporate Laboratory Manager
iNARTE Certified Engineer ATL-0036-E
NVLAP Approved Signatory

Non-Warranty Provision

The testing services have been performed, findings obtained and reports prepared in accordance with generally accepted laboratory principles and practices. This warranty is in lieu of all others, either expressed or implied.

Non-Endorsement

This test report contains only findings and results arrived at after employing the specific test procedures and standards listed herein. It is not intended to constitute a recommendation, endorsement or certification of the product or material tested. This test report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

Requirements and Test Results

Requirement:

FCC Sections 90.205 and 2.1046 RF Power Output

The RF Power Output of the EUT was measured with the transmitter adjusted for maximum power output. The highest observed power output was measured to be 19.66 dBm (92.47 mW), 17.34 dBm below the limit of 37.0 dBm (5 Watts). The measured power output is in compliance with the requirements specified in section 90.205(o) of the FCC Rules.

Requirement:

FCC Sections 90.209 and 2.1049 Occupied Bandwidth

The Occupied Bandwidth of the transmitter was measured and found to be 10 kHz. Utilizing this Bandwidth, the transmitter complied with the requirements for Emissions Mask B contained in section 90.210(b) and the Bandwidth Limitations of section 90.209(b)(5).

Requirement:

FCC Sections 90.210 and 2.1051 Spurious Emissions at Antenna Terminals

The Spurious Emissions present at the antenna terminals were measured over the frequency range of 9 kHz to 760 MHz (ten times the operating frequency) in accordance with section 2.1057. Spurious emissions were attenuated at least $43 + 10 \log P$ (5 Watts), 49.9897 dBm from the carrier as required by sections 90.209 and 90.210.

Requirement:

FCC Sections 90.210 and 2.1053 Field Strength of Spurious Radiation

The Field Strength of Spurious Radiation was measured over the frequency range of 9 kHz to 760 MHz. All spurious emissions complied with the requirements of sections 90.209 and 90.210. In addition, spurious digital emissions in the frequency range of 30 to 1000 MHz were found to be in compliance with the requirements for a Class B Digital Device as contained in section 2.1053.

Requirement:

FCC Sections 90.213 and 2.1055 Frequency Stability

The frequency stability of the transmitter was measured over temperature extremes of -30° to $+50^\circ$ C. For varying of the DC power input, the voltage was reduced to the operating end point, which was 3.2 VDC. The EUT carrier frequency was found to remain within the $\pm 0.05\%$ tolerance as specified in section 90.213(a).

Requirements and Test Results (con't)

RF Exposure Limits

Transmitters operating under Part 2.1091 are categorically excluded from routine environmental evaluation for demonstrating RF exposure compliance with respect to MPE or SAR limits however per 2.1091(b) must be operated in a manner that ensures the public is not exposed to RF energy levels in excess of the commission's guidelines. The user/installation manual contains the proper cautionary statements and specifies that the device be installed and operated so that a minimum separation distance of 20 cm will be maintained. Based on the transmitter power and maximum antenna gain (see calculation below) the 20 cm separation distance exceeds the calculated distance for acceptable MPE power density levels to meet both the Occupational/Controlled Exposure and the General Population/Uncontrolled Exposure requirements of FCC Part 1.1310. The calculation below uses the more stringent General Population MPE Limits.

$$S = \frac{PG}{4\pi Dsq}$$

D = Minimum Separation Distance in cm

S = Max allowed Power Density in mW/cmsq

Per 1.1310 For the Frequency of 72-76 MHz S = 0.2 mW/cmsq

Power = Max Power Input to Antenna = 100 mW

Gain = Max Power Gain of Antenna = 1 dBi = 1.26 numeric

$$0.2 \text{ mW/cmsq} = \frac{100 \times 1.26}{4 \times (3.14) \times D^2} = \frac{126}{12.56 \times D^2}$$

$$D^2 = \frac{126}{12.56 \times 0.2}$$

$$D = \sqrt{50.16} = 7.08 \text{ cm}$$

Equipment List

Sections 90.205 and 2.1046, RF Power Output

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
8357	NARDA	10.0DB ATTENUATOR	DC - 11 GHz, 20 W	768-10	6/5/2012	6/30/2013
8381	BOONTON	POWER METER	10 kHz - 100 GHz	4232A	1/23/2012	1/31/2013
8381B	BOONTON	POWER SENSOR	10 kHz - 8 GHz	51011-EMC	5/11/2012	5/31/2013

Sections 90.209 and 2.1049, Occupied Bandwidth

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
8100	NARDA	20DB ATTENUATOR	10 kHz-11 GHz	768-20	6/4/2012	6/30/2013
R603	AGILENT / HP	SPECTRUM ANALYZER	100 kHz - 26.5 GHz	E7405A;B	6/18/2012	6/18/2013

Sections 90.210 and 2.1051, Spurious Emissions at Antenna Terminals

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
713	ROHDE & SCHWARZ	EMI TEST RECEIVER	20 Hz - 26.5 GHz	ESIB26	6/8/2012	6/30/2013
8457	GENERAL TECHNICS	Control Computer	N/A			
8496	NARDA	MED POWER ATTENUATOR	DC-11GHz / 20W	768-10	6/4/2012	6/30/2013

Sections 90.210 and 2.1053, Field Strength of Spurious Radiation

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
159	AGILENT / HP	FREQUENCY COUNTER	10 Hz - 18 GHz	5342A	9/2/2011	9/2/2012
713	ROHDE & SCHWARZ	EMI TEST RECEIVER	20 Hz - 26.5 GHz	ESIB26	6/8/2012	6/30/2013
8016	EMCO	ANTENNA	200 MHz to 1 GHz	3146	1/31/2012	1/31/2013
8019	EMCO	BICONICAL ANTENNA	20-200 MHZ	3104	5/25/2012	5/31/2013
8076	AGILENT / HP	SPECTRUM ANALYZER	100 Hz - 1.5 GHz	8568B	8/18/2011	8/18/2012
8077	AGILENT / HP	SPECTRUM ANALYZER	N/A	85662A	8/18/2011	8/18/2012
8392	IFR / AEROFLEX	SIGNAL GENERATOR	9 kHz - 2.5 GHz	2025	1/19/2012	1/31/2013
8433	ETS LINDGREN	BICONILOG	20 - 6000 MHz	3142D	8/31/2011	8/31/2012

Sections 90.213 and 2.1055, Frequency Stability - Temperature Variation

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
159	LEADER INSTRUMENTS	FREQUENCY COUNTER	10 Hz - 1 GHz	LDC-825	8/12/2011	8/12/2012
8260	MASTECH	DC POWER SUPPLY	N/A	HY3003	Calibrate Before Use	
8320	ASSOCD ENVIRON SYS	TEMPERATURE CHAMBER	-50 to 150° C	ZFD-531	6/6/2012	6/30/2013

**FCC Part 90, Section 2.1046
RF Power Output
Test Data**

Sheet 1 of 1

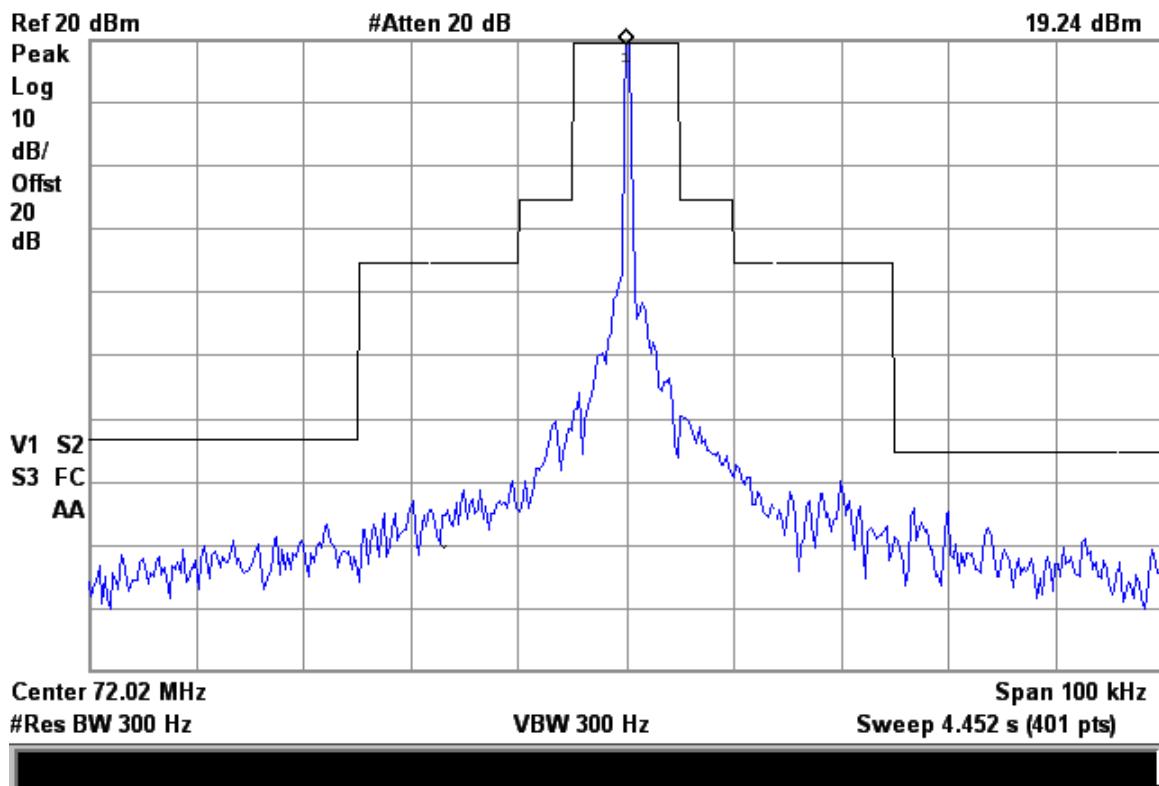
**FCC Part 90, Section 2.1049
Occupied Bandwidth
Test Data**

Agilent 06:32:03 Aug 31, 2012

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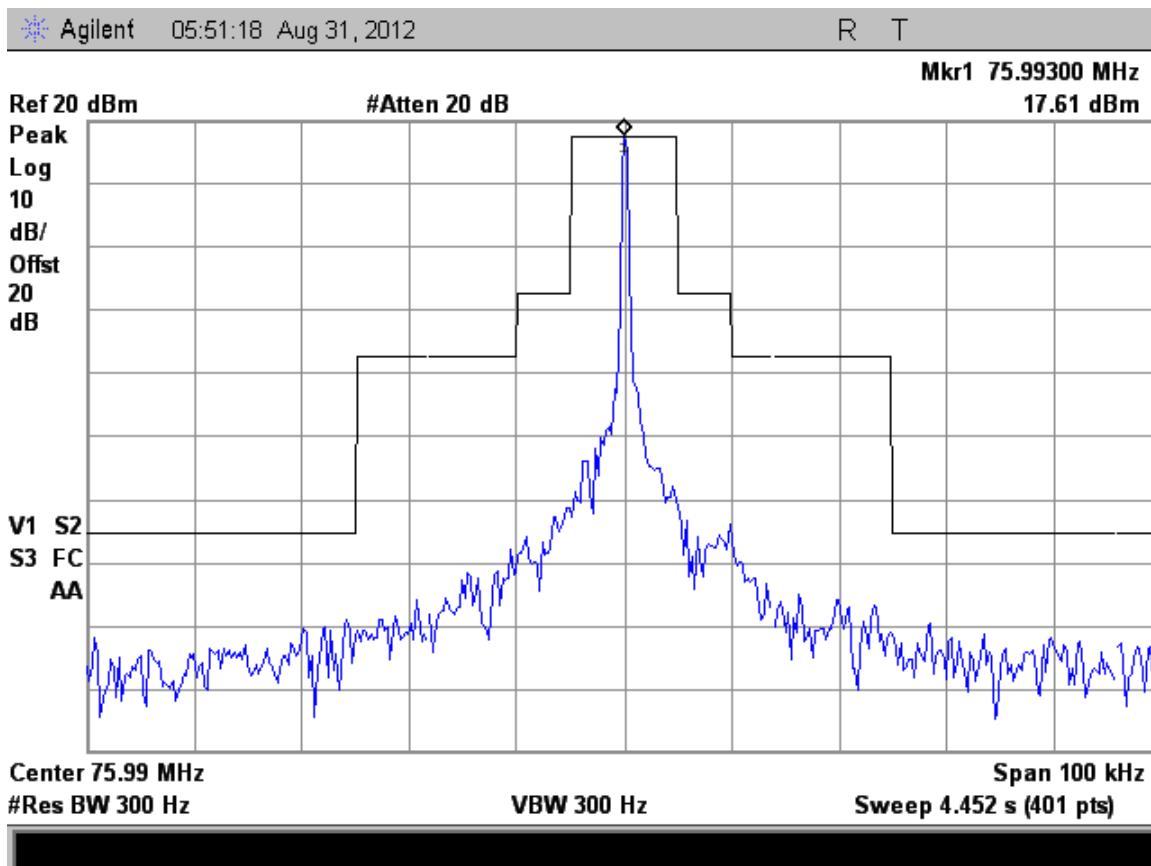
Mkr1 72.02299 MHz

19.24 dBm



Channel 0

Customer	Magnetek /Enrange
Test Sample	VHF Transmitter
Model Number	XLT
Date 8/9/12	Tech: R.Reitz



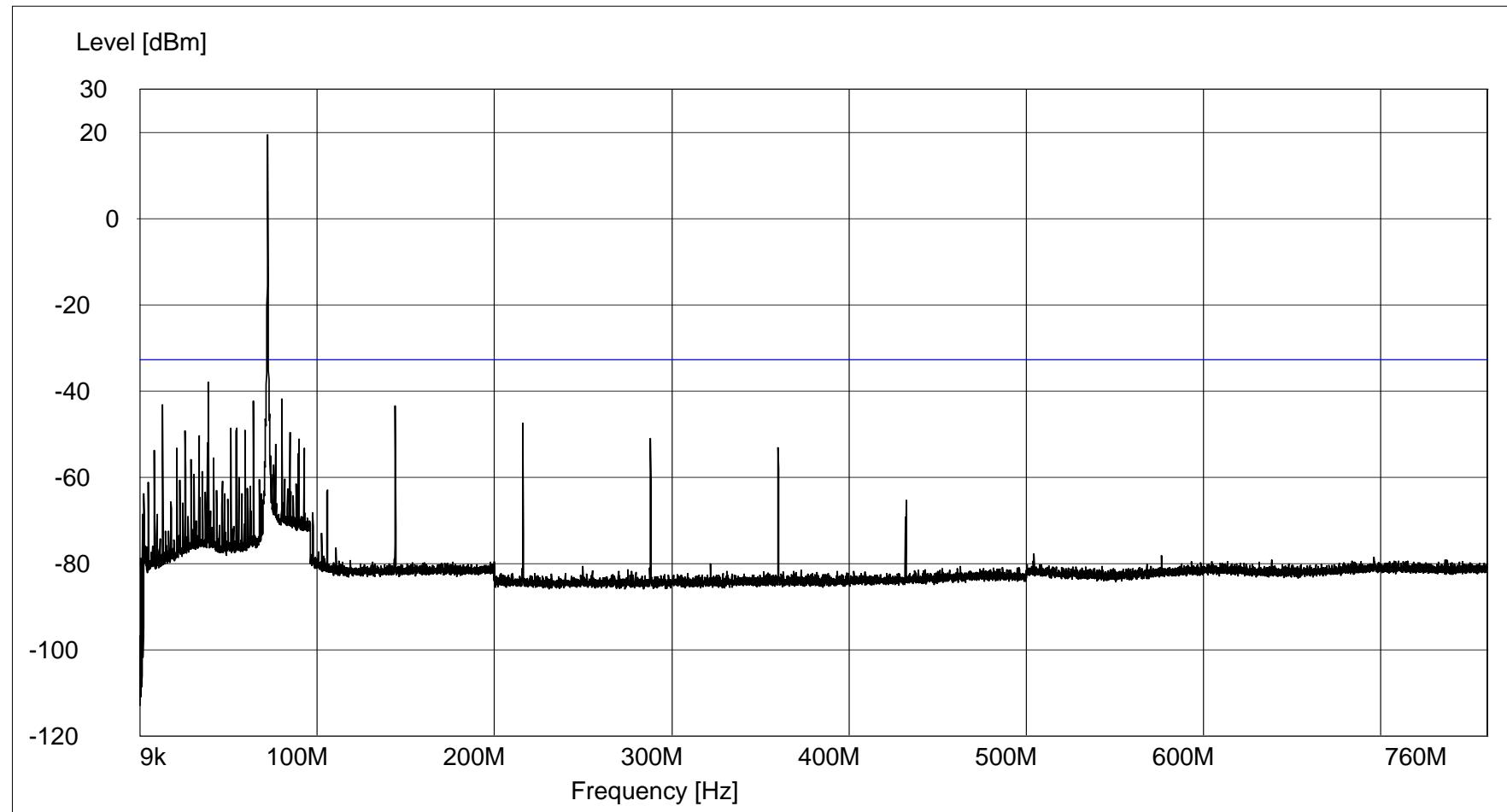
Channel 2

Customer	Magnetek /Enrange
Test Sample	VHF Transmitter
Model Number	XLTX
Date 8/9/12	Tech: R.Reitz

**FCC Part 90 Section 2.1051, Spurious Emissions at Antenna Terminal
9 kHz to 760 MHz
Test Data**

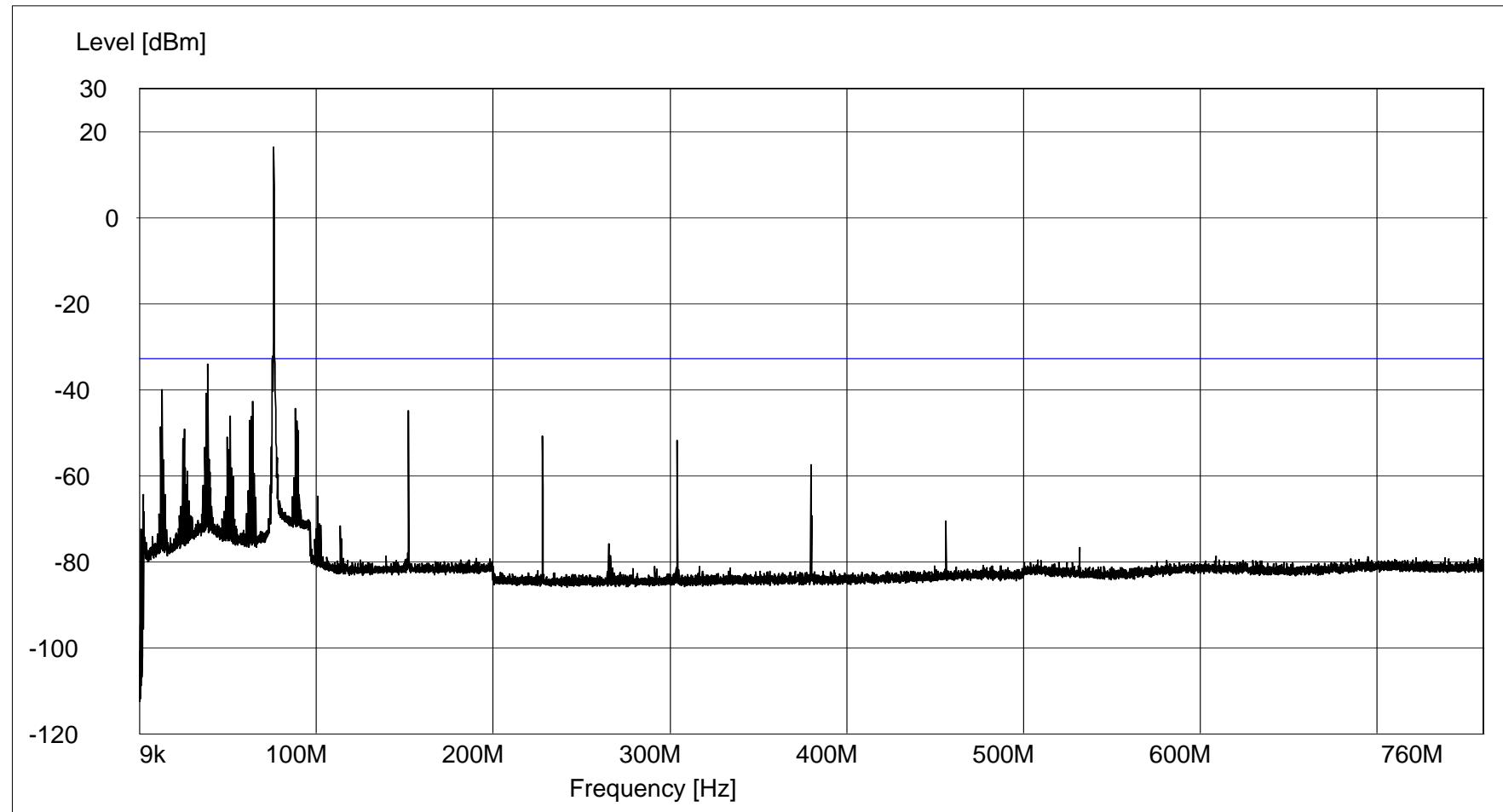
Section 2.1051, Spurious Emissions at Antenna Terminal

Customer: Magnetek
Test Sample: VHF Transmitter
Model Number: XLTX
Test Specification: FCC Part 90
Mode of Operation: Constant Transmit with Modulated Data on Channel 0
Technician/Date: D.Fiore / 6-18-12
Lead Tested: Antenna Port
Note:



Section 2.1051, Spurious Emissions at Antenna Terminal

Customer: Magnetek
Test Sample: VHF Transmitter
Model Number: XLTX
Test Specification: FCC Part 90
Mode of Operation: Constant Transmit with Modulated Data on Channel 2
Technician/Date: D.Fiore / 6-18-12
Lead Tested: Antenna Port
Note:



**FCC Part 90 Section 2.1053, Field Strength of Spurious Emissions
9 kHz to 760MHz
Test Data**

**FCC Part 90, Section 2.1055
Frequency Stability
Test Data**

