

Control Design and Testing, Inc.
6010 Red Fox Drive – Spotsylvania, VA 22553

Radiated Emissions Test Report
Prepared for ADRad Communications, Inc.
November 29, 2001

A. DEVICE UNDER TEST

The device is a VHF Repeater operating under Part 90 of the FCC rules. The device is configured as a metal cased, rack mountable unit, powered from an external DC source of 13.8 volts, nominal. The device covers the frequency range of 216.000 MHz. to 222.000 MHz.

B. MEASUREMENT PROCEDURE:

Radiation measurements were conducted according to the procedures set forth in ANSI C63.4 (1992). The device was tested as follows:

The unit was placed on the center of the turntable directly on top of the DC supply. A 50 ohm, 100 watt load termination was connected to the transmitter section output terminal (type N) and an EMC0 model 3148A log periodic antenna (200 to 1000 Mhz.) was connected to the receiver section input terminal (BNC). The test sample was provided with an external, plug-in switch to lock the the device in transmit mode. The test was conducted with the device positioned as shown in the photographs. The unit was tested the low, mid and high ends of its band.

The device was scanned from 30 MHz. to 4 GHz. and all emissions within -30 dB. of the limit were noted. For transmitter cabinet radiation measurements, the tables below only record emissions up to the 12th harmonic. Although higher harmonic emissions were detected, all were more than 30 dB. below the limit. In this case, the only transmitter emissions detected were those harmonically related to the fundamental transmit frequency.

For receiver section measurements, the device was checked in both the active and inactive states. A search was made specifically for emissions from the processor crystal and local oscillators but were nothing that could be related those frequencies was detected. The receiver emissions that are recorded in the tables were present in both states and at all three channel settings.

The field strength measurements were taken using an HP8596E spectrum analyzer, an EMC0 3121C dipole set and an Avantek UJ210 preamp. The devices were powered by an HP6264 power supply.

At each detected frequency of emission, the device was measured by rotating the turntable and adjusting the antenna height over a range of 1 to 4 meters to obtain the maximum emission level. This procedure was performed with both horizontal and vertical antenna polarizations. The peak reading for each frequency was recorded. The computed field strength for the readings appear in the tables below.

Table 1

RADIATED EMISSIONS DATA				CLIENT: ADRAD COMMUNICATIONS			
ANTENNA: DIPOLES/DRG HORN				EUT: VHF REPEATER			
MODEL: MX800FFHNSZ2CD				TEST DATE: 19-NOV-01			
Frequency MHz.	Ant. H/V	Ant. Factor dB	Peak reading dBm	Duty cycle dB	Peak power uV/m@3m	Adjusted power uV/m@3m	FCC limit uV/m3m
Low Channel: 216.000 MHz.				TRANSMIT MODE CABINET RADIATION			
432.000	V	23.2	-68.90		1161		7385
648.000	V	27.2	-87.22		223		7385
864.000	V	29.9	-83.76		454		7385
1080.000	V	26.5	-89.01		168		7385
1296.000	V	27.6	-77.59		709		7385
1512.000	V	28.7	-91.48		163		7385
1728.000	V	29.8	-92.57		163		7385
1944.000	V	30.7	-99.25		84		7385
2160.000	V	31.6	-90.53		253		7385
2376.000	H	32.4	-94.05		185		7385
2592.000	H	33.1	-94.11		199		7385

Table 2

RADIATED EMISSIONS DATA	CLIENT: ADRAD COMMUNICATIONS
ANTENNA: DIPOLES/DRG HORN	EUT: VHF REPEATER
MODEL: MX800FFHNSZ2CD	TEST DATE: 20-NOV-01

Frequency MHz.	Ant. H/V	Ant. Factor dB	Peak reading dBm	Duty cycle dB	Peak power uV/m@3m	Adjusted power uV/m@3m	FCC limit uV/m3m
-------------------	-------------	----------------------	------------------------	---------------------	--------------------------	------------------------------	---------------------

Mid Channel: 219.000 MHz.				TRANSMIT MODE CABINET RADIATION			
438.000	V	23.3	-69.93		1044		7385
657.000	V	27.3	-91.42		139		7385
876.000	V	30.1	-82.27		551		7385
1095.000	V	26.6	-89.03		169		7385
1314.000	V	27.7	-80.29		525		7385
1533.000	V	28.7	-89.84		196		7385
1752.000	V	29.8	-86.05		345		7385
1971.000	V	30.8	-100.18		76		7385
2189.999	H	31.7	-87.37		369		7385
2408.999	H	32.5	-98.94		107		7385
2627.999	H	33.3	-85.73		535		7385

Table 3

RADIATED EMISSIONS DATA	CLIENT: ADRAD COMMUNICATIONS
ANTENNA: DIPOLES/DRG HORN	EUT: VHF REPEATER
MODEL: MX800FFHNSZ2CD	TEST DATE: 20-NOV-01

Frequency MHz.	Ant. H/V	Ant. Factor dB	Peak reading dBm	Duty cycle dB	Peak power uV/m@3m	Adjusted power uV/m@3m	FCC limit uV/m3m
-------------------	-------------	----------------------	------------------------	---------------------	--------------------------	------------------------------	---------------------

High Channel: 222.000 MHz.				TRANSMIT MODE CABINET RADIATION			
444.000	V	23.4	-72.98		743		7385
666.000	V	27.5	-94.35		102		7385
888.000	V	30.2	-84.08		453		7385
1110.000	V	26.7	-88.41		184		7385
1332.000	V	27.8	-80.22		536		7385
1554.000	V	28.8	-94.40		117		7385
1776.000	V	29.9	-101.57		58		7385
1998.000	V	30.9	-102.32		60		7385
2219.999	V	31.8	-79.83		888		7385
2441.999	H	31.7	-96.51		129		7385
2663.998	H	33.2	-92.1		254		7385

Table 4

RADIATED EMISSIONS DATA				CLIENT: ADRAD COMMUNICATIONS			
ANTENNA: DIPOLES				EUT: VHF REPEATER			
MODEL: MX800FFHNSZ2CD				TEST DATE: 20-NOV-01			
All Channels:				RECEIVE MODE CABINET RADIATION			
Frequency MHz.	Ant. H/V	Ant. Factor dB	Peak reading dBm	Duty cycle dB	Peak power uV/m@3m	Adjusted power uV/m@3m	FCC limit uV/m3m
304.806	H	19.9	-106.08		11		150
314.639	H	20.2	-104.45		14		150

C. FACILITY

Radiated emissions testing for this device was conducted by Control Design & Testing, Inc. Testing was performed at the Hyak Laboratories three meter open area test site located in Spotsylvania, VA. FCC test site #90660.