

A. DEVICE UNDER TEST

The device is a VHF Handheld Transceiver operating under Part 90 of the FCC rules. The transmit frequency range of operation is 150.050 MHz. to 174.050 MHz.

B. MEASUREMENT PROCEDURE:

TRANSMITTER SECTION CABINET RADIATED EMISSIONS

Transmitter cabinet radiation field strength measurements were conducted according to the procedures set forth in ANSI C63.4 (1992). The device under test was terminated with a 50 ohm dummy load and placed on a rotating turntable 0.8 meters high, centered at 3 meters distant from the measurement antenna. The device was placed in the center of the turntable and tested in three major planes as shown in the photographs

The device is powered by an internal 7.5V, NiCad rechargeable battery. The test was conducted with a fresh battery. A spare battery pack was on hand and was used after the first battery dropped to 85% capacity. For the purposes of testing, the device was locked in a constant transmit mode by holding the transmit key depressed with a rubber band. Testing was conducted at the low, mid and high ends of the operational range.

The device was scanned from 30MHz. to 2GHz. and all emissions were noted. In this case, the only emissions detected were those harmonically related to the fundamental transmit frequency.

RECEIVER SECTION RADIATED EMISSIONS

Receiver radiation measurements were conducted according to the procedures set forth in ANSI C63.4 (1992). The device under test was placed on the center of turntable and terminated with the antenna supplied by the manufacturer. Testing was conducted with the device positioned in three major planes. The sample was tested the low, mid and high ends of its range. The squelch control was adjusted to allow sound from the speaker and the volume control was set to approximately one quarter rotation.

The device was scanned from 30MHz. to 2GHz. and all emissions were noted. In this case, the only emissions detected were those harmonically related to the fundamental frequency of the first local oscillator. The manufacturer's specifications indicated a second local oscillator running

at 33.845 MHz., common to all channels. The fourth harmonic (135.380MHz.) of this oscillator was discernable at the antenna terminal (-68.22dBm.) when connected directly to the spectrum analyzer. However, none of the signals related to the second local oscillator were detectable under open field conditions.

MEASUREMENTS

The field strength measurements were taken using an HP8596E spectrum analyzer, an EMCO 3120 dipole set, an EMCO 3115 double ridge guide horn antenna and an Avantek UJ210 preamp.

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 output level. This procedure was performed with both horizontal and vertical antenna polarizations with the device placed in the positions shown in the photographs. The peak reading for each frequency was captured and recorded in the second column on the data sheet.

C. FACILITY

Radiated emissions testing for this device was conducted by Control Design & Testing, Inc. and performed on the Hyak Laboratories 3 meter open area test site located in Spotsylvania, VA.

CD&T

FCC ID

RADIATED EMISSIONS		FCC ID:			page 1 of 6	
client ADRAD Communications		model			project 0752	
device handheld transceiver			Test date 16-Nov-2000			
CFR	test antenna Dipoles/DRG Horn			temp. 7C		
Transmitter Radiated Emissions						
Frequency Radiated MHz.	Peak Reading dBm	Ant Factor dB	Test Antenna Polarity	Field Intensity uV/m @ 3m		FCC Limit uV/m @ 3m
device tuned to 150.050 MHz. 50 ohm dummy load termination						
300.100	-82.01	25.6	H	338		4,500
450.150	-90.10	26.8	V	153		4,500
600.200	-83.86	30.4	H	475		4,500
750.250	-101.28	31.8	H	75		4,500
900.300	-97.46	36.7	V	205		4,500
1050.350	-89.31	25.1	V	138		4,500
1200.400	-88.26	25.6	H	165		4,500
1350.450	-85.09	26.3	V	257		4,500
1500.500	-86.84	26.9	V	225		4,500

RADIATED EMISSIONS		FCC ID:			page 2 of 6	
client	ADRAD Communications	model			project 0752	
device	handheld transceiver	Test date 16-Nov-2000				
CFR	test antenna Dipoles/DRG Horn	temp. 7C				
Transmitter Radiated Emissions						
Frequency Radiated MHz.	Peak Reading dBm	Ant Factor dB	Test Antenna Polarity	Field Intensity uV/m @ 3m		FCC Limit uV/m @ 3m
device tuned to 168.950 MHz. 50 ohm dummy load termination						
337.900	-81.29	25.8	H	376		4,500
506.850	-89.27	27.5	H	183		4,500
675.800	-97.10	31.2	H	114		4,500
844.750	-105.03	33.0	V	56		4,500
1013.700	-94.93	24.9	V	71		4,500
1182.650	-81.39	25.5	V	359		4,500
1351.600	-86.80	26.3	V	211		4,500
1520.550	-88.17	27.0	V	196		4,500
1689.500	-91.37	27.7	V	147		4,500

RADIATED EMISSIONS		FCC ID:			page 3 of 6			
client	ADRAD Communications		model		project 0752			
device	handheld transceiver			Test date 17-Nov-2000				
CFR	test antenna Dipoles/DRG Horn			temp. 12C				
Transmitter Radiated Emissions								
Frequency Radiated MHz.	Peak Reading dBm	Ant Factor dB	Test Antenna Polarity	Field Intensity uV/m @ 3m		FCC Limit uV/m @ 3m		
device tuned to 174.050 MHz. 50 ohm dummy load termination								
348.100	-81.77	25.9	H	360		4,500		
522.150	-86.43	27.6	H	256		4,500		
696.200	-90.51	31.3	V	245		4,500		
870.250	-104.48	33.6	V	64		4,500		
1044.300	-93.58	25.0	V	83		4,500		
1218.350	-88.07	25.6	V	168		4,500		
1392.400	-85.39	26.4	V	251		4,500		
1566.450	-89.80	27.3	H	168		4,500		
1740.500	-90.84	28.2	V	165		4,500		

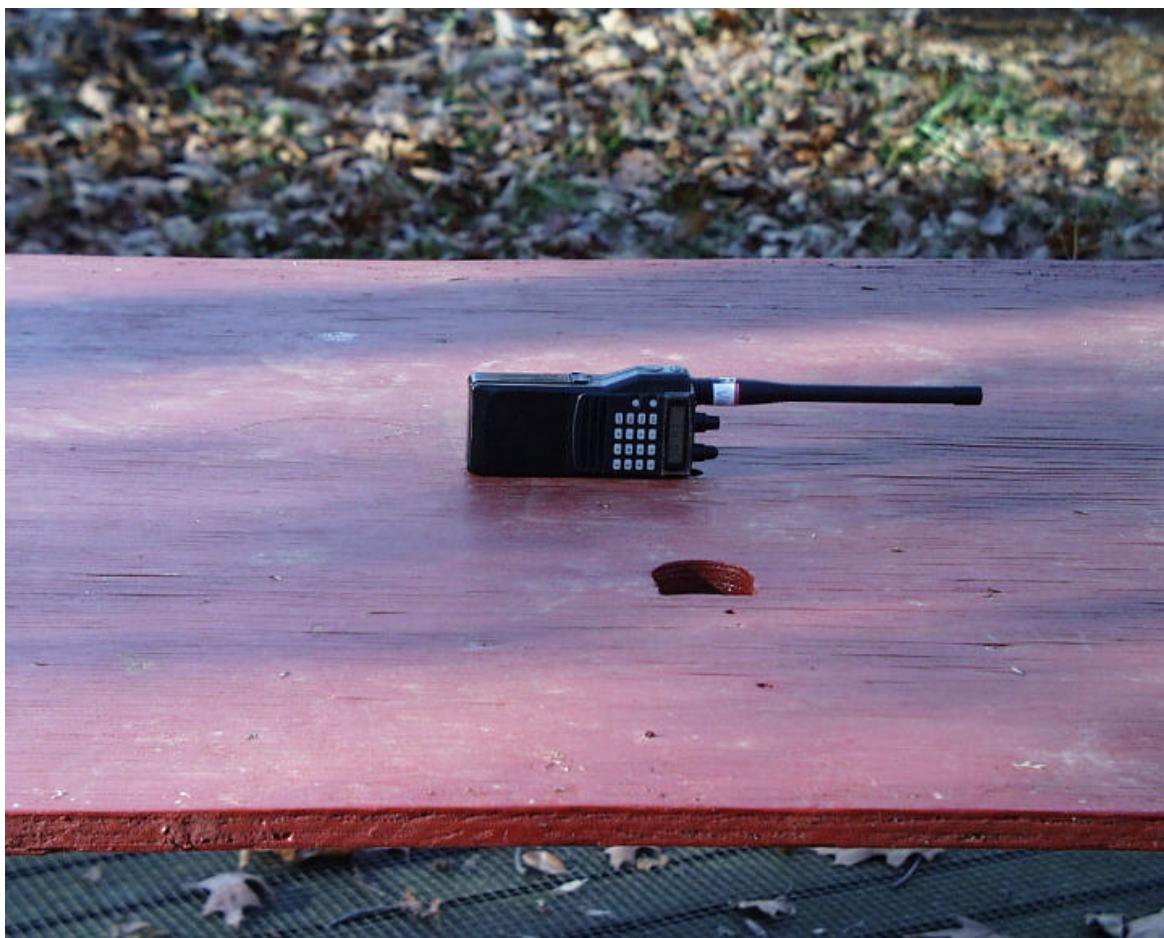
RADIATED EMISSIONS		FCC ID:			page 5 of 6	
client ADRAD Communications		model			project 0752	
device handheld transceiver		Test date 16-Nov-2000				
CFR		test antenna Dipoles			temp. 7C	
Receiver Section Radiated Emissions						
Frequency Radiated MHz.	Peak Reading dBm	Ant Factor dB	Test Antenna Polarity	Field Intensity uV/m @ 3m		FCC Limit uV/m @ 3m
device tuned to 168.950 MHz. supplied antenna attached						
147.550	-97.60	15.7	V	18		150
295.100	-119.72	25.4	H	4		200
442.650	-119.68	26.5	V	5		200
590.200	-124.34	28.2	H	3		200
737.750	-128.05*	31.7	H	3		200
*noise floor = 131.02						



Receiver Testing, Vertical Plane



Receiver Testing, Horizontal, sides



Receiver Testing, Horizontal, Front/Rear



Transmitter Testing, Horizontal, Sides



Transmitter Testing, Vertical



Transmitter Testing, Horizontal, Front/Back