

Radio Shack, A Division of Tandy Corporation, 20-514 (PRO-89)

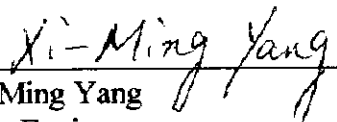
Date of Test: October 27, 1999


TEST REPORT**0.0 Summary of Test Results**

Radio Shack, A Division of Tandy Corporation - Model: 20-514 (PRO-89)
FCC ID: AAO2000514

TEST	REFERENCE	RESULTS
Radiated Emission	15.109	Complies
Conducted Emission	15.107	Complies

We attest to the accuracy of this report:


Xi-Ming Yang
Test Engineer


David Chernomordik
EMC Site Manager

1.0 General Description

1.1 Product Description

The General Research of Electronics, Inc. Model No.: 20-514 (PRO-89) is a scanning receiver used to listen to police and fire departments, ambulance services, government agencies, private companies, amateur radio services, aircraft and military operations.

Please refer to the attached users manual for more details.

A pre-production version of the sample was received on October 26, 1999 in good condition.

1.2 Related Submittal(s) Grants

This is an Application for Certification of a scanning receiver.

1.3 Test Methodology

Both AC mains line-conducted (if applicable) and radiated emission measurements were performed according to the procedures in ANSI C63.4 (1992). All measurements were performed in Open Area Test Sites. All Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "Data Section" of this Application.

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is Site 1. This test facility and site measurement data have been fully placed on file with the FCC.



GENERAL RESEARCH OF ELECTRONICS, INC.

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3-12-17 MITA, MINATO-KU

TOKYO, JAPAN

Date: Oct. 7, 1999

Reference No. 99015

S P E C I F I C A T I O N

SUBJECT : VHF/UHF DIRECT PROGRAMMABLE AM/FM HANDHELD WITH 800MHz BAND
RACE SCANNER PRO-89 CAT. NO. 20-514

1. GENERAL

- 1 Programmable channel : 10 bank 20 channel (200 channel) memory bank
5 Pre-programmed band search
20 monitor channels
50 frequency-skip memories in search mode
200 channels lock-out in scan mode
7 WX pre-programmed frequencies
1 Priority channel
- 3 Receiving system : Triple conversion PLL super heterodyne

1st IF 257.5MHz: the 1st Local OSC frequency for
VHF and UHF Low/T Band employs
upper side of receiving
frequency range

: the 1st Local OSC frequency for
UHF High Band employs lower side
of receiving frequency range

2nd IF 21.4MHz : the 2nd Local OSC frequency
employs upper side of 1st IF

3rd IF 455kHz : the 3rd Local OSC frequency
employs lower side of 2nd IF
- 3 On-air programming : 1200 bps Minimum Shift Keying
- 4 Wired programming : PC to Earphone jack

- cont'd -

PRODUCT DEVELOPMENT & MANUFACTURING

-5 Frequency range	:	<u>Freq.</u>	<u>Steps</u>	<u>Mode</u>
		29 - 54MHz	5.0kHz	FM
		108 - 136.9875MHz	12.5kHz	AM
		137 - 174MHz	5.0kHz	FM
		380 - 512MHz	12.5kHz	FM
		806 - 823.9875MHz	12.5kHz	FM
		849 - 868.9875MHz	12.5kHz	FM
		894 - 960MHz	12.5kHz	FM

Except cellular band : 824 - 848.9875MHz and 869 - 893.9875MHz

- 6 Pre-Programmed band search : Fire/Police (FD/PD)
Ham
Air
Marine (MRN)
Car
- 7 WX 7 frequencies with alert: 162.400, 162.425, 162.450, 162.475, 162.500.
function 162.525, 162.550MHz
- 8 Scanning rate : 25 channels/sec.
- 9 Search rate : 50 steps/sec.
- 10 Display : LCD w/backlighting
- 11 Speaker : Built-in ϕ 36mm 8 ohms dynamic speaker
- 12 Audio output (10% THD) : 180mW at DC 6 volts (Battery)
- 13 Operating Voltage : DC 6V (4 AA cells)
- 14 Ext. Power or Charge voltage: AC Adapter: 273-1767A (9V 300mA)
- 15 Dimension : Approx. 63 (W) x 34 (D) x 145 (H) mm
- 16 Weight : Approx. 220g without an antenna and batteries
- 17 Accessory : Rubber antenna, Stubby antenna, Belt clip,
Owner's manual, Frequency guide,
Normal Batt holder and Ni-HM Batt holder
- 18 Memory backup : Capacitor

2. ELECTRICALNominal Limit

Standard Test Condition

- (1) Power source voltage : 6V DC (Batt.)
- (2) Antenna impedance : 50 ohms
- (3) Test temperature : 25 degrees C
- (4) Standard signal level : 100 μ V
- (5) Modulation frequency : 1kHz
- (6) Reference FM deviation : 3.0kHz
- (7) Reference AM modulation : 60%
- (8) Reference audio output : 75 mW
- (9) Audio output load : 8 ohm resistive load

- 1 Frequency range : VHF Low 29-54MHz
- VHF Air 108-136.9875MHz
- VHF High 137-174MHz
- UHF Low 380-512MHz
- UHF High 806-823.9875MHz
- 849-868.9875MHz
- 894-960MHz

Except cellular band: 824.000 - 848.9875MHz and 869.000 - 893.9875MHz

- 2 Sensitivity : VHF Low 0.3 μ V 1 μ V
- (S+N)/N=20dB VHF Aircraft 1.0 μ V 3 μ V
- DEV. : 3kHz at 1kHz VHF High 0.5 μ V 2 μ V
- MOD. : 60% at 1kHz UHF Low/T 0.5 μ V 2 μ V
- UHF High 0.5 μ V 2 μ V

- 3 WX alert tone decode : WX 0.3 μ V 1 μ V
- sensitivity
- 1050Hz 3kHz Dev. at 162.4MHz

- 4 WX alert tone decode range : 1050 \pm 30Hz \pm 40Hz
- 4kHz Dev. 1 μ V at 162.4MHz

- 5 WX alert tone checking time: 3.0 sec. 2-4 sec.

Note: When receiving WX Alert in Priority operation, the priority sampling time up to 2 sec. is added to this depending on alert tone transmission timing.

		<u>Nominal</u>	<u>Limit</u>	
-6	Image ratio			
	1st IF image	: VHF Low at 40MHz	55dB	45dB
		40MHz + (2 x 257.5MHz) = 555MHz		
		VHF Air at 124MHz	55dB	45dB
		124MHz + (2 x 257.5MHz) = 639MHz		
		VHF High at 154MHz	50dB	40dB
		154MHz + (2 x 257.5MHz) = 669MHz		
		UHF Low at 450MHz	45dB	30dB
		450MHz + (2 x 257.5MHz) = 965MHz		
		UHF High at 860MHz	45dB	30dB
		860MHz - (2 x 257.5MHz) = 345MHz		
	2nd IF image	: VHF High at 154MHz	50dB	35dB
		154MHz - (2 x 21.4MHz) = 111.2MHz		
-7	Squelch sensitivity (Band center)			
	Threshold	: FM and AM	0.3 μ V	1 μ V
	Tight: (S+N)/N	: FM	30dB	20dB
		: AM	20dB	10dB
-8	Selectivity	: -6dB	± 10 kHz	± 14 kHz
		-50dB	± 18 kHz	± 25 kHz
-9	Spurious rejection (Except Primary image)	: VHF High at 154MHz	40dB	30dB
-10	IF rejection	: 257.5MHz at 154MHz	60dB	40dB
		21.4MHz at 154MHz	100dB	80dB
-11	Acceptable radio frequency displacement at EIA RS-204D	: at 154MHz	± 6 kHz	± 3 kHz
-12	Signal to noise ratio	: 29.000- 54.0000MHz	40dB	30dB
	RF : 100 μ V	108.000-136.9875MHz	40dB	30dB
	DEV. : 3kHz at 1kHz	137.000-174.0000MHz	40dB	30dB
	MOD. : 60% at 1kHz	380.000-512.0000MHz	35dB	25dB
		806.000-960.0000MHz	35dB	25dB
-13	Residual noise Vol. min. and Squelched	: at 154MHz	0.5mV	2mV
-14	Scanning rate	:	25ch/sec.	20-28ch/sec.
-15	Search rate	:	50 steps/sec.	40-55 steps/sec.

		<u>Nominal</u>	<u>Limit</u>
-16	Scan and Search delay time :	2sec.	1-3sec.
-17	Priority sampling :	2 sec.	1.5-2.5 sec.
-18	Priority CH checking time :	WX frequency	140m sec.
		Other frequency	200m sec.
-19	Audio output (THD 10%) :	RF input 100 μ V at 154MHz	
	(8 ohms R Load. 1kHz)	Batt. 6V	190mW
		Ext. power DC 9V	140mW
			240mW
-20	THD at 50mW :	RF input 100 μ V at 154MHz	1% 5%
-21	Audio max. power :	RF input 100 μ V at 154MHz	
	8 ohm internal speaker	Batt. 6V	250mW
		Ext. power DC 9V	200mW
			320mW
	32 ohm at headphone mono/stereo (each phone)	Batt. 6V	17mW/10mW
		Ext. power DC 9V	25mW
			22mW/12mW
			32mW
-22	Audio frequency :	RF input 100 μ V at 154MHz	300Hz
	response at -6dB		2.0kHz
			200Hz-440Hz
-23	Intermediate frequency :	1st 257.5MHz	(receiving frequency 29-54, 108-136.9875, 137-174, 380-512, 811.0125-820.7375, 849-960MHz)
		254MHz	(receiving frequency 806-811MHz)
		260MHz	(receiving frequency 820.75-823.9875MHz)
		2nd 21.4MHz	
		3rd 455kHz	
-24	Current drain :	at 154MHz	
	Ext. power 9V	Vol. Max.	170mA
		Squelch	200mA
			75mA
	Batt. 6V	Vol. Max.	160mA
		Squelch	190mA
			75mA
		Power off	100mA
			30 μ A
			100 μ A

-25	Charging current Ni-CD Battery (700mA/h)	<u>Nominal</u>	<u>Limit</u>
	AC adapter charging current:	75mA	60mA
	Note: This specification is obtained AC 120V with model 273-1767A without the scanner on after ten hours.		
-26	Memory hold time	10 hours	1 hour
-27	Birdies and step frequency : when search	Under discussion	
-28	Filter	Monolithic crystal filter for 21.4MHz and ceramic filter for 455kHz	
-29	Antenna impedance	50 ohms	
-30	Temperature range	Test to specification between: +18°C - +35°C Operate (Need not meet spec.): -10°C - +60°C	
-31	Low BATT indicator	4.2V	4.2 ± 0.3V
-32	Wired programming protocol :	Interface	RS232C
		Data format	Asynchronous
		Data length	8 bit
		Parity	None
		Stop bit	2 bit
		Baud rate	4800
		Data direction	One way (receive only)
		Flow control	None (2 lines, RXD and GND)
-33	On-Air programming protocol:	Interface	AFSK (Audio Frequency Shift Keying)
		Modulation	MSK (Minimum Shift Keying)
		Mark frequency	1200Hz
		Space frequency	1800Hz
		Data format	Asynchronous
		Data length	8 bit
		Parity	None
		Stop bit	2 bit
		Baud rate	1200
		Data direction	One way
-34	On-Air programming data : decode sensitivity		
	3kHz Dev. at 154.6MHz	2 μ V	4 μ V

3. OPERATING CONTROL AND CONNECTIONS

- 1 Volume control with power switch
- 2 Squelch control
- 3 Keyboard (24 keys)
- 4 LCD indicator:
 - 7 digits frequency with MHz
 - 3 digits channel # or Car #
 - FD/PD
 - AIR
 - HAM
 - MRN
 - WX
 - CAR
- 10 banks indication
- Other indications
 - SRCH, SCAN, MAN, PGM, DLY, L/O, PRI, B, Key lock, ▲, ▼, M, -d-, -b-, L-r,
 - WIrEd, On Air, CAR, PcH, ALERt, StArt, End, Error, OFF tonE, On tonE,
 - FLo-FULL, FLo ALL-CL, dEFAULT, dUPL, Ch-FULL, P.-SA, on P. SA, OFF P. SA
- 5 BNC type antenna connector
- 6 Earphone/Wired programming jack (D=3.5mm stereo)
- 7 External power/charge jack (EIAJ RC-5320A Voltage classification 3)
- 8 Reset switch
- 9 Battery compartment

4. KEY FUNCTION

BAND
ALERT/PRIority
WX
MANual
SCAN
MONitor/Clear
▲ and ▼
ProGraM
key lock/LIGHT
ENTer
Decimal point/DELAY
10 numeric key/bank selector
CAR

5. FEATURES

- 1 200 channel memories plus 20 monitor memories
- 2 200 channels automatic scanning for VHF to UHF band
- 3 Pre-programed FIRE/POLICE, AIR, HAM, MRN, CAR and WX bands search
- 4 QUICK PROGRAM when receive signals up to 200 channels
- 5 INTELLIGENT SEARCH, 50 frequency-skip memories in search mode
- 6 Easy programming feature for storing car numbers
- 7 HYPERSCAN, 25 channels/sec. scanning rate and 50 steps/sec. searching rate
- 8 "Zeromatic" tuning system
- 9 10 digit channel and frequency display with all function indicators
- 10 200 channels lock-out in scan mode
- 11 Built-in priority channel
- 12 Built-in WX alert system
- 13 Built-in on-air programming system
- 14 Built-in wired programming system
- 15 Lock/Out ReView key to confirm lock out frequency sequentially
- 16 20 monitor memory
- 17 Change search direction by ▲ (up) or ▼ (down)
- 18 2 second scan and search delay
- 19 Manual selection for channel
- 20 Scan mode (cleared channels (000.000 freq.) do not scan)
- 21 Direct search
- 22 Program mode
- 23 Key lock for safety
- 24 Key tone
- 25 LCD backlighting
- 26 Low battery indicator on LCD
- 27 Built-in power save circuit

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1. LOCAL OSC FREQUENCY CALCULATION

-1 CAT. NO. 20-514 formula for 1st, 2nd and 3rd Local oscillation frequencies are as follow:

RECEIVING BAND	RECEIVING FREQ. (FR) (MHz)	1st LO	2nd LO	3rd LO
		PLL 1 (MHz) VCO 1 or VCO 2	PLL 2 (MHz) VCO 3	(MHz) X'TAL
VHF LO	29.0000- 42.5950	VCO 1 = FR + 257.5	$257.5 + 21.4 = 278.9$	20.945
	42.6000- 43.0000	"	$257.5 - 21.4 = 236.1$	"
	43.0050- 54.0000	"	$257.5 + 21.4 = 278.9$	"
VHF HI	108.0000-174.0000	VCO 1 = FR + 257.5	$257.5 + 21.4 = 278.9$	20.945
UHF LO	380.0000-512.0000	VCO 2 = FR + 257.5	$257.5 + 21.4 = 278.9$	20.945
UHF HI	806.0000-811.0000	VCO 2 = FR - 254.0	$254.0 + 21.4 = 275.4$	20.945
	811.0125-815.2875	VCO 2 = FR - 257.5	$257.5 + 21.4 = 278.9$	"
	815.3000-815.5000	"	$257.5 - 21.4 = 236.1$	"
	815.5125-820.7375	"	$257.5 + 21.4 = 278.9$	"
	820.7500-823.9875	VCO 2 = FR - 260.0	$260.0 - 21.4 = 238.6$	"
	849.0000-868.9875	VCO 2 = FR - 257.5	$257.5 + 21.4 = 278.9$	"
	894.0000-960.0000	"	"	"

RF DENOTES Frequency Received.

-2 Example

RECEIVING BAND	RECEIVING FREQ. (MHz)	1st LO (MHz)	2nd LO (MHz)	3rd LO (MHz)
VHF LO	29	$29 + 257.5 = 286.5$	$257.5 + 21.4 = 278.9$	20.945
	40	$40 + 257.5 = 297.5$	"	"
	50	$50 + 257.5 = 307.5$	"	"
VHF HI	108	$108 + 257.5 = 365.5$	$257.5 + 21.4 = 278.9$	20.945
	146	$146 + 257.5 = 403.5$	"	"
	174	$174 + 257.5 = 431.5$	"	"
UHF LO	380	$380 + 257.5 = 637.5$	$257.5 + 21.4 = 278.9$	20.945
	446	$446 + 257.5 = 703.5$	"	"
	512	$512 + 257.5 = 769.5$	"	"
UHF HI	806	$806 - 254.0 = 552.0$	$254.0 + 21.4 = 275.4$	20.945
	860	$860 - 257.5 = 602.5$	$257.5 + 21.4 = 278.9$	"
	960	$960 - 257.5 = 702.5$	"	"

2. IF FREQUENCY

1st IF: 254MHz/257.5MHz/260MHz

2nd IF: 21.4MHz

3rd IF: 455kHz

2.0 System Test Configuration

2.1 Justification

For **emission testing**, the **equipment under test (EUT)** was **configured for testing** in a typical fashion (as a customer would normally use it). During testing, all **cables** were manipulated to produce worst case emissions.

For the **measurements**, the **EUT** is **attached to a cardboard box** (if necessary) and placed on the wooden **turntable**. If the **EUT** attaches to peripherals, they are **connected and operational** (as typical as possible). The **EUT** is wired to transmit **full power without modulation**.

The signal is **maximized through rotation and placement** in the three orthogonal axes. The antenna height and polarization are varied **during the search for maximum signal level**. The **antenna height** is varied from 1 to 4 meters. **Detector function** is in peak mode. **Radiated emissions** are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a **pre-amplifier** is used and/or the test is **conducted at a closer distance**.

All readings are extrapolated back to the **equivalent three meter reading** using **inverse scaling** with distance if measured at a closer distance.

2.2 EUT Exercising Software

For **emissions testing**, the units were **setup to receive continuously** to simplify the measurement methodology. Care was taken to ensure proper **power supply voltages** during testing.

2.3 Mode of Operation

The **EUT** was **tested in two modes** and the **worst case emission** was recorded:

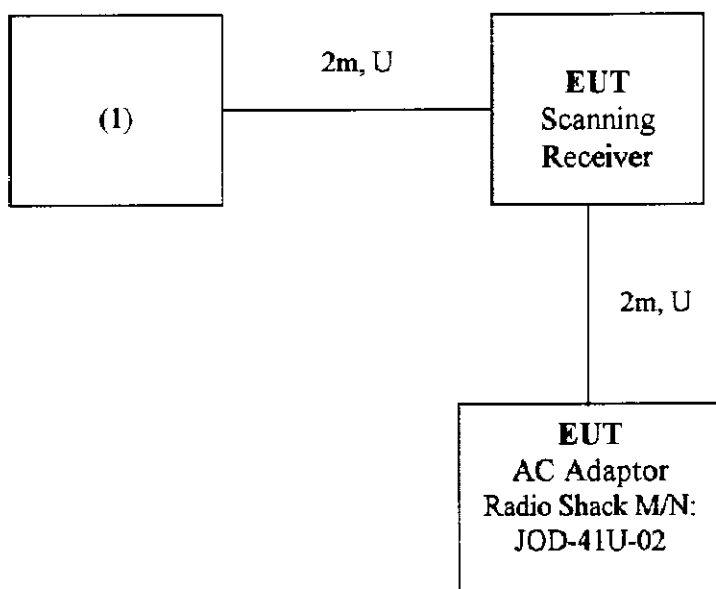
1. **EUT** was set to **constantly receive at a particular frequency**.
2. **EUT** was set to **constantly scan and receive a particular band**.

2.3 Support Equipment List and Description

- a) The FCC ID's for all equipment used in the tested system (included inserted cards, which have grants) are:

Item #	Description	Model No.	Serial No.	FCC ID
1	Sony Speaker	N/A	N/A	N/A

b) **Equipment Setup Block Diagram**



m: Length in meters

U: Unshielded cable

2.4 Equipment Modification

Any modifications installed previous to testing by Radio Shack, A Division of Tandy Corporation will be incorporated in each production model sold/leased in the United States.

No modifications were installed by Intertek Testing Services.

3.0 Emission Results

AC line conducted emission measurements were performed from 0.45 MHz to 30 MHz. Analyzer resolution is 10 kHz or greater.

Radiated emission measurements were performed from 30 MHz to 5000 MHz. Analyzer resolution is 100 kHz or greater for 30 MHz to 1000 MHz, 1 MHz for >1000 MHz.

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included. All measurements were performed with peak detection unless otherwise specified.

3.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG + DF$$

where FS = Field Strength in dB μ V/m

RA = Receiver Amplitude (including preamplifier) in dB μ V

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB

AG = Amplifier Gain in dB

DF = Distance Factor

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows:

$$FS = RR + LF$$

where FS = Field Strength in dB μ V/m

RR = RA - AG in dB μ V

LF = CF + AF + DF in dB

Assume a receiver reading of 52.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dB μ V/m.

This value in dB μ V/m was converted to its corresponding level in μ V/m.

$$RA = 52.0 \text{ dB}\mu\text{V}$$

$$DF = 0 \text{ dB}$$

$$AF = 7.4 \text{ dB}$$

$$RR = 23.0 \text{ dB}\mu\text{V}$$

$$CF = 1.6 \text{ dB}$$

$$LF = 9.0 \text{ dB}$$

$$AG = 29.0 \text{ dB}$$

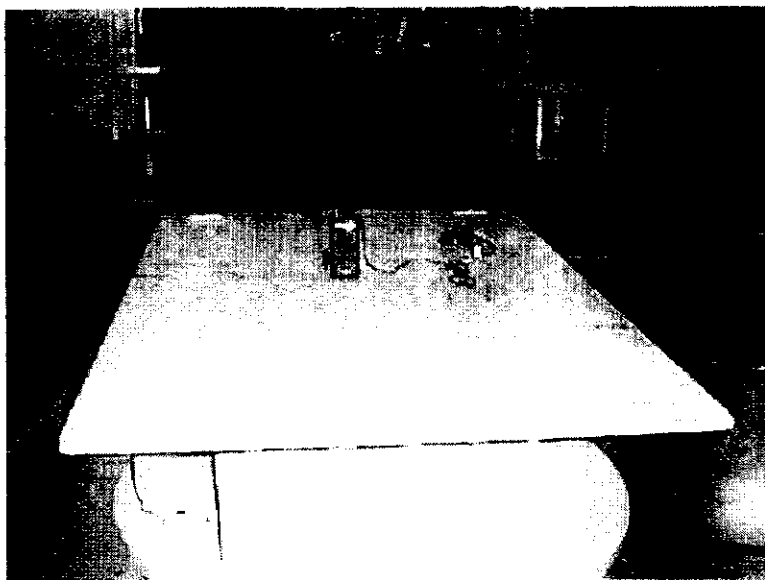
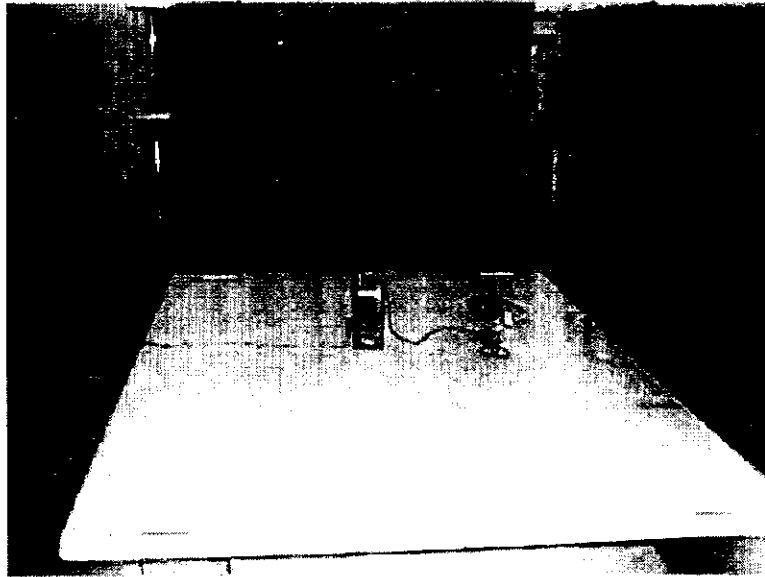
$$FS = RR + LF$$

$$FS = 23 + 9 = 32 \text{ dB}\mu\text{V/m}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm} [(32 \text{ dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}$$

3.2 Radiated Emission Configuration Photograph

Worst Case Radiated Emission
at 365.5 MHz



3.3 Radiated Emission Data

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Judgement: **Passed** by 5.8 dB at 365.5 MHz

Radiated Emissions Test Data

Company:	General Research of Electronics	Model #:	20-514 (PRO-89)	Standard:	FCC § 15.209
EUT:	Scanning Receiver	S/N #:		Limits:	3
Project #:		Test Date:	October 27, 1999	Test Distance:	3 meters
Test Mode:	Rx	Engineer:	Xi-Ming Y.	Duty Relaxation:	0 dB

	Antenna Used			Pre-Amp Used			Cable Used			Transducer Used
Number:	2	7	10	8	1	0	1	0	0	0
Model:	EMCO 3143	EM LPA-25	EMCO 5104	ODE P1 050	HP 8447D	None	Sat-1	None	None	None

Frequency Tuned MHz	Frequency (L.O) MHz	Reading dB(μV)	Detector	Ant. #	Amp. #	Ant. Pol. H/V	Ant. Factor dB(f/m)	Insert. Loss dB	D. C. F. dB	Net dB(μV/m)	Limit @3m dB(μV/m)	Margin dB
29.00	286.49E+0	19.0	Peak	2	0	H	13.0	1.6	0.0	33.6	46.0	-12.4
29.00	572.98E+0	1.4	Peak	2	0	H	19.6	2.7	0.0	23.7	46.0	-22.3
39.50	297.00E+0	19.6	Peak	2	0	H	13.6	1.6	0.0	34.8	46.0	-11.2
39.50	593.99E+0	4.3	Peak	2	0	H	19.6	2.7	0.0	26.6	46.0	-19.4
54.00	311.50E+0	17.5	Peak	2	0	H	13.8	1.7	0.0	33.0	46.0	-13.0
54.00	623.00E+0	3.0	Peak	2	0	H	19.7	2.2	0.0	24.9	46.0	-21.1
108.00	365.50E+0	22.3	Peak	2	0	H	15.7	2.2	0.0	40.2	46.0	-5.8
108.00	730.99E+0	5.0	Peak	2	0	H	21.5	2.5	0.0	29.0	46.0	-17.0
122.50	380.00E+0	16.0	Peak	2	0	H	15.9	2.2	0.0	34.1	46.0	-11.9
122.50	760.00E+0	2.5	Peak	2	0	H	22.2	2.5	0.0	27.2	46.0	-18.8
136.99	394.49E+0	10.6	Peak	2	0	H	15.7	2.2	0.0	28.5	46.0	-17.5
136.99	788.98E+0	3.0	Peak	2	0	H	22.0	2.5	0.0	27.5	46.0	-18.5
137.00	394.50E+0	10.5	Peak	2	0	H	15.7	2.2	0.0	28.4	46.0	-17.6
137.00	789.00E+0	2.0	Peak	2	0	H	22.0	2.5	0.0	26.5	46.0	-19.5
154.00	411.50E+0	14.2	Peak	2	0	H	16.6	2.1	0.0	32.9	46.0	-13.1
154.00	823.00E+0	1.0	Peak	2	0	H	22.0	2.7	0.0	25.7	46.0	-20.3
174.00	380.00E+0	12.4	Peak	2	0	H	15.9	2.2	0.0	30.5	46.0	-15.5
174.00	811.50E+0	0.0	Peak	2	0	H	21.7	2.7	0.0	24.4	46.0	-21.6

Notes:	a) D.C.F.: Distance Correction Factor
	b) Insert. Loss (dB) = Cable A + Cable B + Cable C.
	c) Net (dB) = Reading + Antenna Factor - Pre-amp + Insert. Loss. - Transducer Loss - Duty Relaxation (transmitter only).
	d) Negative signs (-) in Margin column signify levels below the limits.
	e) All other emissions not reported are below the equipment noise floor which is at least 20 dB below the limits.

Radiated Emissions Test Data

Company:	General Research of Electronics	Model #:		Standard:	FCC § 15.209
EUT:	Scanning Receiver	S/N #:		Limits:	3
Project #:		Test Date:	October 27, 1999	Test Distance:	3 meters
Test Mode:	Rx	Engineer:	Xi-Ming Y.	Duty Relaxation:	0 dB

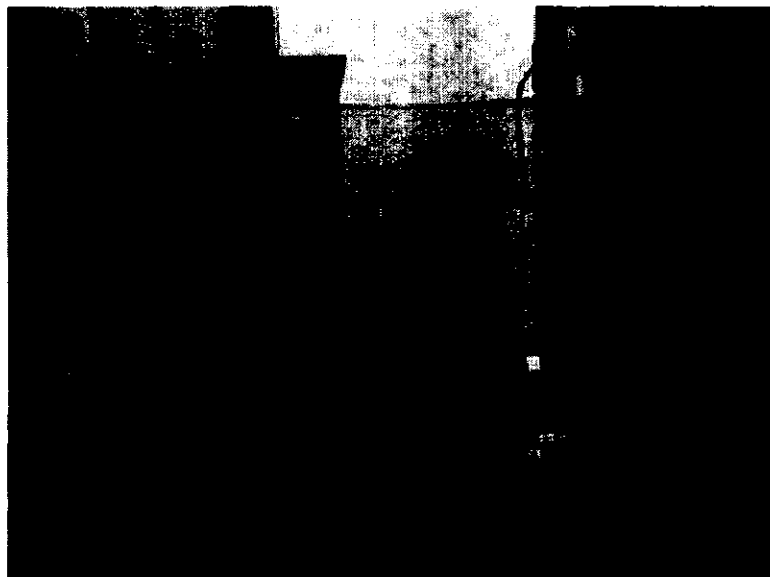
Antenna Used			Pre-Amp Used			Cable Used			Transducer Used
Number:	2	8	10	8	1	0	1	0	0
Model:	EMCO 3143	EMCO 3115	EMCO 3104	CDL P1 000	HP 6447D	None	Site 1	None	None

Frequency Tuned MHz	Frequency (L.O.) MHz	Reading dB(μV)	Detect or P/A/O	Ant. #	Amp. #	Ant. Pol. H/V	Ant. Factor dB(1/m)	Insert Loss dB	D. C. F. dB	Net dB(μV/m)	Limit @3m dB(μV/m)	Margin dB
380.00	637.50E+0	13.6	Peak	2	0	H	20.1	2.2	0.0	35.9	46.0	-10.1
380.00	1275.00E+0	5.0	Ave.	8	0	H	24.9	3.3	0.0	33.2	54.0	-20.8
440.00	797.50E+0	8.8	Peak	2	0	H	21.6	2.5	0.0	32.9	46.0	-13.1
440.00	1395.00E+0	5.1	Ave.	8	0	H	24.9	3.3	0.0	33.3	54.0	-20.7
512.00	769.50E+0	9.0	Peak	2	0	H	22.2	2.5	0.0	33.7	46.0	-12.3
512.00	1539.00E+0	-2.0	Ave.	8	0	H	27.4	3.5	0.0	28.9	54.0	-25.1
806.00	552.00E+0	6.0	Peak	2	0	H	19.9	2.7	0.0	28.6	46.0	-17.4
806.00	1104.00E+0	1.0	Ave.	8	0	H	24.9	3.4	0.0	29.3	54.0	-24.7
894.00	636.50E+0	14.2	Peak	2	0	H	20.1	2.2	0.0	36.5	46.0	-9.5
894.00	1273.00E+0	2.5	Ave.	8	0	H	24.9	3.3	0.0	30.7	54.0	-23.3
960.00	702.50E+0	9.5	Peak	2	0	H	20.9	2.5	0.0	32.9	46.0	-13.1
960.00	1405.00E+0	3.4	Ave.	8	0	H	24.9	3.4	0.0	31.7	54.0	-22.3

Notes:	a) D.C.F.:Distance Correction Factor
	b) Insert Loss (dB) = Cable A + Cable B + Cable C .
	c) Net (dB) = Reading + Antenna Factor - Pre-amp + Insert Loss - Transducer Loss - Duty Relaxation (transmitter only).
	d) Negative signs (-) in Margin column signify levels below the limits.
	e) All other emissions not reported are below the equipment noise floor which is at least 20 dB below the limits.

3.4 AC conducted Emission Configuration Photograph

Worst Case Conducted Emission
at 0.92 MHz



3.5 Conducted Emission Data

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Judgement: Passed by 13.5 dB at 0.92 MHz

