TEST REPORT

Report Number: 3152255MPK-001
Project Number: 3152255
May 31, 2008

Testing performed on the
Advanced Digital Hand Held Scanner
Model Number: 0801
FCC ID: ADV0801
to

FCC Part 15, Subpart B

Class: B

for
GRE America

A2LA Certificate Number: 1755-01

Test Performed by:	Test Authorized by:
Intertek	GRE America
1365 Adams Court	425 Harbor Blvd. Suite B
Menlo Park, CA 94025	Belmont, CA 94002

Prepared by: _____ **Date:** May 31, 2008
Krishna K Vemuri

Reviewed by: _____ **Date:** May 31, 2008
Suresh Kondapalli

VERIFICATION OF COMPLIANCE
Report No. 3152255MPK-001

Verification is hereby issued to the named APPLICANT and is VALID ONLY for the equipment identified hereon for use under the rules and regulations listed below.

Equipment Under Test:	Advanced Digital Hand Held Scanner
Trade Name:	GRECOM
Model No.:	0801
Serial No.	000011
Applicant:	GRE America
Contact:	Mr. Teru Takahashi
Address:	425 Harbor Blvd. Suite B Belmont, CA 94002
Country	USA
Tel. number:	650-591-1400
Fax number:	650-591-2001
Applicable Regulation:	FCC Part 15, Subpart B
Equipment Class:	Class B
Date of Test:	May 19 to 31, 2008

We attest to the accuracy of this report:

Krishna K Vemuri
Senior EMC Project Engineer

Suresh Kondapalli
EMC Team Leader

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1.0 General Description

1.1 Product Description

The Equipment under Test (EUT) is Advanced Digital Hand Held Scanning Receiver, model 0801.

Please refer to the attached specifications sheets in Appendix A for more details.

A pre-production version of the sample was received on May 18, 2008 in good condition. As declared by the Applicant, it is identical to production units.

1.2 Related Submittal(s) Grants

This is a single application for certification of a scanning receiver.

1.3 Test Methodology

Both conducted (if applicable) and radiated emission measurements were performed according to the procedures in ANSI C63.4 (2003). All radiated measurements were performed in a semi-anechoic chamber. 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 test site and conducted measurement facility used to collect the radiated data is Site 1, a 10 meter semi-anechoic chamber. This test facility and site measurement data have been fully placed on file with the FCC and A2LA accredited.

1.5 Summary of Test Results

Model: 0801
FCC ID: ADV0801

TEST	REFERENCE	RESULTS
Radiated Emission	15.109	Complies
AC Line Conducted Emission	15.107	Complies
Antenna Conducted Emission	15.111	Complies
FCC Part 15.121 Requirement	15.121	Complies *

* Refer to file: GRE ADV0801 REPORT FOR FCC RULE PART 15.121

2.0 System Test Configuration

2.1 Justification

The tests were performed according to the test procedure as outlined in CFR47 Part 15.31 and in ANSI C63.4.

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 placed on top of a non-conductive table. If the EUT attaches to peripherals, they are connected and operational (as typical as possible).

For radiated emission measurements, 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. 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

The unit was 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:

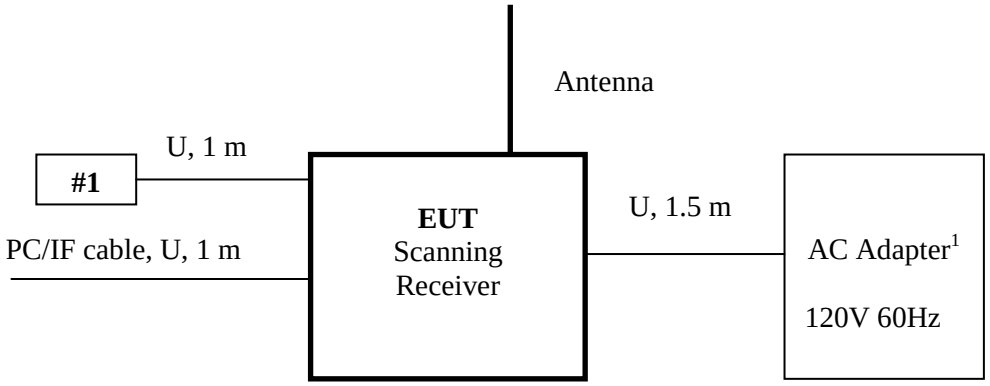
Test Mode 1: The EUT was set to constantly receive at the low, middle and high channels of each band.

Test Mode 2: The EUT was set to constantly scan all bands.

2.4 Support Equipment List and Description

Item #	Description	Model No.	Serial No.
1	External headphones	KOSS	Not Labeled

2.5 Equipment Setup Block Diagram



[1] PHIHONG, AC Adapter, Model: PSA05R-090

U: Unshielded
m: meter

2.6 Equipment Modification

Any modifications installed previous to testing by GRE will be incorporated in each production model sold/leased in the United States.

Intertek Testing Services installed no modifications.

3.0 Emission Test Results

AC line conducted emission measurements were performed from 0.15 MHz to 30 MHz. Analyzer resolution is 10 kHz or greater.

Radiated emission measurements and antenna conducted emission measurements were performed from 30 MHz to 8000 MHz. Analyzer resolution is 100 kHz or greater for frequencies from 30 MHz to 1000 MHz, 1 MHz - for frequencies above 1000 MHz.

Preliminary tests were performed to determine the worst-case emission with the EUT tuned to the low, middle and high channels of each band. From these preliminary measurements the EUT was tuned to the frequency with the highest emission and the final scan was performed using the automated test software.

The same procedure was used to determine the worst-case emission level with the EUT setup in scanning mode for each band.

The final recorded data reflects the worst-case result.

A sample calculation 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(µV/m)
RA = Receiver Amplitude (including preamplifier) in dB(µV)
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB(1/m)
AG = Amplifier Gain in dB
DF = Distance Factor in dB

Assume a receiver reading of 52.0 dB(µV) is obtained. The antennas factor of 7.4 dB(1/m) and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving field strength of 32 dB(µV/m). This value in dB(µV/m) was converted to its corresponding level in µV/m.

RA = 52.0 dB(µV)
AF = 7.4 dB(1/m)
CF = 1.6 dB
AG = 29.0 dB
DF = 0 dB
FS = 52 +7.4 +1.6 –29.0 + 0 = 32 dB(µV/m)
Level in µV/m = Common Antilogarithm [(32 dB(µV/m)/20] = 39.8 µV/m

3.2 Radiated Emission Data

Tested By:	Krishna K Vemuri
Test Date:	May 31, 2008

The results on the following page(s) were obtained when the device was tested in the condition described in Section 2.

Results:	**Complies** by 7.6dB

3.2 Test Data (Continued)

FCC Part 15.109 Class B Radiated Emissions Data

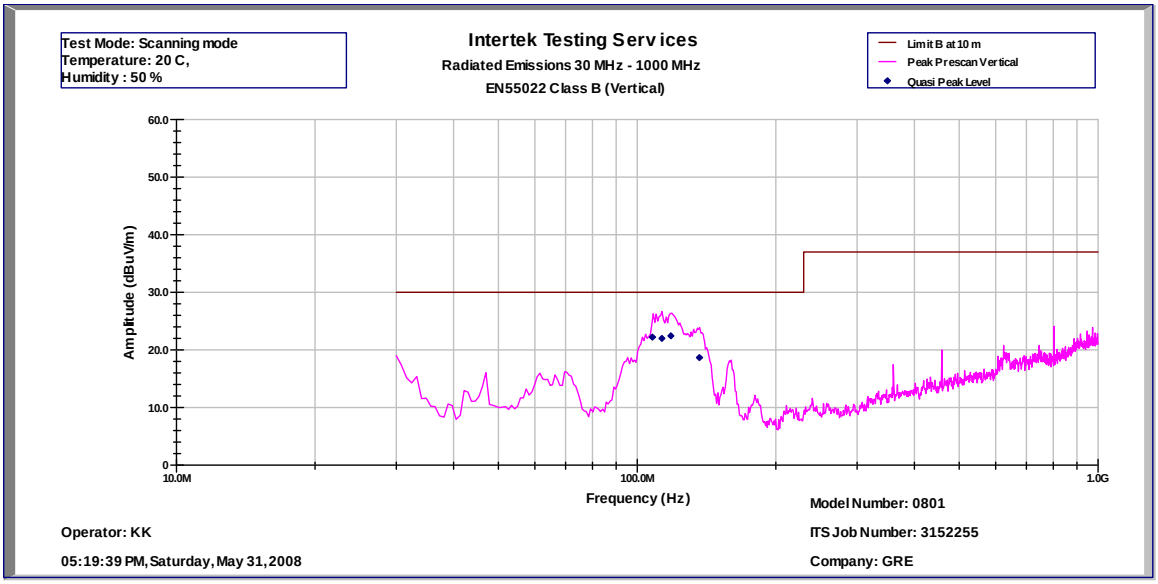
Model: 0801
Test Mode: Receiving at Tuned frequency
Test distance: 3 m

Tuned Frequency	L.O. Frequency	Antenna Polarization	FS at 3 m	FS Limit at 3 m	Margin	RA	AG	CF	AF
MHz	MHz	H/V	dB(µV/m)	dB(µV/m)	dB	dB(µV)	dB	dB	dB(1/m)
25	405.8	V	20.4	46.0	-25.6	35.3	32.1	2.1	15.1
39.5	420.3	V	19.1	46.0	-26.9	33.2	32.1	2.2	15.9
54	434.8	V	20.0	46.0	-26.0	33.6	32.2	2.2	16.4
108	488.8	V	22.7	46.0	-23.3	33.7	32.3	2.3	18.9
122.5	503.3	V	20.4	46.0	-25.6	31.2	32.3	2.4	19.1
136.99	517.79	V	21.6	46.0	-24.4	32.7	32.3	2.4	18.8
137	517.8	V	21.1	46.0	-24.9	32.2	32.3	2.4	18.8
155.5	536.3	V	22.6	46.0	-23.4	34.3	32.4	2.5	18.2
174	554.8	V	21.2	46.0	-24.8	33.4	32.4	2.5	17.7
216	596.8	H	27.3	46.0	-18.7	38.0	32.5	2.6	19.2
224.99	605.79	H	28.5	46.0	-17.5	38.8	32.5	2.6	19.6
225	605.8	H	29.0	46.0	-17.0	39.3	32.5	2.6	19.6
368.5	749.3	H	29.5	46.0	-16.5	37.9	32.5	2.9	21.2
512	892.8	H	26.6	46.0	-19.4	32.5	31.9	3.2	22.8
764	383.2	V	18.9	46.0	-27.1	34.4	32.1	2.1	14.5
793.99	413.19	V	18.5	46.0	-27.5	33.0	32.1	2.1	15.5
823.9875	443.187	V	23.4	46.0	-22.6	36.8	32.2	2.2	16.6
849	468.2	V	24.0	46.0	-22.0	35.9	32.2	2.3	18.0
859	478.2	V	24.2	46.0	-21.8	35.6	32.3	2.3	18.6
868.9875	488.187	V	23.0	46.0	-23.0	34.1	32.3	2.3	18.9
894	513.2	V	21.3	46.0	-24.7	32.3	32.3	2.4	18.9
917	536.2	V	21.8	46.0	-24.2	33.5	32.4	2.5	18.2
939.9875	559.188	H	21.3	46.0	-24.7	32.9	32.4	2.5	18.3
940	559.2	H	20.8	46.0	-25.2	32.4	32.4	2.5	18.3
950	569.2	H	21.3	46.0	-24.7	33.1	32.4	2.5	18.1
960	579.2	H	22.5	46.0	-23.5	34.2	32.4	2.6	18.2
1240	859.2	V	25.4	46.0	-20.6	32.9	32.1	3.1	21.5
1270	889.2	V	25.1	46.0	-20.9	31.4	31.9	3.2	22.4
1300	919.2	V	25.8	46.0	-20.2	31.6	31.6	3.2	22.6

Notes:
1. Negative signs (-) in the Margin column signify levels below the limit.
2. All readings below 1 GHz are quasi-peak, above 1 GHz – average.
3. All other readings not reported are at least 20 dB below the limit.
4. For L.O. frequency calculation, see Appendix A

3.2 Test Data (Continued)

Model: 0801
Test Mode: Scanning all channels
Test distance: 10 m

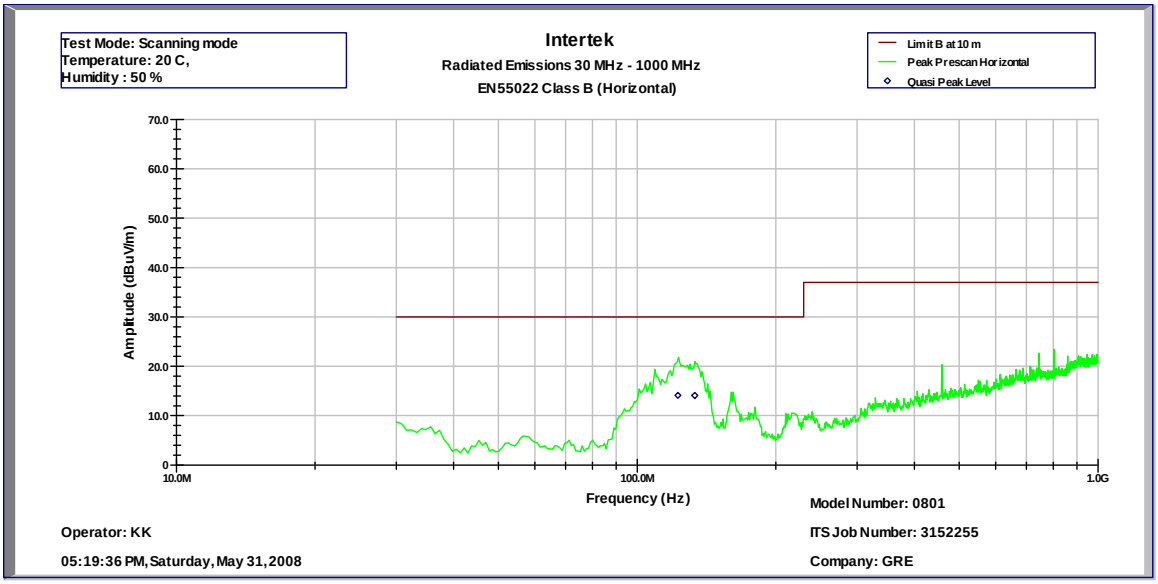


Intertek Testing Services							
Radiated Emissions 30 MHz - 1000 MHz							
EN55022 Class B (QP-Vertical)							
Operator: KK				Model Number: 0801			
				ITS Job Number: 3152255			
05:19:39 PM, Saturday, May 31, 2008				Company: GRE			
Frequency	Quasi Pk FS	Limit@10m	Margin	RA	CF	AG	AF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB(1/m)
108.0	22.2	30.0	-7.8	47.5	1.1	32.0	5.6
113.2	22.0	30.0	-8.0	47.3	1.1	32.0	5.6
118.4	22.4	30.0	-7.6	47.6	1.1	32.0	5.7
136.6	18.6	30.0	-11.4	40.5	1.2	32.0	8.9

Test Mode: Scanning mode
Temperature: 20 C,
Humidity : 50 %

3.2 Test Data (Continued)

Model: 0801
Test Mode: Scanning all channels
Test distance: 10 m



Intertek Testing Services							
Radiated Emissions 30 MHz - 1000 MHz							
EN55022 Class B (QP-Horizontal)							
Operator: KK				Model Number: 0801			
				ITS Job Number: 3152255			
05:19:36 PM, Saturday, May 31, 2008				Company: GRE			
Frequency	Quasi Pk FS	Limit@10m	Margin	RA	CF	AG	AF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB(1/m)
122.7	14.1	30.0	-15.9	38.5	1.1	32.0	6.4
133.4	14.1	30.0	-15.9	36.7	1.2	32.0	8.1

Test Mode: Scanning mode
Temperature: 20 C,
Humidity : 50 %

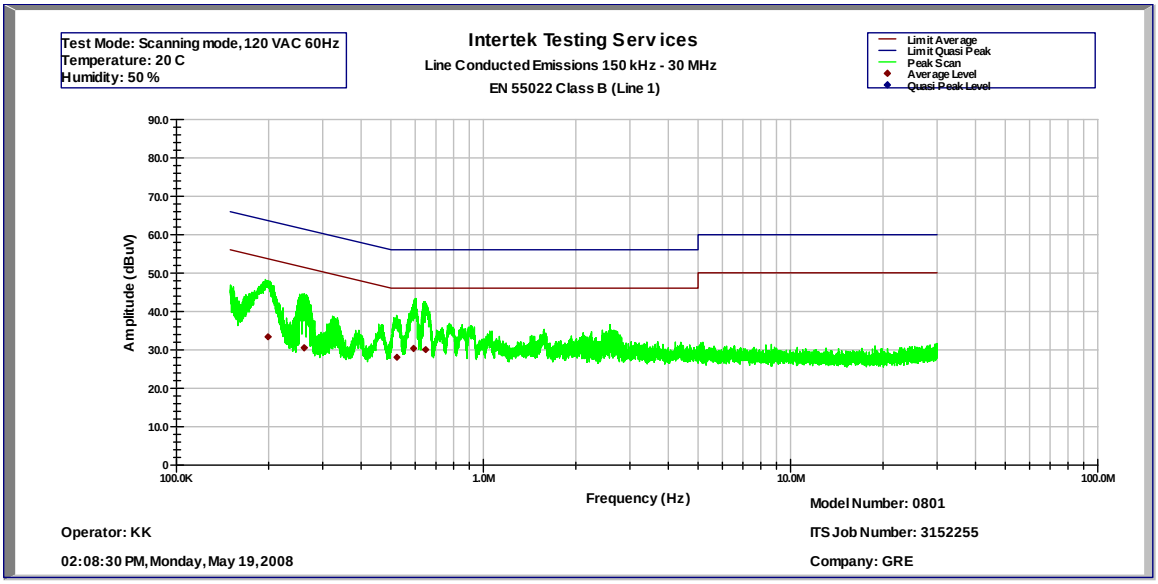
3.3 AC Line Conducted Emission Data

Tested By:	Krishna K Vemuri
Test Date:	May 19, 2008

The results on the following page(s) were obtained when the device was tested in the condition described in Section 2.

Results:	**Complies** by 12.3 dB

3.3 Test Data (Continued)

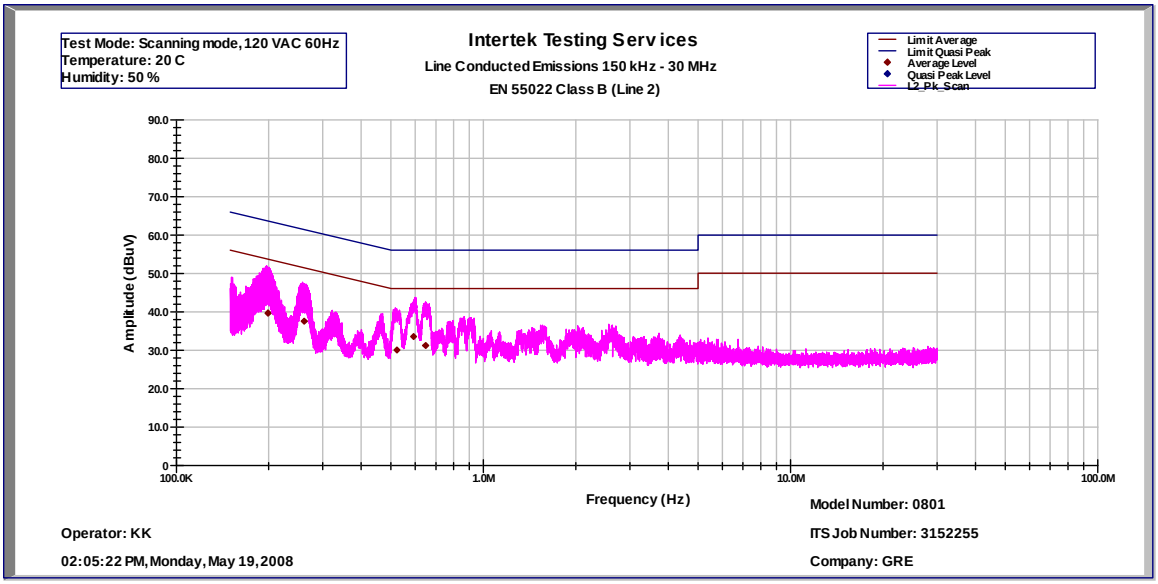


Intertek	
Line Conducted Emissions 150 kHz - 30 MHz	
EN 55022 Class B (Line 1)	
Operator: KK	Model Number: 0801
	ITS Job Number: 3152255
01:56:23 PM, Monday, May 19, 2008	Company: GRE

Frequency	Pk Level	Av Level	Av Limit	QP Limit	Av Margin	QP Margin
MHz	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)
0.1990	48.3	33.4	54.6	64.6	-21.2	-16.3
0.2610	44.5	30.5	52.8	62.8	-22.3	-18.3
0.5230	38.9	28.0	46.0	56.0	-18.0	-17.1
0.5920	43.3	30.3	46.0	56.0	-15.7	-12.7
0.6480	42.5	30.0	46.0	56.0	-16.0	-13.5

Test Mode: Scanning mode, 120 VAC 60Hz
Temperature: 20 C
Humidity: 50 %

3.4 Test Data (Continued)



Intertek	
Line Conducted Emissions 150 kHz - 30 MHz	
EN 55022 Class B (Line 2)	
Operator: KK	Model Number: 0801
	ITS Job Number: 3152255
02:01:31 PM, Monday, May 19, 2008	Company: GRE

Frequency	Pk Level	Av Level	Av Limit	QP Limit	Av Margin	QP Margin
MHz	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)
0.1990	52.0	39.7	54.6	64.6	-14.9	-12.6
0.2610	47.7	37.5	52.8	62.8	-15.3	-15.1
0.5230	40.9	30.0	46.0	56.0	-16.0	-15.1
0.5920	43.7	33.5	46.0	56.0	-12.5	-12.3
0.6480	42.5	31.2	46.0	56.0	-14.8	-13.5

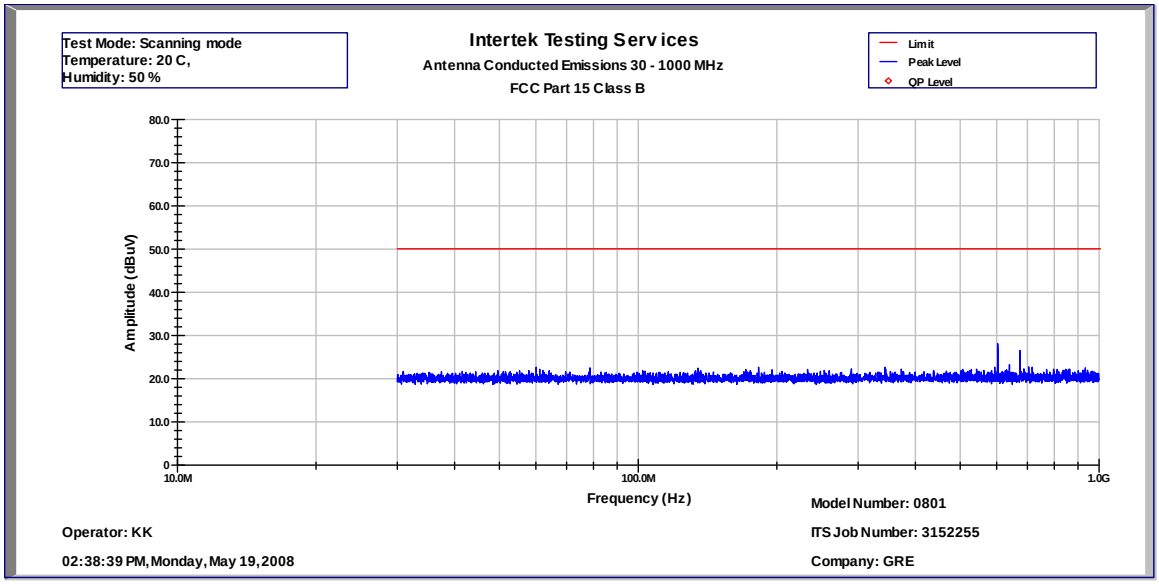
Test Mode: Scanning mode, 120 VAC 60Hz
Temperature: 20 C
Humidity: 50 %

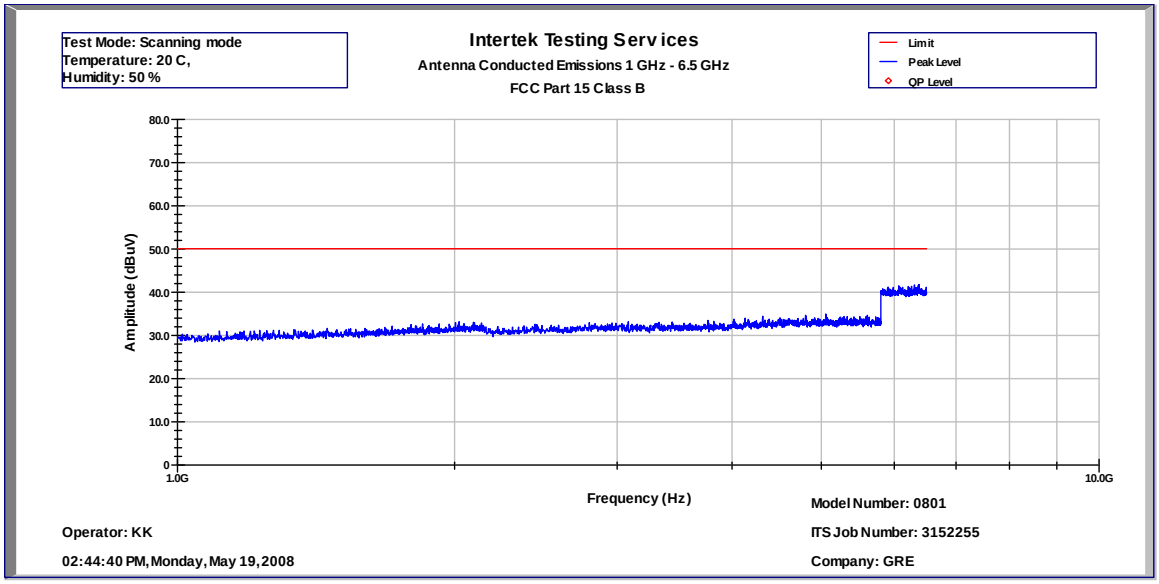
3.4 Antenna Conducted Emission Data

Tested By:	Krishna K Vemuri
Test Date:	May 19, 2008

The results on the following page(s) were obtained when the device was tested in the condition described in Section 2.

Results:	**Complies** by 8.3 dB


Test Mode: Scanning mode
Temperature: 20 C,
Humidity: 50 %
Intertek Testing Services
Antenna Conducted Emissions 30 - 1000 MHz
FCC Part 15 Class B
Limit
Peak Level
QP Level
Amplitude (dBuV)
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
10.0M
100.0M
1.0G
Frequency (Hz)
Operator: KK
02:38:39 PM, Monday, May 19, 2008
Model Number: 0801
ITS Job Number: 3152255
Company: GRE


Test Mode: Scanning mode
Temperature: 20 C,
Humidity: 50 %
Intertek Testing Services
Antenna Conducted Emissions 1 GHz - 6.5 GHz
FCC Part 15 Class B
Limit
Peak Level
QP Level
Amplitude (dBuV)
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
1.0G
10.0G
Frequency (Hz)
Operator: KK
02:44:40 PM, Monday, May 19, 2008
Model Number: 0801
ITS Job Number: 3152255
Company: GRE

4.0 List of Test Equipment

Measurement equipment used for emission compliance testing utilized the equipment on the following list.

Equipment	Manufacturer	Model/Type	Serial #	Cal Int	Cal Due
RF Filter Section	Hewlett Packard	85460A	3448A00267	12	10/02/08
EMI Receiver	Hewlett Packard	8546A	3710A00373	12	10/02/08
BI-Log Antenna	EMCO	3143	9509-1160	12	9/05/08
Pre-Amplifier	Sonoma	310N	185634	12	9/26/08
LISN	FCC	FCC-LISN-50-50-M-H	2011	12	9/05/08
Spectrum Analyzer Display w/85650 QP Adapter	Hewlett Packard	8566B/ 85650A	2416A00317 2521A01021	12	06/11/08

Appendix A – Local Oscillator Frequency calculation

FCC ID: ADV0801

1 LOCAL OSC FREQUENCY CALCULATION

-1 FCC ID: ADV0801 formula for 1st, 2nd and 3rd Local oscillation frequencies are as follow :

RECEIVING BAND (FR STEP)	FREQ. STEP (kHz)	RECEIVING FREQ. FR (MHz)	1st LOCAL PLL 1 /VCO 1 or VCO 2 (MHz)	2nd LOCAL PLL 2 /VCO 3 (MHz)	3rd LOCAL X' TAL (MHz)
VHF Low	10	25.0000 ~ 27.4050	A = (FR + 380.800) / 0.075	2nd Local = 1st IF - 21.4	20.9450
	5	27.4100 ~ 29.7000	= A.xxx (Cut away decimal)		
	10	29.7100 ~ 49.8300	1st Local = A x 0.075		
	5	49.8350 ~ 54.0000	1st IF = 1st Local - FR		
VHF High	8.33	108.0000 ~ 136.99166		2nd Local = 1st IF - 21.4	20.9450
	5	137.0000 ~ 137.9950			
	12.5	138.0000 ~ 143.9875			
	5	144.0000 ~ 147.9950	FR DENOTES Frequency Received.		
	12.5	148.0000 ~ 150.7875			
	5	150.8000 ~ 150.8450			
	7.5	150.8525 ~ 154.4975			
	5	154.5150 ~ 154.6400			
	7.5	154.6500 ~ 156.2550		2nd Local = 1st IF - 21.3975	20.9425
	25	156.2750 ~ 157.4500		2nd Local = 1st IF - 21.4	20.9450
	7.5	157.4700 ~ 161.5725		2nd Local = 1st IF - 21.3975	20.9425
	5	161.6000 ~ 161.9750		2nd Local = 1st IF - 21.4	20.9450
	12.5	162.0000 ~ 174.0000			
	5	216.0025 ~ 224.9950		2nd Local = 1st IF - 21.4025	20.9475
UHF Low	6.25	225.0000 ~ 316.49375		2nd Local = 1st IF - 21.4	20.9450
	〃	316.5000 ~ 316.79375	A = (FR + 380.700) / 0.075		
	〃	316.8000 ~ 337.89375	A = (FR + 380.800) / 0.075		
	〃	337.9000 ~ 338.09375	A = (FR + 380.700) / 0.075		
	〃	338.1000 ~ 339.29375	A = (FR + 380.800) / 0.075		
	〃	339.3000 ~ 359.49375	A = (FR + 380.700) / 0.075		
	〃	359.5000 ~ 379.99375	A = (FR + 380.800) / 0.075		
	12.5	380.0000 ~ 380.7125	〃		
	〃	380.7250 ~ 380.8000	A = (FR + 380.700) / 0.075		
	〃	380.8125 ~ 400.0000	A = (FR + 380.800) / 0.075		
	〃	400.0125 ~ 405.9750	A = (FR + 380.700) / 0.075		
	〃	405.9875 ~ 419.9875	A = (FR + 380.800) / 0.075		
	5	420.0000 ~ 450.0000	〃		
	6.25	450.00625 ~ 469.99375	〃		
	12.5	470.0000 ~ 512.0000	〃		
UHF High	3.125	764.0000 ~ 805.996875	A = (FR - 380.800) / 0.075	2nd Local = 1st IF - 21.4	20.9450
	12.5	806.0000 ~ 823.9875	= A.xxx (Cut away decimal)		
	〃	849.0000 ~ 868.9875	1st Local = A x 0.075		
	〃	894.0000 ~ 939.9875	1st IF = FR - 1st Local		
	6.25	940.0000 ~ 960.0000			
	〃	1240.0000 ~ 1300.0000			

-2 IF FREQUENCY

1st IF : 380.6500 ~ 380.86875Hz

2nd IF : 21.3975MHz/21.4000MHz/21.4025MHz

3rd IF : 455kHZ

-3 Example

RECEIVING BAND (FR STEP)	FREQ. STEP (kHz)	RECEIVING FREQ. FR (MHz)	1st LOCAL PLL 1 /VCO 1 or VCO 2 (MHz)	2nd LOCAL PLL 2 /VCO 3 (MHz)	3rd LOCAL X' TAL (MHz)
VHF Low	5.0	25.0000	A : 5410.666 = (25.0000 + 380.800) / 0.075 = 5410.666 (Cut away decimal) 1st Local : 405.750 =5410 x 0.075 1st IF : 380.750 = 405.750 - 25.0000	359.350 = 380.750 - 21.4	20.9450
		40.0000	5610.666 = (40.0000 + 380.800) / 0.075 = 5610.666 (Cut away decimal) 420.750 =5610 x 0.075 380.750 = 420.750 - 40.0000	359.350 = 380.750 - 21.4	20.9450
		54.0000	5797.333 = (54.0000 + 380.800) / 0.075 = 5797.333 (Cut away decimal) 434.775 =5797 x 0.075 380.775 = 434.775 - 54.0000	359.375 = 380.775 - 21.4	20.9450
VHF High	8.33	108.0000	6517.333 = (108.0000 + 380.800) / 0.075 = 6517.333 (Cut away decimal) 488.775 =6517 x 0.075 380.775 = 488.775 - 108.0000	359.375 = 380.775 - 21.4	20.9450
	7.5	15410000	7132 = (154.1000 + 380.800) / 0.075 = 7132 (Cut away decimal) 534.9 =7132 x 0.075 380.800 = 534.900 - 154.1000	359.4025 = 380.800 - 21.3975	20.9425
	12.5	174.0000	7397.333 = (174.0000 + 380.800) / 0.075 = 7397.333 (Cut away decimal) 554.775 = 7397 x 0.075 380.775 = 554.775 - 174.0000	359.375 = 380.775 - 21.4	20.9450
	5.0	216.0025	7957.366 = (216.0025 + 380.800) / 0.075 = 7957.366 (Cut away decimal) 596.775 = 7957 x 0.075 380.7725 = 596.775 - 216.0025	359.370 = 380.7725 - 21.4025	20.9475
	5.0	225.0000	8077.333 = (225.0000 + 380.800) / 0.075 = 8077.333 (Cut away decimal) 605.775 =8077 x 0.075 380.775 = 605.775 - 225.0000	359.375 = 380.775 - 21.4	20.9450

RECEIVING BAND (FR STEP)	FREQ. STEP (kHz)	RECEIVING FREQ. FR (MHz)	1st LOCAL PLL 1 /VCO 1 or VCO 2 (MHz)	2nd LOCAL PLL 2 /VCO 3 (MHz)	3rd LOCAL X' TAL (MHz)
UHF Low	25.0	310.0000	9210.666 = (310.0000 + 380.800) / 0.075 = 9210.666 (Cut away decimal) 690.750 =9210 x 0.075 380.750 = 690.750 – 310.0000	359.350 = 380.750 – 21.4	20.9450
	6.25	406.0000	10490.666 = (406.0000 + 380.800) / 0.075 = 10490.666 (Cut away decimal) 786.750 =10490 x 0.075 380.750 = 786.750 – 406.0000	359.350 = 380.750 – 21.4	20.9450
		446.0000	11024.000 = (446.0000 + 380.800) / 0.075 = 11024.000 (Cut away decimal) 826.800 =11024 x 0.075 380.800 = 826.800 – 446.0000	359.400 = 380.800 – 21.4	20.9450
		512.0000	11904.000 = (512.0000 + 380.800) / 0.075 = 11904.000 (Cut away decimal) 892.800 =11904 x 0.075 380.800 = 892.800 – 512.0000	359.400 = 380.800 – 21.4	20.9450
UHF High	3.125	764.0000	5109.333 = (764.0000 – 380.800) / 0.075 = 5109.333 (Cut away decimal) 383.175 =5109 x 0.075 380.825 = 764.000 – 383.175	359.425 = 380.825 – 21.4	20.9450
	6.25	806.0000	5669.333 = (806.0000 – 380.800) / 0.075 = 5669.333 (Cut away decimal) 425.175 =5669 x 0.075 380.825 = 806.000 – 425.175	359.425 = 380.825 – 21.4	20.9450
		860.0000	6389.333 = (860.0000 – 380.800) / 0.075 = 6389.333 (Cut away decimal) 479.175 =6389 x 0.075 380.825 = 860.000 – 479.175	359.425 = 380.825 – 21.4	20.9450
		960.0000	7722.666 = (960.0000 – 380.800) / 0.075 = 7722.666 (Cut away decimal) 579.150 =7722 x 0.075 380.850 = 806.000 – 579.150	359.450 = 380.850 – 21.4	20.9450
		12400.0000	11456.000 = (1240.0000 – 380.800) / 0.075 = 11456.000 (Cut away decimal) 859.200 =11456 x 0.075 380.800 = 1240.000 – 859.200	359.400 = 380.800 – 21.4	20.9450
		1300.0000	12256.000 = (1300.0000 – 380.800) / 0.075 = 12256.000 (Cut away decimal) 919.200 =12256 x 0.075 380.800 = 1300.000 – 919.200	359.400 = 380.800 – 21.4	20.9450

Appendix B – ADV0801 Specification

GENERAL RESEARCH OF ELECTRONICS, INC.
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SHIBA NO.3 AMEREX BLDG.
No. 12-17 MITA 3-CHOME, MINATO-KU
TOKYO 108-0073, JAPAN

Date: April. 4, 2008
Reference No. 08001F

SPECIFICATIONS

SUBJECT: DIGITAL AND ANALOGUE TRIPLE TRUNKING SYSTEM, VHF/UHF PROGRAMMABLE AM/FM SCANNING RECEIVER WITH SIGNAL STALKER II AND SKYWARN, FCC ID: ADV0801

1. GENERAL SPECIFICATIONS

1.1	Working Memory:	1,800 programmed objects using flexible "scannable object" system. Program and scan conventional channels, trunking talkgroups, limit searches, service searches, and Signal Stalker II configurations as "scannable objects" that are created, edited, grouped and scanned using common user interface conventions.
1.2	Virtual Scanners:	21 Virtual Scanner (V-Scanner) folders, each capable of holding the entire contents of working memory, for a total storage capacity of over 37,800 objects.
1.3	Searches	8 preprogrammed dedicated service searches, 1 dedicated limit search. Any service or limit search can be programmed and scanned as an object alongside conventional channels and trunking talkgroups
1.4	Priority	Talkgroup and conventional channel priority, selectable priority sample rate and priority sample during trunking talkgroup call
1.5	Conv. Receive Modes	AM, FM, NFM, CTCSS, DCS, P25 NAC
1.6	Trunking Receiver Modes	Motorola Type I/II/Iii Analog and Digital, GE/Ericsson/MA-COM EDACS Narrowband, and Wideband, EF Johnson LTR

– Continued –

1.7 Receiver Design

Triple conversion PLL super-heterodyne

1st IF 380.8 MHz : The 1st LO uses high side of receive frequency range for VHF and UHF Low/T, and low side of receive frequency range for >512 MHz

2nd IF 21.4 MHz : The second LO uses low side of 1st IF

3rd IF 455 kHz : The 3rd LO uses the low side of the 2nd IF

1.8 Frequency Range :

VHF Low	25.00000 – 54.00000 MHz
VHF Aircraft	108.00000 – 136.99166 MHz
VHF High	137.00000 – 174.00000 MHz
	216.00250 – 299.99375 MHz
UHF Low/T	300.00000 – 512.00000 MHz
UHF High	764.00000 – 960.00000 MHz*
	1240 .00000 – 1300.0000 MHz

*Excludes frequencies utilized by the Cellular Mobile Radiotelephone Service 824 – 848.9875 MHz and 869 – 893.9875 MHz

1.9 Service Searches

Marine
Aircraft
CB
FRS/GMRS/MURS/DOT-STAR
Public Safety
Aircraft
Amateur Radio
Railroad

1.10 Weather Frequencies

162.400, 162.425, 162.450, 162.475, 162.500, 162.525, 162.550 MHz

1.11 Scanning Rate

Approximately 55 channels per second

1.12 Search Rate

Approximately 90 steps per second

1.13 Display

LCD with amber LED backlight, 4 lines of 16 characters each, plus 13 display icons

1.14 Zeromatic

Automatically zeroes receiver on correct frequency during searches

1.15 Audio Output

250 mWatts

1.16 Signal Stalker II

All Bands:

Group 0 : 25 – 54 MHz
Group 1 : 108 – 137 MHz
Group 2 : 137 – 174 MHz
Group 3 : 216.0025 – 300 MHz
Group 4 : 300 – 406 MHz
Group 5 : 406 – 470 MHz
Group 6 : 470 – 512 MHz
Group 7 : 764 – 806 MHz
Group 8 : 806 – 868.9875 MHz*
Group 9 : 896 – 960, 1240 - 1300 MHz

Public Safety Bands:

Group 0 : 33.420 – 46.500 MHz
Group 1 : 151.820 – 170.150 MHz
Group 2 : 453.0375 – 467.7125 MHz
Group 3 : 764.003125 – 805.996875 MHz
Group 4 : 806.0125 – 868.9875 MHz*

*Excludes frequencies utilized by the Cellular Mobile Radiotelephone Service 824 – 848.9875 MHz and 869 – 893.9875 MHz

1.17 Speaker — Built-in 36 mm 8 Ohms dynamic speaker

1.18 Operating Voltage — DC 6 Volts (4 ea. "AA" alkaline, Ni-Cd or Ni-MH)

1.19 External Power and Charger — DC 9 Volts 500 mA regulated power supply

1.20 Dimensions — Approximately 2.56(W) x 1.65(D) x 5.71(H) inches, 65 (W) x 42 (D) x 145 (H) mm

1.21 Weight — Approximately 8.5 ounces, 240 grams (not including batteries and antenna)

1.22 Included accessories — Rubber antenna, Normal battery holder, Rechargeable battery holder, Belt clip and Owner's manual,

1.23 Memory backup — No backup battery required, utilizes non-volatile EEPROM memory

2. ELECTRICAL SPECIFICATIONS

Standard Test Condition

(1)	Power source voltage	:	6 Volts DC (Battery)
(2)	Antenna impedance	:	50 Ohms
(3)	Test temperature	:	25 degrees C
(4)	Standard signal level	:	100 μV
(5)	Modulation frequency	:	1 kHz
(6)	Reference FM deviation	:	3.0 kHz
(7)	Reference AM modulation	:	60%
(8)	Reference audio output	:	75m Watts
(9)	Audio output load	:	8 Ohm resistive load

2.1 FREQUENCY RANGES:

Frequency Range	Step Size	Default Mode
25.00000 – 26.96000 MHz	10 kHz	AM
26.96500 – 27.40500 MHz	10 kHz	AM
27.41000 – 29.50500 MHz	5 kHz	AM
29.51000 – 29.70000 MHz	5 kHz	FM
29.71000 – 49.83000 MHz	10 kHz	FM
49.83500 – 54.00000 MHz	5 kHz	FM
108.00000 – 136.99166 MHz	8.33 kHz	AM
137.00000 – 137.99500 MHz	5 kHz	FM
138.00000 – 143.98750 MHz	12.5 kHz	FM
144.00000 – 147.99500 MHz	5 kHz	FM
148.00000 – 150.78750 MHz	12.5 kHz	FM
150.80000 – 150.84500 MHz	5 kHz	FM
150.85250 – 154.49750 MHz	7.5 kHz	FM
154.51500 – 154.6400 MHz	5 kHz	FM
154.65000 – 156.2550 MHz	7.5 kHz	FM
156.27500 – 157.4500 MHz	25 kHz	FM
157.47000 – 161.5725 MHz	7.5 kHz	FM
161.60000 – 161.9750 MHz	5 kHz	FM
162.00000 – 174.0000 MHz	12.5 kHz	FM
216.00250 – 219.9975 MHz	5 kHz	FM
220.00000 – 224.9950 MHz	5 kHz	FM
225.00000 – 379.99375 MHz	6.25 kHz	AM
380.00000 – 419.98750 MHz	12.5 kHz	FM
420.00000 – 450.00000 MHz	5 kHz	FM
450.00625 – 469.99375 MHz	6.25 kHz	FM
470.00000 – 512.00000 MHz	12.5 kHz	FM
764.00000 – 805.996875 MHz	3.125 kHz	FM
806.00000 – 823.987500 MHz	12.5 kHz	FM
849.00000 – 868.98750 MHz	12.5 kHz	FM
894.00000 – 939.98750 MHz	12.5 kHz	FM
940.00000 – 960.00000 MHz	6.25 kHz	FM
1240.00000 – 1300.0000 MHz	6.25 kHz	FM

*Excludes frequencies utilized by the Cellular Mobile Radiotelephone Service:
824 – 848.9875 MHz and 869 – 893.9875 MHz

				Nominal	Limit
2.2	Sensitivity	:	VHF Low	0.3 μV	1 μV
	FM: (S+N)/N = 20 dB		VHF Aircraft	0.3 μV	1 μV
	Dev.: 3 kHz at 1 kHz		VHF High 137 – 174 MHz	0.5 μV	2 μV
			216.0025 – 224.995 MHz	0.5 μV	2 μV
			225 – 299.99375 MHz	0.5 μV	2μV
			UHF Low/T 300 – 405.9875 MHz	0.8 μV	3μV
			406 – 512 MHz	0.5 μV	2μV
			UHF High 764 – 960 MHz	0.7 μV	3 μV
			1240 – 1300 MHz	0.7 μV	4 μV
	AM: (S+N)/N = 20 dB	:	VHF Low	1 μV	3 μV
	Mod.: 60% at 1 kHz		VHF Aircraft	1 μV	3 μV
			VHF High 137 – 174 MHz	1.5 μV	5 μV
			216.0025 – 224.995 MHz	1.5 μV	5 μV
			225 – 299.99375 MHz	2 μV	6 μV
			UHF Low/T 300 – 405.9875 MHz	3 μV	10 μV
			406 – 512 MHz	2 μV	6 μV
			UHF High 764 – 960 MHz	2 μV	6 μV
			1240 – 1300 MHz	3 μV	12 μV
2.3	Signal Stalker II sensitivity	:	450 MHz	–60 dBm	–50 dBm
2.4	Data decode sensitivity				
	ED	:	ED (GE/Ericsson/MA-COM)	1 μV	4 μV
	4 kHz Dev. at 450, 861 MHz				
	MO (Voice channel)	:	MO (Motorola)	0.5 μV	2 μV
	350 Hz Dev. at 174, 450, 861 MHz				
	MO (Control channel)	:	MO (Motorola)	0.8μV	4 μV
	4 kHz Dev. at 174, 450, 861 MHz				
	LTR	:	LTR (EF Johnson)	0.5 μV	3 μV
	800 Hz Dev. at 450, 861 MHz				
	WX Alert 1050 Hz tone	:		0.3 μV	1 μV
	3 kHz Dev. at 162.4 MHz				
	WX Digital Weather Alert	:		0.5 μV	2 μV
	4 kHz Dev. at 162.4 MHz				
2.5	CTCSS decode sensitivity	:		0.5 μV	3 μV
	350 Hz Dev. at 450, 861 MHz				
2.6	DCS decode sensitivity	:		0.5μV	3 μV
	350 Hz Dev. at 450, 861 MHz				
2.7	WX alert tone decode range	:		1050 ±25 Hz	±40 Hz
	4 kHz Dev. 2 μV at 162.400 MHz				
2.8	WX alert tone checking time	:		6 sec.	4 – 8 sec.
	4 kHz Dev. 2 μV at 162.400 MHz				

			Nominal	Limit
2.9	WX same sound level at 1 ft. :		70 dB SPL	60 dB SPL
2.10	Image ratio 1st IF image :	VHF Low at 41 MHz	50 dB	40 dB
		VHF Aircraft at 124 MHz	50 dB	40 dB
		VHF High at 154.1 MHz	50 dB	40 dB
		Military Air at 310 MHz	40 dB	25 dB
		UHF Low/T at 450 MHz	50 dB	40 dB
		UHF High at 861 MHz	80 dB	60 dB
		1270 MHz	55 dB	40 dB
	2nd IF image :	VHF High at 154.1 MHz	50 dB	40 dB
2.11	Attenuator :	VHF Low at 41 MHz	20 dB	17 – 24 dB
		VHF Aircraft at 124 MHz	20 dB	17 – 24 dB
		VHF High at 154.1 MHz	20 dB	17 – 24 dB
		UHF Low/T at 450 MHz	18 dB	10 – 20 dB
		UHF High at 861 MHz	15 dB	8 – 20 dB
		at 1270 MHz	15 dB	8 – 18 dB
2.12	Squelch sensitivity (Band center)			
	Threshold :	AM/FM	0.5 μV	2 μV
	Tight: (S+N)/N :	AM	20 dB	10 dB
		FM	25 dB	15 dB
2.13	Selectivity			
	AM 25 – 27.995 MHz :	–6 dB	±4 kHz	>±2.5 kHz
		–50 dB	±6 kHz	<±12 kHz
	Other frequency :	–6 dB	±7 kHz	>±4.5 kHz
		–50 dB	±13 kHz	<±18 kHz
2.14	Spurious rejection (Except Primary image) :	VHF High at 154.1 MHz	40 dB	30 dB
2.15	IF rejection ratio :	380.8 MHz at 154.1 MHz	60 dB	40 dB
		21.4 MHz at 154.1 MHz	100 dB	70 dB
		Fr : 225 – 300 MHz	30 dB	not specified
		300 – 405.9875 MHz	10 dB	not specified
2.16	Acceptable radio frequency displacement at EIA RS-204D :		±6 kHz	±3 kHz
2.17	Signal meter indicating	Full level (▪▪▮▮▮) at 154.1 MHz	-96 dBm	-94 dBm – -98 dBm

				Nominal	Limit
2.18	Signal to noise ratio AM/FM RF: 100 μV Dev.: 3 kHz at 1 kHz Mod. 60% at 1 kHz	:	VHF Low	40 dB	30 dB
			VHF Aircraft	40 dB	30 dB
			VHF High 137 – 174 MHz	40 dB	30 dB
			216.0025 – 299.99375 MHz	40 dB	30 dB
			UHF Low/T 300 – 512 MHz	35 dB	25 dB
			UHF High 764 – 960 MHz	35 dB	25 dB
			1240 – 1300 MHz	35 dB	25 dB
2.19	Residual noise Vol. min. and Squelched	:		1 mV	3 mV
2.20	Scanning rate without trunking:		138 – 147.9 MHz (in 100kHz: Intervals)	55 ch/sec.	45 – 66 ch/sec.
2.21	Search rate steps/sec.	:	at 162.250 — 167.250 MHz	90 steps/sec.	80 – 100
2.22	Signal Stalker II Time One active signal present above threshold	:	Public safety band	<0.75 sec.	0.825 sec.
			All bands, default groups	<2.0 sec.	2.50 sec.
			All bands, all groups	<6.0 sec.	6.5 sec.
2.23	Scan and Search delay time	:	User programmable, default	2 sec.	1 – 3 sec
2.24	Audio output (T.H.D. 10 %) 8 Ohms R Load, 1 kHz	:	RF input: 100 μV at 154.1 MHz	170 m Watts	140 m Watts
2.25	T.H.D. at 50 m Watt	:	RF input: 100 μV at 154.1 MHz	1 %	5%
2.26	Audio max. power 8 Ohm internal speaker	:	RF input: 100 μV at 154.1 MHz	250 m Watts	200 m Watts
	32 Ohm at headphone mono/stereo (each phone)			12/7 m Watts	<25 m Watts
2.27	Audio frequency response at –6 dB	:	RF input: 100 μV at 154.1 MHz	300 Hz	200 – 400 Hz
				2.0 kHz	1.5 – 3.0 kHz
2.28	Intermediate frequency	:	1st 380.8 MHz 2nd 21.4 MHz 3rd 455 kHz		
2.29	Current drain Ext. Power at 9 Volts 8 Ohm internal speaker at 154.1 MH	:	Vol. Max.	220 mA	260 mA
			Squelch	140 mA	170 mA
2.30	Charging current at 9 VDC Note : AC-DC Adapter 9V 500mA	:		150 mA	100 – 200 mA
2.31	Charging time		: Ni-Cd Battery (1000mA/h)	8 Hours	Not specified
			: Ni-MH Battery (2300 mA/h)	16 Hours	Not specified

	Nominal	Limit
Battery life at continuous operation		
Alkaline Battery :	12 Hours	Not specified
Ni-Cd Battery (1000mA/h)	7 Hours	Not specified
Ni-MH Battery (2300 mA/h)	15 Hours	Not specified

Note: Test condition
LCD Back light, Key Back light ,tri - color LED Off ,
EIAJ CP-2905 (1–4–4.1)

2.32 Birdies and step frequency when search : Not specified

2.33 Filter : Saw filter for 380.8 MHz, Monolithic crystal filter for 21.4 MHz and ceramic filter for 455 kHz

2.34 Antenna impedance : 50 Ohms

2.35 Temperature range : Test to specification between: +18℃ – +35 degree C
Operate (Need not meet spec.: -10 ℃ – +60 degree C

2.36 Low BATT indicator when battery icon is flashes :

Alkaline Battery	3.8 V	3.6 – 4.1 V
Ni-Cd Battery	4.1 V	3.9 – 4.4 V
Ni-MH Battery	4.3 V	4.1 – 4.6 V

3. OPERATING CONTROLS AND CONNECTIONS

3.1 Volume control with power switch

3.2 Squelch control

3.3 Keyboard (34 keys): FUNCtion 1-3, Five Way Pushbutton Key (up, down, left, right, SEL) , FUNCtion, Light/key-lock, MANual, SCAN/ signal stalker Ⅱ, TUNE, SEARCH, ATT, PRIority, FAV, WX/Skywarn, PGM/V-S, L/OUT ENTer, PauSE, 1, ABC/2, DEF/3, GHI/4, JKL/5, MNO/6, PQRS/7, TUV/8, WXYZ/9, CL, 0 and• /DELAY

3.4 LCD display: 16 characters x 4 lines and 8 icons
Frequency, Mode, CH Bank, Text, Squelch, Signal meter, Battery low, up/down ...

F, **T**, **G**, **A**, **S** , ▲, ▼, ▪▪▮▮▮ ..... icons

3.5 BNC type antenna connector

3.6 Earphone jack (D = 3.5 mm stereo)

3.7 External power jack and charge jack(type –"C")

3.8 PC/IF Interface jack (D = 3.5 mm stereo)
Set to PC : use USB cable (Cat. No.20-047)
Set to Set : use D=3.5 mm stereo cable

3.9 Battery compartment

4. Major Features:

4.1 **Intuitive "Object Oriented" User Interface Design** is designed for ease of use, yet powerful enough to satisfy the most sophisticated experts. Common data entry, browsing and control methods are used for non-trunked conventional channels, trunking talkgroups, search configurations and Signal Stalker II setups. The radio grows with your customers – they can start out with a small, easy to manage configuration, then expand it whenever your customers need to.

4.2 **Menu Driven Programming With Context Sensitive Help** - Each menu item provides a few lines of help text that provide assistance with programming and using the scanner.

4.3 Powerful and Flexible Scan List Functionality allows your customers to arrange, group and scan objects according to their preference.

4.4 **Flexible Free-Form Memory Organization** - memory is assigned as objects are created using a sophisticated internal file management system. Your customers are not constrained to traditional bank/channel scanner memory layouts. No memory is wasted as a result of bank/channel programming constraints. The scanner has sufficient main memory capacity to store over 1,800 conventional channels, trunking talkgroups, search configurations and Signal Stalker II objects in any combination, providing ample capacity for more sophisticated hobbyists and professionals while keeping the database size manageable for beginners.

4.5 **V-Scanner Technology** - Allows your customers to save complete radio configurations within the radio, for recall into main memory as needed in the field. This is similar to having a laptop computer and programming software available anytime. Your customers can use V-Scanners to store configurations for different geographical areas or usage styles. Twenty-one V-Scanner Folders are provided, each capable of storing over 1,800 objects. Total memory capacity of main memory combined with V-Scanners is over 37,800 objects!

4.6 **SKYWARN Storm Spotter Functionality** – Provides instant, one button access to frequencies used by storm spotter networks. Your customers can monitor storm conditions as they occur, and become aware of dangerous conditions before the media or emergency management officials are able to announce them to the general public.

4.7 **SAME and All Hazards Weather Alerting** – PRO-106 Advanced Digital Scanner can operate in dedicated SAME weather alerting mode, and alert your customers to severe weather and other hazards in the specific area(s) that they select, or, the scanner can check local NOAA weather frequencies periodically, even while scanning, and alert your customers when an All Hazards alert occurs.

4.8 **Multi-System Trunking** - Scans most common trunked radio system signaling formats, including Motorola, EDACS, LTR and P25 trunked radio networks. Talkgroup and individual call monitoring is supported.

4.9 **Automatic Adaptive Digital Tracking** - When monitoring Motorola and P25 digital systems, instantly adapts the digital decoder to the digital modulation format of the transmitted signal, then analyzes the signal hundreds of times each second and adapts to any subtle changes caused by multipath or fading. No cumbersome manual adjustments are required.

4.10 **Digital AGC** - instantly compensates for low user audio levels that are very common on digital systems. The radio is easier to listen to, and provides your customers with a more enjoyable scanning experience.

4.11 **The Best Subaudible Squelch Decoder in the Scanning Industry** - CTCSS and DCS subaudible squelch coding is processed by the same powerful DSP chip that is used for P25 digital decoding. Provides fast and reliable decoding of subaudible squelch signaling with squelch tail elimination.

4.12 **Signal Stalker II** - Quickly searches the scanner's frequency ranges for transmissions from nearby transmitters.

4.13 **P25 NAC Functionality** - Much like CTCSS and DCS with analog signals, P25 Network Access Code (NAC) is used to provide selective squelch operation on conventional digital channels. PRO-106 Advanced Digital Scanner will detect the NAC that is being used on a P25 conventional digital channel, and allow your customers to program NAC codes to block transmissions that do not have a matching NAC, including analog traffic on the same frequency!

4.14 **Exclusive ALERT LED** - Programmable tri-color LED can be configured to illuminate or flash when certain objects are active. Eight user-defined colors and brightness levels can be specified from thousands of possible combinations. Provides visual alerts when certain channels are active, e.g., blue can be used to signal activity on a primary police channel, red for fire, etc.

4.15 **Audible alarms** - Programmable audible alarms can be configured to sound when certain objects are active. Can be used in conjunction with, or separately from, the ALERT LED described above.

4.16 **High Speed PC Interface** - uses USB cable (Cat. No.20-047) in full duplex mode at 6 times the speed of previous scanner models for PC transfer and 8 times the speed of previous models for radio-to-radio cloning.

4.17 **Real-time Signal Strength Indicator** - shows relative strength of received signals.

4.18 **Sleek, Compact Case Design with Large Speaker** is designed for one-handed operation and ease of use.