TEST REPORT

Report Number: 3187216MPK-001
Project Number: 3187216
September 8, 2009

Testing performed on the
Scanner
Model Number: 0602
FCC ID: ADV0602

to

FCC Part 15, Subpart B

Class: B

for
GRE America

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:** September 08, 2009
Arkadi Kaplan

Reviewed by: _____ **Date:** September 08, 2009
Ollie Moyrong

VERIFICATION OF COMPLIANCE
Report No. 3187216MPK-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:	Hand Held Scanner
Trade Name:	GRE America
Model No.:	0602
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:	August 11 and September 08, 2009

We attest to the accuracy of this report:

Arkadi Kaplan
EMC Engineer

Ollie Moyrong
EMC Manager

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1.0 General Description

1.1 Product Description

The Equipment under Test (EUT) is an Advanced Digital Scanning Receiver, model 0602.

A pre-production version of the sample was received on August 11, 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: 0602
FCC ID: ADV0602

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: “ADV0602 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:

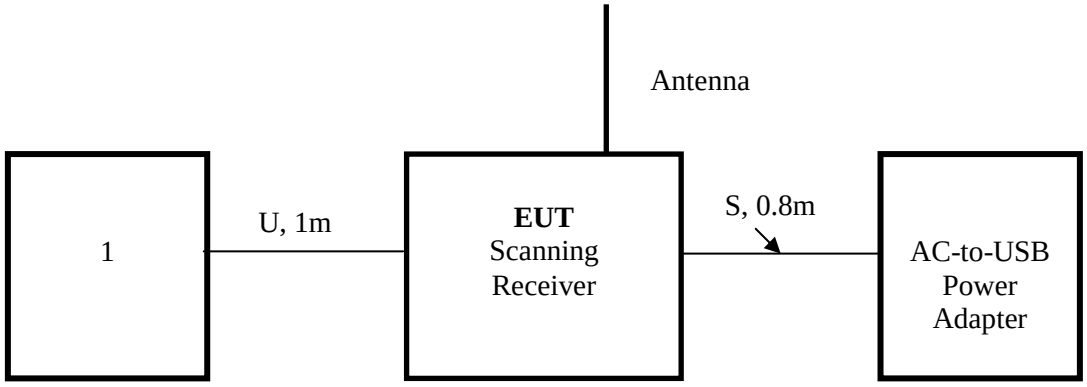
Test Mode 1: The EUT was set to continuously receive at the low, middle and high channels of each band.

Test Mode 2: The EUT was set to continuously 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



Power Adapter: AC-to-USB, Enercell, Cat. #273-317
U: Unshielded
S: Shielded
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

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

Tests were performed with the EUT tuned to the low, middle and high channels of each band and with the EUT setup in scanning mode. The final recorded data reflects the worst-case results.

A sample calculation and data tables of the emissions are included.

All measurements were performed with peak detection unless otherwise specified.

Limits for Electromagnetic Radiated Disturbance, FCC Section 15.109(b)

Frequency (MHz)	**Class B at 3m dB(μV/m)**
30-88	40.0
88-216	43.5
216-960	46.0
Above 960	54.0

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:	Arkadi Kaplan
Test Date:	August 24, 2009

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

Results:	**Complies** by 8.4 dB

3.2 Test Data (Continued)

FCC Part 15.109 Class B Radiated Emissions Data

Model: 0602
Test Mode: Tuned Frequency
Test distance: 3 m

Tuned Frequency	L.O. Frequency	Antenna Polarization	Quasi-PK FS	Limit @3m	RA	AG	CF	AF	Margin
MHz	MHz	H/V	dB(uV/m)	dB(uV/m)	dB(uV)	dB	dB	dB(1/m)	dB
25	405.8	V	21.4	46	34.5	32.1	2.1	16.9	-24.6
41	421.8	V	22.4	46	34.8	32.1	2.2	17.6	-23.6
54	434.8	V	21.2	46	33.5	32.2	2.2	17.6	-24.8
108	488.8	V	14.3	46	25.8	32.3	2.3	18.4	-31.7
124	504.8	V	16.3	46	27.6	32.3	2.4	18.6	-29.7
136	516.8	V	16.3	46	27.4	32.3	2.5	18.8	-29.7
137	517.8	V	15.3	46	26.4	32.3	2.5	18.8	-30.7
154	534.9	V	17.8	46	28.5	32.4	2.6	19.1	-28.2
174	554.8	V	17.9	46	28.2	32.4	2.7	19.3	-28.1
216.0025	596.0025	V	29.6	46	39.3	32.5	3	19.8	-16.4
225	605.8	V	30.1	46	38.2	32.5	3	21.3	-15.9
310	690.8	V	21.3	46	29.8	32.5	2.8	21.3	-24.7
406	786.8	V	23.9	46	31.4	32.4	3	21.9	-22.1
450	830.8	V	25.7	46	32.6	32.2	3.1	22.3	-20.3
512	892.8	V	37.6	46	42.8	31.9	3.2	23.5	-8.4
764	383.2	V	20.9	46	34.7	32	2.1	16.1	-25.1
806	425.2	V	23.6	46	35.7	32	2.2	17.7	-22.4
860	479.2	V	21.1	46	32.7	32.1	2.3	18.2	-24.9
960	579.2	V	20.7	46	31.1	32.3	2.6	19.3	-25.3
1240	859.2	V	17.2	46	22.9	31.8	3.1	23	-28.8
1270	889.2	V	25.9	46	30.6	31.6	3.2	23.7	-20.1
1300	919.2	V	23.5	46	28.2	31.3	3.2	23.4	-22.5

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.
5. Emissions in the “Scanning” mode were lower than the “Tuned Frequency” Mode .

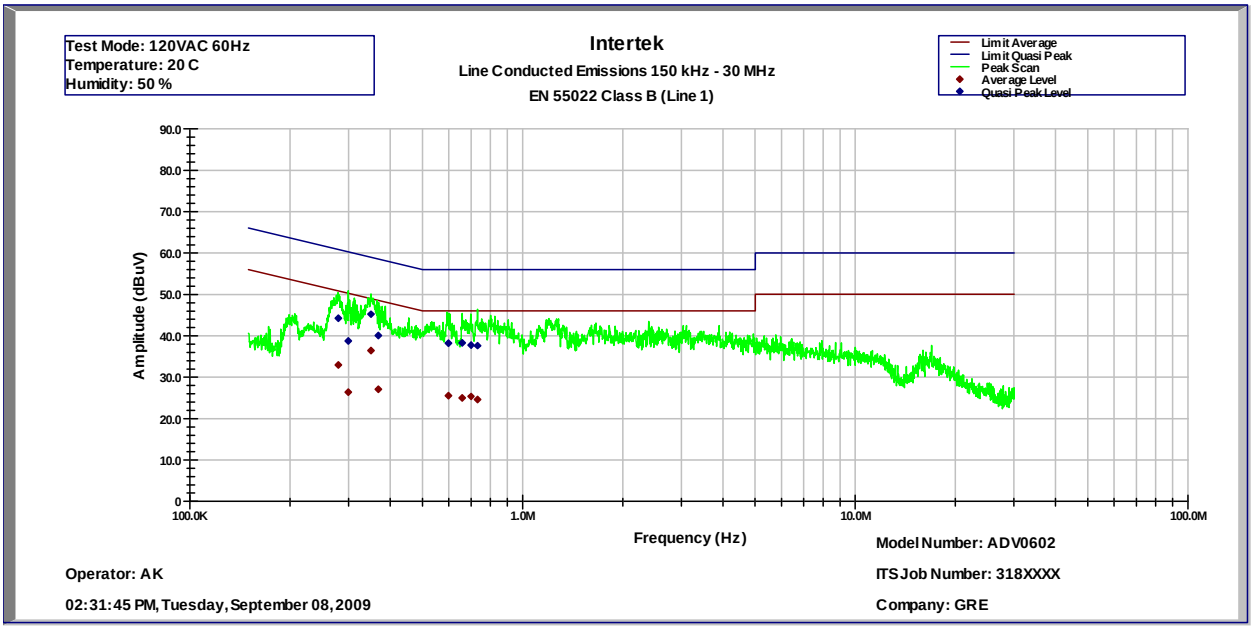
3.3 AC Line Conducted Emission Data

Tested By:	Arkadi Kaplan
Test Date:	September 8, 2009

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

Results:	**Complies** by 13.9 dB

3.3. Test Data (Continued)



Intertek
Line Conducted Emissions 150 kHz - 30 MHz
EN 55022 Class B (Line 1)

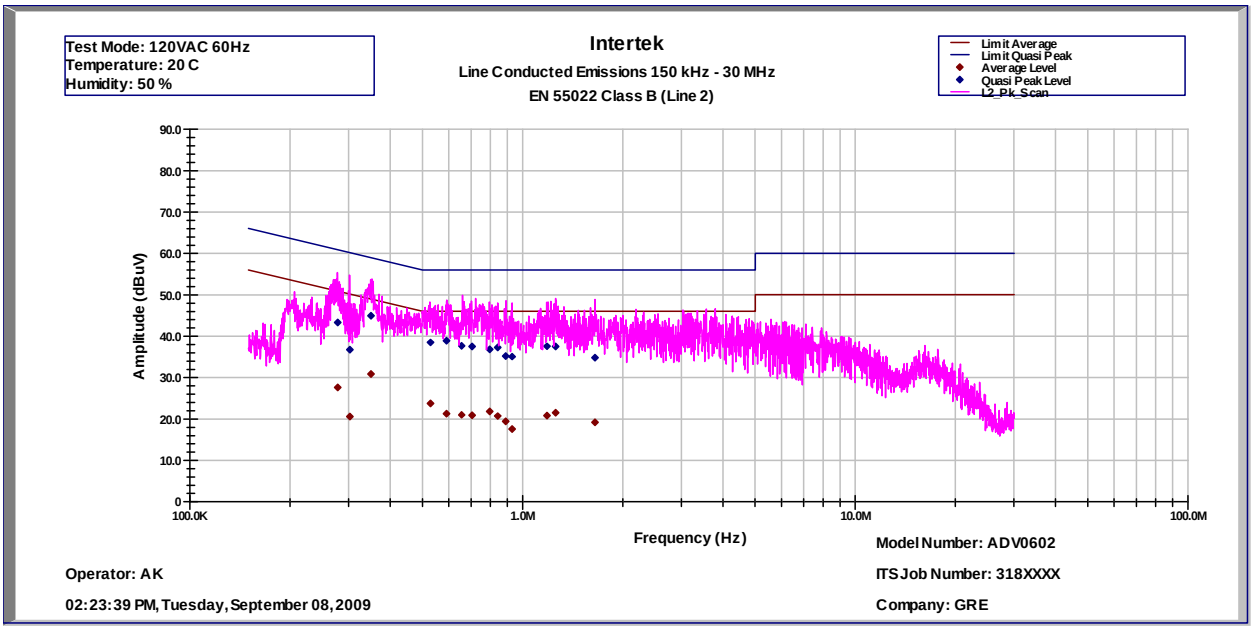
Operator: AK — Model Number: 0602

02:31:45 PM, Tuesday, September 08, 2009 — Company: GRE

Frequency MHz	Av Level (dBuV)	QP Level (dBuV)	Av Limit (dBuV)	QP Limit (dBuV)	Av Margin (dB)	QP Margin (dB)
0.279	32.9	44.2	52.3	62.3	-19.4	-18.1
0.299	26.4	38.8	51.7	61.7	-25.3	-23.0
0.350	36.4	45.2	50.3	60.3	-13.9	-15.1
0.368	27.1	40.1	49.8	59.8	-22.7	-19.7
0.599	25.5	38.2	46.0	56.0	-20.5	-17.8
0.657	25.0	38.3	46.0	56.0	-21.0	-17.7
0.699	25.3	37.8	46.0	56.0	-20.7	-18.2
0.732	24.6	37.6	46.0	56.0	-21.4	-18.4

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

3.3 Test Data (Continued)



Intertek
Line Conducted Emissions 150 kHz - 30 MHz
EN 55022 Class B (Line 2)

Operator: AK — Model Number: 0602

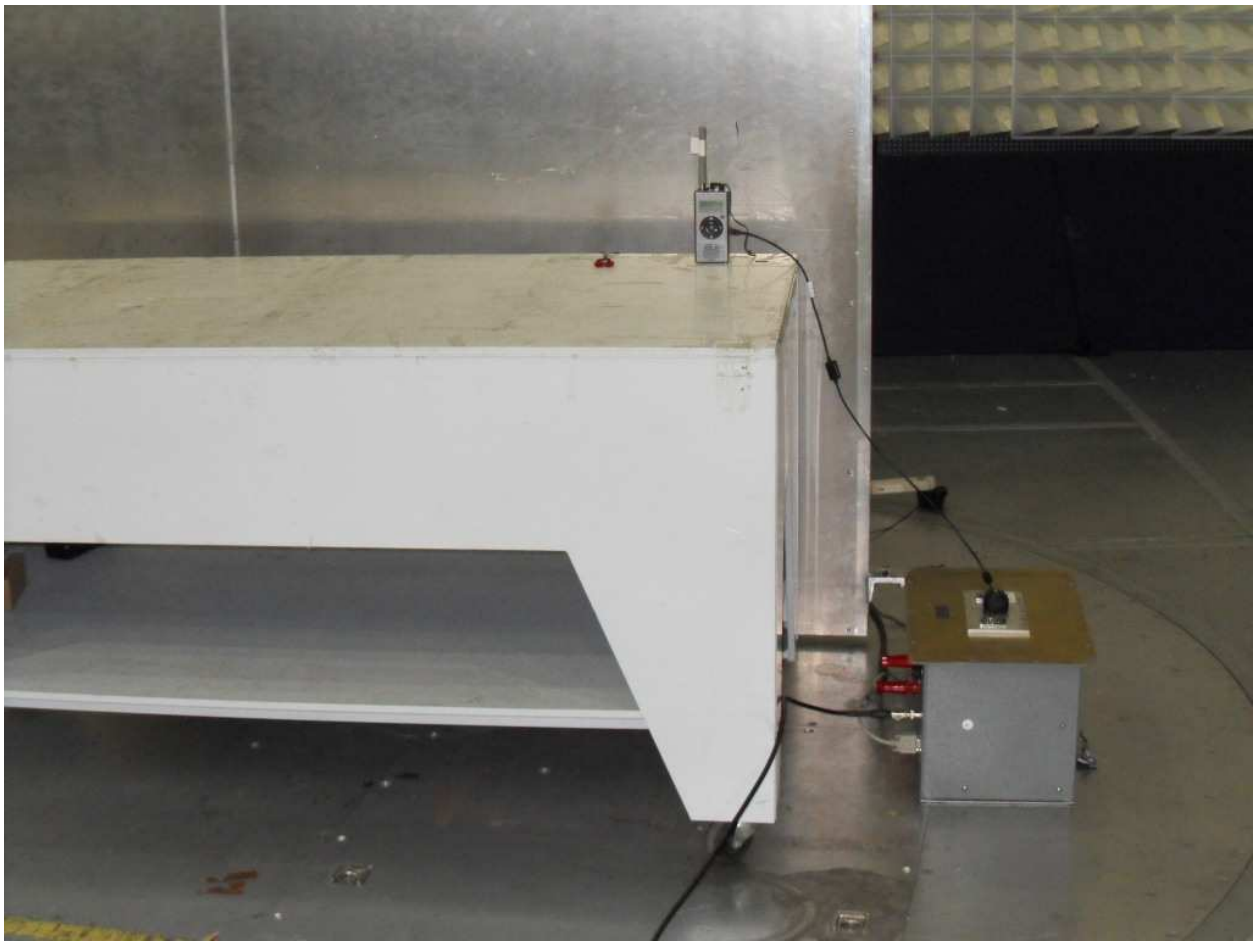
02:23:39 PM, Tuesday, September 08, 2009 — Company: GRE

Frequency MHz	Av Level (dBuV)	QP Level (dBuV)	Av Limit (dBuV)	QP Limit (dBuV)	Av Margin (dB)	QP Margin (dB)
0.278	27.6	43.3	52.3	62.3	-24.8	-19.0
0.302	20.6	36.7	51.7	61.7	-31.1	-24.9
0.350	30.8	44.9	50.3	60.3	-19.5	-15.3
0.528	23.7	38.5	46.0	56.0	-22.3	-17.5
0.591	21.3	38.9	46.0	56.0	-24.7	-17.1
0.656	21.0	37.6	46.0	56.0	-25.0	-18.4
0.705	20.9	37.5	46.0	56.0	-25.1	-18.5
0.796	21.8	36.8	46.0	56.0	-24.2	-19.2
0.842	20.7	37.3	46.0	56.0	-25.3	-18.7
0.889	19.4	35.2	46.0	56.0	-26.6	-20.8
0.930	17.5	35.1	46.0	56.0	-28.5	-20.9
1.180	20.8	37.6	46.0	56.0	-25.2	-18.4
1.260	21.5	37.5	46.0	56.0	-24.5	-18.5
1.650	19.2	34.8	46.0	56.0	-26.8	-21.2

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

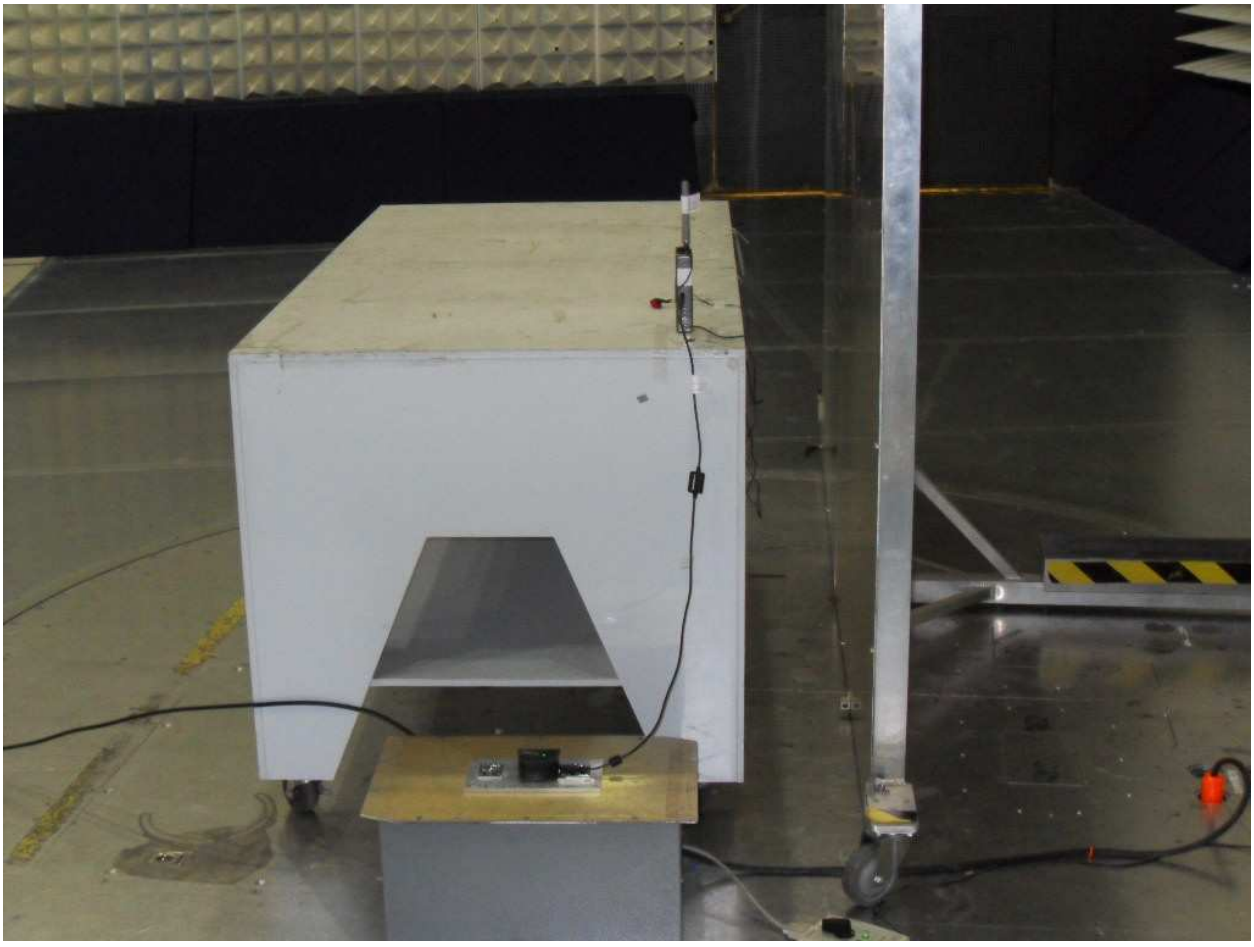
3.3.1 Test Configuration Photographs

The following photographs show the testing configurations used.



Electromagnetic Radiated Disturbance Setup Photograph

3.4 Test Configuration Photograph (Continued)



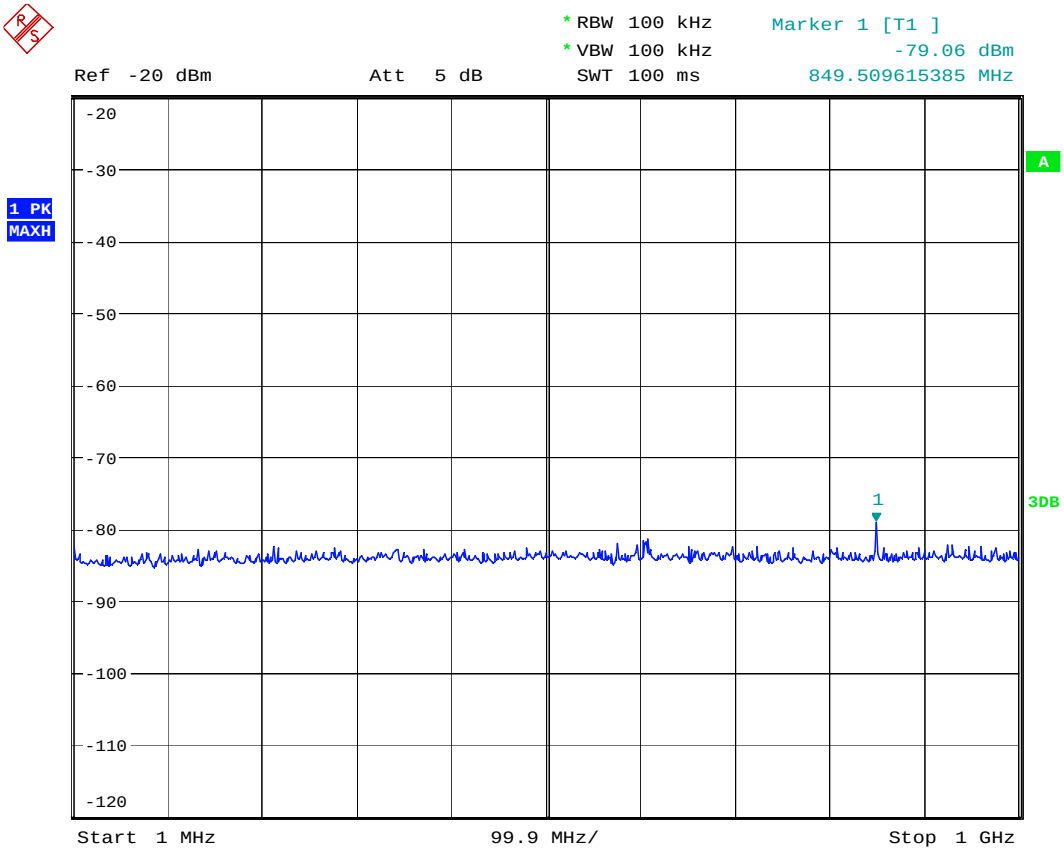
Electromagnetic Radiated Disturbance Setup Photograph

3.5 Antenna Conducted Emission Data

Tested By:	Arkadi Kaplan
Test Date:	August 27, 2009

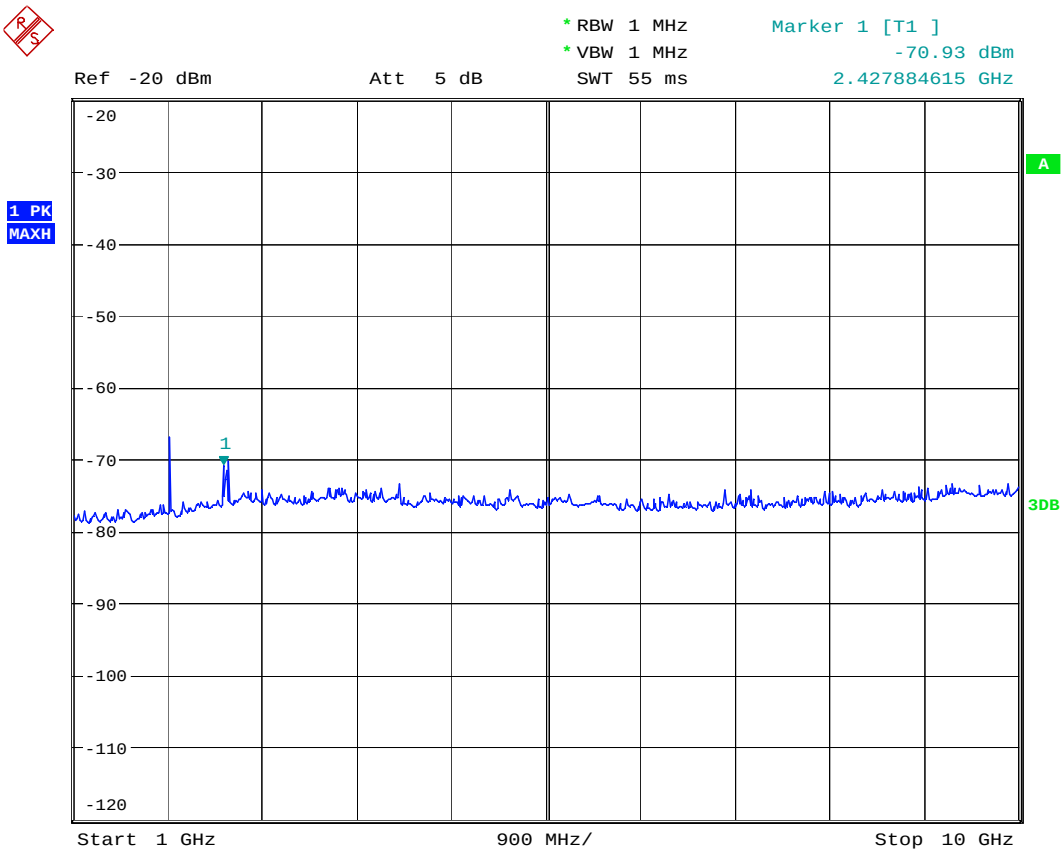
The results on the following page(s) were obtained when the device was tested in the condition described in Section 2.

Results:	**Complies**



Antenna Port Conducted

Date: 27.AUG.2009 23:42:07



Antenna Port Conducted

Date: 27.AUG.2009 23:43:16

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	10/01/09
EMI Receiver	Hewlett Packard	8546A	3710A00373	12	10/01/09
BI-Log Antenna	EMCO	3143	9509-1160	12	11/06/10
Pre-Amplifier	Sonoma	310N	185634	12	11/10/09
LISN	FCC	FCC-LISN-50-50-M-H	2011	12	9/19/09
Spectrum Analyzer	Rohde/Schwarz	FSP-40	100030	12	10/13/09

Appendix A LO Frequency Calculation

FCC ID: ADV0602

1 LOCAL OSC FREQUENCY CALCULATION

-1 FCC ID: ADV0602 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			
	25	156.2750 ~ 157.4500			
	7.5	157.4700 ~ 161.5725			
	5	161.6000 ~ 161.9750			
	12.5	162.0000 ~ 174.0000			
	5	216.0025 ~ 224.9950			
UHF Low	6.25	225.0000 ~ 316.54375		2nd Local = 1st IF - 21.4	20.9450
	〃	316.5500 ~ 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 ~ 359.29375	A = (FR + 380.800) / 0.075		
	〃	359.3000 ~ 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	〃		
	6.25	470.0000 ~ 512.0000	〃		
UHF High	3.125	764.0000 ~ 781.996875	A = (FR - 380.800) / 0.075	2nd Local = 1st IF - 21.4	20.9450
	〃	791.0000 ~ 796.996875	= A.xxx (Cut away decimal)		
	12.5	806.0000 ~ 823.9875	1st Local = A x 0.075		
	〃	849.0000 ~ 868.9875	1st IF = FR - 1st Local		
	〃	894.0000 ~ 939.9875			
	6.25	940.0000 ~ 960.0000			
	〃	1240.0000 ~ 1300.0000			

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	6.25	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
	12.5	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
	5.0	450.0000	11077.333 = (450.0000 + 380.800) / 0.075 = 11077.333 (Cut away decimal) 830.775 =11077 x 0.075 380.775 = 830.775 – 450.0000	359.375 = 380.775 – 21.4	20.9450
	6.25	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
	12.5	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
	12.5	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
	6.25	960.0000	7722.666 = (960.0000 – 380.800) / 0.075 = 7722.666 (Cut away decimal) 579.150 =7722 x 0.075 380.850 = 960.000 – 579.150	359.450 = 380.850 – 21.4	20.9450
	6.25	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
	6.25	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