TEST REPORT

Report Number: 30760821
Project Number: 3076082
April 25, 2005

Testing performed on the
Multi Trunk-Tracking Scanner
Model Number: PRO-2054
FCC ID: ADV2000427
to

FCC Part 15, Subpart B
ICES 003

Class: B
For
General Research of Electronics, Inc.

A2LA Certificate Number: 1755-01

Test Performed by:	Test Authorized by:
Intertek	General Research of Electronics, Inc.
1365 Adams Court	425 Harbor Blvd. Suit B
Menlo Park, CA 94025	Belmont, CA 94002

Prepared by: **Date:** April 28, 2005

Bruce Gordon

Reviewed by: **Date:** April 28, 2005

Ollie Moyrong

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VERIFICATION OF COMPLIANCE
Report No. 30760821

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:	Multi Trunk-Tracking Scanner
Trade Name:	General Research of Electronics, Inc.
Model No.:	PRO-2054
Applicant:	General Research of Electronics, Inc.
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 Industry Canada ICES-003
Equipment Class:	Class B
Date of Test:	April 25 to 27, 2005

We attest to the accuracy of this report:

Bruce Gordon
Test Engineer

Ollie Moyrong
EMC Department Manager

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1.0 General Description

1.1 Product Description

The Equipment under Test (EUT) is Multi Trunk-Tracking Scanning Receiver, model PRO-2054

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

A pre-production version of the sample was received on April 25, 2005 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. 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: PRO-2054
FCC ID: ADV2000427

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: ADV2000427 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:

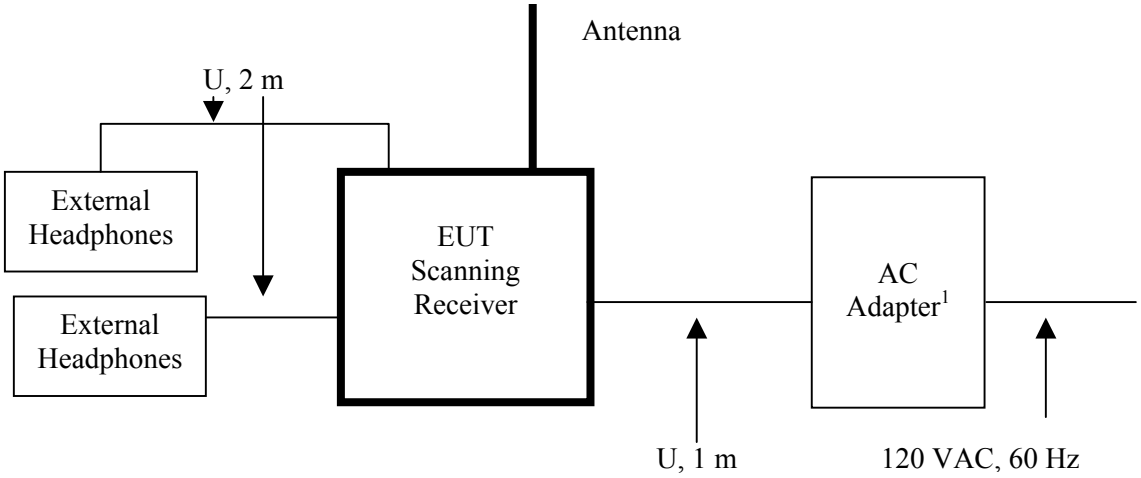
Test Mode 1: The EUT was set to constantly receive at the low, middle and high channels of each band.

Test Mode 2: The EUT was set to constantly scan a particular band.

2.4 Support Equipment List and Description

Item #	Description	Model No.	Serial No.
1	External headphones	Avid	Not Labeled
2	External headphones	LConcepts	Not Labeled

2.5 Equipment Setup Block Diagram



[1] The AC adapter is manufactured by RadioShack®, Part number JOD(M)-48-A641

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 dBμV/m)/20] = 39.8 μV/m

3.2 Radiated Emission Data

Tested By:	Bruce Gordon
Test Date:	April 25 2005

Temperature	**(°C)**	20^0C
Relative Humidity	**(%)**	50%

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

Results:	**Complies** by 16.3 dB at 579.15 MHz

3.2 Test Data (Continued)

Model: PR-2054
Test Mode: Receiving
Test distance: 3 m

FCC Part 15.109 Class B Radiated Emissions Data

Tuned Frequency	L.O. Frequency	Antenna Polarization	Corrected Reading	Limit at 3 m	Margin	SA Reading	Amp Gain	Cable Loss	Ant
MHz	MHz	H/V	dB(uV/m)	dB(uV/m)	dB	dBuV	dB	dB	dB/m
28.0	408.75	H	9.3	46.0	-33.7	22.4	32.3	3.1	16.1
41.0	421.80	H	9.2	46.0	-33.8	21.4	32.3	3.1	17..0
54.0	434.775	H	9.7	46.0	-33.3	22.4	32.3	3.1	16.5
108.0	488.775	H	12.0	46.0	-31.0	23.3	32.4	3.3	17.8
122.5	503.25	H	13.5	46.0	-29.5	24.4	32.4	3.4	18.1
137.0	517.80	H	6.2	46.0	-36.8	17.3	32.4	3.5	17.8
155.5	536.25	H	6.9	46.0	-36.1	17.3	32.4	3.5	18.5
174.0	554.775	H	16.7	46.0	-26.3	26.6	32.5	3.6	18.9
406.0	786.75	H	14.9	46.0	-28.1	21.7	32.5	4.3	21.4
438.0	818.775	H	15.5	46.0	-27.5	21.7	32.4	4.5	21.7
470.0	850.80	H	20.2	46.0	-22.8	25.5	32.2	4.8	22.1
491.0	871.80	H	20.3	46.0	-22.7	25.3	32.1	4.8	22.3
512.0	892.80	H	24.0	46.0	-19.0	28.0	32..0	4.8	23.1
806.0	425.175	H	9.2	46.0	-33.8	21.3	32.3	3.1	17.1
823.0	442.20	H	9.5	46.0	-33.5	22.1	32.3	3.1	16.6
849.0	468.15	H	11.9	46.0	-31.1	23.6	32.4	3.3	17.4
869.0	488.175	H	5.9	46.0	-37.1	17.2	32.4	3.3	17.7
894.0	513.15	H	13.2	46.0	-29.8	24.4	32.4	3.4	17.7
939.0	558.15	H	8.0	46.0	-35.0	18.0	32.5	3.7	18.8
960.0	579.15	H	26.7	46.0	-16.3	36.2	32.5	3.7	19.2

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 B
5. The EUT was tested in two modes. The worst-case data is reported.

3.3 AC Line Conducted Emission Data

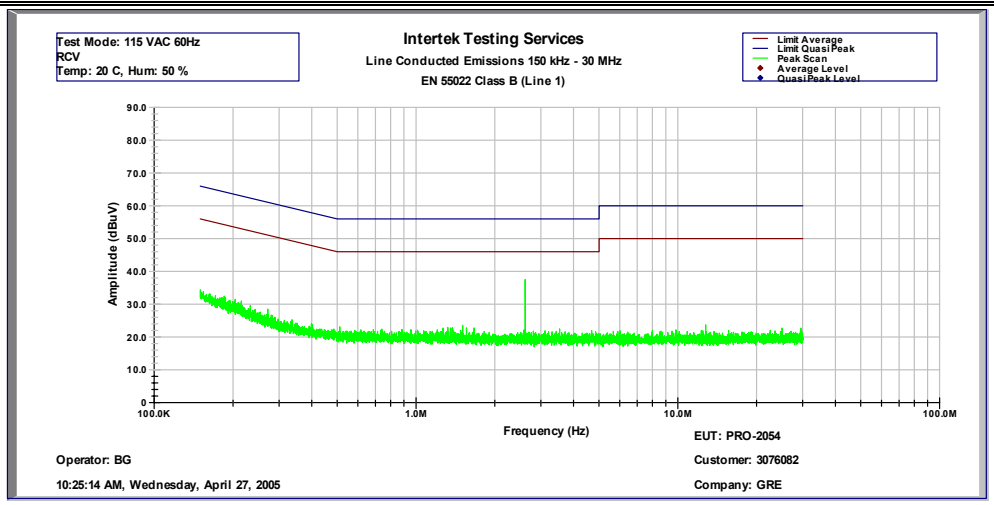
Tested By:	Bruce Gordon
Test Date:	April 27, 2005

Temperature	**(°C)**	20^0C
Relative Humidity	**(%)**	50%

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

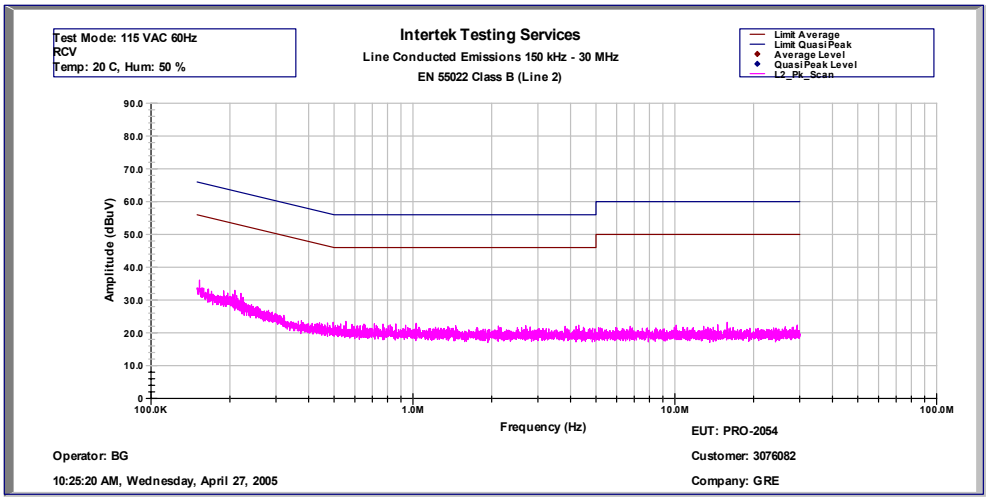
Results:	**Complies** by more than 8.5 dB at 2.61 MHz

3.3 Test Data (Continued)



Intertek Testing Services				
Line Conducted Emissions 150 kHz - 30 MHz				
EN 55022 Class B (Line 1)				
Operator: BG		Model Number: PRO-2054		
ITS Job Number: 3076082				
April 27, 2005		Company: GRE		
Frequency	**Pk Level**	**Av Limit**	**QP Limit**	**Margin**
MHz	**(dBuV)**	**(dBuV)**	**(dBuV)**	**(dB)**
0.150	34.4	56.0	66.0	-21.6
0.171	32.5	55.4	65.4	-22.8
0.178	32.0	55.2	65.2	-23.2
0.182	32.0	55.1	65.1	-23.1
0.185	32.5	55.0	65.0	-22.5
0.186	32.2	55.0	65.0	-22.8
0.195	31.2	54.7	64.7	-23.6
0.199	30.8	54.6	64.6	-23.8
0.204	31.0	54.5	64.5	-23.5
0.204	31.5	54.5	64.5	-23.0
0.209	30.5	54.3	64.3	-23.8
0.214	30.2	54.2	64.2	-23.9
0.215	30.9	54.1	64.1	-23.2
0.229	28.7	53.7	63.7	-25.1
0.233	29.6	53.6	63.6	-24.1
0.243	28.4	53.3	63.3	-24.9
0.272	28.5	52.5	62.5	-24.0
2.61	37.5	46.0	56.0	-8.5
Test Mode: 115 VAC 60Hz				
Temp: 20 C, Hum: 50 %				

3.3 Test Data (Continued)



Intertek Testing Services				
Line Conducted Emissions 150 kHz - 30 MHz				
EN 55022 Class B (Line 2)				
Operator: BG		Model Number: PRO-2054		
ITS Job Number: 3076082				
April 27, 2005		Company: GRE		
Frequency	**Pk Level**	**Av Limit**	**QP Limit**	**Margin**
MHz	**(dBuV)**	**(dBuV)**	**(dBuV)**	**(dB)**
0.153	36.1	55.9	65.9	-19.8
0.165	33.3	55.6	65.6	-22.2
0.170	32.7	55.4	65.4	-22.8
0.173	31.7	55.3	65.3	-23.6
0.189	32.8	54.9	64.9	-22.0
0.196	32.1	54.7	64.7	-22.5
0.205	31.8	54.4	64.4	-22.6
0.207	31.2	54.4	64.4	-23.2
0.209	33.0	54.3	64.3	-21.4
0.212	31.4	54.2	64.2	-22.9
0.220	32.0	54.0	64.0	-22.0
0.222	30.2	54.0	64.0	-23.7
0.225	30.8	53.9	63.9	-23.1
0.227	29.3	53.8	63.8	-24.5
0.238	28.2	53.5	63.5	-25.2
0.242	28.6	53.4	63.4	-24.7
Test Mode: 115 VAC 60Hz				
Temp: 20 C, Hum: 50 %				

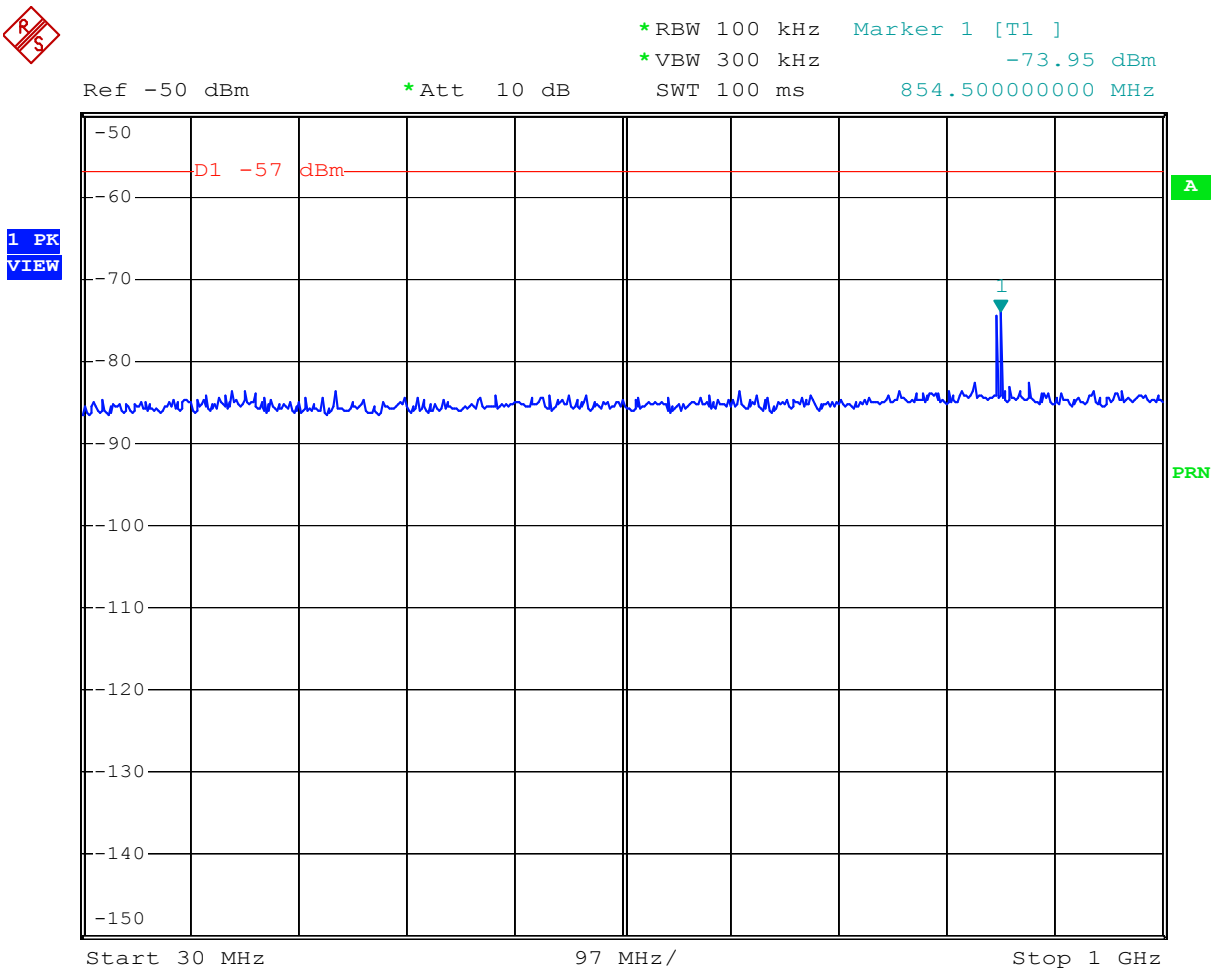
3.4 Antenna Conducted Emission Data

Tested By:	Bruce Gordon
Test Date:	April 26, 2005

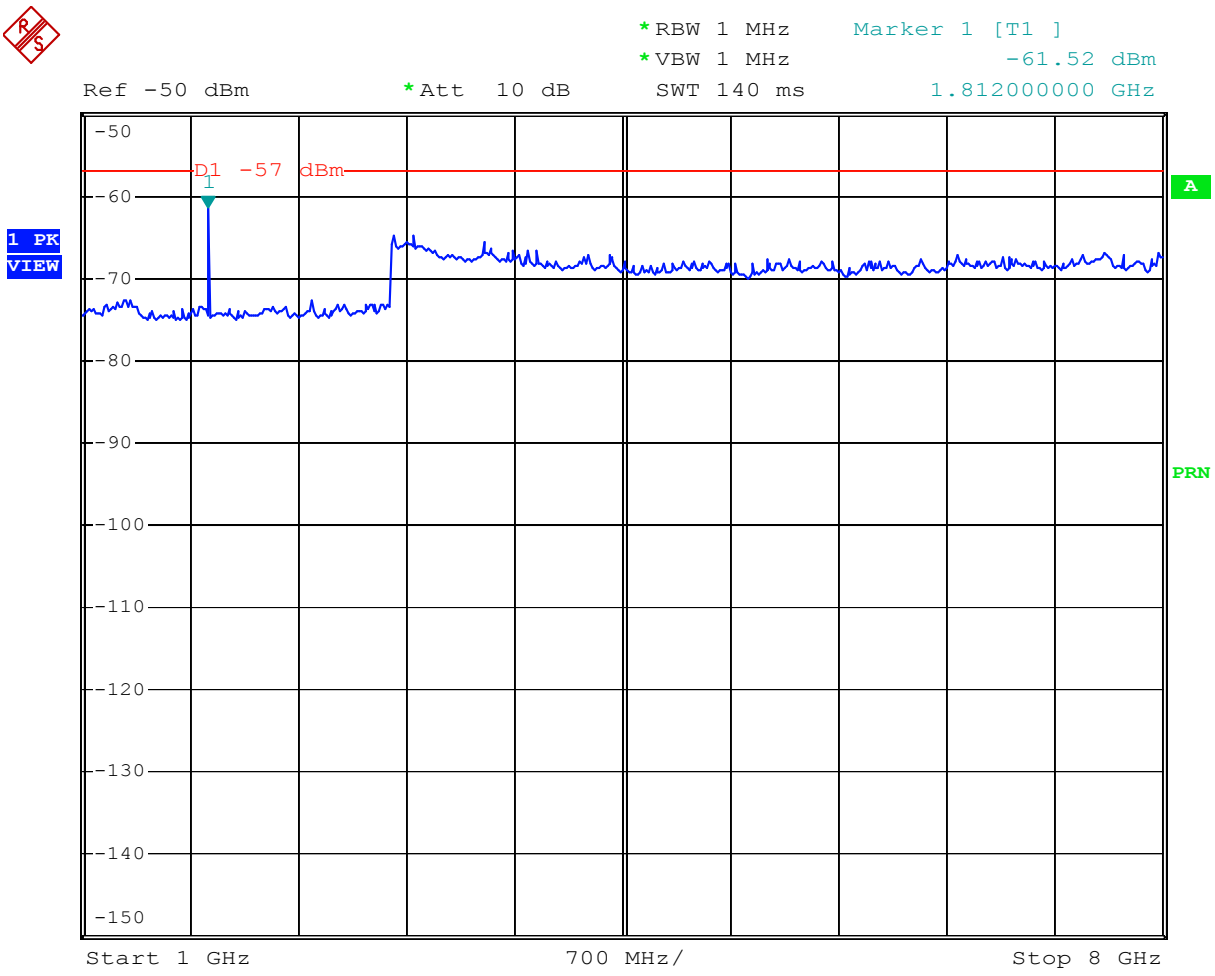
Temperature	**(°C)**	20^0C
Relative Humidity	**(%)**	50%

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

Results:	**Complies** by 4.5 dB at 1.812 GHz



Date: 26.APR.2005 20:02:41



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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
Spectrum Analyzer	Rhode-Schwarz	FSP-40	100030	12	9/15/05
RF Filter Section	Hewlett Packard	85460A	3448A00267	12	9/10/05
EMI Receiver	Hewlett Packard	8546A	3710A00373	12	9/10/05
BI-Log Antenna	EMCO	3143	9509-1160	12	10/28/05
LISN	Fischer	FCC-LISN-50/250-60-2-02	01005	12	7/2/05
Pre-Amplifier	Sonoma Inst.	310	185634	12	3/29/06

Appendix A – EUT Specification

Refer to file: ADV2000427 SPECIFICATION

Appendix B – Local Oscillator Frequency calculation

Refer to file: ADV2000427 LOCAL OSC FREQ CALCULATION

Appendix C – Antenna Drawing

Refer to file: ADV2000427 Telescopic ANT Drawing