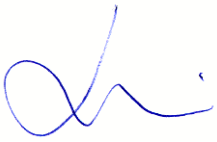
Test Report:	6W75437
Applicant:	Amphitech Systems 3440 Francis-Hughes Suite 120 Laval, Quebec H7L 5A9
Apparatus:	PSR-1400
FCC ID:	UMN-PSR-1400
In Accordance With:	FCC Part 90 Subpart F Radiolcation Service
Tested By:	Nemko Canada Inc. 303 River Road Ottawa, Ontario K1V 1H2
Authorized By:	 Jin Xu, Wireless Specialist
Date:	December 18, 2006
Total Number of Pages:	22

Report Summary

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 90. Conducted measurements were performed in accordance with ANSI TIA-603-B-2002. Radiated tests were conducted is accordance with ANSI C63.4-2003. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC.

The assessment summary is as follows:

Apparatus Assessed: PSR-1400

Specification: FCC Part 90 Private Land Mobile Radio Services

Compliance Status: Complies

Exclusions: None

Non-compliances: None

Report Release History: Original Release

Author: Jason Nixon, Telecom Specialist

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025.

TABLE OF CONTENTS

Section 1 : Equipment Under Test

1.1 Product Identification

The Equipment Under Test was identified as follows:

PSR-1400

1.2 Samples Submitted for Assessment

The following samples of the apparatus have been submitted for type assessment:

Sample No.	Description	Serial No.
1	PSR-1400 Perimeter surveillance Radar	None
2	Power supply	None

The first samples were received on: October 30, 2006

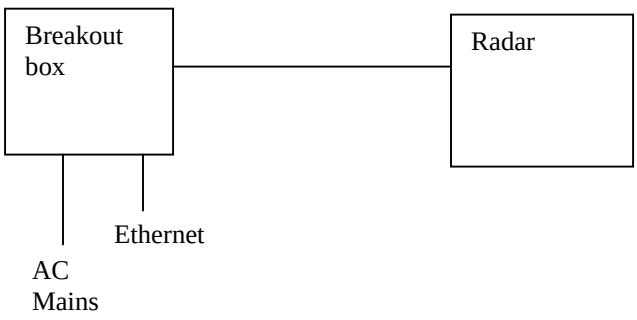
1.3 Theory of Operation

The EUT is a perimeter surveillance radar operating at 35GHz. The EUT uses a swept frequency of 700MHz centred around 35GHz.

1.4 Technical Specifications of the EUT

Manufacturer:	Amphitech Systems
Operating Frequency:	35GHz +/- 350MHz
LO Frequency:	17GHz
Emission Designator:	N0N
Rated Power:	27dBm
Measured Power:	25.83dBm
Modulation:	Swept Frequency
Antenna Data:	32dBi bi-static antenna
Power Source:	28VDC

1.5 Block Diagram of the EUT



Section 2 : Test Conditions

2.1 Specifications

The apparatus was assessed against the following specifications:
FCC Part 2 Subpart J, Equipment Authorization Procedures
FCC Part 90 Private Land Mobile Radio Services

2.2 Deviations From Laboratory Test Procedures

No deviations were made from laboratory test procedures.

2.3 Test Environment

All tests were performed under the following environmental conditions:

Temperature range	:	15 – 30 ºC
Humidity range	:	20 - 75 %
Pressure range	:	86 - 106 kPa
Power supply range	:	+/- 5% of rated voltages

2.4 Test Equipment

Equipment	Manufacturer	Model No.	Asset/Serial No.	Next Cal.
Spectrum Analyzer	Rohde & Schwarz	FSU	FA001877	May 10/07
Spectrum Analyzer	Hewlett-Packard	8565E	FA000981	Oct. 06/07
Horn Antenna #1	EMCO	3115	FA000649	Jan. 12/07
Biconical (1) Antenna	EMCO	3109	FA000805	May 03/07
Log Periodic Antenna #1	EMCO	LPA-25	FA000477	Sept. 12/07
18.0 – 40.0GHz Horn Antenna	EMCO	3116	FA001847	May 3/07
1.0 – 2.0 GHz Amplifier	JCA	12-400	FA001498	Aug. 02/07
2.0 – 4.0 GHz Amplifier	JCA	24-600	FA001496	Aug. 02/07
4.0 – 8.0 GHz Amplifier	JCA	48-600	FA001497	Aug. 02/07
5.0 – 18.0 GHz Amplifier	NARDA	DWT-186N23U40	FA001409	COU
18.0 – 26.0 GHz Amplifier	NARDA	BBS-1826N612	FA001550	COU
26 – 40.0 GHz Amplifier	NARDA	DBL-2640N610	FA001556	COU
Mixer/Antenna (40-60GHz)	Olsen	M19HWA	FA001523	COU
Mixer/Antenna (60-90GHz)	Olsen	M12HWA	FA001524	COU
Mixer/Antenna (90-140GHz)	Olsen	M08HWA	FA001296	COU
Mixer/Antenna (140-220GHz)	Olsen	M05HWA	FA001526	COU
Mixer (50-75GHz)	HP	11970V	FA001027	July 2/07
Mixer (75-110GHz)	HP	11970W	FA001302	July 21/07
Harmonic Generator	Olsen	40200WGS	FA001546	COU
Signal Generator	HP	8673B	FA001134	COU
WR28 20dB Attenuator	Dorado Company	FA-28-20	99003	COU
WR28 20dB Attenuator	Dorado Company	FA-28-20	99015	COU
WR28-K Adapter	Dorado Company	WA28-K	None	COU
Temperature Chamber	Thermotron	SM-16C	FA001030	COU
K/J Thermometer	Fluke	52	FA001247	Jan 10/07

COU – Calibrate on Use
NCR – No Calibration Required

Section 3 : Observations

3.1 Modifications Performed During Assessment

No modifications were performed during assessment.

3.2 Record Of Technical Judgements

No technical judgements were made during the assessment.

3.3 EUT Parameters Affecting Compliance

The user of the apparatus could not alter parameters that would affect compliance.

3.4 Test Deleted

No Tests were deleted from this assessment.

3.5 Additional Observations

There were no additional observations made during this assessment.

Section 4 : Results Summary

This section contains the following:

FCC Part 90 : Test Results

The column headed 'Required' indicates whether the associated clauses were invoked for the apparatus under test. The following abbreviations are used:

N	No : not applicable / not relevant.
Y	Yes : Mandatory i.e. the apparatus shall conform to these tests.
N/T	Not Tested, mandatory but not assessed. (See section 3.4 Test deleted)

The results contained in this section are representative of the operation of the apparatus as originally submitted.

4.1 FCC Part 90 : Test Results

Test Method	Test Description	Required	Result
2.1046	Output power	Y	PASS
2.1047	Modulation Charateristics	N	
2.1049	Occupied bandwidth	Y	PASS
2.1051	Spurious Emissions at the antenna terminal	Y	PASS
2.1053	Field strength of surious radiation	Y	PASS
2.1055	Frequency stability	Y	PASS
—	Transient Behavior	N	
—	Use of boosters	N	

Notes:

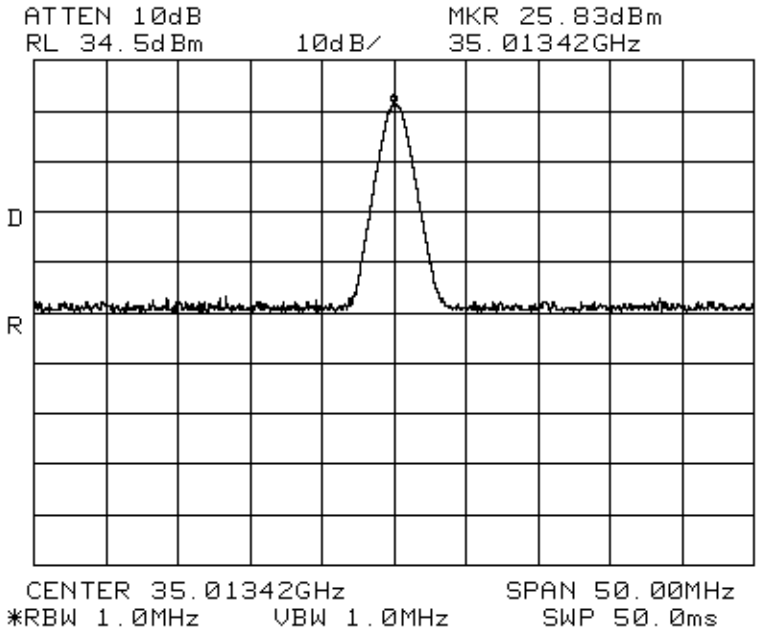
Appendix A : Test Results

Clause 2.1046 Output Power

Test Conditions:

Sample Number:	1	**Temperature (°C):**	24
Date:	November 1, 2006	**Humidity (%):**	29
Modification State:	0	**Tester:**	Jason Nixon
		Laboratory:	Wireless

Test Results:



Note: Output power was tested with the sweeping turn off.

Clause 2.1049 Occupied Bandwidth

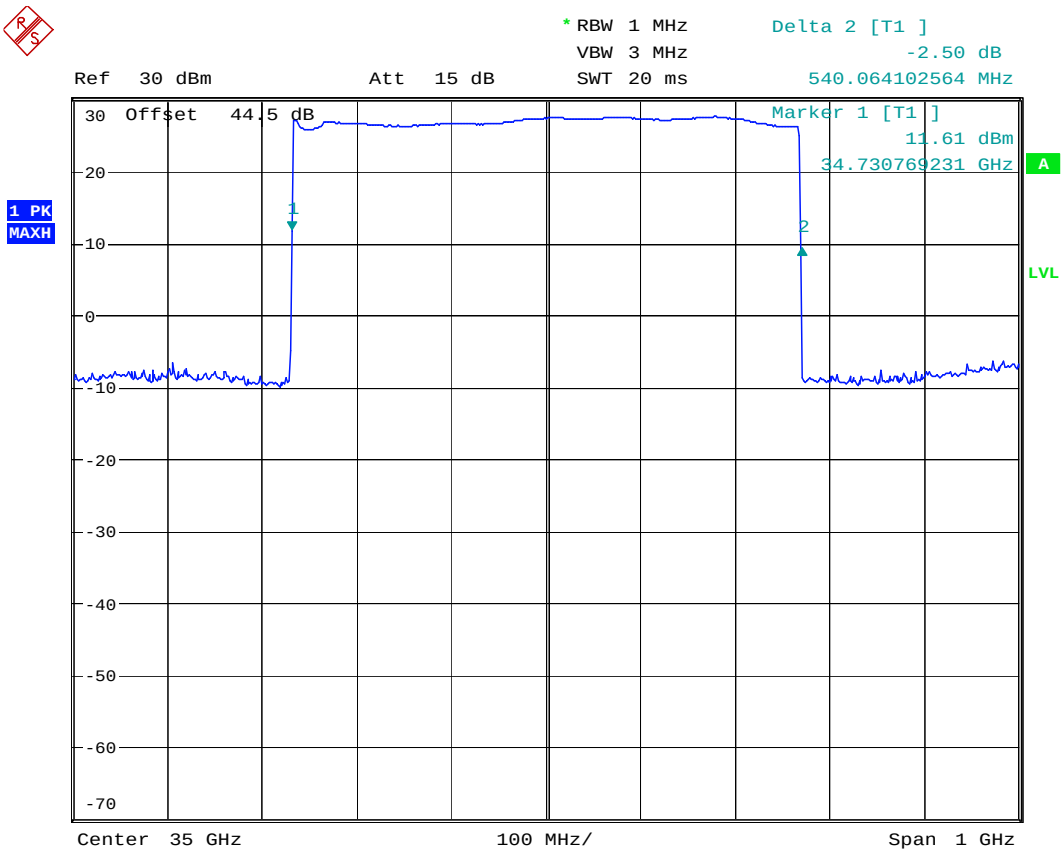
Test Conditions:

Sample Number:	1	**Temperature (°C):**	23
Date:	October 31, 2006	**Humidity (%):**	27
Modification State:	0	**Tester:**	Jason Nixon
		Laboratory:	Wireless

Test Results:

See Attached Plots.

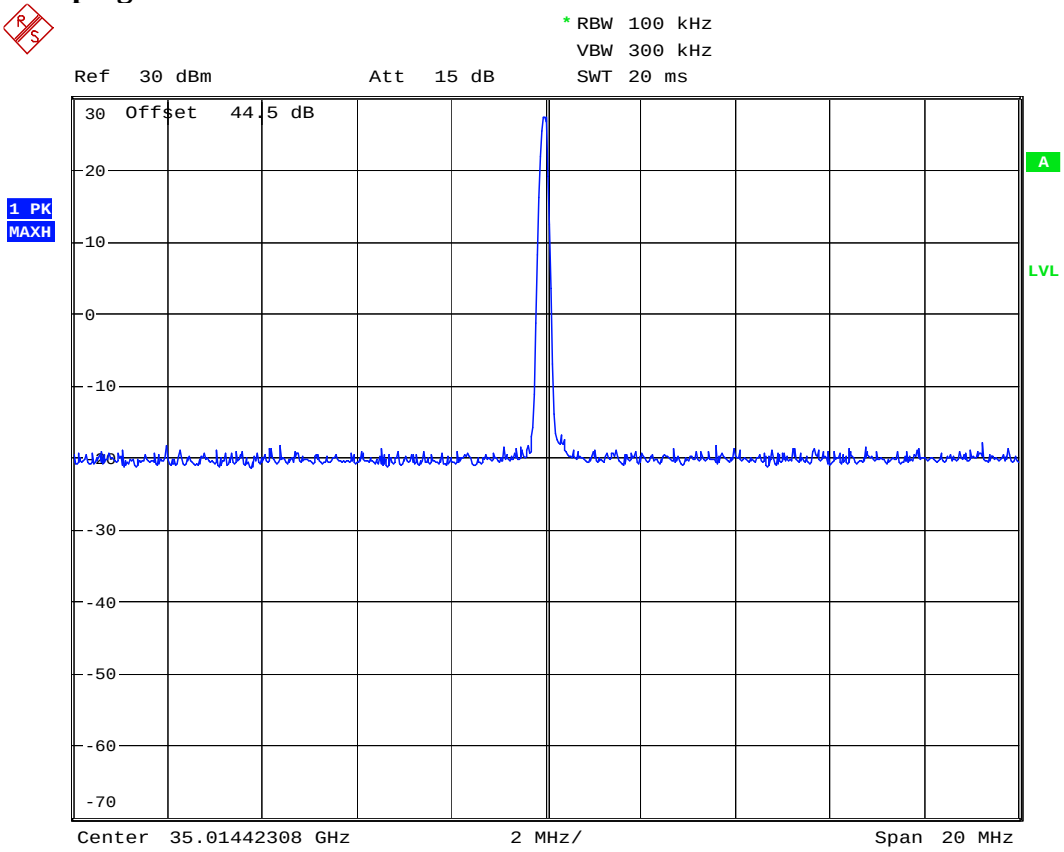
Sweeping On



20dB Bandwidth

Date: 31.OCT.2006 10:57:15

Sweeping Off



Sweeping Off

Date: 31.OCT.2006 10:58:39

Clause 2.1051 Spurious emissions at the antenna terminal

Attenuated by 43+10logP

Test Conditions:

Sample Number:	1	**Temperature (°C):**	24
Date:	November 1, 2006	**Humidity (%):**	29
Modification State:	0	**Tester:**	Jason Nixon
		Laboratory:	Wireless

Test Results:

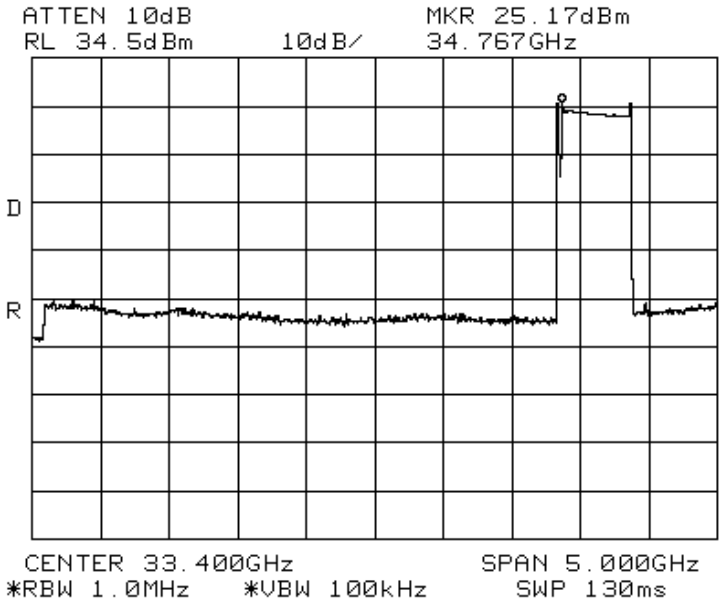
See Attached Plots.

Additional Observations:

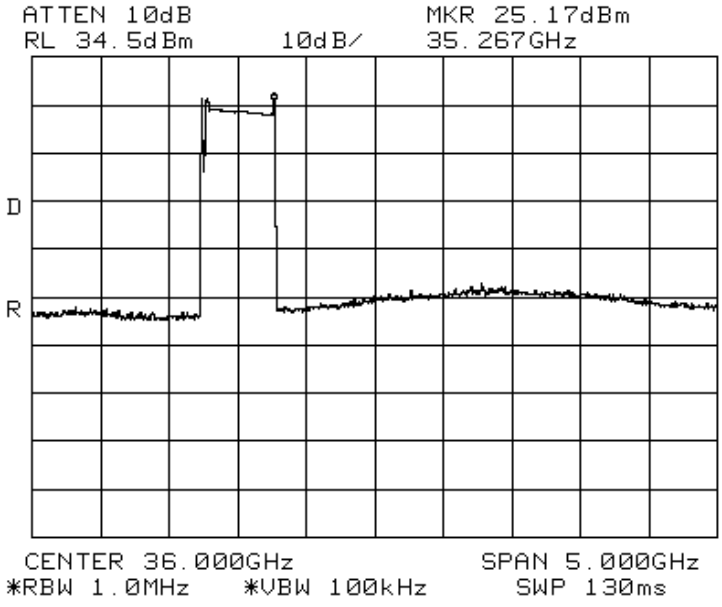
The spectrum was searched from 30MHz to 220GHz.

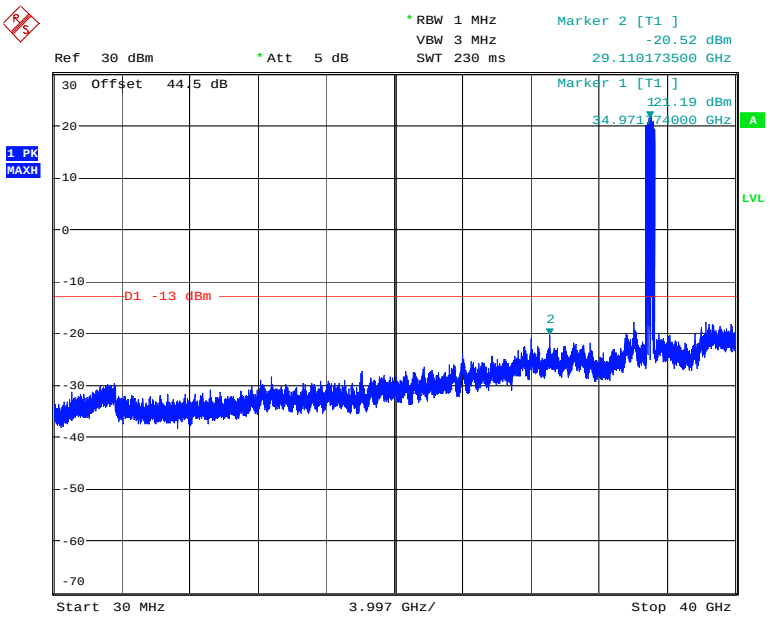
Except for the bandedge requirements the frequency sweeping was turned off.

Lower Bandedge



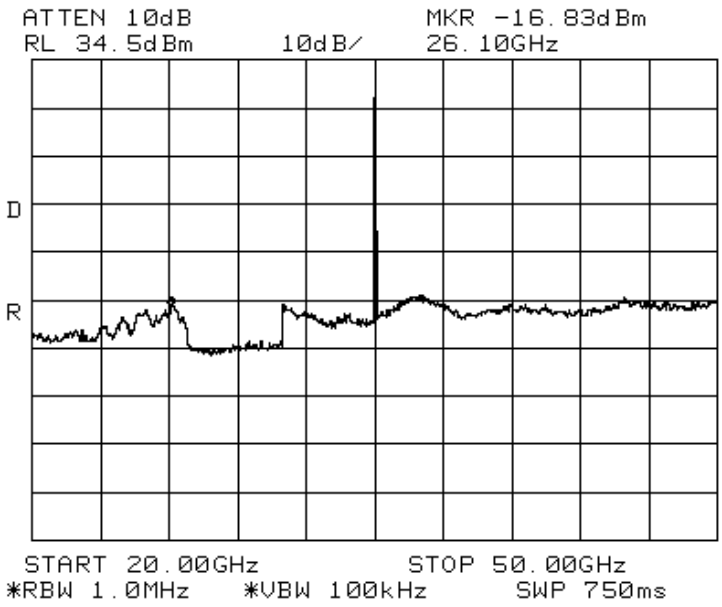
Upper Bandedge

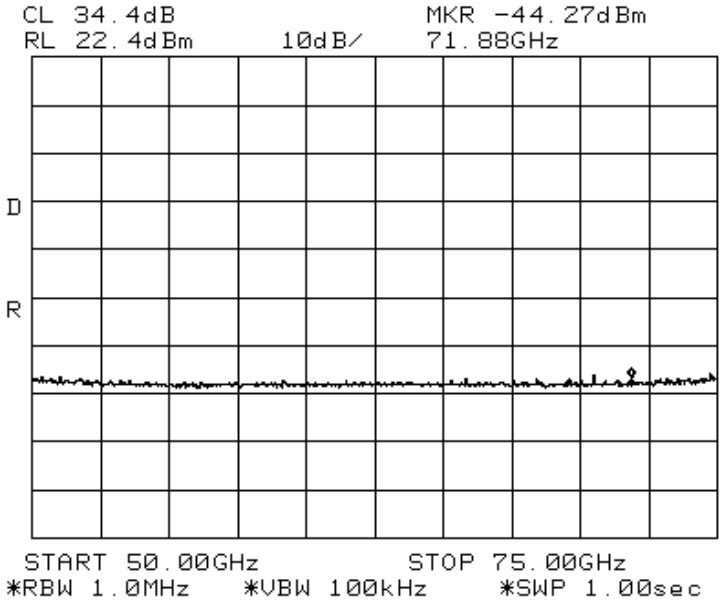


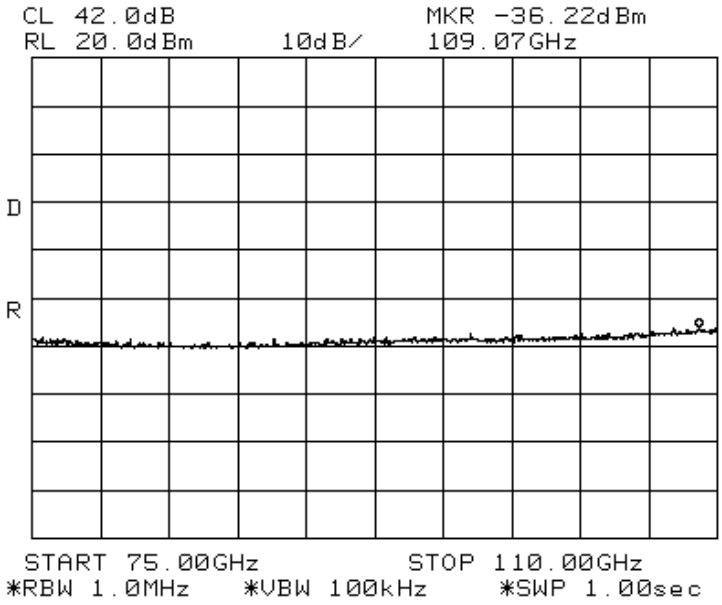


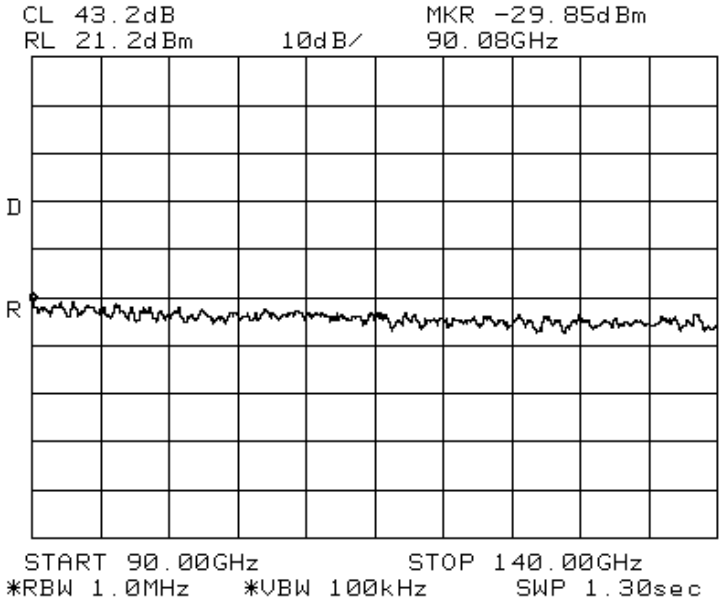
Conducted emissions

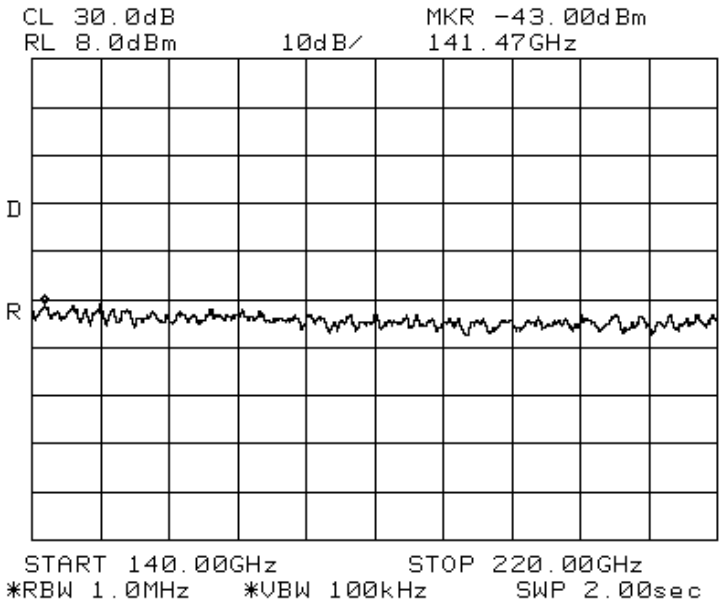
Date: 31.OCT.2006 11:29:44




CL 34.4dB
MKR -44.27dBm
RL 22.4dBm
10dB/
71.88GHz
D
R
START 50.00GHz
STOP 75.00GHz
*RBW 1.0MHz
*VBW 100kHz
*SWP 1.00sec


CL 42.0dB
MKR -36.22dBm
RL 20.0dBm
10dB/
109.07GHz
D
R
START 75.00GHz
STOP 110.00GHz
*RBW 1.0MHz
*VBW 100kHz
*SWP 1.00sec


CL 43.2dB
MKR -29.85dBm
RL 21.2dBm
10dB/
90.08GHz
D
R
START 90.00GHz
STOP 140.00GHz
*RBW 1.0MHz
*VBW 100kHz
SWP 1.30sec


CL 30.0dB
MKR -43.00dBm
RL 8.0dBm
10dB/
141.47GHz
D
R
START 140.00GHz
STOP 220.00GHz
*RBW 1.0MHz
*VBW 100kHz
SWP 2.00sec

Clause 2.1053 Field Strength of spurious radiation

Attenuated by 43+10logP

Test Conditions:

Sample Number:	1	**Temperature (°C):**	23
Date:	October 30, 2006	**Humidity (%):**	28
Modification State:	0	**Tester:**	Jason Nixon
		Laboratory:	Wireless

Test Results:

See Attached Table for Results

Additional Observations:

The Spectrum was searched from 30MHz to 200GHz.

All measurements were performed using a Peak Detector with 100kHz RBW/VBW below 1GHz and a 1MHz RBW/VBW above 1GHz at a distance of 3 meters.

Measurements above 1GHz were performed at 1m. Measurements above 18GHz were performed at 30cm.

All measurements were performed with frequency sweeping turned off.

Frequency (GHz)	Pol.	Measured value	Signal Substitution	Antenna Gain	Emission level (EIRP)	Emission level (ERP)
17.0	V	-55.01dBuV/m	-28.9dBm	12.0dBi	-16.9dBm	-19.0dBm
17.0	H	-56.41dBuV/m	-30.6dBm	12.1dBi	-18.5dBm	-20.6dBm

Measurement method:

1) Detect emissions using Spectrum analyzer, amplifier and horn.
2) Replace EUT with a calibrated antenna and signal generator.
3) Recreate the emission detected.
4) Measure level being injected to the antenna.
5) Add the antenna gain at the detected frequency to the level injected.

Clause 2.1055 Frequency Stability

Test Conditions:

Sample Number:	1	**Temperature (°C):**	23
Date:	October 31, 2006	**Humidity (%):**	27
Modification State:	0	**Tester:**	Jason Nixon
		Laboratory:	Wireless

Test Results: See Attached Table.

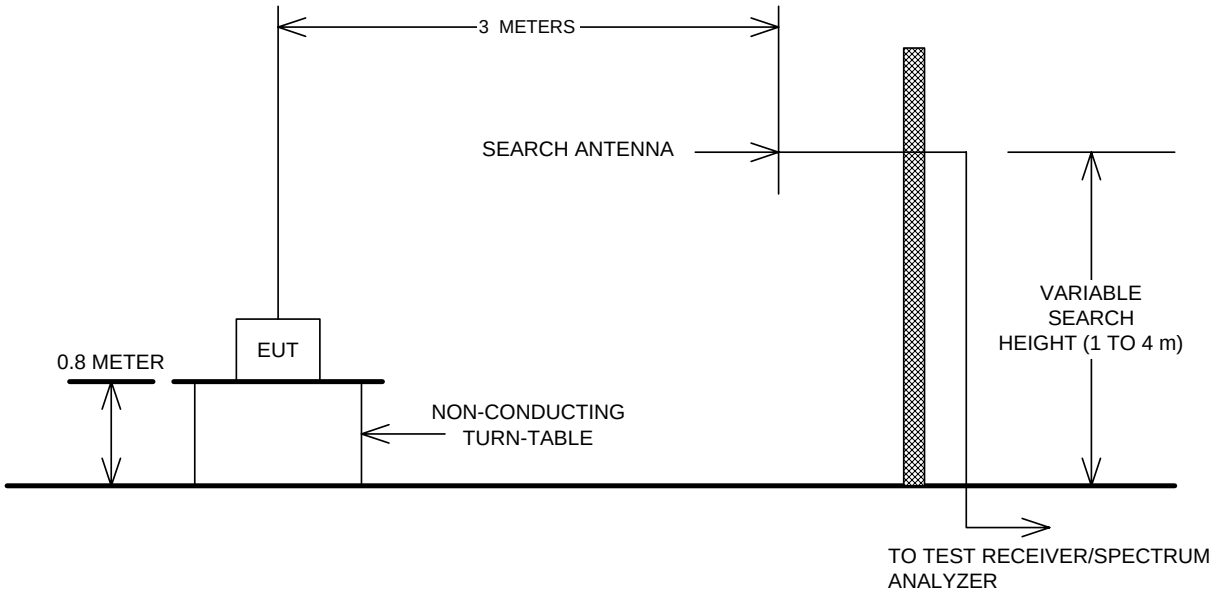
Condition	Frequency (Hz)	Offset (ppm)
+50°C, Nominal	35005194608	360.483
+40°C, Nominal	35011764112	172.8784
+30°C, Nominal	35014266718	101.4118
+20°C, +15%	35017858732	-1.16498
+20°C, Nominal	35017817937	———
+20°C, -15%	35017842530	-0.7023
+10°C, Nominal	35010718686	202.7325
0°C, Nominal	35004656115	375.8607
-10°C, Nominal	34996491466	609.0177
-20°C, Nominal	34985494000	923.0711
-30°C, Nominal	34982926907	996.3793

Appendix B : Setup Photographs

Radiated Spurious Emissions Setup:

Appendix C : Block Diagram of Test Setups

Test Site For Radiated Emissions



Conducted Emissions, Output power, Occupied Bandwidth