TEST REPORT

FROM

SIEMIC

For

Skyway 4000 Radio -1

To

FCC Part 90 Subpart Y

Test Report Serial No.:
SL05081801-SLK-001A

This report supersedes NONE

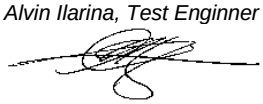
Remarks:

Equipment complied with the specification	[X]
Equipment did not comply with the specification	[ ]

This Test Report is Issued Under the Authority of:

.....

Tested by: Alvin Ilarina, Test Enginner



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Reviewed by: Leslie Bai, Lab Manager

Issue date: 06 September 2005

Equipment Details:
Manufacturer: Solectek Corporation

Registration No. 783147	Registration No. 4842	Lab Code: KR0032	RTA No. D23/16V	Registration No. 2195

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Executive Summary

The purpose of this test programme was to demonstrate compliance of the Solectek Corporation, Skyway 4000 Radio -1 against the current FCC Part 90 Subpart Y. The Skyway 4000 Radio -1 demonstrated compliance with the FCC Part 90 Subpart Y.

Solectek Corporation is the applicant and claimed manufacturer of this tested product. For the detailed description of this product, please refer to the Skyway 4000 Radio -1 User Manual.

The test has demonstrated that this unit complies with stipulated standards.

1 Technical Details

Purpose	Compliance testing of Skyway 4000 Radio -1 with FCC Part 90 Subpart Y
Applicant / Client	Solectek Corporation 6370 Nancy Ridge Dr. Suite 109 San Diego, CA 92121-3212
Manufacturer	Solectek Corporation
Laboratory performing the tests	SIEMIC Labs 2206 Ringwood Avenue San Jose, CA 95131
Test location(s)	SIEMIC Labs 2206 Ringwood Avenue San Jose, CA 95131
Test report reference number	SL05081801-SLK-001A
Date EUT received	30 Aug 2005
Standard applied	FCC Part 90 Subpart Y
Dates of test (from – to)	30 Aug 2005 to 30 Sep 2005
No of Units:	1
Equipment Category:	Licensed Non-Broadcast Station Transmitter
Trade/Product Name:	Skyway 4000 Radio -1
Type/Model Name/No:	Skyway 4000 Radio -1
Technical Variants:	None
FCC ID No.	KA349WAN1

2 Tests Required

The product was tested in accordance with the following specifications.
The test results recorded in this Test Report are exclusively referred to the tested sample(s).

Test Standard	Description	Pass / Fail
47 CFR Part 90, Subpart Y		
2.1046; 90.1215(a)	Peak Output Power	Pass
2.1046; 90.1215(a)	Peak Power Spectral Density	Pass
2.1049; 90.210(m)	Occupied Bandwidth; Emissions Mask	Pass
2.1051; 90.210(m)	Spurious Emissions at Antenna Terminals	Pass
2.1053; 90.210(m)	Radiated Spurious Emissions	Pass
2.1055(a)(1); 90.213	Frequency Stability; Temperature Variations	Pass
2.1055(d)(1); 90.213	Frequency Stability; Voltage Variations	Pass
TIA/EIA-603-A-2001		
ANSI C63.4: 2001		

Notes: Deviations to above standards are outlined in specific test sections if applicable.
Cable loss and external attenuation are compensated for in the measurement system when applicable.

3 Measurements, Examinations and Derived Results

3.1 General observations

Equipment serial number(s)		
Module:	Part number:	Serial number:
Skyway 4000 Radio -1	Skyway 4000 Radio -1	none

3.2 Test Results

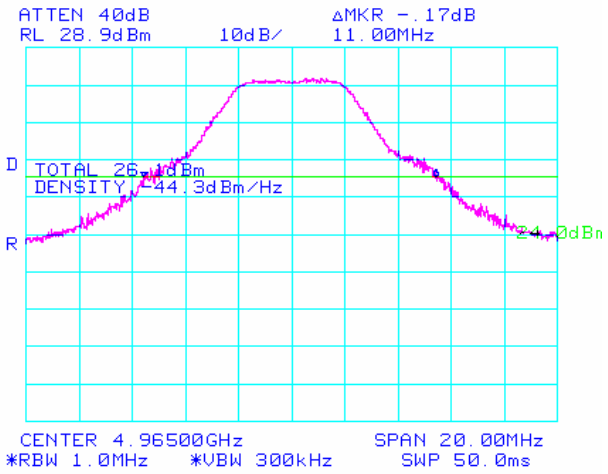
3.2.1 Peak Output Power

Requirement(s): 47 CFR §2.1046 and §90.1215(a)

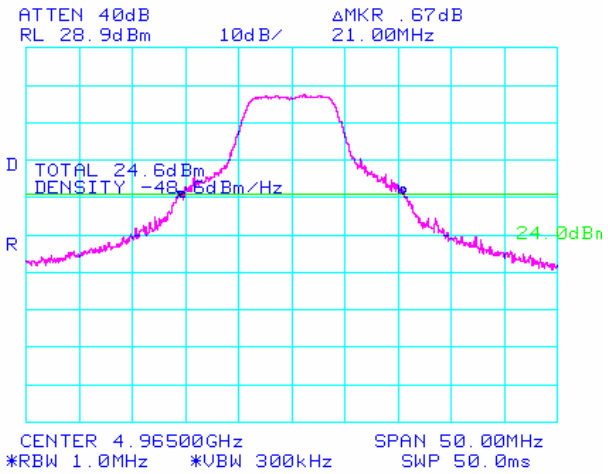
Procedures: The peak output power was measured at the antenna terminal using Acceptable Procedures: Peak conducted transmit output power outlined in FCC DA 02-2138 Appendix A. The Average Power measurements were taken using a power meter with a sensor capable of measuring the entire bandwidth of the signal. The measurements were made for the 5MHz, 10MHz, and 20MHz bandwidths at the center frequency of the channel.

Results:

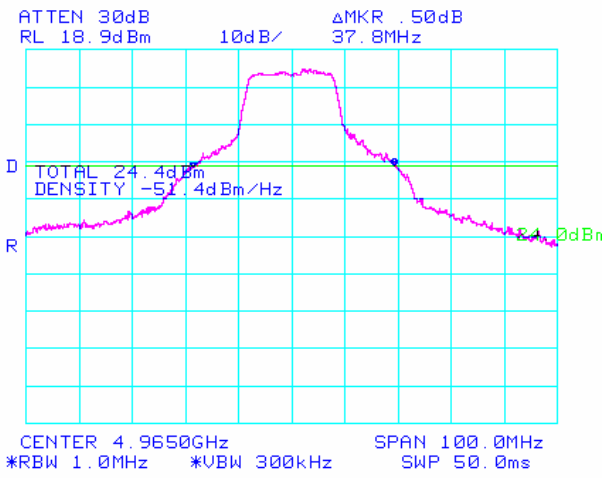
Plot #	Frequency (MHz)	Channel Bandwidth (MHz)	Peak Power (dBm)	Peak Limit (dBm)
1	4965	5	26.1	27
2	4965	10	24.6	30
3	4965	20	24.4	33



Plot 1: Peak Power 5MHz Bandwidth



Plot 2: Peak Power 10MHz Bandwidth



Plot 3: Peak Power 20MHz Bandwidth

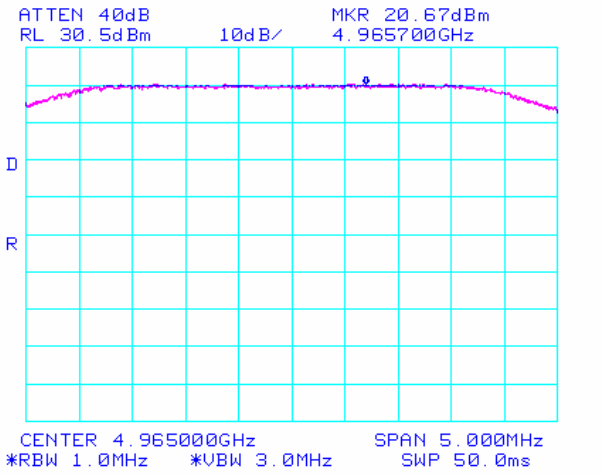
3.2.2 Peak Power Spectral Density

Requirement(s): 47 CFR §2.1046 and §90.1215(a)

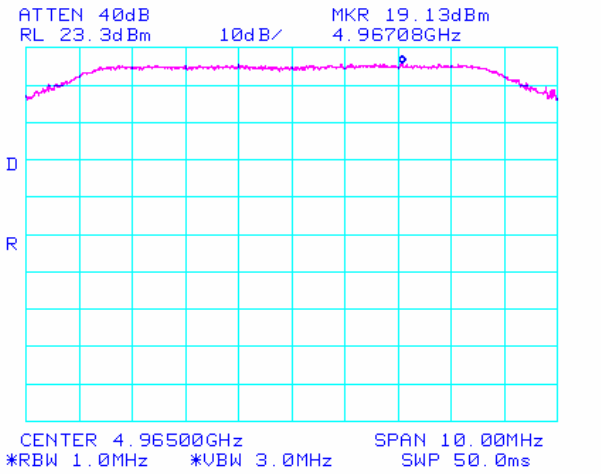
Procedures: The peak power spectral density measured at the antenna terminal using a spectrum analyzer. The measurements were made for the 5MHz, 10MHz, and 20MHz bandwidths at the center frequency of the channel.

Results:

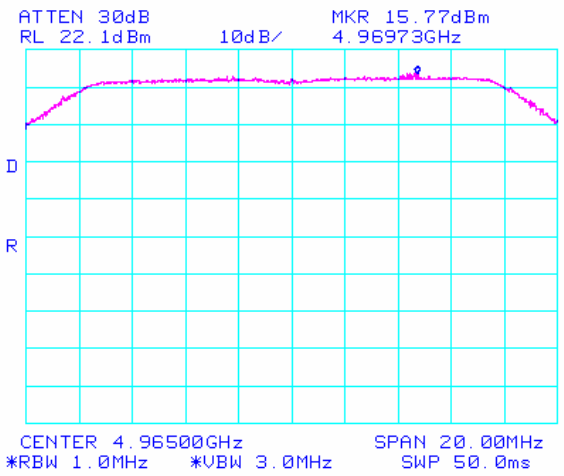
Plot #	Frequency (MHz)	Channel Bandwidth (MHz)	PPSD (dBm)	Limit (dBm)
4	4965	5	20.67	21
5	4965	10	19.1	21
6	4965	20	15.7	21



Plot 4: Peak Power Spectral Density 5MHz Bandwidth



Plot 5: Peak Power Spectral Density 10MHz Bandwidth



Plot 6: Peak Power Spectral Density 15MHz Bandwidth

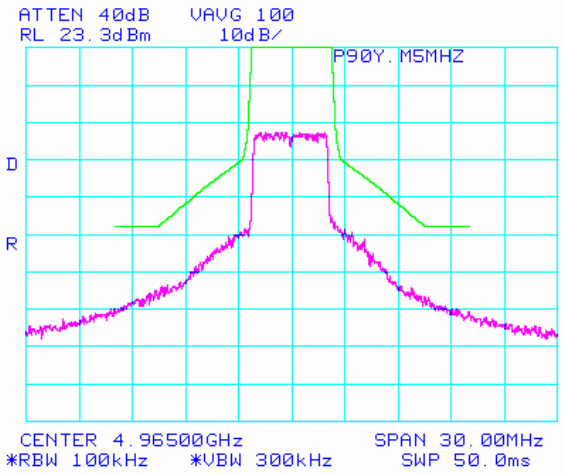
3.2.3 Occupied Bandwidth; Emission Mask

Requirement(s): 47 CFR §2.1049 and §90.210(m)

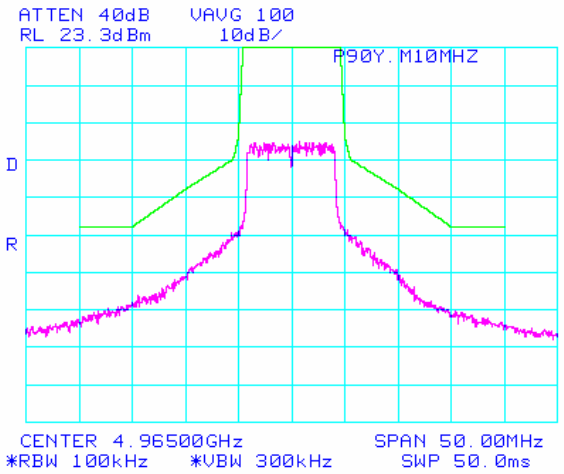
Procedures: The Emission Masks were measured at the antenna terminal using a spectrum analyzer. The measurements were made for the 5MHz, 10MHz, and 20MHz bandwidths at the center frequency of the channel.

Results:

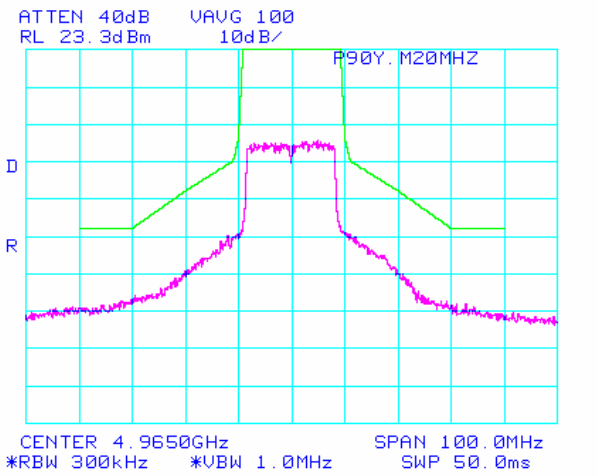
Plot #	Frequency (MHz)	Channel Bandwidth (MHz)	Pass/Fail
7	4965	5	Pass
8	4965	10	Pass
9	4965	15	Pass



Plot 7: Emission Mask M – 5MHz Bandwidth



Plot 8: Emission Mask M – 10MHz Bandwidth



Plot 9: Emission Mask M – 20MHz Bandwidth

3.2.4 Spurious Emissions at Antenna Terminals

Requirement(s): 47 CFR §2.1051 and §90.210(m)

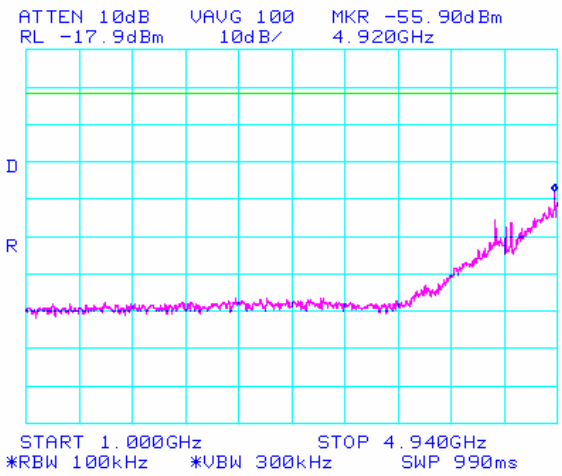
Procedures: The spurious emissions at the antenna terminal as measured at the antenna terminal using a spectrum analyzer. The measurements were made for the 5MHz, 10MHz, and 20MHz bandwidths at the center frequency of the channel.

The spurious limit was determined by:

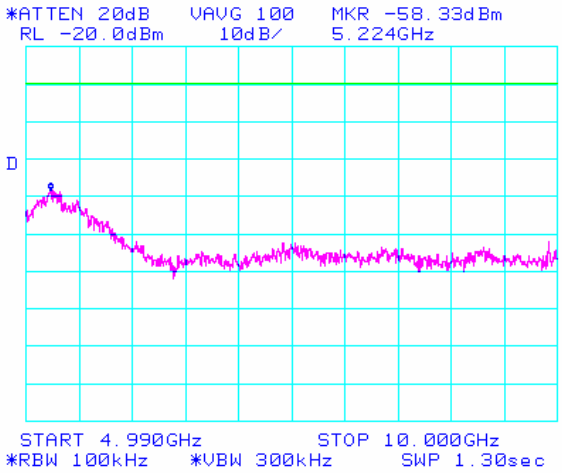
Measured Average Output Power of EUT – 50 dBm/MHz

Results:

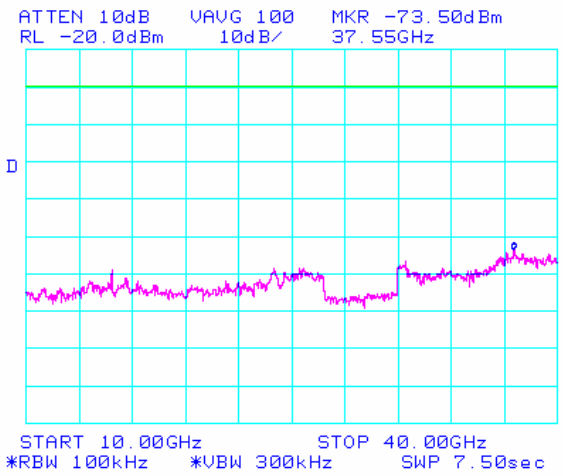
Plots #	Frequency (MHz)	Channel Bandwidth (MHz)	Pass/Fail
10 to 12	4965	5	Pass
13 to 15	4965	10	Pass
16 to 18	4965	20	Pass



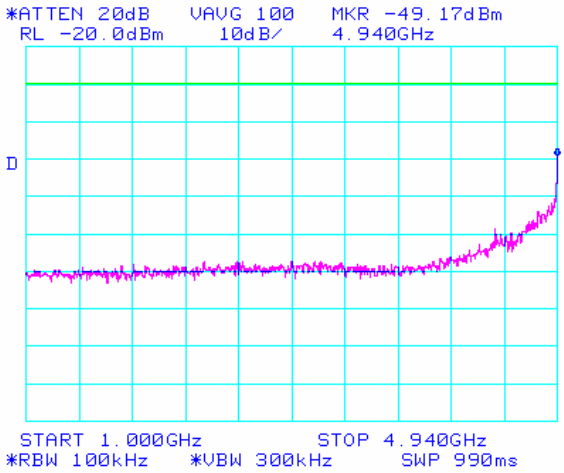
Plot 10: Conducted Spurious 5MHz BW 1 of 3



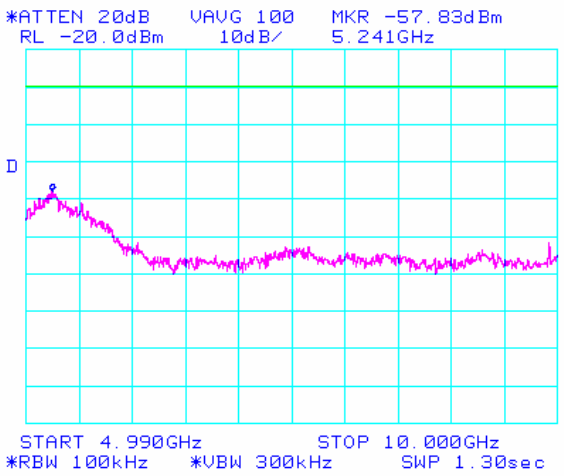
Plot 11: Conducted Spurious 5MHz BW 2 of 3



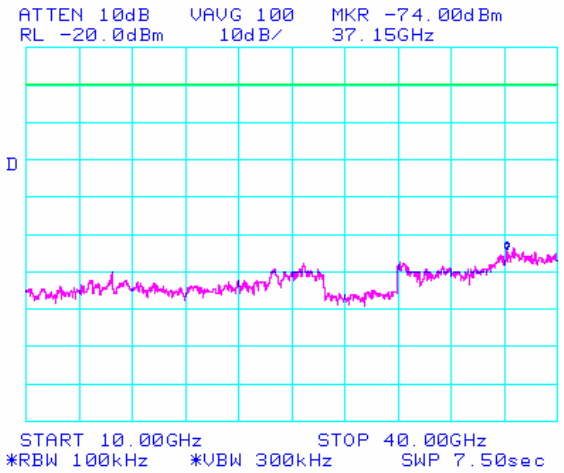
Plot 12: Conducted Spurious 5MHz BW 3 of 3



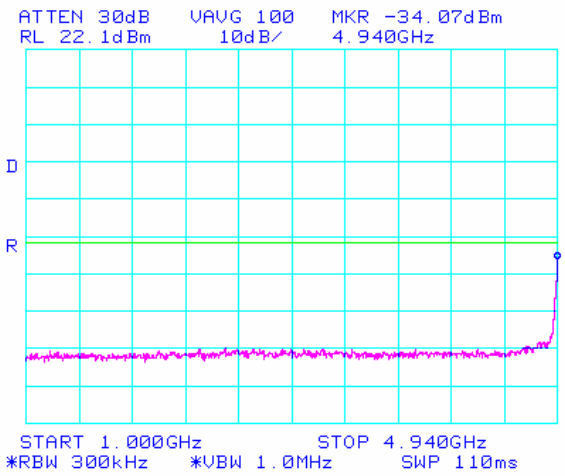
Plot 13: Conducted Spurious 10MHz BW 1 of 3



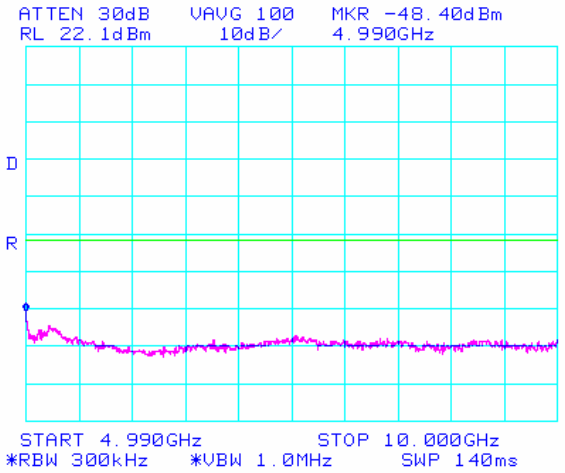
Plot 14: Conducted Spurious 10MHz BW 2 of 3



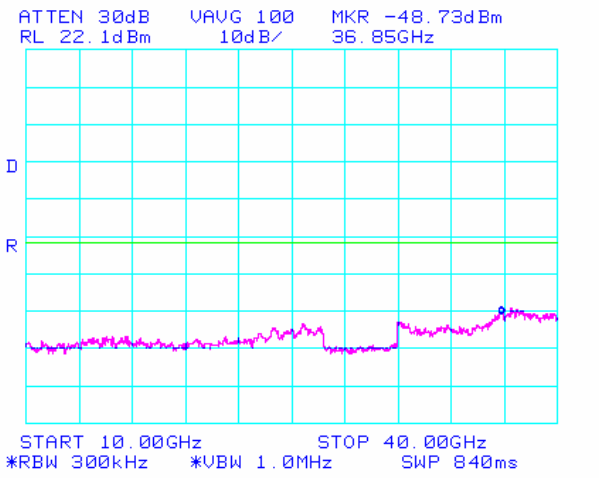
Plot 15: Conducted Spurious 10MHz BW 3 of 3



Plot 16: Conducted Spurious 20MHz BW 1 of 3



Plot 17: Conducted Spurious 20MHz BW 2 of 3



Plot 18: Conducted Spurious 20MHz BW 3 of 3

3.2.5 Radiated Spurious Emissions

Requirement(s): 47 CFR §2.1053 and §90.210(m)

Procedures: The radiated spurious emissions were measured using signal substitution. Any spurious emission amplitude was recorded. The emission amplitude was then reproduced with another antenna and signal generator. The output power at the substitution antenna was then measured with a power meter. This reading was then added with the antenna gain to determine the EIRP of the spurious emission. The measurements were made for the 5MHz, 10MHz, and 20MHz bandwidths at the center frequency of the channel.

The spurious limit was determined by:

Measured Average Output Power of EUT – 50 dBm/MHz

Results:

EBW	Frequency	Polarization	Azimuth	Power Meter	Antenna Gain	EIRP	Limit	Margin
(MHz)	(MHz)	V/H	(degrees)	(dBm)	(dBi)	(dBm)	(dBm)	(dB)
5	9920	V	180	-55.8	10.70	-45.1	-26.7	-18.4
5	9920	H	180	-49.9	10.74	-39.16	-26.7	-12.46
5	14890	V	Noise Floor					
5	14890	H	Noise Floor					
10	9920	V	180	-57.8	10.70	-47.1	-26.7	-20.4
10	9920	H	180	-52.9	10.74	-42.16	-26.7	-15.16
10	14890	V	Noise Floor					
10	14890	H	Noise Floor					
20	9920	V	180	-60.7	10.70	-50.0	-26.7	-23.3
20	9920	H	180	-54.9	10.74	-44.16	-26.7	-17.46
20	14890	V	Noise Floor					
20	14890	H	Noise Floor					

Notes:
NF = Noise Floor
EIRP = Power Meter reading + Antenna Gain
Margin = EIRP – Limit

3.2.6 Frequency Stability; Temperature Variations

Requirement(s): 47 CFR §2.1055(a)(1) and §90.213

Procedure: The frequency stability was measured at the antenna terminal using a spectrum analyzer. The measurements were made at the 5MHz bandwidths using the frequency counter function of the spectrum analyzer. The temperature was varied from -30ºC to +50ºC at 10ºC increments with suitable time allowed for temperature stability between measurements.

Results:

Temperature (ºC)	Frequency (GHz)	ppm
+50	4.964980957	0.56
+40	4.964974171	1.93
+30	4.964975019	1.75
+20	4.964983756	0
+10	4.964990306	1.31
0	4.964995787	2.42
-10	4.965015836	6.46
-20	4.964999051	3.08
-30	4.965023808	8.06

3.2.7 Frequency Stability: Voltage Variations

Requirement(s): 47 CFR §2.1055(d)(1) and §90.213

Procedures: The frequency stability was measured at the antenna terminal using a spectrum analyzer. The measurements were made at the 5MHz bandwidth using the frequency counter function of the spectrum analyzer. The voltage was varied from +/- 15% of the nominal with a programmable power supply.

Results:

Voltage (VAC)	Frequency (GHz)	ppm
126.5	4.96497707	0.27
110	4.964978441	0
93.5	4.96497751	0.18

4 TEST INSTRUMENTATION

4.1 TEST INSTRUMENTATION

Instrument	Manufacturer	Model
Spectrum Analyzer	HP	8564E
Power Meter	HP	437B
Power Sensor	HP	8485A
Antenna	Emco	3115
Antenna	Emco	3115
Signal Generator	Wiltron	68169B
Chamber	Lingren	3m
Pre-Amplifier	HP	8449
DMM	Fluke	73III
Variac	KRM	AEEC-2090
Chamber	Tenney	TTRS
DMM	Fluke	51II

APPENDIX A: EUT TEST CONDITIONS

The following is the description of supporting equipment and details of cables used with the EUT.

Equipment Description (Including Brand Name)	Cable Description
PC Laptop POE Module	1. Power cord 2. Ethernet

EUT Description	:	Skyway 4000 Radio
Model No	:	Skyway 4000 Radio
Serial No	:	none

The following is the description of how the EUT is exercised during testing.

Test	Description Of Operation
	The EUT was controlled and monitored via Ethernet by a PC running a radio test program. The data rate was set at maximum at each bandwidth to simulate worse case conditions during the equipment operation.

APPENDIX B: External Photos

See Attachment

APPENDIX C: CIRCUIT/BLOCK DIAGRAMS

See Attachment

APPENDIX D: Internal Photos

See Attachment

APPENDIX F: PRODUCT DESCRIPTION

Detail description of this product is shown in the User's Guide.

APPENDIX H: FCC LABEL LOCATION

See Attachment

APPENDIX I: USER MANUAL

See Attachment