TEST REPORT

Report Number: 30532821
Project Number: 3053282
March 12, 2004

Testing performed on the
Tsunami Multipoint Base Station Unit
FCC ID: HZB-S58-GX1
to

FCC Part 15, Subpart C

for
Proxim Corporation

Test Performed by:	Test Authorized by:
Intertek Testing Services	Proxim Corporation
1365 Adams Court	935 Stewart Drive
Menlo Park, CA 94025	Sunnyvale, California 94085

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1.0 Summary of Tests

FCC ID: HZB-S58-GX1

TEST	REFERENCE	RESULTS
Output power	15.247(b)	Complies
6 dB Bandwidth	15.247(a)(2)	Complies
Power Density	15.247(d)	Complies
Out-of-band Antenna Conducted Emission	15.247(c)	Complies
Out-of-band Radiated Emission (except emissions in restricted bands)	15.247(c)	Not Applicable. The EUT passed out-of-band antenna conducted emission
Radiated Emission in Restricted Bands	15.209, 15.205	Complies
AC Line-conducted Emission	15.207	Not Applicable; the EUT is DC powered from IDU via a coax cable.
Radiated Emission from Digital Part	15.109	Complies
Radiated Emission from Receiver L.O.	15.109	Not Applicable. The operating frequency is above 960 MHz
RF Exposure Requirement	2.1091	Complies, see exhibit “RF Exposure”
Antenna Requirement	15.203	Not Applicable; professional installation is required

A pre-production version of the EUT was received on February 2, 2004 in good operating condition. As declared by the Applicant, it is identical to the production units.

Date of Test: February 2, 2004 – February 10, 2004

2.0 General Description

2.1 Product Description

The HZB-S58-GX1 is a radio transceiver designed to offer outdoor point-to-point wireless link using 5.725-5.850GHz frequency bands. Its transmission is controlled from indoor units (IDU) of different types depending on the type of data interface and capacity.

There are 4 types of IDUs that can control the transmission of the ODU at channels as defined in the following table with designated capacity and interfaces. The IDU Unit contains the power supply, modem, multiplexing functions, system control, user and data interfaces, and orderwire. There are two versions of IDUs, The first IDU has for types of line interface cards (LIU) to offer different data interfaces. They are:

- LIU-1: Provides 1, or 2, or 4, or 8 T1 or E1 interface(s), or a 100BaseT interface using RJ45 connectors.
- LIU-2: Provides a DS3 interface using BNC connectors
- LIU-3: Provides 16T1 or 12 E1 interfaces using RJ45 connectors
- LIU-4: Provides 28 T1 or 21 E1 interfaces using 64-pin (telco) DSX connectors

The second type of IDU is unique for the Tsunami 200 radio only.

Depending on the configuration of the product, which is a combination of software setup and hardware configuration, the product is capable of offering outdoor point to point wireless links with certain data capacities and interfaces under the provision of rules as defined in the FCC 15.247. Different RF transmit channel plans are available corresponding to different data bandwidth. For marketing purpose, different model names and numbers are given to distinguish different combination of data capacity and interfaces. Please refer to the following table for a list of all product models in the product family and relevant information of test/certification concern on each model.

Model Name	Model Number	IDU1 with:				IDU2	Channel Center Frequencies (MHz)
		LIU-1	LIU-2	LIU-3	LIU-4		
Lynx.GX 16T1 5.8 GHz	52290-10xx			x			5745/5830
Lynx.GX 12E1 5.8 GHz	52250-20xx			x			5745/5830
Lynx.GX 8E1 5.8 GHz	51145-20xx	x					5745/5830
Lynx.GX 8T1 5.8 GHz	51145-10xx	x					5734/5756/5819/5841
Lynx.GX 4T1 5.8 GHz	51850-10xx	x					5731.5/5745.0/ 5758.5/5816.5/5830.0/5843.5
Lynx.GX 4E1 5.8 GHz Balanced	51850-20xx	x					5731.5/5745.0/5758.5/5816.5/5830.0/5843.5
Lynx.GX 4E1 5.8 GHz Unbalanced	51850-30xx	X					5731.5/5745.0/5758.5/5816.5/5830.0/5843.5
Lynx.GX 2T1 5.8 GHz	51600-10xx	x					5728.5/5735.0/ 5741.5/5748.0/5754.5/5761.0/ 5813.5/5820.0/5826.5/5833.0/5839.5/5846.0
Lynx.GX 2E1 5.8 GHz	51700-20xx	x					5728.5/5735.0/ 5741.5/5748.0/5754.5/5761.0/ 5813.5/5820.0/5826.5/5833.0/5839.5/5846.0
Lynx.GX 1T1 5.8 GHz	51000-10xx	x					5727/5731/5735/5739/5743/5747/ 5751/5755/ 5759/5763/ 5812/5816/ 5820/5824/5828/5832/ 5836/5840/5844/5848
Lynx.GX 1E1 5.8 GHz	51400-20xx	x					5727/5731/5735/5739/5743/5747/ 5751/5755/ 5759/5763/ 5812/5816/ 5820/5824/5828/5832/ 5836/5840/5844/5848
Lynx.GX 28T1 5.8 GHz	57720-91xx				x		5745/5830
Lynx.GX 21E1 5.8 GHz	57710-71xx				x		5745/5830
Lynx.GX DS-3 + T1 5.8 GHz	57710-91xx		x				5745/5830
Tsunami 90+2T1/2E1 5.8 GHz	57710-61xx	x					5745/5830
Tsunami GX 20 + 2T1/2E1 5.8GHz	51145W-61xx	x					5734/5756/5819/5841
Tsunami GX 32+2T/E 5.8GHz	51145-61xx	X					5731.5/5745/5758.5/5816.5/5830/5843.5 or 5734/5756/5819/5841
Tsunami GX 200+2T/E 5.8GHz	58010-51xx					X	5745/5830

Overview of the FCC ID: HZB-S58-GX1

Applicant name & address	Proxim Corporation 935 Stewart Drive, Sunnyvale, CA 94085 USA
Manufacturer	Proxim Corporation
FCC Identifier	HZB-S58-GX1
Use of Product	Fixed Wireless Ethernet Access
Type of Transmission	TDD
Type of Modulation	QPSK, QAM16
Rated RF Output	30 dBm (peak)
Frequency Range	5727 – 5848 MHz
Number of Channel(s)	20 channels maximum
Antenna	See the table below. The EUT requires professional installation.

As declared by the Applicant, the following antennas may be used with the device**:**

Antenna Type	Manufacturer	Model Number	Mid-band Gain (dBi)	Notes
1 Foot Flat Panel	Gabriel	DFPD1-52	23.5	X
	Andrew	FPA5250D12-N	23.6	
2 Foot Flat Panel	Gabriel	DFPD2-52	28	X
	Andrew	FPA5250D24-N	28.2	
	RSI	A57A24-U	26.5	
2 Foot Parabolic	Gabriel	SSP2-52B	28.5	
	Gabriel	SSD2-52A	28.4	
	Gabriel	HSSP2-52	28.1	
	Radio Waves	SP2-5.2	28.3	
	Radio Waves	SPD2-5.2	28.1	
	Andrew	P2F-52	29.4	
	Andrew	PX2F-52	29.4	
	RSI	P-57C24	29	
3 Foot Parabolic	Radio Waves	SP3-5.2	31.4	
	Radio Waves	SPD3-5.2	31.1	
	Andrew	P3F-52	33.4	
	Andrew	PX3F-52	33.4	
4 Foot Parabolic	Gabriel	SSP4-52A	34.2	
	Gabriel	SSD4-52	34.1	
	Gabriel	HSSP4-52	33.9	
	Radio Waves	SP4-5.2	34.6	
	Radio Waves	SPD4-5.2	34.4	
	RSI	P-57B48	34.7	
6 Foot Parabolic	Gabriel	SSP6-52A	37.5	
	Gabriel	SSD6-52	37.4	
	Gabriel	HSSP6-52	37.2	
	Radio Waves	SP6-5.2	37.7	
	Radio Waves	SPD6-5.2	37.5	
	RSI	P-57A72	38.2	
8 Foot Parabolic	Gabriel	SSP8-52	39.8	
	Gabriel	SSD8-52	39.7	X
	Gabriel	HSSP8-52	39.6	
	Gabriel	DRFB8-55ASE	40.7	

Notes: Antennas with gain less than 23.5 dBi are not allowed, panel antennas of higher gain then 29dBi, and parabolic antennas with higher gain than 40dBi are not allowed.
Antennas of other make may be used with the HZB-S58-GX1 device, but must be of the same type, as those listed.

Therefore, the antennas marked with ”X” have been chosen for testing.

2.2 Related Submittal(s) Grants

None.

2.3 Test Methodology

Both conducted and radiated emissions measurements were performed according to the procedures in ANSI C63.4 (1992). Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the **"Data Sheet"** of this Application. All other measurements were made in accordance with the procedures in parts 2 and 15 of CFR 47.

2.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is site 1 (10-m semi-anechoic chamber). This test facility and site measurement data have been fully placed on file with the FCC and A2LA accredited.

3.0 System Test Configuration

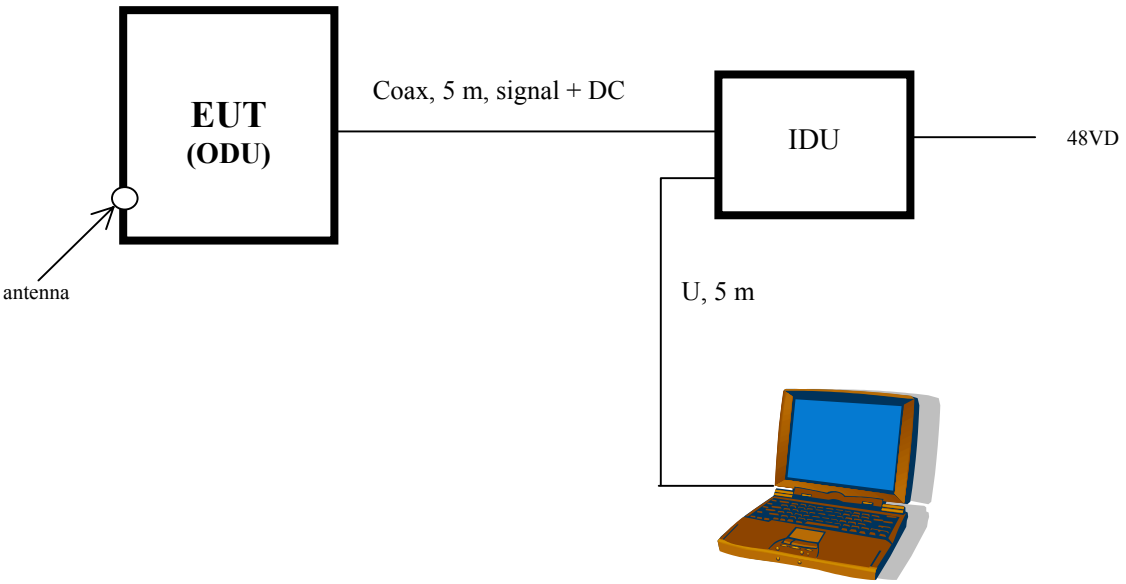
The following frequency and configuration were selected for the tests:

Frequency MHz	Modulation	Configuration	Date rate
5727	QPSK	1T/E	2.7 Msps
5728.5	QPSK	2T/E	4.5 Msps
5731.5	QPSK	4T/E	9.0 Msps
5745	QPSK	16T/12E/Tsu-27	27 Msps
5763	QPSK	1T/E	2.7 Msps
5761	QPSK	2T/E	4.5 Msps
5758.5	QPSK	4T/E	9.0 Msps
5848	QPSK	1T/E	2.7 Msps
5846	QPSK	2T/E	4.5 Msps
5843.5	QPSK	4T/E	9.0 Msps
5830	QPSK	16T/12E/Tsu-27	27 Msps
5728.5	QAM16	2T/E	4.5 Msps
5731.5	QAM16	4T/E	9.0 Msps
5745	QAM16	16T/12E/Tsu-27	27 Msps
5761	QAM16	2T/E	4.5 Msps
5843.5	QAM16	4T/E	9.0 Msps
5830	QAM16	16T/12E/Tsu-27	27 Msps
5846	QAM16	2T/E	4.5 Msps

3.1 Support Equipment and description

Laptop computer: Hewlett Packard Omnibook 4150

3.2 Block Diagram of Test Setup



S = Shielded **U** = Unshielded	**F** = With Ferrite **m** = Meter

3.3 Justification

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 radiated emission measurements, the EUT is attached to a cardboard box (if necessary) and placed on the wooden turntable. If the EUT attaches to peripherals, they are connected and operational (as typical as possible). The EUT is wired to transmit full power.

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.

Care was taken to ensure proper power supply voltages during testing.

3.4 Software Exercise Program

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. For emissions testing, the units were setup to transmit continuously to simplify the measurement methodology.

3.5 Mode of operation during test

Transmitting signal on different channels with different types of modulation.

3.6 Modifications required for Compliance

Intertek installed no modifications during compliance testing in order to bring the product into compliance.

3.7 Additions, deviations and exclusions from standards

No additions, deviations or exclusion have been made from standard.

4.0 Measurement Results

4.1 Conducted Output Power at Antenna Terminals
FCC Rule: 15.247(b)

Requirements

For fixed, point-to-point systems operating in the 5725 - 5850 MHz band, maximum allowed transmitter output power is 1 Watt or 30 dBm.

Procedure

The antenna port of the EUT was connected to the input of a peak power meter. Power was read directly from the power meter. The RF Output Power was measured for nominal AC power (110 V, 60 Hz), and for 85% and 115% of the nominal AC power.

Test Results

Frequency MHz	Modulation	Configuration	Date rate	RF Peak Output Power dBm		
				110 VAC	93.5 VAC	126.5 VAC
5727	QPSK	1T/E	2.7 Msps	28.1	28.0	28.1
5728.5	QPSK	2T/E	4.5 Msps	28.5	28.5	28.6
5731.5	QPSK	4T/E	9.0 Msps	27.9	27.7	27.9
5745	QPSK	16T/12E/Tsu-27	27 Msps	27.6	27.6	27.7
5763	QPSK	1T/E	2.7 Msps	26.8	26.7	26.8
5761	QPSK	2T/E	4.5 Msps	28.1	28.0	28.2
5758.5	QPSK	4T/E	9.0 Msps	27.7	27.5	27.7
5848	QPSK	1T/E	2.7 Msps	27.7	27.7	27.8
5846	QPSK	2T/E	4.5 Msps	28.2	28.1	28.2
5843.5	QPSK	4T/E	9.0 Msps	27.2	27.2	27.3
5830	QPSK	16T/12E/Tsu-27	27 Msps	27.0	27.0	27.1
5728.5	QAM16	2T/E	4.5 Msps	29.8	29.6	29.7
5731.5	QAM16	4T/E	9.0 Msps	27.9	27.8	27.9
5745	QAM16	16T/12E/Tsu-27	27 Msps	26.8	26.8	27.0
5761	QAM16	2T/E	4.5 Msps	29.0	28.8	28.9
5843.5	QAM16	4T/E	9.0 Msps	28.2	28.1	28.2
5830	QAM16	16T/12E/Tsu-27	27 Msps	28.0	28.0	28.1
5846	QAM16	2T/E	4.5 Msps	29.2	29.1	29.1

4.2 6 dB RF Bandwidth
FCC Rule 15.247(a)(2):

Requirements

The minimum 6-dB bandwidth shall be at least 500 kHz

Procedure

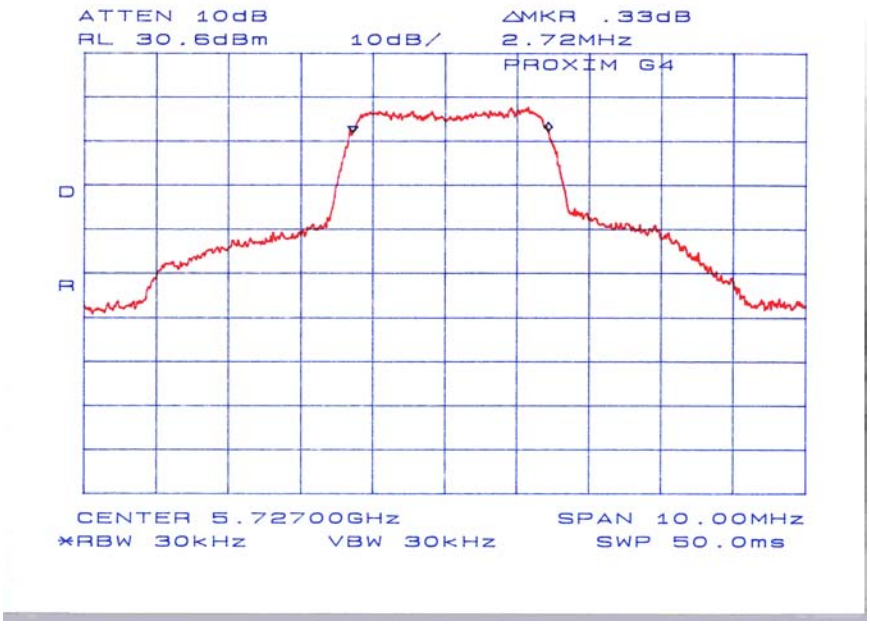
The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RES BW was set to 100 kHz. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was taken, a DISPLAY line was drawn 6 dB lower than PEAK level. The 6-dB bandwidth was determined from where the channel output spectrum intersected the display line.

Test Result

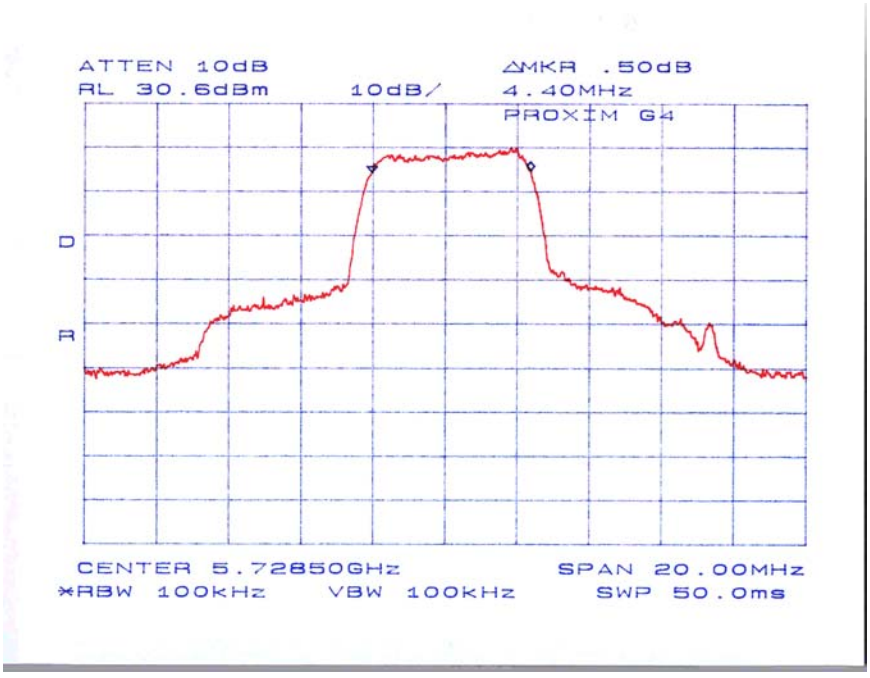
Frequency MHz	Modulation		Date rate	6-dB Bandwidth MHz	Plot #
5727	QPSK	1T/E	2.7 Msps	2.72	2.1
5728.5	QPSK	2T/E	4.5 Msps	4.40	2.2
5731.5	QPSK	4T/E	9.0 Msps	8.80	2.3
5745	QPSK	16T/12E/Tsu-27	27 Msps	26.7	2.4
5763	QPSK	1T/E	2.7 Msps	2.67	-
5761	QPSK	2T/E	4.5 Msps	4.47	-
5758.5	QPSK	4T/E	9.0 Msps	8.83	-
5848	QPSK	1T/E	2.7 Msps	2.68	2.5
5846	QPSK	2T/E	4.5 Msps	4.47	2.6
5843.5	QPSK	4T/E	9.0 Msps	8.77	2.7
5728.5	QAM16	2T/E	4.5 Msps	4.50	2.8
5745	QAM16	16T/12E/Tsu-27	27 Msps	26.0	2.9
5761	QAM16	2T/E	4.5 Msps	4.40	-
5846	QAM16	2T/E	4.5 Msps	4.37	2.10

On the plots 2.1 – 2.10 the 6-dB bandwidth is presented.

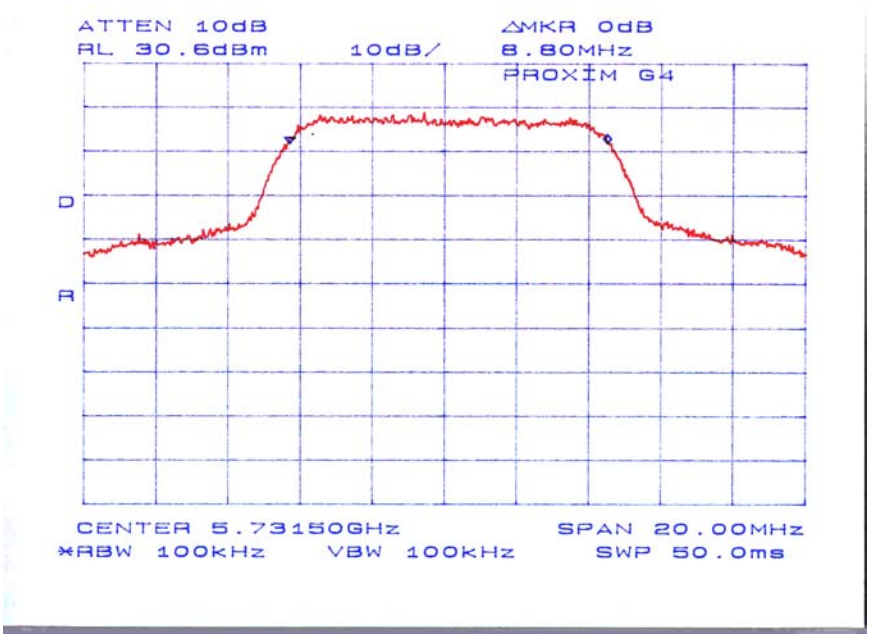
Plot 2.1



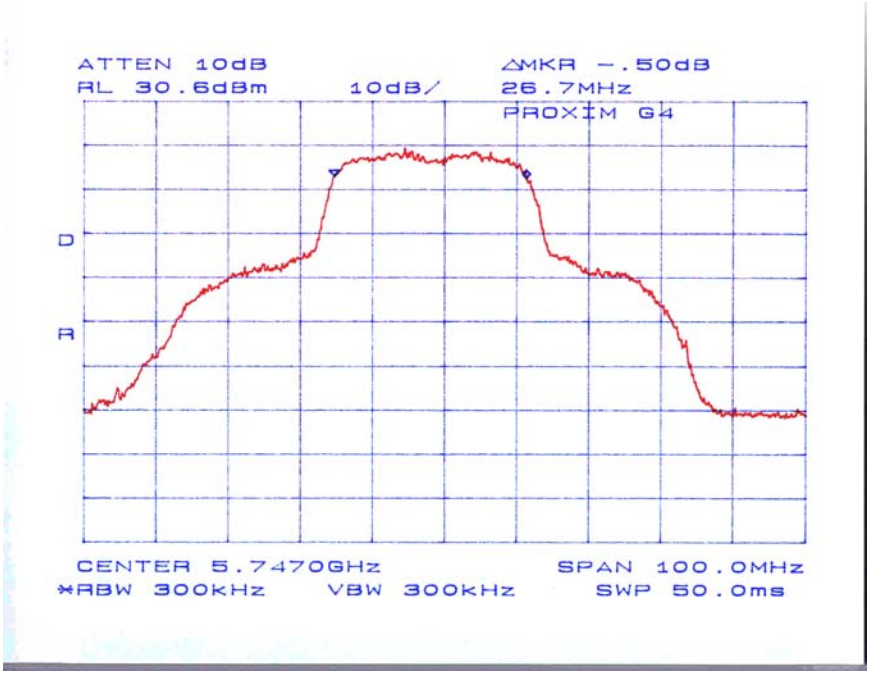
Plot 2.2



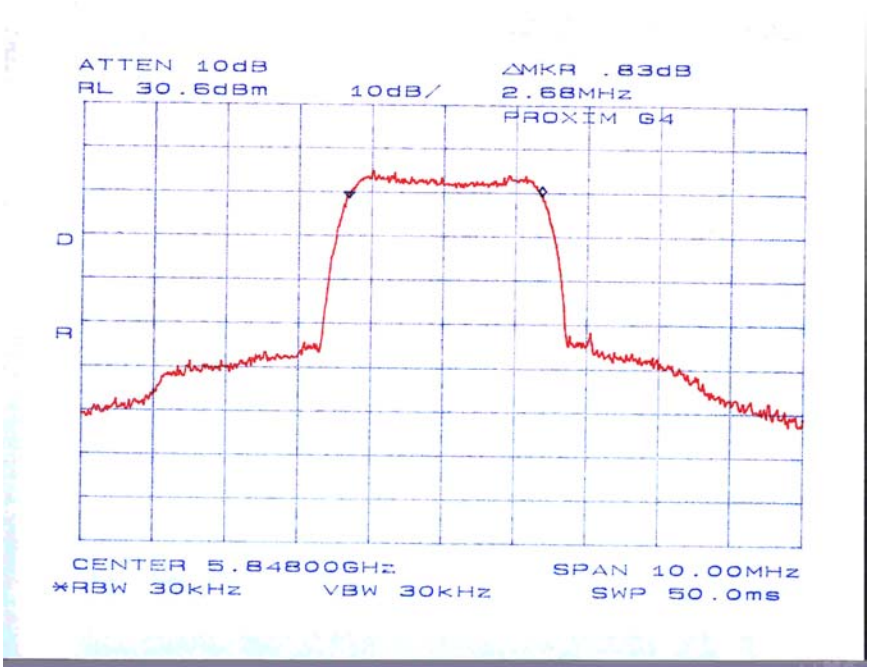
Plot 2.3



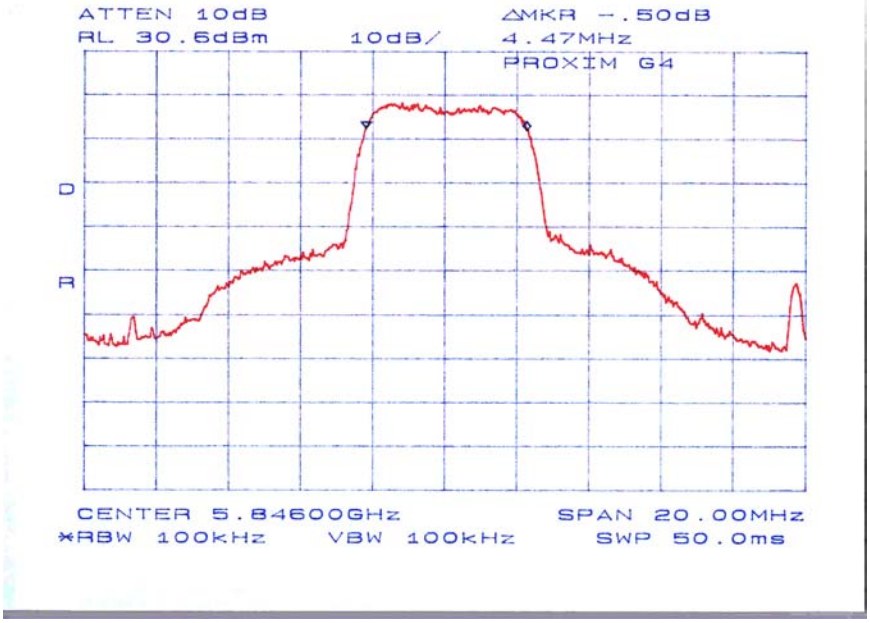
Plot 2.4



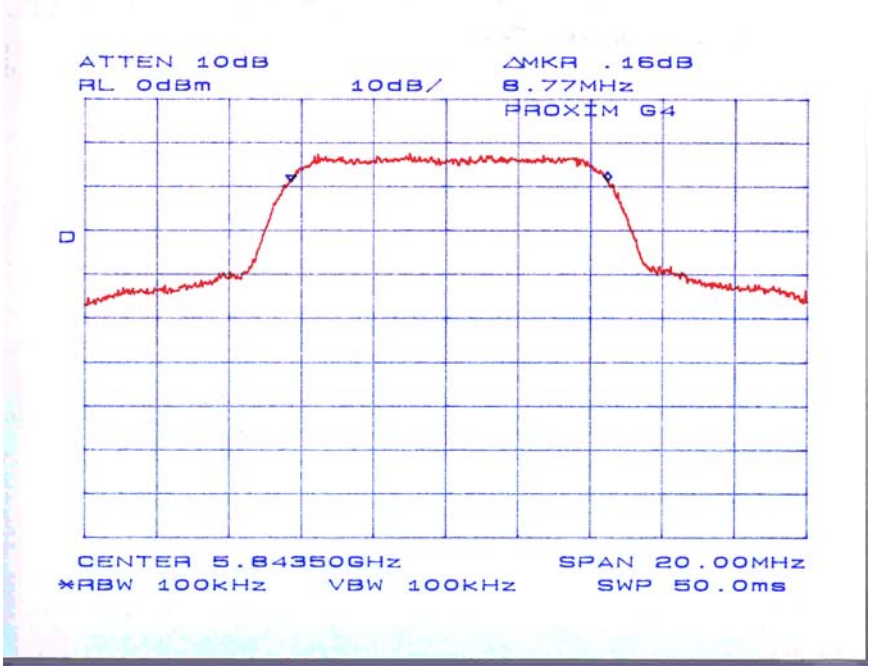
Plot 2.5



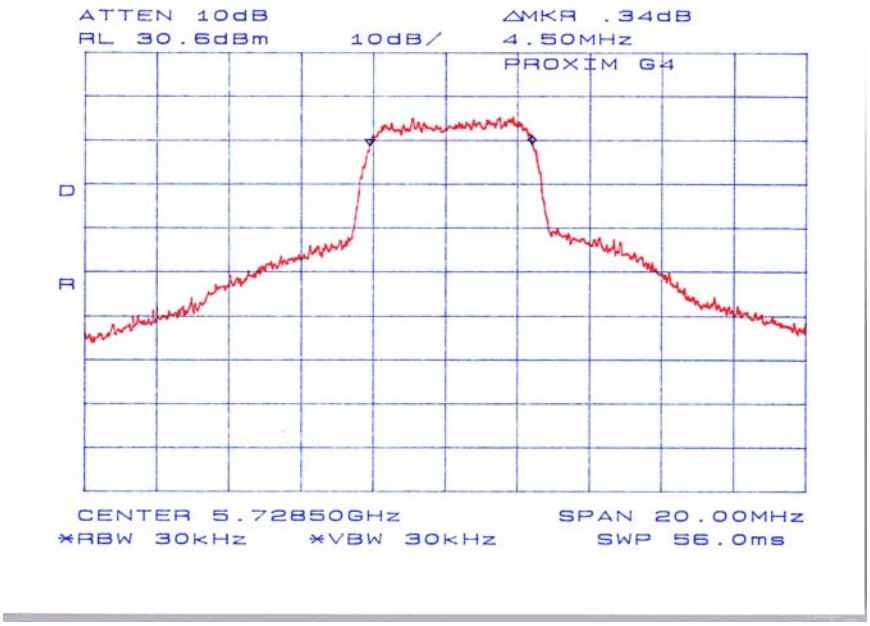
Plot 2.6



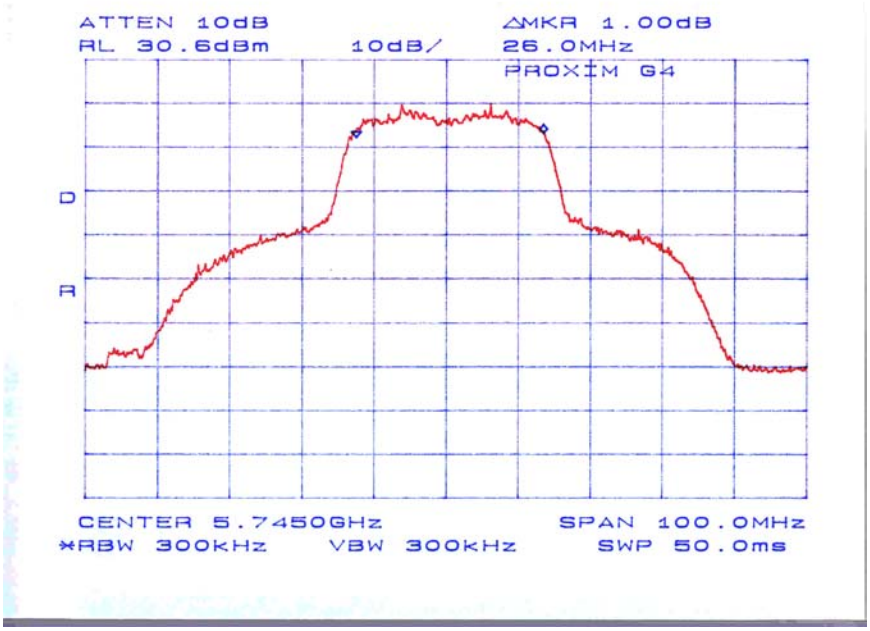
Plot 2.7



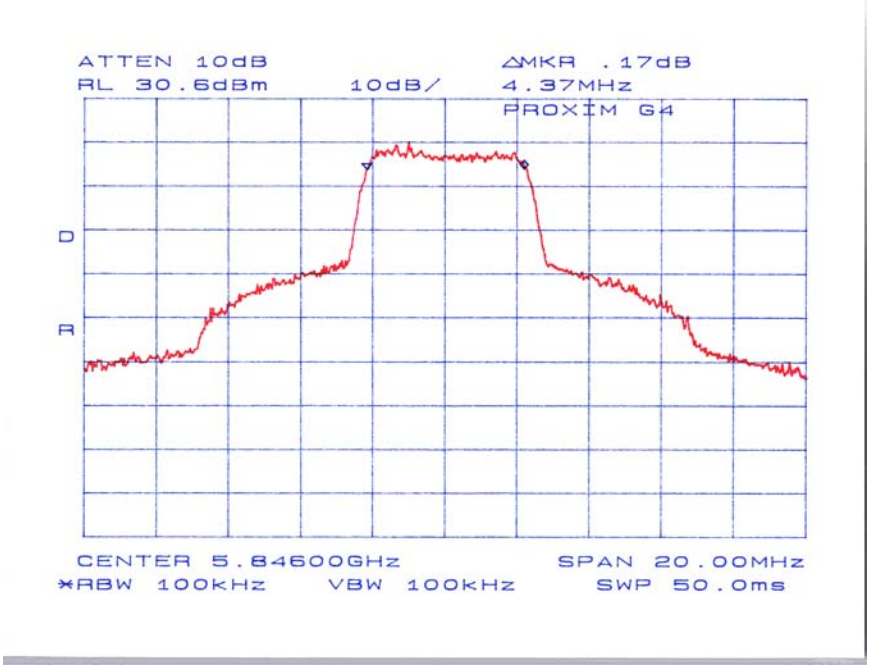
Plot 2.8



Plot 2.9



Plot 2.10



4.3 Power Density
FCC Rule: 15.247(d)

Requirements

The peak power spectral density shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Procedure

The spectrum analyzer RES BW was set to 3 kHz. The START and STOP frequencies were set to the band edges of the maximum output pass-band. If there is no clear maximum amplitude in any given portion of the band, it may be necessary to make measurements at a number of bands defined by several START and STOP frequency pairs. Total SWEEP TIME is calculated as follows:

SWEEP TIME (SEC) = (Fstop, kHz - Fstart, kHz)/3 kHz

Antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated for with the analyzer OFFSET function.

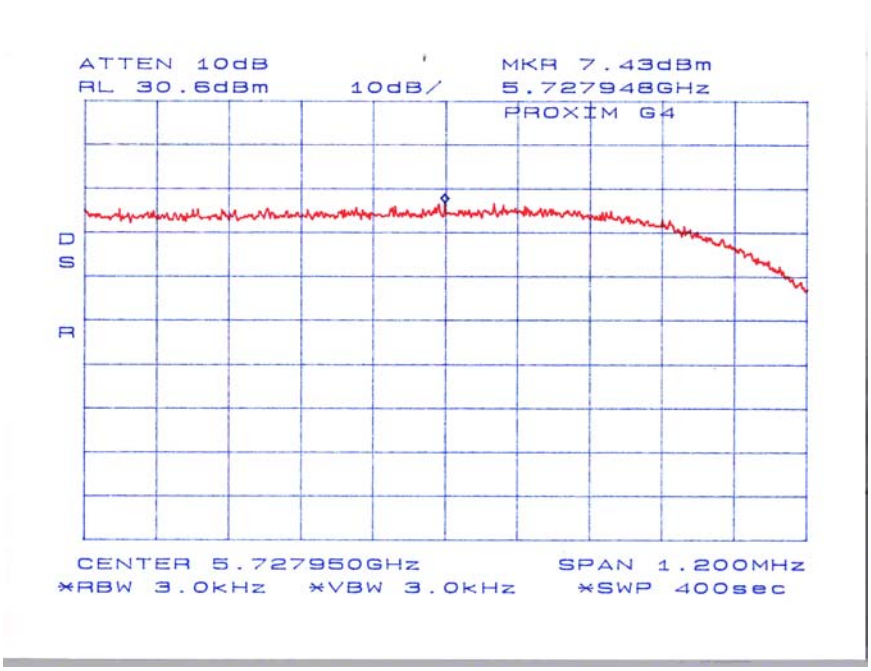
Frequency Span = 1500 kHz
Sweep Time = Frequency Span/3 kHz = 500 Seconds

Test Result

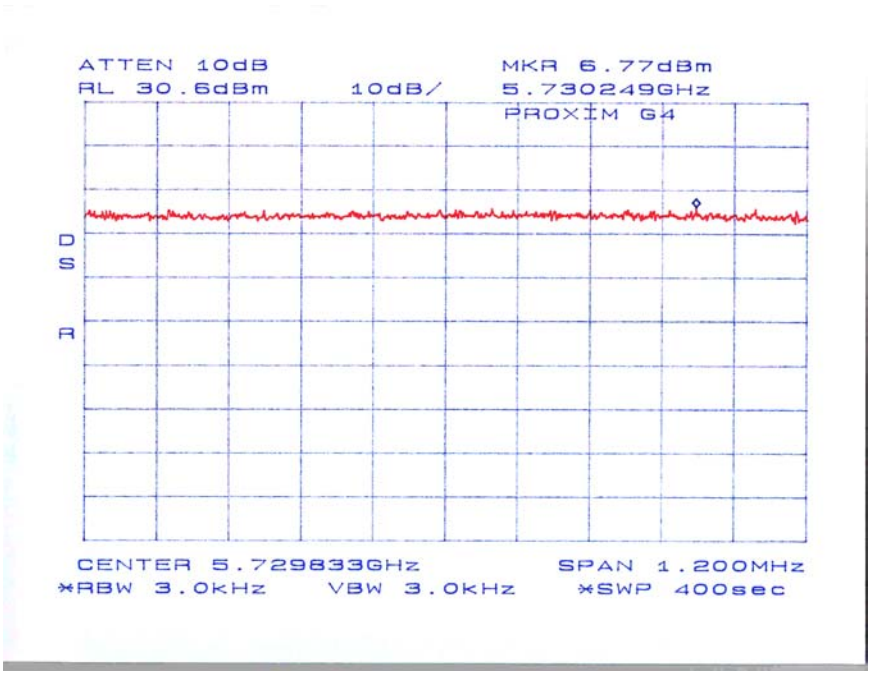
Frequency MHz	Modulation		Date rate	Power Density dBm	Plot #
5727	QPSK	1T/E	2.7 Msps	7.43	3.1
5728.5	QPSK	2T/E	4.5 Msps	6.77	3.2
5731.5	QPSK	4T/E	9.0 Msps	4.43	3.3
5745	QPSK	16T/12E/Tsu-27	27 Msps	0.77	3.4
5763	QPSK	1T/E	2.7 Msps	6.60	-
5761	QPSK	2T/E	4.5 Msps	6.77	-
5758.5	QPSK	4T/E	9.0 Msps	5.27	-
5848	QPSK	1T/E	2.7 Msps	6.27	3.5
5846	QPSK	2T/E	4.5 Msps	5.27	3.6
5843.5	QPSK	4T/E	9.0 Msps	4.10	3.7
5728.5	QAM16	2T/E	4.5 Msps	7.43	3.8
5745	QAM16	16T/12E/Tsu-27	27 Msps	-0.40	3.9
5761	QAM16	2T/E	4.5 Msps	4.40	-
5846	QAM16	2T/E	4.5 Msps	6.43	3.10

On the plots 3.1 – 3.10 the Power Density is presented.
The EUT passed by 0.57 dB.

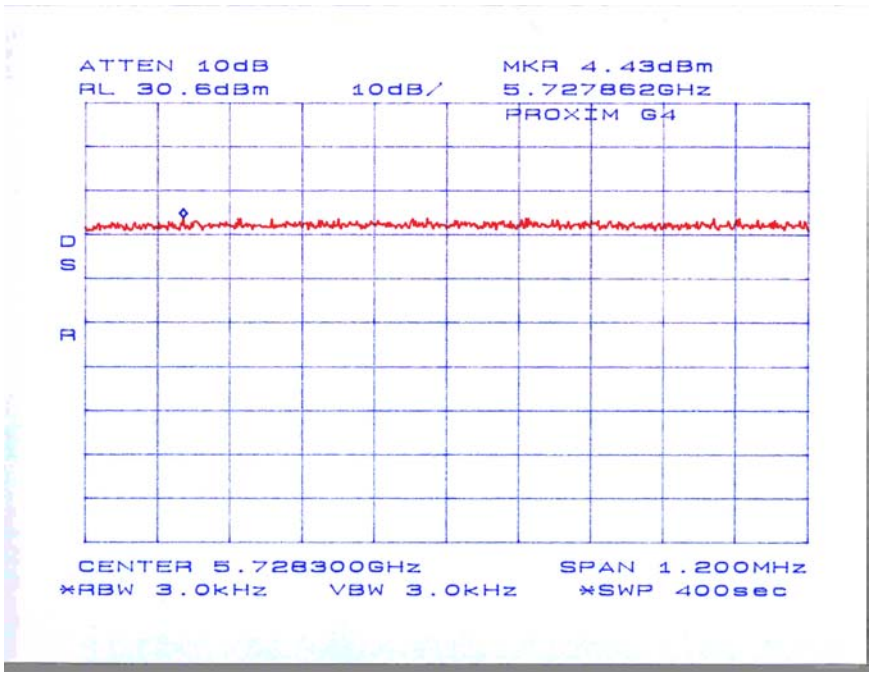
Plot 3.1



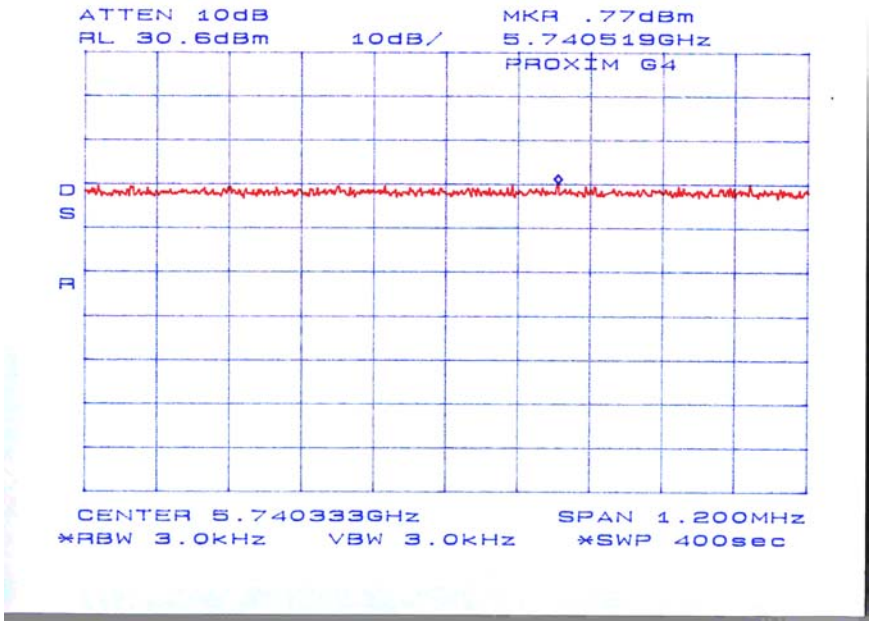
Plot 3.2



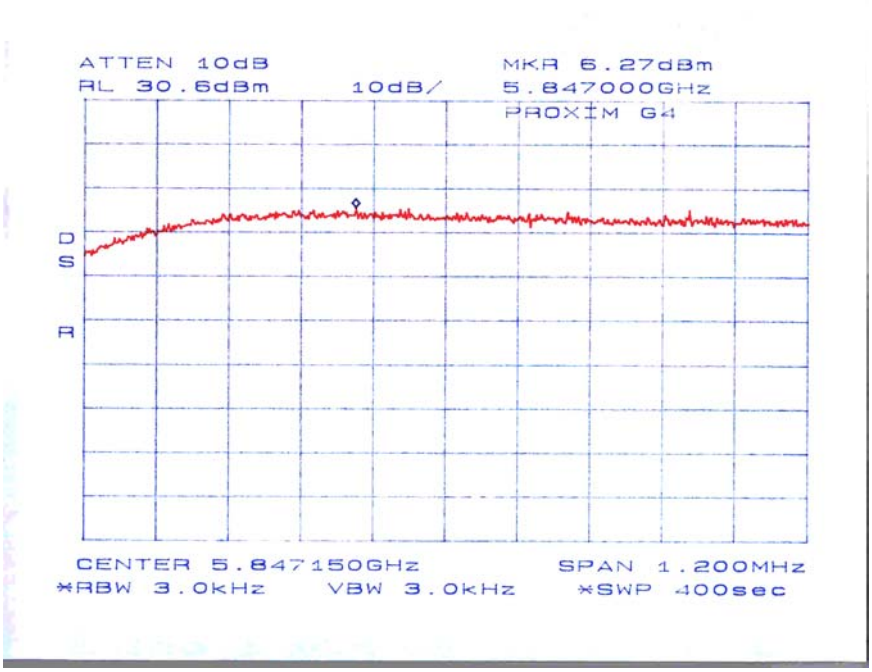
Plot 3.3



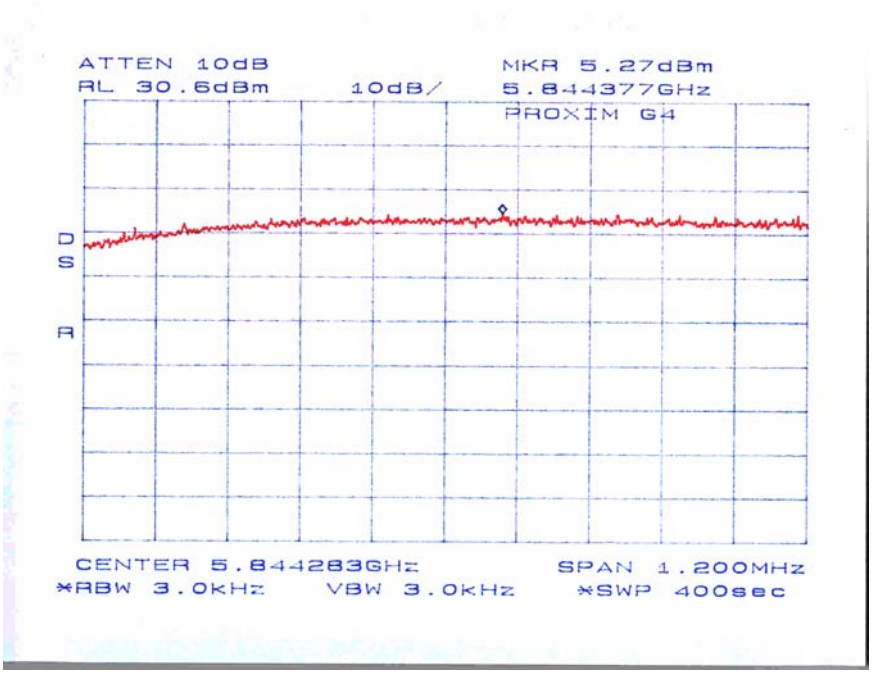
Plot 3.4



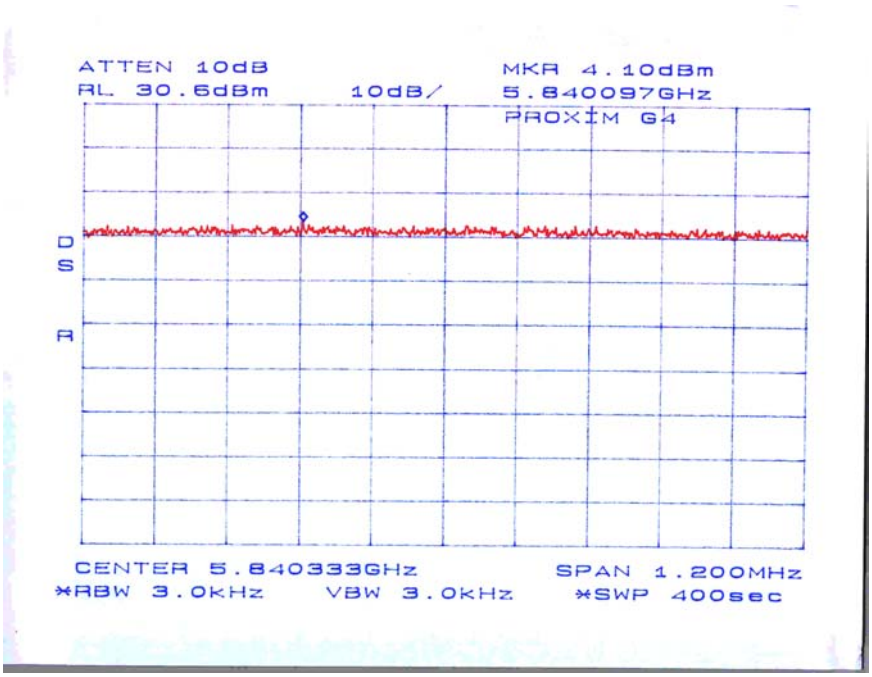
Plot 3.5



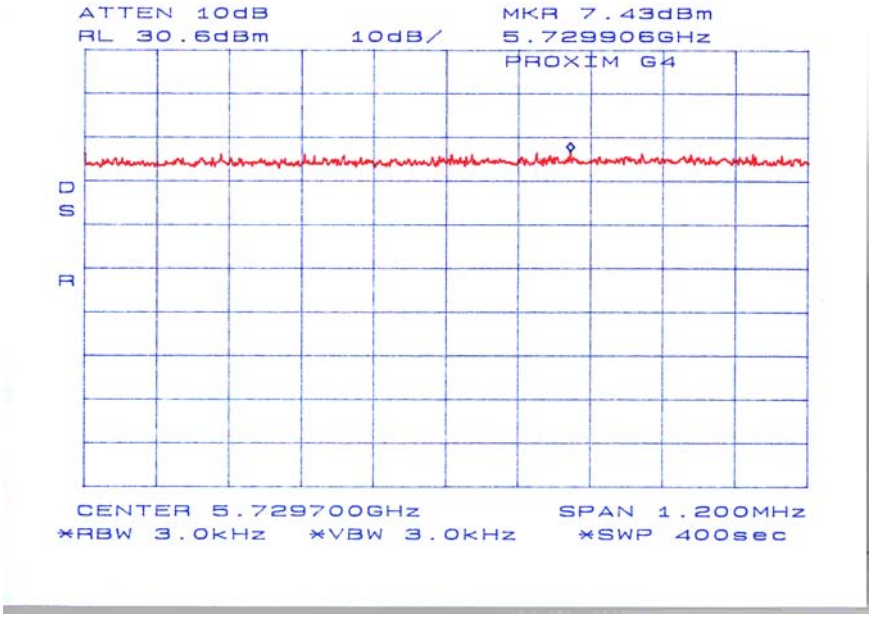
Plot 3.6



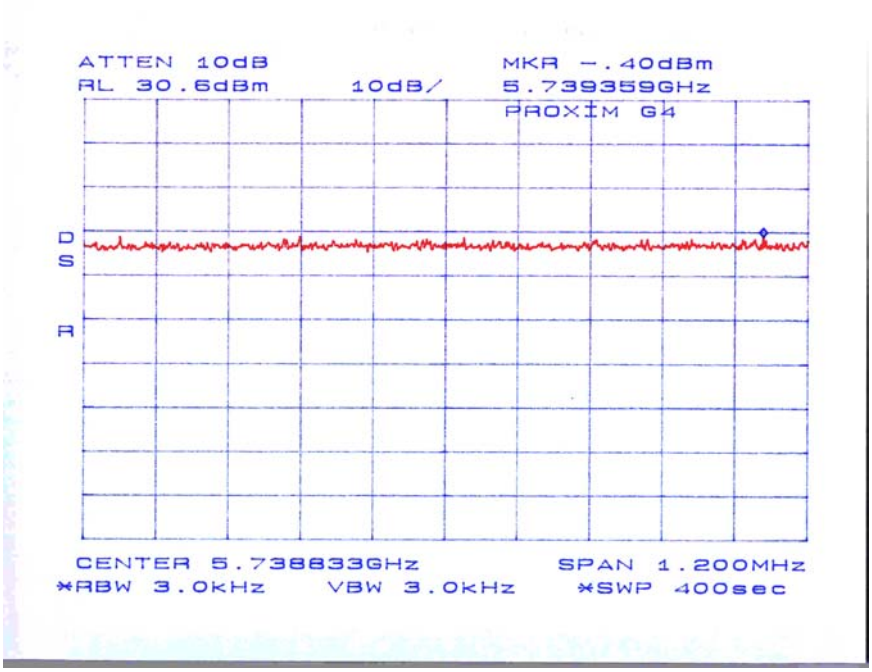
Plot 3.7



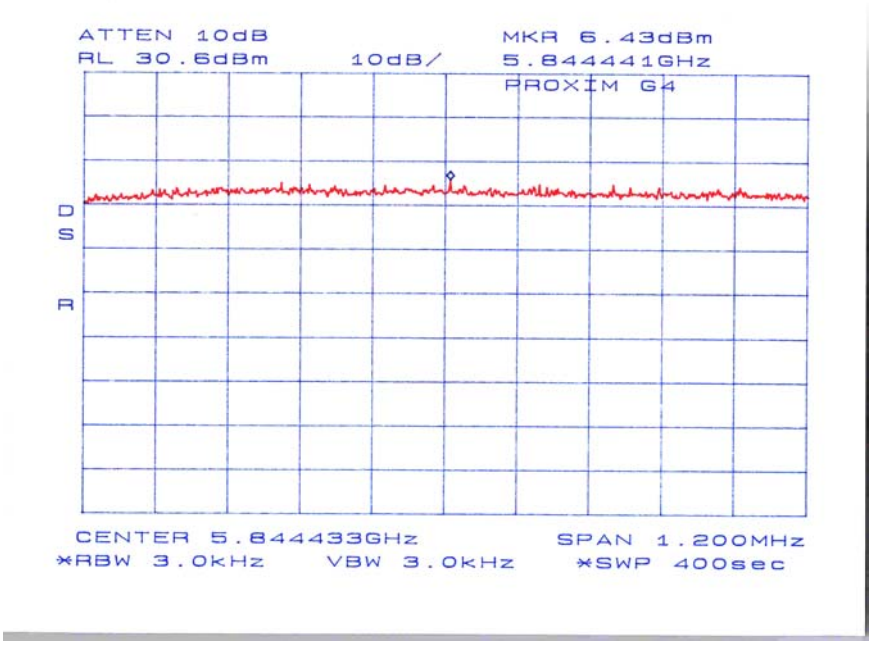
Plot 3.8



Plot 3 9



Plot 3.10



4.4 Out-of-Band Conducted Emissions
FCC Rule: 15.247(c)

Requirements

In any 100 kHz bandwidth outside the EUT pass-band, the RF power shall be at least 20 dB below that of the maximum in-band 100 kHz emission.

Procedure

A spectrum analyzer was connected to the antenna port of the transmitter. Analyzer Resolution Bandwidth was set to 100 kHz. For each channel investigated, the in-band and out-of-band emission measurements were performed.

The out-of-band emissions were measured from 30 MHz to 40 GHz for low, middle and high channels for QPSK and QAM16 modulations in all configurations. In addition, measurements on the band-edge frequencies were performed for other configurations for QPSK and QAM16 modulations.

Test Result

Refer to the plots in Appendix A for the test result.

The EUT passed by 5.7 dB.

Frequency, MHz	Modulation	Date rate	Description	Plot #
5727	QPSK	2.7 Msps	Scan 30 MHz – 1 GHz	4.1
			Scan 1 GHz – 5.7 GHz	4.2
			Scan 5.7 GHz – 5.725 GHz	4.3
			Scan 5.725 GHz – 5.85 GHz	4.4
			Scan 5.85 GHz – 40 GHz	4.5
5728.5	QPSK	4.5 Msps	Scan 30 MHz – 1 GHz	4.6
			Scan 1 GHz – 5.7 GHz	4.7
			Scan 5.7 GHz – 5.725 GHz	4.8
			Scan 5.725 GHz – 5.85 GHz	4.9
			Scan 5.85 GHz – 40 GHz	4.10
5731.5	QPSK	9.0 Msps	Scan 2 GHz – 5.7 GHz	4.11
			Scan 5.7 GHz – 5.725 GHz	4.12
			Scan 5.725 GHz – 5.85 GHz	4.13
5745	QPSK	27 Msps	Scan 5.7 GHz – 5.725 GHz	4.14
			Scan 5.725 GHz – 5.85 GHz	4.15
5763	QPSK	2.7 Msps	Scan 30 MHz – 1 GHz	4.16
			Scan 1 GHz – 5.7 GHz	4.17
			Scan 5.7 GHz – 5.725 GHz	4.18
			Scan 5.725 GHz – 5.85 GHz	4.19
			Scan 5.85 GHz – 40 GHz	4.20
5761	QPSK	4.5 Msps	Scan 30 MHz – 1 GHz	4.21
			Scan 1 GHz – 5.7 GHz	4.22
			Scan 5.7 GHz – 5.725 GHz	4.23
			Scan 5.725 GHz – 5.85 GHz	4.24
			Scan 5.85 GHz – 40 GHz	4.25
5758.5	QPSK	9.0 Msps	Scan 2 GHz – 5.7 GHz	4.26
			Scan 5.7 GHz – 5.725 GHz	4.27
			Scan 5.725 GHz – 5.85 GHz	4.28
5848	QPSK	2.7 Msps	Scan 30 MHz – 1 GHz	4.29
			Scan 1 GHz – 5.725 GHz	4.30
			Scan 5.725 GHz – 5.85 GHz	4.31
			Scan 5.85 GHz – 5.90 GHz	4.32
			Scan 5.9 GHz – 10 GHz	4.33
			Scan 10 GHz – 40 GHz	4.34
5846	QPSK	4.5 Msps	Scan 30 MHz – 1 GHz	4.35
			Scan 1 GHz – 5.7 GHz	4.36
			Scan 5.725 GHz – 5.85 GHz	4.37
			Scan 5.85 GHz – 6 GHz	4.38
			Scan 6 GHz – 40 GHz	4.39
5843.5	QPSK	9.0 Msps	Scan 5.725 GHz – 5.85 GHz	4.40
			Scan 5.85 GHz – 6 GHz	4.41
			Scan 6 GHz – 10 GHz	4.42
			Scan 10 GHz – 40 GHz	4.43

Frequency, MHz	Modulation	Date rate	Description	Plot #
5728.5	QAM16	4.5 Msps	Scan 30 MHz – 1 GHz	4.44
			Scan 1 GHz – 5.7 GHz	4.45
			Scan 5.7 GHz – 5.725 GHz	4.46
			Scan 5.725 GHz – 5.85 GHz	4.47
			Scan 5.85 GHz – 40 GHz	4.48
5745	QAM16	27 Msps	Scan 5.7 GHz – 5.725 GHz	4.49
			Scan 5.725 GHz – 5.85 GHz	4.50
5846	QAM16	4.5 Msps	Scan 5.7 GHz – 5.725 GHz	4.51
			Scan 5.725 GHz – 5.85 GHz	4.52
			Scan 5.85 GHz – 5.87 GHz	4.53
			Scan 5.87 GHz – 6 GHz	4.54
			Scan 6 GHz – 40 GHz	4.55

4.6 Transmitter Radiated Emissions
FCC Rules: 15.247 (c), 15.205, 15.209

Procedure

Radiated emission measurements were performed from 30 MHz to 40,000 MHz. Spectrum Analyzer Resolution Bandwidth is 100 kHz or greater for frequencies 30 MHz to 1000 MHz, 1 MHz - for frequencies above 1000 MHz.

The EUT is placed on the wooden turntable. If the EUT attaches to peripherals, they are connected and operational (as typical as possible). During testing, all cables were manipulated to produce worst-case emissions. The signal is maximized through rotation. 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 3 m 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.

Data is included of the worst-case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

Since the EUT passed out-of-band (spurious) antenna conducted emission test, the only radiated emission measurements in the restricted bands were performed.

Field Strength Calculation

FS = RA + AF + CF - AG
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

Assume a receiver reading of 52.0 dB(μV) is obtained. The antenna 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 Intertek corresponding level in μV/m.
RA = 52.0 dB(μV); CF = 1.6 dB; AF = 7.4 dB(1/m); AG = 29.0 dB
FS = 52 + 7.4 + 1.6 - 29 = 32 dB(μV/m)
Level in μV/m = Common Antilogarithm [(32 dB(μV/m)/20] = 39.8 μV/m

Result

The data listed on the following tables list the significant emission frequencies in the restricted bands, the limit and the margin of compliance. The EUT passed by 2.9 dB.

The data listed on the following tables were the only emissions found in the investigation up to 40 GHz. No other emissions were found above the system noise floor, which is at least 6 dB below the regulatory limit.

No emissions from the fundamental transmit frequencies were detected in the restricted bands listed in FCC section 15.205.

All radiated spurious emissions in the restricted bands, including the emissions in the adjacent channels, are below the limits listed in FCC section 15.205.

Company:	PROXIM		**Model #:**					**Standard**	**FCC 15.247**	
EUT:	HZB-S58-GX1		**S/N #:**							
Project #:	3053282		**Test Date:**	February 05, 2004				**Test Distance**	3	meter
Test Mode:	Tx, QPSK		**Engineer:**	AK.				**Duty Relaxation**	0	dB
	Antenna Used			Pre-Amp Used			Cable Used			
Number:	14	21	22	10	4	13				
Model:	EMCO 3115	3160-9	3160-10	AFT18855	None	ACO/400	None	#3	None	

1 Foot Flat Panel Antenna, model: DFPD1-52

TX at 5727 MHz

Frequency	Reading	Detector	Ant. Pol.	Ant. Factor	Correction Factor	Net	Limit @3m	Margin
MHz	dB(µV)	P/A/Q	H/V	dB(1/m)	dB	dB(µV/m)	dB(µV/m)	dB
11454	52.6	Peak	H	39.4	-29.7	62.3	74	-11.7
11454	40.2	Ave.	H	39.4	-29.7	49.9	54	-4.1
22908	36.7	Peak	H	40.4	-15.8	61.3	74	-12.7
22908	24.8	Ave.	H	40.4	-15.8	49.4	54	-4.6

TX at 5763 MHz

Frequency	Reading	Detector	Ant. Pol.	Ant. Factor	Correction Factor	Net	Limit @3m	Margin
MHz	dB(µV)	P/A/Q	H/V	dB(1/m)	dB	dB(µV/m)	dB(µV/m)	DB
11526	52.9	Peak	H	39.4	-30.3	62	74	-12
11526	40.8	Ave.	H	39.4	-30.3	49.9	54	-4.1
23052	37.9	Peak	H	40.4	-15.8	62.5	74	-11.5
23052	25.2	Ave.	H	40.4	-15.8	49.8	54	-4.2

TX at 5848 MHz

Frequency	Reading	Detector	Ant. Pol.	Ant. Factor	Correction Factor	Net	Limit @3m	Margin
MHz	dB(µV)	P/A/Q	H/V	dB(1/m)	dB	dB(µV/m)	dB(µV/m)	DB
11696	51.3	Peak	H	39.4	-29.2	61.5	74	-12.5
11696	39.6	Ave.	H	39.4	-29.2	49.8	54	-4.2

Notes: a) Correction Factor (dB) = Cable #3 - Pre-amp gain + High-pass filter (10GHz) loss
b) Net (dB) = Reading + Antenna Factor + Correction Factor
c) Negative signs (-) in Margin column signify levels below the limits.

Company:	PROXIM		**Model #:**				**Standard**	**FCC 15.247**		
EUT:	HZB-S58-GX1		**S/N #:**							
Project #:	3053282		**Test Date:**	February 05, 2004			**Test Distance**	3	meter	
Test Mode:	Tx, QPSK		**Engineer:**	AK.			**Duty Relaxation**	0	dB	
	Antenna Used			Pre-Amp Used			Cable Used			
Number:	14	21	22	10	4	13				
Model:	EMCO 3115	3160-9	3160-10	AFT18855	None	ACO/400	None	#3	None	

2 Foot Flat Panel Antenna, model: DFPD2-52

TX at 5727 MHz

Frequency MHz	Reading dB(µV)	Detector P/A/Q	Ant. Pol. H/V	Ant. Factor dB(1/m)	Correction Factor dB	Net dB(µV/m)	Limit @3m dB(µV/m)	Margin dB
11454	53.3	Peak	H	39.4	-29.7	63	74	-11
11454	40.7	Ave.	H	39.4	-29.7	50.4	54	-3.6
22908	36.9	Peak	H	40.4	-15.8	61.5	74	-12.5
22908	25.1	Ave.	H	40.4	-15.8	49.7	54	-4.3

TX at 5763 MHz

Frequency MHz	Reading dB(µV)	Detector P/A/Q	Ant. Pol. H/V	Ant. Factor dB(1/m)	Correction Factor dB	Net dB(µV/m)	Limit @3m dB(µV/m)	Margin DB
11526	53.4	Peak	H	39.4	-30.3	62.5	74	-11.5
11526	41.3	Ave.	H	39.4	-30.3	50.4	54	-3.6
23052	38.1	Peak	H	40.4	-15.8	62.7	74	-11.3
23052	25.5	Ave.	H	40.4	-15.8	50.1	54	-3.9

TX at 5848 MHz

Frequency MHz	Reading dB(µV)	Detector P/A/Q	Ant. Pol. H/V	Ant. Factor dB(1/m)	Correction Factor dB	Net dB(µV/m)	Limit @3m dB(µV/m)	Margin DB
11696	51.9	Peak	H	39.4	-29.2	62.1	74	-11.9
11696	40.1	Ave.	H	39.4	-29.2	50.3	54	-3.7

Notes: a) Correction Factor (dB) = Cable #3 - Pre-amp gain + High-pass filter (10GHz) loss
b) Net (dB) = Reading + Antenna Factor + Correction Factor
c) Negative signs (-) in Margin column signify levels below the limits.

Company:	PROXIM		**Model #:**				**Standard**	**FCC 15.247**		
EUT:	HZB-S58-GX1		**S/N #:**							
Project #:	3053282		**Test Date:**	February 06, 2004			**Test Distance**	3	meter	
Test Mode:	Tx, QPSK		**Engineer:**	AK.			**Duty Relaxation**	0	dB	
	Antenna Used			Pre-Amp Used			Cable Used			
Number:	14	21	22	10	4	13				
Model:	EMCO 3115	3160-9	3160-10	AFT18855	None	ACO/400	None	#3	None	

8 Foot Parabolic Antenna, model: SSD8-52

TX at 5727 MHz

Frequency MHz	Reading dB(µV)	Detector P/A/Q	Ant. Pol. H/V	Ant. Factor dB(1/m)	Correction Factor dB	Net dB(µV/m)	Limit @3m dB(µV/m)	Margin dB
11454	53.9	Peak	H	39.4	-29.7	63.6	74	-10.4
11454	41.1	Ave.	H	39.4	-29.7	50.8	54	-3.2
22908	36.9	Peak	H	40.4	-15.8	61.5	74	-12.5
22908	25.1	Ave.	H	40.4	-15.8	49.7	54	-4.3

TX at 5763 MHz

Frequency MHz	Reading dB(µV)	Detector P/A/Q	Ant. Pol. H/V	Ant. Factor dB(1/m)	Correction Factor dB	Net dB(µV/m)	Limit @3m dB(µV/m)	Margin DB
11526	54.1	Peak	H	39.4	-30.3	63.2	74	-10.8
11526	41.8	Ave.	H	39.4	-30.3	50.9	54	-3.1
23052	38.1	Peak	H	40.4	-15.8	62.7	74	-11.3
23052	25.5	Ave.	H	40.4	-15.8	50.1	54	-3.9

TX at 5848 MHz

Frequency MHz	Reading dB(µV)	Detector P/A/Q	Ant. Pol. H/V	Ant. Factor dB(1/m)	Correction Factor dB	Net dB(µV/m)	Limit @3m dB(µV/m)	Margin DB
11696	52.7	Peak	H	39.4	-29.2	62.9	74	-11.1
11696	40.9	Ave.	H	39.4	-29.2	51.1	54	-2.9

Notes: a) Correction Factor (dB) = Cable #3 - Pre-amp gain + High-pass filter (10GHz) loss
b) Net (dB) = Reading + Antenna Factor + Correction Factor
c) Negative signs (-) in Margin column signify levels below the limits.

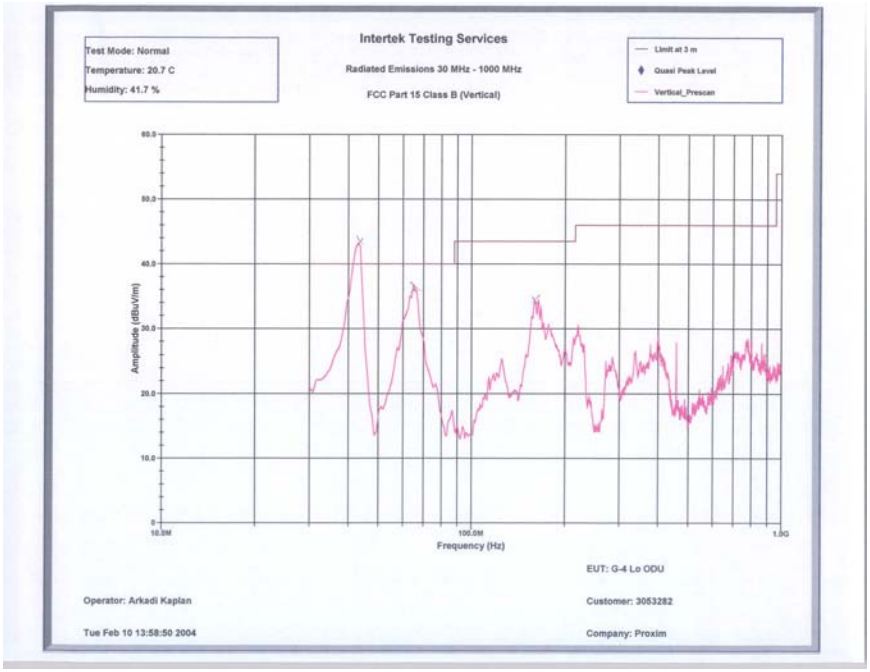
4.7 Radiated Emissions from Digital Section of Transceiver
FCC Ref: 15.109

Procedure

Radiated emission measurements were performed from 30 MHz to 1000 MHz. Spectrum Analyzer Resolution Bandwidth is 100 kHz or greater. See also section 4.6 for the test procedure and field strength calculation.

Result

The result is presented on the following pages.
The EUT passed by 1.4 dB.



Intertek Testing Services
Radiated Emissions 30 MHz - 1000 MHz
FCC Part 15 Class B (QP-Vertical)

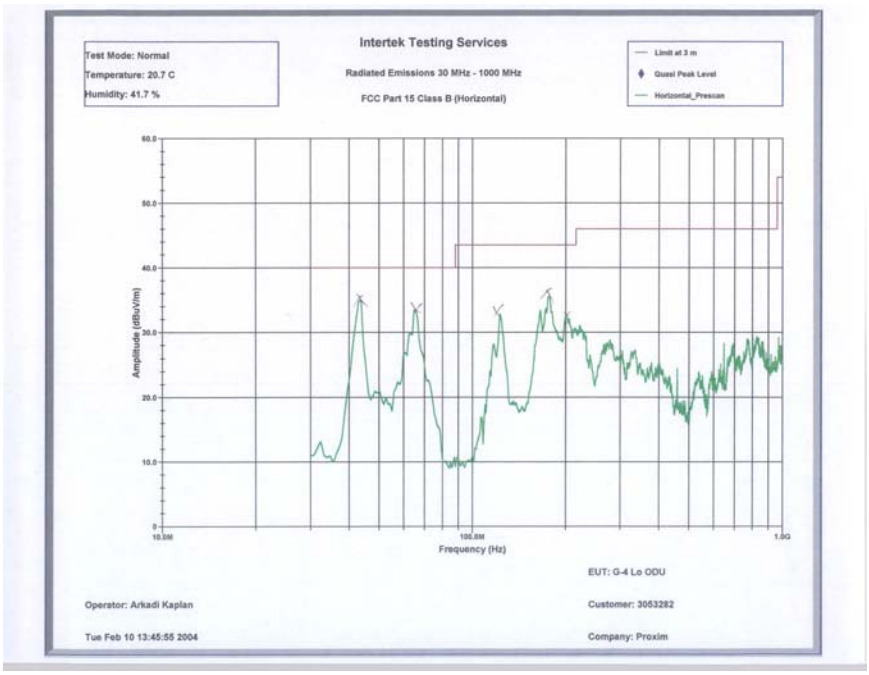
Operator: Arkadi Kaplan
03:02:16 PM, Tuesday, February 10, 2004

Model Number: G-4 Lo ODU
ITS Job Number: 3053282
Company: Proxim

	1	2	3	4	5	6	7	8
Frequency	Quasi Pk FS	Limit@3	Margin	RA	AG	AF	Atten	CF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB(1/m)	dB	dB
41.966 MHz	38.2	40.0	-1.8	59.1	32.4	7.6	3.0	0.9
62.984 MHz	32.5	40.0	-7.5	55.8	32.3	5.0	3.0	1.1
164.816 MHz	30.7	43.5	-12.8	49.0	32.3	9.1	3.0	1.8
400.877 MHz	20.5	46.0	-25.5	31.4	32.3	15.4	3.0	3.0

Test Mode: Normal
Temperature: 20.7 C
Humidity: 41.7 %

Page 1



Intertek Testing Services
Radiated Emissions 30 MHz - 1000 MHz
FCC Part 15 Class B (QP-Horizontal)

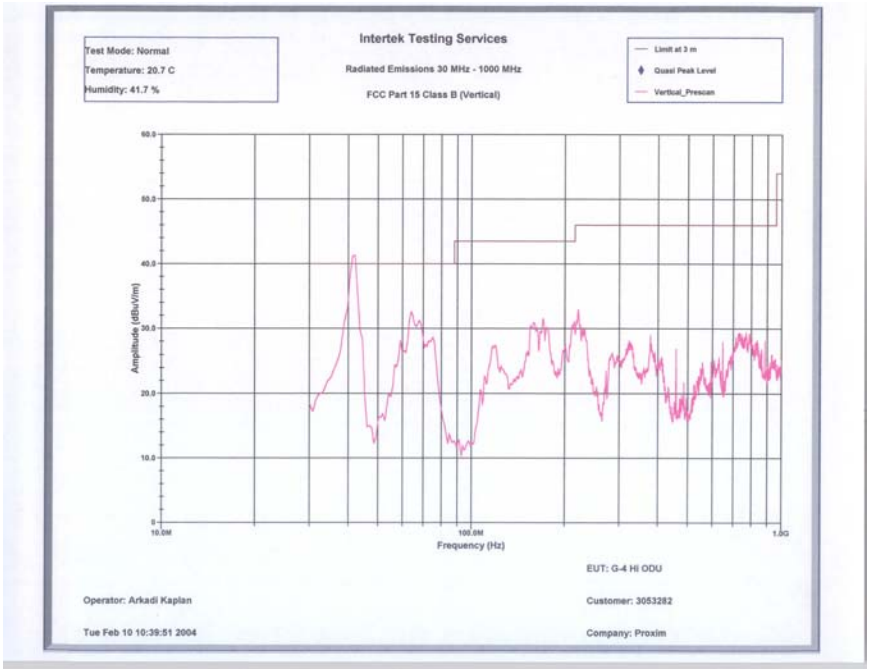
Operator: Arkadi Kaplan
02:48:48 PM, Tuesday, February 10, 2004

Model Number: G-4 Lo ODU
ITS Job Number: 3053282
Company: Proxim

	1	2	3	4	5	6	7	8
Frequency	Quasi Pk FS	Limit@3m	Margin	RA	AG	AF	Atten	CF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB(1/m)	dB	dB
42.547 MHz	31.7	40.0	-8.3	50.7	32.4	9.4	3.0	0.9
63.126 MHz	28.1	40.0	-11.9	50.5	32.3	5.9	3.0	1.1
121.740 MHz	20.1	43.5	-23.4	41.0	32.3	6.9	3.0	1.5
163.948 MHz	24.7	43.5	-18.8	43.3	32.3	8.9	3.0	1.8
201.829 MHz	28.0	43.5	-15.5	44.2	32.3	11.0	3.0	2.0

Test Mode: Normal
Temperature: 20.7 C
Humidity: 41.7 %

Page 1



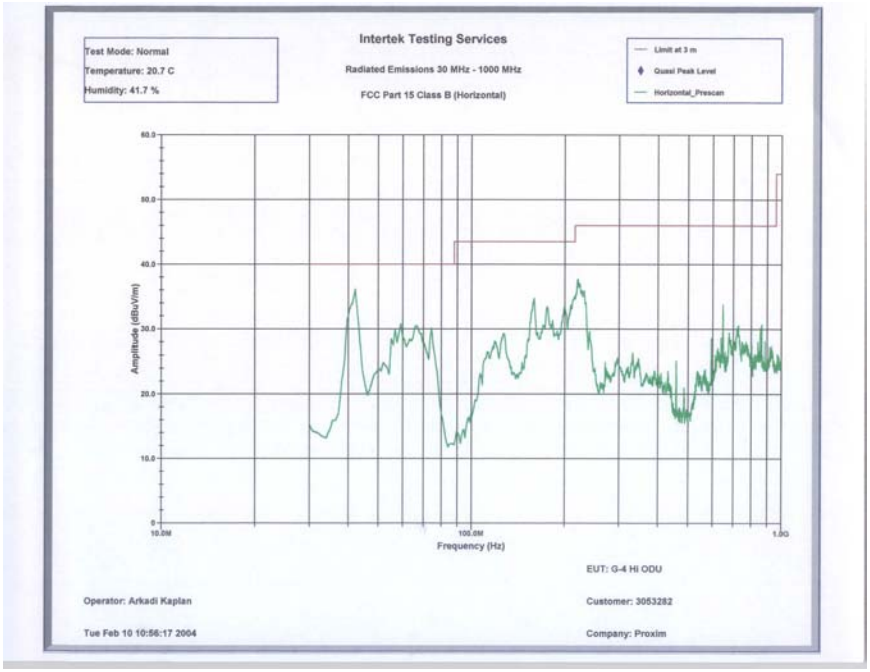
Intertek Testing Services
Radiated Emissions 30 MHz - 1000 MHz
FCC Part 15 Class B (QP-Vertical)

Operator: Arkadi Kaplan
Model Number: G-4 Hi ODU
ITS Job Number: 3053282
12:09:45 PM, Tuesday, February 10, 2004
Company: Proxim

	1	2	3	4	5	6	7	8	
Frequency	Quasi Pk FS	Limit@3	Margin	RA	AG	AF	Atten	CF	
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB(1/m)	dB	dB	
41.793 MHz	38.6	40.0	-1.4	59.8	32.4	7.2	3.0	0.9	
64.135 MHz	30.1	40.0	-9.9	53.5	32.3	4.9	3.0	1.1	

Test Mode: Normal
Temperature: 20.7 C
Humidity: 41.7 %

Page 1



Intertek Testing Services
Radiated Emissions 30 MHz - 1000 MHz
FCC Part 15 Class B (QP-Horizontal)

Operator: Arkadi Kaplan
Model Number: G-4 Hi ODU
ITS Job Number: 3053282
11:40:31 AM, Tuesday, February 10, 2004
Company: Proxim

	1	2	3	4	5	6	7	8
Frequency	Quasi Pk FS	Limit@3m	Margin	RA	AG	AF	Atten	CF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB(1/m)	dB	dB
41.627 MHz	31.8	40.0	-8.2	50.5	32.4	9.9	3.0	0.9
59.261 MHz	27.1	40.0	-12.9	50.3	32.3	5.1	3.0	1.0
161.096 MHz	32.2	43.5	-11.3	50.8	32.3	8.9	3.0	1.8
220.018 MHz	32.9	46.0	-13.1	48.6	32.2	11.5	3.0	2.1
647.745 MHz	22.9	46.0	-23.1	27.3	32.5	21.2	3.0	4.0

Test Mode: Normal
Temperature: 20.7 C
Humidity: 41.7 %

Page 1

4.8 Radiated Emissions from Receiver Section of Transceiver (L.O. Radiation)
FCC Ref: 15.109, 15.111

Not required; EUT operation frequency is above 960 MHz only.

4.9 AC Line Conducted Emission
FCC Rule 15.207:

Not Applicable. The EUT is DC powered from IDU via a coax cable.

5.0 List of Test Equipment

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

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. INTERVAL	CAL. DUE
Spectrum Analyzer w/85650 QP Adapter	Hewlett Packard	8566B	2416A00317 2043A00251	12	10/28/04
Spectrum Analyzer	Hewlett Packard	8565E	AE9674	12	5/27/04
BI-Log Antenna	EMCO	3143	9509-1160	12	3/24/04
Horn Antenna	EMCO	3115	8812-3049	12	4/08/04
Horn Antenna	EMCO	3160-09	Not Labeled	#	#
Horn Antenna	EMCO	3160-10	Not Labeled	#	#
Pre-Amplifier	Miteq	AMF-4D-001180-24-10P	799159	12	4/06/04
Pre-Amplifier	Avantek	AFT-18855	8723H705	12	4/10/04
Pre-amplifier	CTT	ACO/400	47526	12	4/10/04

No Calibration required

6.0 Document History

Revision/ Job Number	Writer Initials	Date	Change
1.0 / 3053282	DC	March 12, 2003	Original document