TEST REPORT

Report Number: 30507211
Project Number: 3050721
December 18, 2003

Testing performed on the
Unlicensed Transceiver
FCC ID: HZB-S58-S60
IC ID: 1856A-S58S60

to
FCC Part 15, Subparts C & B
RSS-210

for
Proxim Corporation

A2LA Certificate Number: 1755-01

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

Prepared by: _____ **Date:** December 18, 2003
Bruce Gordon

Reviewed by: _____ **Date:** December 22, 2003
David Chernomordik, EMC Technical Manager

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1.0 Summary of Tests

FCC ID: HZB-S58-B60
IC ID: 1856A-S58S60

TEST	REFERENCE FCC	REFERENCE IC	RESULTS
Output power	15.247(b)	6.2.2(o)(b)	Complies
6 dB Bandwidth	15.247(a)(2)		Complies
Power Density	15.247(d)	6.2.2(o)(b)	Complies
Out-of-band Antenna Conducted Emission	15.247(c)	6.2.2(o)(b)	Complies
Out-of-band Radiated Emission (except emissions in restricted bands)	15.247(c)	6.2.2(o)(b)	Not Applicable. The EUT passed out-of-band antenna conducted emission
Radiated Emission in Restricted Bands	15.209, 15.205	6.3	Complies
AC Line-conducted Emission	15.207	6.6	Complies
Radiated Emission from Digital Part	15.109	ICES-003	Complies
Radiated Emission from Receiver L.O.	15.109	7 (category II)	Not Applicable. The operating frequency is above 960 MHz
RF Exposure Requirement	2.1091	14, RSS-102	Complies, see exhibit "RF Exposure"
Antenna Requirement	15.203	5.5	Not Applicable; professional installation is required

A pre-production version of the EUT was received on October 28, 2003 in good operating condition. As declared by the Applicant, it is identical to the production units.

Date of Test: October 29 – December 18, 2003

2.0 General Description

2.1 Product Description

The Equipment under Test (EUT), FCC ID: HZB-S58-S60 is a product family that includes the following models:

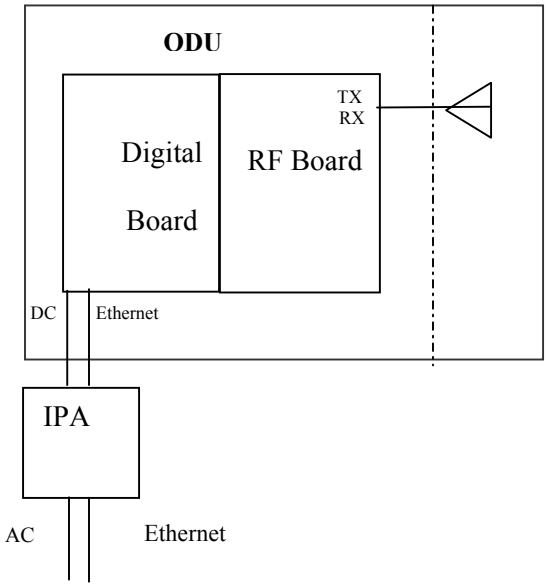
Model	Description
40100-252C	Tsunami Multipoint 20MB Subscriber Unit, Ext Ant
40100-452C	Tsunami Multipoint 40MB Subscriber Unit, Ext Ant
40100-652C	Tsunami Multipoint 60MB Subscriber Unit, Ext Ant
40100-28MC	Tsunami QuickBridge 20MB, Master, Ext Ant
40100-68MC	Tsunami QuickBridge 60MB, Master, Ext Ant
40100-28SC	Tsunami QuickBridge 20MB, Slave, Ext Ant
40100-68SC	Tsunami QuickBridge 60MB, Slave, Ext Ant
40100-29MC	Tsunami QuickBridge ll 20, Master, Ext Ant
40100-29SC	Tsunami QuickBridge ll 20, Slave, Ext Ant
40100-47MC	Tsunami QuickBridge ll 40, Master, Ext Ant
40100-47SC	Tsunami QuickBridge ll 40, Slave, Ext Ant
40100-69MC	Tsunami QuickBridge ll 60, Master, Ext Ant
40100-69SC	Tsunami QuickBridge ll 60, Slave, Ext Ant
40100-28M	Tsunami QuickBridge 20, Master
40100-28S	Tsunami QuickBridge 20, Slave
40100-68M	Tsunami QuickBridge 60, Master
40100-68S	Tsunami QuickBridge 60, Slave
40100-47M	Tsunami QuickBridge II 40, Master
40100-47S	Tsunami QuickBridge II 40, Slave
40100-49M	Tsunami QuickBridge II 40 with 2xT1/E1, Master
40100-49S	Tsunami QuickBridge II 40 with 2xT1/E1, Slave
40100-69M	Tsunami QuickBridge II 60, Master

The HZB-S58-S60 platform consists of two major components: an outdoor unit (ODU) and an indoor power adapter (IPA). It supports three modulation modes: QPSK ½, QPSK ¾, and 16QAM. Corresponding to each different modulation mode, the product is capable of data communication with data rate of 20Mbps, 30Mbps, 40Mbps and 60Mbps. The table above lists all product models Proxim markets or plans to market.

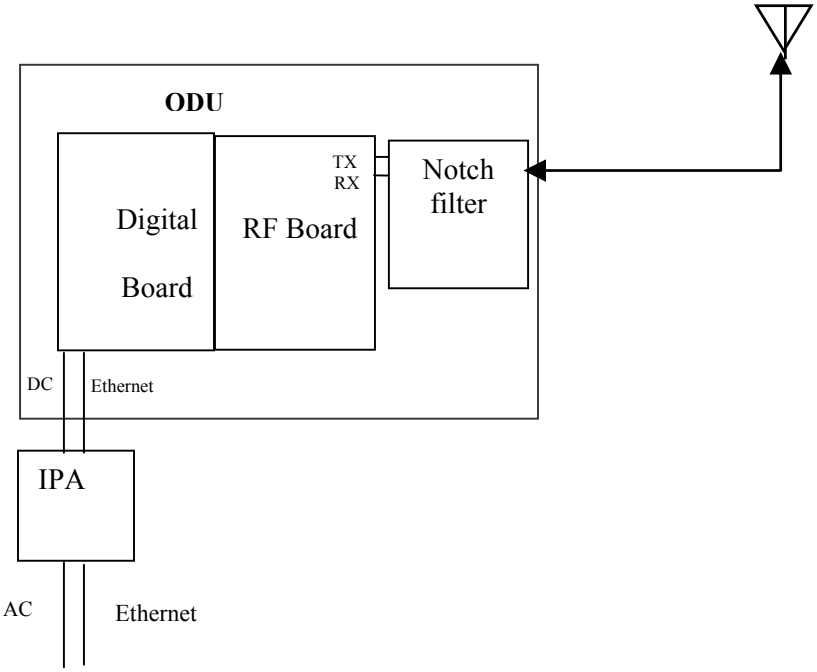
With regards to antenna connection, the product family can be divided into two groups, one with integrated antenna (integrated) and one using external antenna (connectorized).

The internal PCB design for all the models is identical. The firmware of the subscriber units is different from that of the QuickBridge units. A subscriber unit is used in a point-to-point network communicating to its base station located in a fixed central location, while two QuickBridge units are used in a point-to-point link communicating under a master-slave relationship. A connectorized unit is identical to integrated unit internally, except the connectorized unit has a notch filter hardware in between the RF output of the RF board and the radio antenna port. See the diagram below.

Antenna Integrated Unit



Connectorized Unit



Overview of the EUT, FCC ID: HZB-S58-S60

Applicant name & address	Proxim Corporation 935 Stewart Drive, Sunnyvale, CA 94085 USA
Manufacturer	Proxim Corporation
FCC Identifier	HZB-S58-S60
Use of Product	Fixed Wireless Ethernet Access
Type of Transmission	TDD
Type of Modulation	QAM16, QPSK 3/4, QPSK 1/2
Rated RF Output	20 dBm (peak)
Frequency Range	5740 – 5810 MHz
Number of Channel(s)	6 channels maximum
Antenna Requirement	The EUT requires professional installation.

As declared by the Applicant, the antennas listed in the following table may be used with the Connectorized **SU.** Therefore, the antennas marked with ”X” have been chosen for testing.

Antenna Type	Manufacturer	Model Number	Mid-band Gain (dBi)	Notes	Used
Omni	Telex	5830AN	7.5	Vertical	X
	MTI	MT-482009/N	9		
	MTI	MT-483003/N	12		X
1 Foot Flat Panel	Gabriel	DFPD1-52	23.5		
	RFS	MA0528-23AN	23		
	Andrew	FPA5250D12-N	23.6		
2 Foot Flat Panel	Gabriel	DFPD2-52	28		X
	RFS	MA0528-28AN	28		
	Andrew	FPA5250D24-N	28.5		
	MTI	MT-20004	28		
	RSI	A57A24-U	26.5		
2 Foot Parabolic	Gabriel	SSP2-52B	28.5		
	Gabriel	SSD2-52A	28.4	Dual Pol	
	Gabriel	HSSP2-52	28.1	High Performance	
	YDI	A5.8-2'-RW	28.3		
	Radio Waves	SP2-5.2	28.3	Linear or Circular	
	Radio Waves	SPD2-5.2	28.1	Dual Pol	
	Andrew	P2F-52	29.4		
	Andrew	PX2F-52	29.4	Dual Pol	
	RFS	SPF2-52A	27.9		
	RSI	P-57C24	29		
3 Foot Parabolic	Radio Waves	SP3-5.8	31.4	Linear or Circular	
	Radio Waves	SPD3-5.8	31.1	Dual Pol	
	Radio Waves	SP3-5.2	31.4	Linear or Circular	
	Radio Waves	SPD3-5.2	31.1	Dual Pol	
	RFS	SPF3-52A	31.4		
	YDI	A5.8-3'-RW	31.4		
	Andrew	P3F-52	33.4		
	Andrew	PX3F-52	33.4	Dual Pol	
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		
	RSI	P-57A96	40.8		

Notes:
All Proxim radios require professional installation.
Antennas with gain less than 7.5 dBi are not allowed
Antennas of other make may be used with the HZB-S58-S60 device, but must be of the same type, dimensions and gain as those listed.

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

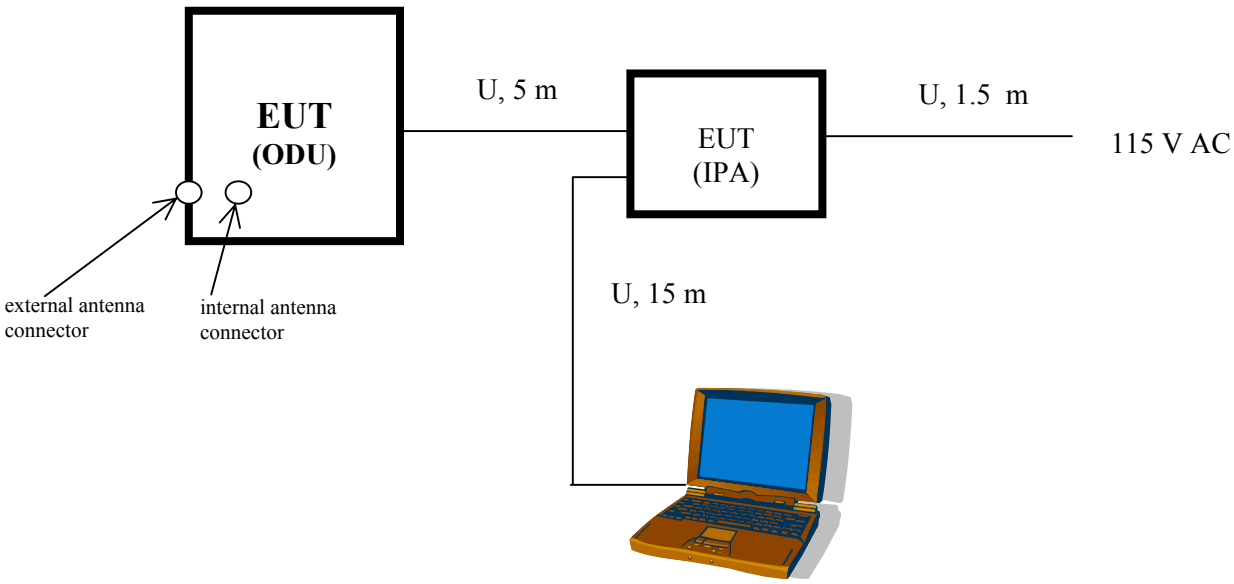
The open area test site and conducted measurement facility used to collect the radiated data is site 1 (10-m semi-anechoic chamber). This test facility and site measurement data have been fully placed on file with the FCC and A2LA accredited.

3.0 System Test Configuration

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 Point-to-point systems operating in the 5725 - 5850 MHz band, maximum allowed transmitter output is 1 watt.

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.

Test Results

Frequency MHz	**Modulation**	**Output Peak Power** (measured from integrated SU RF output) **dBm**	**Output Peak Power** (measured from connectorized SU antenna connector) **dBm**
5740	QAM16	19.9	20.5
	QPSK 3/4	20.3	20.8
	QPSK 1/2	20.3	20.8
5782	QAM16	19.8	20.2
	QPSK 3/4	19.9	20.3
	QPSK 1/2	19.9	20.3
5810	QAM16	19.3	19.6
	QPSK 3/4	19.4	19.9
	QPSK 1/2	19.6	19.9

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

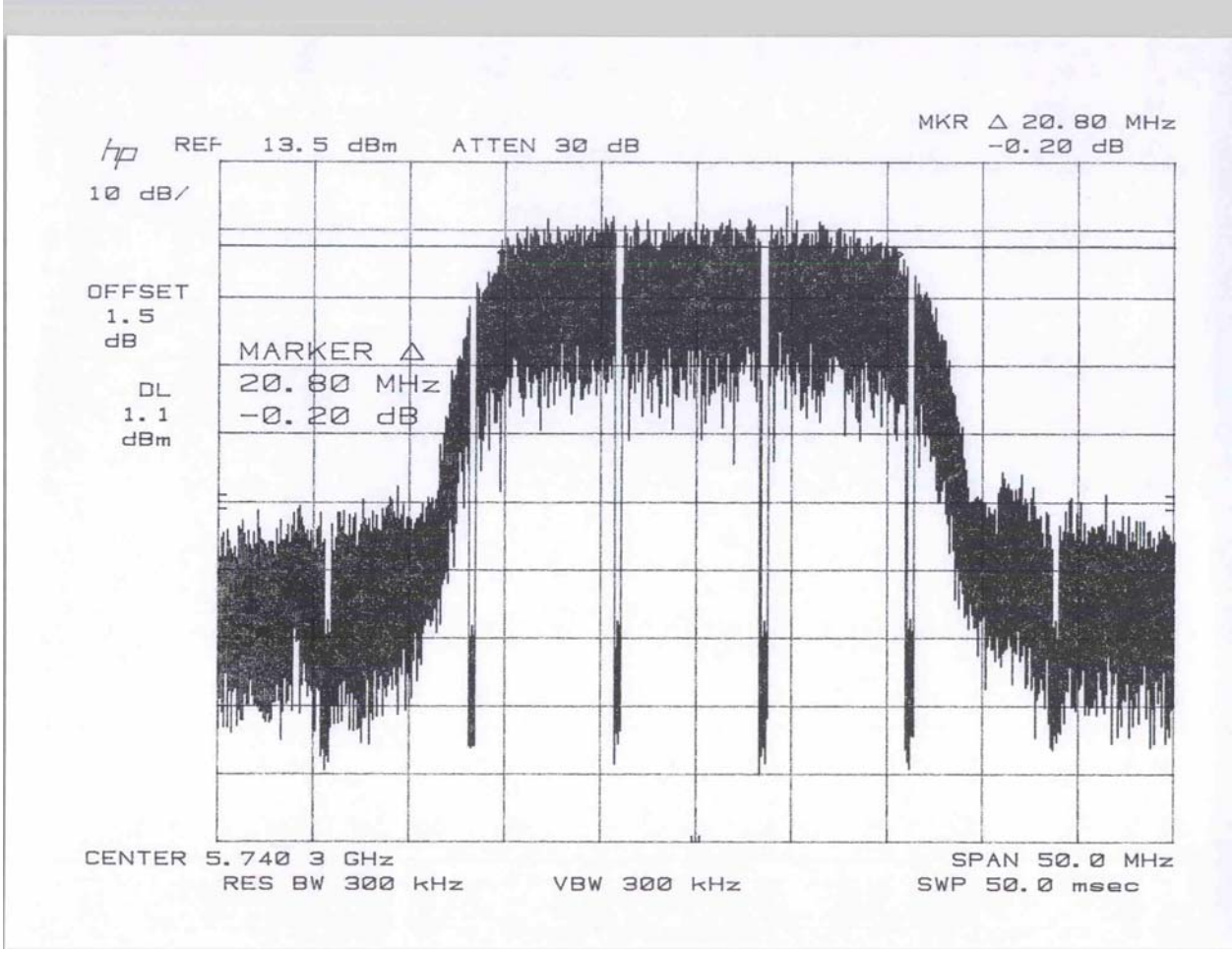
The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RES BW was set to 100 kHz. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was taken, a DISPLAY line was drawn 6 dB lower than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

Test Result

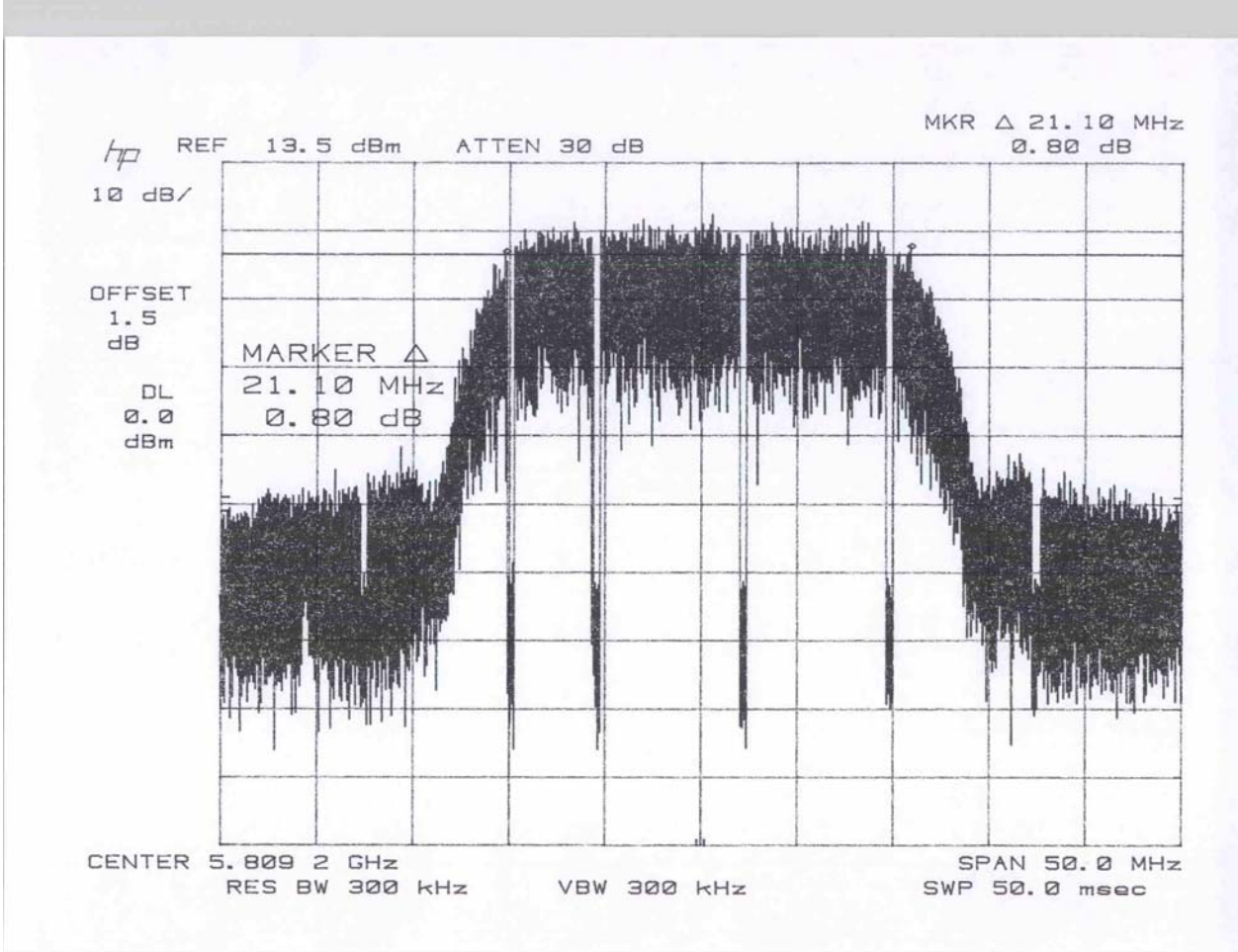
Frequency MHz	**Modulation**	**6-dB Bandwidth** (measured from integrated SU RF output) **MHz**	**6-dB Bandwidth** (measured from connectorized SU antenna connector) **MHz**
5740	QAM16	20.6	20.8
5782	QAM16	20.5	20.3
	QPSK 3/4	20.7	20.9
	QPSK 1/2	20.6	21.8
5810	QAM16	20.5	21.1

On the plots 2.1 – 2.5 the 6-dB bandwidth is presented for QAM16 modulation, transmission frequencies of 5710 MHz, 5782 MHz and 5810 MHz, and QPSK ¾ and QPSK ½ modulations for the frequency 5782 MHz. The configurations are with an external antenna connector and with no external antenna connector.
The Emission designator is defined as 21M8G7D.

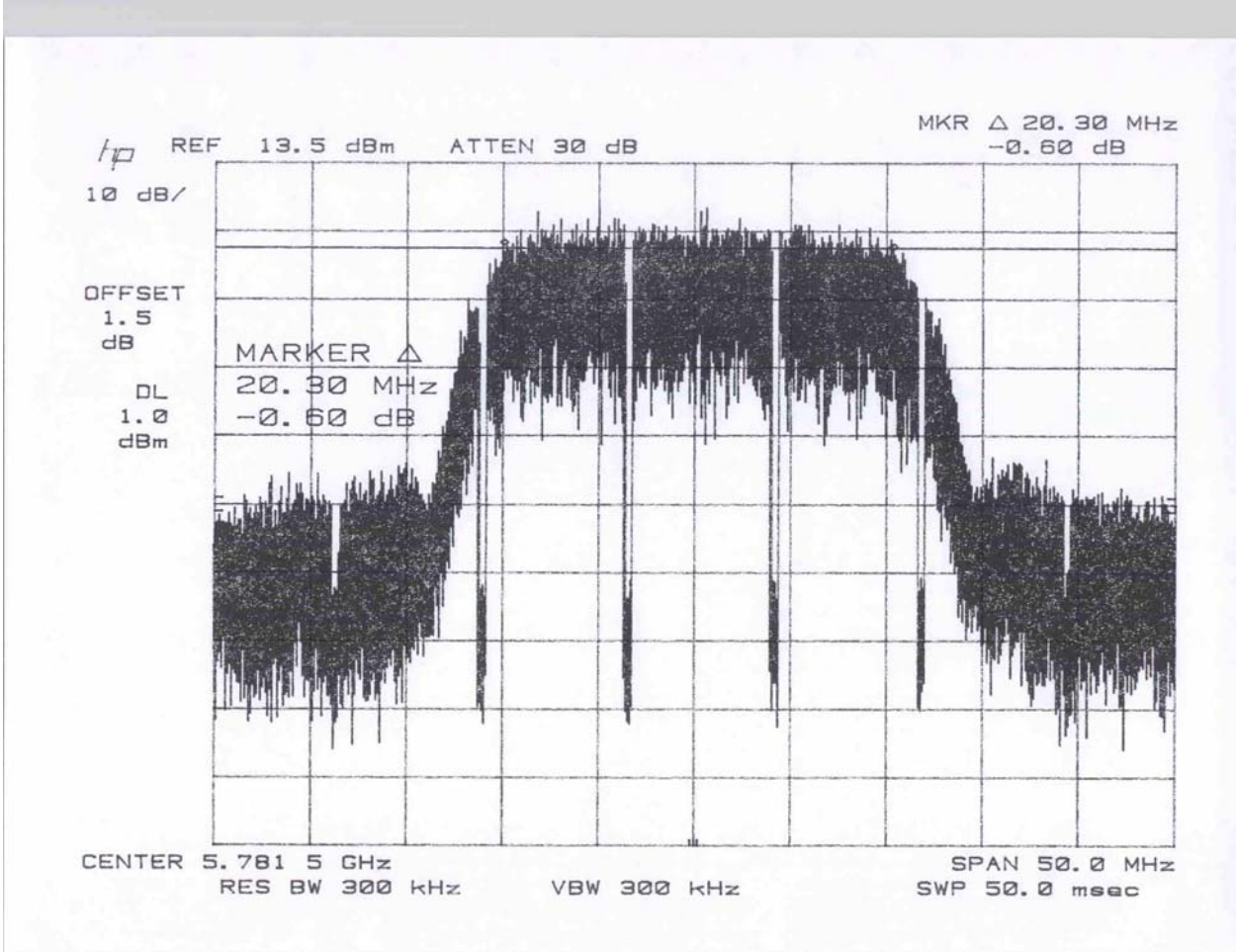
Plot 2.1 Low Channel with QAM16 modulation and an antenna connector



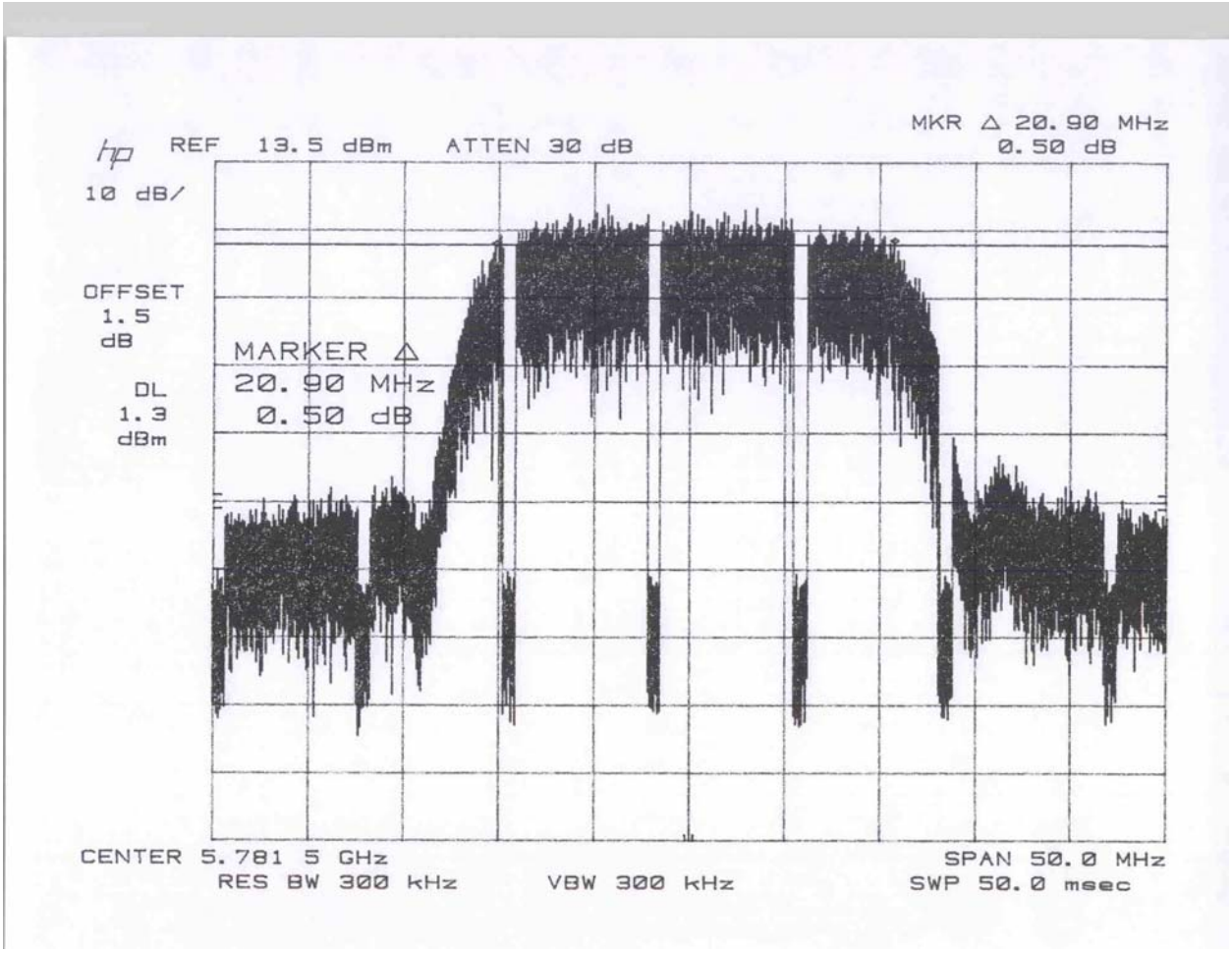
Plot 2.2 Hi Channel with QAM16 modulation and an antenna connector



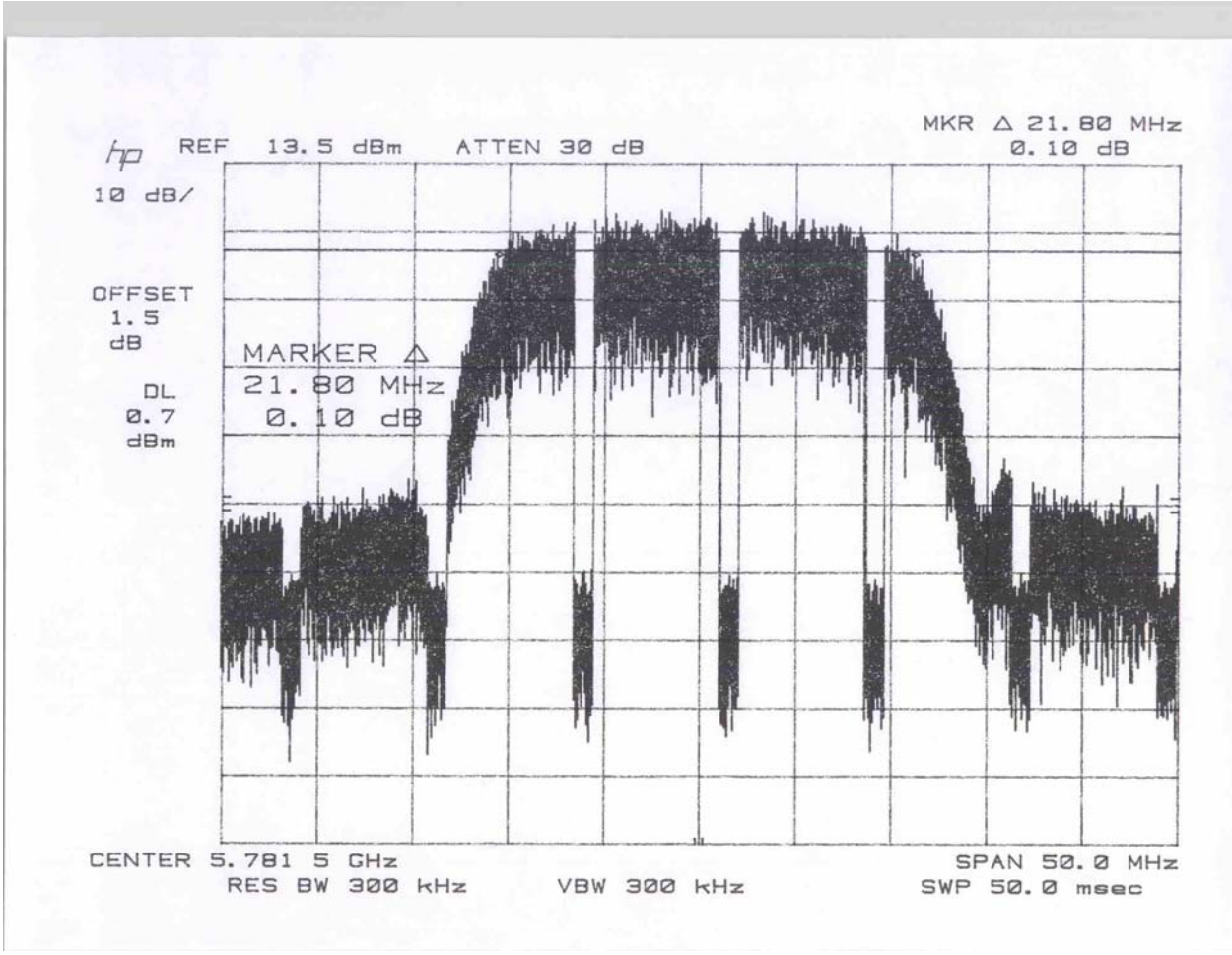
Plot 2.3 Middle Channel QAM 16 modulation and an antenna connector



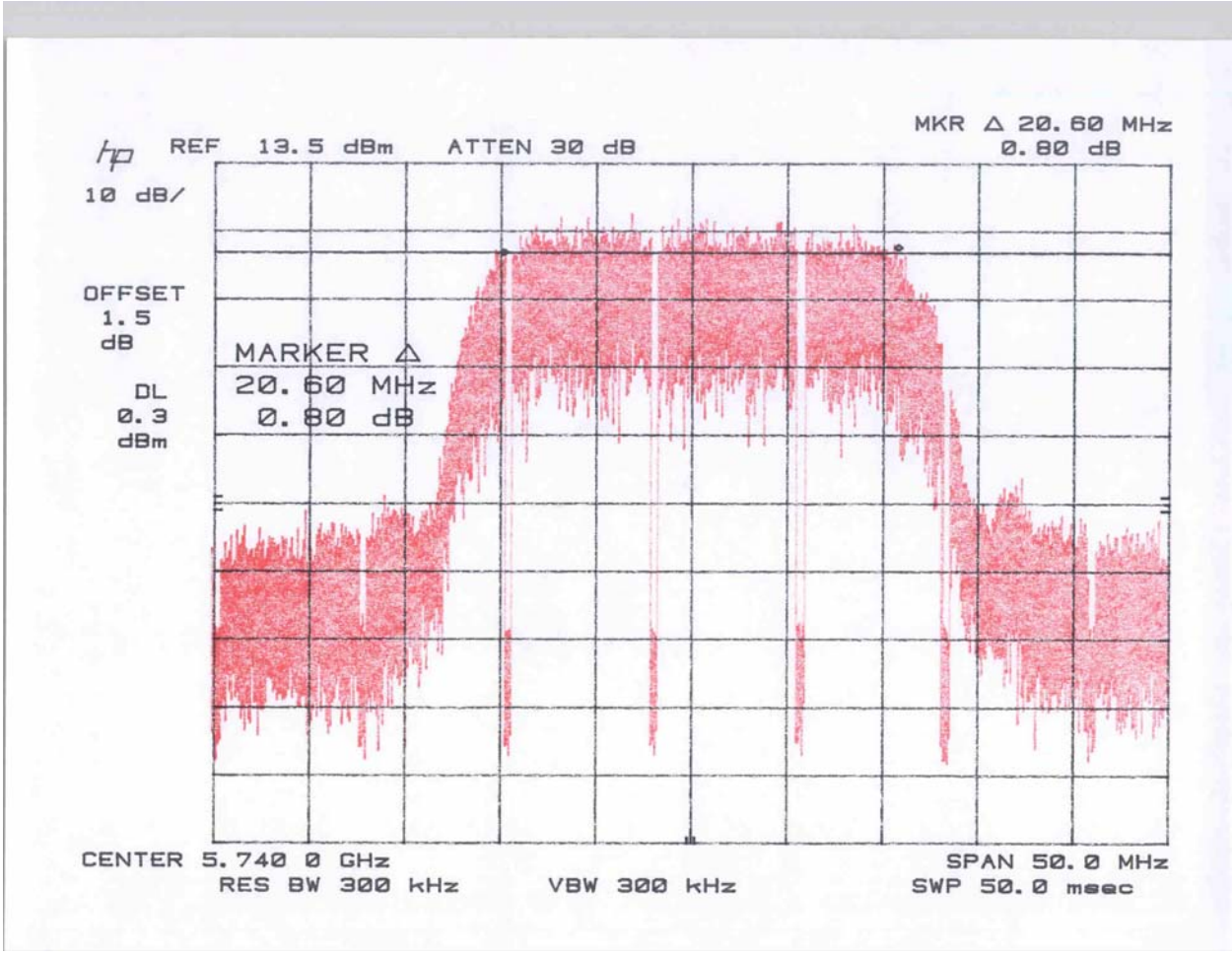
Plot 2.4 Middle Channel QPSK ¾ modulation and an antenna connector



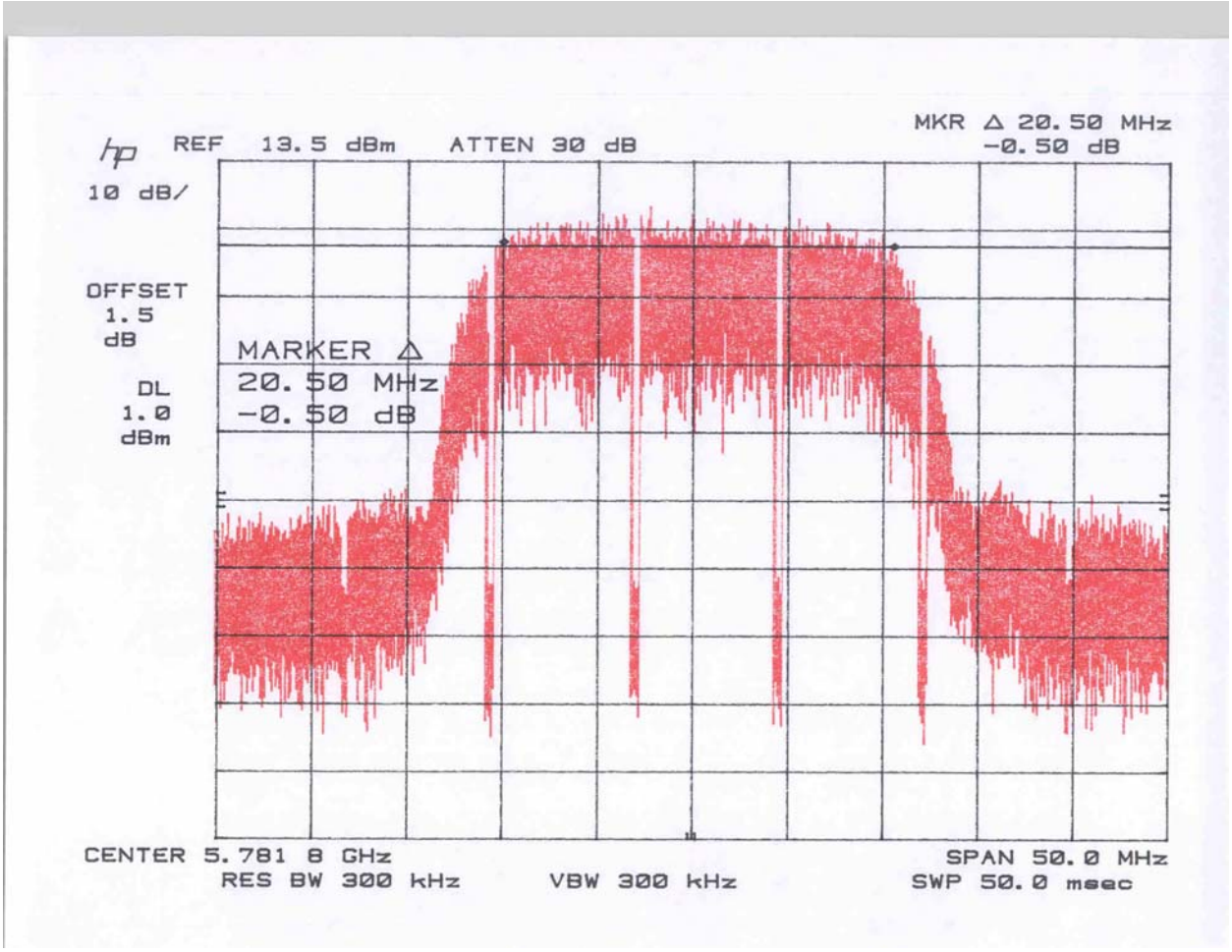
Plot 2.5 Middle Channel QPSK ½ modulation and an antenna connector



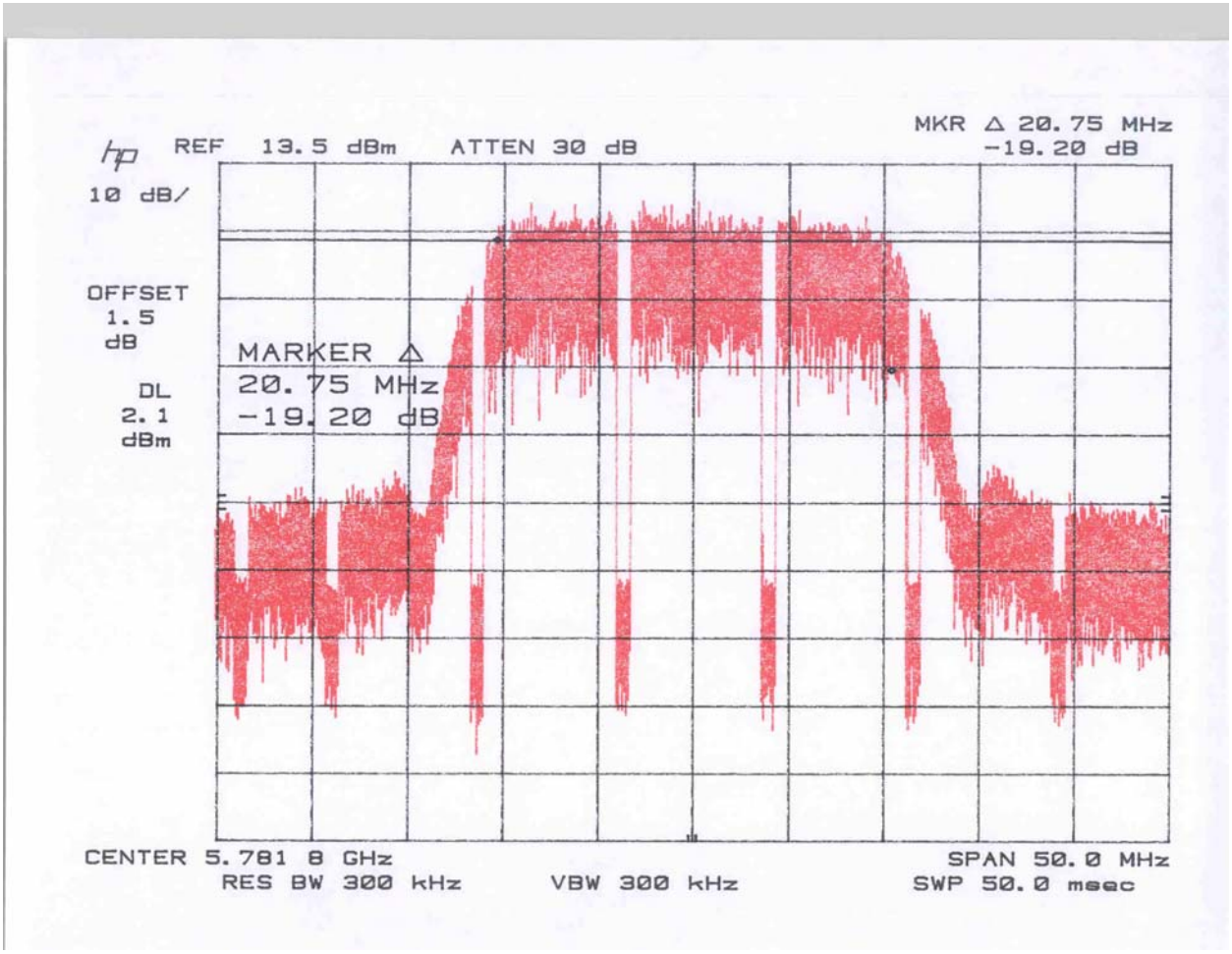
Plot 2.6 Low Channel with QAM16 modulation and no antenna connector



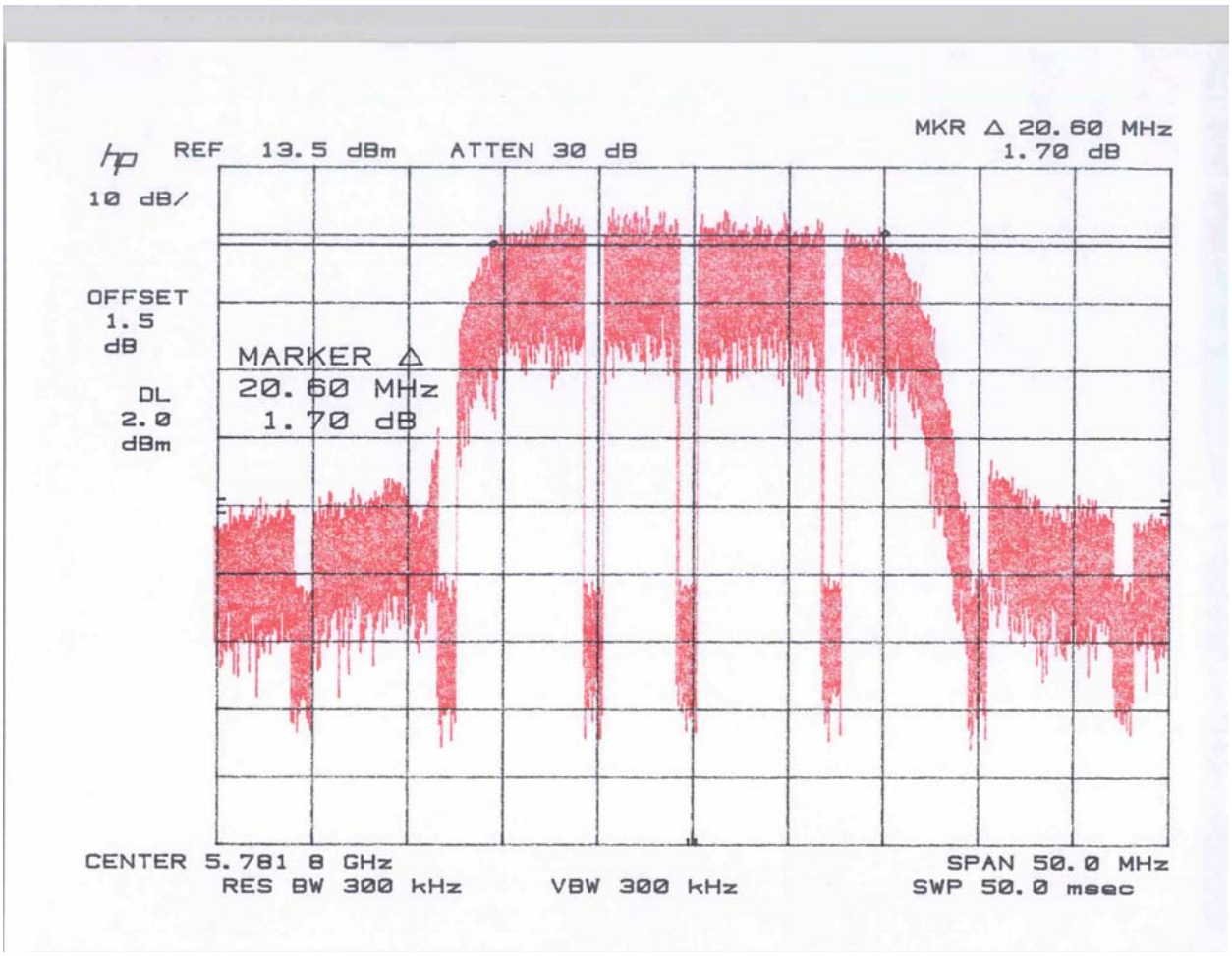
Plot 2.7 Middle Channel with QAM16 modulation and no antenna connector



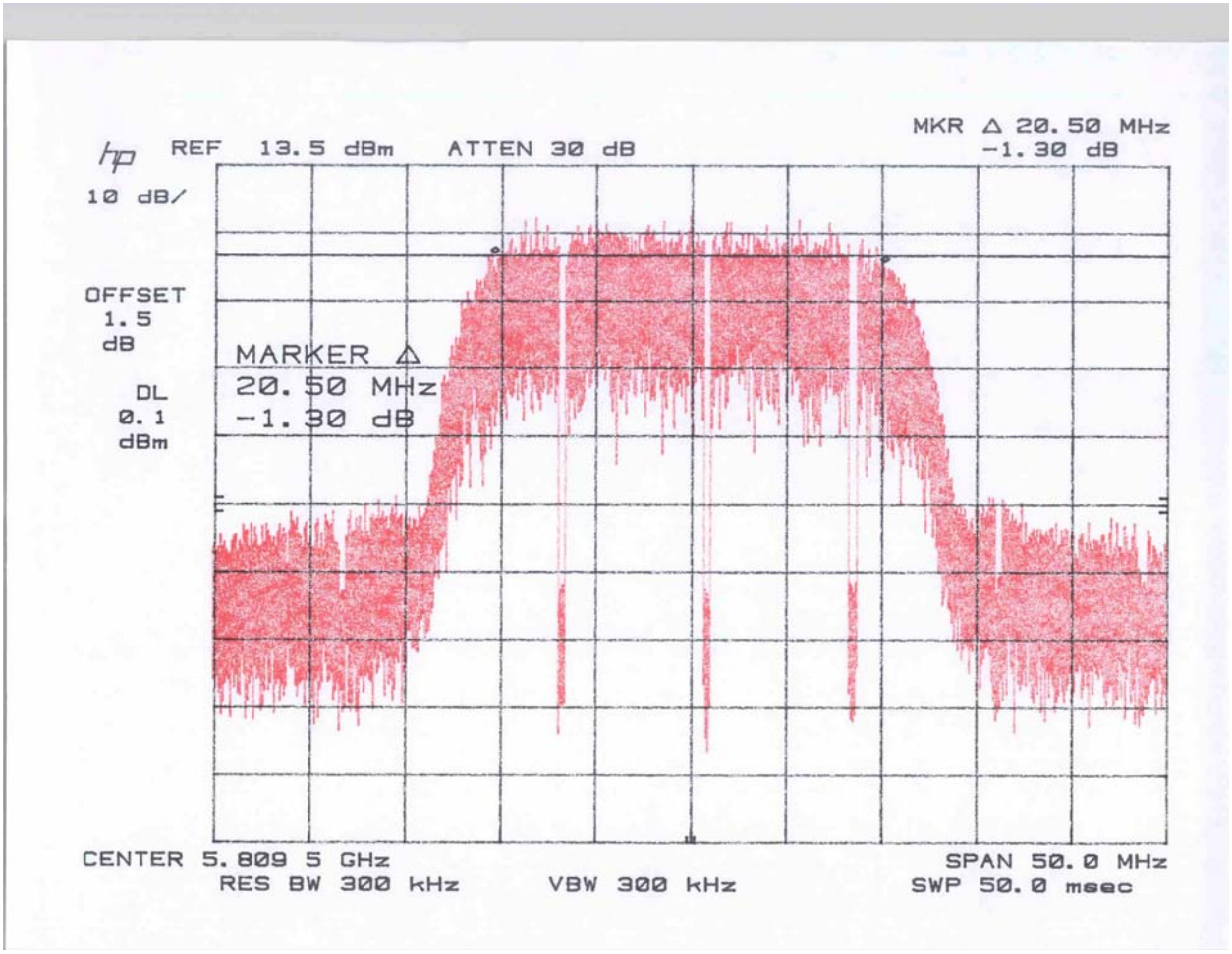
Plot 2.8 Middle Channel with QPSK ¾ modulation and no antenna connector



Plot 2.9 Middle Channel with QPSK ½ modulation and no antenna connector



Plot 2.10 High Channel with QAM16 modulation and no antenna connector



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 passband. 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.

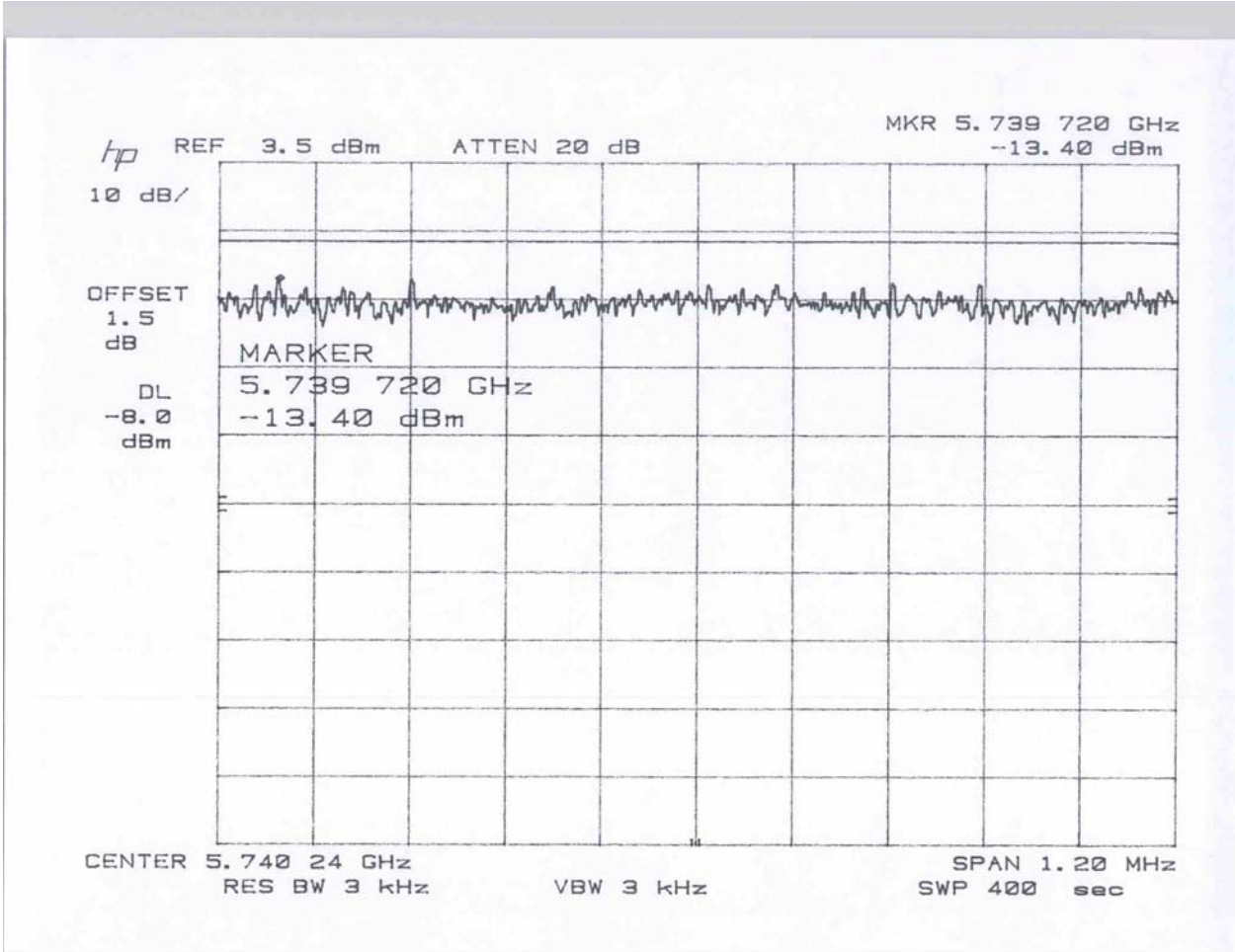
Frequency Span = 1200 kHz
Sweep Time = Frequency Span/3 kHz = 400 Seconds

Test Result

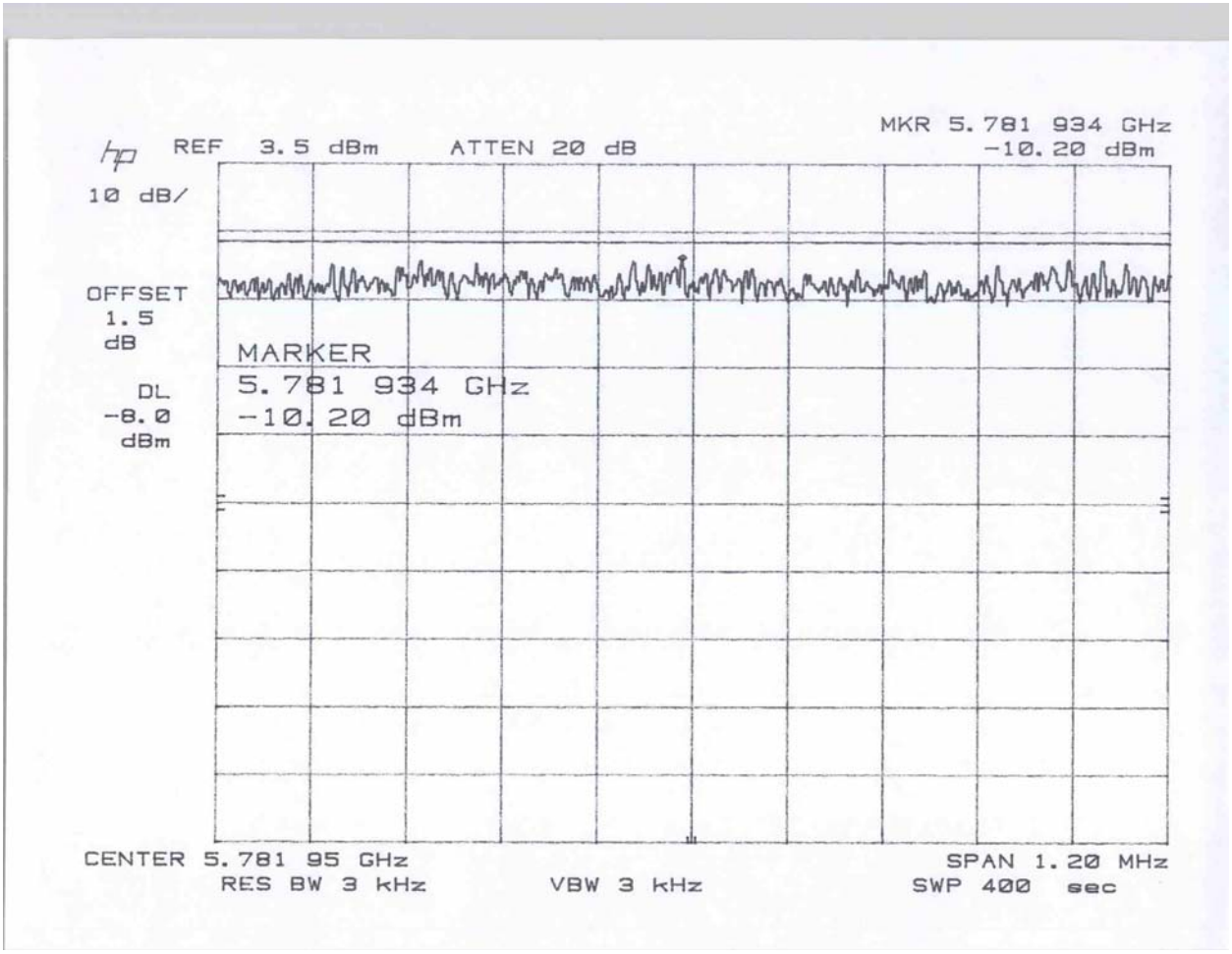
Frequency MHz	**Modulation**	**Power Density** (measured from integrated SU RF output) **dBm**		**Power Density** (measured from connectorized SU antenna connector) **dBm**	
		measured	plot	measured	plot
5740	QAM16	-13.6	3.6	-13.4	3.1
5775	QAM16	-13.2	3.7	-10.2	3.2
	QPSK 3/4	-9.5	3.8	-9.4	3.3
	QPSK 1/2	-10.1	3.9	-12.3	3.4
5810	QAM16	-13.2	3.10	-14.0	3.5

The EUT passed by 17.4 dB.

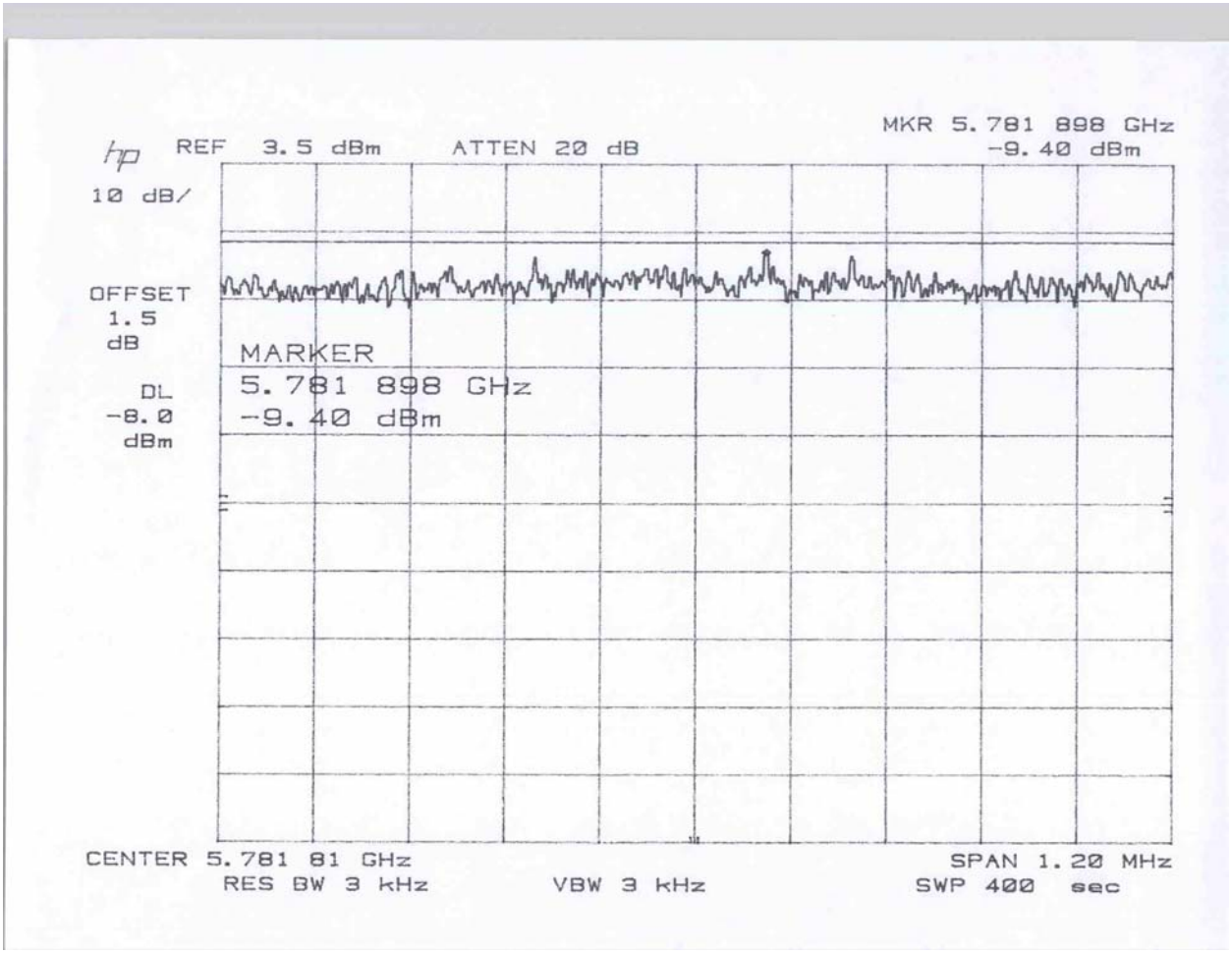
Plot 3.1 Low Channel with QAM16 modulation and an antenna connector



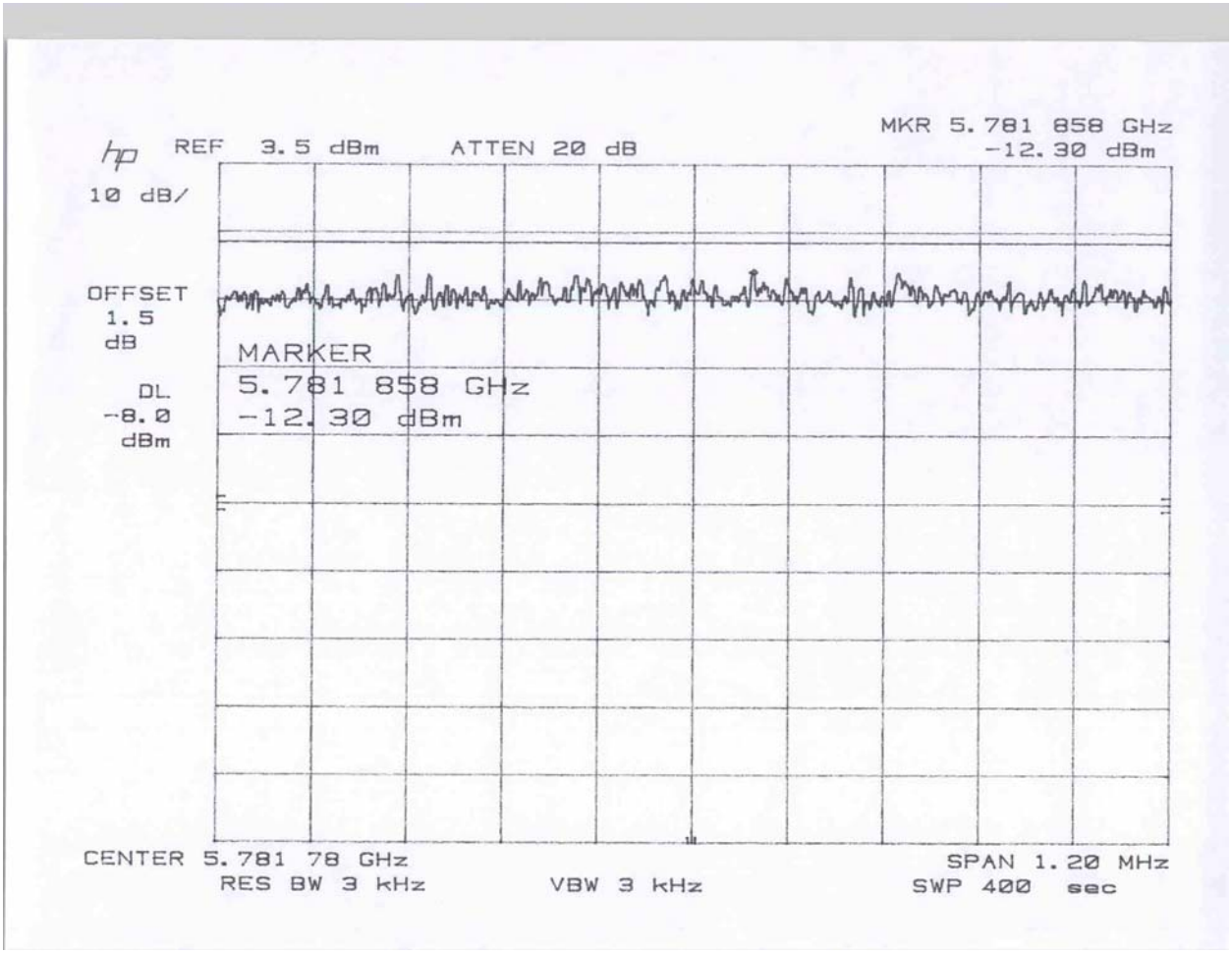
Plot 3.2 Middle Channel with QAM16 modulation and an antenna connector



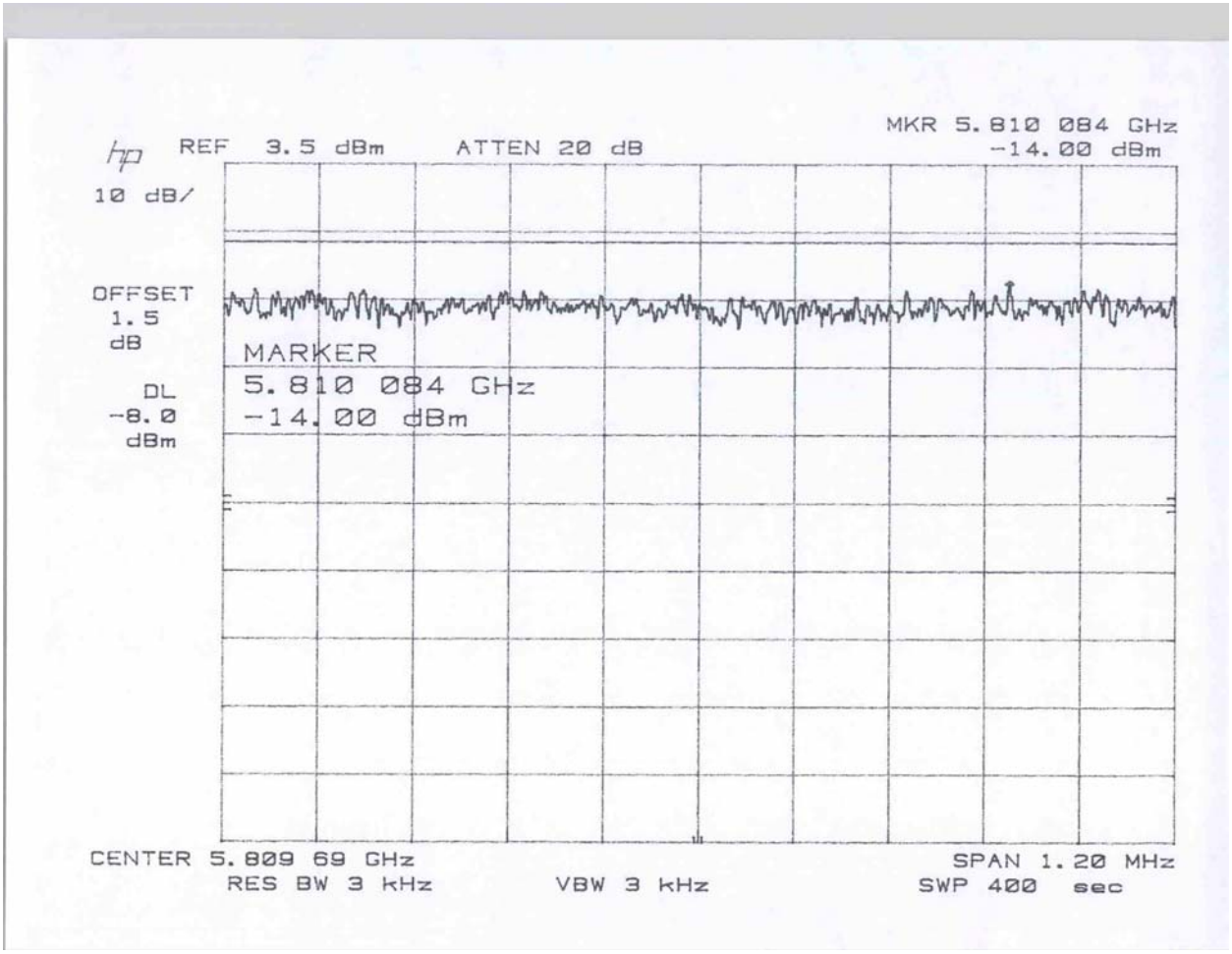
Plot 3.3 Middle Channel with QPSK ¾ modulation and an antenna connector



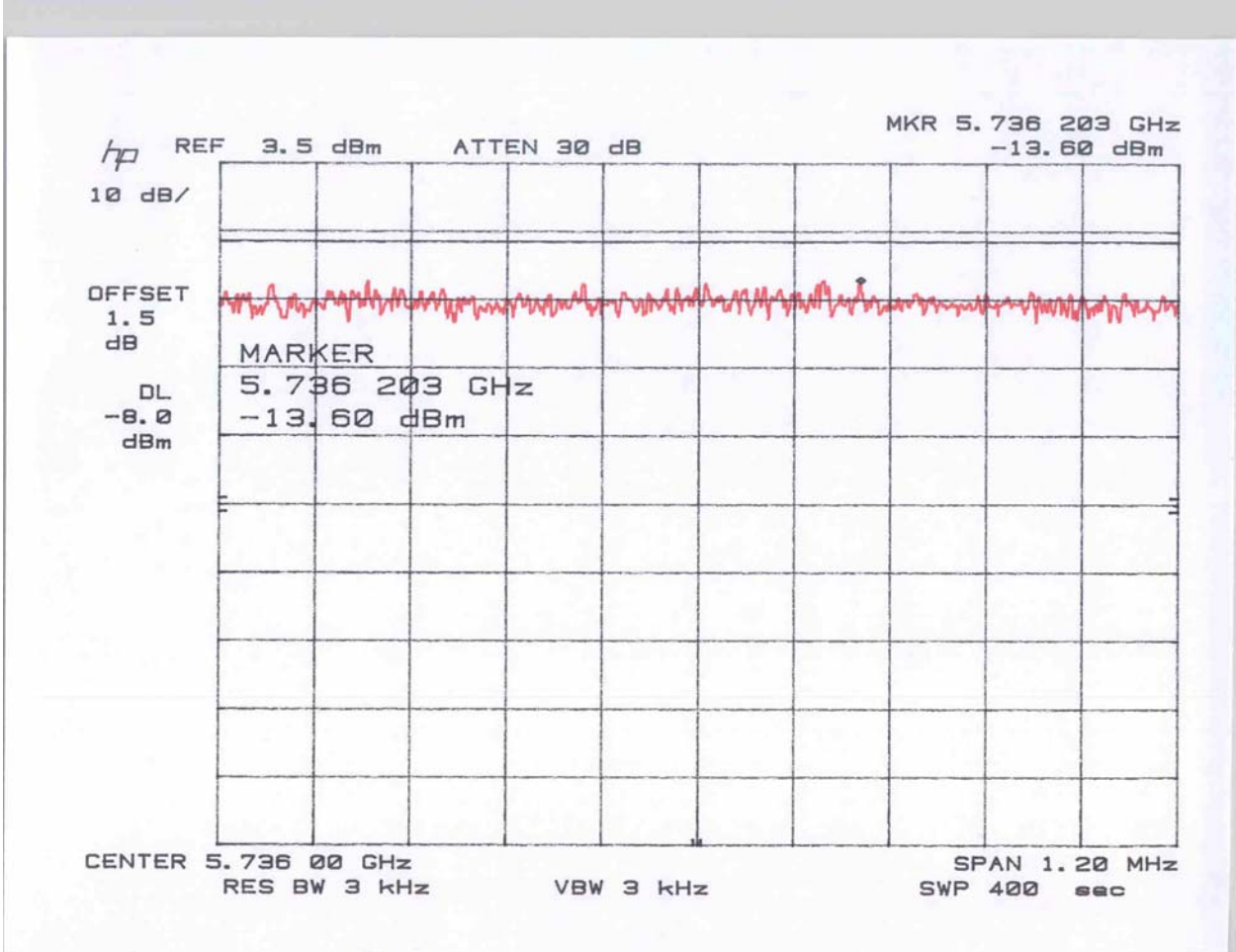
Plot 3.4 Middle Channel with QPSK ½ modulation and an antenna connector



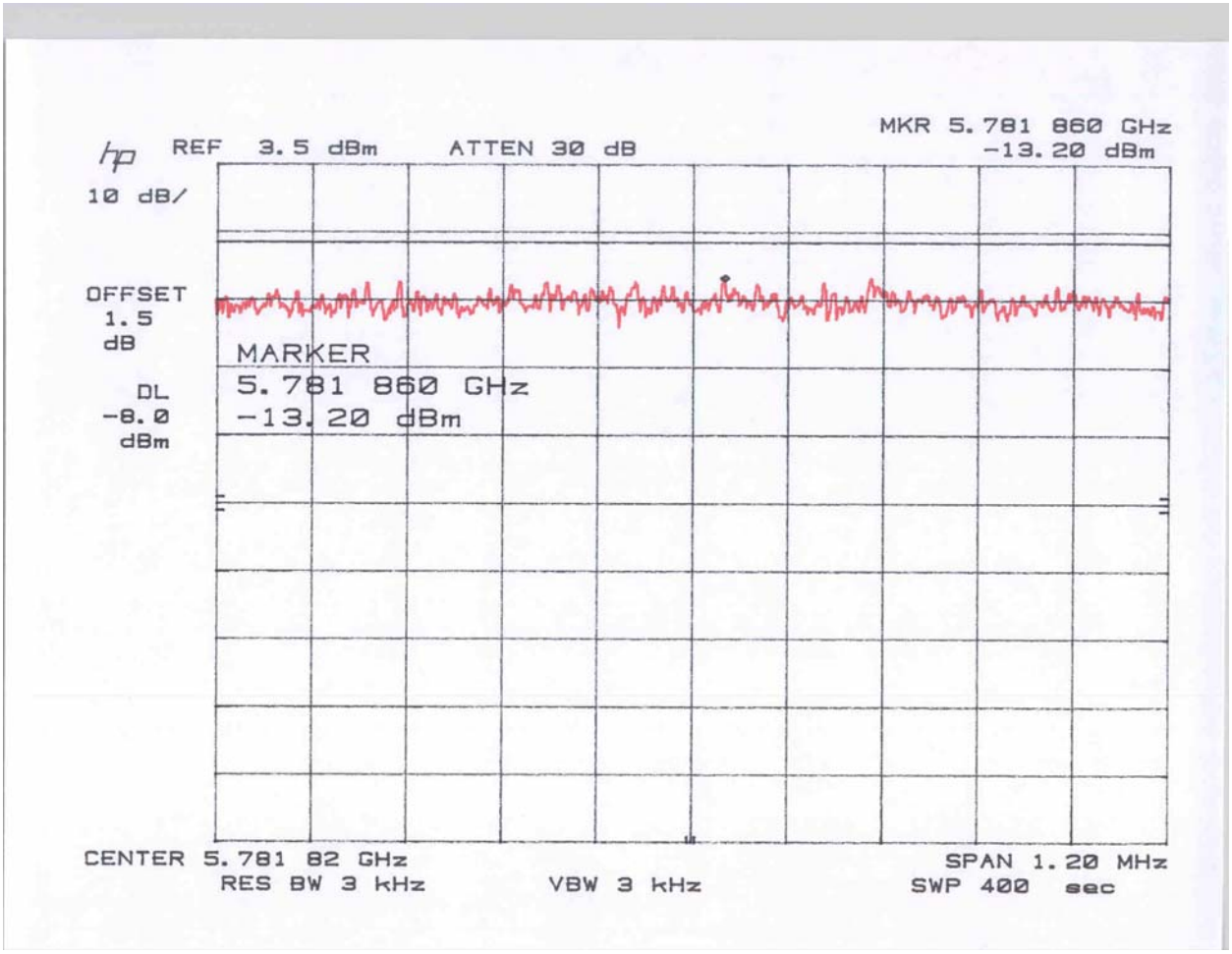
Plot 3.5 High Channel with QAM16 modulation and an antenna connector



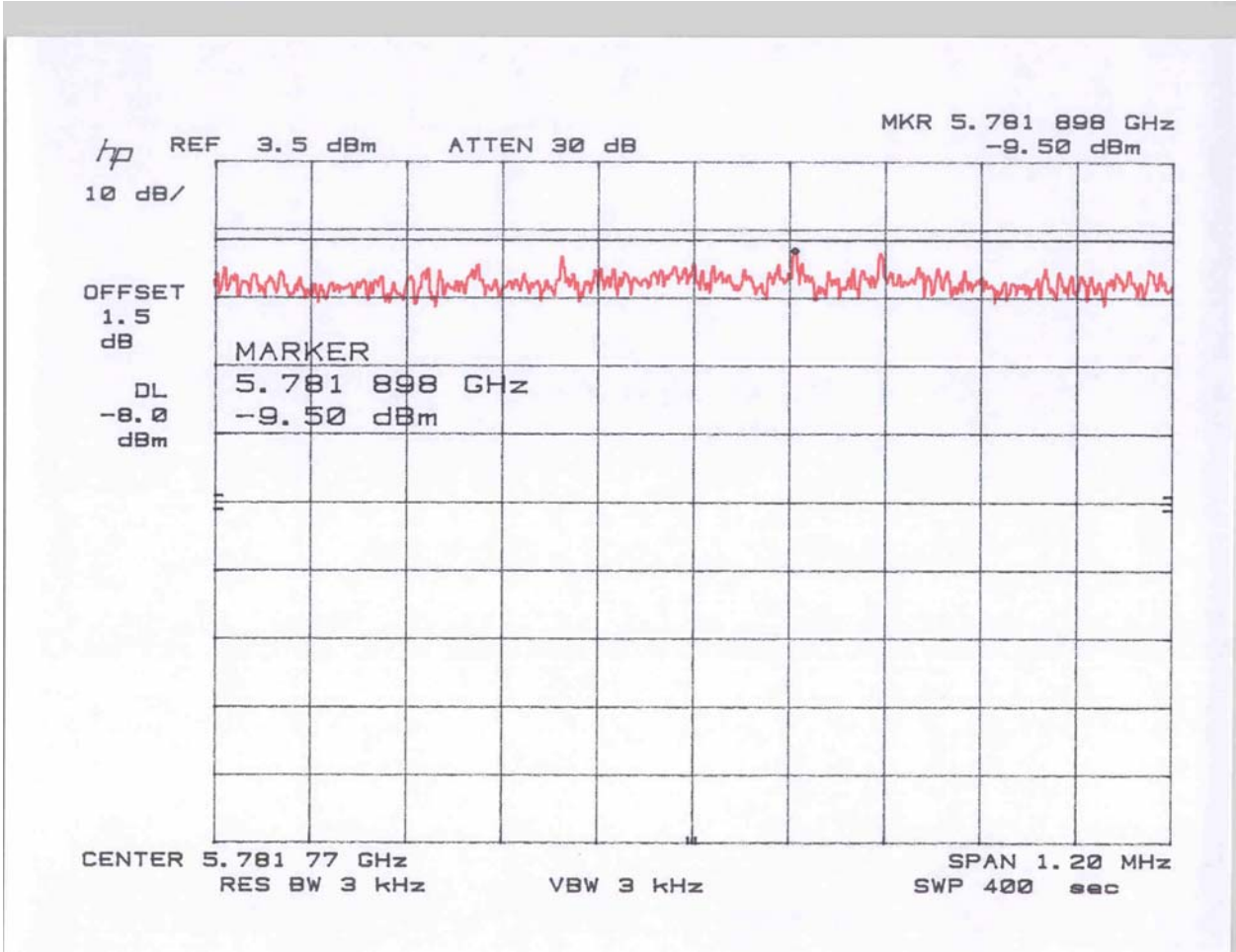
Plot 3.6 Low Channel with QAM16 modulation and no antenna connector



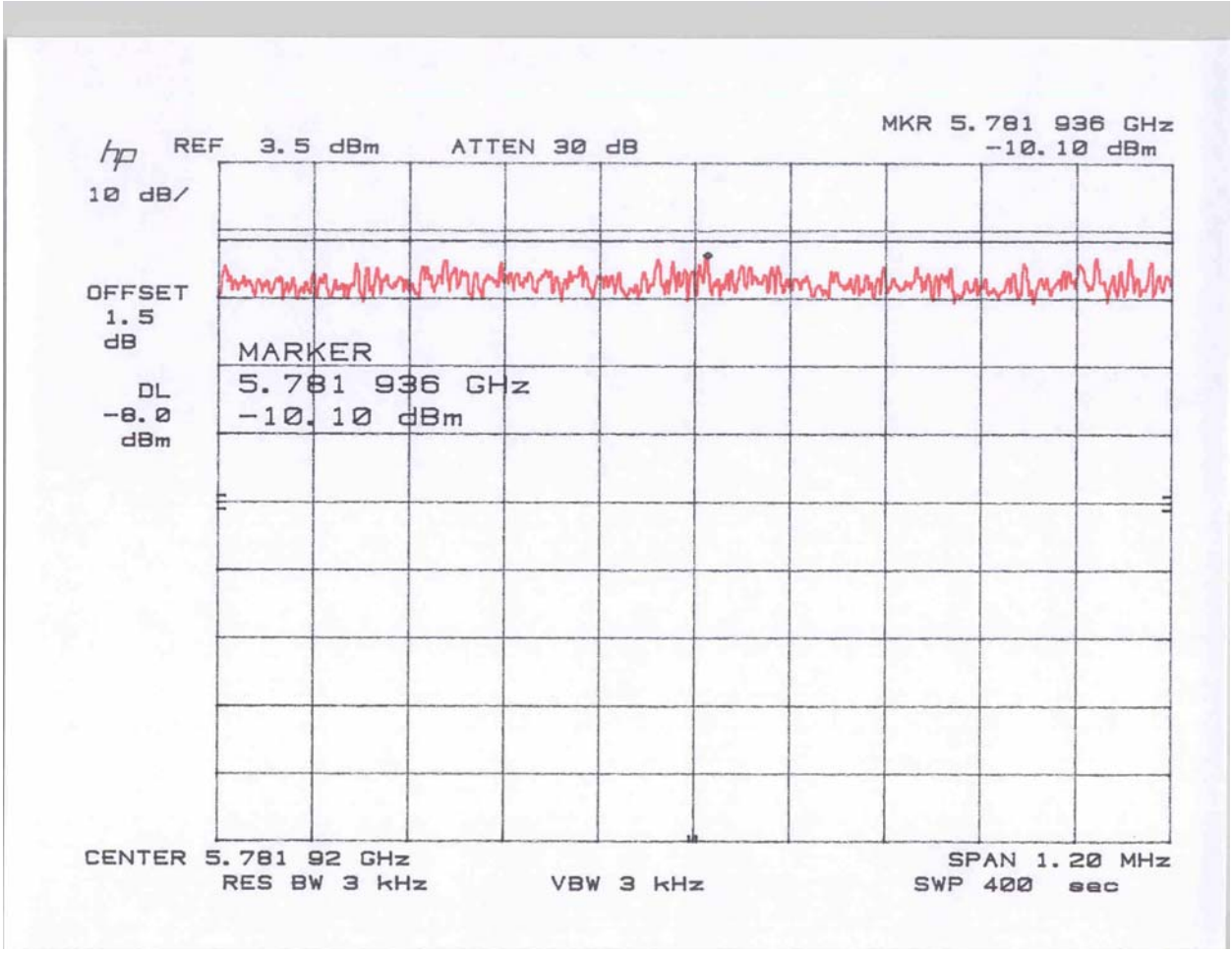
Plot 3.7 Middle Channel with QAM16 modulation and no antenna connector



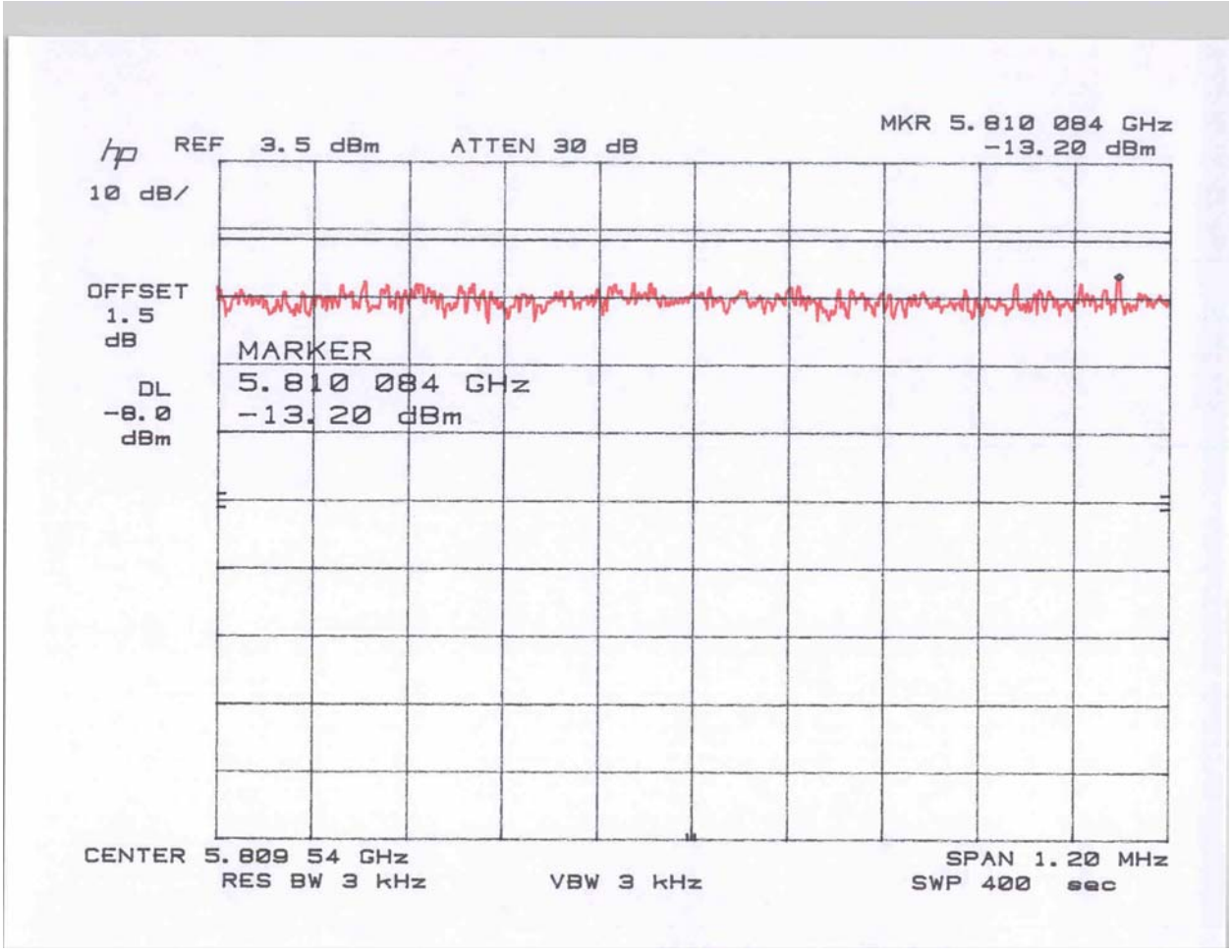
Plot 3.8 Middle Channel with QPSK ¾ modulation and no antenna connector



Plot 3.9 Middle Channel with QPSK ½ modulation and no antenna connector



Plot 3.10 High Channel with QAM16 modulation and no antenna connector



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 10 MHz to 40 GHz for the configuration with an external antenna connector for QAM16 modulation. In addition, measurements on the band-edge frequencies were performed for both configuration for QPSK ¾ and QPSK ½ modulations.

Test Result

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

Plot	Point of measurement	Modulation	Description
4.1a–4.1e	connectorized SU antenna connector	QAM16	low channel, scan 30 MHz to 40 GHz
4.2a–4.2d	connectorized SU antenna connector	QAM16	middle channel, scan 30 MHz to 40 GHz
4.3a–4.3d	connectorized SU antenna connector	QAM16	high channel, scan 30 MHz to 40 GHz
4.4a–4.4b	connectorized SU antenna connector	QPSK ¾	low channel, scan 4 GHz to 5.85 GHz
4.4c–4.4d	connectorized SU antenna connector	QPSK ½	low channel, scan 4 GHz to 5.85 GHz
4.5a–4.5b	connectorized SU antenna connector	QPSK ¾	high channel, scan 5.725 GHz to 8 GHz
4.5c–4.5d	connectorized SU antenna connector	QPSK ½	high channel, scan 5.725 GHz to 8 GHz
4.6a–4.6b	integrated SU RF output	QAM16	low channel, scan 5 GHz to 5.85 GHz
4.6c–4.6d	integrated SU RF output	QPSK ¾	low channel, scan 5 GHz to 5.85 GHz
4.6e–4.6f	integrated SU RF output	QPSK ½	low channel, scan 5 GHz to 5.85 GHz
4.7a–4.7b	integrated SU RF output	QAM16	high channel, scan 5.725 GHz to 10 GHz
4.7c–4.7d	integrated SU RF output	QPSK ¾	high channel, scan 5.725 GHz to 10 GHz

4.7e–4.7f	integrated SU RF output	QPSK ½	high channel, scan 5.725 GHz to 10 GHz

The EUT passed by more than 20 dB.

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 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.

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. All measurements were performed with peak detection unless otherwise specified.

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 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

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 on the following pages list the significant emission frequencies, the limit and the margin of compliance. The EUT passed by 15.2 dB.

Company:	PROXIM		**Model #:**			**Standard**	**FCC § 15.247(R.B.)**		
EUT:	SU with Internal Ant.		**FCC ID:**	HZB-S58-S60		**Limits**	2		
Project #:	3050721		**Test Date:**	October 29, 2003		**Test Distance**	1	meter	
Test Mode:	Tx		**Engineer:**	AK.		**Duty Relaxation**	0	dB	
	Antenna Used			Pre-Amp Used			Cable Used		
Number:	14	8	22	10	4	13	10	0	0
Model:	EMCO 3115	3160-9	3160-10	Miteg	None	CTT	Cable #3	Cable A	None

TX at 5740 MHz

Frequency MHz	**Reading** dB(µV)	**Detector** P/A/Q	**Ant. Pol.** H/V	**Ant. Factor** dB(1/m)	**Correction Factor** dB	**D.C.F** dB	**Net** dB(µV/m)	**Limit @3m** dB(µV/m)	**Margin** dB
11480	44.2	Peak	H	39.4	-26.7	-9.5	47.4	74.0	-27.6
11480	35.1	Ave.	H	39.4	-26.7	-9.5	38.3	54.0	-15.7
22960	37.7 *	Peak	H/V	40.4	-12.8	-9.5	55.8	74.0	-18.2
22960	24.8 *	Ave.	H/V	40.4	-12.8	-9.5	42.9	54.0	-11.1

TX at 5782 MHz

Frequency MHz	**Reading** dB(µV)	**Detector** P/A/Q	**Ant. Pol.** H/V	**Ant. Factor** dB(1/m)	**Correction Factor** dB	**D.C.F** dB	**Net** dB(µV/m)	**Limit @3m** dB(µV/m)	**Margin** DB
11564	44.7	Peak	H	39.4	-26.7	-9.5	47.9	74.0	-26.1
11564	35.6	Ave.	H	39.4	-26.7	-9.5	38.8	54.0	-15.2
23128	38.9 *	Peak	H/V	40.4	-12.8	-9.5	57.0	74.0	-17.0
23128	25.2 *	Ave.	H/V	40.4	-12.8	-9.5	43.3	54.0	-10.7

TX at 5810 MHz

Frequency MHz	**Reading** dB(µV)	**Detector** P/A/Q	**Ant. Pol.** H/V	**Ant. Factor** dB(1/m)	**Correction Factor** dB	**D.C.F** dB	**Net** dB(µV/m)	**Limit @3m** dB(µV/m)	**Margin** DB
11620	45.8	Peak	H	39.4	-28.0	-9.5	47.7	74.0	-26.3
11620	36.5	Ave.	H	39.4	-28.0	-9.5	38.4	54.0	-16.1

Notes:
a) D.C.F: Distance Correction Factor
b) Correction Factor (dB) = Cable #3 - Pre-amp gain + Cable A + High-pass filter (10GHz) loss
c) Net (dB) = Reading + Antenna Factor + Correction Factor
d) Negative signs (-) in Margin column signify levels below the limits.
e) All other emissions not reported are below the equipment noise floor which is at least 10 dB below the limits.
f) * Noise floor reading

Company:	PROXIM	**Model #:**		**Standard**	**FCC § 15.247(R.B.)**			
EUT:	SU with External Ant.	**FCC ID:**	HZB-S58-S60	**Limits**	2			
Project #:	3050721	**Test Date:**	October 29, 2003	**Test Distance**	1	meter		
Test Mode:	Tx	**Engineer:**	AK.	**Duty Relaxation**	0	dB		
	Antenna Used			Pre-Amp Used			Cable Used		
Number:	14	8	22	10	4	13	10	0	0
Model:	EMCO 3115	3160-9	3160-10	Miteg	None	CTT	Cable #3	Cable A	None

OMNI Antenna, model: 5830AN

TX at 5740 MHz

Frequency MHz	Reading dB(µV)	Detector P/A/Q	Ant. Pol. H/V	Ant. Factor dB(1/m)	Correction Factor dB	D.C.F dB	Net dB(µV/m)	Limit @3m dB(µV/m)	Margin dB
11480	42.5	Peak	H	39.4	-26.7	-9.5	45.7	74.0	-28.3
11480	33.5	Ave.	H	39.4	-26.7	-9.5	36.7	54.0	-17.3
22960	37.7 *	Peak	H/V	40.4	-12.8	-9.5	55.8	74.0	-18.2
22960	24.8 *	Ave.	H/V	40.4	-12.8	-9.5	42.9	54.0	-11.1

TX at 5782 MHz

Frequency MHz	Reading dB(µV)	Detector P/A/Q	Ant. Pol. H/V	Ant. Factor dB(1/m)	Correction Factor dB	D.C.F dB	Net dB(µV/m)	Limit @3m dB(µV/m)	Margin DB
11564	45.8	Peak	H	39.4	-26.7	-9.5	49.0	74.0	-25.0
11564	36.5	Ave.	H	39.4	-26.7	-9.5	39.7	54.0	-14.3
23128	38.9 *	Peak	H/V	40.4	-12.8	-9.5	57.0	74.0	-17.0
23128	25.2 *	Ave.	H/V	40.4	-12.8	-9.5	43.3	54.0	-10.7

TX at 5810 MHz

Frequency MHz	Reading dB(µV)	Detector P/A/Q	Ant. Pol. H/V	Ant. Factor dB(1/m)	Correction Factor dB	D.C.F dB	Net dB(µV/m)	Limit @3m dB(µV/m)	Margin DB
11620	47.0	Peak	H	39.4	-28.0	-9.5	48.9	74.0	-26.3
11620	37.8	Ave.	H	39.4	-28.0	-9.5	39.7	54.0	-14.7

Notes:
a) D.C.F: Distance Correction Factor
b) Correction Factor (dB) = Cable #3 - Pre-amp gain + Cable A + High-pass filter (10 GHz) loss
c) Net (dB) = Reading + Antenna Factor + Correction Factor
d) Negative signs (-) in Margin column signify levels below the limits.
e) All other emissions not reported are below the equipment noise floor which is at least 10 dB below the limits.
f) * Noise floor reading

Company:	PROXIM	**Model #:**				**Standard**	**FCC § 15.247(R.B.)**		
EUT:	SU with External Ant.	**FCC ID:**	HZB-S58-S60			**Limits**	2		
Project #:	3050721	**Test Date:**	October 29, 2003			**Test Distance**	1	meter	
Test Mode:	Tx	**Engineer:**	AK.			**Duty Relaxation**	0	dB	
	Antenna Used			Pre-Amp Used			Cable Used		
Number:	14	8	22	10	4	13	10	0	0
Model:	EMCO 3115	3160-9	3160-10	Miteg	None	CTT	Cable #3	Cable A	None

OMNI Antenna, model: MT-483003/N

TX at 5740 MHz

Frequency MHz	Reading dB(µV)	Detector P/A/Q	Ant. Pol. H/V	Ant. Factor dB(1/m)	Correction Factor dB	D.C.F dB	Net dB(µV/m)	Limit @3m dB(µV/m)	Margin dB
11480	41.7	Peak	H	39.4	-26.7	-9.5	44.9	74.0	-29.1
11480	31.2	Ave.	H	39.4	-26.7	-9.5	34.4	54.0	-19.6
22960	37.7 *	Peak	H/V	40.4	-12.8	-9.5	55.8	74.0	-18.2
22960	24.8 *	Ave.	H/V	40.4	-12.8	-9.5	42.9	54.0	-11.1

TX at 5782 MHz

Frequency MHz	Reading dB(µV)	Detector P/A/Q	Ant. Pol. H/V	Ant. Factor dB(1/m)	Correction Factor dB	D.C.F dB	Net dB(µV/m)	Limit @3m dB(µV/m)	Margin DB
11564	43.2	Peak	H	39.4	-26.7	-9.5	46.4	74.0	-27.6
11564	33.6	Ave.	H	39.4	-26.7	-9.5	36.8	54.0	-17.2
23128	38.9 *	Peak	H/V	40.4	-12.8	-9.5	57.0	74.0	-17.0
23128	25.2 *	Ave.	H/V	40.4	-12.8	-9.5	43.3	54.0	-10.7

TX at 5810 MHz

Frequency MHz	Reading dB(µV)	Detector P/A/Q	Ant. Pol. H/V	Ant. Factor dB(1/m)	Correction Factor dB	D.C.F dB	Net dB(µV/m)	Limit @3m dB(µV/m)	Margin DB
11620	44.7	Peak	H	39.4	-28.0	-9.5	46.6	74.0	-27.4
11620	35.1	Ave.	H	39.4	-28.0	-9.5	37.0	54.0	-17.0

Notes:
a) D.C.F: Distance Correction Factor
b) Correction Factor (dB) = Cable #3 - Pre-amp gain + Cable A + High-pass filter (10GHz) loss
c) Net (dB) = Reading + Antenna Factor + Correction Factor
d) Negative signs (-) in Margin column signify levels below the limits.
e) All other emissions not reported are below the equipment noise floor which is at least 10 dB below the limits.
f) * Noise floor reading

Company:	PROXIM	**Model #:**				**Standard**	**FCC § 15.247(R.B.)**		
EUT:	SU with External Ant.	**FCC ID:**	HZB-S58-S60			**Limits**	2		
Project #:	3050721	**Test Date:**	October 29, 2003			**Test Distance**	1	meter	
Test Mode:	Tx	**Engineer:**	AK.			**Duty Relaxation**	0	dB	
	Antenna Used			Pre-Amp Used			Cable Used		
Number:	14	8	22	10	4	13	10	0	0
Model:	EMCO 3115	3160-9	3160-10	Miteg	None	CTT	Cable #3	Cable A	None

Flat Panel Antenna, model: DFPD2-52

TX at 5740 MHz

Frequency MHz	Reading dB(µV)	Detector P/A/Q	Ant. Pol. H/V	Ant. Factor dB(1/m)	Correction Factor dB	D.C.F dB	Net dB(µV/m)	Limit @3m dB(µV/m)	Margin dB
11480	41.8	Peak	H	39.4	-26.7	-9.5	45.0	74.0	-32.0
11480	31.0	Ave.	H	39.4	-26.7	-9.5	34.2	54.0	-19.8
22960	37.7 *	Peak	H/V	40.4	-12.8	-9.5	55.8	74.0	-18.2
22960	24.8 *	Ave.	H/V	40.4	-12.8	-9.5	42.9	54.0	-11.1

TX at 5782 MHz

Frequency MHz	Reading dB(µV)	Detector P/A/Q	Ant. Pol. H/V	Ant. Factor dB(1/m)	Correction Factor dB	D.C.F dB	Net dB(µV/m)	Limit @3m dB(µV/m)	Margin DB
11564	41.2	Peak	H	39.4	-26.7	-9.5	44.4	74.0	-29.6
11564	31.3	Ave.	H	39.4	-26.7	-9.5	34.5	54.0	-19.5
23128	38.9 *	Peak	H/V	40.4	-12.8	-9.5	57.0	74.0	-17.0
23128	25.2 *	Ave.	H/V	40.4	-12.8	-9.5	43.3	54.0	-10.7

TX at 5810 MHz

Frequency MHz	Reading dB(µV)	Detector P/A/Q	Ant. Pol. H/V	Ant. Factor dB(1/m)	Correction Factor dB	D.C.F dB	Net dB(µV/m)	Limit @3m dB(µV/m)	Margin DB
11620	41.7	Peak	H	39.4	-28.0	-9.5	43.6	74.0	-26.3
11620	31.5	Ave.	H	39.4	-28.0	-9.5	33.4	54.0	-16.1

Notes:
a) D.C.F: Distance Correction Factor
b) Correction Factor (dB) = Cable #3 - Pre-amp gain + Cable A + High-pass filter (10GHz) loss
c) Net (dB) = Reading + Antenna Factor + Correction Factor
d) Negative signs (-) in Margin column signify levels below the limits.
e) All other emissions not reported are below the equipment noise floor which is at least 10 dB below the limits.
f) * Noise floor reading

Company:	PROXIM	**Model #:**		**Standard**	FCC § 15.247(R.B.)			
EUT:	SU with External Ant.	**FCC ID:**	HZB-S58-S60	**Limits**	2			
Project #:	3050721	**Test Date:**	October 29, 2003	**Test Distance**	1	meter		
Test Mode:	Tx	**Engineer:**	AK.	**Duty Relaxation**	0	dB		
	Antenna Used			Pre-Amp Used			Cable Used		
Number:	14	8	22	10	4	13	10	0	0
Model:	EMCO 3115	3160-9	3160-10	Miteg	None	CTT	Cable #3	Cable A	None

Parabolic Antenna, model: SSD8-52

TX at 5740 MHz

Frequency MHz	Reading dB(µV)	Detector P/A/Q	Ant. Pol. H/V	Ant. Factor dB(1/m)	Correction Factor dB	D.C.F dB	Net dB(µV/m)	Limit @3m dB(µV/m)	Margin dB
11480	42.5	Peak	H	39.4	-26.7	-9.5	45.7	74.0	-28.3
11480	31.9	Ave.	H	39.4	-26.7	-9.5	35.1	54.0	-18.6
22960	37.7 *	Peak	H/V	40.4	-12.8	-9.5	55.8	74.0	-18.2
22960	24.8 *	Ave.	H/V	40.4	-12.8	-9.5	42.9	54.0	-11.1

TX at 5782 MHz

Frequency MHz	Reading dB(µV)	Detector P/A/Q	Ant. Pol. H/V	Ant. Factor dB(1/m)	Correction Factor dB	D.C.F dB	Net dB(µV/m)	Limit @3m dB(µV/m)	Margin DB
11564	43.6	Peak	H	39.4	-26.7	-9.5	46.8	74.0	-27.2
11564	34.0	Ave.	H	39.4	-26.7	-9.5	37.2	54.0	-16.8
23128	38.9 *	Peak	H/V	40.4	-12.8	-9.5	57.0	74.0	-17.0
23128	25.2 *	Ave.	H/V	40.4	-12.8	-9.5	43.3	54.0	-10.7

TX at 5810 MHz

Frequency MHz	Reading dB(µV)	Detector P/A/Q	Ant. Pol. H/V	Ant. Factor dB(1/m)	Correction Factor dB	D.C.F dB	Net dB(µV/m)	Limit @3m dB(µV/m)	Margin DB
11620	45.0	Peak	H	39.4	-28.0	-9.5	46.9	74.0	-27.1
11620	35.5	Ave.	H	39.4	-28.0	-9.5	37.4	54.0	-16.6

Notes:
a) D.C.F: Distance Correction Factor
b) Correction Factor (dB) = Cable #3 - Pre-amp gain + Cable A + High-pass filter (10GHz) loss
c) Net (dB) = Reading + Antenna Factor + Correction Factor
d) Negative signs (-) in Margin column signify levels below the limits.
e) All other emissions not reported are below the equipment noise floor which is at least 10 dB below the limits.
f) * Noise floor reading

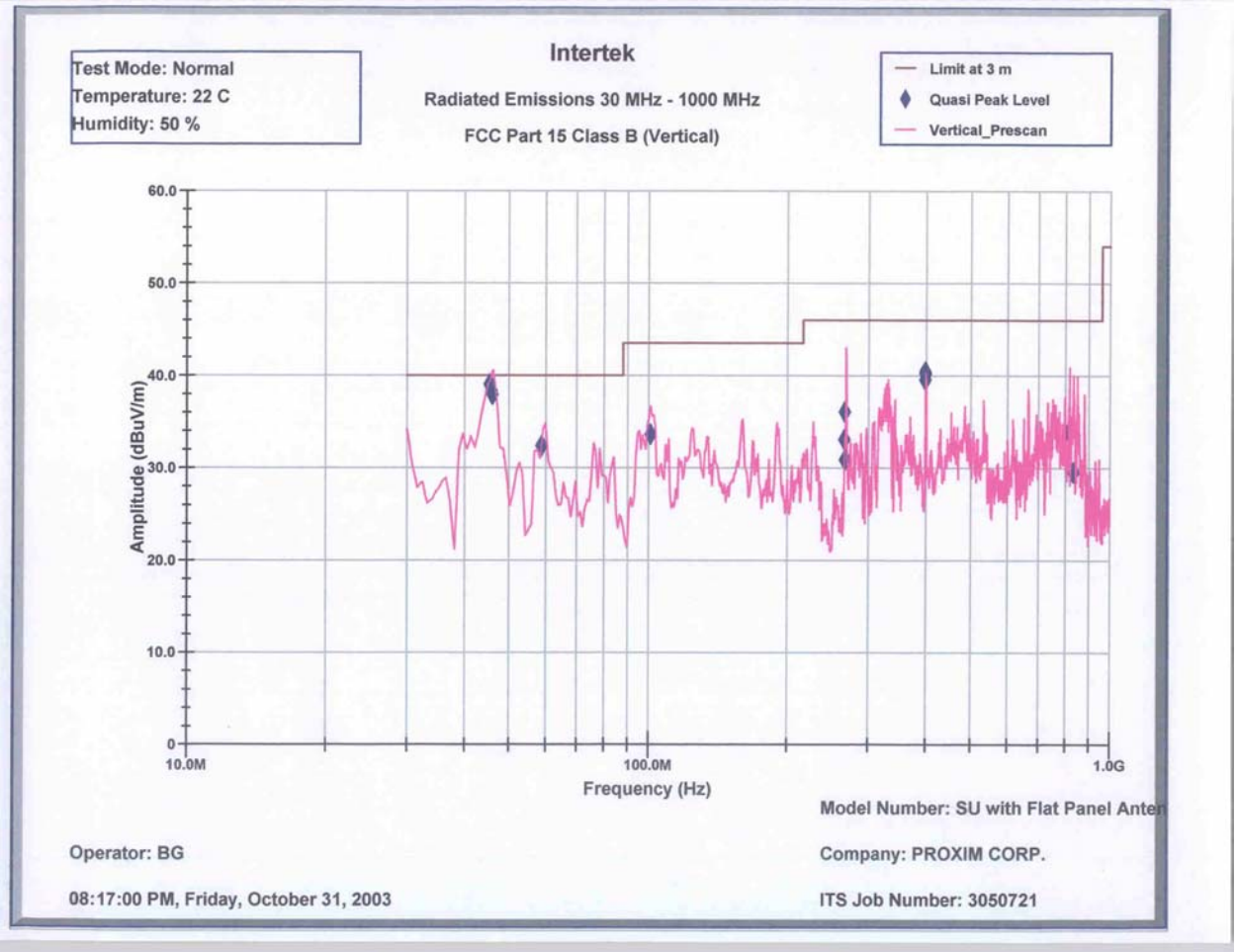
4.7 Radiated Emissions from Digital Section of Transceiver
FCC Rule: 15.109

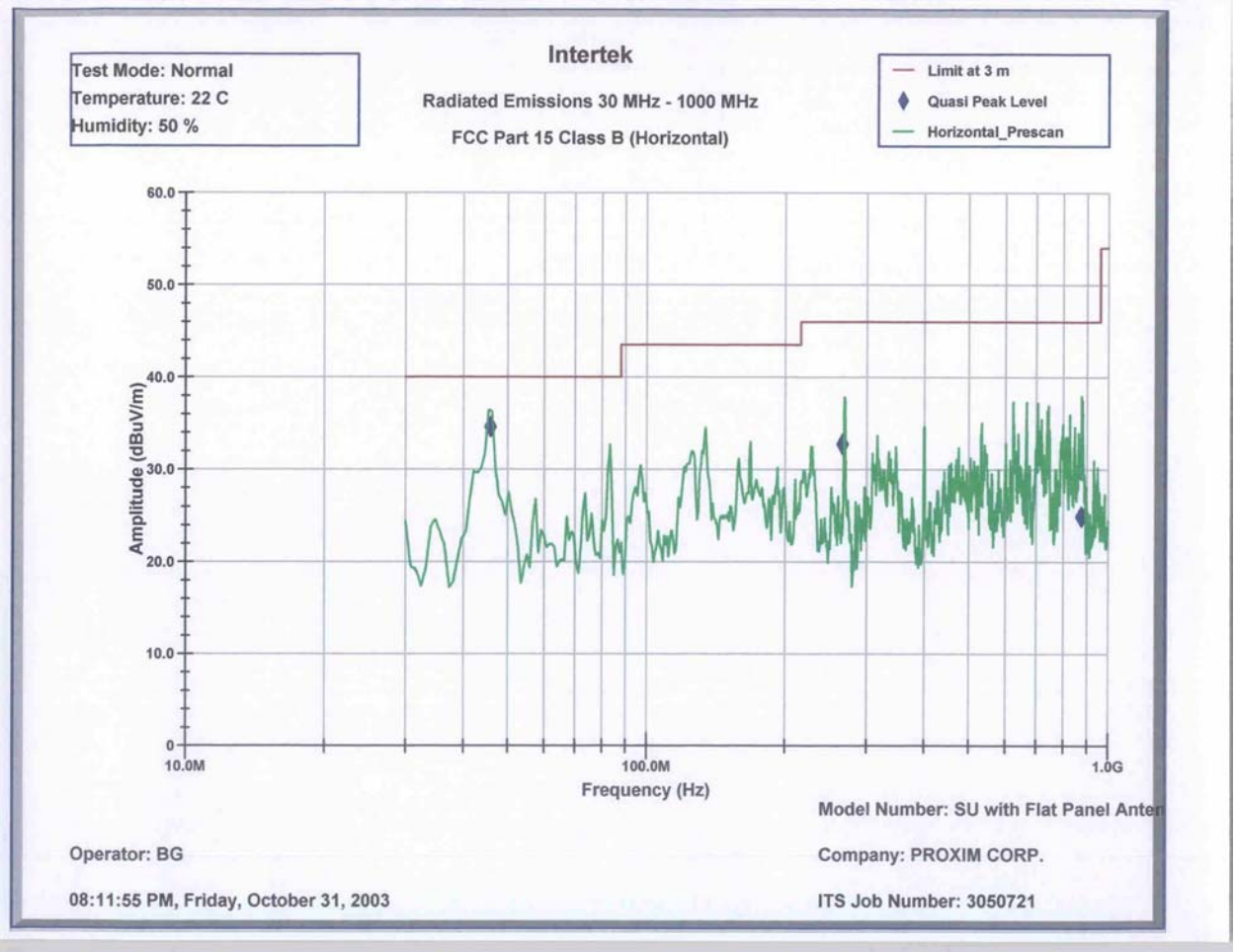
Procedure

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 1.0 dB.


Test Mode: Normal
Temperature: 22 C
Humidity: 50 %
Intertek
Radiated Emissions 30 MHz - 1000 MHz
FCC Part 15 Class B (Vertical)
Limit at 3 m
Quasi Peak Level
Vertical_Prescan
60.0
50.0
40.0
30.0
20.0
10.0
0
Amplitude (dBuV/m)
10.0M
100.0M
1.0G
Frequency (Hz)
Model Number: SU with Flat Panel Anten
Operator: BG
Company: PROXIM CORP.
08:17:00 PM, Friday, October 31, 2003
ITS Job Number: 3050721


Intertek
Test Mode: Normal
Temperature: 22 C
Humidity: 50 %
Radiated Emissions 30 MHz - 1000 MHz
FCC Part 15 Class B (Horizontal)
Limit at 3 m
Quasi Peak Level
Horizontal_Prescan
60.0
50.0
40.0
30.0
20.0
10.0
0
Amplitude (dBuV/m)
10.0M
100.0M
1.0G
Frequency (Hz)
Model Number: SU with Flat Panel Anter
Operator: BG
Company: PROXIM CORP.
08:11:55 PM, Friday, October 31, 2003
ITS Job Number: 3050721

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

Operator: BG
Model Number: SU with Flat Panel Antenna
ITS Job Number: 3050721
08:17:00 PM, Friday, October 31, 2003
Company: PROXIM CORP.

	1	2	3	4	5	6	7	8
Frequency	Quasi Pk FS	Limit@3	Margin	RA	AG	CF	AF	Atten
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB(1/m)	dB
45.288 MHz	39.0	40.0	-1.0	59.5	32.4	0.6	8.3	3.0
45.713 MHz	38.4	40.0	-1.6	59.1	32.4	0.6	8.0	3.0
45.913 MHz	37.9	40.0	-2.1	58.8	32.4	0.6	7.9	3.0
58.738 MHz	32.3	40.0	-7.7	55.7	32.3	0.8	5.2	3.0
100.96 MHz	33.6	43.5	-9.9	54.8	32.3	0.9	7.3	3.0
265.418 MHz	33.1	46.0	-12.9	47.8	32.2	1.5	13.0	3.0
265.758 MHz	36.1	46.0	-9.9	50.9	32.2	1.5	13.0	3.0
266.225 MHz	30.9	46.0	-15.1	45.7	32.2	1.5	12.9	3.0
397.982 MHz	39.6	46.0	-6.4	51.5	32.3	1.9	15.5	3.0
398.237 MHz	40.4	46.0	-5.6	52.3	32.3	1.9	15.5	3.0
398.715 MHz	40.2	46.0	-5.8	52.1	32.3	1.9	15.5	3.0
814.707 MHz	33.9	46.0	-12.1	39.5	32.4	2.7	21.1	3.0
832.496 MHz	29.5	46.0	-16.5	34.8	32.3	2.7	21.4	3.0

Test Mode: Normal
Temperature: 22 C
Humidity: 50 %

Page 1

Intertek

Radiated Emissions 30 MHz - 1000 MHz

FCC Part 15 Class B (QP-Horizontal)

Operator: BG

Model Number: SU with Flat Panel Antenna

ITS Job Number: 3050721

08:17:41 PM, Friday, October 31, 2003

Company: PROXIM CORP.

	1	2	3	4	5	6	7	8
Frequency	Quasi Pk FS	Limit@3m	Margin	RA	AG	CF	AF	Atten
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB(1/m)	dB
45.783 MHz	34.6	40.0	-5.4	54.9	32.4	0.6	8.4	3.0
265.7575 MHz	32.7	46.0	-13.3	47.6	32.2	1.5	12.9	3.0
875.13 MHz	24.9	46.0	-21.1	28.1	32.1	2.8	23.1	3.0

Test Mode: Normal

Temperature: 22 C

Humidity: 50 %

Page 1

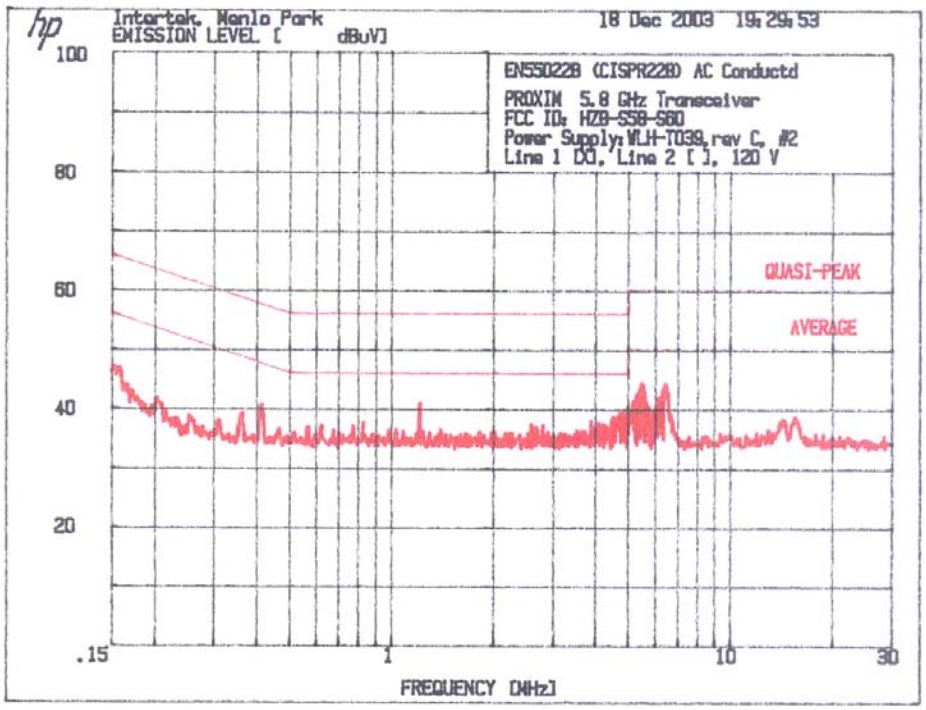
4.8 Radiated Emissions from Receiver Section of Transceiver (L.O. Radiation)
FCC Rule: 15.109, 15.111

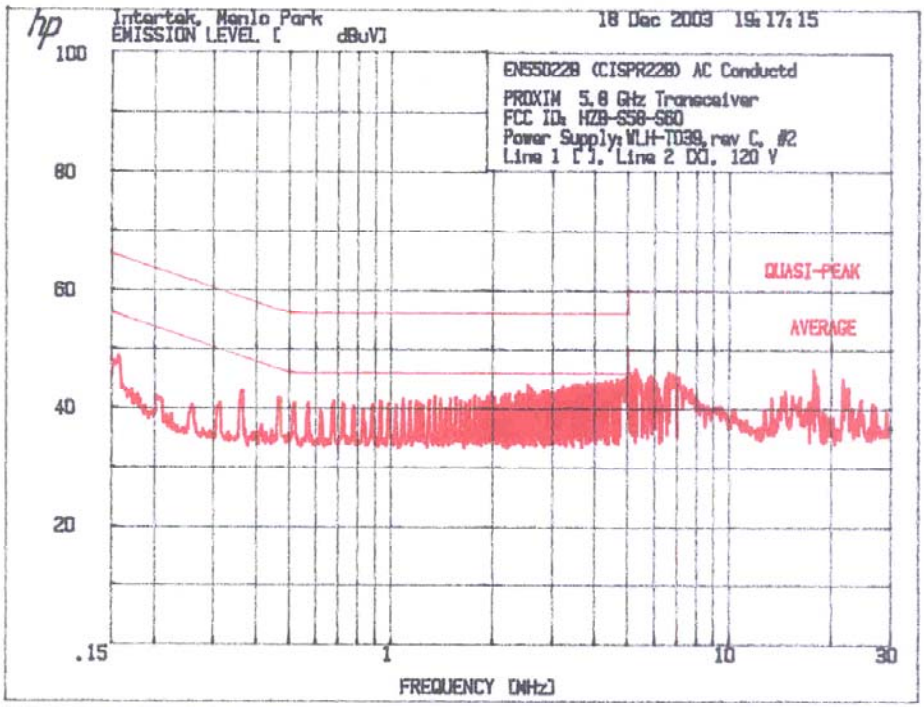
Not required - EUT operation above 960 MHz only.

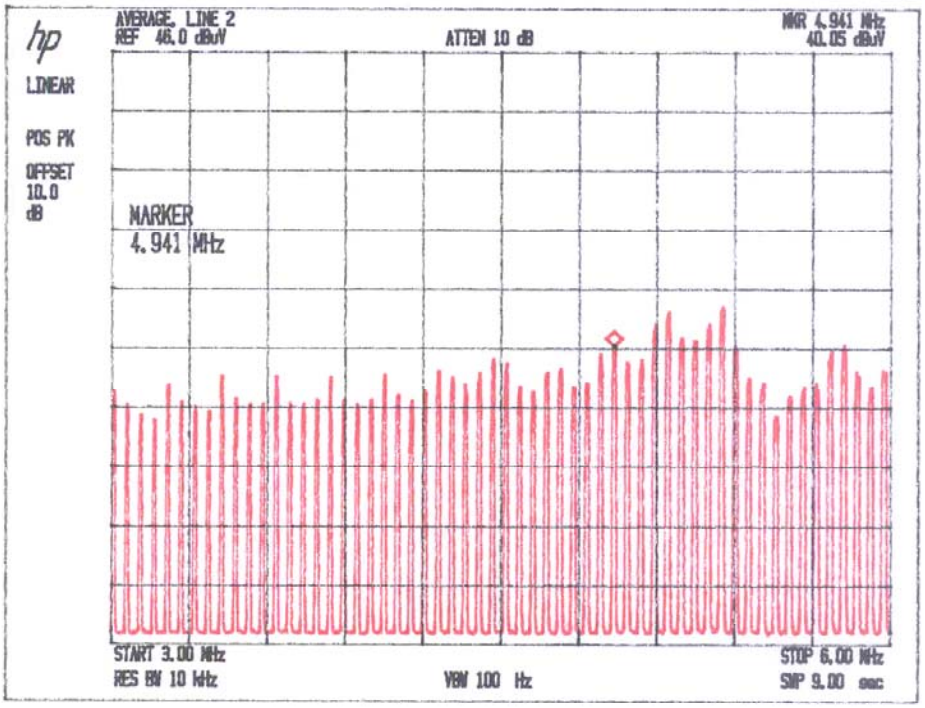
4.9 AC Line Conducted Emission
FCC Rule: 15.207

AC line conducted emission test was performed according the ANSI C63.4 standard. The EUT was connected to AC Line through the LISNs.

For the test result, see attached plots.
The EUT passed by 5 dB.


Intertek, Menlo Park
EMISSION LEVEL [dBuV]
18 Dec 2003 19:29:53
EN55022B (CISPR22B) AC Conductd
PROXIM 5.8 GHz Transceiver
FCC ID: HZB-S58-S60
Power Supply: WLH-T039, rev C, #2
Line 1 [ ], Line 2 [ ], 120 V
QUASI-PEAK
AVERAGE
100
80
60
40
20
.15
1
10
30
FREQUENCY [MHz]


Intertek, Manlo Park
EMISSION LEVEL [dBuV]
18 Dec 2003 19:17:15
EN55022B (CISPR22B) AC Conducted
PROXIM 5.8 GHz Transceiver
FCC ID: HZB-S58-S60
Power Supply: WLH-T039, rev C, #2
Line 1 [ ], Line 2 DC, 120 V
QUASI-PEAK
AVERAGE
100
80
60
40
20
.15
1
10
30
FREQUENCY [MHz]


AVERAGE, LINE 2
REF 46.0 dBuV
ATTEN 10 dB
MKR 4.941 MHz
40.05 dBuV
LINEAR
POS PK
OFFSET
10.0
dB
MARKER
4.941 MHz
START 3.00 MHz
RES BW 10 kHz
VBW 100 Hz
STOP 6.00 MHz
SWP 9.00 sec

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 w/86650 QP Adapter	Hewlett Packard	8568B	1912A0053 2521A01021	12	11/18/04
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
LISN	FCC	FCC-LISN-50-50-M-H	2011	12	2/08/04

No Calibration required

6.0 Document History

Revision/ Job Number	Writer Initials	Date	Change
1.0 / 3050721	BG	December 18, 2003	Original document

Appendix A – Out-of-band conducted emissions plots

Plot	Point of measurement	Modulation	Description
4.1a–4.1e	connectorized SU antenna connector	QAM16	low channel, scan 30 MHz to 40 GHz
4.2a–4.2d	connectorized SU antenna connector	QAM16	middle channel, scan 30 MHz to 40 GHz
4.3a–4.3d	connectorized SU antenna connector	QAM16	high channel, scan 30 MHz to 40 GHz
4.4a–4.4b	connectorized SU antenna connector	QPSK ¾	low channel, scan 4 GHz to 5.85 GHz
4.4c–4.4d	connectorized SU antenna connector	QPSK ½	low channel, scan 4 GHz to 5.85 GHz
4.5a–4.5b	connectorized SU antenna connector	QPSK ¾	high channel, scan 5.725 GHz to 8 GHz
4.5c–4.5d	connectorized SU antenna connector	QPSK ½	high channel, scan 5.725 GHz to 8 GHz
4.6a–4.6b	integrated SU RF output	QAM16	low channel, scan 5 GHz to 5.85 GHz
4.6c–4.6d	integrated SU RF output	QPSK ¾	low channel, scan 5 GHz to 5.85 GHz
4.6e–4.6f	integrated SU RF output	QPSK ½	low channel, scan 5 GHz to 5.85 GHz
4.7a–4.7b	integrated SU RF output	QAM16	high channel, scan 5.725 GHz to 10 GHz
4.7c–4.7d	integrated SU RF output	QPSK ¾	high channel, scan 5.725 GHz to 10 GHz
4.7e–4.7f	integrated SU RF output	QPSK ½	high channel, scan 5.725 GHz to 10 GHz