EMISSIONS TEST REPORT FOR A LOW POWER TRANSMITTER

I. GENERAL INFORMATION

Requirement: Federal Communications Commissions

Test Requirements: 15.205, 15.207, 15.209, 15.247

Applicant: Pointred Technologies Inc.
397 Trimble Road
San Jose, CA

Product ID: **FCC ID:** QDU-MCRD-5R7

This product is not sold directly to end users. Systems will be sold only to Point Red Authorized Resellers.

II. DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

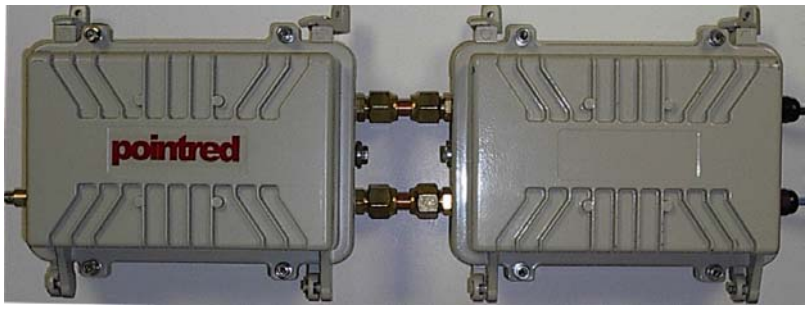
RF Specifications

RF Frequency Band	5730 to 5820 MHz
RF Channels	Programmable in 1 MHz steps
Modulation Type	FSK
Data rate	8 Mbps
Transmitter Output Power	23 dBm, variable
Antennas :	

1. Radiowaves model SP2-5.2NS	28 dBi dish*
2. MTI “Wireless Edge” model MT-485024/N	21dBi panel
3. MAR Antennas model MA-WA 58-1X	23 dBi panel*
4. Superpass model SPPJ48	21 dBi panel
5. Superpass model SPPJ19	19 dBi panel
6. Radiowaves model SEC 5.5H-90-16	16 dBi sector*

* test data taken using this antenna

The Base Station Modem



The BASE STATION (BST) IF Unit contains an RF modem operating at 380 MHz, as both a receive and transmit device. The BST is a lightweight, robust ODU (outdoor unit) and is typically mounted on a structure or radio tower. The BST modem provides the interface to the Internet, Router, or other media types. The BST is combined with a transceiver unit to generate the radio base station.

The CPE Modem

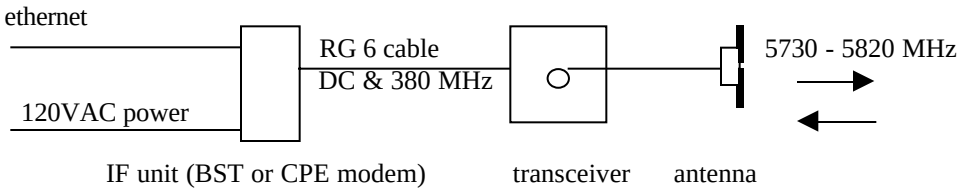
The Customer Premise Equipment (CPE) Modem IF Unit functions as the endpoint users interface to the Internet or other media types. The CPE is an easily configurable subscriber Modem unit. That provides a 10BASET connection type for multiple applications such as Data, Voice, or Video. The CPE is partnered with a Power supply that operates at 110vdc or 220vdc. The CPE modem is connected via coaxial cable to the transceiver unit mounted outdoors.

The Transceiver Unit

The Transceiver unit functions as the RF interface. The Transceiver can be configured with various antenna gain combinations and models and is powered with DC provided from the

unit. The transceiver (radio unit) can be configured as either customer premises **equipment (CPE) or as a base station unit (BST). The transceiver is identical for both applications. The BST and subscriber (CPE) modem have different housings and power supplies, and the CPE has an optional T1 interface board, but the IF output signals are the same and the transceiver used with them is identical.**

Fig.1



III. TEST LOCATION

All tests except power spectral density and final output power were performed at:

Compliance Certification Services
571F Monterey Road
Morgan Hill, CA 95037

Output power and psd tests were performed at Pointred Technologies.

T.N. Cokenias 28 August 2003
EMC Consultant/Agent for Pointred Technologies

TEST PROCEDURES

Measurement Equipment Used:

Bilog Antenna (30-2000 MHz): Schaffner- Chase model CLB6112B
Horn Antenna (1 - 18GHz): EMCO Model 3115
Horn Antenna (18-26.5 GHz)
Horn Antenna (26.5 – 40 GHz)
Pre-amplifier (1-26.5 GHz): Miteq model NSP2600-44
Pre-amplifier (26.5-40 GHz): Miteq model NSP4000-SP4
Agilent E4446A spectrum analyzer, 3 Hz – 44 GHz

Radiated Emissions
Test Requirement: 15.109, 15.205, 15.209, 15.247

Test Procedures, 1- 40 GHz:

1. The EUT was placed on a wooden table resting on a turntable on the open air test site. The search antenna was placed 3m from the EUT. The EUT antenna was mounted vertically as per normal installation.

2. The turntable was slowly rotated to locate the direction of maximum emission at each emission falling in the restricted bands of 15.205.

3. Radiated emissions were investigated for a LOW channel, a MID channel, and HIGH channel. Emissions were investigated to the 10^{th} harmonic.

4. Once maximum direction was determined, the search antenna was raised and lowered in both vertical and horizontal polarizations. The maximum readings so obtained are recorded in the data listed below.

Radiated Test Set-up, 1-40 GHz

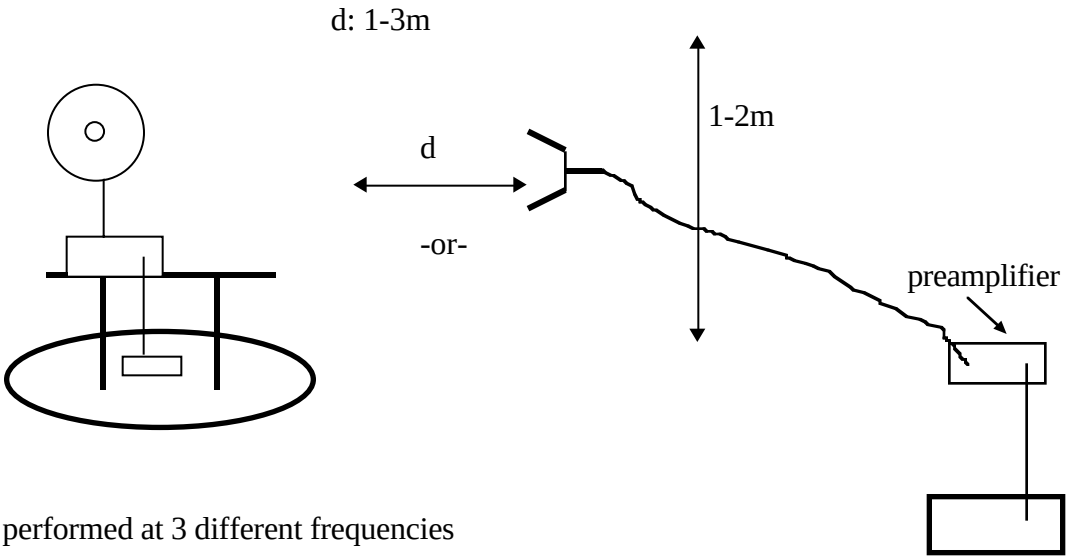


Figure 2

Testing was performed at 3 different frequencies

Channel	**Frequency, MHz**
Low	5730
Mid	5775
High	5820

Radiated emissions were performed at each frequency for 2 different transmitter antennas.

Antennas tested:

Antenna Type	**Gain**	**Antenna Manufacturer**	**Model Number**
sector	16 dBi	Radiowaves	SEC 5.5 H-90-16
flat panel	23 dBi	MAR Antenna	MA-WA-58-1X
dish	28 dBi	Radiowaves	SP2-5.2-NS

Test Results: Worst case results are presented. Refer to separate Excel spread sheet files.

Radiated Test Set-up, 30 - 1000 MHz

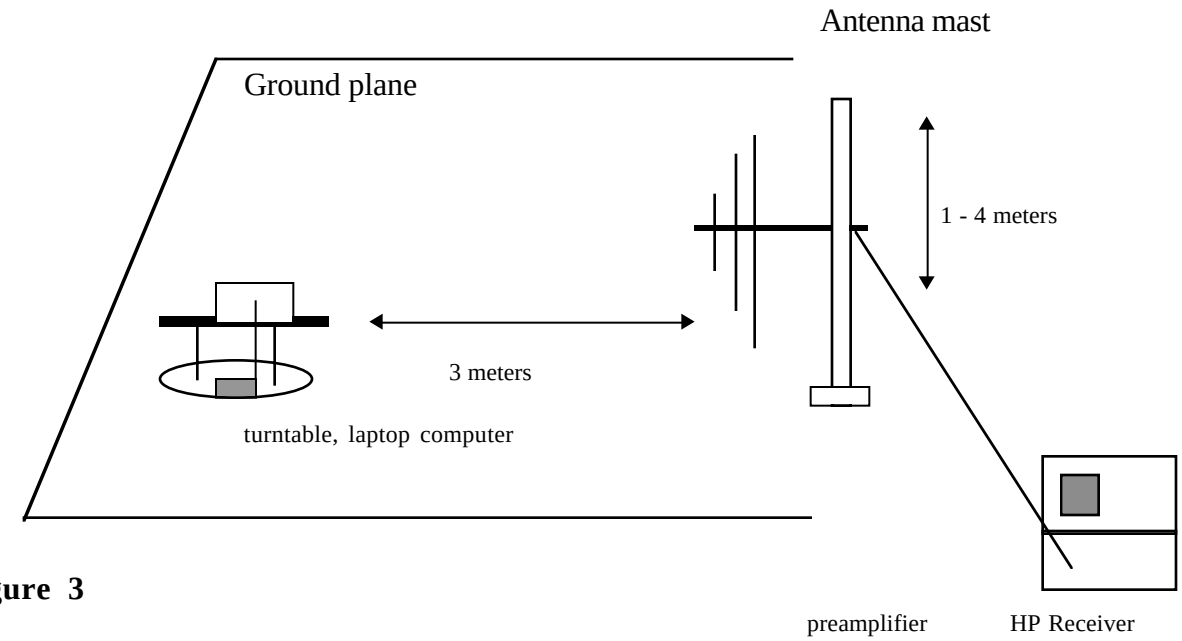


Figure 3

Test Procedures, 30 -1000 MHz

The EUT was set to RECEIVE/TRANSMIT mode. Radiation emissions from the digital portion of the EUT were measured according to the dictates of ANSI C63.4.

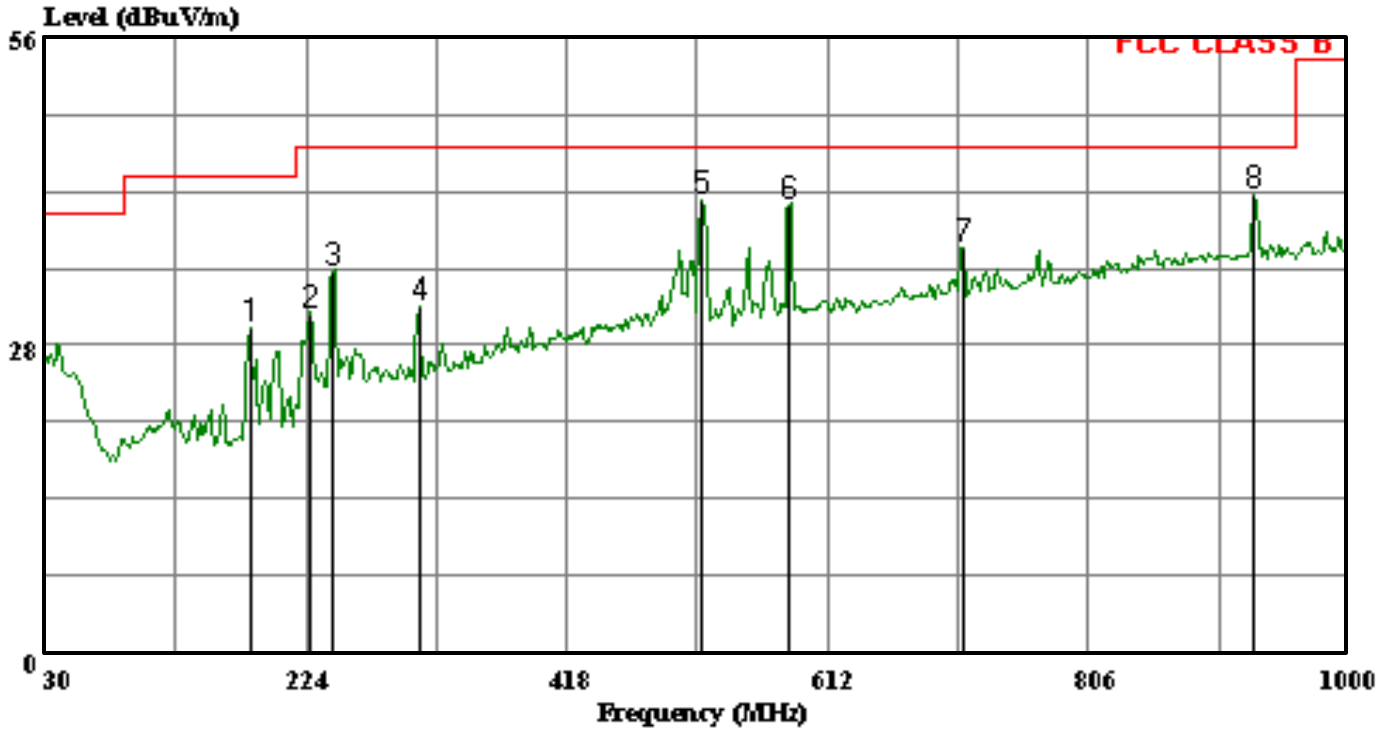
Test Results

Refer to separate attachment.

COMPLIANCE Engineering Service, Inc.
FCC,VCCI,CISPR,CE
UL,CSA,TUV

561F Monterey Road
Morgan Hill, CA 95037, U.S.A.
Tel: (408) 463-0885
Fax:(408) 463-0888

Data#: 4 File#: EMILow.EMI Date: 08-21-2003 Time: 10:28:00



(Audix ATC)

Trace: 3 Ref Trace:

Condition: FCC CLASS B
Company : POINT RED Technologies
EUT Description : Point Red 5.7GHz ODU and Base+CPE IDU
Model Number : MARS MA-WA58-1X
Test Configurtion: Base and Antenna
Tester : Thanh Nguyen
Test Target : FCC 15.247
Mode of Operation: Tx Worst Case
Project No : 03U2029-3

	Freq	Read Level	Probe Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	182.290	19.41	8.76	1.34	0.00	29.51	43.50	-13.99	Peak
2	226.910	18.67	10.55	1.47	0.00	30.69	46.00	-15.31	Peak
3	244.370	21.66	11.46	1.52	0.00	34.64	46.00	-11.36	Peak
4	308.390	17.44	12.29	1.76	0.00	31.49	46.00	-14.51	Peak
5	518.880	22.08	16.77	2.31	0.00	41.16	46.00	-4.84	Peak
6	583.870	20.73	17.53	2.53	0.00	40.79	46.00	-5.21	Peak
7	712.880	15.46	18.72	2.78	0.00	36.96	46.00	-9.04	Peak
8	929.190	17.55	20.77	3.26	0.00	41.58	46.00	-4.42	Peak

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Tel: (408) 463-0885
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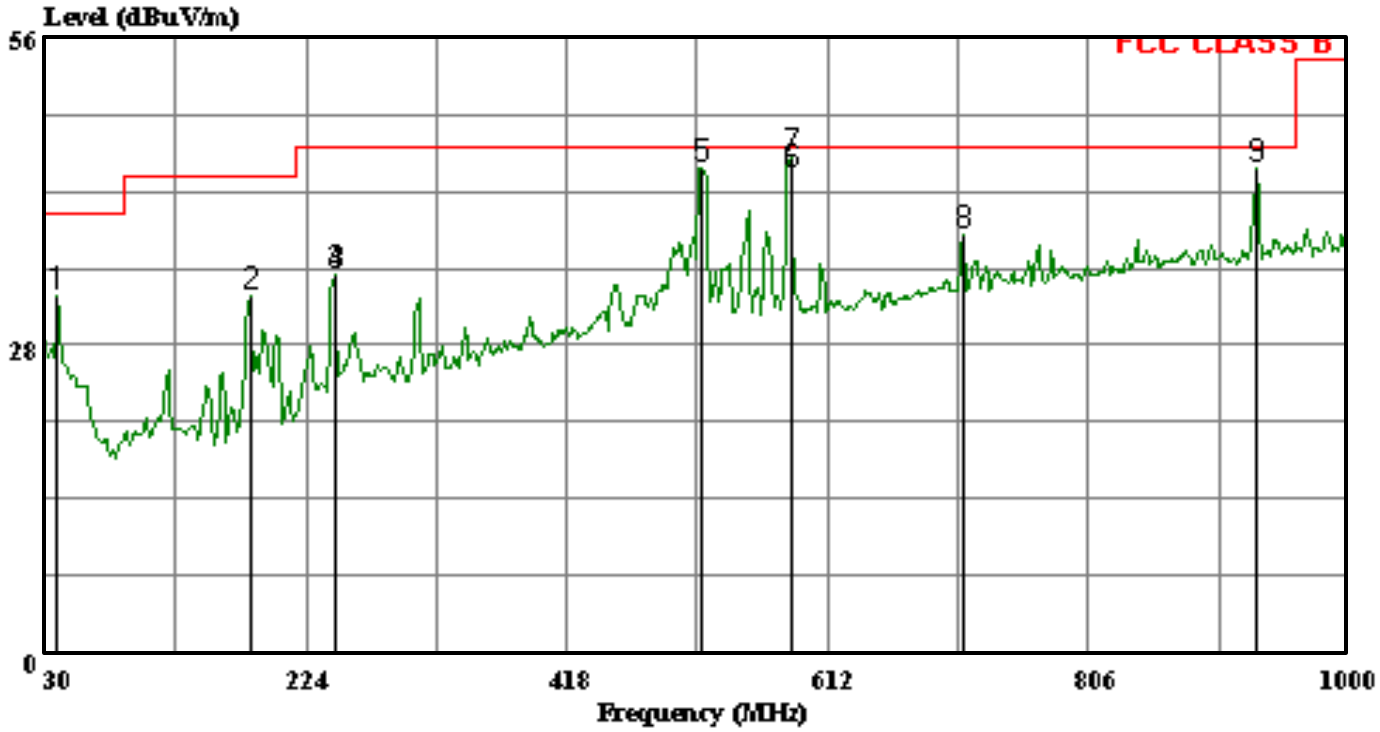
Data#: 8 File#: EMILow.EMI Date: 08-21-2003 Time: 10:41:48



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Tester : Thanh Nguyen
Test Target : FCC 15.247
Mode of Operation: Tx Worst Case
Project No : 03U2029-3

	Freq	Read Level	Probe Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	38.730	15.36	16.64	0.59	0.00	32.59	40.00	-7.41	Peak
2	182.290	22.33	8.76	1.34	0.00	32.43	43.50	-11.07	Peak
3	245.340	21.33	11.50	1.52	0.00	34.35	46.00	-11.65	Peak
4	245.340	21.33	11.50	1.52	0.00	34.35	46.00	-11.65	Peak
5	517.910	25.03	16.76	2.31	0.00	44.10	46.00	-1.90	Peak
6	584.840	23.65	17.53	2.53	0.00	43.71	46.00	-2.29	QP
7	584.840	25.03	17.53	2.53	0.00	45.09	46.00	-0.91	Peak
8	712.880	16.60	18.72	2.78	0.00	38.10	46.00	-7.90	Peak
9	931.130	20.03	20.79	3.29	0.00	44.11	46.00	-1.89	Peak

08/20/03 **High Frequency Measurement**

Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: THANH NGUYEN
Project #: 03U2029-3
Company: POINT RED
EUT Descrip.: Point Red 5.7GHz ODU and BASE w 4 antennas
EUT M/N: TransCeiver P/N 10-0004 S/N 0042 with MicroWave Antenna SECTOR M/N SEC 5.5H-90-16 ,Gain 16dBi
Test Target: FCC 15.247
Mode Oper: Tx

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifer 1-26GHz	Spectrum Analyzer	Horn > 18GHz
T73; S/N: 6717 @3m	T87 Miteq 924342	Agilent E4446A Analyzer	

Hi Frequency Cables

☐ (2 ft) ☑ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)

Peak Measurements:
1 MHz Resolution Bandwidth
1MHz Video Bandwidth

Average Measurements:
1 MHz Resolution Bandwidth
10Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
						Tx at LOW Channel 5.730GHz									
						Spurious Emissions at the Restricted Band									
2.675	9.8	46.1	37.3	29.8	2.2	-43.2	0.0	2.0	36.9	28.0	74.0	54.0	-37.1	-26.0	V
5.350	9.8	50.6	38.4	33.8	3.4	-44.8	0.0	2.0	44.9	32.7	74.0	54.0	-29.1	-21.3	V
8.025	9.8	47.6	37.4	37.0	4.4	-44.0	0.0	2.0	47.0	36.8	74.0	54.0	-27.0	-17.2	Noise Floor
2.675	9.8	49.3	40.6	29.8	2.2	-43.2	0.0	2.0	40.0	31.4	74.0	54.0	-34.0	-22.6	H
5.350	9.8	52.3	45.3	33.8	3.4	-44.8	0.0	2.0	46.7	39.6	74.0	54.0	-27.3	-14.4	H
8.025	9.8	46.5	37.9	37.0	4.4	-44.0	0.0	2.0	45.9	37.3	74.0	54.0	-28.1	-16.7	Noise floor
10.700	9.8	43.8	34.3	38.3	5.2	-41.2	0.0	1.0	47.0	37.5	74.0	54.0	-27.0	-16.5	Noise floor
11.460	9.8	44.2	35.4	38.7	5.4	-41.4	0.0	1.0	47.8	39.1	74.0	54.0	-26.2	-14.9	Noise floor
13.375	9.8	47.1	37.4	39.8	5.9	-43.8	0.0	1.0	50.1	40.3	74.0	54.0	-23.9	-13.7	Noise Floor
16.050	9.8	45.6	38.2	38.2	6.7	-45.7	0.0	1.0	45.8	38.4	74.0	54.0	-28.2	-15.6	Noise Floor
						No more spurious emissions was detected up to 40GHz.									
						Tx at Mid Channel 5.775GHz									
2.698	9.8	47.0	36.2	29.9	2.2	-43.2	0.0	2.0	37.9	27.1	74.0	54.0	-36.1	-26.9	V
5.395	9.8	51.3	41.9	33.9	3.4	-44.8	0.0	2.0	45.7	36.3	74.0	54.0	-28.3	-17.7	V
8.092	9.8	46.7	39.6	37.2	4.4	-43.9	0.0	2.0	46.3	39.3	74.0	54.0	-27.7	-14.7	Noise floor
2.698	9.8	51.4	44.8	29.9	2.2	-43.2	0.0	2.0	42.2	35.7	74.0	54.0	-31.8	-18.3	H
5.395	9.8	51.5	43.3	33.9	3.4	-44.8	0.0	2.0	45.9	37.6	74.0	54.0	-28.1	-16.4	H
8.092	9.8	47.1	37.8	37.2	4.4	-43.9	0.0	2.0	46.7	37.4	74.0	54.0	-27.3	-16.6	Noise floor
10.790	9.8	43.5	34.5	38.3	5.2	-41.1	0.0	1.0	46.9	37.9	74.0	54.0	-27.1	-16.1	Noise floor
11.550	9.8	45.8	36.4	38.8	5.4	-41.6	0.0	1.0	49.5	40.1	74.0	54.0	-24.5	-13.9	Noise floor
16.185	9.8	45.6	37.6	38.5	6.7	-45.8	0.0	1.0	46.0	38.0	74.0	54.0	-28.0	-16.0	Noise floor
						No more spurious emissions was detected up to 40GHz.									
						Tx at High channel 5.820GHz									
2.720	9.8	46.3	34.5	30.0	2.2	-43.2	0.0	2.0	37.2	25.5	74.0	54.0	-36.8	-28.5	V
5.440	9.8	54.4	43.9	33.9	3.4	-44.8	0.0	2.0	48.8	38.3	74.0	54.0	-25.2	-15.7	V
8.160	9.8	44.7	36.0	37.3	4.4	-43.9	0.0	2.0	44.6	35.9	74.0	54.0	-29.4	-18.1	Noise Floor
2.720	9.8	52.4	47.4	30.0	2.2	-43.2	0.0	1.0	42.4	37.3	74.0	54.0	-31.6	-16.7	H
5.440	9.8	49.6	37.8	33.9	3.4	-44.8	0.0	1.0	43.1	31.2	74.0	54.0	-30.9	-22.8	H
8.160	9.8	44.6	36.2	37.3	4.4	-43.9	0.0	1.0	43.4	35.0	74.0	54.0	-30.6	-19.0	Noise Floor
						No more spurious emissions was detected up to 40GHz									
	9.8														

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

08/20/03 **High Frequency Measurement**

Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: THANH NGUYEN
Project #: 03U2029-3
Company: POINT RED
EUT Descrip.: Point Red 5.7GHz ODU and BASE w 4 antennas
EUT M/N: TransCeiver P/N 10-0004 S/N 0042 with Antenna MARS M/N MA-WA58-1X S/N 1018,Gain 23dBi
Test Target: FCC 15.247
Mode Oper: Tx

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifer 1-26GHz	Spectrum Analyzer	Horn > 18GHz
T73; S/N: 6717 @3m	T87 Miteq 924342	Agilent E4446A Analyzer	

Hi Frequency Cables

☐ (2 ft) ☑ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)

Peak Measurements:
1 MHz Resolution Bandwidth
1MHz Video Bandwidth

Average Measurements:
1 MHz Resolution Bandwidth
10Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
						Tx at LOW Channel 5.730GHz									
						Spurious Emissions at the Restricted Band									
2.675	9.8	48.3	43.2	29.8	2.2	-43.2	0.0	2.0	39.1	34.0	74.0	54.0	-34.9	-20.0	V
5.350	9.8	54.8	51.2	33.8	3.4	-44.8	0.0	2.0	49.1	45.5	74.0	54.0	-24.9	-8.5	V
8.025	9.8	48.6	37.9	37.0	4.4	-44.0	0.0	2.0	48.0	37.3	74.0	54.0	-26.0	-16.7	Noise Floor
2.675	9.8	50.6	45.5	29.8	2.2	-43.2	0.0	2.0	41.4	36.3	74.0	54.0	-32.6	-17.7	H
5.350	9.8	52.4	45.5	33.8	3.4	-44.8	0.0	2.0	46.7	39.8	74.0	54.0	-27.3	-14.2	H
8.025	9.8	46.2	37.6	37.0	4.4	-44.0	0.0	2.0	45.6	37.0	74.0	54.0	-28.4	-17.0	Noise floor
10.700	9.8	44.6	34.1	38.3	5.2	-41.2	0.0	1.0	47.9	37.4	74.0	54.0	-26.1	-16.6	Noise floor
11.460	9.8	44.1	35.0	38.7	5.4	-41.4	0.0	1.0	47.8	38.7	74.0	54.0	-26.2	-15.3	Noise floor
13.375	9.8	48.5	37.2	39.8	5.9	-43.8	0.0	1.0	51.4	40.1	74.0	54.0	-22.6	-13.9	Noise Floor
16.050	9.8	45.3	37.5	38.2	6.7	-45.7	0.0	1.0	45.5	37.6	74.0	54.0	-28.5	-16.4	Noise Floor
						No more spurious emissions was detected up to 40GHz.									
						Tx at Mid Channel 5.775GHz									
2.698	9.8	52.2	46.1	29.9	2.2	-43.2	0.0	2.0	43.0	37.0	74.0	54.0	-31.0	-17.0	V
5.395	9.8	51.0	46.6	33.9	3.4	-44.8	0.0	2.0	45.4	41.0	74.0	54.0	-28.6	-13.0	V
8.092	9.8	46.6	37.3	37.2	4.4	-43.9	0.0	2.0	46.2	36.9	74.0	54.0	-27.8	-17.1	Noise floor
2.698	9.8	49.2	40.2	29.9	2.2	-43.2	0.0	2.0	40.0	31.0	74.0	54.0	-34.0	-23.0	H
5.395	9.8	51.6	45.2	33.9	3.4	-44.8	0.0	2.0	46.0	39.5	74.0	54.0	-28.0	-14.5	H
8.092	9.8	47.1	37.8	37.2	4.4	-43.9	0.0	2.0	46.7	37.4	74.0	54.0	-27.3	-16.6	Noise floor
10.790	9.8	43.5	34.5	38.3	5.2	-41.1	0.0	1.0	46.9	37.9	74.0	54.0	-27.1	-16.1	Noise floor
11.550	9.8	45.6	34.7	38.8	5.4	-41.6	0.0	1.0	49.3	38.4	74.0	54.0	-24.7	-15.6	Noise floor
16.185	9.8	48.3	37.6	38.5	6.7	-45.8	0.0	1.0	48.7	38.0	74.0	54.0	-25.3	-16.0	Noise floor
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2.720	9.8	49.6	39.3	30.0	2.2	-43.2	0.0	2.0	40.6	30.2	74.0	54.0	-33.4	-23.8	V
5.440	9.8	54.4	43.9	33.9	3.4	-44.8	0.0	2.0	48.8	38.3	74.0	54.0	-25.2	-15.7	V
8.160	9.8	47.4	37.4	37.3	4.4	-43.9	0.0	2.0	47.2	37.3	74.0	54.0	-26.8	-16.7	Noise Floor
2.720	9.8	51.2	46.1	30.0	2.2	-43.2	0.0	1.0	41.2	36.0	74.0	54.0	-32.8	-18.0	H
5.440	9.8	52.6	47.9	33.9	3.4	-44.8	0.0	1.0	46.0	41.3	74.0	54.0	-28.0	-12.7	H
8.160	9.8	44.2	36.6	37.3	4.4	-43.9	0.0	1.0	43.1	35.4	74.0	54.0	-30.9	-18.6	Noise Floor
						No more spurious emissions was detected up to 40GHz									
	9.8														

	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
f	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Dist	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
Read	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
AF	Cable Loss	HPF	High Pass Filter		
CL					

08/20/03 **High Frequency Measurement**

Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: THANH NGUYEN
Project #: 03U2029-3
Company: POINT RED
EUT Descrip.: Point Red 5.7GHz ODU and BASE w 4 antennas
EUT M/N: TransCeiver P/N 10-0004 S/N 0042 with RadioWave Antenna M/N SP2- 5.2H-NS ,Gain 28dBi
Test Target: FCC 15.247
Mode Oper: Tx

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifer 1-26GHz	Spectrum Analyzer	Horn > 18GHz
T73; S/N: 6717 @3m	T87 Miteq 924342	Agilent E4446A Analyzer	

Hi Frequency Cables

☐ (2 ft) ☑ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)

Peak Measurements:
1 MHz Resolution Bandwidth
1MHz Video Bandwidth

Average Measurements:
1 MHz Resolution Bandwidth
10Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
		Tx at LOW Channel 5.730GHz													
		Spurious Emissions at the Restricted Band													
2.675	9.8	52.4	48.6	29.8	2.2	-43.2	0.0	2.0	43.2	39.4	74.0	54.0	-30.8	-14.6	V
5.350	9.8	51.3	45.8	33.8	3.4	-44.8	0.0	2.0	45.6	40.1	74.0	54.0	-28.4	-13.9	V
8.025	9.8	47.6	37.4	37.0	4.4	-44.0	0.0	2.0	47.0	36.8	74.0	54.0	-27.0	-17.2	Noise Floor
2.675	9.8	50.6	41.6	29.8	2.2	-43.2	0.0	2.0	41.4	32.3	74.0	54.0	-32.6	-21.7	H
5.350	9.8	53.2	49.1	33.8	3.4	-44.8	0.0	2.0	47.6	43.4	74.0	54.0	-26.4	-10.6	H
8.025	9.8	45.5	35.4	37.0	4.4	-44.0	0.0	2.0	44.9	34.8	74.0	54.0	-29.1	-19.2	Noise floor
10.700	9.8	43.6	32.9	38.3	5.2	-41.2	0.0	1.0	46.8	36.1	74.0	54.0	-27.2	-17.9	Noise floor
11.460	9.8	42.2	32.8	38.7	5.4	-41.4	0.0	1.0	45.8	36.5	74.0	54.0	-28.2	-17.5	Noise floor
13.375	9.8	46.8	36.7	39.8	5.9	-43.8	0.0	1.0	49.8	39.7	74.0	54.0	-24.2	-14.3	Noise Floor
16.050	9.8	46.5	37.2	38.2	6.7	-45.7	0.0	1.0	46.6	37.4	74.0	54.0	-27.4	-16.6	Noise Floor
		No more spurious emissions was detected up to 40GHz.													
		Tx at Mid Channel 5.775GHz													
2.698	9.8	51.7	46.5	29.9	2.2	-43.2	0.0	2.0	42.6	37.3	74.0	54.0	-31.4	-16.7	V
5.395	9.8	54.0	48.1	33.9	3.4	-44.8	0.0	2.0	48.4	42.5	74.0	54.0	-25.6	-11.5	V
8.092	9.8	48.4	35.9	37.2	4.4	-43.9	0.0	2.0	48.0	35.5	74.0	54.0	-26.0	-18.5	Noise floor
2.698	9.8	49.4	42.5	29.9	2.2	-43.2	0.0	2.0	40.2	33.4	74.0	54.0	-33.8	-20.6	H
5.395	9.8	54.1	50.4	33.9	3.4	-44.8	0.0	2.0	48.5	44.8	74.0	54.0	-25.5	-9.2	H
8.092	9.8	48.4	36.2	37.2	4.4	-43.9	0.0	2.0	48.0	35.8	74.0	54.0	-26.0	-18.2	Noise floor
10.790	9.8	45.5	33.9	38.3	5.2	-41.1	0.0	1.0	48.9	37.3	74.0	54.0	-25.1	-16.7	Noise floor
11.550	9.8	46.6	34.5	38.8	5.4	-41.6	0.0	1.0	50.3	38.1	74.0	54.0	-23.7	-15.9	Noise floor
16.185	9.8	49.4	38.2	38.5	6.7	-45.8	0.0	1.0	49.8	38.6	74.0	54.0	-24.2	-15.4	Noise floor
		No more spurious emissions was detected up to 40GHz.													
		Tx at High channel 5.820GHz													
2.720	9.8	56.9	54.9	30.0	2.2	-43.2	0.0	2.0	47.8	45.9	74.0	54.0	-26.2	-8.1	V
5.440	9.8	55.1	52.3	33.9	3.4	-44.8	0.0	2.0	49.5	46.8	74.0	54.0	-24.5	-7.2	V
8.160	9.8	47.9	36.0	37.3	4.4	-43.9	0.0	2.0	47.7	35.9	74.0	54.0	-26.3	-18.1	Noise Floor
2.720	9.8	52.4	47.4	30.0	2.2	-43.2	0.0	1.0	42.4	37.3	74.0	54.0	-31.6	-16.7	H
5.440	9.8	51.6	45.2	33.9	3.4	-44.8	0.0	1.0	45.1	38.6	74.0	54.0	-28.9	-15.4	H
8.160	9.8	48.4	36.6	37.3	4.4	-43.9	0.0	1.0	47.2	35.5	74.0	54.0	-26.8	-18.5	Noise Floor
		No more spurious emissions was detected up to 40GHz													
	9.8														

	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
f	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Dist	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
Read	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
AF	Cable Loss	HPF	High Pass Filter		
CL					

AC Line Conducted Emissions
Test Requirement: 15.107, 15.207

Measurement Equipment Used:

Rohde & Schwarz EMI Receiver ESHS-20
Fischer Custom Communication LISN, FCC-LISN-50/250-25-2

Test Procedure

1. The EUT was placed on a wooden table 40 cm from a vertical ground plane and approximately 80 cm above the horizontal ground plane on the floor. The EUT was set to transmit in normally.
2. Line conducted data was recorded for both NEUTRAL and HOT lines.

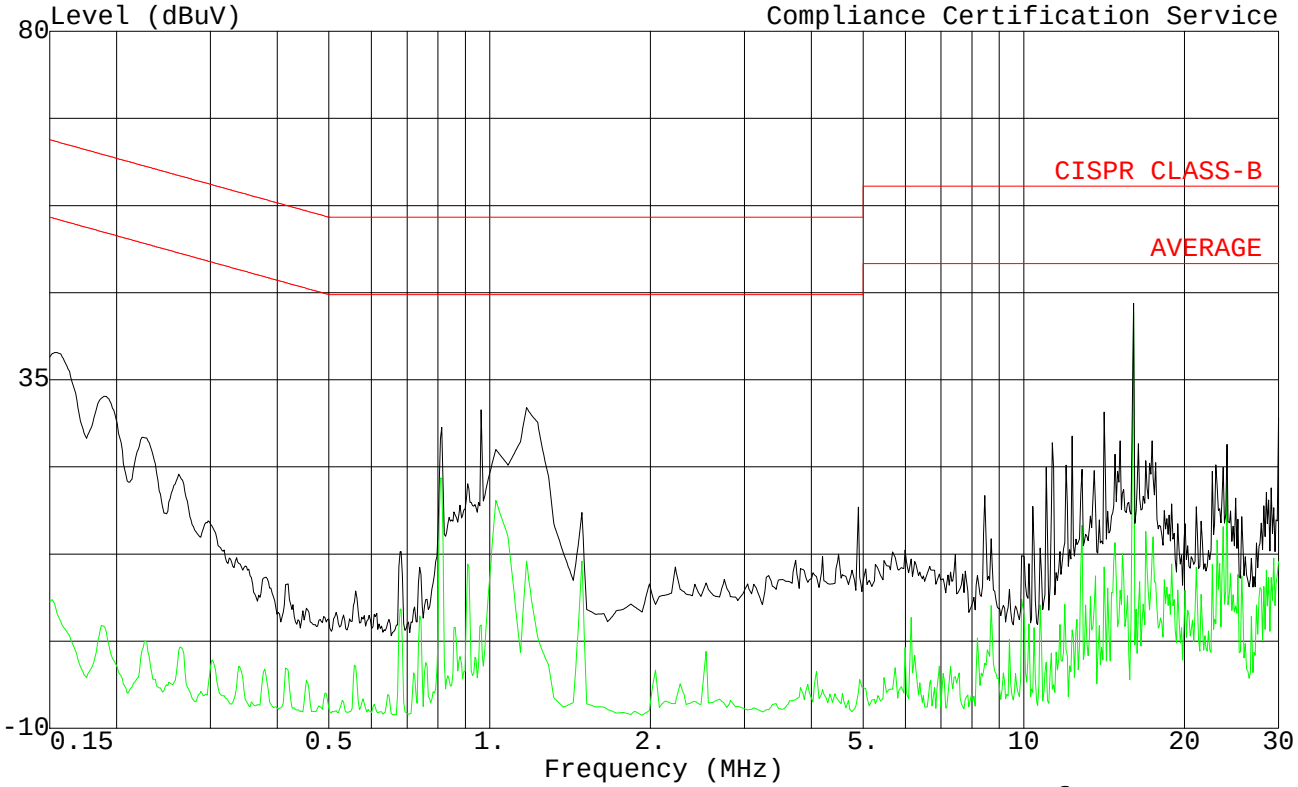
Test Results

PASS. Refer to data sheets for base station and cpe configurations below.

COMPLIANCE Engineering Service, Inc.
FCC,VCCI,CISPR,CE
UL,CSA,TUV

561F Monterey Road,
San Jose, CA 95037 USA
Tel: (408) 463-0885
Fax: (408) 463-0888

Data#: 7 File#: 03U2029.EMI Date: 06-03-2003 Time: 14:24:54



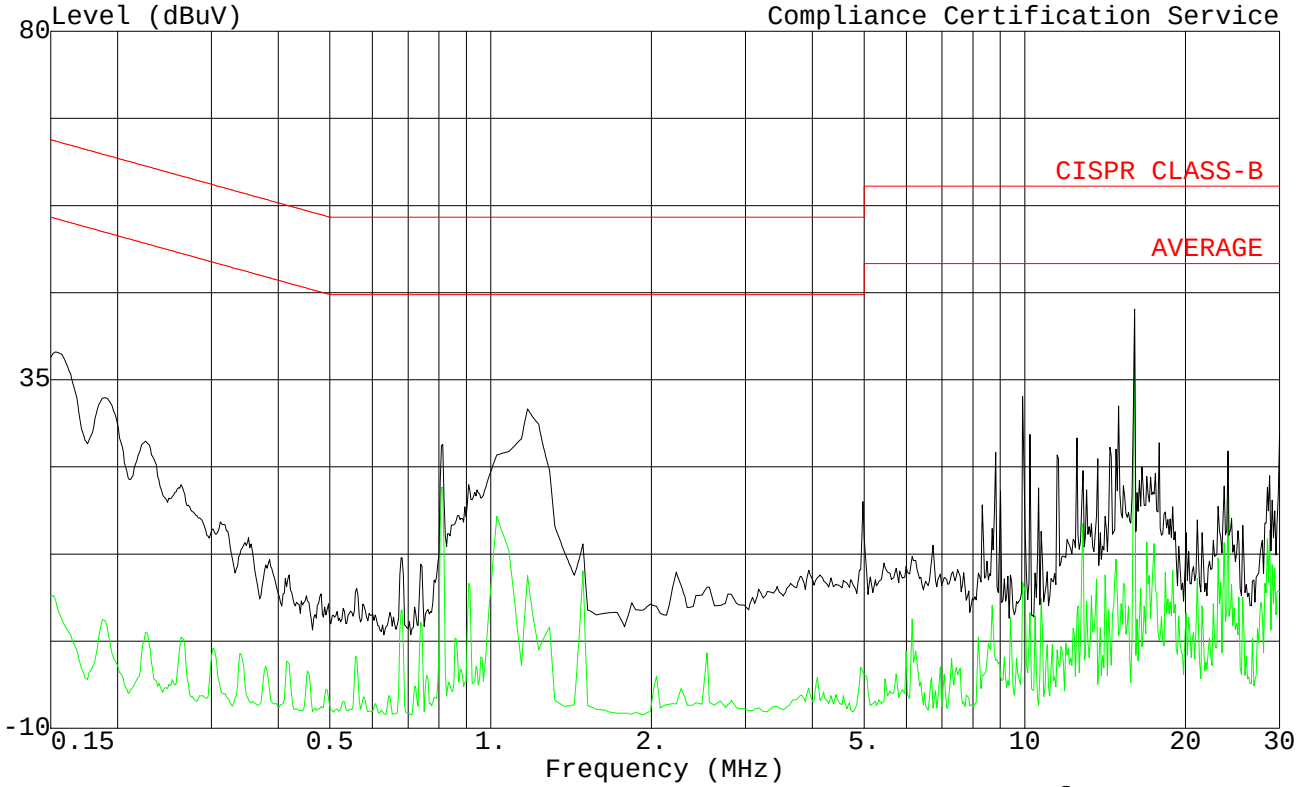
Trace: 5 Ref Trace:

Project # : 03U2029-1
Test Engineer : William Zhuang
Company : Point Red Technologies
EUT : Point Red 5.7GHz ODU & CPE IDU
Model : MIcro Red CPE
Configuration : EUT/Support Equipment
Target of Test: EN55022, Class B
: 115Vac, 60Hz
: Line 1, Peak (Black), Average (Green)

COMPLIANCE Engineering Service, Inc.
FCC,VCCI,CISPR,CE
UL,CSA,TUV

561F Monterey Road,
San Jose, CA 95037 USA
Tel: (408) 463-0885
Fax: (408) 463-0888

Data#: 14 File#: 03U2029.EMI Date: 06-03-2003 Time: 14:37:27



Trace: 12 Ref Trace:

Project # : 03U2029-1
Test Engineer : William Zhuang
Company : Point Red Technologies
EUT : Point Red 5.7GHz ODU & CPE IDU
Model : MIcro Red CPE
Configuration : EUT/Support Equipment
Target of Test: EN55022, Class B
: 115Vac, 60Hz
: Line 2, Peak (Black), Average (Green)

Minimum 6 dB Bandwidth
Test Requirement: 15.247(a)2

Measurement Equipment Used:

Agilent E4446A spectrum analyzer, 3 Hz – 44 GHz
10 dB attenuator
2 ft length coaxial cable

Test Procedures

The EUT was configured on a test bench. The EUT was set for continuous operation . Frequency was set to LOW channel. While the transmitter broadcast a steady stream of digital data, the analyzer MAX HOLD function was used to capture the envelope of the transmission occupied bandwidth.

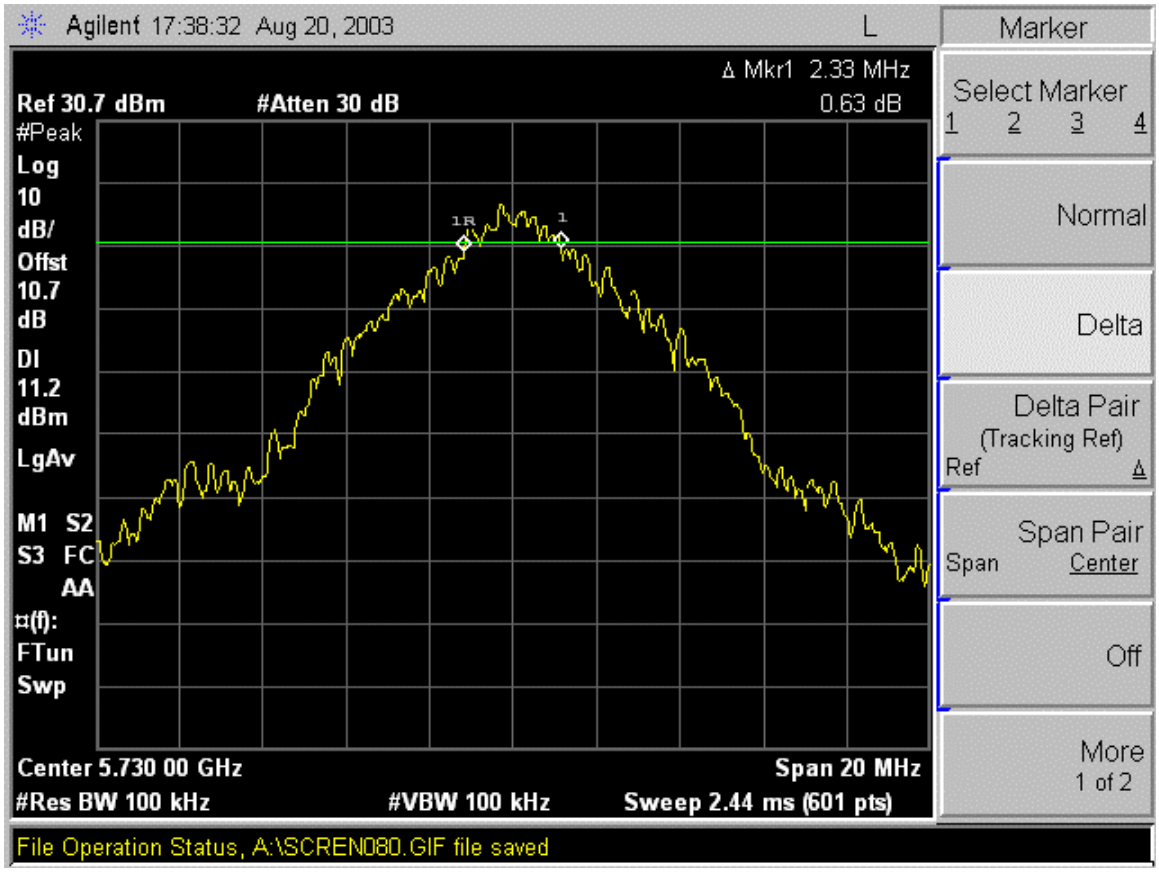
The test was repeated at MID channel and at HIGH channel.

Test Results: Refer to attached spectrum analyzer charts. Data taken with RES BW of 100 kHz shows minimum 6 dB BW of 2.23 MHz. Minimum requirement: 500 kHz

Channel	**Frequency, MHz**
Low	5730
Mid	5775
High	5820

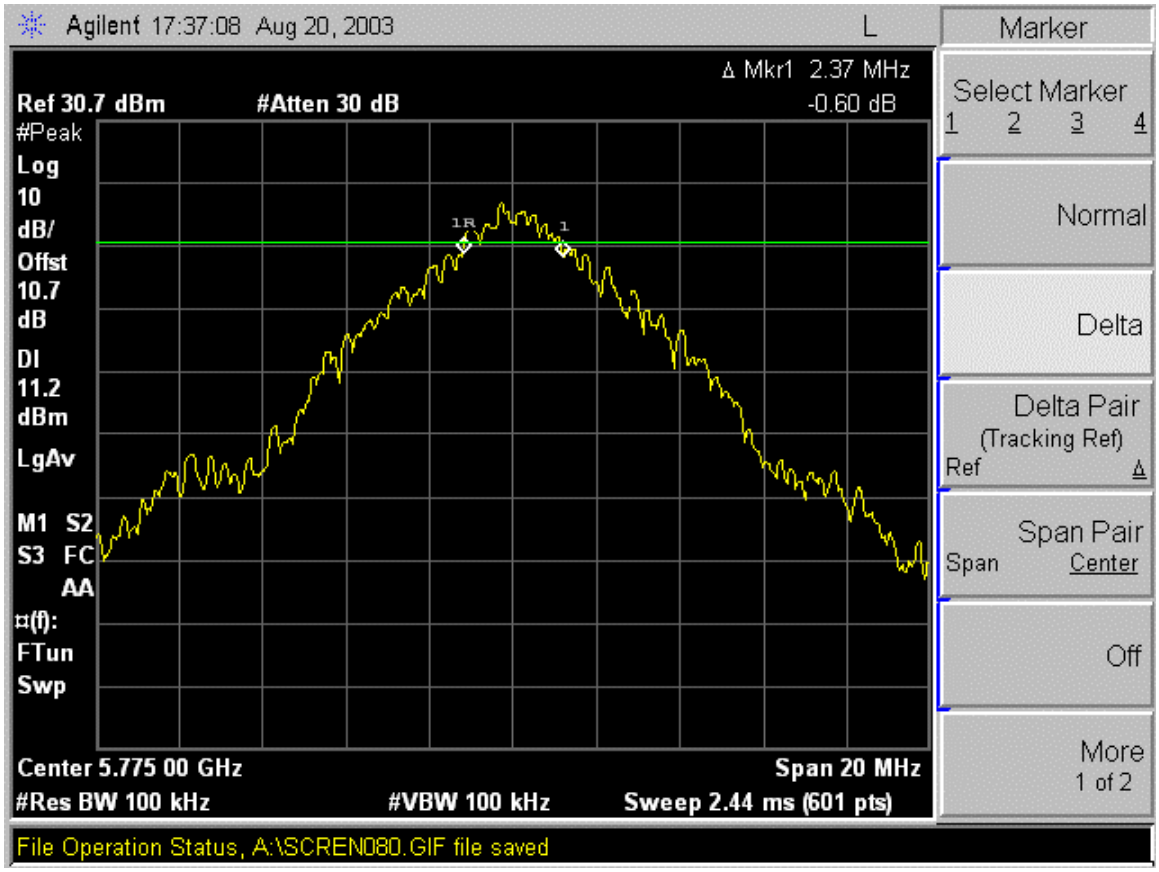
15.247(a)2: Minimum 6 dB Bandwidth

LOW Channel



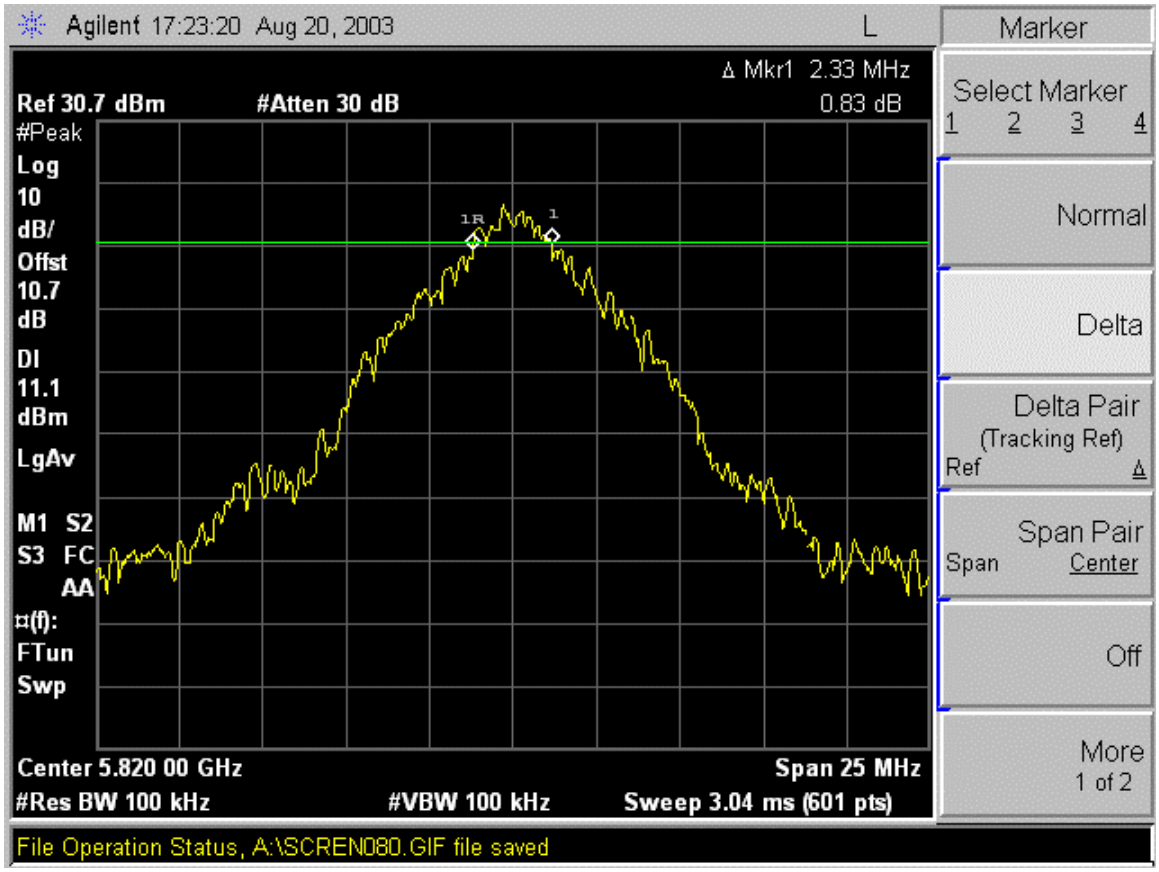
Minimum 6 dB BW

MID Channel

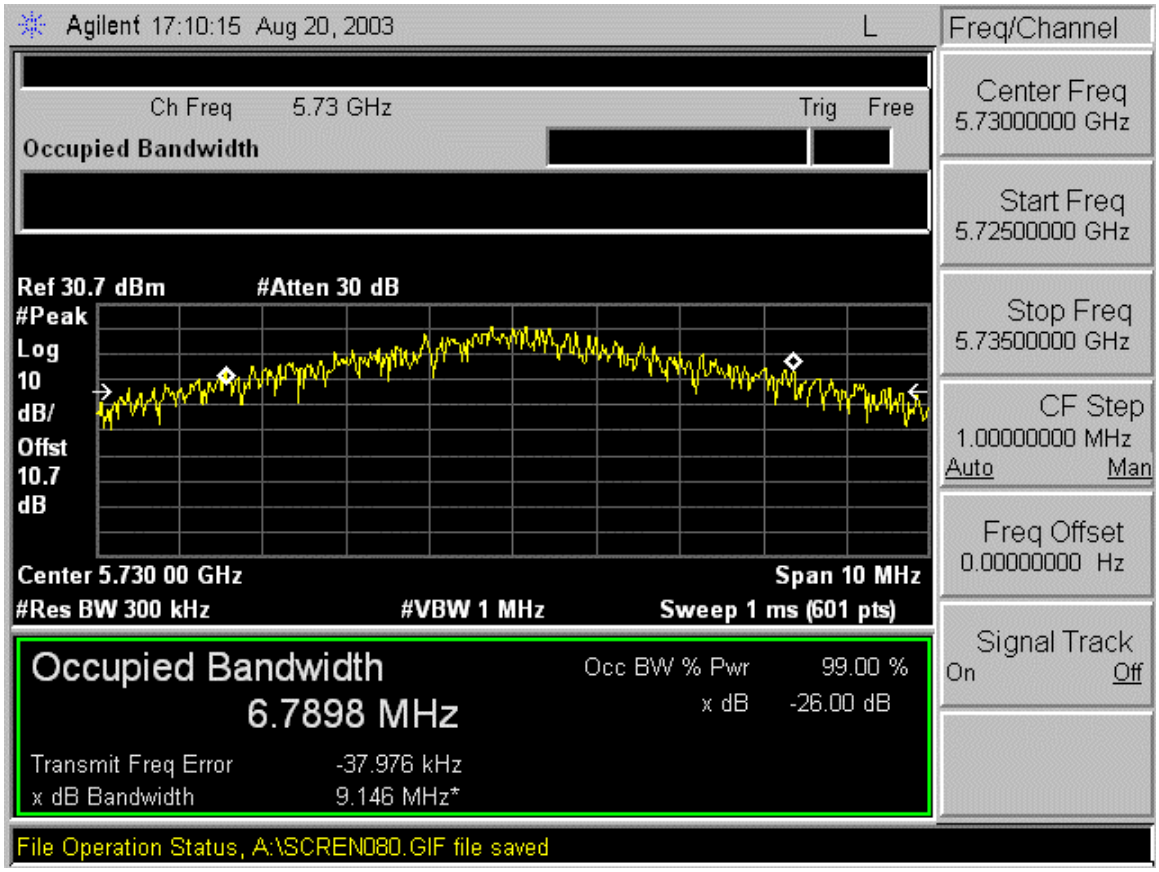


Minimum 6 dB BW

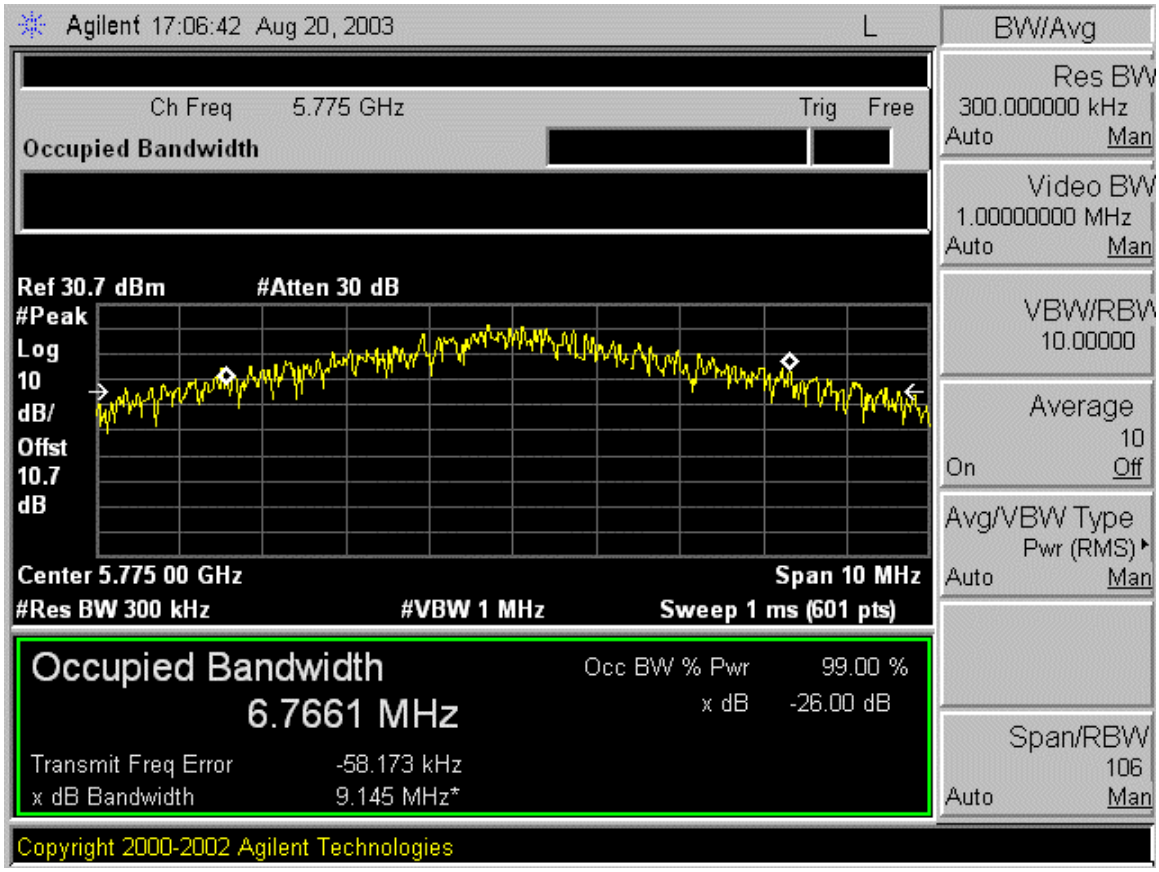
HIGH Channel



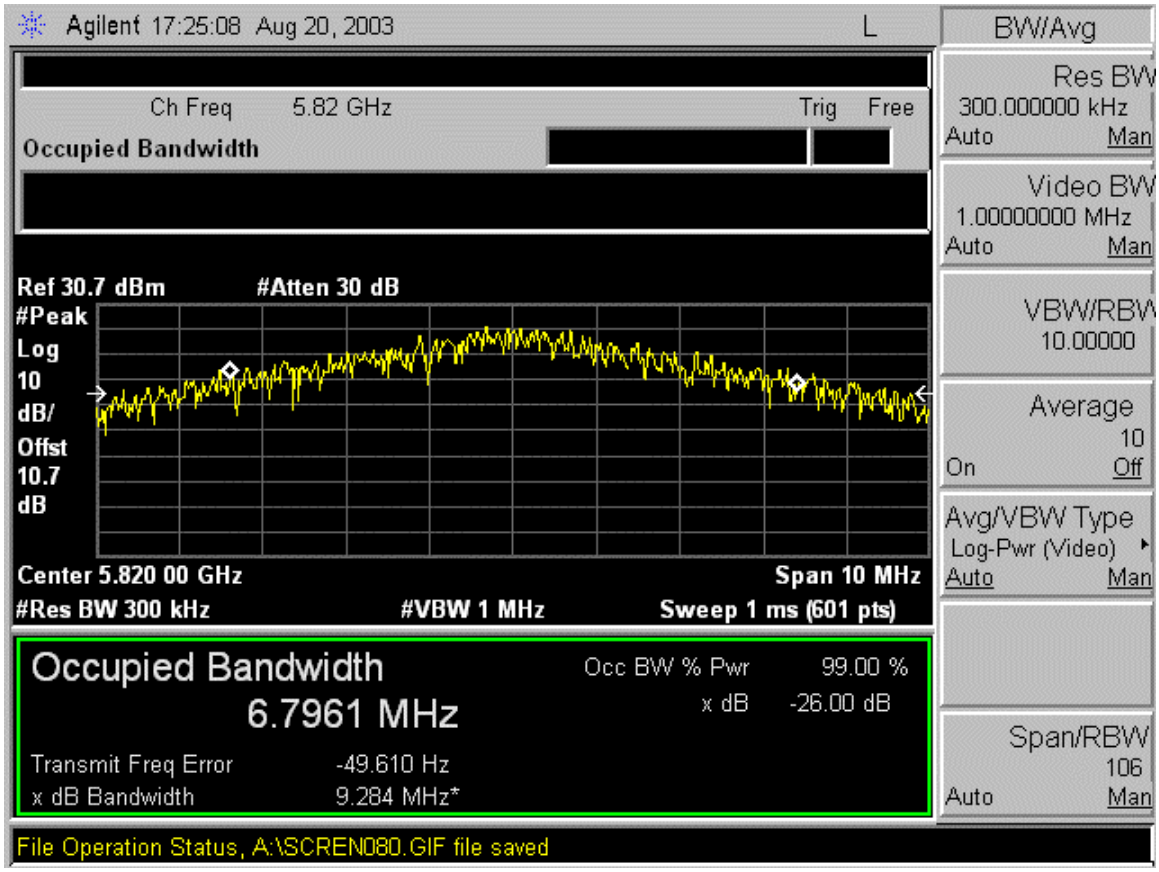
99% Occupied Bandwidth (Industry Canada RSS 210 requirement)
LOW Channel



99% Occupied Bandwidth (Industry Canada RSS 210 requirement)
MID Channel



99% Occupied Bandwidth (Industry Canada RSS 210 requirement)
HIGH Channel



RF Power Output
Test Requirement: 15.247(b)

Measurement Equipment Used:

Agilent E4416A power meter
Agilent E9327A peak RF power sensor
HP 8563 Spectrum analyzer
20 dB attenuator

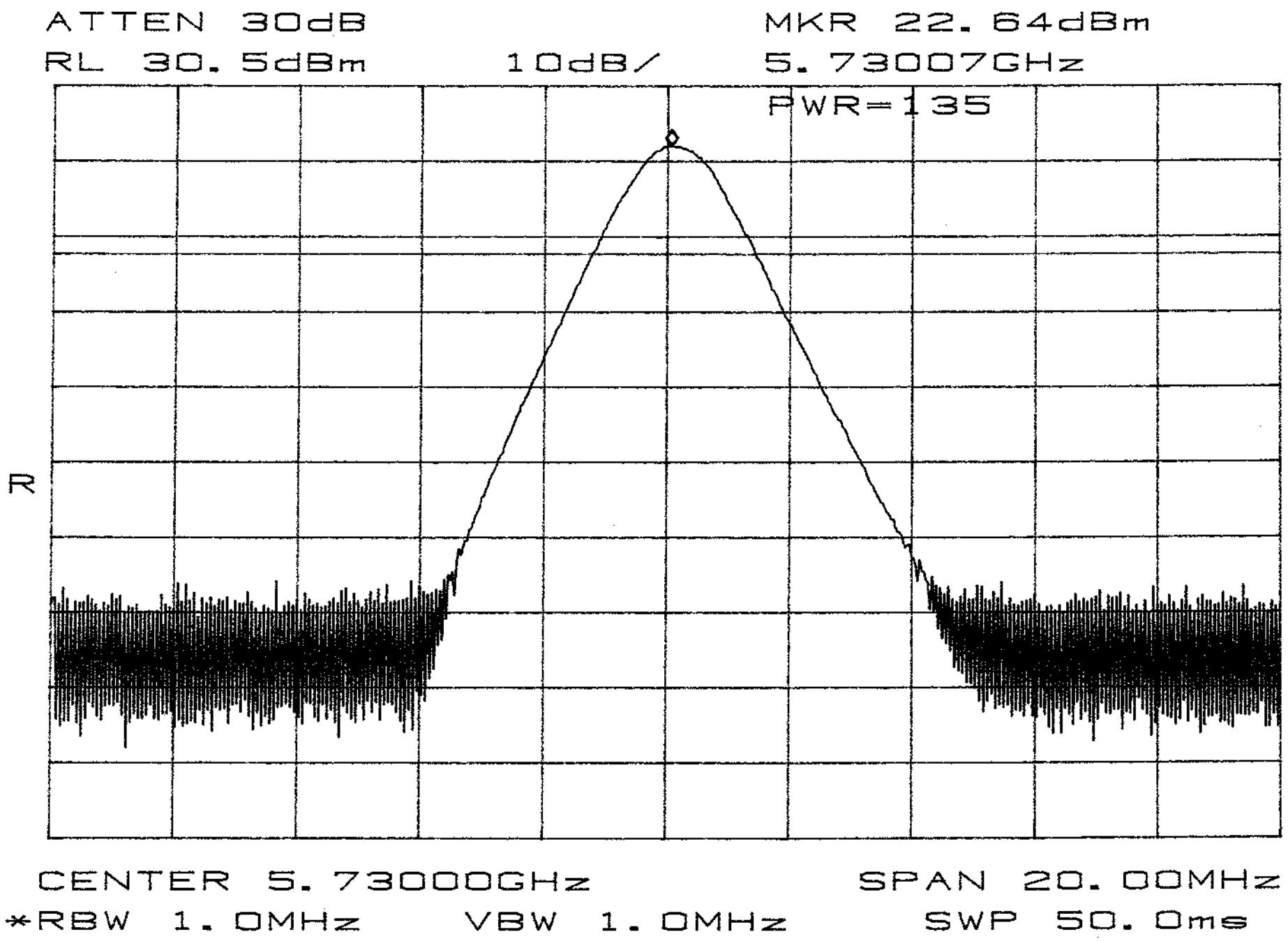
Test Procedures

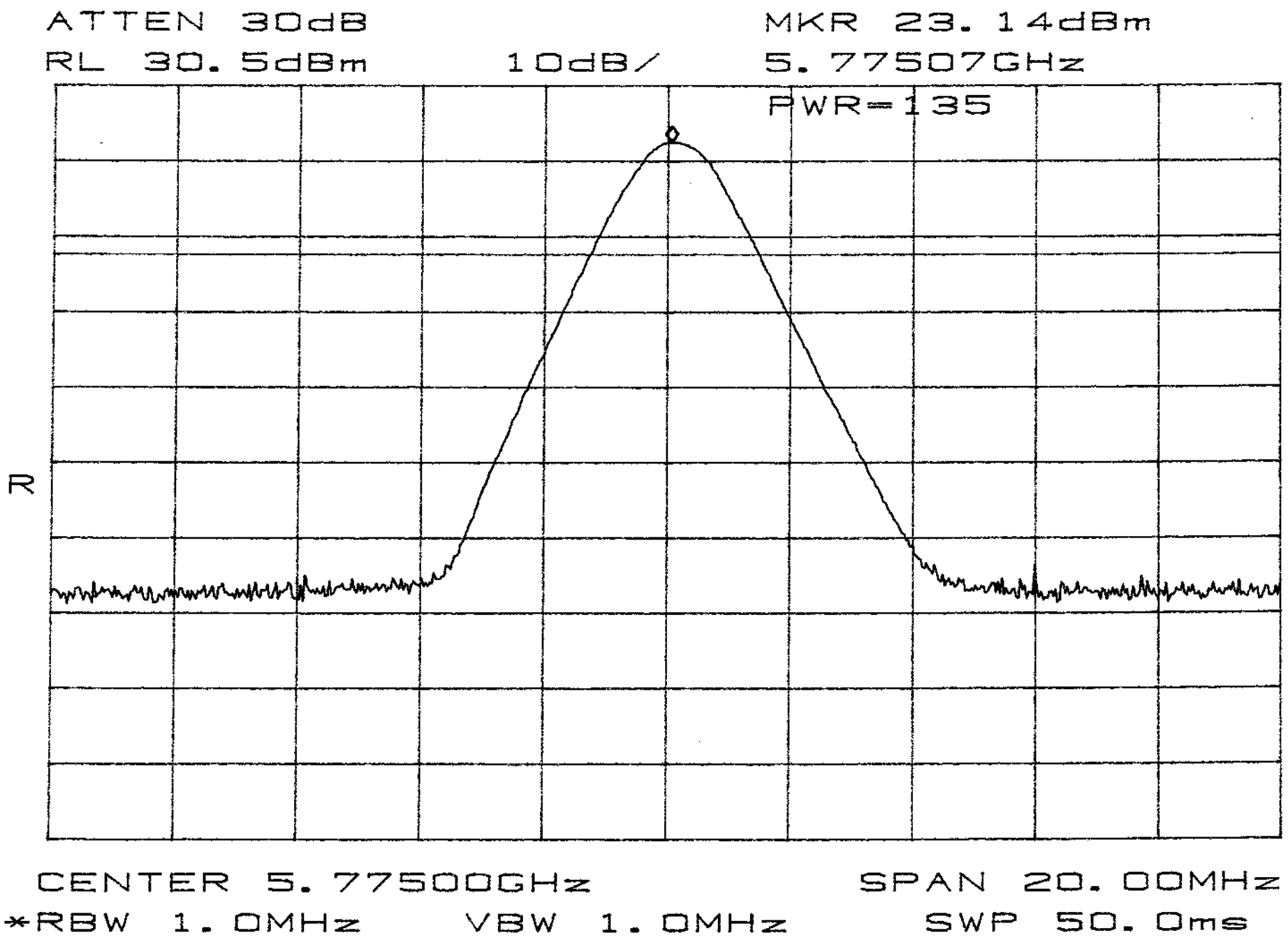
1. The EUT was configured on a test bench. The power meter was zeroed and calibrated. The control software was activated and power was set to produce highest output level.
2. The 20 dB attenuator was connected to the antenna port of the EUT. The power meter head was connected to the other end of the attenuator. Peak power was read directly off the meter, accounting for the 20 dB attenuator.
3. The process in (1) and (2) was repeated for MID channel and HIGH channel.
4. The EUT modulation is FSK, a form of FM modulation. The carrier amplitude remains constant during modulation, only frequency is changed. A peak power meter will read the same value for FSK modulated signal and the unmodulated CW signal.
The EUT was set to produce CW and connected to a spectrum analyzer. Spectrum analyzer readings were within $\pm$ 0.3 dB of the peak power meter reading for the modulated output. Spectrum analyzer charts are presented below.

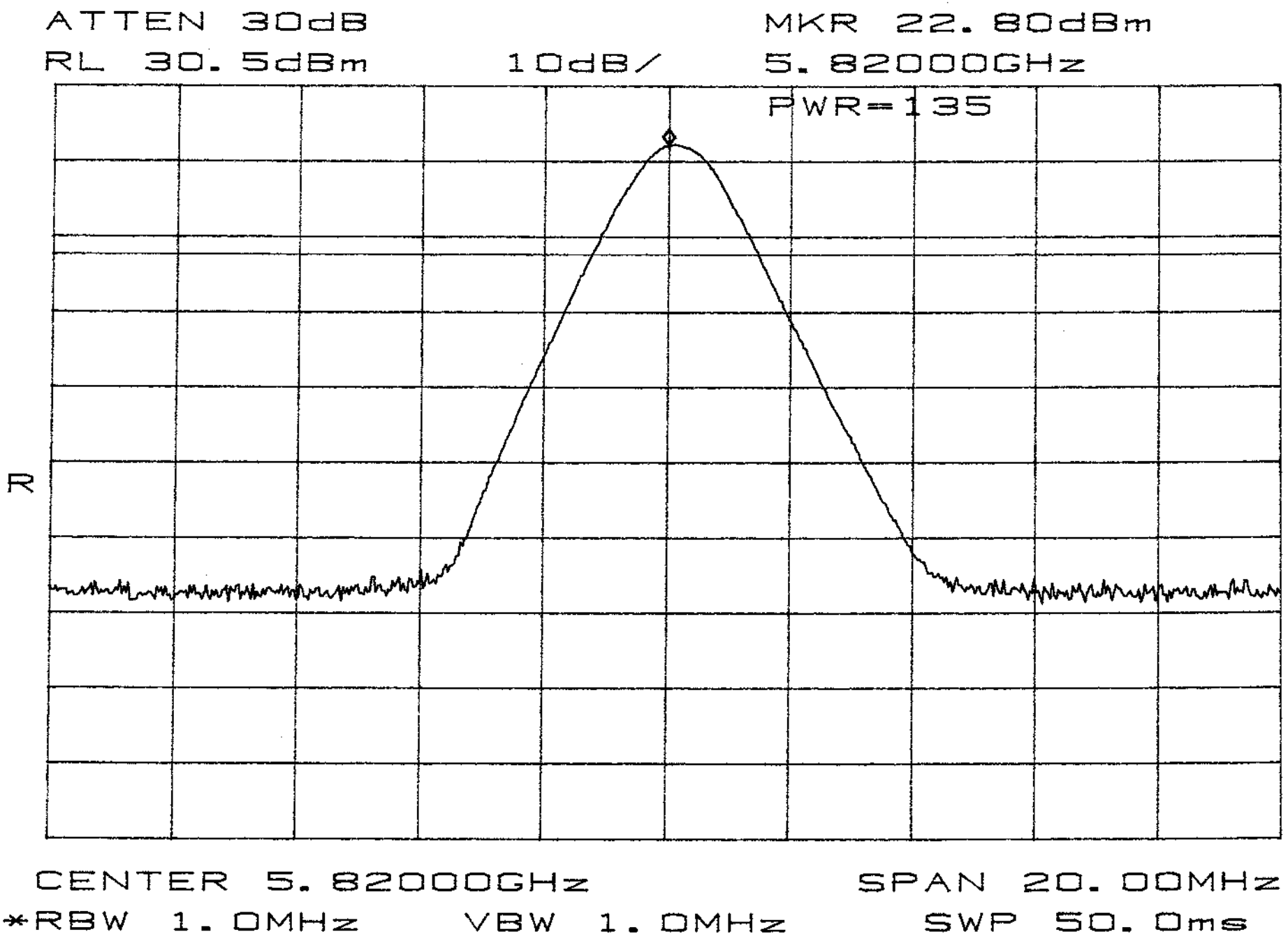
Test Results

Power level readings converted to dBm are shown below. Refer also to spectrum analyzer graphs. Reference level offset corrects for external attenuation and cable loss.

Channel	Frequency, MHz	Output Power, dBm
1 LOW	5730	22.9
3 MID	5775	23.1
5 HIGH	5820	22.7


ATTEN 30dB
RL 30.5dBm
10dB/
MKR 22.64dBm
5.73007GHz
PWR=135
R
CENTER 5.73000GHz
SPAN 20.00MHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms


ATTEN 30dB
RL 30.5dBm
10dB/
MKR 23.14dBm
5.77507GHz
PWR=135
R
CENTER 5.77500GHz
SPAN 20.00MHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms


ATTEN 30dB
RL 30.5dBm
10dB/
MKR 22.80dBm
5.82000GHz
PWR=135
R
CENTER 5.82000GHz
SPAN 20.00MHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms

Spurious Emissions, Conducted
Test Requirement: 15.247(c)

Measurement Equipment Used:

Agilent E4446A spectrum analyzer, 3 Hz – 44 GHz
10 dB attenuator

Test Procedure

1. The EUT was configured on a test bench. The cable was connected between the EUT antenna port and the spectrum analyzer input port.

Spectrum analyzer RES BW was set to 100 kHz. While the transmitter broadcast a steady stream of digital data, the analyzer MAX HOLD function was used to capture the envelope of the transmission.

Readings were taken out to 10fo.

2. The process in (1) was repeated for MID channel and HIGH channel.

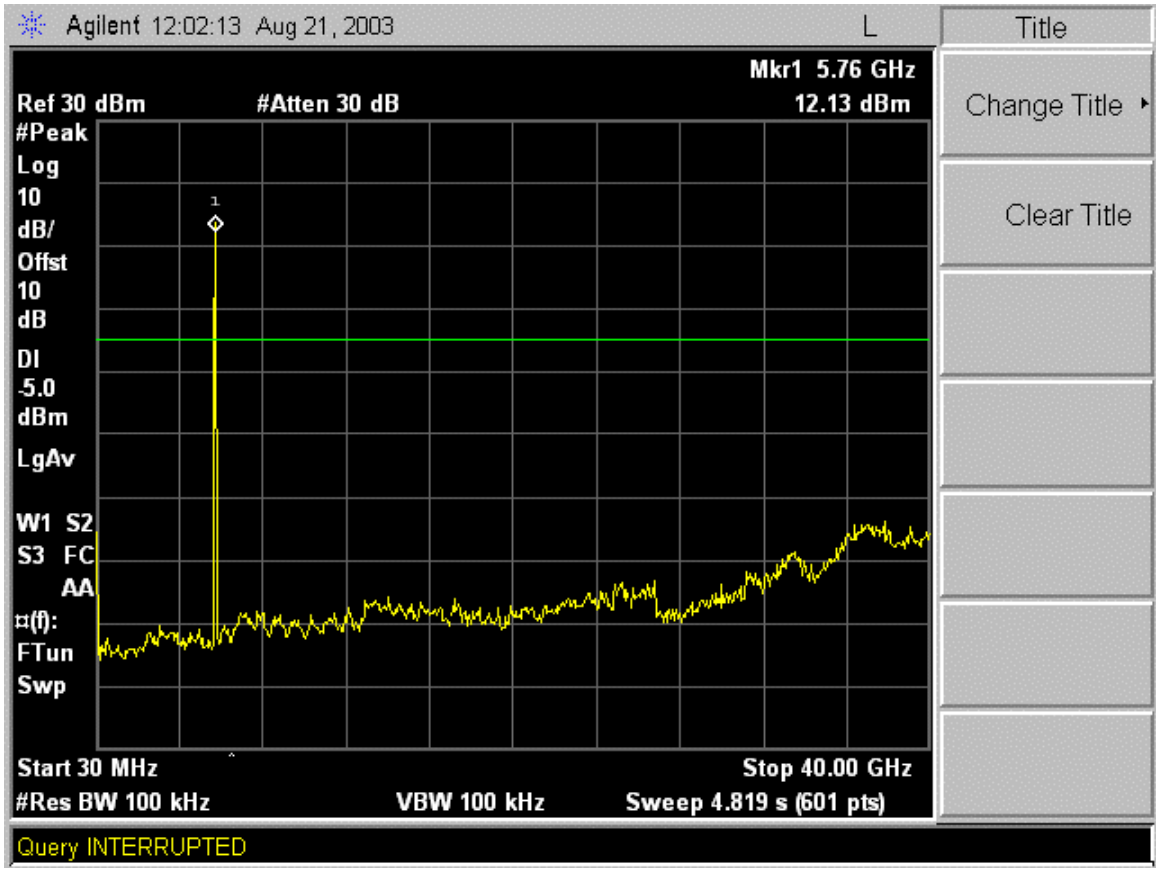
Test Results

Refer to attached data sheets. Data shows out of band emissions are suppressed well below the -20 dBc minimum required by the Rules.

Channel	**Frequency, MHz**
1 LOW	5730
4 MID	5775
5 HIGH	5820

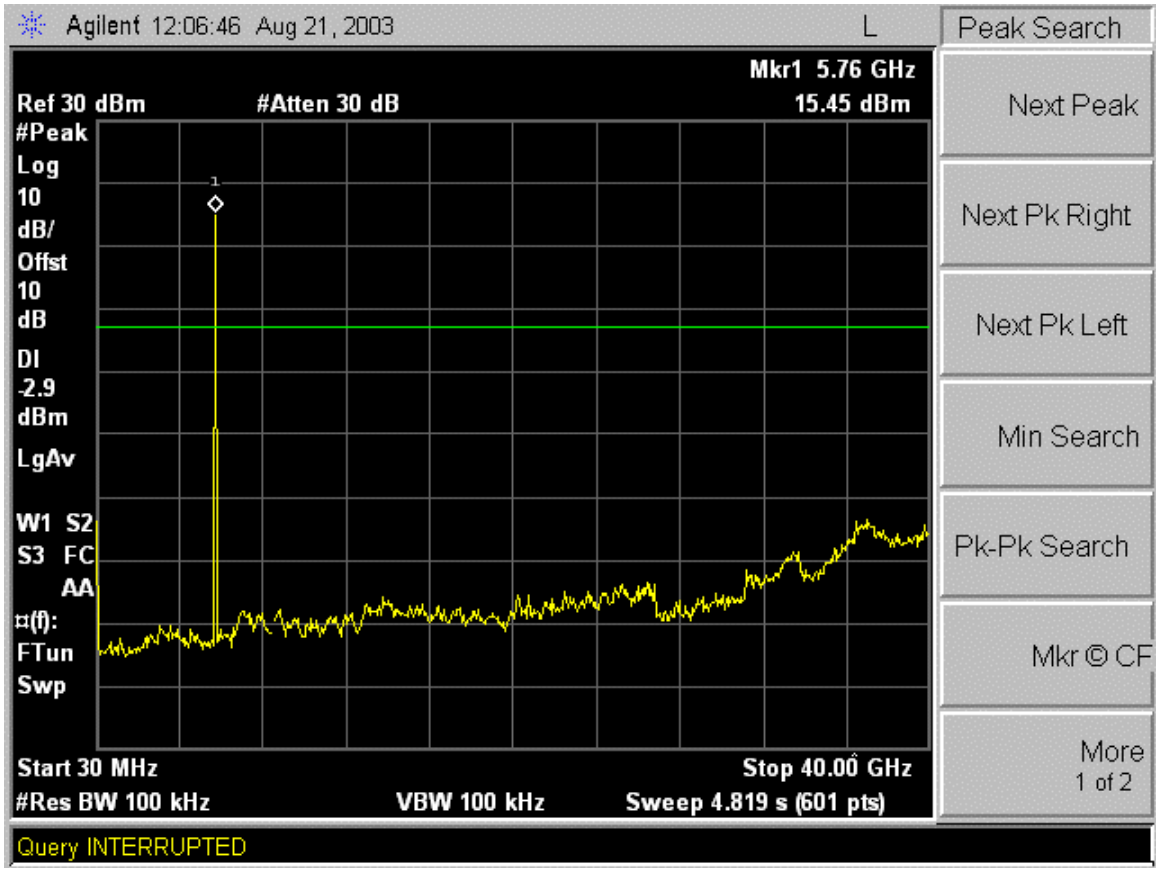
15.247(c): Spurious Emissions, Conducted, -20 dBc

LOW Channel



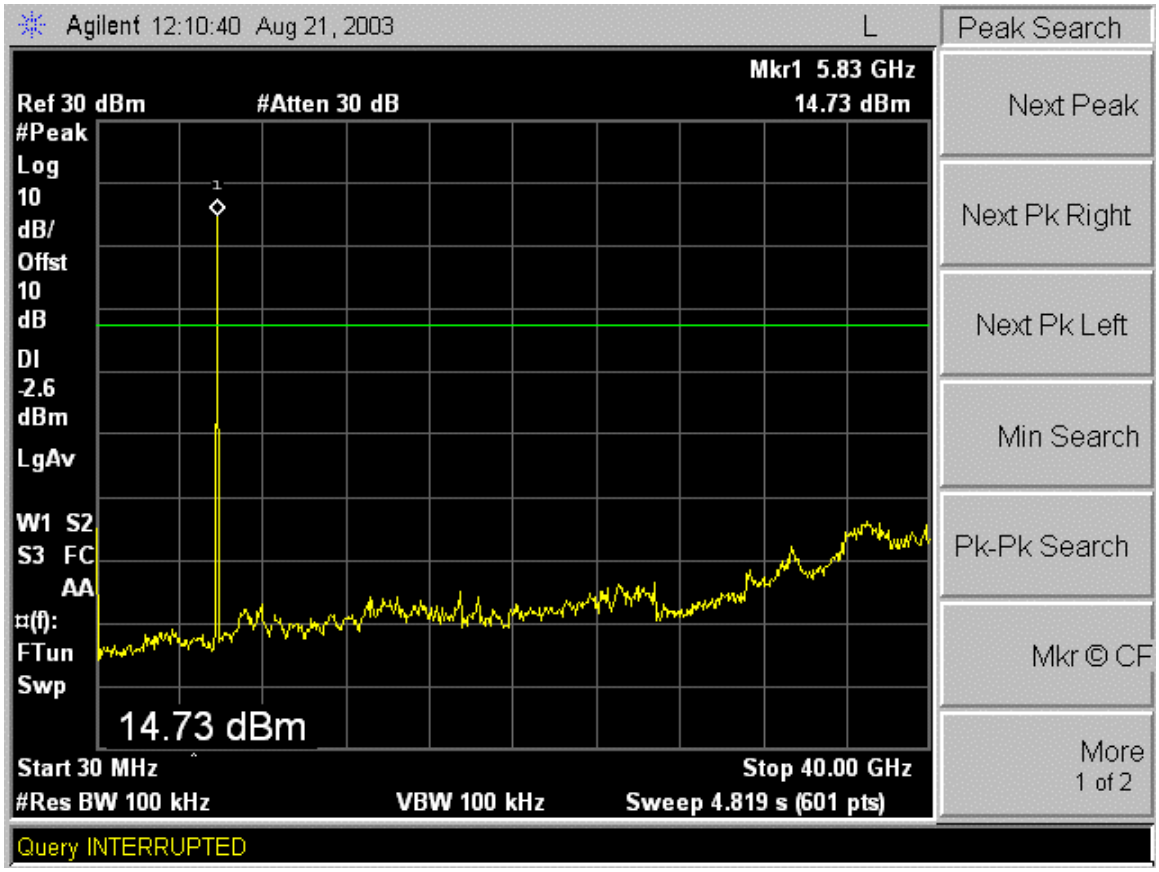
15.247(c): Spurious Emissions, Conducted, -20 dBc

MID Channel



15.247(c): Spurious Emissions, Conducted, -20 dBc

High Channel



Power Spectral Density
Test Requirement: 15.247(d)

Measurement Equipment Used:

HP 8563 Spectrum Analyzer (Pointred Technologies)
10 dB attenuator
18" length coaxial cable (supplied with EUT)

Test Procedure

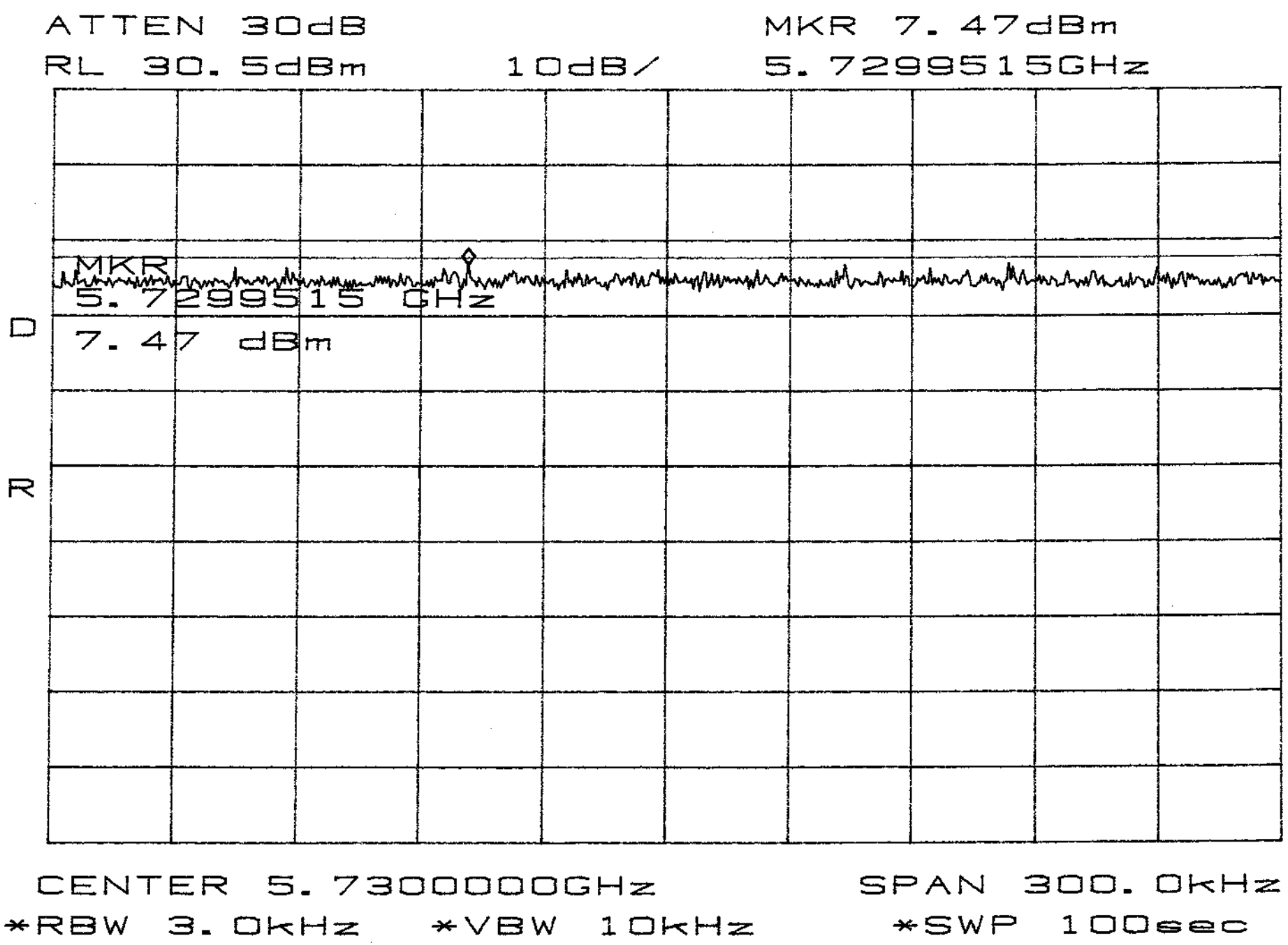
For the LOW channel, the emission peak was set to the center of the display. The SPAN was set to 300 kHz, the RES BW = 3kHz, VID BW ≥3 kHz, and SWEEP TIME was set to 100 seconds. The maximum trace was recorded and compared to the 8 dBm limit.

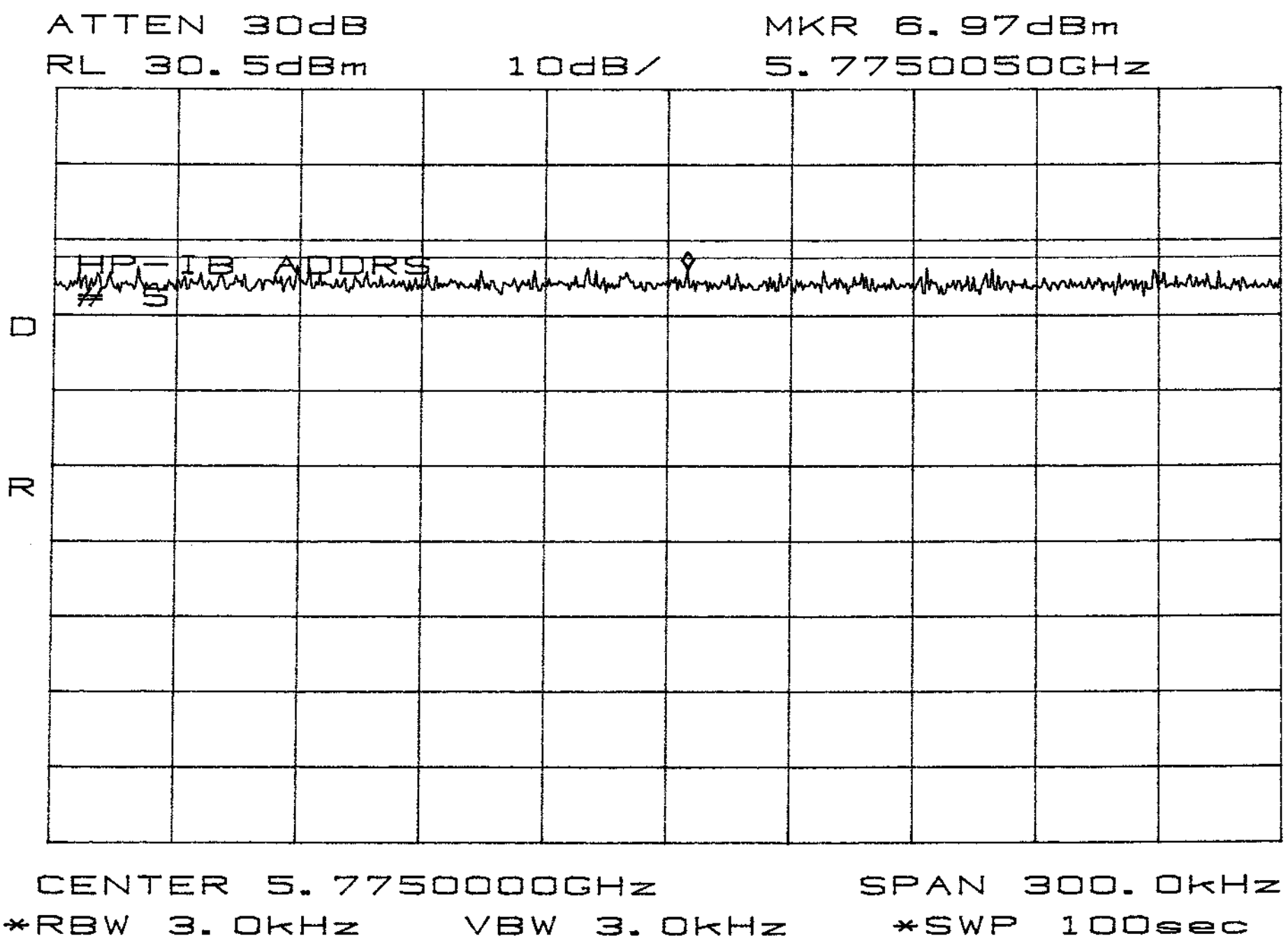
The test was repeated for MID and HIGH channel.

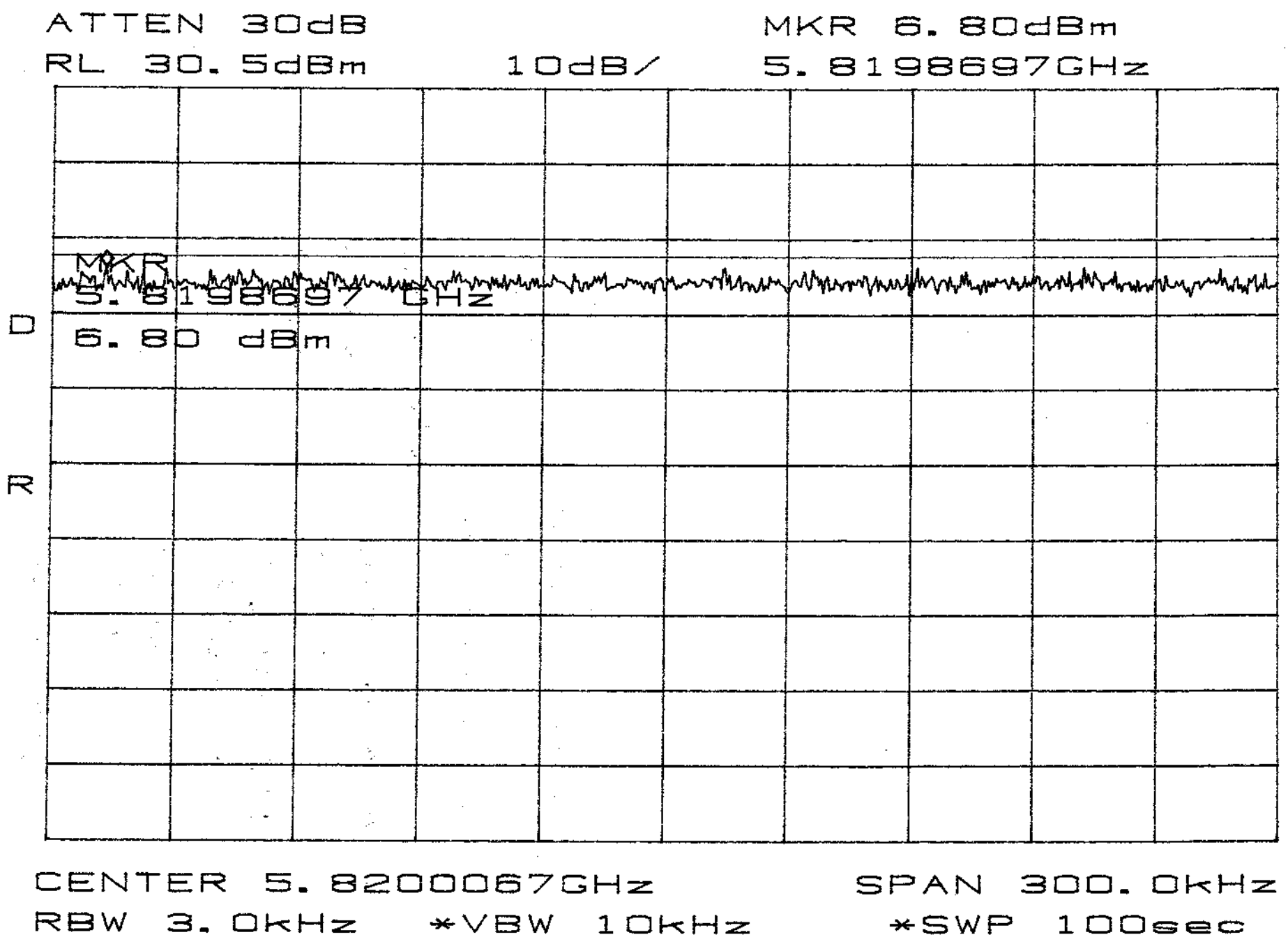
Test Results

Maximum measured PSD was approximately 7.5 dBm. Maximum allowed psd is 8 dBm. Refer to attached spectrum analyzer charts.

Channel	**Frequency, MHz**
1 (Low)	5730
4 (Mid)	5775
5 (High)	5820


ATTEN 30dB
MKR 7.47dBm
RL 30.5dBm
10dB/
5.7299515GHz
MKR
5.7299515 GHz
D
7.47 dBm
R
CENTER 5.7300000GHz
SPAN 300.0kHz
*RBW 3.0kHz
*VBW 10kHz
*SWP 100sec


ATTEN 30dB
MKR 6.97dBm
RL 30.5dBm
10dB/
5.7750050GHz
HP-IB ADDRS
#5
D
R
CENTER 5.7750000GHz
SPAN 300.0kHz
*RBW 3.0kHz
VBW 3.0kHz
*SWP 100sec


ATTEN 30dB
RL 30.5dBm
10dB/
MKR 6.80dBm
5.8198697GHz
MKR
5.8198697 GHz
6.80 dBm
D
R
CENTER 5.8200067GHz
SPAN 300.0kHz
RBW 3.0kHz
*VBW 10kHz
*SWP 100sec

Pointred Technologies
MPE Calculations

FCC ID: QDU-MCRD-5R7

RF Hazard Distance Calculation

mW/cm2 from Table1: 1.00

Max RF Power P, dBm	TX Antenna G, dBi	MPE Safe Distance, cm
23.0	**28.0**	**100.1**
23.0	**23.0**	**56.3**
23.0	**21.0**	**44.7**
23.0	**19.0**	**35.5**
23.0	**16.0**	**25.1**

Basis of Calculations:

E^2/3770 = S, mW/cm2
E, V/m = (Pwatts*Ggain*30)^.5/d, meters
d = ((Pwatts*G*30)/3770*S))^0.5
Pwatts*Ggain = 10^(PdBm-30+GdBi)/10)