



FCC Part 15.247 Certification Application

**Industrie Canada RSS210 Certification
Application**

**EMI Test Report
on
SilverSpring eBridge Radio
Model: 205-000017**

FCC ID: OWS-NIC506

IC ID: 5975A-NIC506

Report #:SSN_08

Prepared by:
David Waitt
21565 Mary Alice Way
Los Gatos California
david@waitt.us
(408) 832 7053

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General Information

Unit(s) Under Test: 900MHz eBridge Radio
Model(s): 205-000017

Product Description: eBridge Radio

FCC ID: OWS-NIC506
IC ID: 5975A-NIC506

Tested For: Silver Spring Networks
2755 Campus Drive
Suite 205
San Mateo, CA 94403

Tested At: (Radiated Emissions)
Elliott Laboratories
41039 Boyce Road
Fremont, CA

(RF Conducted tests)
David Waitt
21656 Mary Alice Way
Los Gatos, California, 95033

Tested By: Mehran Birgani, Test Engineer, Elliott Labs
Rafael Veralas, Test Engineer, Elliott Labs
David Waitt, (Independent Consultant)

Tested To: FCC CFR 47, Part 15.247, 900MHz FHSS
IC RSS-210 / Issue 7

Test Procedures: FCC DA00705

Tested On: Dec 2007 / Jan 2008

Requested Certifications: FCC Part 15 Subpart C certification
IC RSS-210 / Issue 7 Certification

Operating Environment: Commercial, Class A

Detailed Product Information

The Relay Radio is a 900MHz FHSS radio that is used to transfer information from SilverSpring wireless electric meters to another wireless network infrastructure.

Number of hopping channels: 83
 Operating frequency range: 902.3 MHz to 926.9 MHz
 Channel spacing: 300kHz
 RF power output: 29.94dBm
 Antenna gain: Approx 6 dBi MAX Omni
 EIRP: 35.94 dBm EIRP
 Antenna type: Single, external, Omni
 Operating voltage: 10.0 VDC
 DUT: Engineering prototype, equivalent to mass produced items.
 Modifications: No modifications were made to the unit during testing
 Environment: Commercial, Industrial, Class A

Test Results Summary

This report presents the results of the tests that verify compliance with FCC Part 15.247 and RSS210 issue 7

A brief results summary of all the in this report is below.

Part 15 Paragraph	RSS-210, Issue 7 Paragraph	Test	Results
15.247(b)(2)	A8.4(1)	Maximum Power	29.94 dBm Max
15.247(a)(1)(i)	A8.1(c)	20dB Bandwidth	295 kHz Max
15.247(d)	A8.5	Out of Band Spurious Emissions	39.3 @ 2000 MHz
15.205	2.2	Radiated Emissions in Restricted bands	4.6dB in spec min @ 6402.0MHz (Restricted Band)
15.247(a)(1)(i)	A8.1(c)	Number of hopping channels	83
15.247(a)(1)(i)	A8.1(b)	Channel Spacing	300kHz
15.247(a)(1)(i)	A8.1(b)	Time on Channel	310ms/20Sec

Test Facilities

All radiated emissions testing for 15.247 (15.205) were performed at:

Elliott Laboratories
41039 Boyce Road
Fremont, CA 94538

Testing was conducted in accordance with DA00705

General:

Pursuant to section 2.948 of the Rules, construction, calibration, and equipment data for chamber 1 has been filed with the Commission.

The FCC recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Within the chamber, ambient levels are well below this requirement. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent FCC requirements.

Antenna, Antenna Mast and Turntable

The Horn antennas that are use to measure radiated emissions above 1000MHz are amounted on a non-conductive antenna mast equipped with a motor drive to vary the antenna height.

DA00705 specifies that the test height above the ground plane shall be 80cm unless the equipment is intended to be floor mounted. During the radiated emissions tests the equipment is positioned on a motorized turntable in conformance with the most recent requirements.

Equipment Lists

Instrument Calibration

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles.

The following test equipment was used to perform the testing

Test Equipment

Radiated Emissions, 30 - 10,000 MHz, 18-Dec-07				
Engineer: Rafael Varelas				
Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	SpecAn 9 KHz-26.5 GHz, Non-Program	8563E	284	21-Jun-08
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	29-May-08
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	25-Aug-08
Hewlett Packard	Preamplifier, 100 kHz - 1.3 GHz	8447E	1606	07-Feb-08
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1657	03-May-08
EMCO	Antenna, Horn, 1-18 GHz (SA40-Purple)	3115	1779	07-Feb-08
Hewlett Packard	High Pass filter, 1.5 GHz (Red System)	P/N 84300-80037 (84125C)	1154	15-Oct-08

Conducted Emissions - AC Power Ports, 15-Jan-08				
Engineer: Mehran Birgani				
Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	LISN, 10 kHz-100 MHz	3825/2	1292	25-Jan-08
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	1401	11-Apr-08
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	25-Aug-08

Radiated Emissions, 30 - 2,000 MHz, 15-Jan-08				
Engineer: Mehran Birgani				
Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	16-Mar-08
Hewlett Packard	SpecAn 9 KHz-26.5 GHz, Non-Program	8563E	284	21-Jun-08
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	25-Aug-08
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	10-May-08
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1657	03-May-08

RF Conducted Tests – Dec 2007				
Engineer: David Waitt				
Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	Spectrum Analyzer	8593A		27 July 2009

Test Methods

Unless otherwise noted in the specific test procedure, tests are performed at a low, middle and high channel band used by the device. Unless otherwise noted, all testing was performed on these channels / frequencies.

902 - 928 MHz Band	
Channel	Freq(MHz)
Low	902.3
Mid	915.4
High	926.9

The device was running special diagnostic software to allow it to transmit random data on a particular channel indefinitely. This diagnostic software allowed the frequency hopping function to be disabled or enabled as tested required.

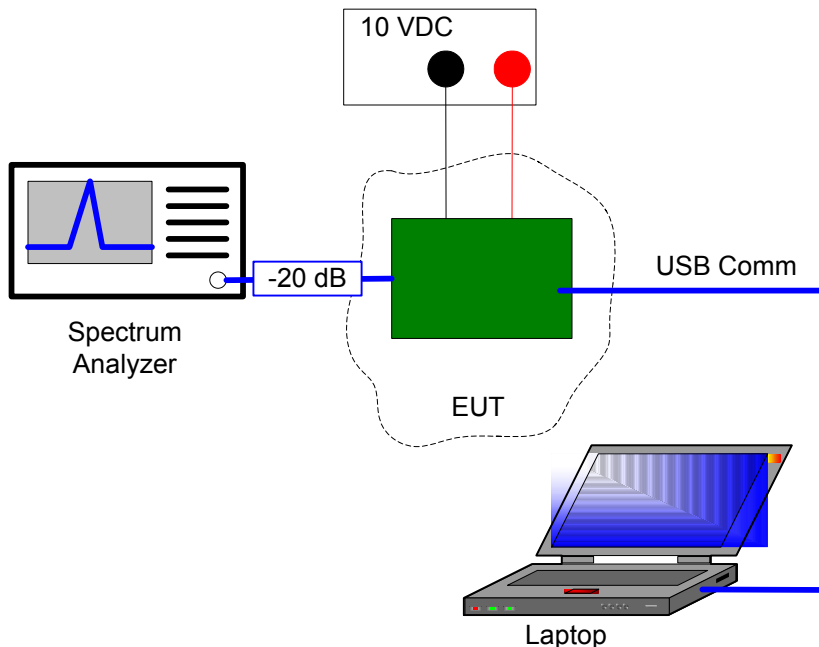
The diagnostic software also allowed variation of the RF transmit power. The maximum power setting that allowed compliance with the radiated emissions requirements (determined during testing) will be programmed into the configuration firmware of the relay radio. This will ensure compliance with the FCC / IC radiated emissions requirements. The test procedures followed are those outlined in FCC Notice DA00705

The tests listed below are performed using the basic “conducted” test setup shown below unless otherwise noted

Part 15	Test
15.247 (b) (2)	RF Transmit power
15.247 (a) (1) (i)	Bandwidth
15.247 (a) (1) (i)	Number of hopping channels
15.247 (a) (1)	Channel Spacing
15.247 (a) (1) (i)	Time on channel

Basic Conducted RF Bench Test Setup

The bench top RF test setup is shown to the right. Unless otherwise noted, the support equipment for the bench tests is listed below.



Support Equipment				
Description	Model number	FCC ID or SN	Manufacturer	Power Cable
Laptop	Satellite	DoC	Toshiba	Laptop PS, unshielded

Test Results

Detailed test procedures and test results are contained in the following sections. In cases where the test setup differs from the "Conducted RF Bench Top" test setup shown earlier, the test setup is also presented within that section of the test report.

Test Conditions			
Temperature	65.7 F	Humidity:	82%
ATM pressure	30.07 in	Grounding:	None
Tested By	David Waitt	Date of Test:	2008 Jan
Test Reference	Refer to individual test results		
Tested Freq Range	Test dependent		
Test Voltage	10 VDC		
Modifications	No internal modifications were made to the unit during he conducted testing. Some modification were made during the radiated emissions testing.		

Maximum RF Power Output at Antenna Terminals

Specifications:

FCC Specification: Paragraph: 15.247(b)(2)

IC Specification: RSS-210/7, A8.4(1)

Procedure:

The test was configured as shown in the RF conducted bench top test setup. The unit was sequentially tuned to the test channels (Low, Mid and High) and configured to transmit random data (100% duty cycle). The RF transmit power was then measured with the spectrum analyzer. The measurement settings were RBW=1MHz, VBW = 1MHz. These settings ensured that the entire channel power is within the RBW of the measurement given that the 20dB BW is approximately 220kHz, thus all of the channel power was captured within the RBW of the analyzer.

Results:

Measured RF power levels are below. Spectrum analyzer photos showing the data are contained in the appendix. Note that when this data was recorded there was a 20 dB attenuator in the test setup between the EUT and the spectrum analyzer, thus the results shown in the photos in the appendix are 20 dB lower than the actual transmit power.

Channel	Power (dBm)	Power (mW)	(Max EIRP) Peak antenna gain (6 dBi)
LOW	29.51	893.30	35.51
MID	29.94	986.28	35.94
HIGH	29.31	853.10	35.31

20 dB Bandwidth

Specifications

FCC Specification: Paragraph 15.247(a)(1)(i)

IC Specification: RSS-210 / 7 A8.1(c)

Procedure:

The 20 dB bandwidth was measured on the low, mid and high channels of the 900 MHz band using the conducted RF test setup. The spectrum analyzer was configured for MAX HOLD and the trace allowed to stabilize. A peak search was performed and the then "Delta-Marker" used to locate the points at -20dB below the previously determined peak. The 20 dB BW was measured with a 30 kHz RBW and VBW. This is approximately 10% of the expected 20 dB BW.

Results:

Measured 20 dB bandwidths for the low, middle and high channels are below. Spectrum analyzer photos showing the data are contained in the appendix

	20 dB BW (kHz)	BW Spec (min, kHz)	Delta from spec (kHz)
LOW	295	500	205
MID	255	500	245
HIGH	265	500	235

Number of Hopping Channels

Specifications:

FCC Specification: Paragraph 15.247(a)(1)(i)

IC Specification: RSS-210 / 7 A8.1(c)

Procedure:

The test setup is as shown in the Conducted RF bench setup. The EUT was configured to hop sequentially through all of its channels. (This is not possible with the normal operating code). The spectrum analyzer was set to MAX HOLD to capture the number of hopping channels. The entire 902 - 928 MHz band was examined in three sub-bands. 902 - 914 MHz and 914 - 928 MHz. The results are below.

Results:

All 83 hopping channels were recorded.

Spectrum analyzer photos showing the data are contained in the appendix

From (MHz)	to (MHz)	Num of Channels
902	914	39
914	928	44
TOTAL		83

Channel Spacing

Specifications:

FCC Specification: Paragraph 15.247(a)(1)

IC Specification: RSS-210 / 7 A8.1(b)

Procedure:

The test setup is as shown in the Conducted RF bench setup. The EUT was configured to hop sequentially through all of its channels. (This is not possible with the normal operating code). The spectrum analyzer was set to MAX HOLD to capture a few of the sequential channel frequencies. The spectrum analyzer markers were used to determine the channel spacing. The results are below.

Results:

Channel spacing was measured at **300kHz**. The specification requires that the channel spacing be greater than the measured 20 dB BW. The 20 dB BW was measured at a maximum of 295 kHz.

A spectrum analyzer photo showing the data is contained in the appendix

Channel Dwell Time

Specifications:

FCC Specification: Paragraph 15.247(a)(1)

IC Specification: RSS-210 / 6 A8.1(2)

Procedure:

A communications link was established with the EUT. Random data packets were transmitted over the link at a fixed packet size. The number of “hits” on the low middle and high channel in a 20 second window were recorded.

The test was repeated with the sweep time decreased to allow accurate measurement of the duration of each hit. RBW was set to 10 kHz to prevent hits on adjacent channels appearing as hits on the test channel (recall, there is a 300kHz channel spacing)

Results:

The table below summarizes the results. Photos of the data are contained in the appendix.

Note: The specification for this test is 400mS / 10Sec given the bandwidth of the device. This test was performed prior to the bandwidth being measured. However the unit demonstrates compliance with the 20 second time window, thus compliance with the 10second time window is also demonstrated.

Channel	Time On Channel per 20 S (mS)	Limit (ms/20S)	Margin
LOW	308.75	400	91.25
MID	307.50	400	92.50
HIGH	310.00	400	90.00

900MHz Band Edge

Specifications:

FCC Specification: Paragraph 15.247(d)

IC Specification: RSS-210/7 A8.5

Procedure:

The test setup was configured as shown in the conducted test setup. The UUT was configured to continuously transmit random data on the low, and then the high test channel. The span of the analyzer was centered on the 902 and 928 MHz band edge respectively.

The RBW was set to 100 kHz, VBW = 100kHz. The trace was allowed to stabilize then a Peak-search and a marker delta measurement to the band edge was performed to verify that the RF power at the band edge was at least 20 dB below the peak of the fundamental level.

Results:

Level at 902 MHz: -25.07dBc Spec -20 dBc Min

Level at 928 MHz: -57.34dBc Spec -20 dBc Min

Spectrum analyzer photos showing the data are contained in the appendix

Radiated Emissions in Restricted Bands & Out of Band Radiated Emissions

Tx and Rx

Specifications:

FCC Specification: Paragraph 15.247(d)

IC Specification: RSS-210 / 7 Sec 2.2

Procedure:

This test was conducted inside a semi-anechoic chamber at Elliott labs in Fremont, CA per FCC DA00705.

. The unit was placed on a rotating wooden table 80cm above the ground plane. A Horn antenna was secured to a mast 3 meter away. The unit was tested at each of the Low, Mid and High channels. The UUT was running in the diagnostic mode and set to transmit at maximum on each of the channels in turn. The test equipment was configured as shown below.

The EUT was rotated 360 degrees and the height of the antenna adjusted from 1 to 4 meters above the ground plane to determine the maximum level of the emission. The level of the harmonic emission was measured in two modes, "Peak" and "Average" .

The spectrum analyzer measurement was adjusted by the test lab software using the appropriate correction factors (antenna factor, cable loss,...). The final corrected measurement results were then recorded.

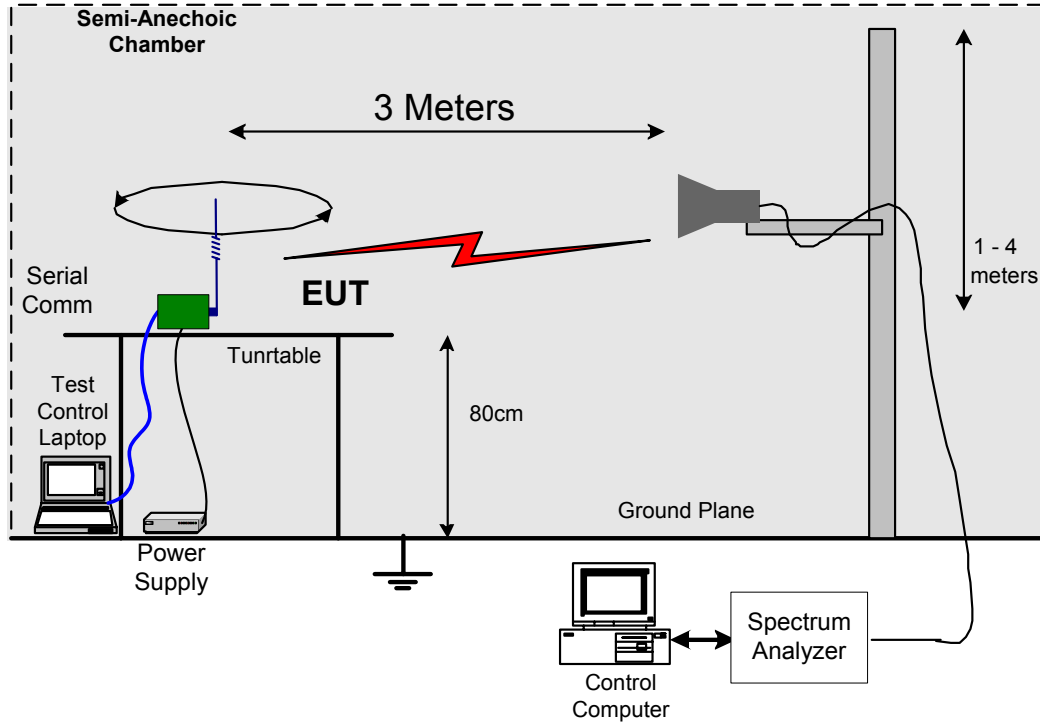
Preliminary emission scans were performed on the EUT in three orthogonal planes It was determined that the vertical positioning of the antenna was the worst case. The final radiated emissions data was recorded with the EUT being horizontal on the turntable and the antenna being vertical. This procedure was performed for all of the channels outlined in the Test Methods section of this report.

The band up to 10 GHz was examined. The table below indicates the harmonics that fall within restricted bands.

CHAN	FUND	2	3	4	5	6	7	8	9	10
LOW	902.3	1804.6	2706.9	3609.2	4511.5	5413.8	6316.1	7218.4	8120.7	9023.0
MID	915.4	1830.8	2746.2	3661.6	4577.0	5492.4	6407.8	7323.2	8238.6	9154.0
HIGH	926.7	1853.4	2780.1	3706.8	4633.5	5560.2	6486.9	7413.6	8340.3	9267.0

15.205 Harmonic test tables

NOTE: RED indicates a harmonic that falls within a restricted band and is subject to 15.205. The harmonics in Green are NOT in restricted bands and are subject to 15.209



Radiated Emissions in Restricted Bands Test Setup

<u>Support Equipment</u>				
Description	Model number	FCC ID or SN	Manufacturer	Power Cable
Laptop	ZR5500	DOC	HP	Laptop PS, unshielded

<u>Test Conditions</u>			
Temperature	24C	Humidity:	63%
ATM pressure	30.04 in	Grounding:	None
Tested By	Mehran Birgani , Elliott Rafael Veralas, Elliott	Date of Test:	Dec 2007
Test Reference	FCC Part 15.205 IC Paragraph RSS210, 6.2.3 (c)		
Setup Method	ANSI C63.4		
Tested Range	1 GHz to 10GHz		
Test Voltage	10 VDC		
Modifications	No modifications were made to the unit		

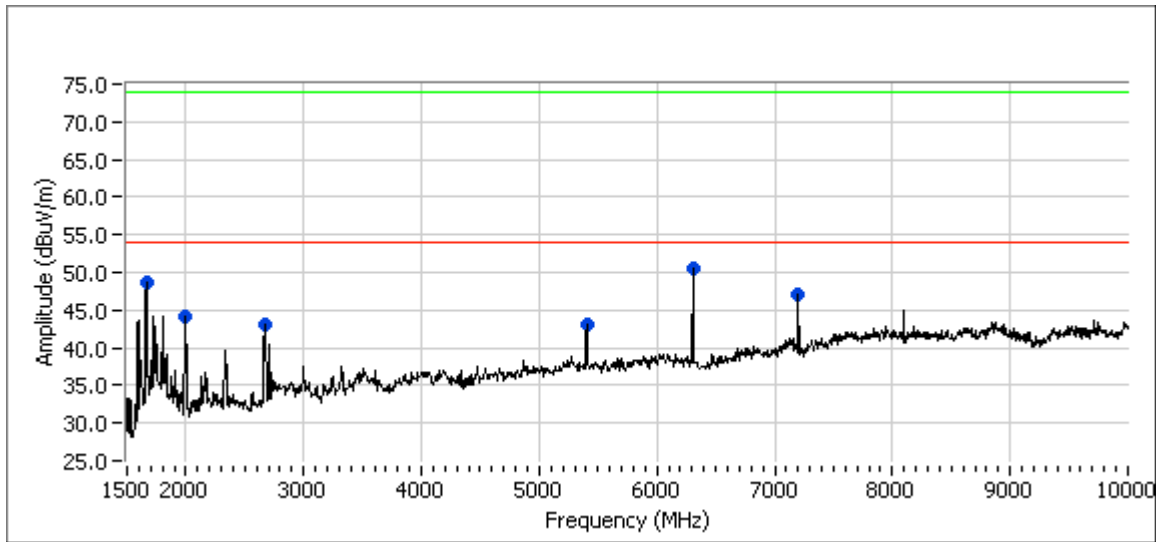
NOTES: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.

Restricted Band Peak Measurements: RBW = VBW = 1 MHz

Restricted Band Average Measurements: RBW =1MHz and VBW=10 Hz.

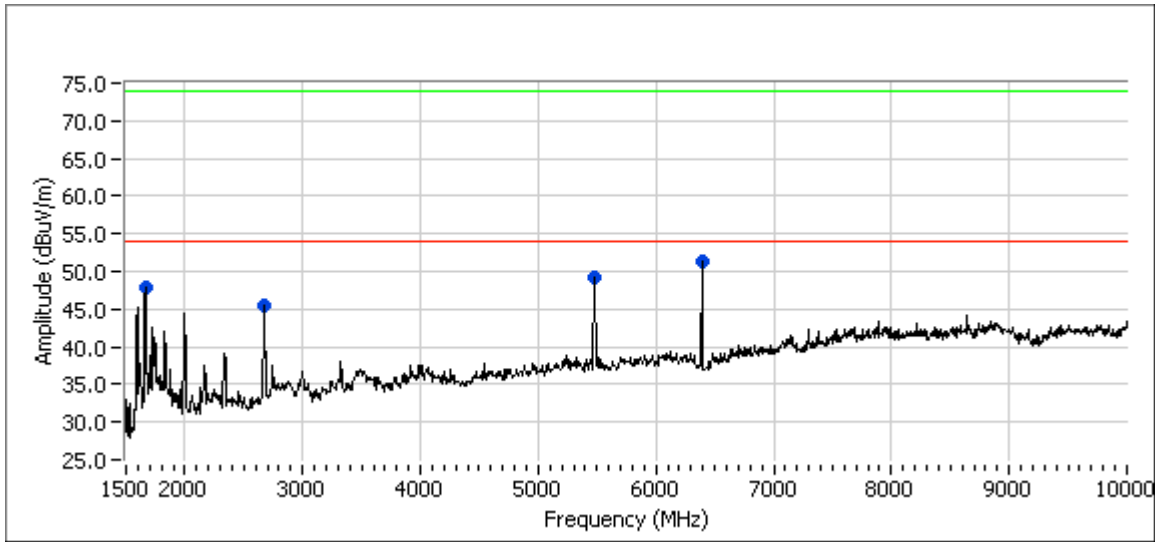
All other measurements, RBW = 1MHz and VBW = 3MHz, video averaging on (100 samples).

Results:
EUT Xmit / Rcv on LOW channel, 902.3 MHz



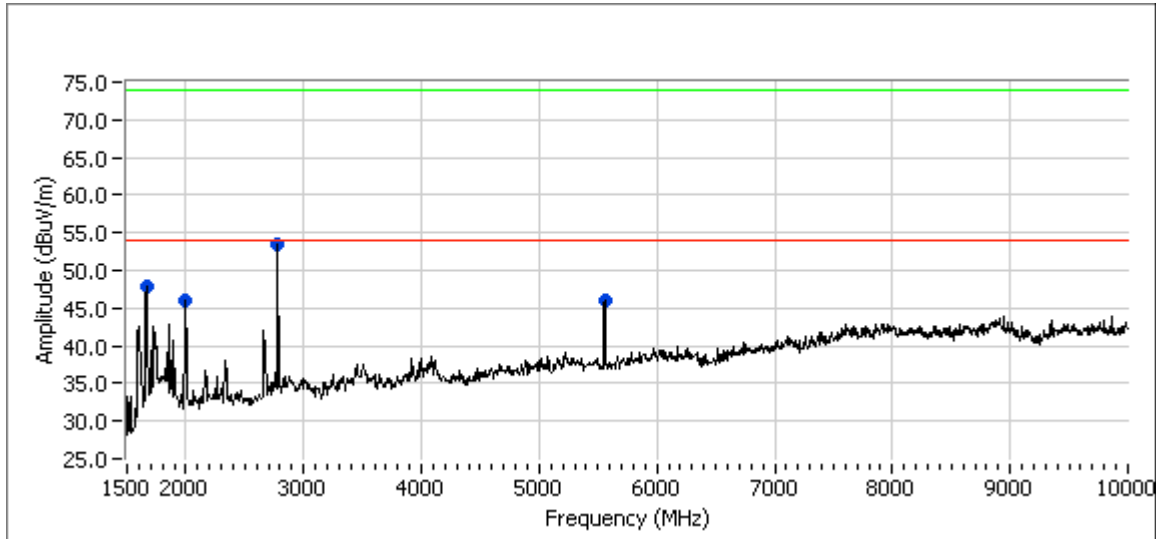
Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector	Azimuth	Height	Comments
			Limit	Margin	Pk/QP/Avg	degrees	meters	
2000.000	44.2	V	54.0	-9.8	Peak	80	1.0	
2675.000	43.1	V	54.0	-10.9	Peak	195	1.0	
5408.330	43.0	H	54.0	-11.0	Peak	360	2.0	
6315.630	46.9	V	54.0	-7.1	AVG	0	1.6	
6315.630	51.9	V	74.0	-22.1	PK	0	1.6	
1667.300	41.8	V	54.0	-12.2	AVG	0	1.0	
1667.300	56.5	V	74.0	-17.5	PK	0	1.0	
7187.270	35.7	V	54.0	-18.3	AVG	216	2.0	
7187.270	47.2	V	74.0	-26.8	PK	216	2.0	

EUT Xmit / Rcv on MID channel, 914.6 MHz



Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
2675.000	45.4	V	54.0	-8.6	Peak	138	1.3	
1664.350	41.0	V	54.0	-13.0	AVG	1	1.0	
1664.350	55.2	V	74.0	-18.8	PK	1	1.0	
5487.500	46.9	V	54.0	-7.1	AVG	1	1.0	
5487.500	51.7	V	74.0	-22.3	PK	1	1.0	
6402.400	49.4	V	54.0	-4.6	AVG	5	2.0	Not Restricted Bnd
6402.400	53.4	V	74.0	-20.6	PK	5	2.0	Not Restricted Bnd

EUT Xmit / Rcv on HIGH channel, 926.9 MHz



Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
2000.000	45.9	V	54.0	-8.1	Peak	68	1.0	
5558.330	46.0	V	54.0	-8.0	Peak	0	1.0	
2780.770	31.1	V	54.0	-22.9	AVG	2	1.6	
2780.770	42.1	V	74.0	-31.9	PK	2	1.6	
6487.920	49.0	V	54.0	-5.0	AVG	4	1.6	
6487.920	53.3	V	74.0	-20.7	PK	4	1.6	
1668.920	38.2	V	54.0	-15.8	AVG	336	1.0	
1668.920	52.8	V	74.0	-21.2	PK	336	1.0	

30MHz - 1 GHz “Digital” Radiated Emissions

Specification:

FCC Specification: 15.109(f)

IC Specification: RSS210 / 7 A8.5

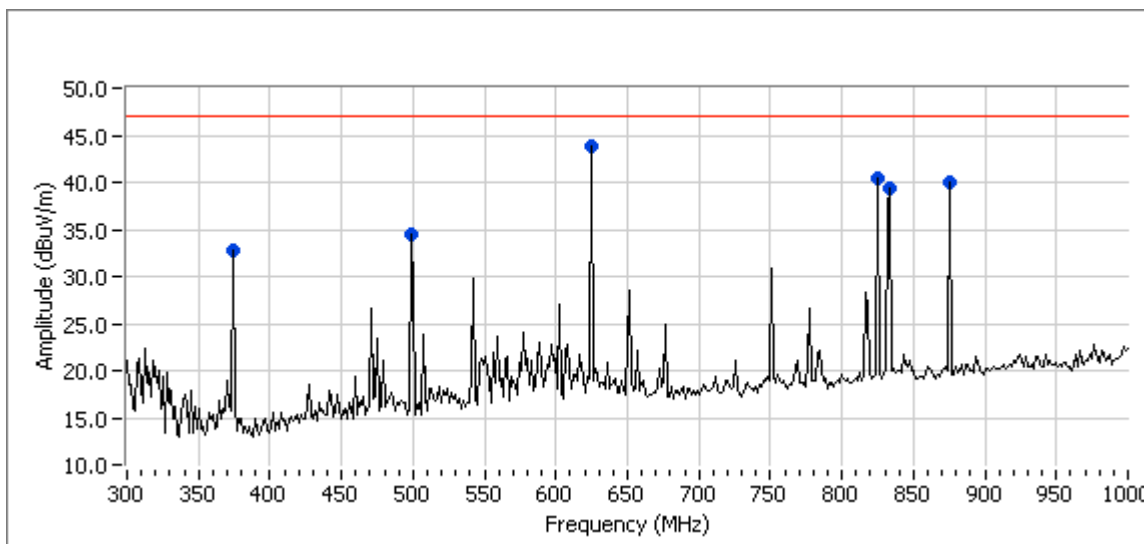
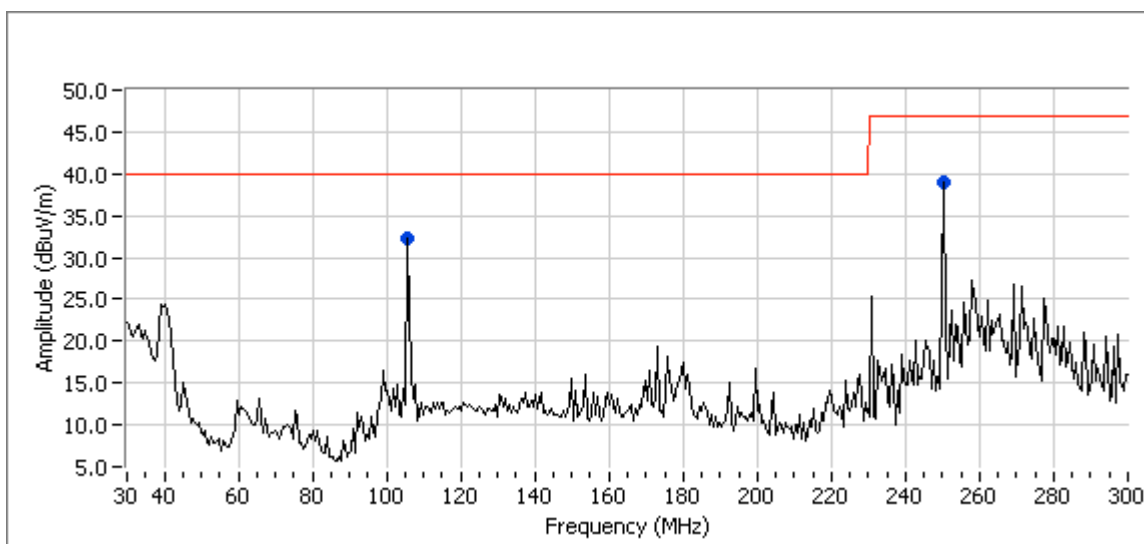
Procedure:

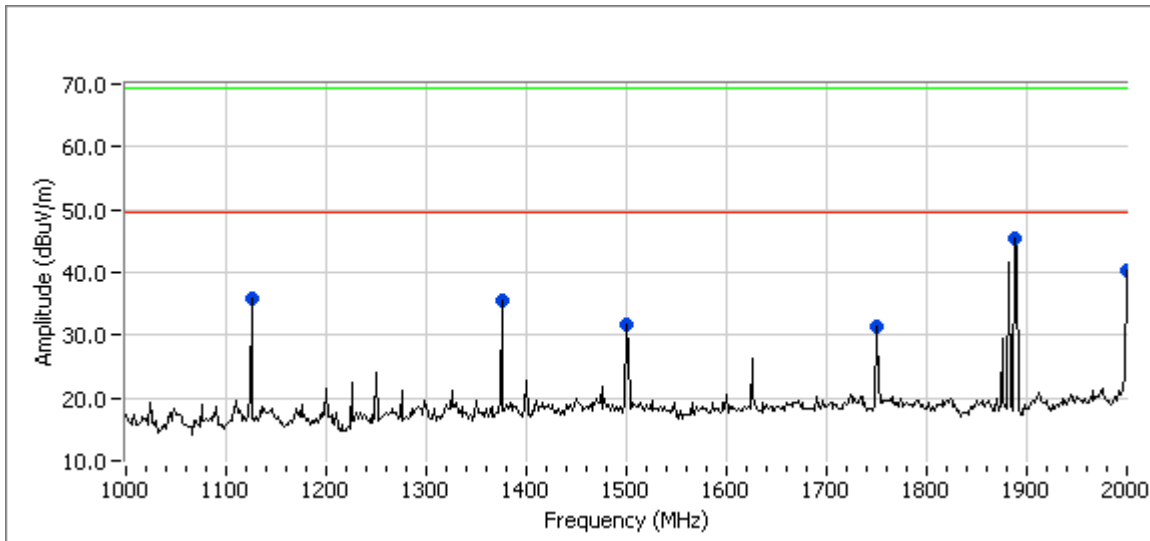
The test was configured as a standard DA00705 Class A radiated emissions test setup. The EUT was tested in XMIT mode on the middle channel. The frequency range of 30 to 1000 MHz was scanned.

Results: (XMIT mode)

The worst case results are presented below and on the following page.

Maximized quasi-peak readings (includes manipulation of EUT interface cables)





Maximized quasi-peak readings (includes manipulation of EUT interface cables)								
Frequency	Level	Pol	FCC Class A		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2000.000	39.5	V	49.5	-10.0	AVG	174	1.0	
1125.200	35.7	H	49.5	-13.8	Peak	263	1.0	Peak reading with average limit
1375.230	35.4	H	49.5	-14.1	Peak	214	1.0	Peak reading with average limit
1500.260	31.6	V	49.5	-17.9	Peak	159	1.3	Peak reading with average limit
1750.290	31.3	V	49.5	-18.2	Peak	184	1.0	Peak reading with average limit
2000.320	41.2	V	69.5	-28.3	PK	174	1.0	
1878.060	18.4	V	49.5	-31.1	AVG	175	1.0	
1878.060	27.4	V	69.5	-42.1	PK	175	1.0	

AC Line Conducted Emissions

Specification: FCC Part 15.207

Procedure:

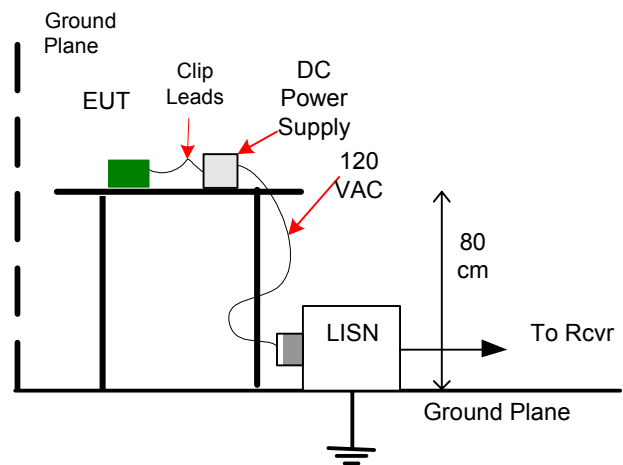
The test was set up and tested to the limits outlined in FCC 15.207 for AC Line Conducted Emissions. The measurement used a LISN line on each AC line and an EMI receiver. A peak scan was made over the measurement frequency range (150 kHz to 30 MHz). The highest peaks were then marked and re-measured and quasi-peaked and averaged.

The test was configured as shown below. The product was tested with a generic benchtop power supply running on 120 VAC @ 60 Hz. The power supply provides 10 VDC to the EUT. The EUT was configured to transmit in order to draw the maximum current from the power supply. This results in the worst case conducted emissions.

In a typical operating environment the device will be operated by a similar type of power supply.

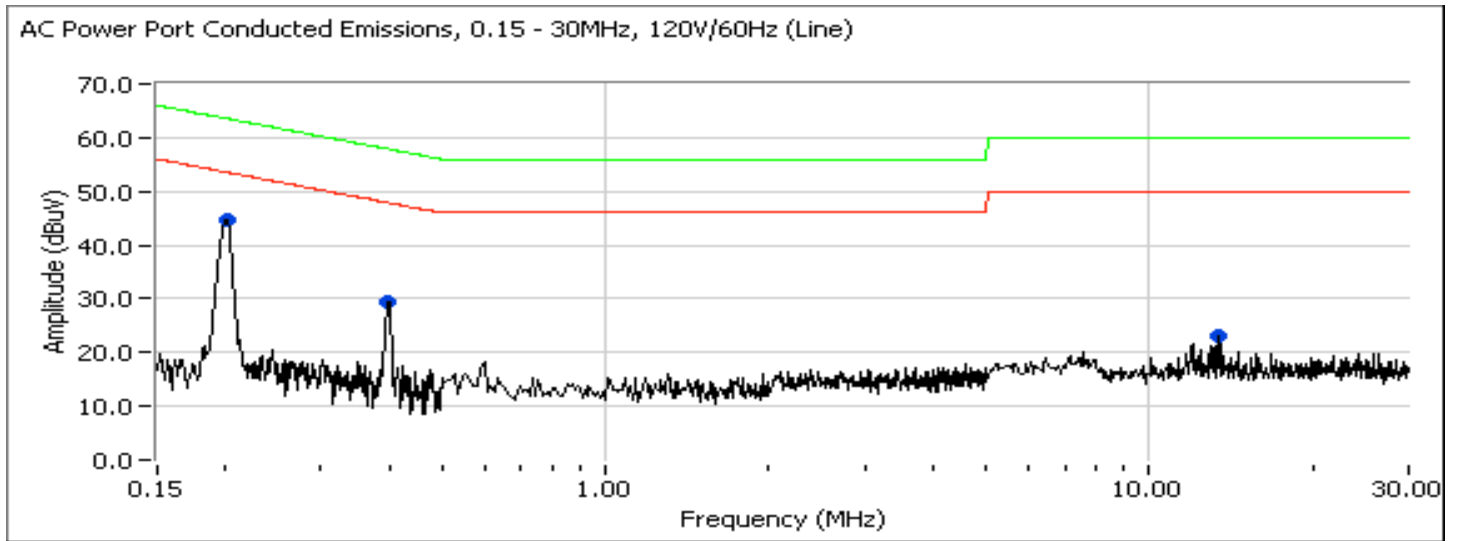
Results:

AC line Conducted Emissions, QP and AVG Results

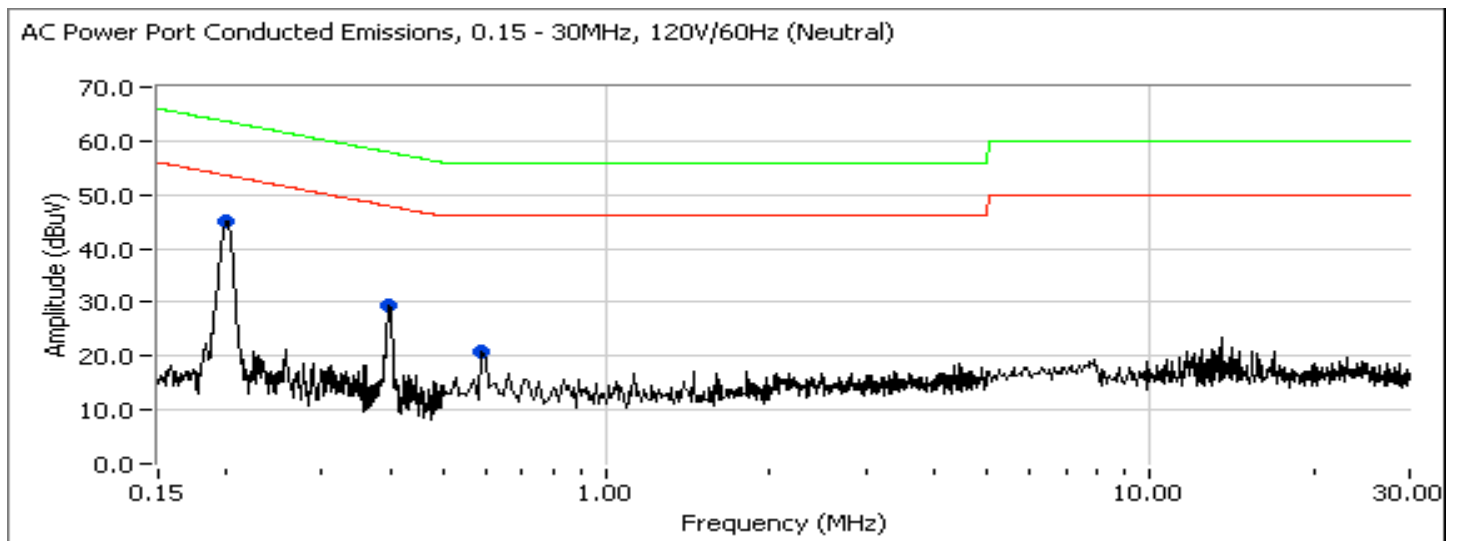


Frequency MHz	Level dB μ V	AC Line	EN 55022 Class B		Detector QP/Ave	Comments
			Limit	Margin		
0.199	44.5	Neutral	53.7	-9.2	AVG	
0.199	44.4	Line	53.7	-9.3	AVG	
0.199	44.8	Line	63.7	-18.9	QP	
0.199	44.8	Neutral	63.7	-18.9	QP	
0.398	28.5	Neutral	47.9	-19.4	AVG	
0.398	28.4	Line	47.9	-19.5	AVG	
0.590	20.7	Neutral	46.0	-25.3	Peak	Peak reading with average limit
13.367	23.1	Line	50.0	-26.9	Peak	Peak reading with average limit
0.398	29.1	Neutral	57.9	-28.8	QP	
0.398	29.0	Line	57.9	-28.9	QP	

AC Line conducted emissions, LINE



AC Line conducted emissions, NEUTRAL



EMI Test Report APPENDIX

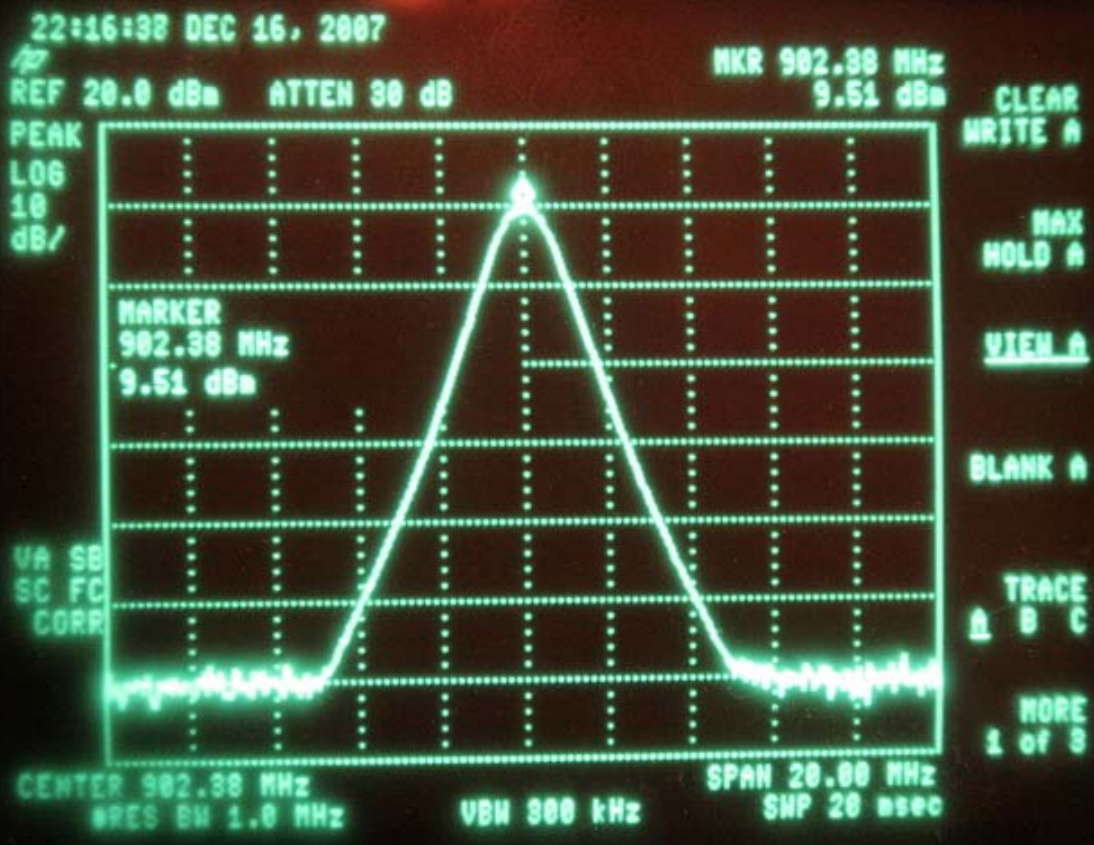
EMI Test Report
APPENDIX A

SilverSpring eBridge Radio

Model: 205-00017

FCC ID: OWS-NIC506

IC ID: 5975A-NIC506



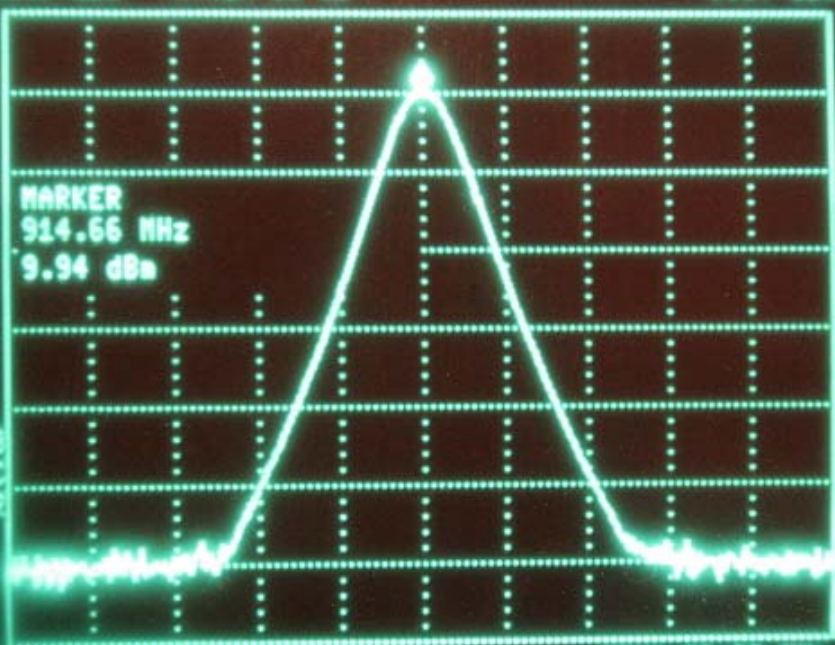
01_Power_out_chan_low.jpg

22:21:30 DEC 16, 2007

REF 20.0 dBm ATTN 30 dB

MKR 914.66 MHz
9.94 dBm

PEAK
LOG
10
dB/



CLEAR
WRITE A

MAX
HOLD A

VIEW A

BLANK A

TRACE
A B C

MORE
1 of 3

VA SB
SC FC
CORR

CENTER 914.66 MHz
RES BW 1.0 MHz

VBN 300 kHz

SPAN 20.00 MHz
SMP 20 nsec

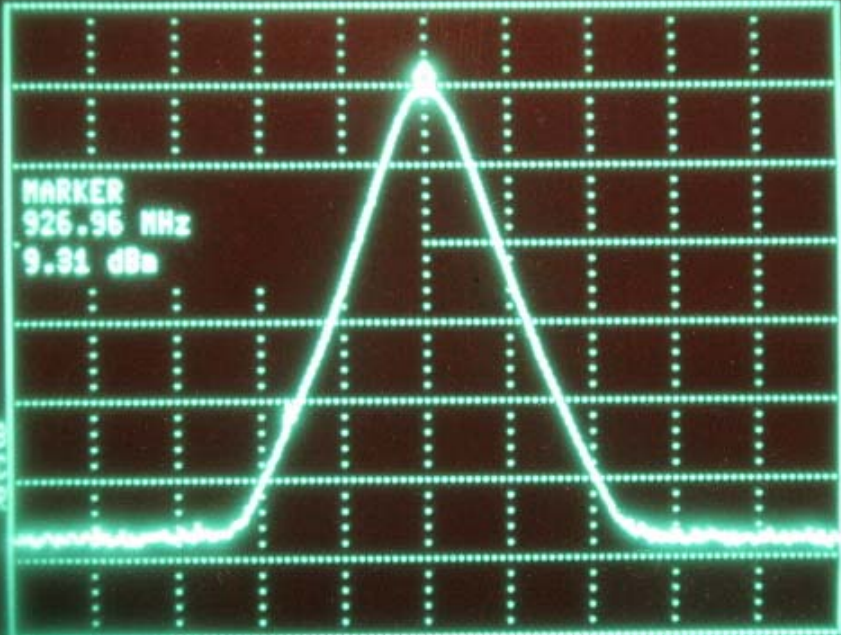
02_power_out_chan_mid.jpg

22:27:39 DEC 16, 2007

REF 20.0 dBm ATTN 30 dB

MKR 926.96 MHz
9.31 dBm

PEAK
LOG
10
dB/



CLEAR
WRITE A

MAX
HOLD A

VIEW A

BLANK A

TRACE
A B C

MORE
1 of 3

MA SB
SC FC
CORR

CENTER 926.96 MHz
#RES BW 1.0 MHz

VBW 300 kHz

SPAN 20.00 MHz
SNP 20 nsec

03_power_out_chan_high.jpg

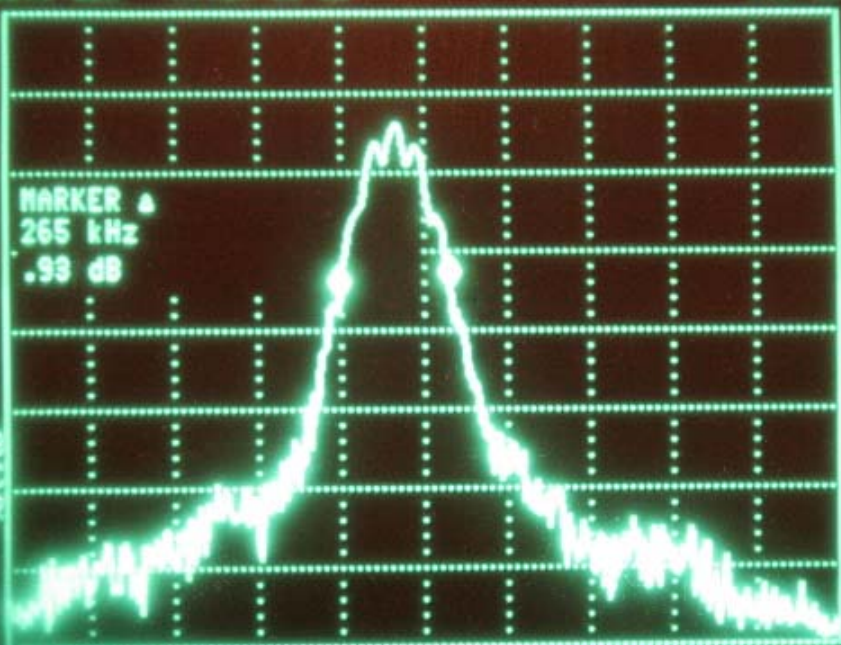
22:29:34 DEC 16, 2007

REF 20.0 dBm ATTN 30 dB

MARKER Δ 265 kHz
.93 dB

PEAK
LOG
10
dB/

MARKER
NORMAL



MARKER
ON

MARKER CHT
ON OFF

MARKER NOISE
ON OFF

MARKERS
OFF

MARKER
1 of 2

VA SB
SC FC
CORR

CENTER 926.965 MHz
RES BW 30 kHz

VBW 30 kHz

SPAN 2.000 MHz
SWP 20 nsec

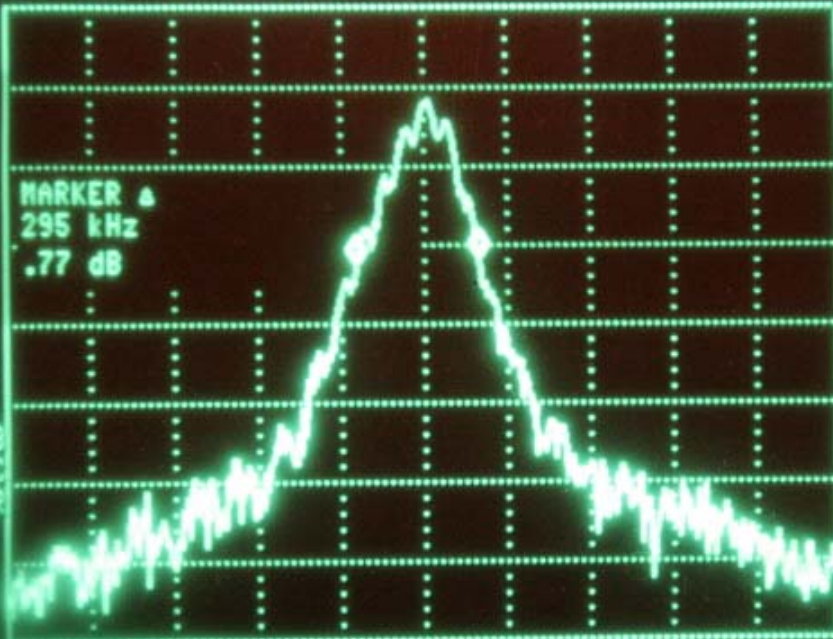
04_20dB_BW_high_chan.jpg

22:31:57 DEC 16, 2007

REF 20.0 dBm ATTN 30 dB

MKR Δ 295 kHz
.77 dB

PEAK
LOG
10
dB/



MARKER
+ CF

MARKER
+ CF

NEXT
PEAK

NEXT PK
RIGHT

NEXT PK
LEFT

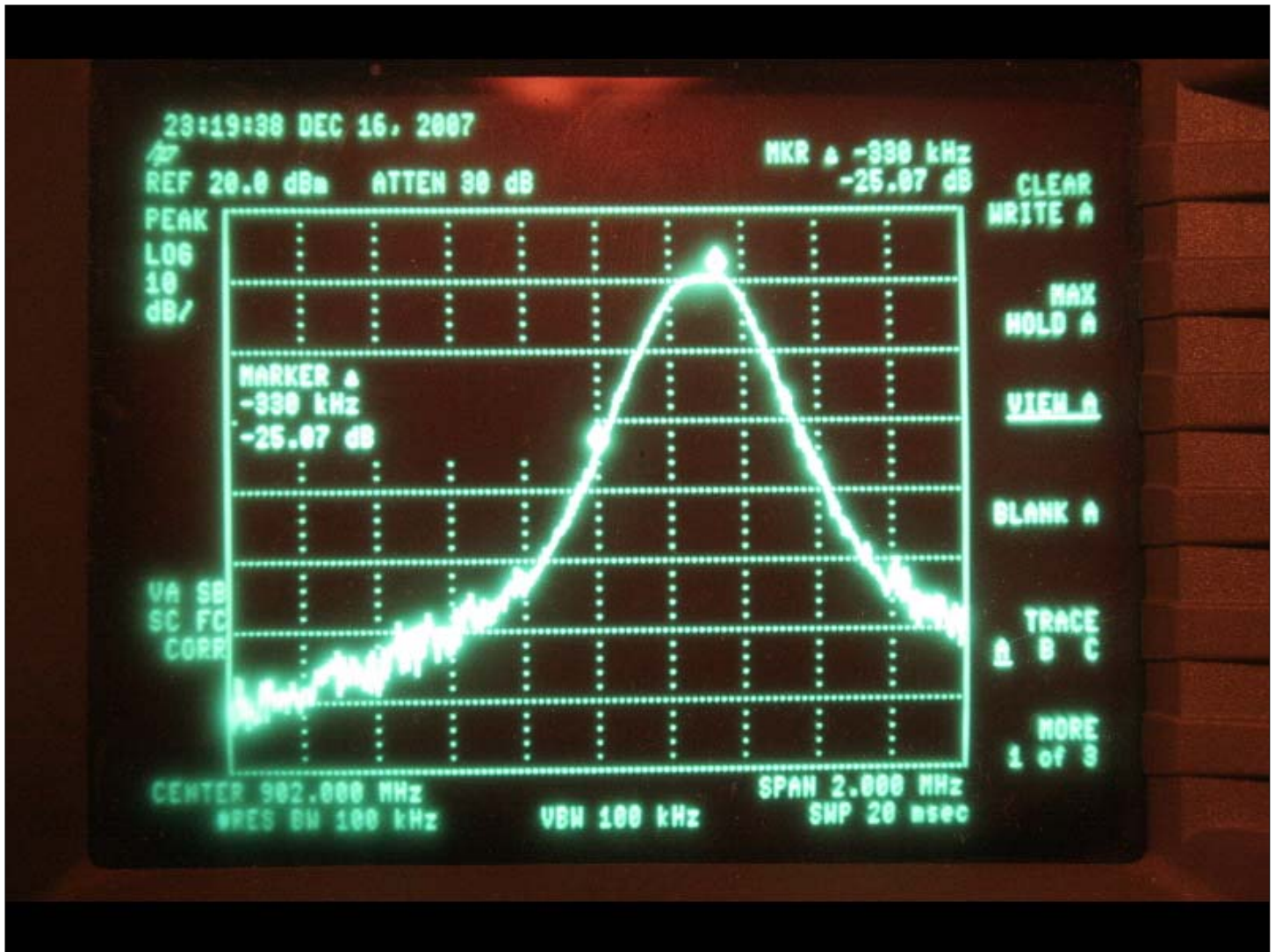
PEAK
EXCURSN

CENTER 902.290 MHz
RES BW 30 kHz

VBW 30 kHz

SPAN 2.000 MHz
SNP 20 nsec

05_20dB_BW_low_chan.jpg



06_Bandedge_Low.jpg

23:17:42 DEC 16, 2007

REF 20.0 dBm ATTEN 30 dB

MARKER Δ 1.138 MHz
-57.34 dB

MARKER
NORMAL

PEAK
LOG
10
dB/

MARKER Δ
1.138 MHz
-57.34 dB

MARKER CNT
ON OFF

MARKER NOISE
ON OFF

MARKERS
OFF

MARKER
1 of 2

VA SB
SC FC
CORR

CENTER 928.000 MHz
RES BW 100 kHz

VBW 100 kHz

SPAN 5.000 MHz
SNP 20 msec

07_Bandedge_high.jpg

23:27:25 DEC 16, 2007

REF 20.0 dBm ATTEN 30 dB

MKR Δ -300 kHz
.07 dB

PEAK
LOG
10
dB/

MARKER
NORMAL

MARKER Δ
-300 kHz
.07 dB

MARKER
NORMAL

MKR CNT
ON OFF

MKNOISE
ON OFF

MARKERS
OFF

VA SB
SC FC
CORR

MORE
1 of 2

START 902.000 MHz
WRES BW 100 kHz

VBW 100 kHz

STOP 905.000 MHz
SWP 20 nsec

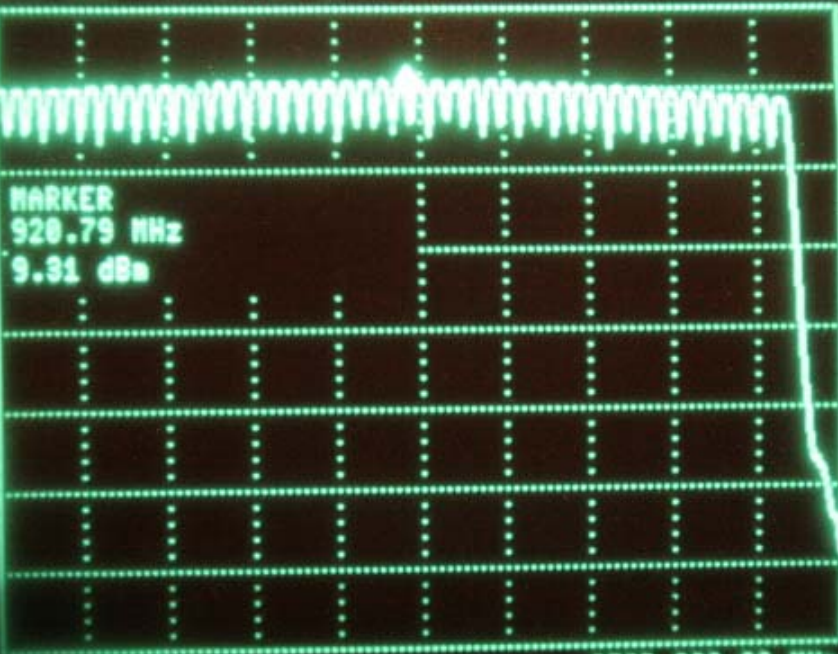
08_Channel_spacing.jpg

23:26:02 DEC 16, 2007

REF 20.0 dBm ATTN 30 dB

MKR 920.79 MHz
9.31 dBm

PEAK
LOG
10
dB/



MARKER
920.79 MHz
9.31 dBm

MA SB
SC FC
CORR

MARKER
DELTA

MARKER
DELTA

MKR CNT
ON OFF

MKNOISE
ON OFF

MARKERS
OFF

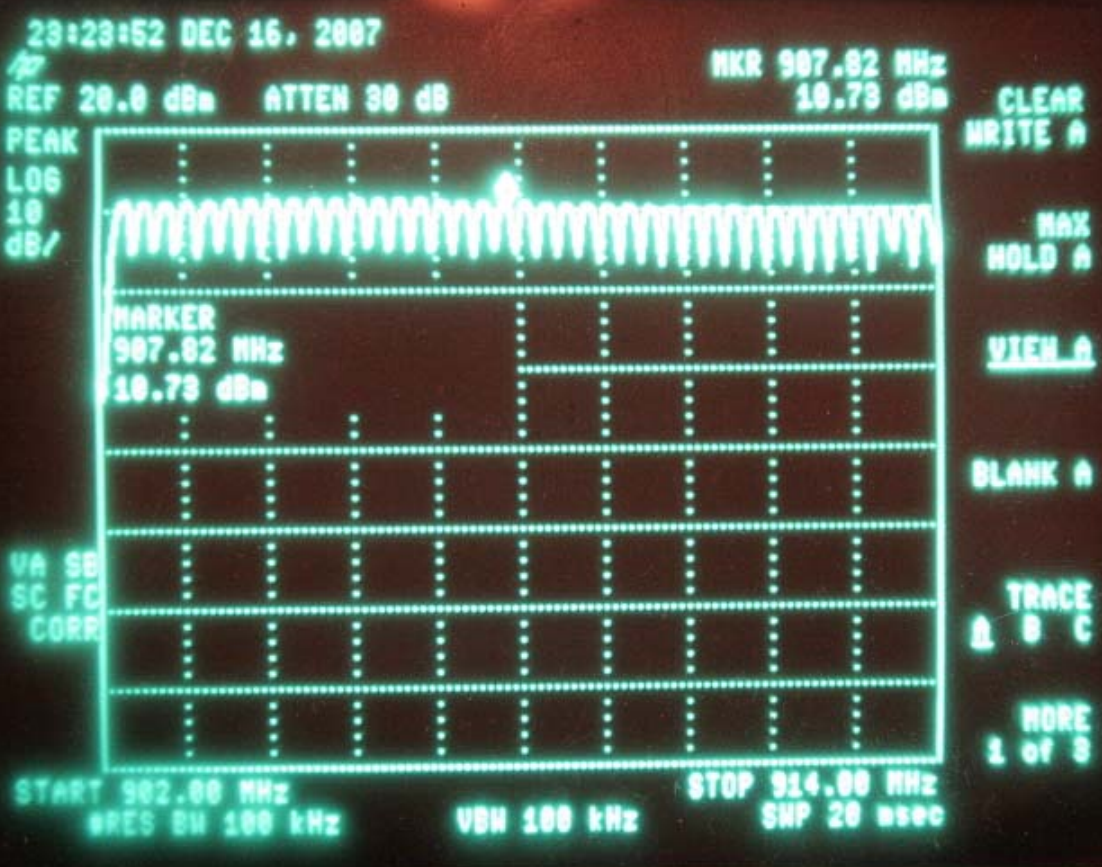
MORE
1 of 2

START 914.00 MHz
WRES BW 100 kHz

VBW 100 kHz

STOP 928.00 MHz
SWP 20 msec

09_num_chan_high.jpg



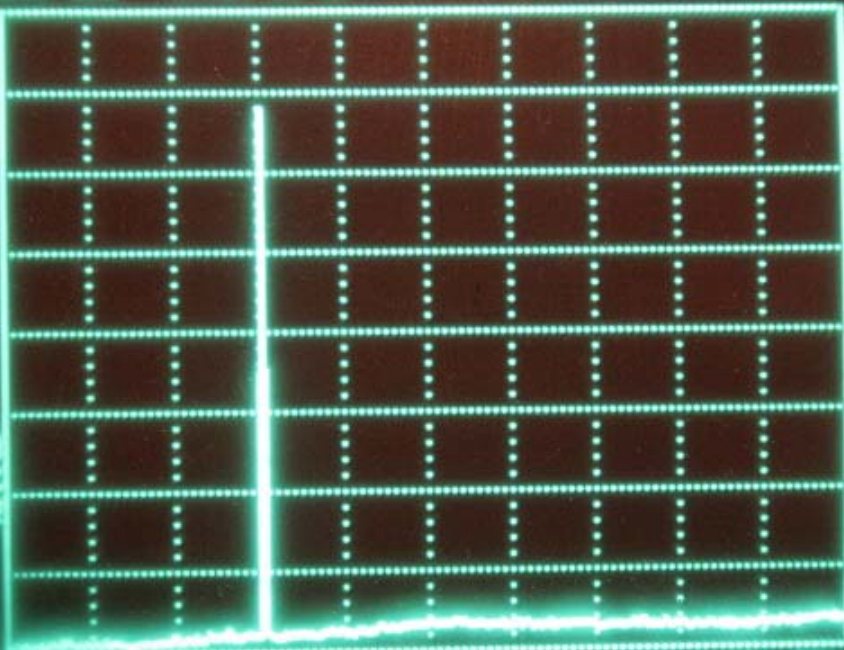
10_num_chan_low.jpg

23:38:13 DEC 16, 2007

REF 20.0 dBm ATTEN 30 dB

PEAK
LOG
10
dB/

VA SB
SC FC
CORR



START 30 MHz

RES BW 30 kHz

VBW 30 kHz

STOP 2.921 GHz

SMP 9.6 sec

MARKER
NORMAL

MARKER
DELTA

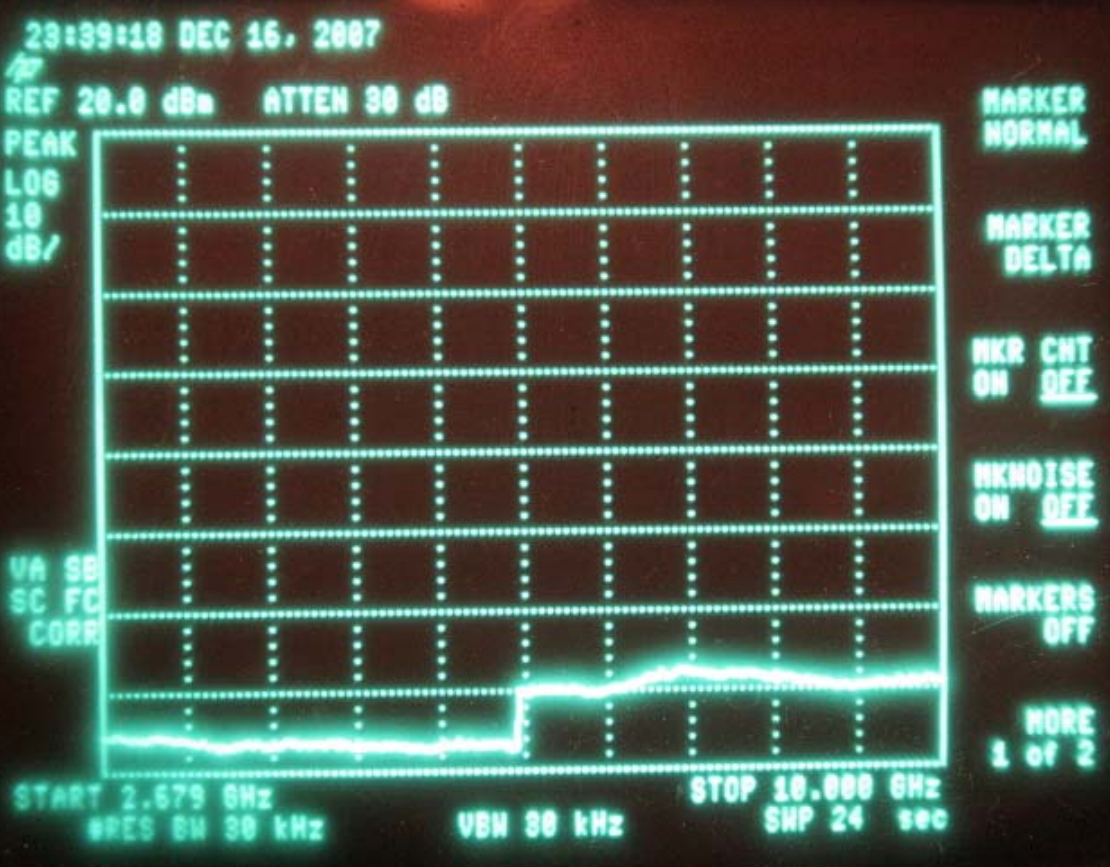
MKR CNT
ON OFF

MKNOISE
ON OFF

MARKERS
OFF

MORE
1 of 2

11_OOB_emissions_low_chan_1.jpg

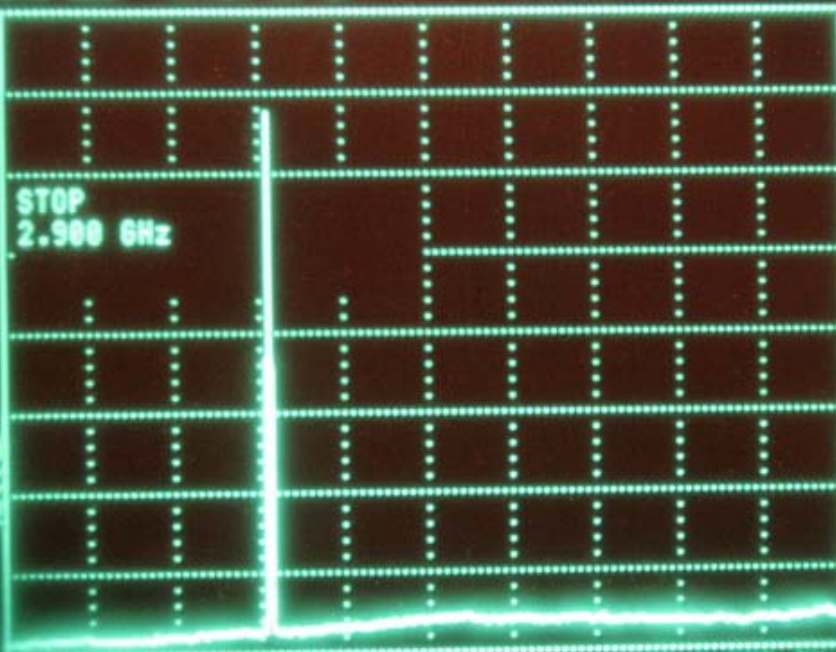


12_OOB_emissions_low_chan_2.jpg

00:10:45 DEC 17, 2007

REF 20.0 dBm ATTEN 30 dB

PEAK
LOG
10
dB/



CLEAR
WRITE A

MAX
HOLD A

VIEW A

BLANK A

TRACE
A B C

MORE
1 of 3

VA SB
SC FC
CORR

START 30 MHz

RES BW 30 kHz

VBW 30 kHz

STOP 2.900 GHz

SWP 9.6 sec

13_OOB_emissions_mid_chan_1.jpg

00:11:52 DEC 17, 2007

REF 20.0 dBm ATTN 30 dB

PEAK
LOG
10
dB/

STOP
10.000 GHz

VA SB
SC FC
CORR

CLEAR
WRITE A

MAX
HOLD A

VIEW A

BLANK A

TRACE
A B C

WORE
1 of 3

START 2.679 GHz
RES BW 30 kHz

VBW 30 kHz

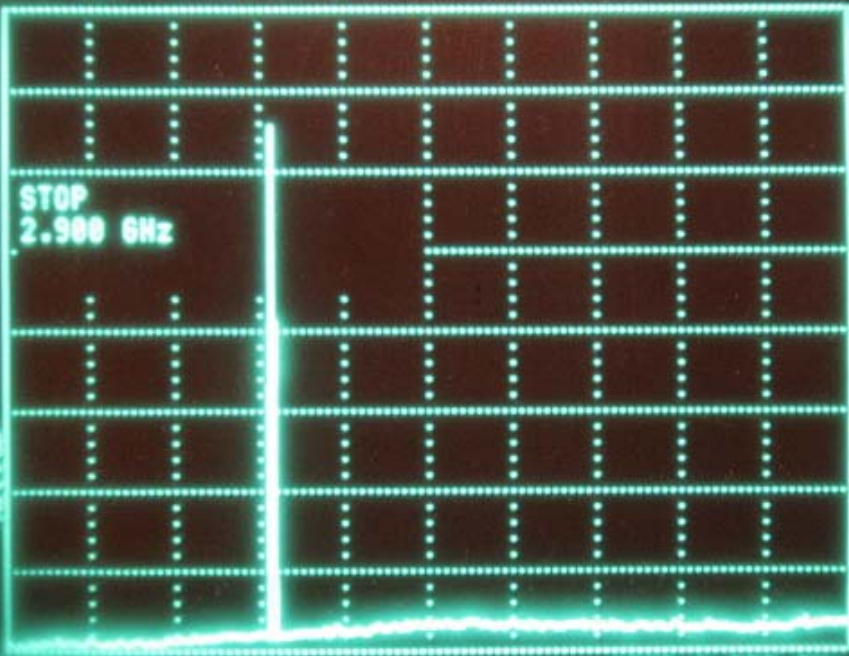
STOP 10.000 GHz
SWP 24 sec

14_OOB_emissions_mid_chan_2.jpg

00:12:56 DEC 17, 2007

REF 20.0 dBm ATTEN 30 dB

PEAK
LOG
10
dB/



VA SB
SC FC
CORR

CLEAR
WRITE A

MAX
HOLD A

VIEW A

BLANK A

TRACE
A B C

MORE
1 of 3

15_OOB_emissions_high_chan_1.jpg

00:13:50 DEC 17, 2007

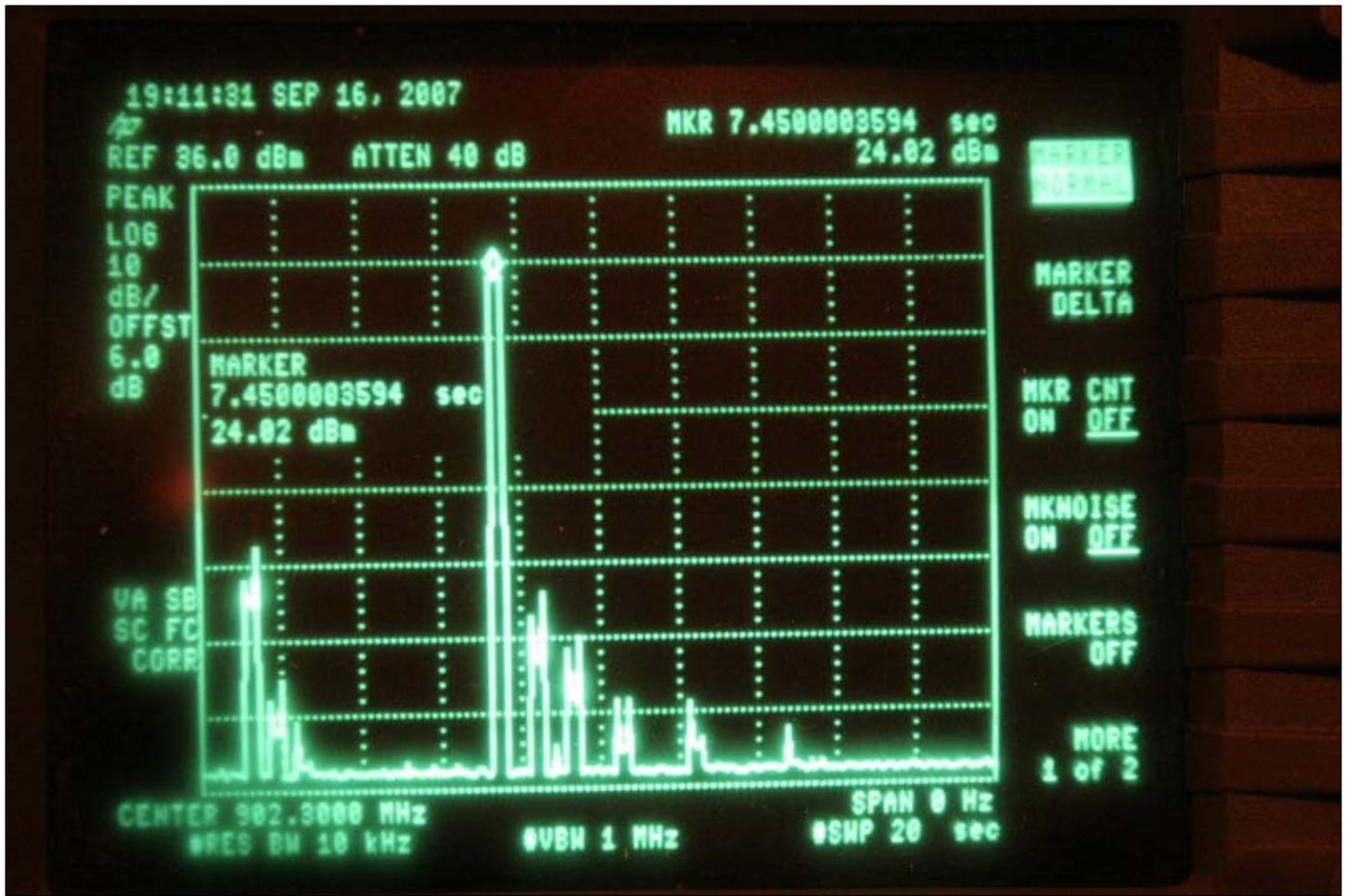
REF 20.0 dBm ATTN 30 dB

PEAK
LOG
10
dB/

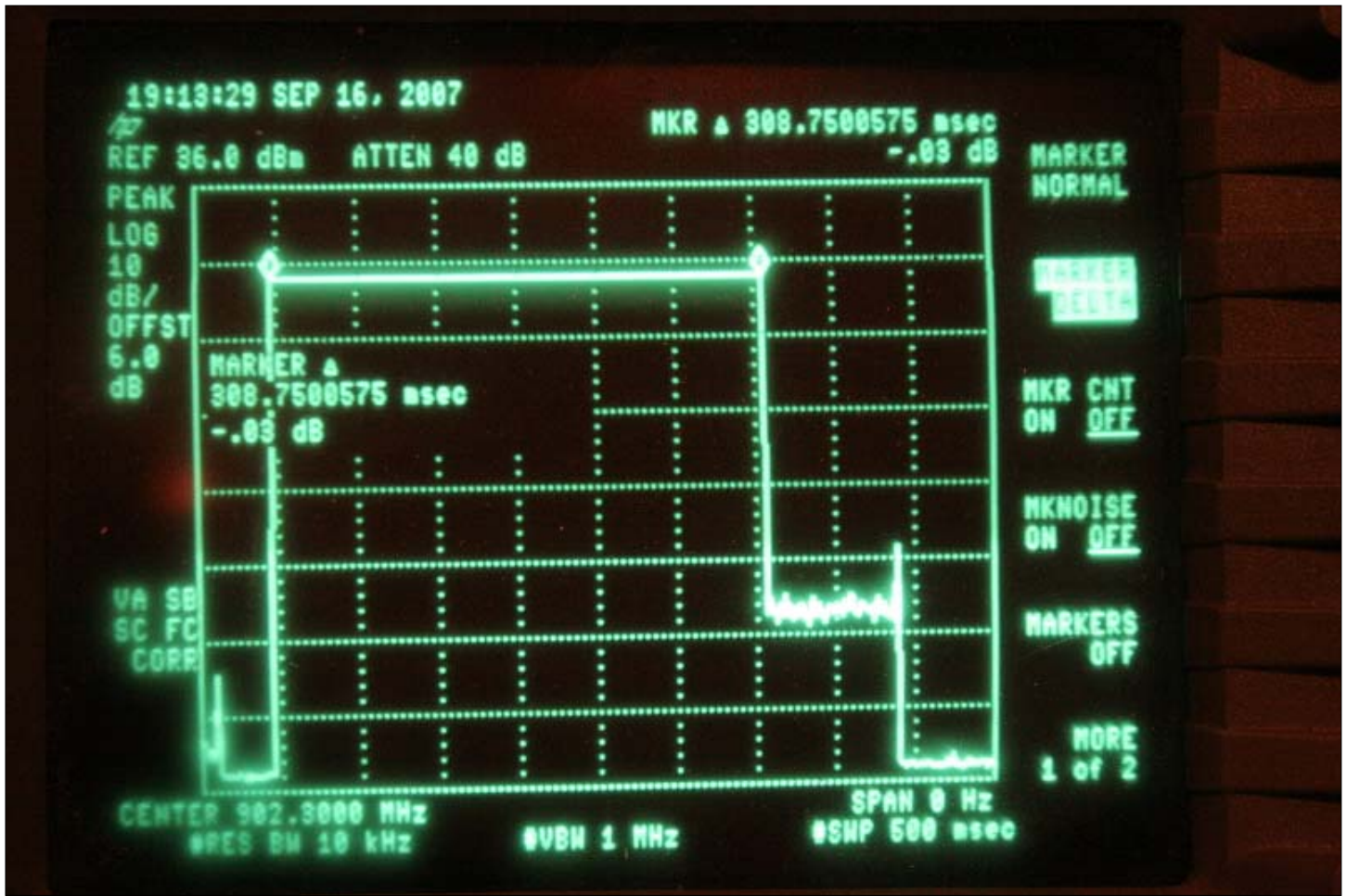


CLEAR
WRITE A
MAX
HOLD A
VIEW A
BLANK A
TRACE
A B C
MORE
1 of 3

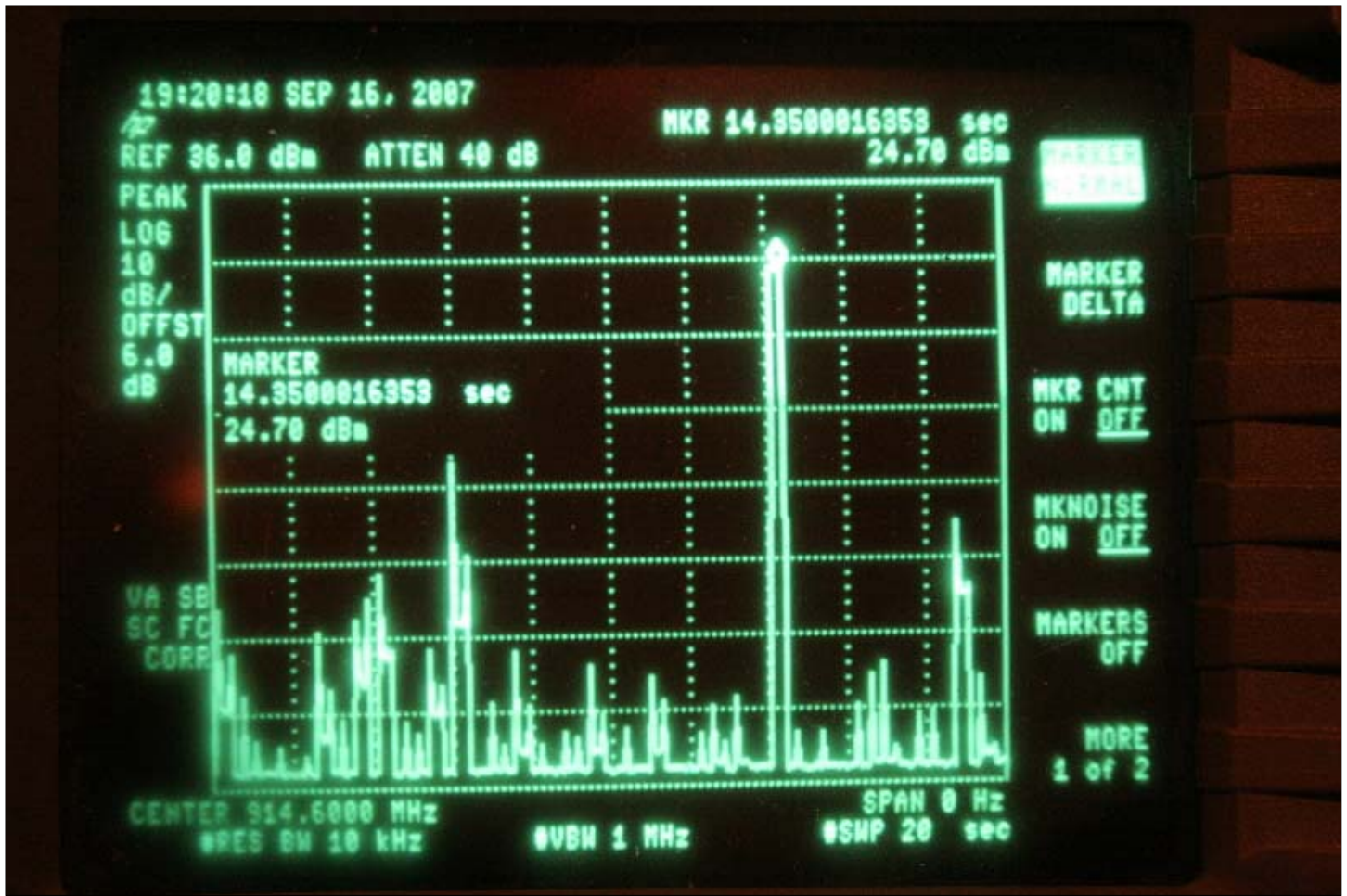
16_OOB_emissions_high_chan_2.jpg



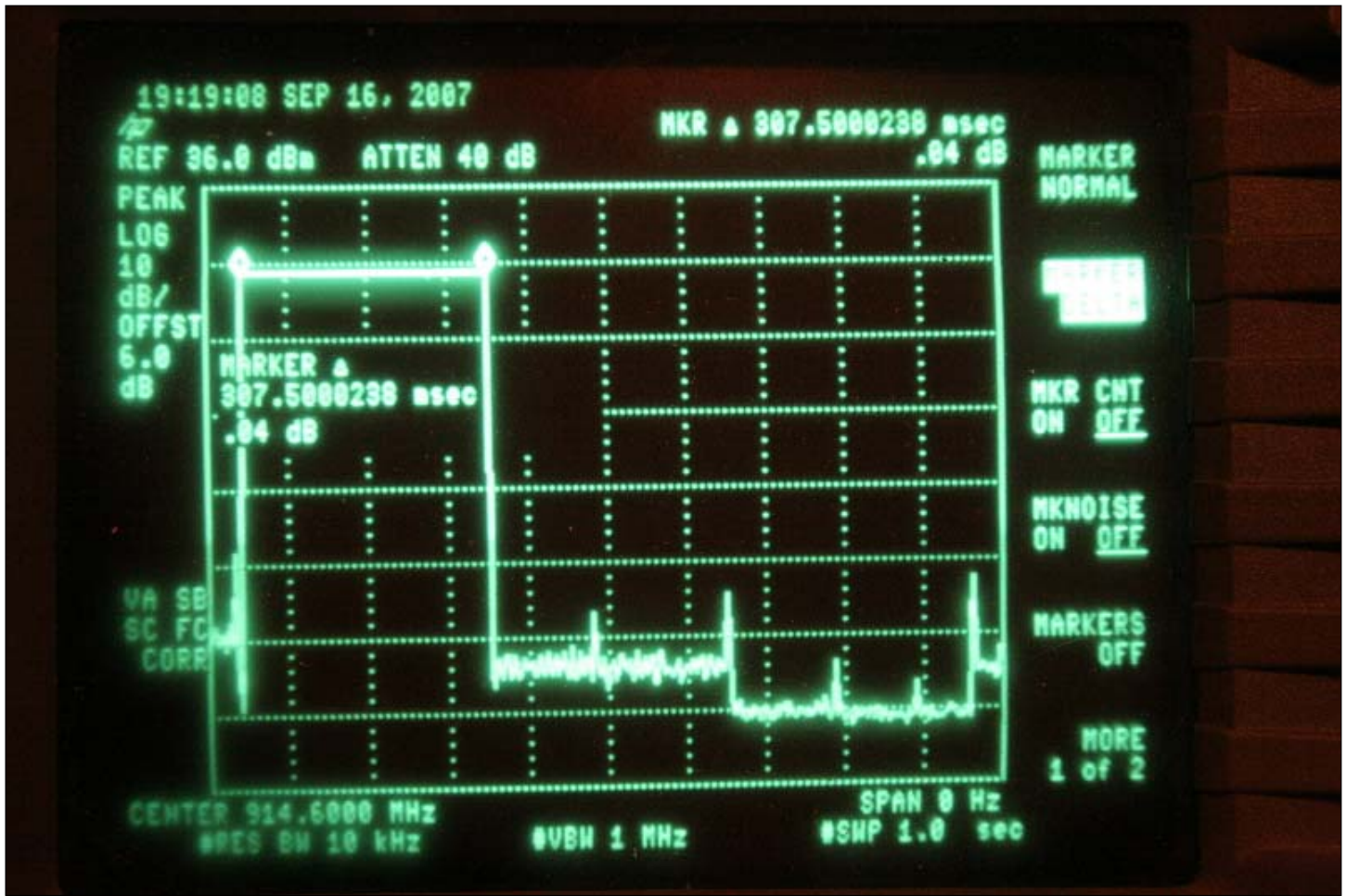
17_Time_on_chan_per20_sec_LOW.jpg



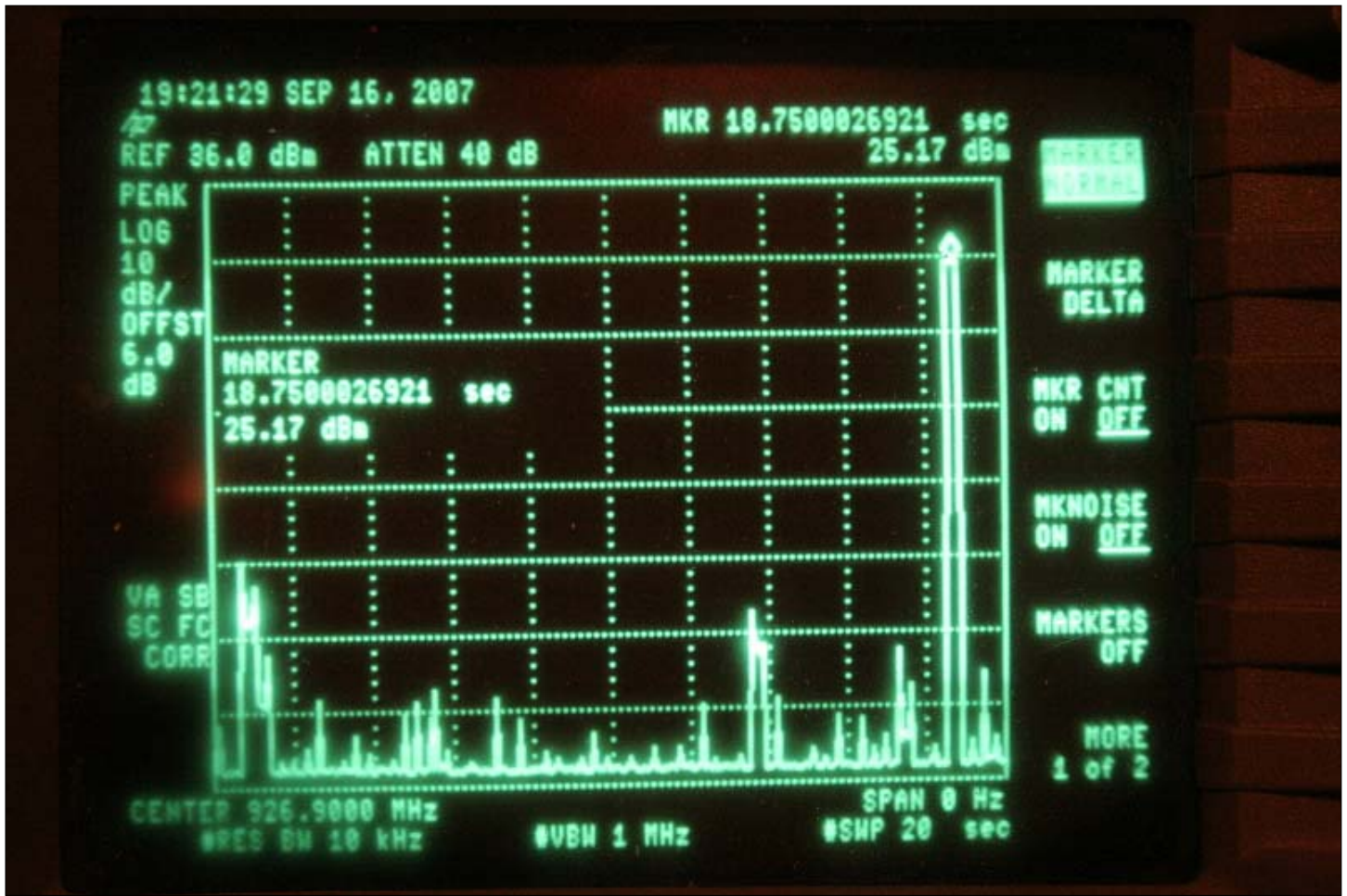
18_time_on_chan_one_hit_LOW.jpg



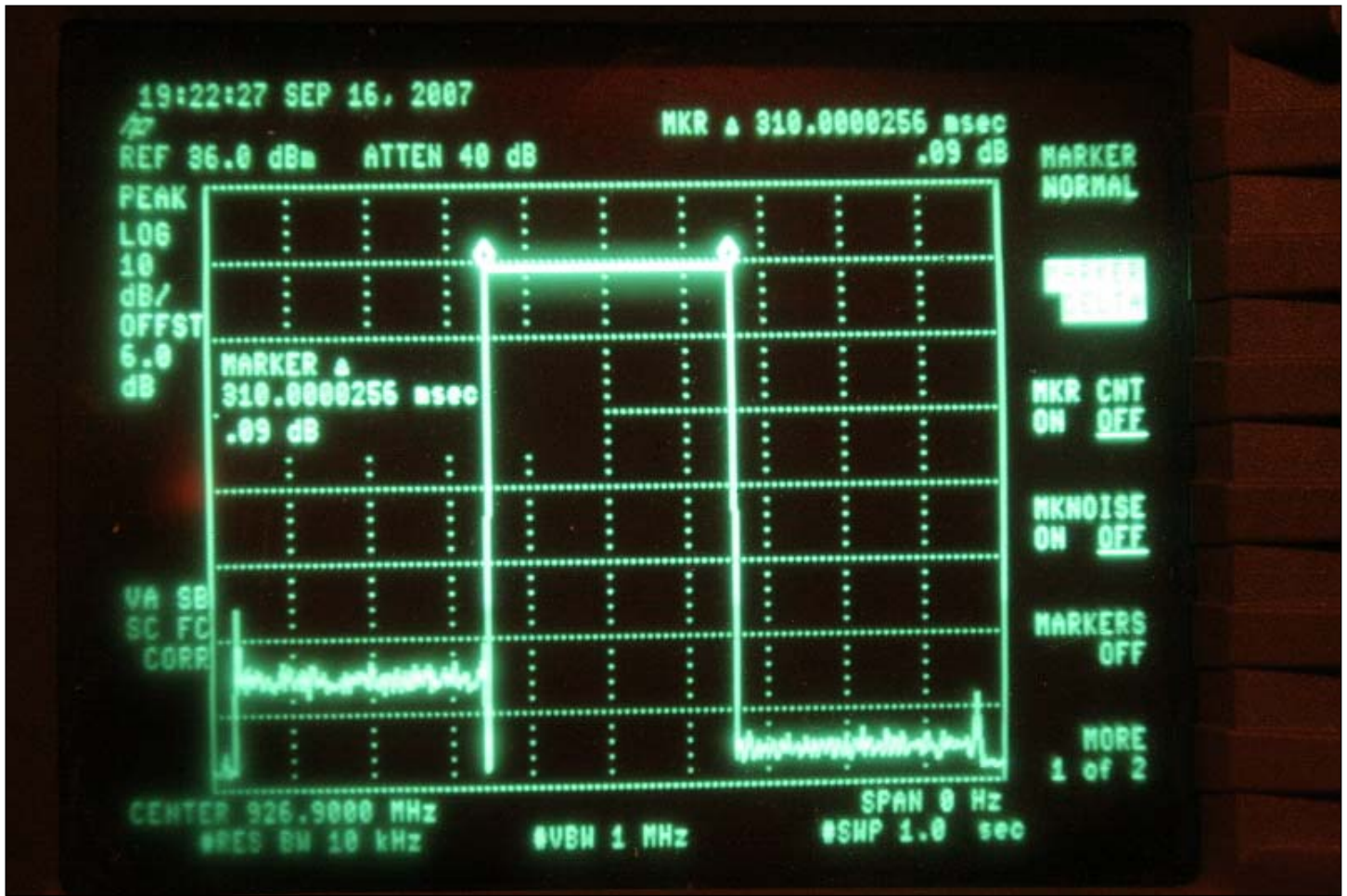
19_Time_on_chan_per20_sec_MID.jpg



20_time_on_chan_one_hit_MID.jpg



21_Time_on_chan_per20_sec_HIGH.jpg



22_time_on_chan_one_hit_HIGH.jpg