



**FCC CFR47 PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 8**

CERTIFICATION TEST REPORT

FOR

902-928 MHZ TRANSCEIVER

MODEL NUMBER: A110LR09A and A110LR09C*

**FCC ID: X7J-A11072401
IC: 8975A-A11072401**

REPORT NUMBER: 11U13990-2, Revision B

ISSUE DATE: OCTOBER 26, 2011

Prepared for
**ANAREN, INC.
6635 KIRKVILLE ROAD
EAST SYRACUSE, NY 13057-9600, U.S.A.**

Prepared by
**COMPLIANCE CERTIFICATION SERVICES
47173 BENICIA STREET
FREMONT, CA 94538, U.S.A.
TEL: (510) 771-1000
FAX: (510) 661-0888**



NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	10/10/11	Initial Issue	F. Ibrahim
A	10/24/11	Removed the GFSK data from the report, and added high frequency radiated data for 2FSK for EUT with monopole antenna.	F. Ibrahim
B	10/26/11	Revised MPE limits in section 10.	F. Ibrahim

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS.....	5
2. TEST METHODOLOGY	6
3. FACILITIES AND ACCREDITATION.....	6
4. CALIBRATION AND UNCERTAINTY	6
4.1. MEASURING INSTRUMENT CALIBRATION	6
4.2. SAMPLE CALCULATION.....	6
4.3. MEASUREMENT UNCERTAINTY	6
5. EQUIPMENT UNDER TEST	7
5.1. DESCRIPTION OF EUT.....	7
5.2. MANUFACTURER'S DESCRIPTION OF MODEL DIFFERENCES.....	7
5.3. MAXIMUM OUTPUT POWER.....	7
5.4. DESCRIPTION OF AVAILABLE ANTENNAS	7
5.5. SOFTWARE AND FIRMWARE	7
5.6. WORST-CASE CONFIGURATION AND MODE.....	8
5.7. DESCRIPTION OF TEST SETUP	9
6. TEST AND MEASUREMENT EQUIPMENT	11
7. ANTENNA PORT TEST RESULTS	12
7.1.1. 6 dB BANDWIDTH	12
7.1.2. 99% BANDWIDTH	15
7.1.3. OUTPUT POWER	18
7.1.4. AVERAGE POWER	26
7.1.5. POWER SPECTRAL DENSITY	28
7.1.6. CONDUCTED SPURIOUS EMISSIONS.....	36
8. RADIATED TEST RESULTS	44
8.1. LIMITS AND PROCEDURE	44
8.2. TRANSMITTER BELOW 1 GHz (PCB Antenna).....	45
8.2.1. TRANSMITTER BELOW 1 GHz FOR 2FSK MODE, ML4	45
8.2.2. TRANSMITTER BELOW 1 GHz FOR 2FSK MODE, ML7	57
8.3. TRANSMITTER ABOVE 1 GHz (PCB Antenna)	69
8.3.1. HARMONIC AND SPURIOUS ABOVE 1 GHz FOR 2FSK MODE, ML4.....	69
8.3.2. HARMONIC AND SPURIOUS ABOVE 1 GHz FOR 2FSK MODE, ML7.....	70
8.4. TRANSMITTER BELOW 1 GHz (Monopole Antenna_Worst-case)	71
8.4.1. TRANSMITTER BELOW 1 GHz FOR 2FSK MODE, ML7	71
8.5. TRANSMITTER ABOVE 1 GHz (Monopole Antenna).....	75
8.5.1. HARMONIC AND SPURIOUS ABOVE 1 GHz FOR 2FSK MODE, ML7.....	75
8.6. RECEIVER BELOW 1 GHz	76

8.7. RECEIVER ABOVE 1 GHz.....	79
9. AC POWER LINE CONDUCTED EMISSIONS.....	80
10. MAXIMUM PERMISSIBLE EXPOSURE.....	84
11. SETUP PHOTOS.....	88

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: ANAREN, INC.
6635 KIRKVILLE ROAD
EAST SYRACUSE, NY 13057, U.S.A.

EUT DESCRIPTION: 902-928 MHZ TRANSCEIVER

MODEL: A110LR09A (Radiated Sample) and A110LR09C (Conducted Sample)

SERIAL NUMBER: 0007431105 (Radiated Sample) and 0007471105 (Conducted Sample)

DATE TESTED: August 18 – October 21, 2011

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-210 Issue 8	Pass
INDUSTRY CANADA RSS-GEN Issue 3	Pass

Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For CCS By:



FRANK IBRAHIM
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

Tested By:



WILLIAM ZHUANG
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 3, and RSS-210 Issue 8.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 dB

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a 902-928 MHz Transceiver.

5.2. MANUFACTURER'S DESCRIPTION OF MODEL DIFFERENCES

A110LR09A and A110LR09C are Identical, except that A110LR09C has a U.FL connector, and A110LR09A has an integral printed antenna.

5.3. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

Frequency Range (MHz)	Mode	Modulation	Output Power (dBm)	Output Power (mW)
902.700 – 927.377	DSSS	2FSK	12.32	17.06

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes Monopole and PCB antenna with maximum peak gains of 2dBi on Monopole and 0dBi on PCB antennas.

5.5. SOFTWARE AND FIRMWARE

The EUT Firmware software installed during testing was v00.07

The test utility software used during testing was AirFCC v4.2.0.0

5.6. WORST-CASE CONFIGURATION AND MODE

The EUT has the following modulations and data rates:

LR09X – FCC CONFIGURATIONS					
Modulation	Datarate [kbps]	Code	Deviation (kHz)	Band (MHz)	Memo
2-FSK	1.2	ML4	237	902 – 928	Narrowest Bandwidth case for 2-FSK
2-FSK	38.4	ML5	237	902 – 928	
2-FSK	100	ML6	237	902 – 928	
2-FSK	250	ML7	237	902 – 928	Widest Bandwidth case for 2-FSK

Peak output power, Average output power, and PPSD were measured for the 2FSK modulation for all available data rates. Radiated and Conducted Emissions spurious were performed for 2FSK modulation at the lowest and highest data rates as worst-case scenarios to cover all data rates. 6 dB Bandwidth was measured for 2FSK modulation at lowest data rate as worst-case scenario.

The EUT with PCB antenna has been investigated on X, Y and Z position. The worst case was found to be at X orientation. All final testing was performed with the EUT in the X orientation.

Based on the results for EUT with PCB antenna, worst-case modes and channels were chosen to investigate the radiated emissions from EUT with monopole antenna in the worst-case orientation (vertical orientation).

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop PC	DELL	PP18L	2921940145	DoC
AC Adapter	DELL	LA65NS0-00	0D5263-71615-82P-217E	DoC

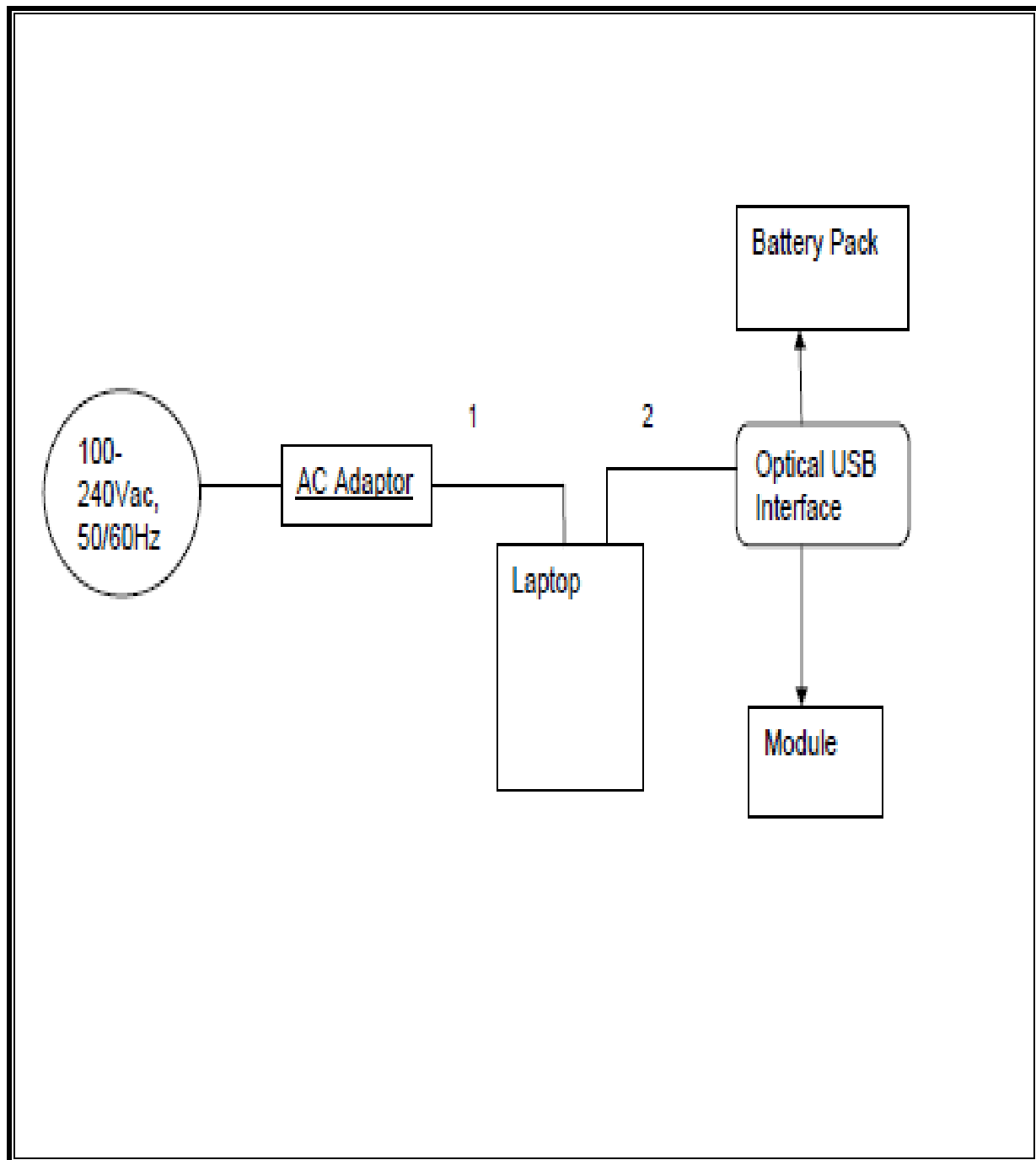
I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	AC	Un-shielded	2m	N/A
2	DC	1	DC	Un-shielded	2m	N/A
3	USB	1	USB	Shielded	2m	N/A

TEST SETUP

The EUT is connected to a host laptop computer during the tests. Test software exercised the radio card.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Asset	Cal Due
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01016	07/14/12
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	08/04/12
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01178	08/31/11
Antenna, Horn, 18 GHz	EMCO	3115	C00945	07/29/12
LISN, 30 MHz	FOC	LISN-50/250-25-2	N02625	11/06/11
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	05/06/12
Peak Power Meter	Boonton	4541	C01186	03/01/12
Peak Power Sensor	Boonton	57318	C01202	02/23/12

7. ANTENNA PORT TEST RESULTS

7.1.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

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

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

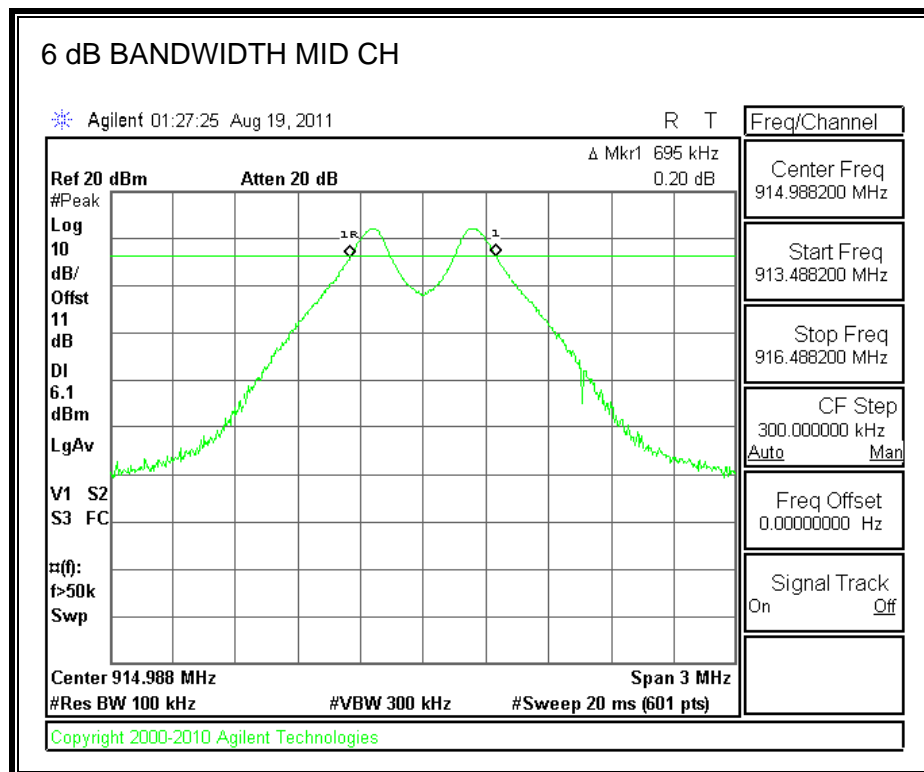
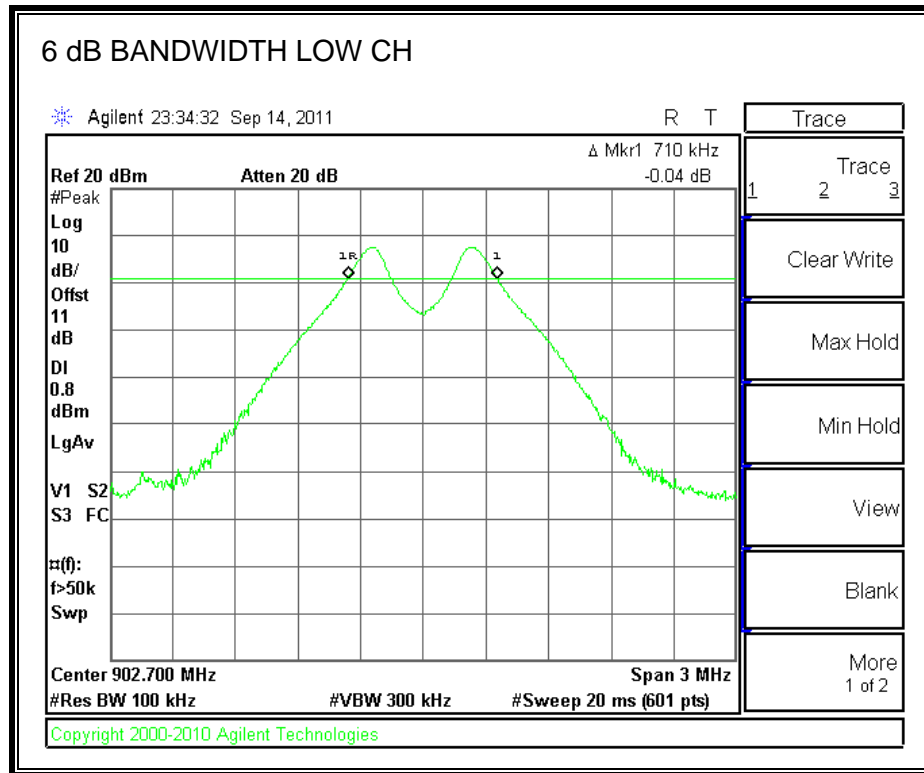
RESULTS

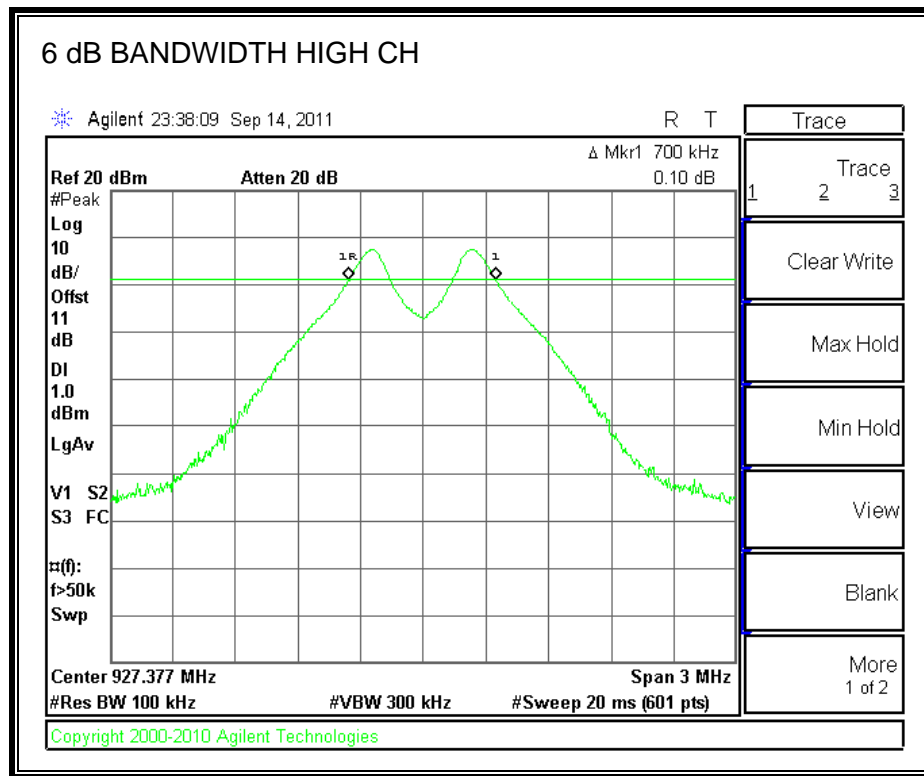
2FSK MODE

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	902.700	0.710	0.5
Middle	914.988	0.695	0.5
High	927.377	0.700	0.5

2FSK MODE, ML4

6 dB BANDWIDTH





7.1.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

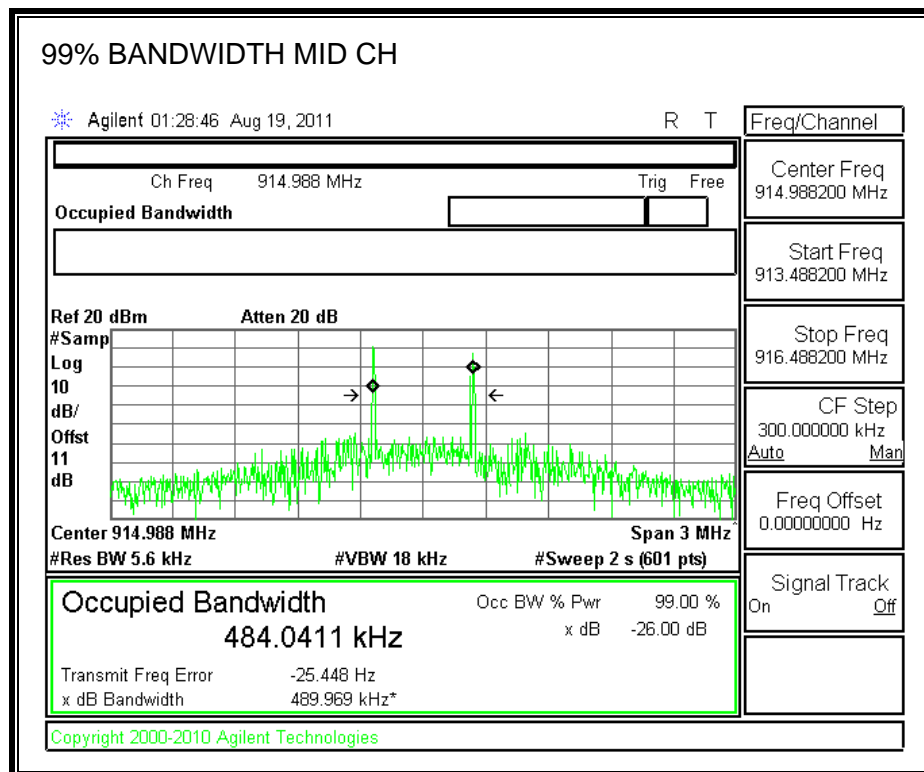
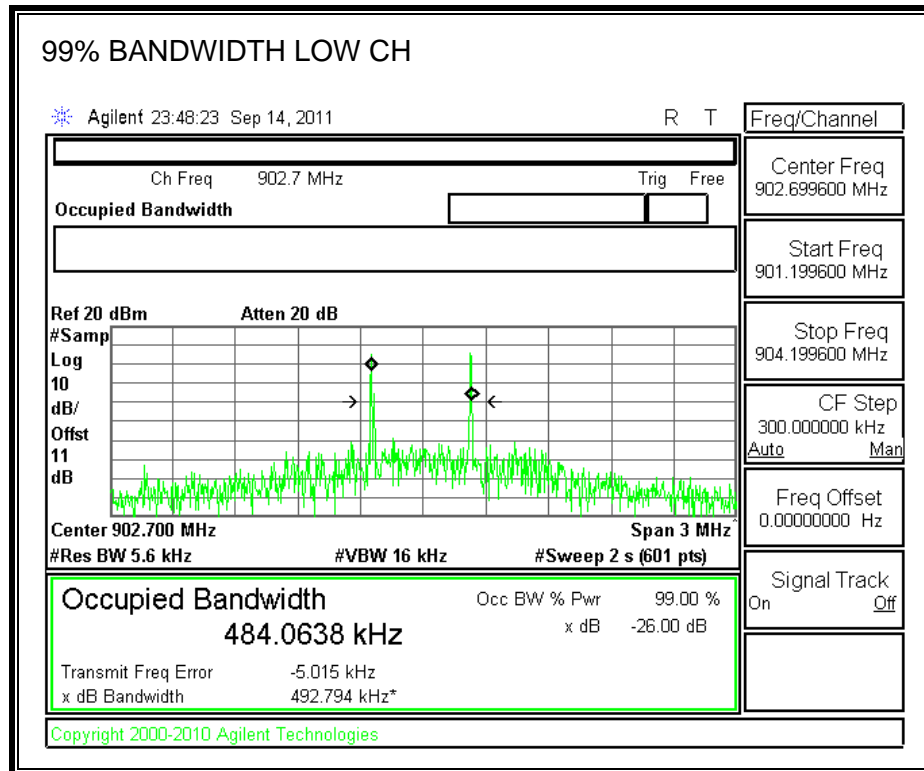
RESULTS

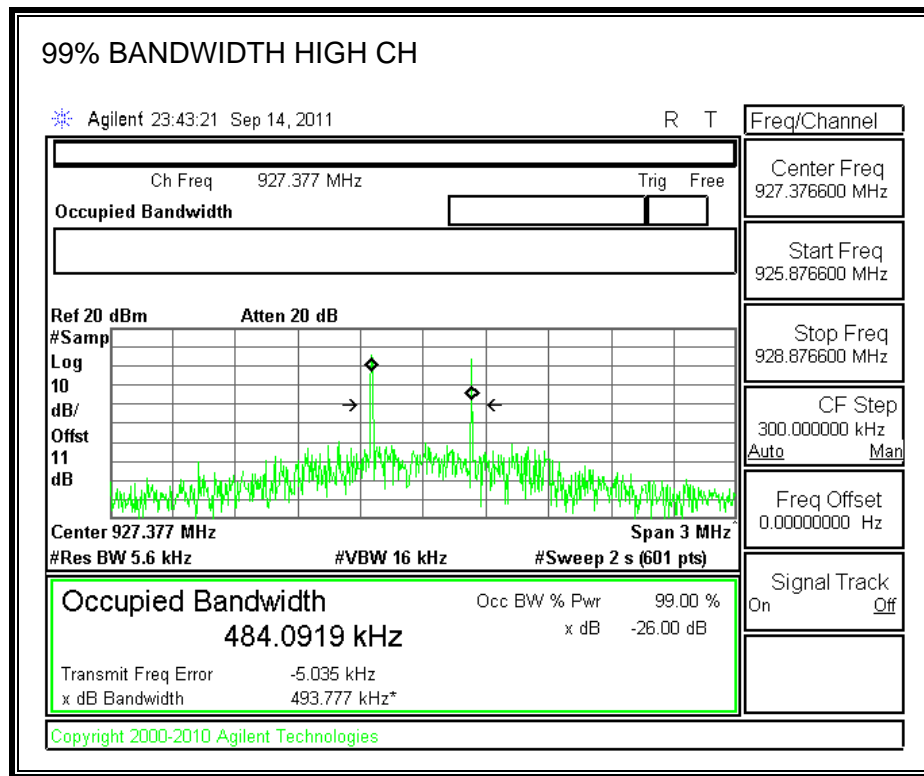
2FSK MODE

Channel	Frequency (MHz)	99% Bandwidth (KHz)
Low	902.700	484.0638
Middle	914.988	484.0411
High	927.377	484.0919

2FSK MODE, ML4

99% BANDWIDTH





7.1.3. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3)

IC RSS-210 A8.4

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

TEST PROCEDURE

Peak power is measured by the spectrum analyzer.

RESULTS

2FSK Mode

ML4

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	902.700	7.49	30	-22.51
Middle	914.988	7.70	30	-22.30
High	927.377	7.33	30	-22.67

ML5

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	902.700	8.50	30	-21.50
Middle	914.988	8.73	30	-21.27
High	927.377	8.36	30	-21.64

ML6

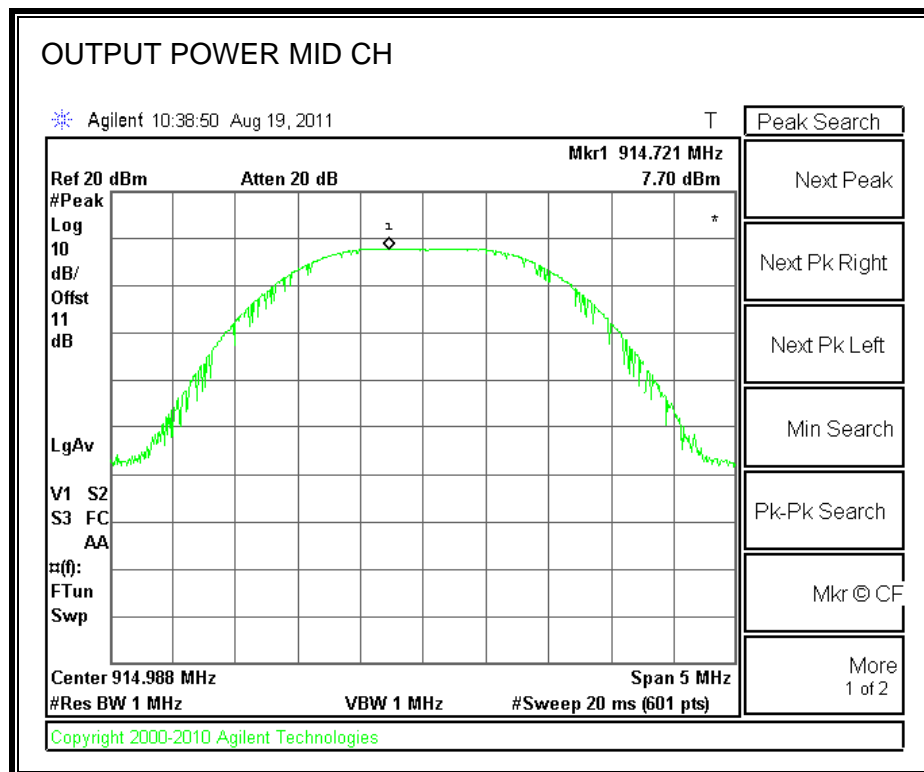
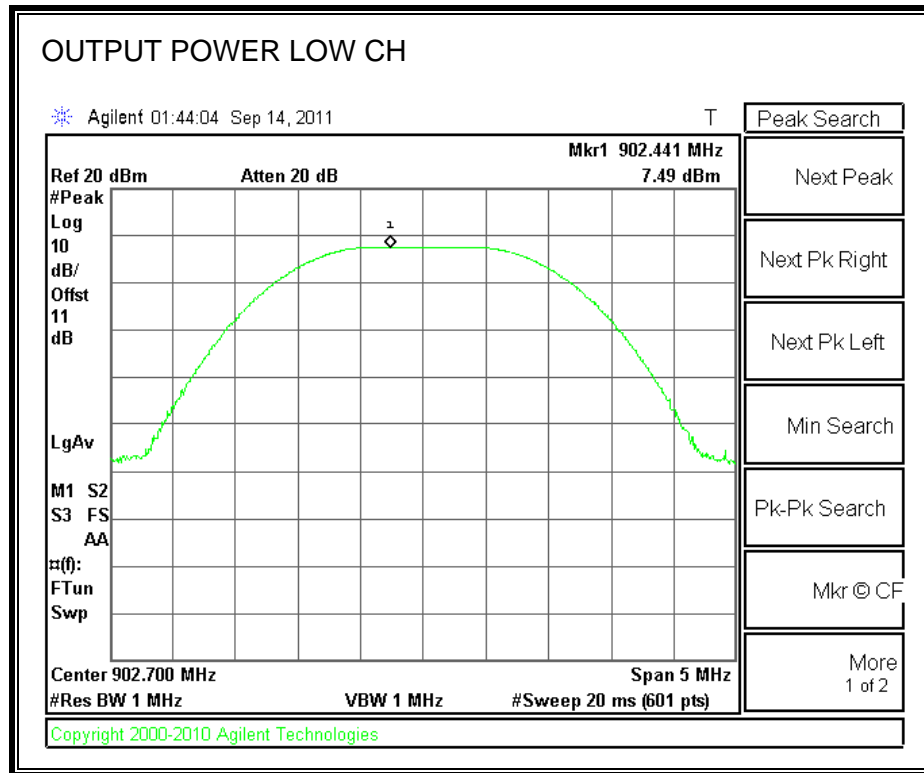
Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	902.700	10.60	30	-19.40
Middle	914.988	10.83	30	-19.17
High	927.377	10.46	30	-19.54

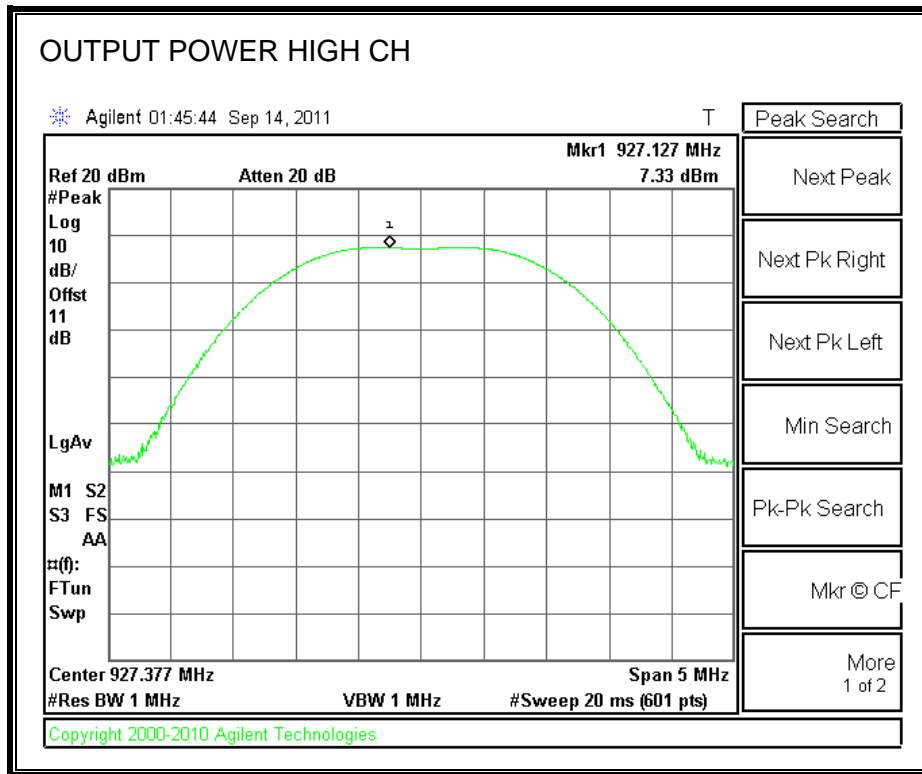
ML7

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	902.700	12.09	30	-17.91
Middle	914.988	12.32	30	-17.68
High	927.377	11.93	30	-18.07

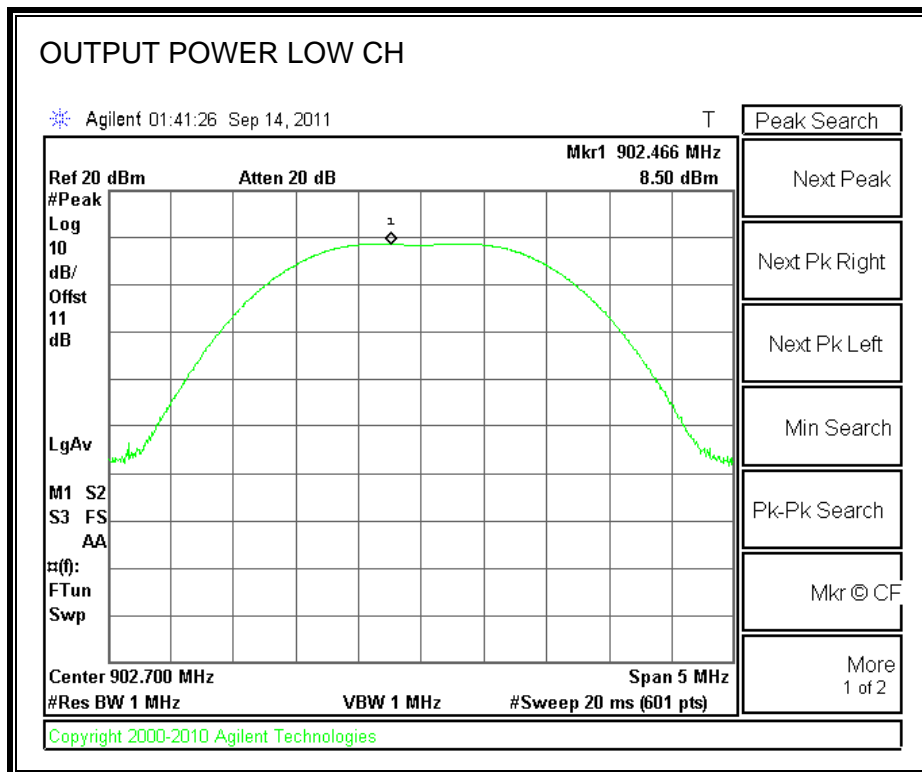
2FSK MODE ML4

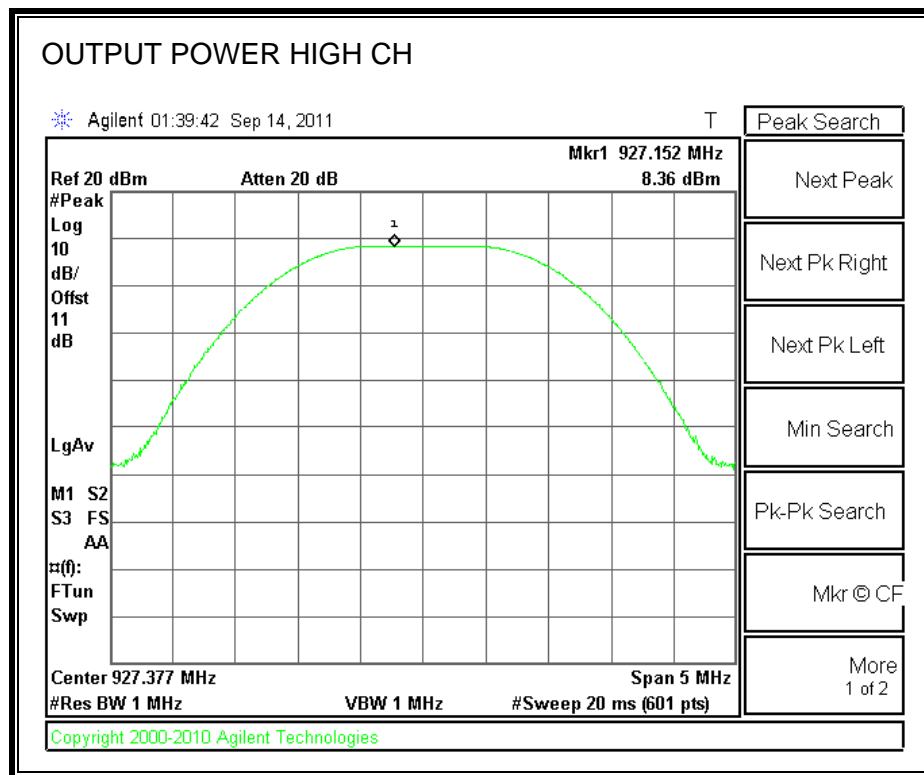
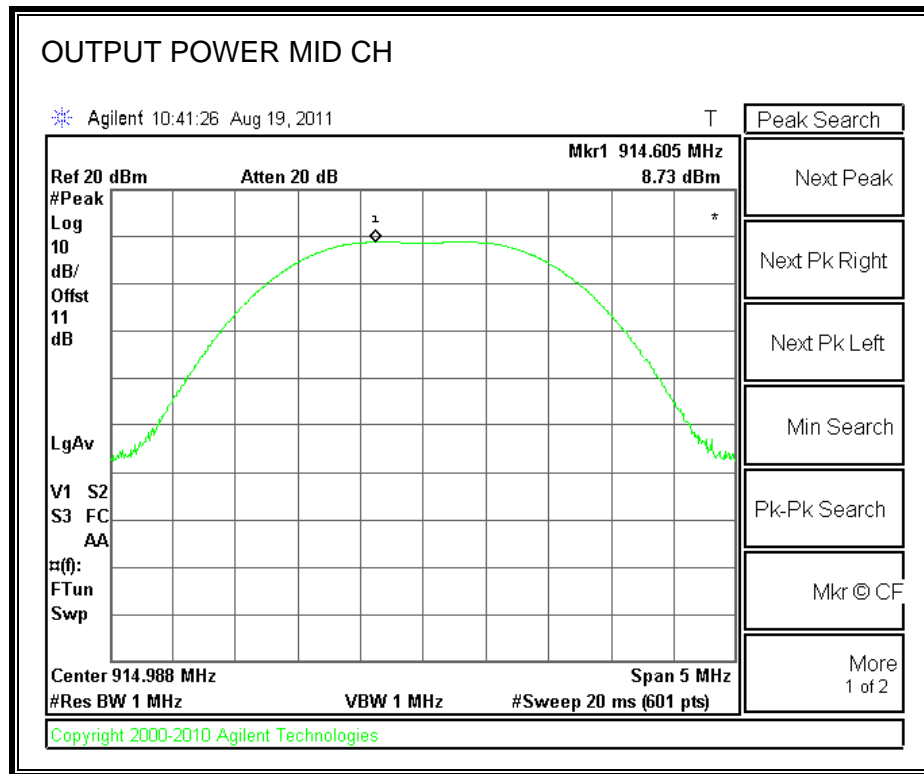
Output Power



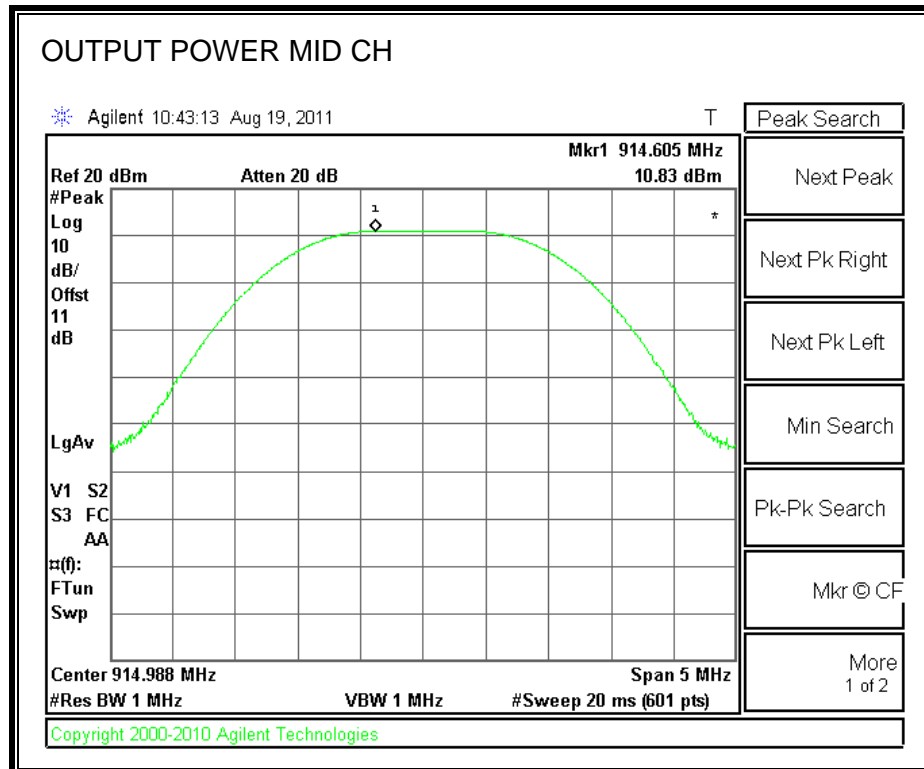
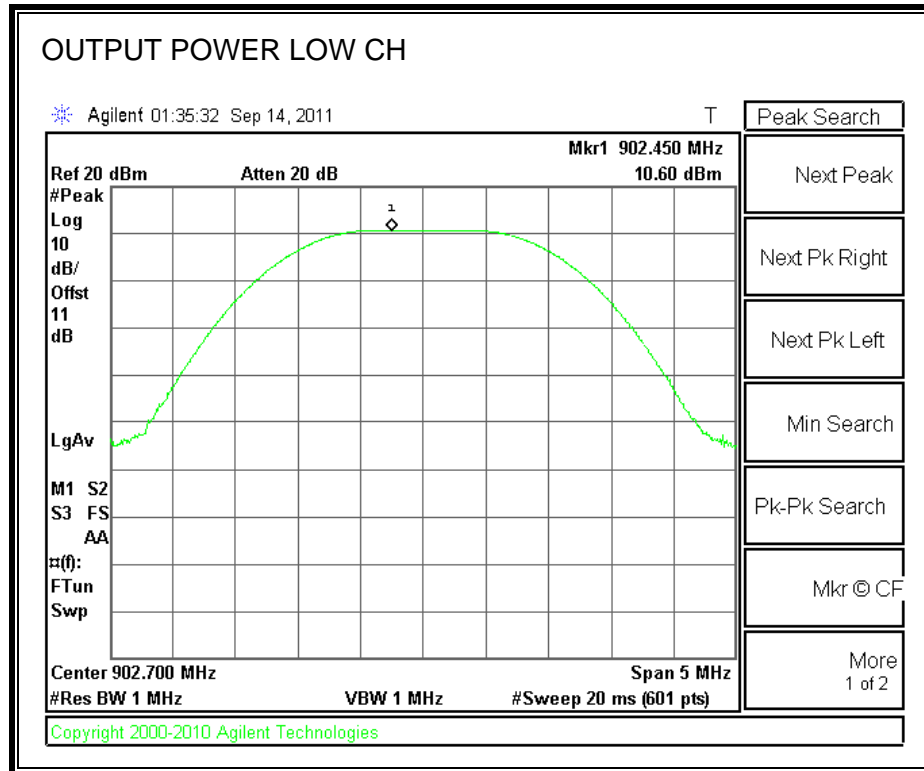


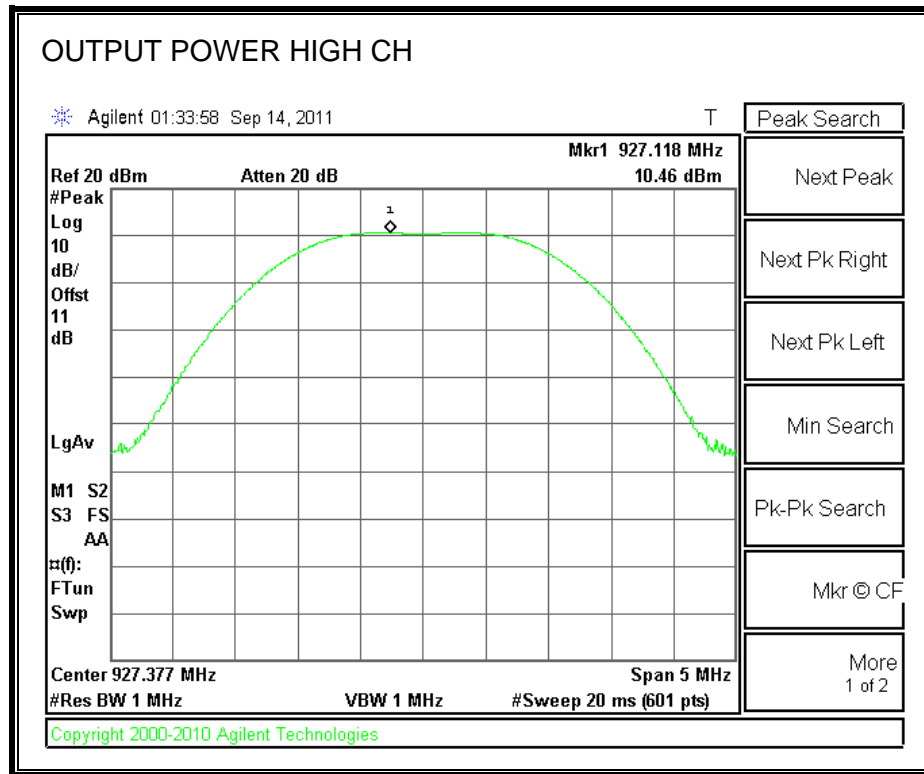
2FSK MODE ML5



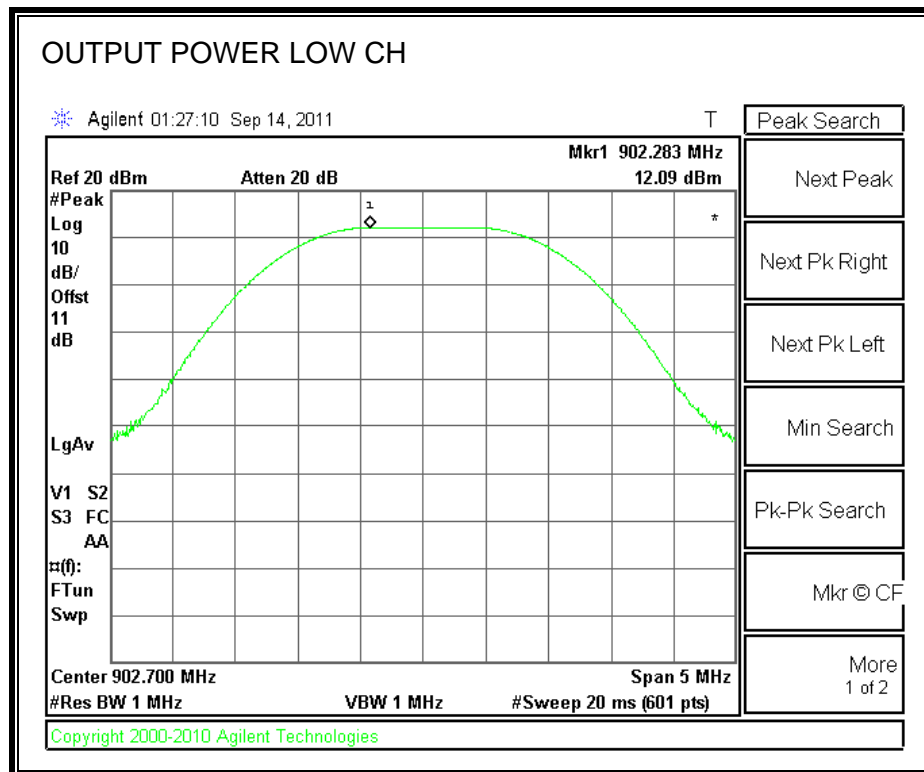


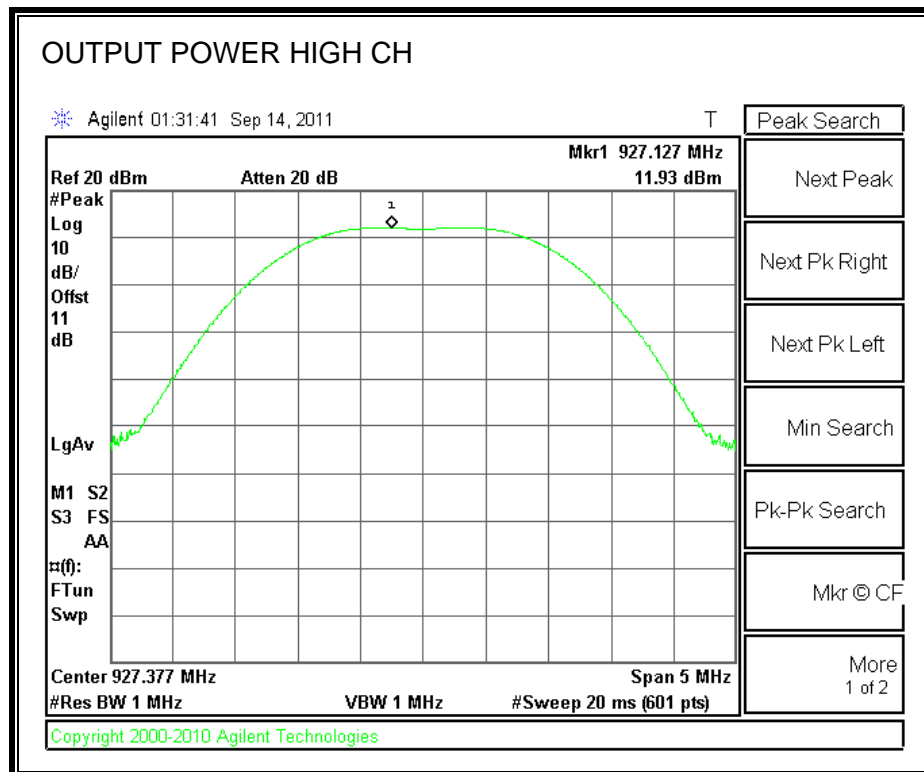
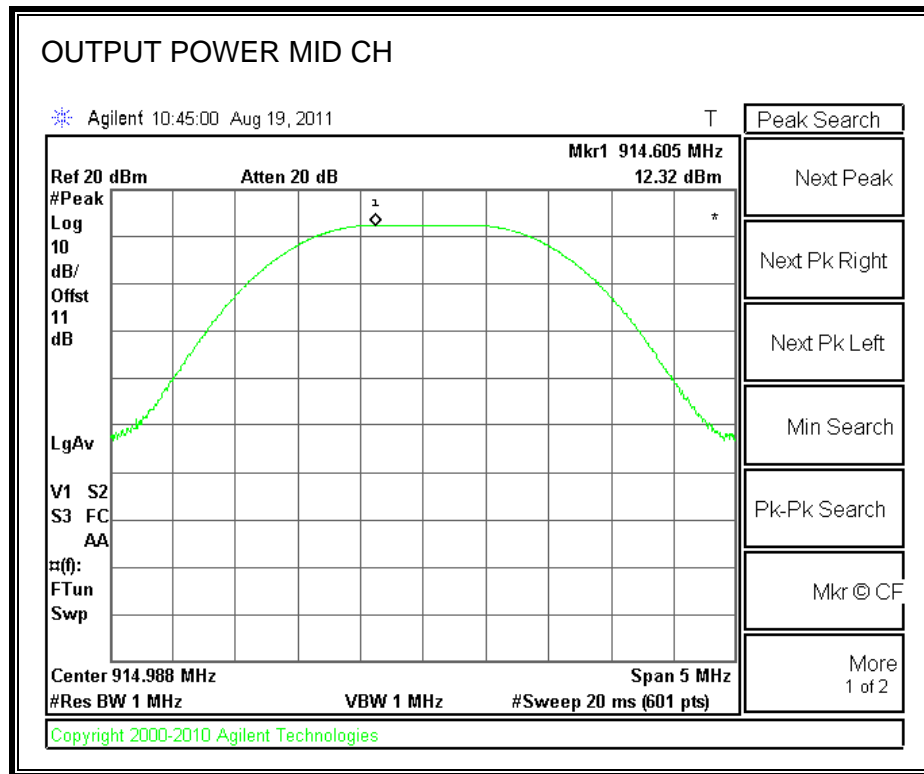
2FSK MODE ML6





2FSK MODE ML7





7.1.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 1dB was entered as an offset in the power meter to allow for direct reading of power.

2FSK

ML4

Channel	Frequency (MHz)	Power (dBm)
Low	902.700	7.53
Middle	914.988	7.47
High	927.377	7.39

ML5

Channel	Frequency (MHz)	Power (dBm)
Low	902.700	8.55
Middle	914.988	8.49
High	927.377	8.41

ML6

Channel	Frequency (MHz)	Power (dBm)
Low	902.700	10.64
Middle	914.988	10.58
High	927.377	10.50

ML7

Channel	Frequency (MHz)	Power (dBm)
Low	902.700	12.14
Middle	914.988	12.08
High	927.377	12.00

7.1.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST PROCEDURE

Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

RESULTS

2FSK MODE

ML4

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	902.700	7.45	8	-0.55
Middle	914.988	7.64	8	-0.36
High	927.377	7.30	8	-0.70

ML5

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	902.700	7.74	8	-0.26
Middle	914.988	7.93	8	-0.07
High	927.377	7.58	8	-0.42

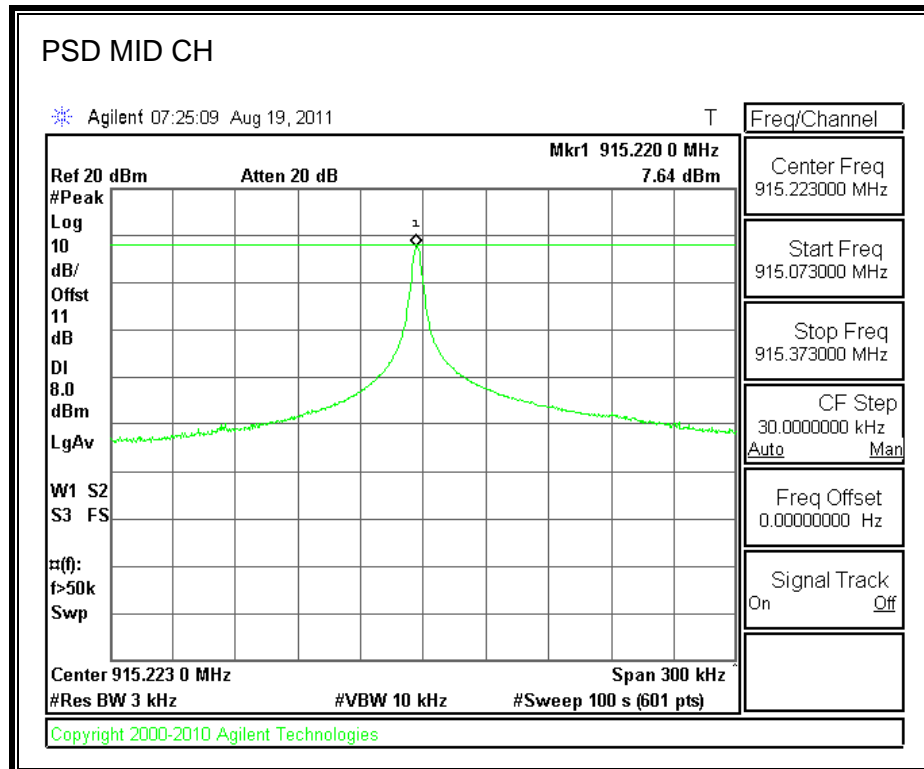
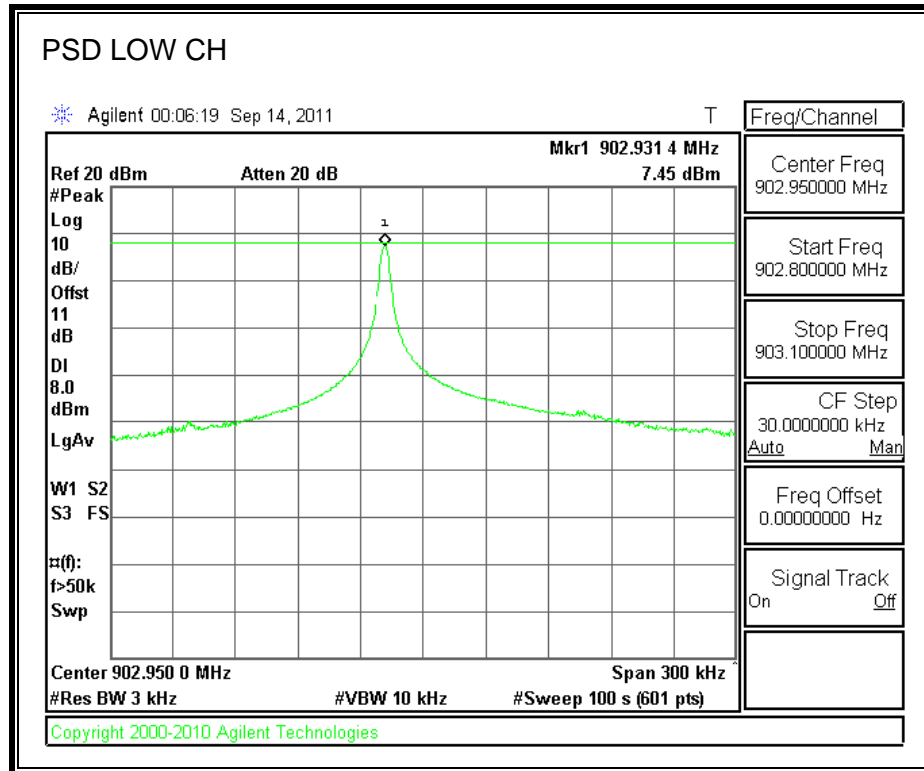
ML6

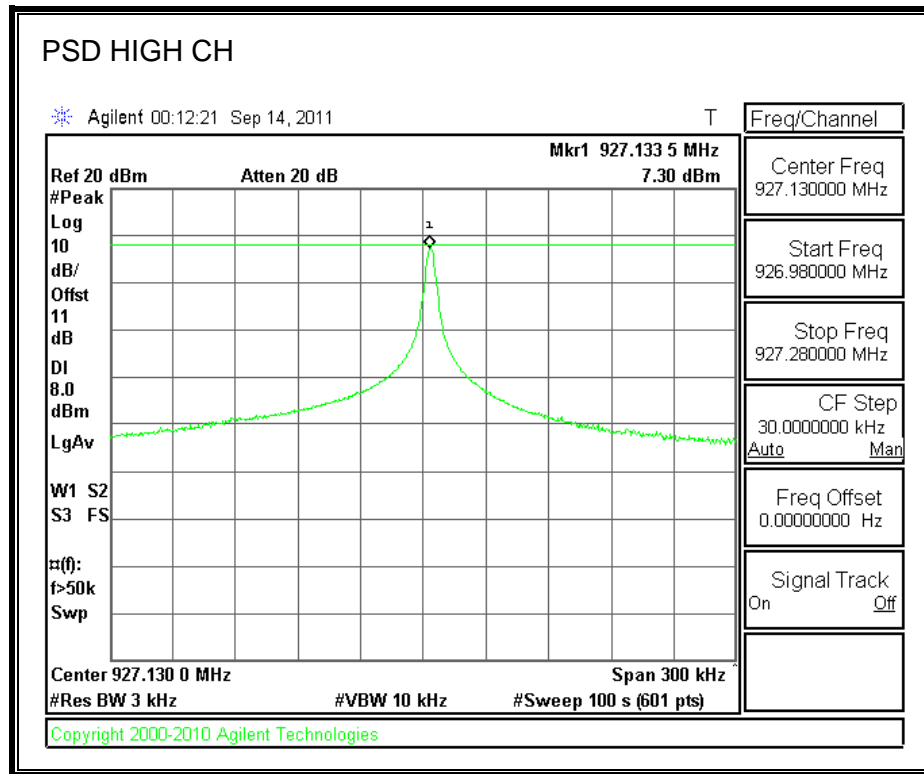
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	902.700	7.11	8	-0.89
Middle	914.988	7.31	8	-0.69
High	927.377	6.89	8	-1.11

ML7

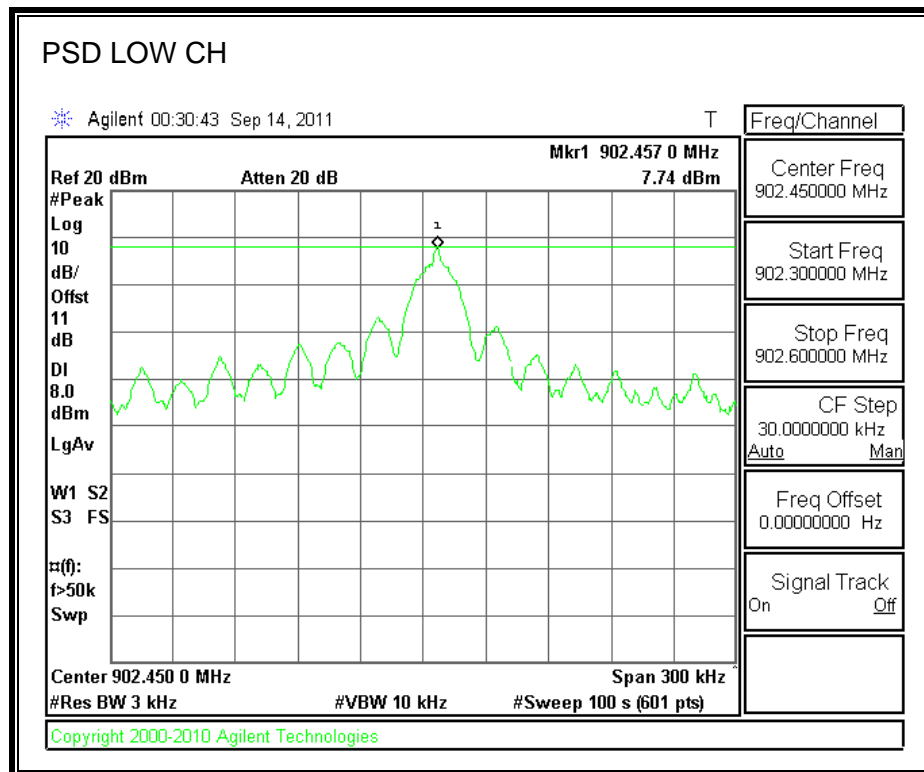
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	902.700	6.23	8	-1.77
Middle	914.988	6.48	8	-1.52
High	927.377	6.14	8	-1.86

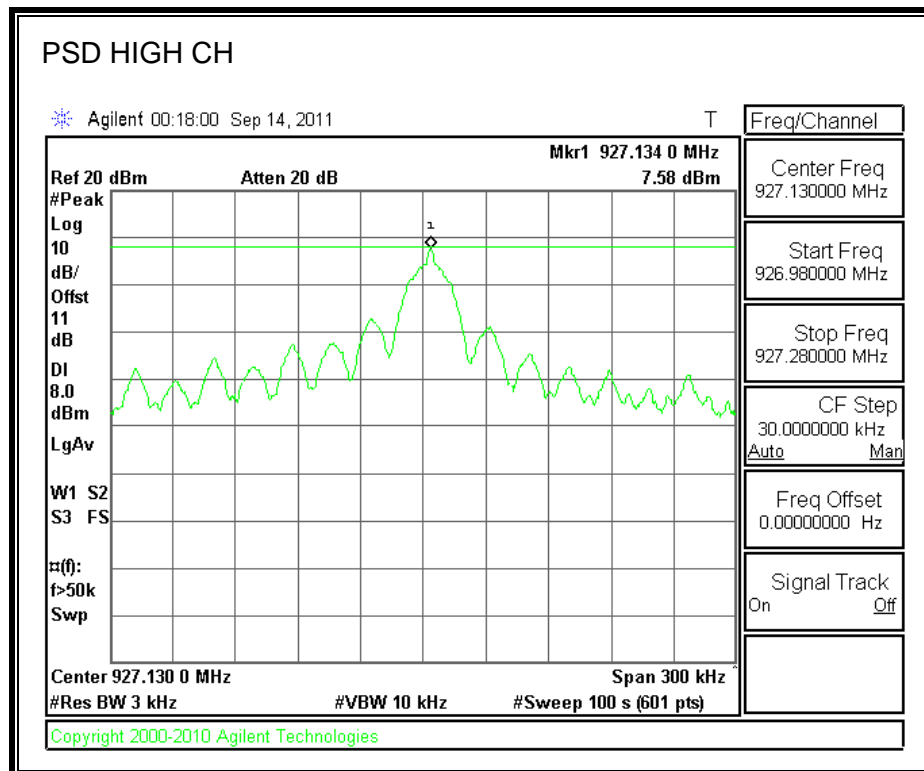
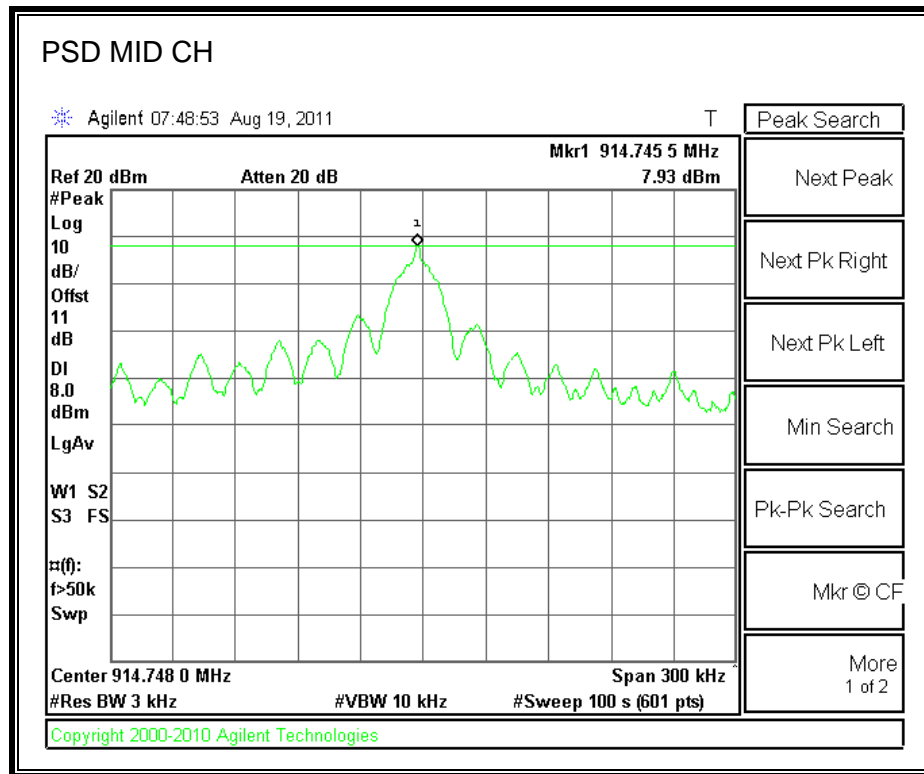
2FSK MODE (ML4)



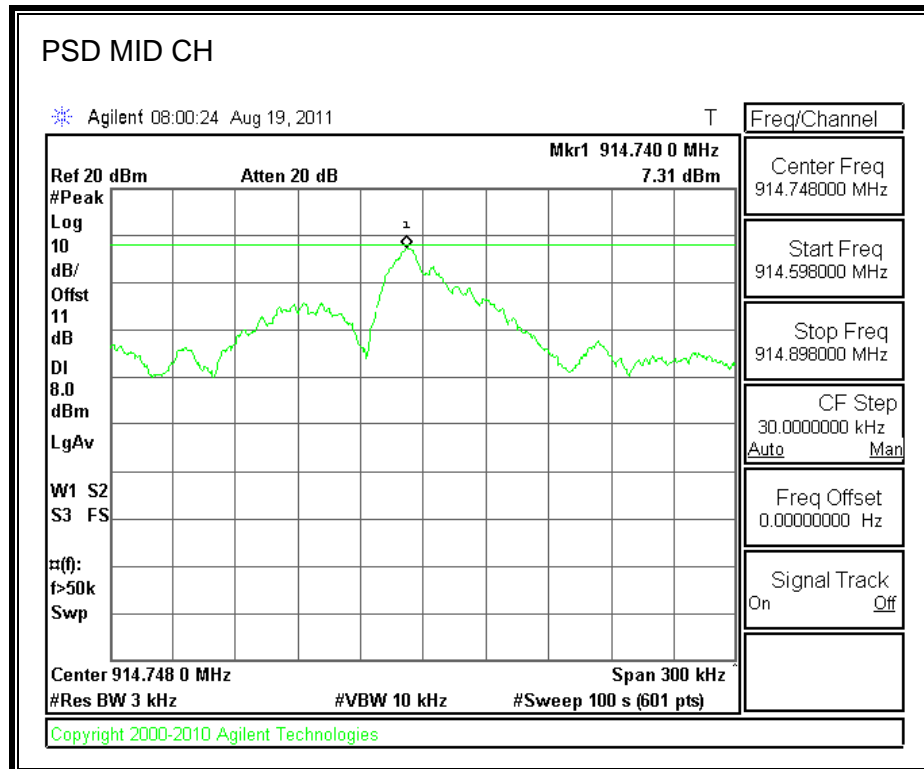
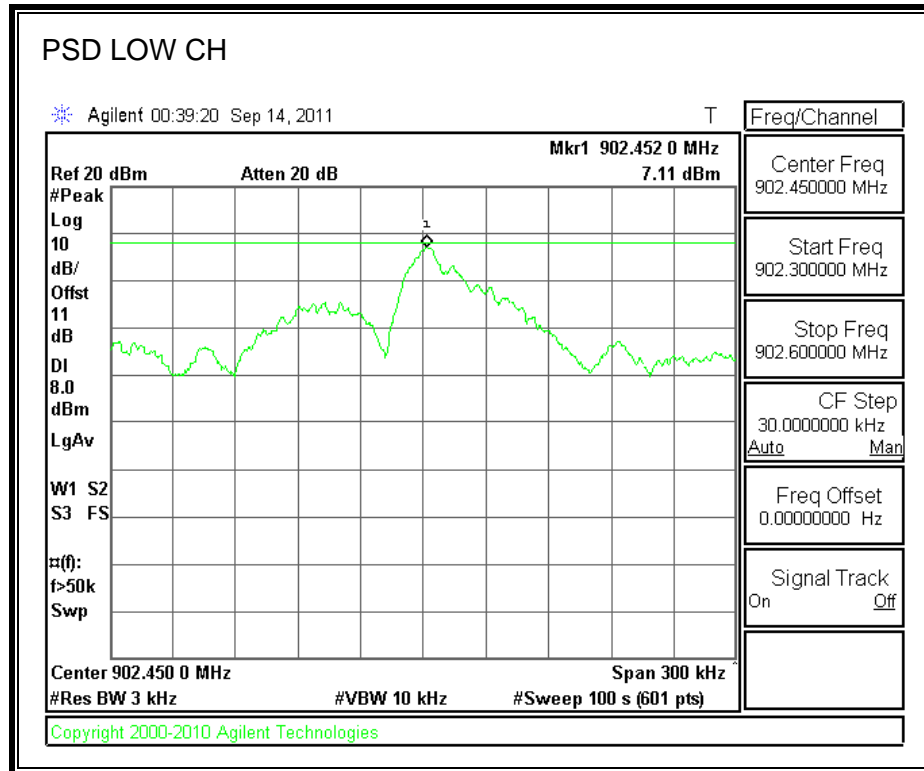


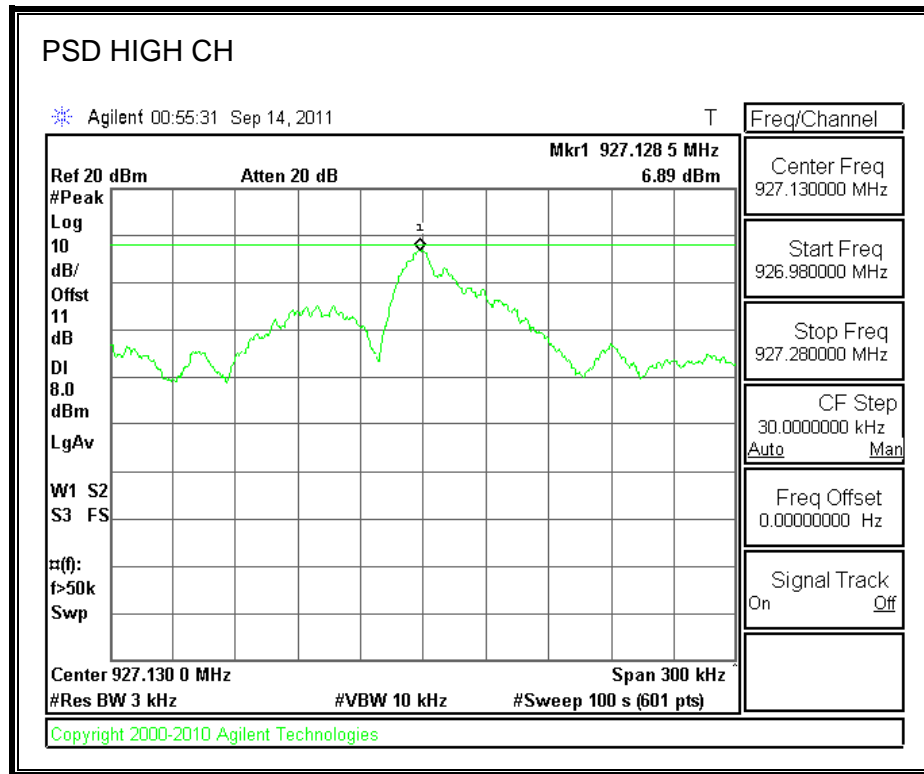
2FSK MODE (ML5)



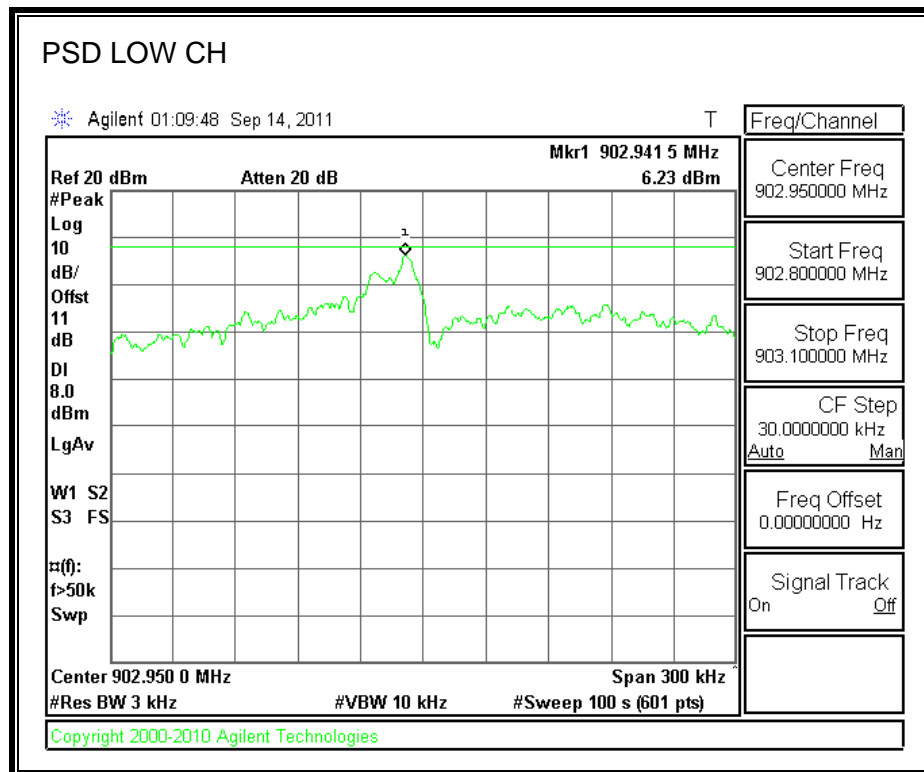


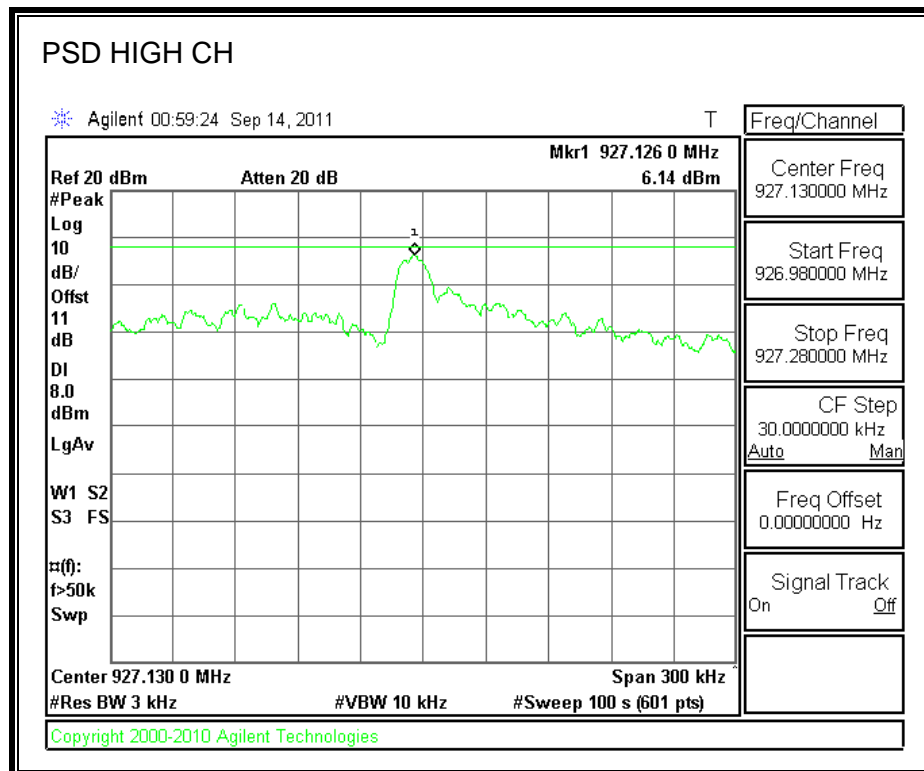
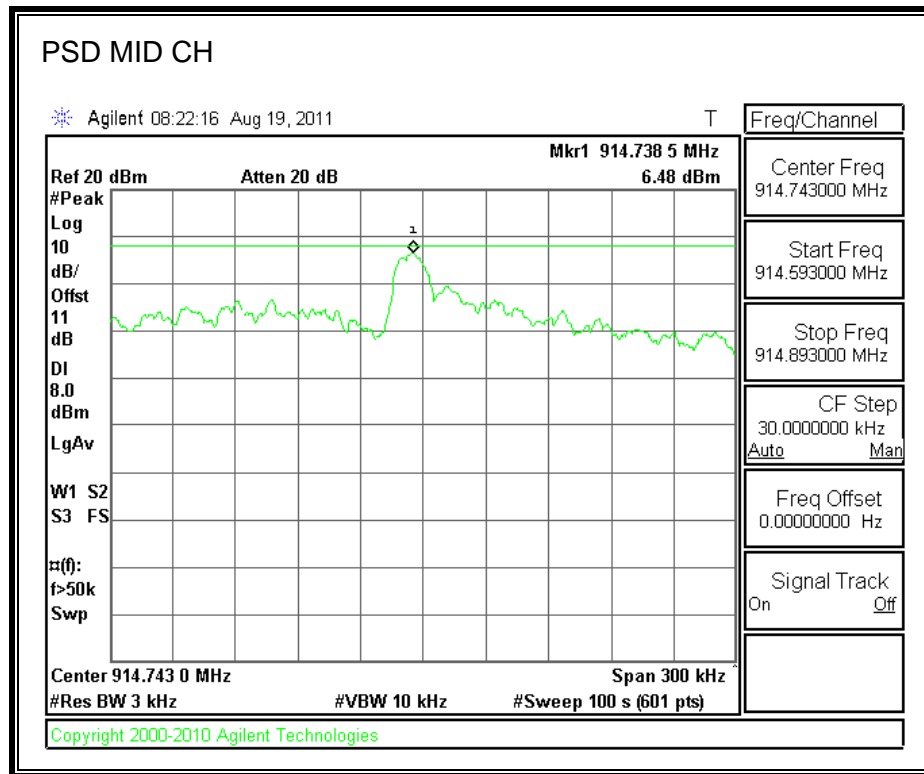
2FSK MODE (ML6)





2FSK MODE (ML7)





7.1.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

TEST PROCEDURE

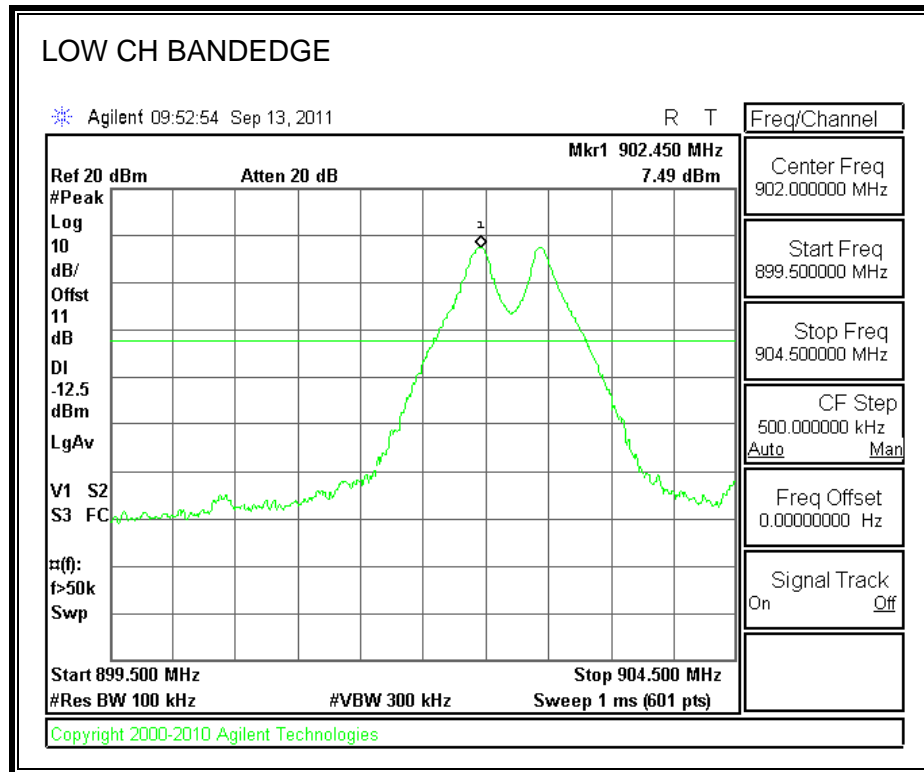
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

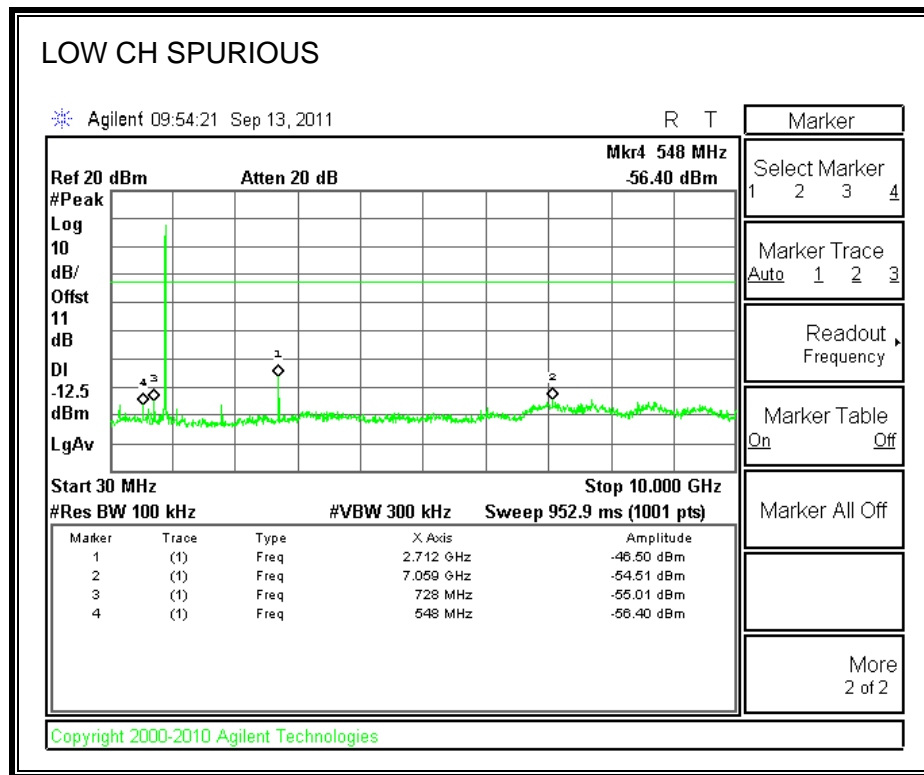
The spectrum from 30 MHz to 10 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

RESULTS

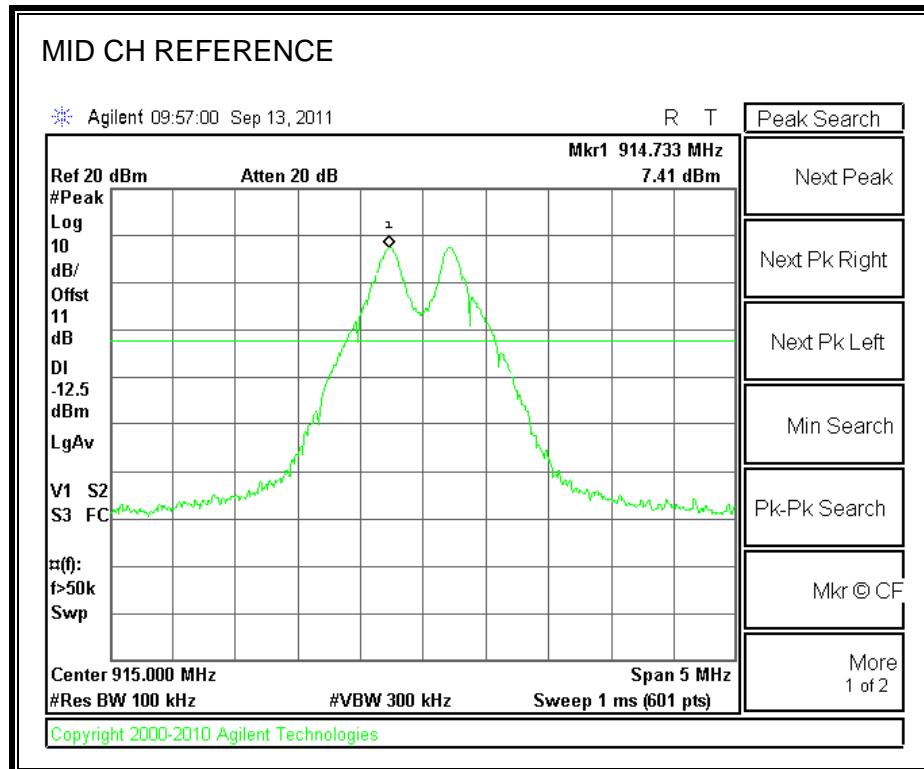
2FSK MODE, ML4

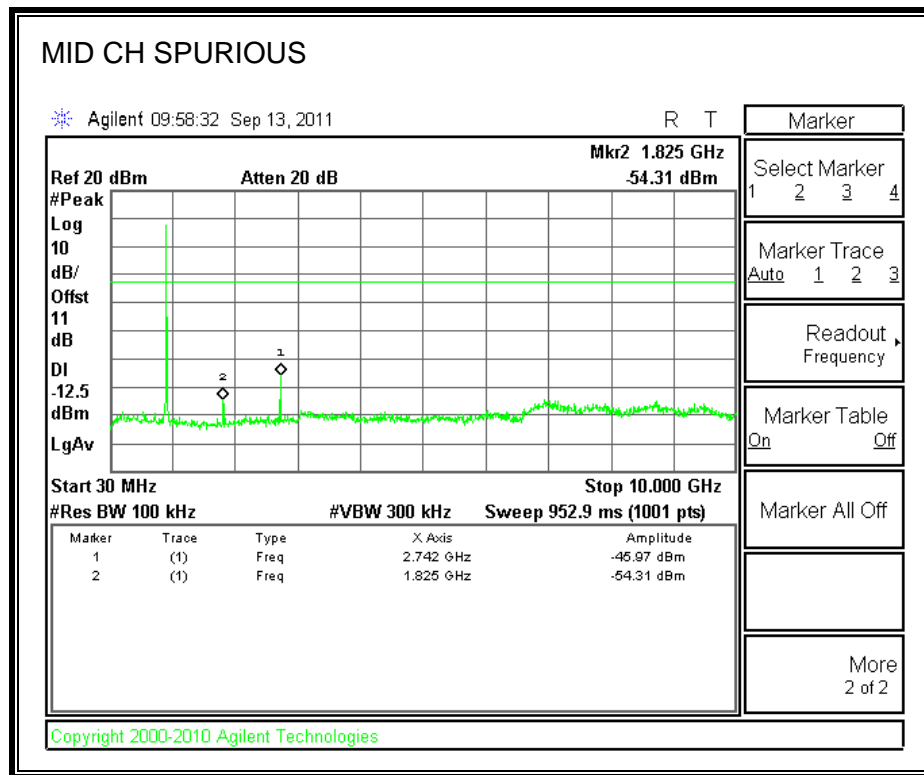
SPURIOUS EMISSIONS, LOW CHANNEL



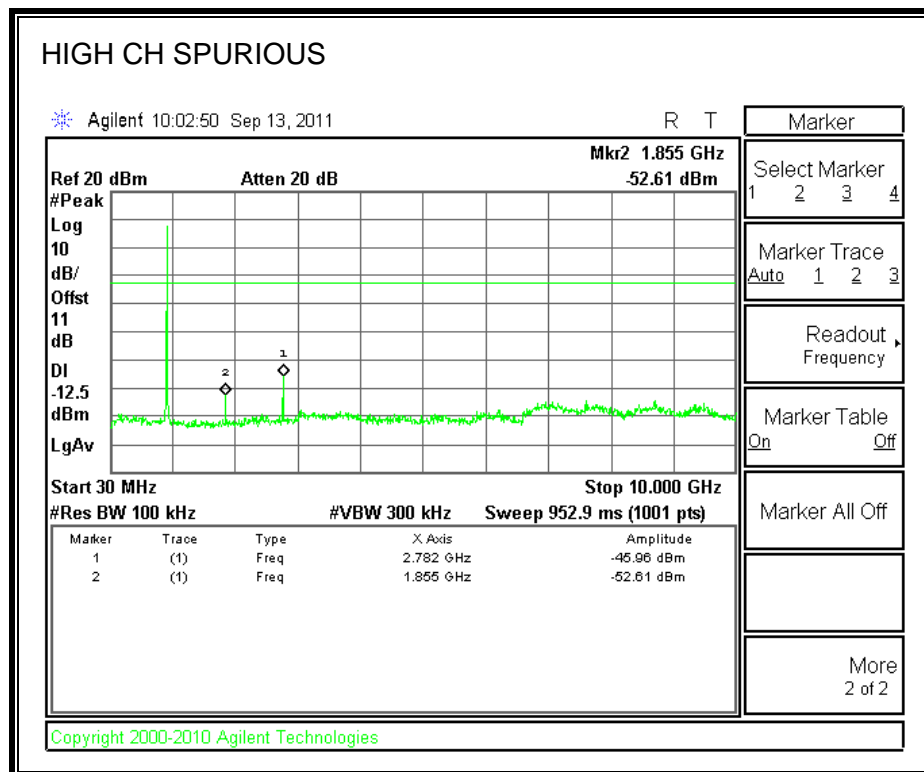
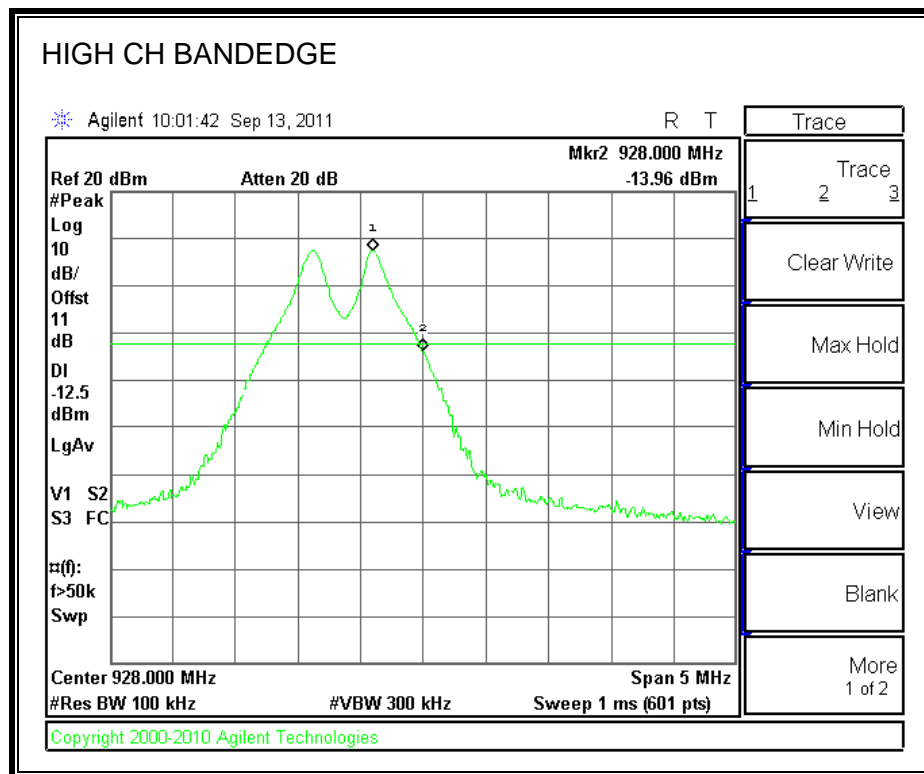


SPURIOUS EMISSIONS, MID CHANNEL



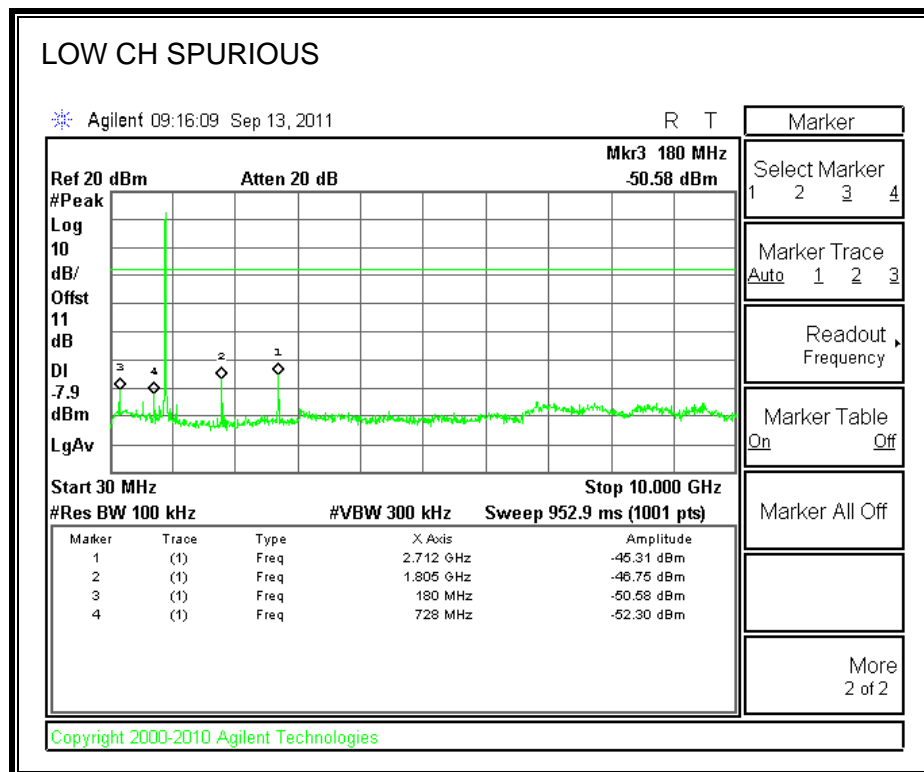
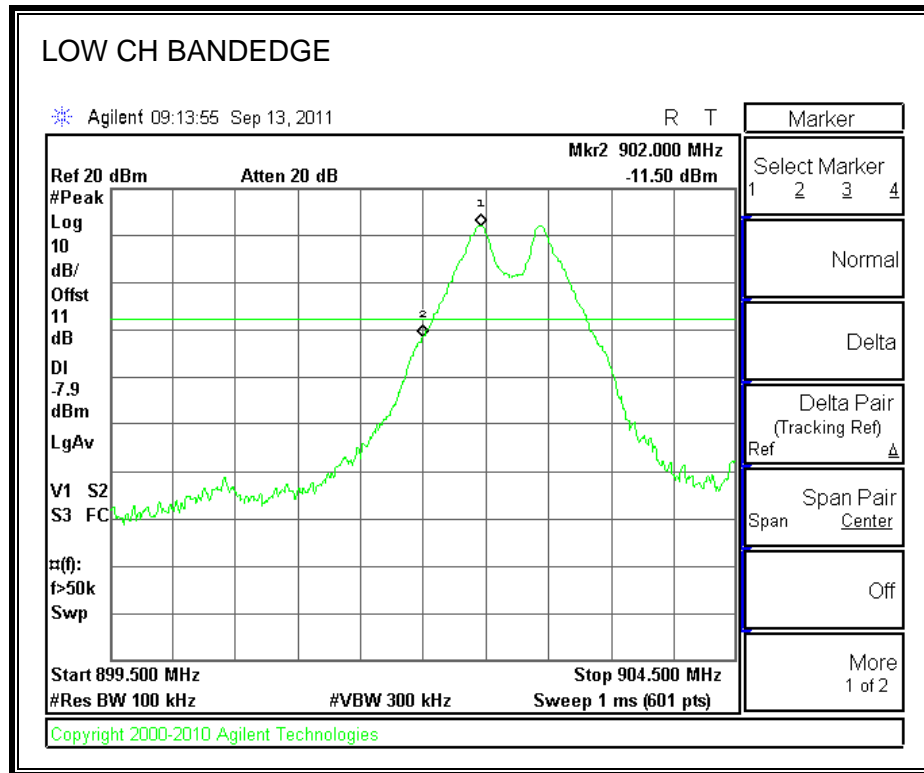


SPURIOUS EMISSIONS, HIGH CHANNEL

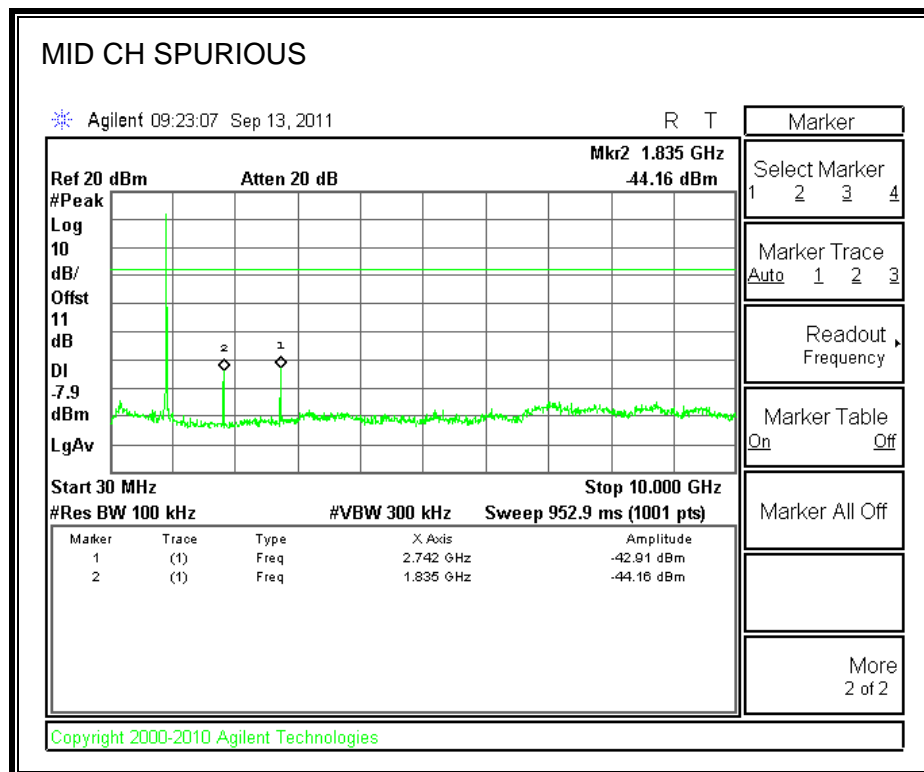
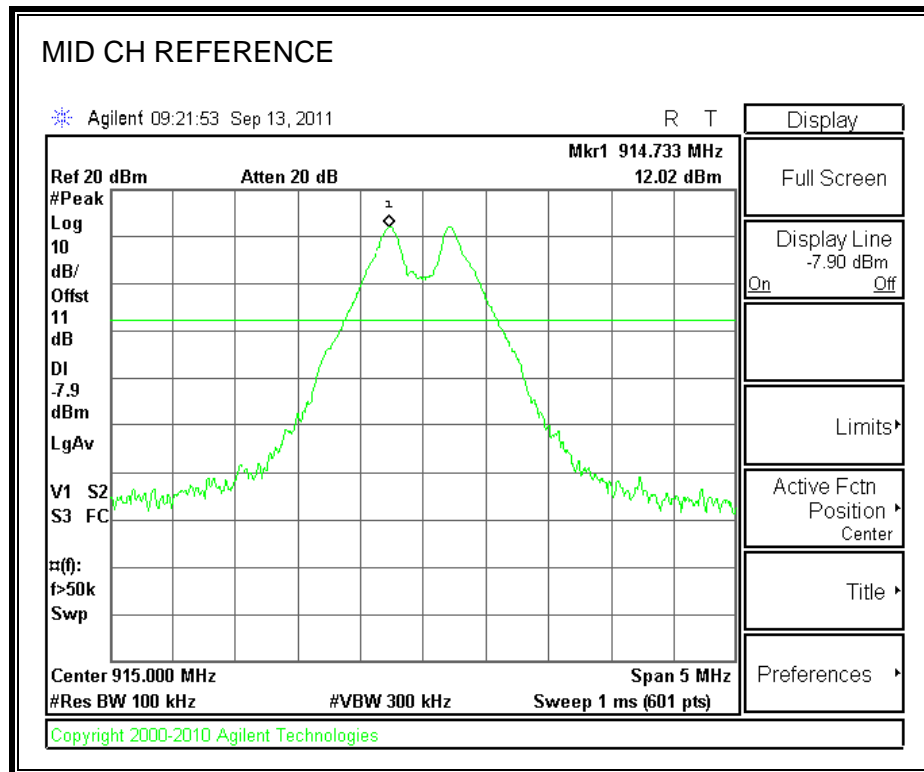


2FSK MODE, ML7

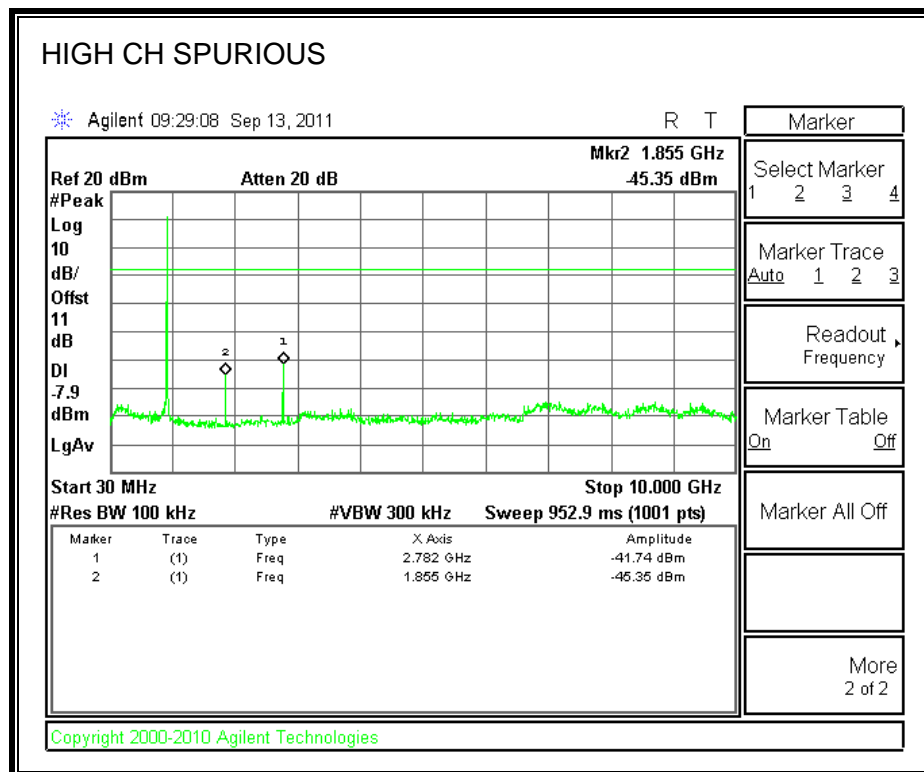
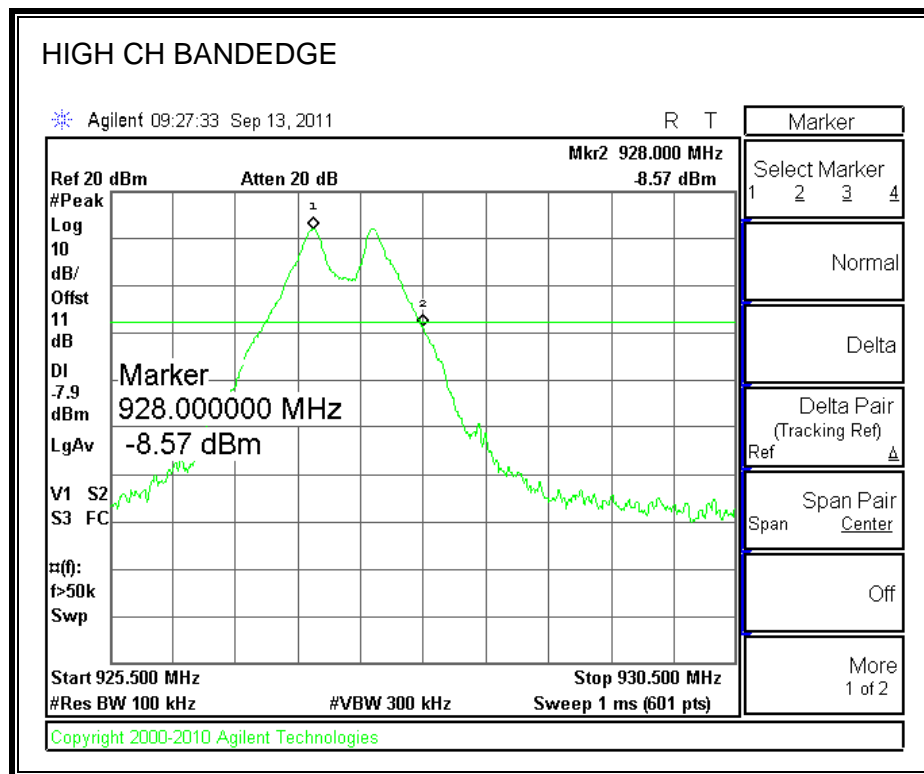
SPURIOUS EMISSIONS, LOW CHANNEL



SPURIOUS EMISSIONS, MID CHANNEL



SPURIOUS EMISSIONS, HIGH CHANNEL



8. RADIATED TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

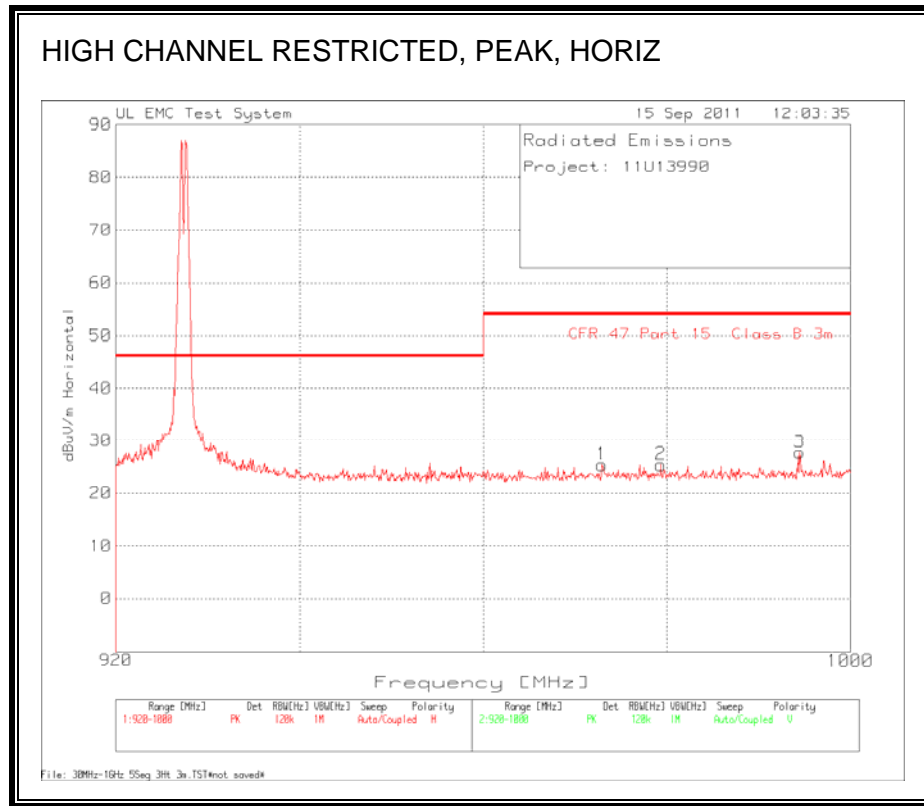
The spectrum from 30 MHz to 10 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 900 MHz band.

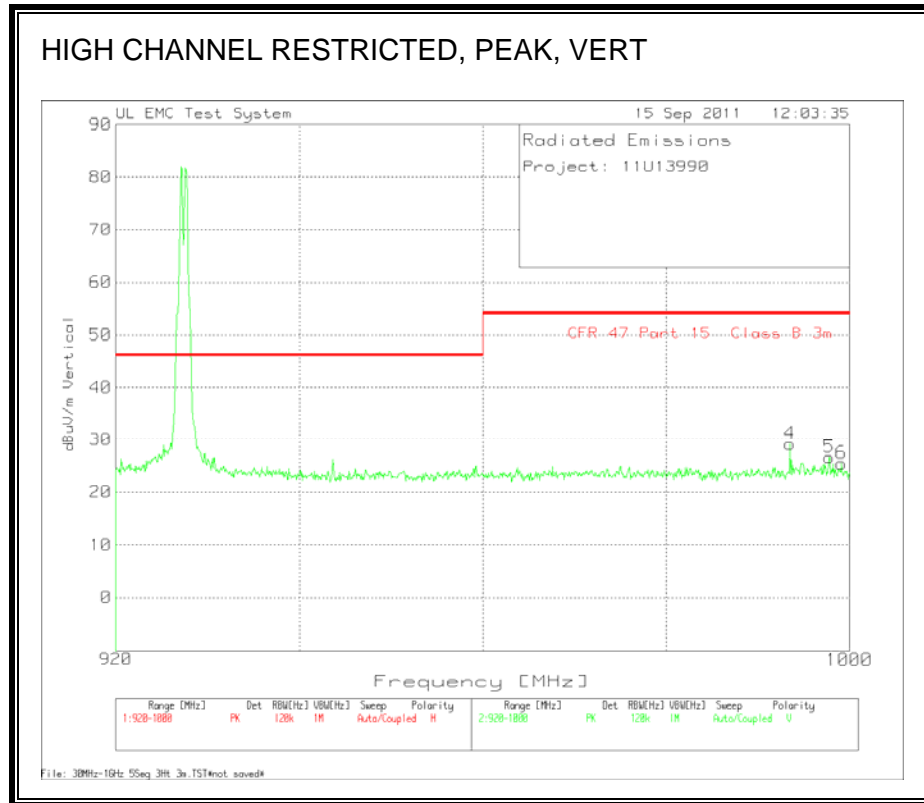
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

8.2. TRANSMITTER BELOW 1 GHz (PCB Antenna)

8.2.1. TRANSMITTER BELOW 1 GHz FOR 2FSK MODE, ML4

RESTRICTED BANDEDGE (HIGH CHANNEL)

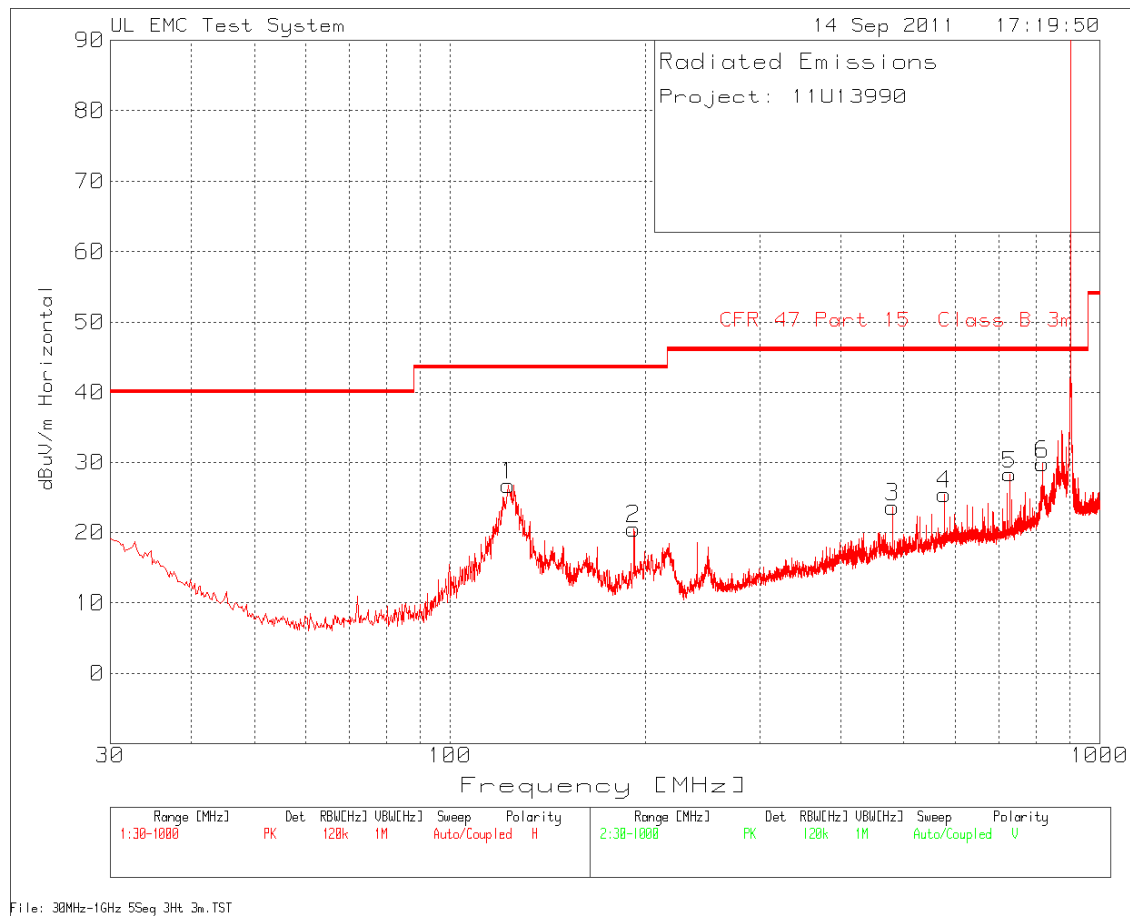




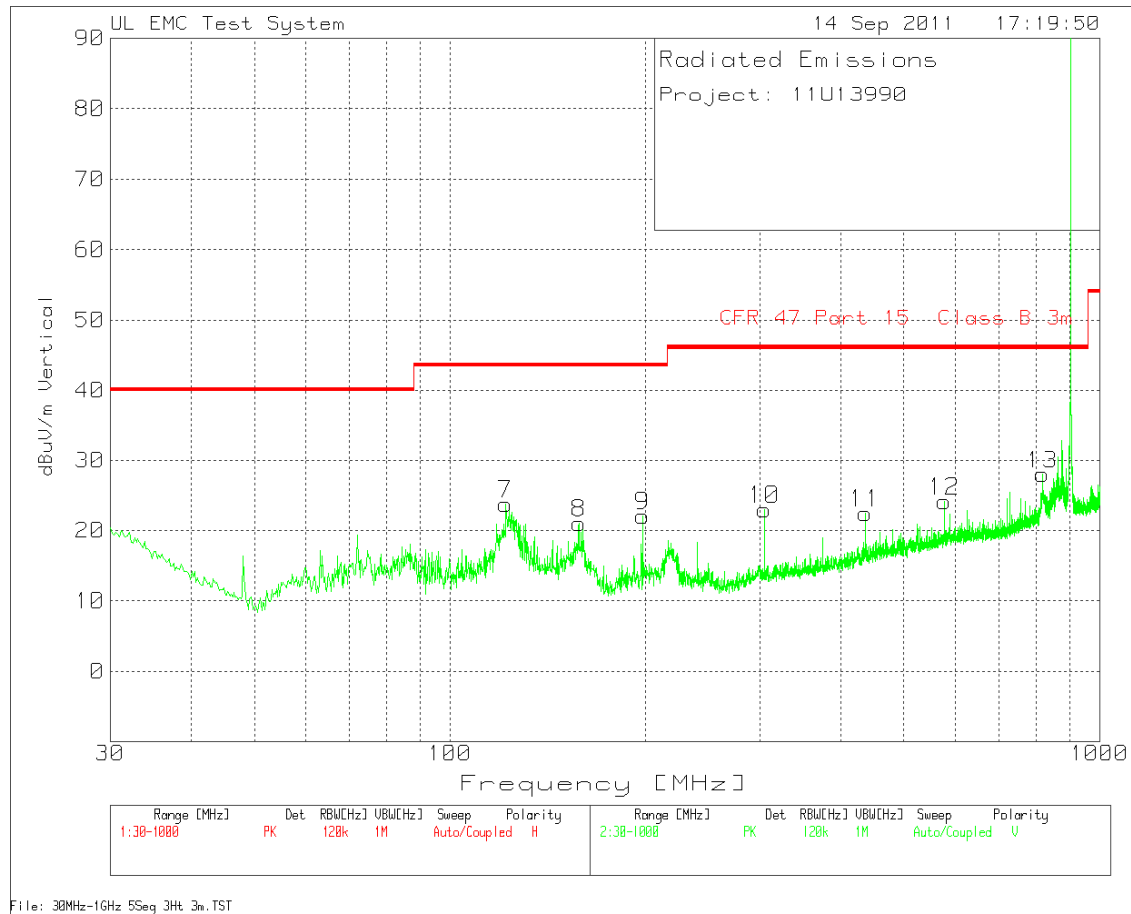
HIGH CHANNEL RESTRICTED (VERTICAL AND HORIZONTAL DATA)

Project: 11U13990										
Horizontal 920 - 1000MHz										
Test Frequency	Meter Reading	Detector	3m below 1GHz Cable.TXT [dB]	3m T15 PreAmp below 1GHz.TXT [dB]	3m Bilog T185 below 1GHz.TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
972.96	27.04	PK	3.2	-27.4	22.5	25.34	54	-28.66	99	Horz
979.36	26.94	PK	3.2	-27.4	22.6	25.34	54	-28.66	99	Horz
994.48	29.05	PK	3.3	-27.3	22.7	27.75	54	-26.25	176	Horz
Vertical 920 - 1000MHz										
Test Frequency	Meter Reading	Detector	3m below 1GHz Cable.TXT [dB]	3m T15 PreAmp below 1GHz.TXT [dB]	3m Bilog T185 below 1GHz.TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
993.52	30.49	PK	3.3	-27.3	22.7	29.19	54	-24.81	99	Vert
997.8	27.88	PK	3.3	-27.3	22.7	26.58	54	-27.42	99	Vert
999.12	26.72	PK	3.3	-27.3	22.7	25.42	54	-28.58	99	Vert

LOW CHANNEL HORIZONTAL PLOT



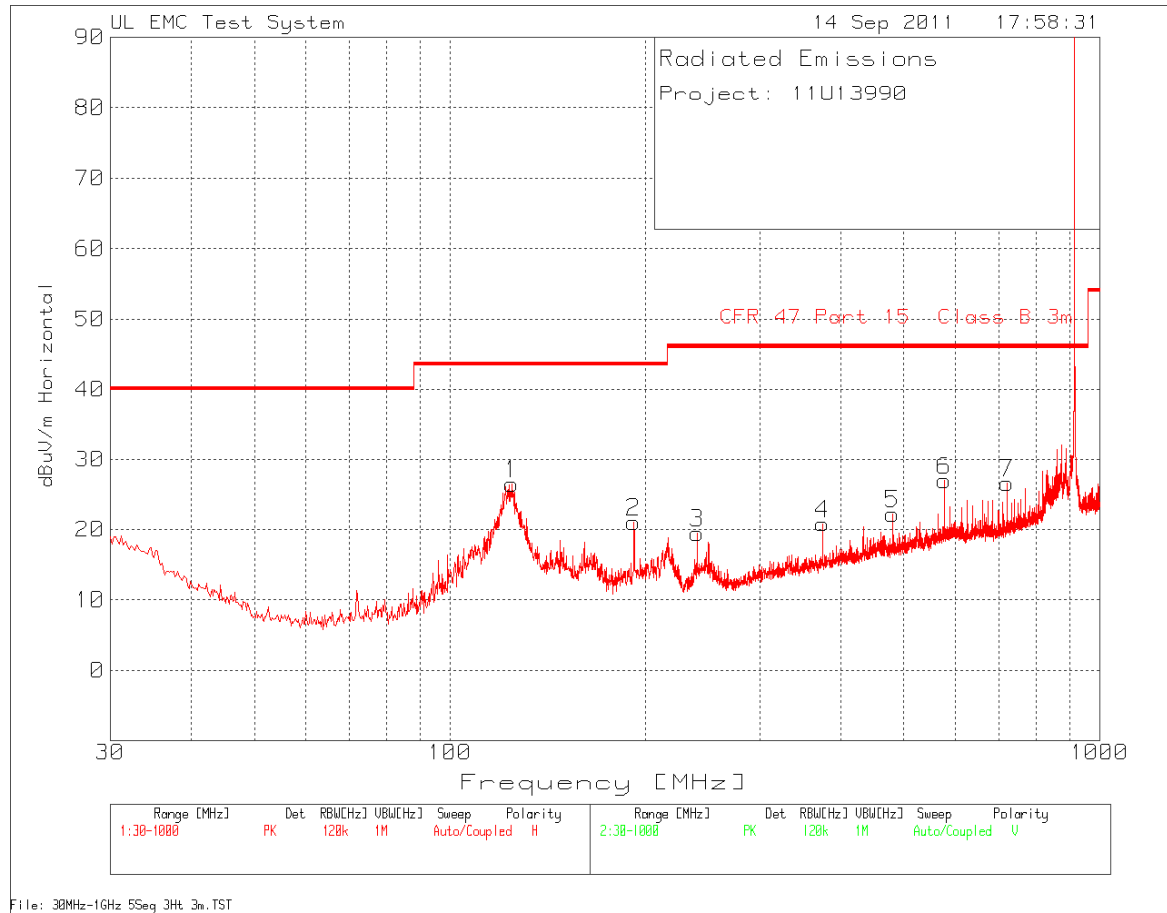
LOW CHANNEL VERTICAL PLOT

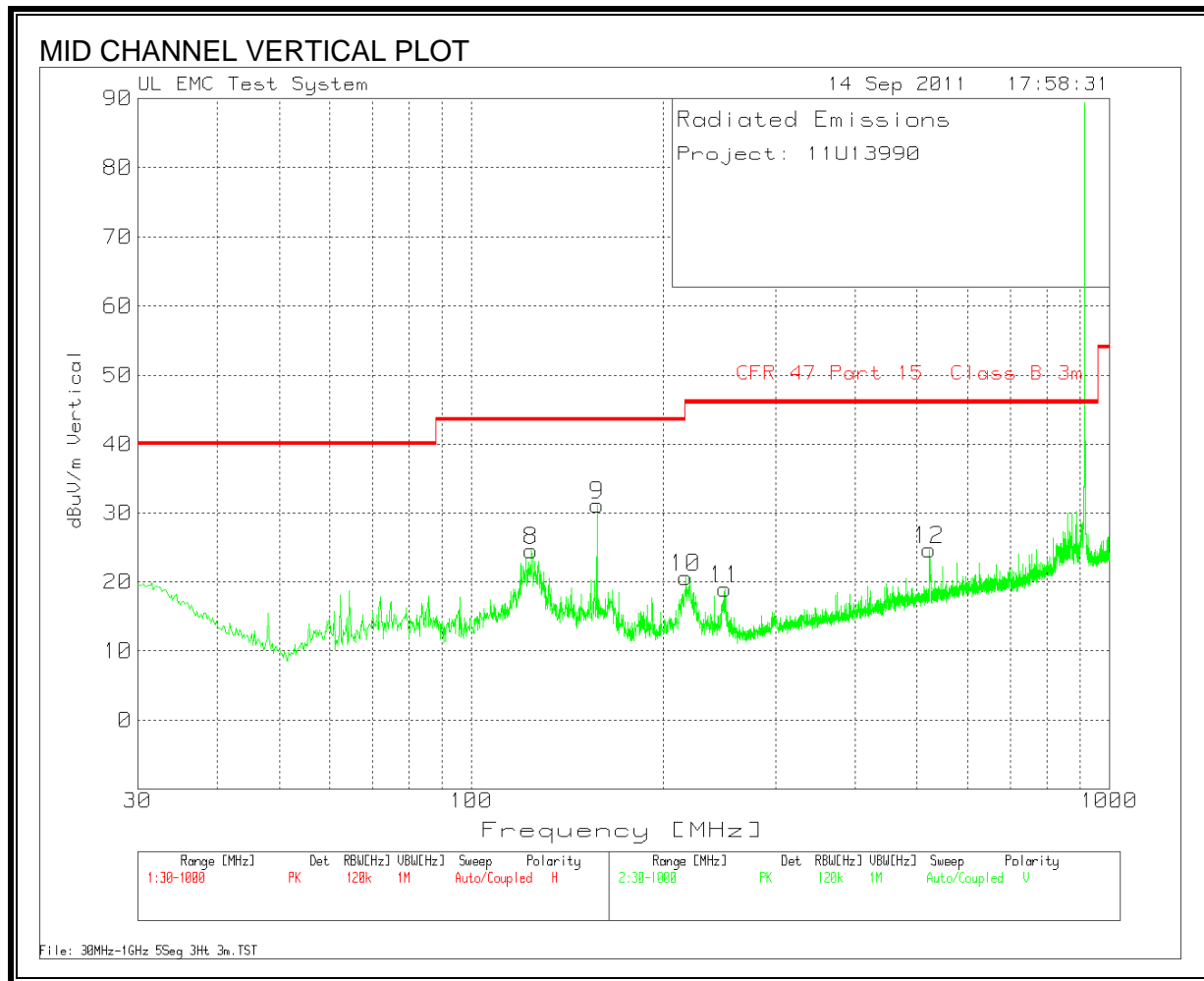


LOW CHANNEL VERTICAL AND HORIZONTAL DATA

Project: 11U13990										
Horizontal 30 - 1000MHz										
Test Frequency	Meter Reading	Detector	3m below 1GHz Cable.TXT [dB]	3m T15 PreAmp below 1GHz.TXT [dB]	3m Bilog T185 below 1GHz.TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
123.0456	39.76	PK	1.1	-28	13.9	26.76	43.5	-16.74	251	Horz
192.0544	35.4	PK	1.4	-27.7	11.4	20.5	43.5	-23	176	Horz
480.6894	33.27	PK	2.2	-28.4	16.5	23.57	46	-22.43	176	Horz
576.6427	33.24	PK	2.5	-28.4	18.1	25.44	46	-20.56	99	Horz
727.0663	34.23	PK	2.8	-28.2	19.5	28.33	46	-17.67	99	Horz
817.2042	33.76	PK	2.9	-27.9	21.1	29.86	46	-16.14	99	Horz
Vertical 30 - 1000MHz										
Test Frequency	Meter Reading	Detector	3m below 1GHz Cable.TXT [dB]	3m T15 PreAmp below 1GHz.TXT [dB]	3m Bilog T185 below 1GHz.TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
121.8825	36.82	PK	1.1	-28	13.8	23.72	43.5	-19.78	99	Vert
158.1315	34.44	PK	1.3	-27.8	13.1	21.04	43.5	-22.46	99	Vert
197.8697	36.6	PK	1.4	-27.7	11.8	22.1	43.5	-21.4	99	Vert
305.2598	34.87	PK	1.8	-27.3	13.6	22.97	46	-23.03	99	Vert
436.4928	32.75	PK	2.1	-28.1	15.7	22.45	46	-23.55	99	Vert
576.6427	31.92	PK	2.5	-28.4	18.1	24.12	46	-21.88	175	Vert
817.2042	31.89	PK	2.9	-27.9	21.1	27.99	46	-18.01	99	Vert

MID CHANNEL HORIZONTAL PLOT

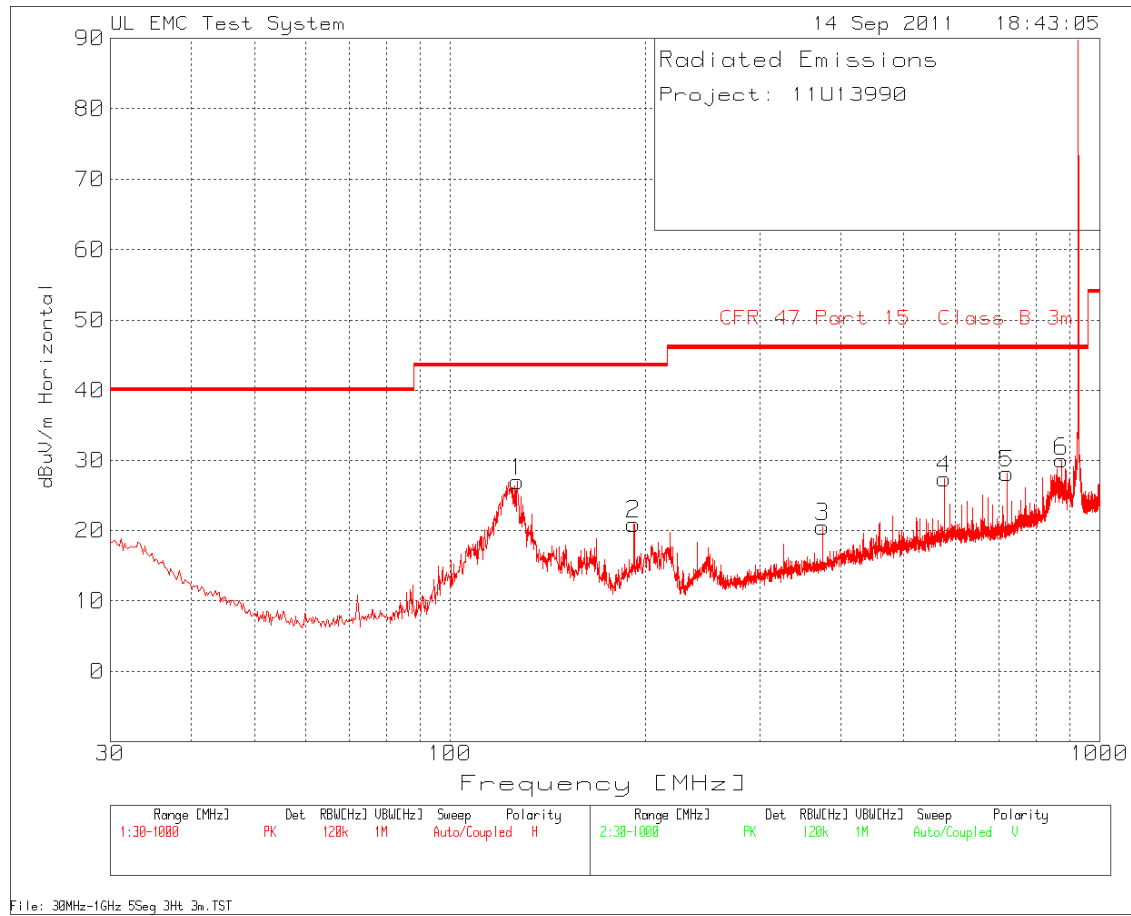




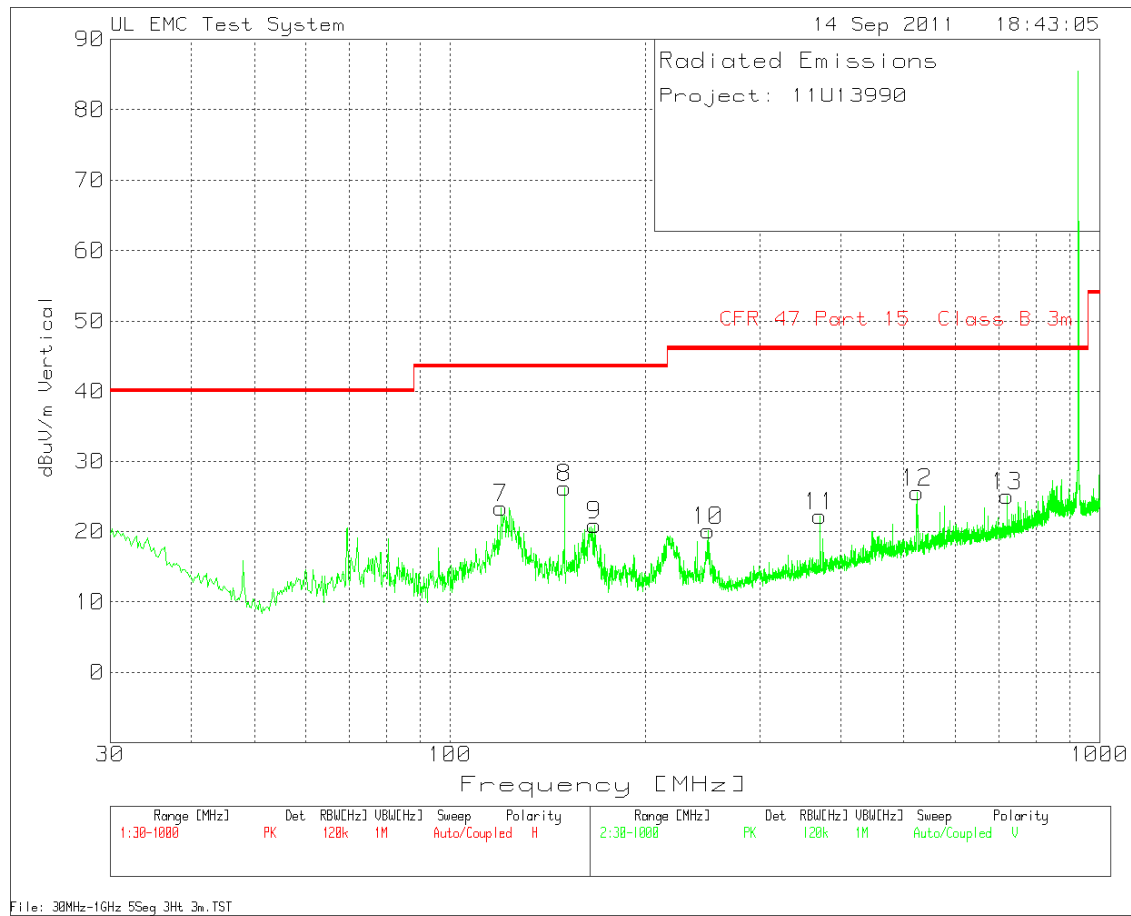
MID CHANNEL VERTICAL AND HORIZONTAL DATA

Project: 11U13990										
Horizontal 30 - 1000MHz										
Test Frequency	Meter Reading	Detector	3m below 1GHz Cable.TXT [dB]	3m T15 PreAmp below 1GHz.TXT [dB]	3m Bilog T185 below 1GHz.TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
124.5963	39.3	PK	1.1	-28	14.1	26.5	43.5	-17	251	Horz
192.0544	35.93	PK	1.4	-27.7	11.4	21.03	43.5	-22.47	176	Horz
240.3217	33.56	PK	1.6	-27.5	11.8	19.46	46	-26.54	99	Horz
374.8501	31.94	PK	2	-27.7	14.6	20.84	46	-25.16	176	Horz
480.4956	31.92	PK	2.2	-28.4	16.5	22.22	46	-23.78	176	Horz
576.6427	34.76	PK	2.5	-28.4	18.1	26.96	46	-19.04	99	Horz
720.8633	32.78	PK	2.8	-28.3	19.3	26.58	46	-19.42	99	Horz
Vertical 30 - 1000MHz										
Test Frequency	Meter Reading	Detector	3m below 1GHz Cable.TXT [dB]	3m T15 PreAmp below 1GHz.TXT [dB]	3m Bilog T185 below 1GHz.TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
124.2086	37.43	PK	1.1	-28	14	24.53	43.5	-18.97	99	Vert
157.3561	44.7	PK	1.3	-27.8	13.1	31.3	43.5	-12.2	176	Vert
216.6727	34.9	PK	1.5	-27.6	11.9	20.7	46	-25.3	99	Vert
250.014	32.92	PK	1.6	-27.4	11.8	18.92	46	-27.08	99	Vert
522.9476	33.7	PK	2.3	-28.5	17.2	24.7	46	-21.3	99	Vert

HIGH CHANNEL HORIZONTAL PLOT



HIGH CHANNEL VERTICAL PLOT

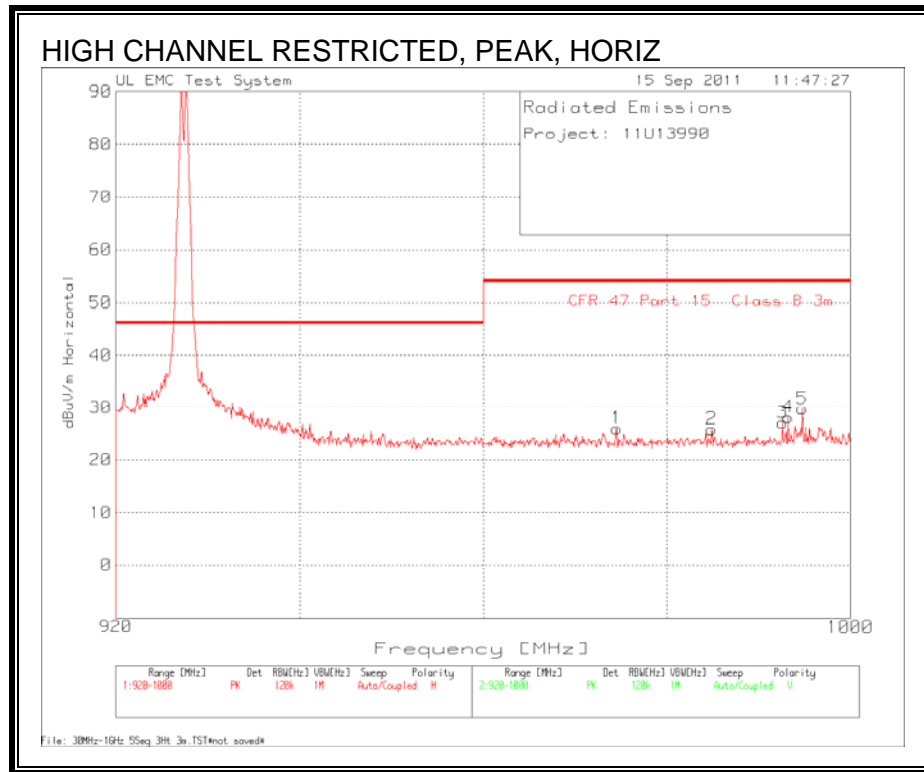


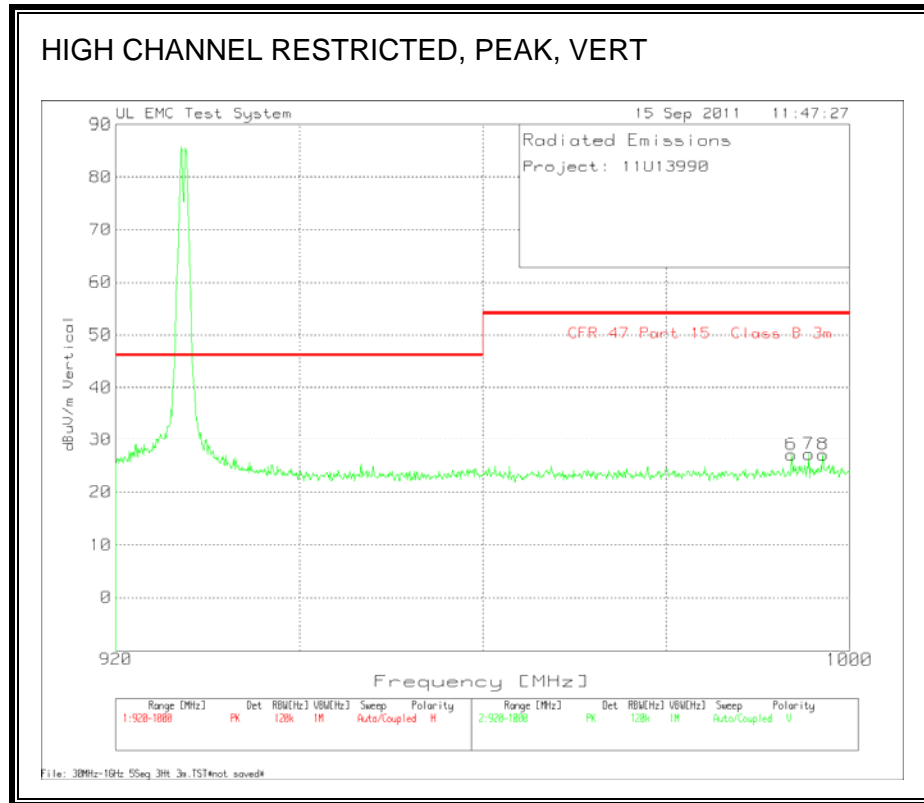
HIGH CHANNEL VERTICAL AND HORIZONTAL DATA

Project: 11U13990										
Horizontal 30 - 1000MHz										
Test Frequency	Meter Reading	Detector	3m below 1GHz Cable.TXT [dB]	3m T15 PreAmp below 1GHz.TXT [dB]	3m Bilog T185 below 1GHz.TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
126.9225	39.81	PK	1.1	-27.9	14	27.01	43.5	-16.49	251	Horz
192.0544	35.86	PK	1.4	-27.7	11.4	20.96	43.5	-22.54	176	Horz
374.8501	31.59	PK	2	-27.7	14.6	20.49	46	-25.51	176	Horz
576.6427	35.14	PK	2.5	-28.4	18.1	27.34	46	-18.66	99	Horz
720.8633	34.34	PK	2.8	-28.3	19.3	28.14	46	-17.86	99	Horz
873.6131	32.91	PK	3.1	-27.8	21.8	30.01	46	-15.99	99	Horz
Vertical 30 - 1000MHz										
Test Frequency	Meter Reading	Detector	3m below 1GHz Cable.TXT [dB]	3m T15 PreAmp below 1GHz.TXT [dB]	3m Bilog T185 below 1GHz.TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
119.7502	36.78	PK	1.1	-28	13.5	23.38	43.5	-20.12	101	Vert
150.1839	40.09	PK	1.2	-27.8	12.7	26.19	43.5	-17.31	176	Vert
167.0484	35.64	PK	1.3	-27.8	11.8	20.94	43.5	-22.56	101	Vert
250.014	34.08	PK	1.6	-27.4	11.8	20.08	46	-25.92	101	Vert
371.1671	33.32	PK	2	-27.7	14.6	22.22	46	-23.78	176	Vert
523.9169	34.56	PK	2.3	-28.5	17.2	25.56	46	-20.44	101	Vert
720.8633	31.28	PK	2.8	-28.3	19.3	25.08	46	-20.92	176	Vert

8.2.2. TRANSMITTER BELOW 1 GHz FOR 2FSK MODE, ML7

RESTRICTED BANDEDGE (HIGH CHANNEL)

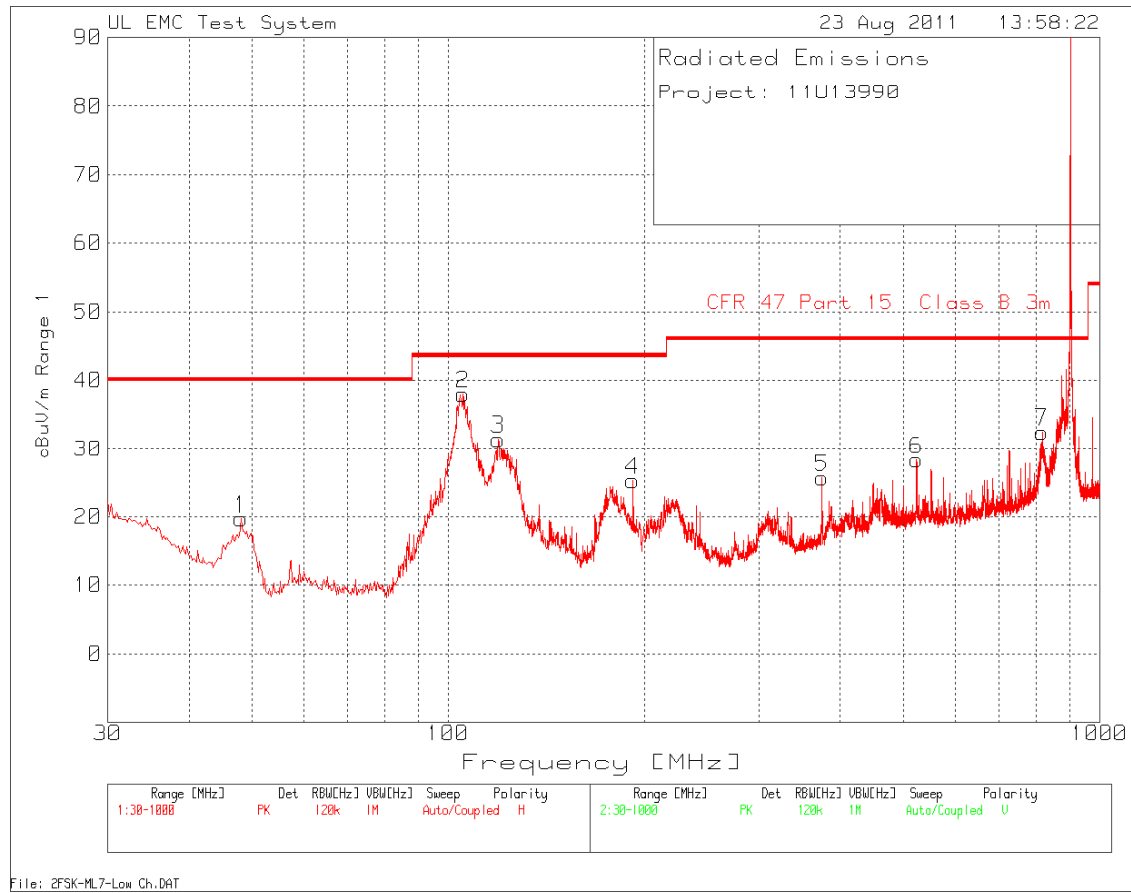




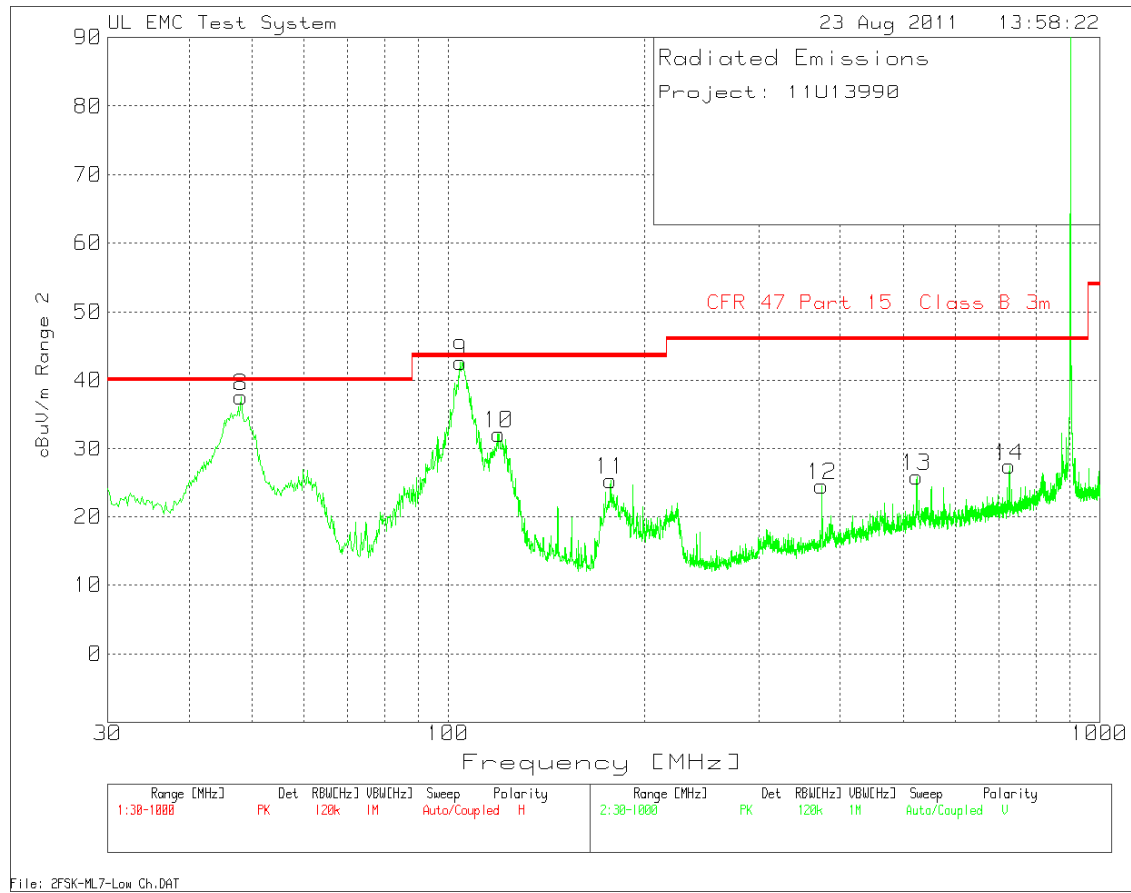
HIGH CHANNEL RESTRICTED (VERTICAL AND HORIZONTAL DATA)

Project: 11U13990										
Horizontal 920 - 1000MHz										
Test Frequency	Meter Reading	Detector	3m below 1GHz Cable.TXT [dB]	3m T15 PreAmp below 1GHz.TXT [dB]	3m Bilog T185 below 1GHz.TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
974.56	27.61	PK	3.2	-27.4	22.5	25.91	54	-28.09	99	Horz
984.88	27.38	PK	3.2	-27.4	22.6	25.78	54	-28.22	99	Horz
992.64	28.32	PK	3.3	-27.3	22.7	27.02	54	-26.98	99	Horz
993.2	29.44	PK	3.3	-27.3	22.7	28.14	54	-25.86	175	Horz
994.8	31.08	PK	3.3	-27.3	22.7	29.78	54	-24.22	99	Horz
Vertical 920 - 1000MHz										
Test Frequency	Meter Reading	Detector	3m below 1GHz Cable.TXT [dB]	3m T15 PreAmp below 1GHz.TXT [dB]	3m Bilog T185 below 1GHz.TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
993.68	28.36	PK	3.3	-27.3	22.7	27.06	54	-26.94	99	Vert
995.6	28.47	PK	3.3	-27.3	22.7	27.17	54	-26.83	176	Vert
997.12	28.42	PK	3.3	-27.3	22.7	27.12	54	-26.88	176	Vert

LOW CHANNEL HORIZONTAL PLOT



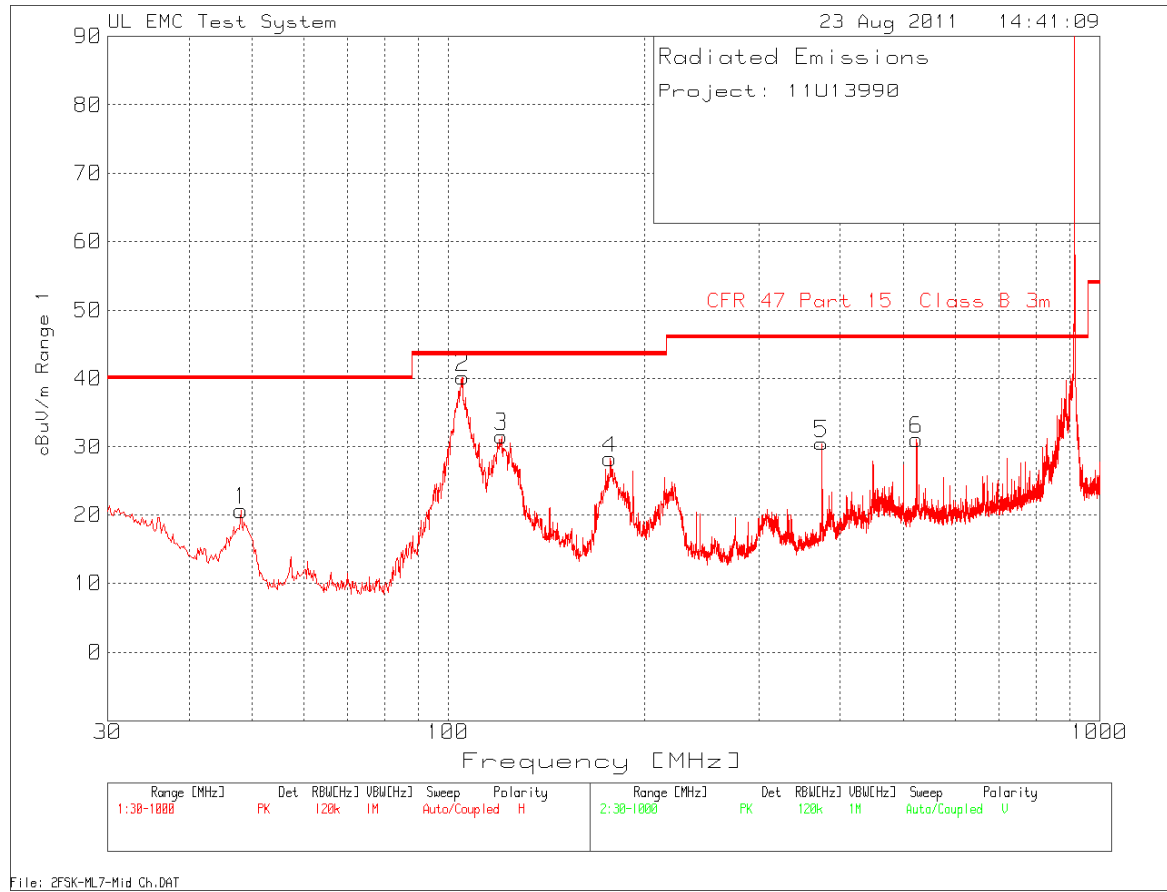
LOW CHANNEL VERTICAL PLOT

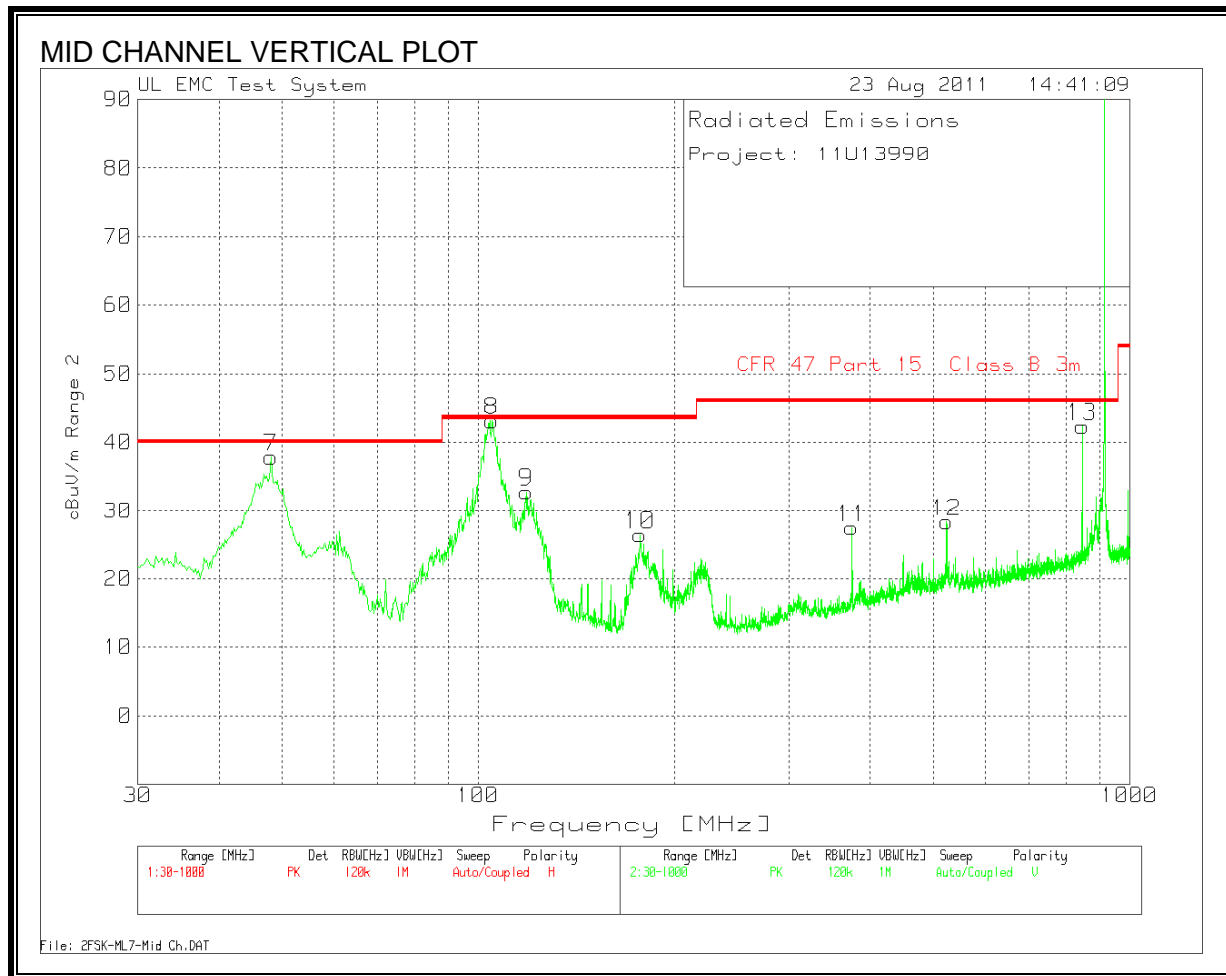


LOW CHANNEL VERTICAL AND HORIZONTAL DATA

Project: 11U13990										
Range 1 30 - 1000MHz										
Test Frequency	Meter Reading	Detector	5m A Cable below 1GHz.TX T [dB]	5m A T64 PreAmp below 1GHz.TX T [dB]	5m A T122 Bilog below 1GHz.TX T [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
48.0276	37.86	PK	0.8	-28.3	9.3	19.66	40	-20.34	200	Horz
105.4057	54.21	PK	1.1	-28.2	10.9	38.01	43.5	-5.49	300	Horz
119.3625	44.92	PK	1.2	-28.2	13.5	31.42	43.5	-12.08	300	Horz
192.0544	40.35	PK	1.5	-28.1	11.5	25.25	43.5	-18.25	200	Horz
375.044	36.98	PK	2.1	-27.9	14.5	25.68	46	-20.32	200	Horz
523.723	36.33	PK	2.5	-27.6	17.1	28.33	46	-17.67	100	Horz
816.235	35.38	PK	3.2	-27.2	21.1	32.48	46	-13.52	100	Horz
Range 2 30 - 1000MHz										
Test Frequency	Meter Reading	Detector	5m A Cable below 1GHz.TX T [dB]	5m A T64 PreAmp below 1GHz.TX T [dB]	5m A T122 Bilog below 1GHz.TX T [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
48.0276	55.78	PK	0.8	-28.3	9.3	37.58	40	-2.42	100	Vert
104.4365	58.93	PK	1.1	-28.2	10.8	42.63	43.5	-0.87	100	Vert
119.5564	45.6	PK	1.2	-28.2	13.6	32.2	43.5	-11.3	100	Vert
177.516	41.2	PK	1.4	-28.1	10.8	25.3	43.5	-18.2	100	Vert
374.8501	35.78	PK	2.1	-27.9	14.5	24.48	46	-21.52	100	Vert
523.9169	33.81	PK	2.5	-27.6	17.1	25.81	46	-20.19	100	Vert
727.0663	31.46	PK	3	-27.1	20	27.36	46	-18.64	100	Vert

MID CHANNEL HORIZONTAL PLOT

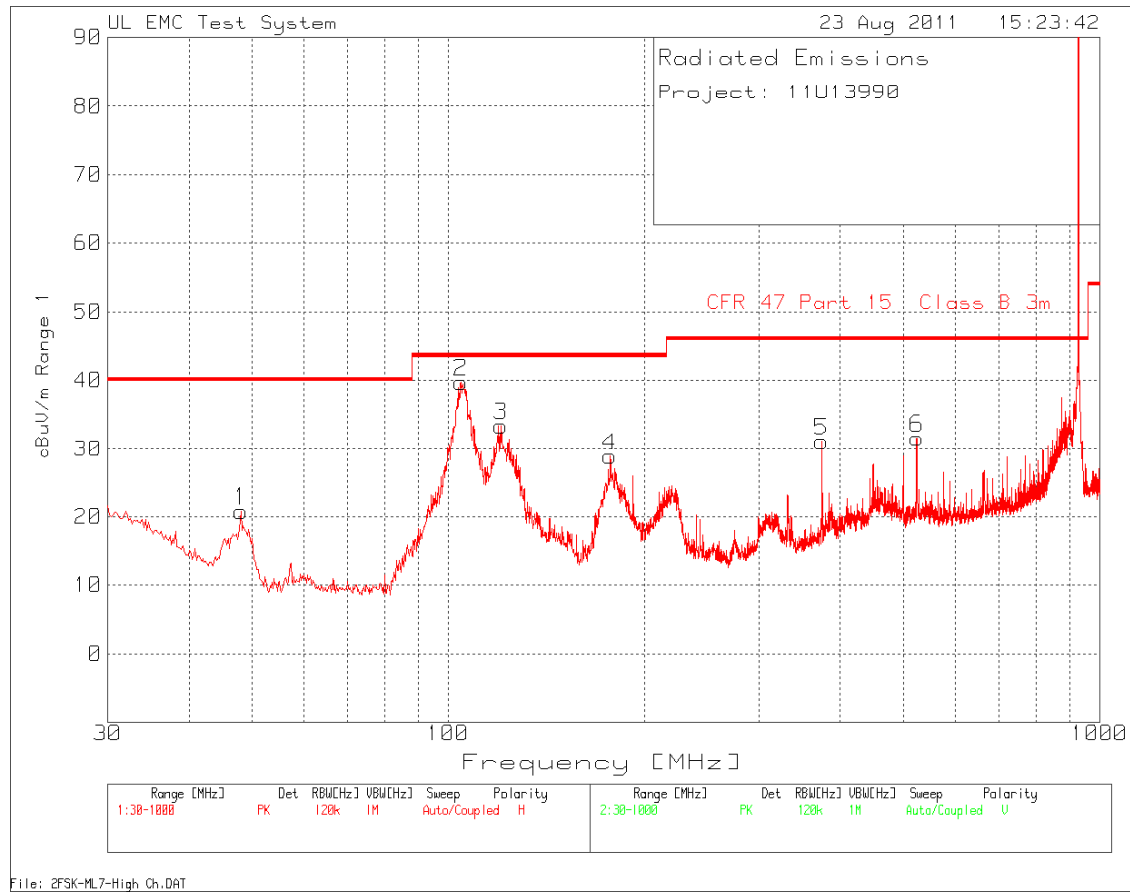




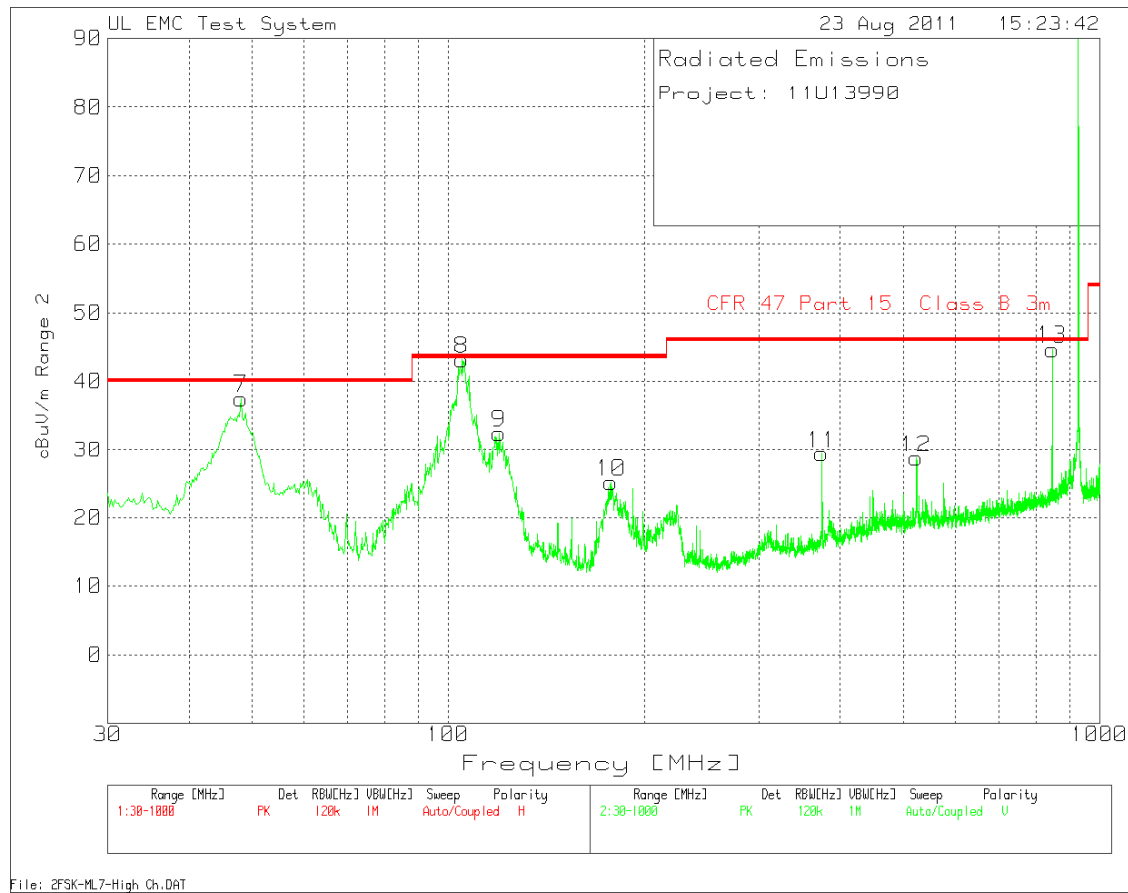
MID CHANNEL VERTICAL AND HORIZONTAL DATA

Project: 11U13990										
Range 1 30 - 1000MHz										
Test Frequency	Meter Reading	Detector	5m A Cable below 1GHz.TXT [dB]	5m A T64 PreAmp below 1GHz.TXT [dB]	5m A T122 Bilog below 1GHz.TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
48.0276	38.86	PK	0.8	-28.3	9.3	20.66	40	-19.34	200	Horz
105.2118	56.39	PK	1.1	-28.2	10.9	40.19	43.5	-3.31	300	Horz
120.7194	44.97	PK	1.2	-28.2	13.6	31.57	43.5	-11.93	200	Horz
177.3221	44.22	PK	1.4	-28.1	10.7	28.22	43.5	-15.28	200	Horz
374.8501	41.8	PK	2.1	-27.9	14.5	30.5	46	-15.5	100	Horz
523.723	39.08	PK	2.5	-27.6	17.1	31.08	46	-14.92	100	Horz
Range 2 30 - 1000MHz										
Test Frequency	Meter Reading	Detector	5m A Cable below 1GHz.TXT [dB]	5m A T64 PreAmp below 1GHz.TXT [dB]	5m A T122 Bilog below 1GHz.TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
48.0276	56.05	PK	0.8	-28.3	9.3	37.85	40	-2.15	100	Vert
105.018	59.38	PK	1.1	-28.2	10.9	43.18	43.5	-0.32	100	Vert
118.5871	46.36	PK	1.2	-28.2	13.4	32.76	43.5	-10.74	100	Vert
177.1283	42.39	PK	1.4	-28.1	10.7	26.39	43.5	-17.11	100	Vert
374.8501	38.76	PK	2.1	-27.9	14.5	27.46	46	-18.54	100	Vert
523.723	36.31	PK	2.5	-27.6	17.1	28.31	46	-17.69	100	Vert
846.0871	45.03	PK	3.2	-27.3	21.4	42.33	46	-3.67	100	Vert

HIGH CHANNEL HORIZONTAL PLOT



HIGH CHANNEL VERTICAL PLOT



HIGH CHANNEL VERTICAL AND HORIZONTAL DATA

Project: 11U13990										
Range 1 30 - 1000MHz										
Test Frequency	Meter Reading	Detector	5m A Cable below 1GHz.TXT [dB]	5m A T64 PreAmp below 1GHz.TXT [dB]	5m A T122 Bilog below 1GHz.TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
48.0276	39.01	PK	0.8	-28.3	9.3	20.81	40	-19.19	200	Horz
104.6303	56.06	PK	1.1	-28.2	10.8	39.76	43.5	-3.74	300	Horz
120.5256	46.79	PK	1.2	-28.2	13.6	33.39	43.5	-10.11	200	Horz
177.1283	44.86	PK	1.4	-28.1	10.7	28.86	43.5	-14.64	200	Horz
374.8501	42.38	PK	2.1	-27.9	14.5	31.08	46	-14.92	200	Horz
524.1107	39.58	PK	2.5	-27.6	17.1	31.58	46	-14.42	100	Horz
Range 2 30 - 1000MHz										
Test Frequency	Meter Reading	Detector	5m A Cable below 1GHz.TXT [dB]	5m A T64 PreAmp below 1GHz.TXT [dB]	5m A T122 Bilog below 1GHz.TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
48.0276	55.72	PK	0.8	-28.3	9.3	37.52	40	-2.48	100	Vert
105.018	59.37	PK	1.1	-28.2	10.9	43.17	43.5	-0.33	100	Vert
119.7502	45.85	PK	1.2	-28.2	13.6	32.45	43.5	-11.05	100	Vert
177.9037	41.03	PK	1.4	-28.1	10.8	25.13	43.5	-18.37	100	Vert
374.8501	40.67	PK	2.1	-27.9	14.5	29.37	46	-16.63	100	Vert
522.9476	36.73	PK	2.5	-27.6	17.1	28.73	46	-17.27	100	Vert
845.8933	47.38	PK	3.2	-27.3	21.4	44.68	46	-1.32	300	Vert

8.3. TRANSMITTER ABOVE 1 GHz (PCB Antenna)

8.3.1. HARMONIC AND SPURIOUS ABOVE 1 GHz FOR 2FSK MODE, ML4

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: William Zhuang
Date: 09/15/11
Project #: 11U13990
Company: Anaren
Test Target: FCC 15.205
Mode Oper: Tx On, 2FSK, ML4

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

f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fitr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
Low Ch.															
2.708	3.0	45.6	29.6	4.8	-35.5	0.0	0.6	45.2	74.0	-28.8	V	P	122.0	189.0	
2.708	3.0	36.8	29.6	4.8	-35.5	0.0	0.6	36.3	54.0	-17.7	V	A	122.0	189.0	
2.708	3.0	45.1	29.6	4.8	-35.5	0.0	0.6	44.6	74.0	-29.4	H	P	98.0	138.0	
2.708	3.0	35.2	29.6	4.8	-35.5	0.0	0.6	34.8	54.0	-19.2	H	A	98.0	138.0	
Mid Ch.															
2.745	3.0	49.3	29.7	4.9	-35.5	0.0	0.6	49.0	74.0	-25.0	V	P	120.0	160.0	
2.745	3.0	36.8	29.7	4.9	-35.5	0.0	0.6	36.5	54.0	-17.5	V	A	120.0	160.0	
2.745	3.0	46.1	29.7	4.9	-35.5	0.0	0.6	45.8	74.0	-28.2	H	P	120.0	133.0	
2.745	3.0	36.6	29.7	4.9	-35.5	0.0	0.6	36.3	54.0	-17.7	H	A	120.0	133.0	
High Ch.															
2.782	3.0	45.8	29.8	4.9	-35.4	0.0	0.6	45.6	74.0	-28.4	V	P	118.0	158.0	
2.782	3.0	38.6	29.8	4.9	-35.4	0.0	0.6	38.5	54.0	-15.5	V	A	118.0	158.0	
2.782	3.0	46.2	29.8	4.9	-35.4	0.0	0.6	46.1	74.0	-27.9	H	P	102.0	216.0	
2.782	3.0	36.8	29.8	4.9	-35.4	0.0	0.6	36.7	54.0	-17.3	H	A	102.0	216.0	

Rev. 4.1.2.7

Note: No other emissions were detected above the system noise floor.

8.3.2. HARMONIC AND SPURIOUS ABOVE 1 GHz FOR 2FSK MODE, ML7

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: William Zhuang
Date: 09/14/11
Project #: 11U13990
Company: Anaren
Test Target: FCC 15.205
Mode Oper: Tx On, 2FSK, ML7

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

f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
Low Ch.															
2.708	3.0	52.4	30.2	4.6	-36.8	0.0	0.6	51.0	74.0	-23.0	V	P	100.1	15.6	
2.708	3.0	42.8	30.2	4.6	-36.8	0.0	0.6	41.4	54.0	-12.6	V	A	100.1	15.6	
2.708	3.0	50.3	30.2	4.6	-36.8	0.0	0.6	48.9	74.0	-25.1	H	P	102.0	104.5	
2.708	3.0	40.0	30.2	4.6	-36.8	0.0	0.6	38.6	54.0	-15.4	H	A	102.0	104.5	
Mid Ch.															
2.745	3.0	53.7	30.3	4.6	-36.7	0.0	0.6	52.5	74.0	-21.5	V	P	103.0	29.0	
2.745	3.0	44.1	30.3	4.6	-36.7	0.0	0.6	42.9	54.0	-11.1	V	A	103.0	29.0	
2.745	3.0	50.8	30.3	4.6	-36.7	0.0	0.6	49.6	74.0	-24.4	H	P	101.4	104.9	
2.745	3.0	41.0	30.3	4.6	-36.7	0.0	0.6	39.8	54.0	-14.2	H	A	101.4	104.9	
High Ch.															
2.782	3.0	53.7	30.5	4.7	-36.7	0.0	0.6	52.7	74.0	-21.3	V	P	100.0	21.5	
2.782	3.0	44.4	30.5	4.7	-36.7	0.0	0.6	43.4	54.0	-10.6	V	A	100.0	21.5	
2.782	3.0	51.6	30.5	4.7	-36.7	0.0	0.6	50.6	74.0	-23.4	H	P	101.4	105.5	
2.782	3.0	41.9	30.5	4.7	-36.7	0.0	0.6	40.9	54.0	-13.1	H	A	101.4	105.5	

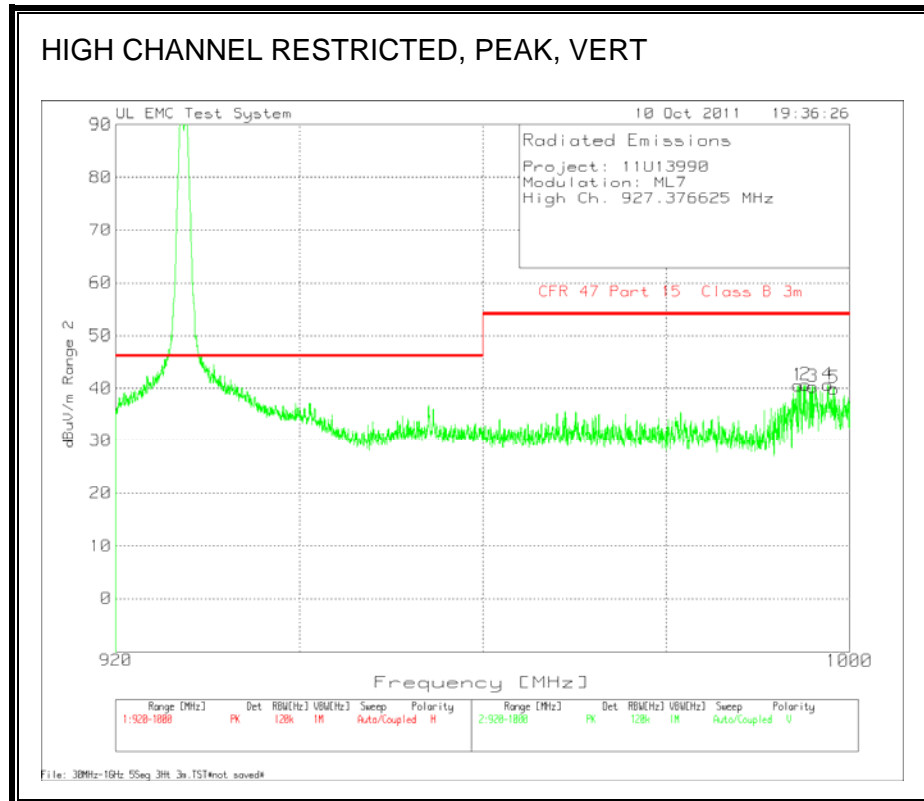
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Note: No other emissions were detected above the system noise floor.

8.4. TRANSMITTER BELOW 1 GHz (Monopole Antenna_Worst-case)

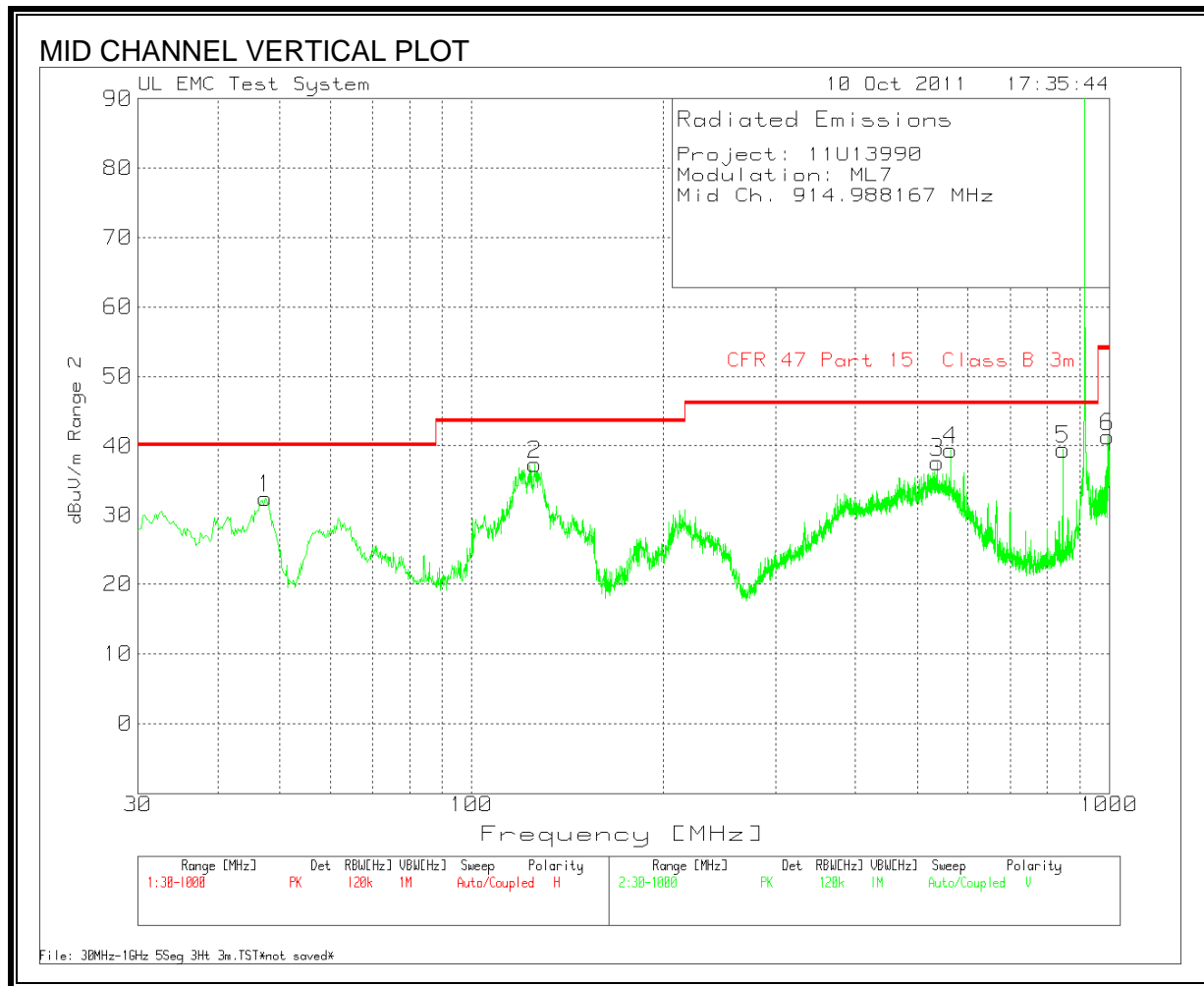
8.4.1. TRANSMITTER BELOW 1 GHz FOR 2FSK MODE, ML7

RESTRICTED BANDEDGE (HIGH CHANNEL)



HIGH CHANNEL RESTRICTED (VERTICAL DATA)

Project: 11U13990										
Modulation: ML7										
High Ch. 927.376625 MHz										
Range 2 920 - 1000MHz										
Test	Meter	Detector	5m A Cable below 1GHz.TXT [dB]	5m A T64 PreAmp below 1GHz.TXT [dB]	5m A T122 Bilog below 1GHz.TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
Frequency	Reading									
994.3725	42.4	PK	3.5	-27.7	22.4	40.6	54	-13.4	100	Vert
995.1879	42.45	PK	3.5	-27.7	22.4	40.65	54	-13.35	100	Vert
995.9872	42.1	PK	3.5	-27.7	22.4	40.3	54	-13.7	100	Vert
997.6659	42.47	PK	3.5	-27.7	22.4	40.67	54	-13.33	100	Vert
998.2734	41.78	PK	3.5	-27.7	22.4	39.98	54	-14.02	100	Vert



MID CHANNEL VERTICAL DATA

Project: 11U13990										
Modulation: ML7										
Mid Ch. 914.988167 MHz										
Range 2 30 - 1000MHz										
Test	Meter		5m A Cable below 1GHz.TXT	5m A T64 PreAmp below 1GHz.TXT [dB]	5m A T122 Bilog below 1GHz.TXT [dB]		CFR 47 Part 15 Class B		Height	
Frequency	Reading	Detector	[dB]			dBuV/m	3m	Margin	[cm]	Polarity
47.446	50.41	PK	0.8	-28.3	9.6	32.51	40	-7.49	100	Vert
125.7594	50.61	PK	1.2	-28.2	13.7	37.31	43.5	-6.19	100	Vert
536.7106	45.16	PK	2.6	-27.5	17.4	37.66	46	-8.34	100	Vert
563.6551	46.45	PK	2.6	-27.5	17.8	39.35	46	-6.65	100	Vert
845.5056	42.17	PK	3.2	-27.3	21.4	39.47	46	-6.53	300	Vert
995.7354	43.18	PK	3.5	-27.7	22.4	41.38	54	-12.62	100	Vert

8.5. TRANSMITTER ABOVE 1 GHz (Monopole Antenna)

8.5.1. HARMONIC AND SPURIOUS ABOVE 1 GHz FOR 2FSK MODE, ML7

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber

Test Engr: William Zhuang
Date: 10/21/11
Project #: 11U13990
Company: Anaren
Test Target: FCC 15.205
Mode Oper: Tx On, 2FSK, ML7 with Monopole Antenna

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

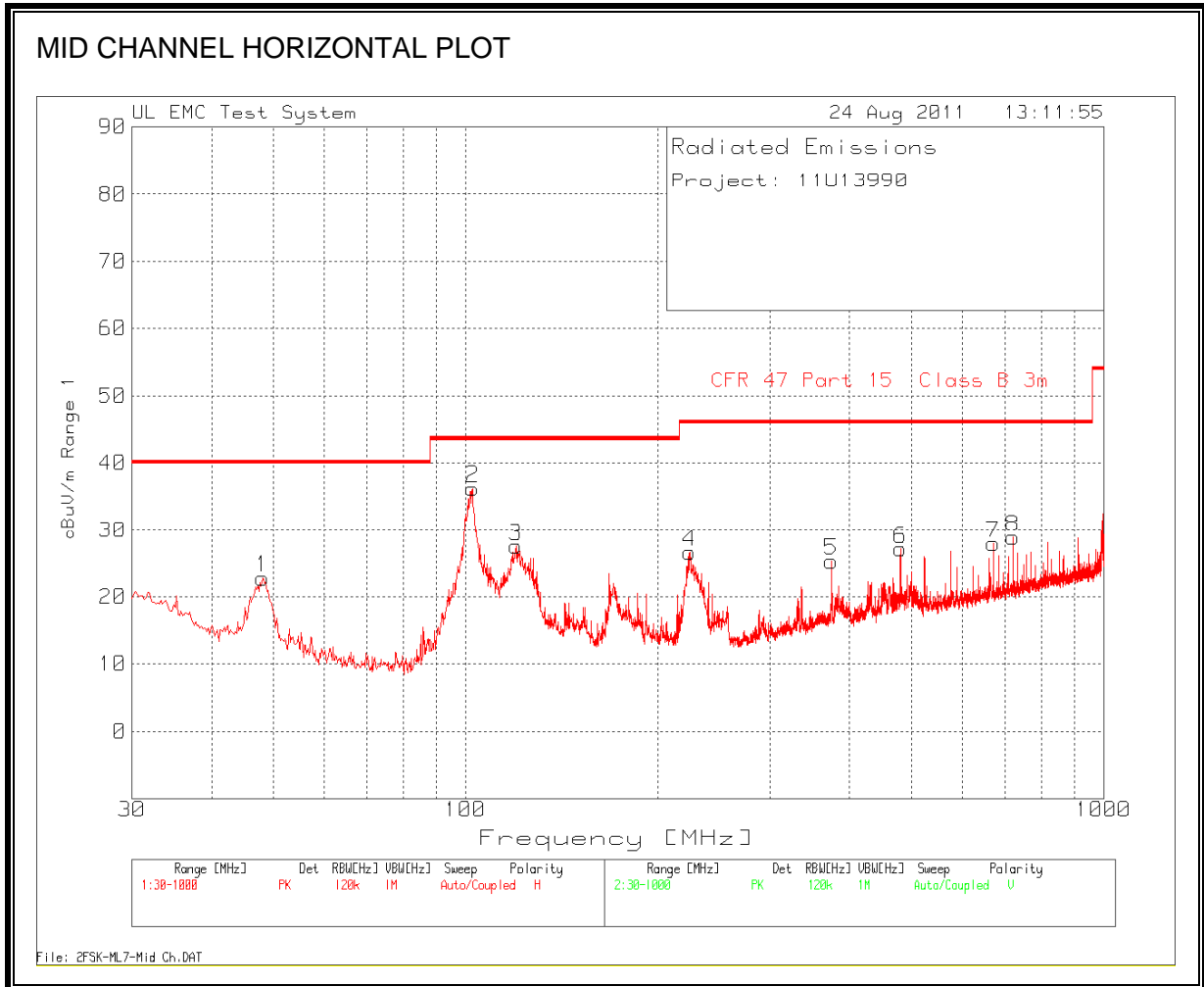
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
Low Ch.															
2.708	3.0	48.4	29.6	4.8	-35.5	0.0	0.6	47.9	74.0	-26.1	V	P	105.0	320.0	
2.708	3.0	37.9	29.6	4.8	-35.5	0.0	0.6	37.4	54.0	-16.6	V	A	105.0	320.0	
2.708	3.0	45.9	29.6	4.8	-35.5	0.0	0.6	45.4	74.0	-28.6	H	P	101.0	6.0	
2.708	3.0	34.7	29.6	4.8	-35.5	0.0	0.6	34.2	54.0	-19.8	H	A	101.0	6.0	
Mid Ch.															
2.745	3.0	48.7	29.7	4.9	-35.5	0.0	0.6	48.3	74.0	-25.7	V	P	114.0	318.0	
2.745	3.0	38.0	29.7	4.9	-35.5	0.0	0.6	37.7	54.0	-16.3	V	A	114.0	318.0	
2.745	3.0	45.1	29.7	4.9	-35.5	0.0	0.6	44.8	74.0	-29.2	H	P	103.0	355.0	
2.745	3.0	34.3	29.7	4.9	-35.5	0.0	0.6	33.9	54.0	-20.1	H	A	103.0	355.0	
High Ch.															
2.782	3.0	49.2	29.8	4.9	-35.4	0.0	0.6	49.0	74.0	-25.0	V	P	141.0	113.0	
2.782	3.0	38.8	29.8	4.9	-35.4	0.0	0.6	38.7	54.0	-15.3	V	A	141.0	113.0	
2.782	3.0	44.7	29.8	4.9	-35.4	0.0	0.6	44.5	74.0	-29.5	H	P	100.0	2.0	
2.782	3.0	33.6	29.8	4.9	-35.4	0.0	0.6	33.5	54.0	-20.5	H	A	100.0	2.0	

Rev. 4.1.2.7

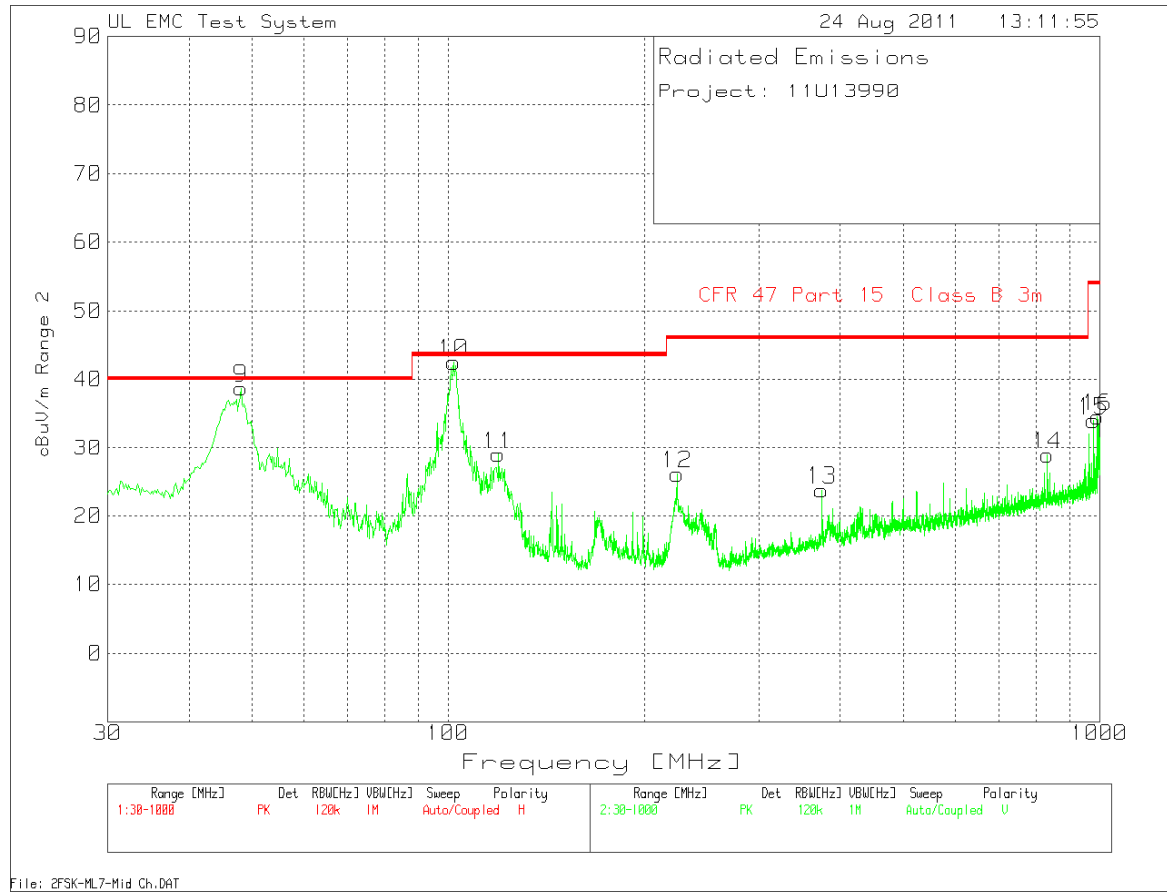
Note: No other emissions were detected above the system noise floor.

8.6. RECEIVER BELOW 1 GHz

2FSK Mode



MID CHANNEL VERTICAL PLOT



MID CHANNEL VERTICAL AND HORIZONTAL DATA

Project: 11U13990										
Range 1 30 - 1000MHz										
Test Frequency	Meter Reading	Detector	5m A Cable below 1GHz.TXT [dB]	5m A T64 PreAmp below 1GHz.TXT [dB]	5m A T122 Bilog below 1GHz.TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
48.0276	40.97	PK	0.8	-28.3	9.3	22.77	40	-17.23	200	Horz
102.498	52.92	PK	1.1	-28.2	10.4	36.22	43.5	-7.28	200	Horz
119.944	40.89	PK	1.2	-28.2	13.6	27.49	43.5	-16.01	300	Horz
224.4265	41.17	PK	1.6	-28.1	11.9	26.57	46	-19.43	100	Horz
374.8501	36.56	PK	2.1	-27.9	14.5	25.26	46	-20.74	200	Horz
480.4956	35.98	PK	2.4	-27.7	16.4	27.08	46	-18.92	200	Horz
672.5959	32.82	PK	2.9	-27.1	19.3	27.92	46	-18.08	100	Horz
720.6695	33.06	PK	3	-27.1	19.9	28.86	46	-17.14	100	Horz
Range 2 30 - 1000MHz										
Test Frequency	Meter Reading	Detector	5m A Cable below 1GHz.TXT [dB]	5m A T64 PreAmp below 1GHz.TXT [dB]	5m A T122 Bilog below 1GHz.TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
48.0276	56.93	PK	0.8	-28.3	9.3	38.73	40	-1.27	100	Vert
101.9165	59.31	PK	1.1	-28.2	10.3	42.51	43.5	-0.99	100	Vert
119.3625	42.43	PK	1.2	-28.2	13.5	28.93	43.5	-14.57	100	Vert
224.6203	40.66	PK	1.6	-28.1	11.9	26.06	46	-19.94	100	Vert
374.8501	35.03	PK	2.1	-27.9	14.5	23.73	46	-22.27	100	Vert
831.9365	31.69	PK	3.2	-27.3	21.3	28.89	46	-17.11	100	Vert
978.6771	35.78	PK	3.5	-27.6	22.3	33.98	54	-20.02	100	Vert
992.44	36.34	PK	3.5	-27.7	22.4	34.54	54	-19.46	100	Vert

8.7. RECEIVER ABOVE 1 GHz

2FSK Mode

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber

Test Engr: William Zhuang
Date: 08/24/11
Project #: 11U13990
Company: Anaren
Test Target: FCC 15.205
Mode Oper: Rx On, 2FSK ML7, Mid Ch.

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

f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
1.027	3.0	57.4	24.1	2.7	-38.8	0.0	0.0	45.4	74.0	-28.6	V	P	118.0	302.4	
1.027	3.0	35.5	24.1	2.7	-38.8	0.0	0.0	23.5	54.0	-30.5	V	A	118.0	302.4	
1.033	3.0	54.2	24.1	2.7	-38.8	0.0	0.0	42.3	74.0	-31.7	H	P	100.4	311.0	
1.033	3.0	40.4	24.1	2.7	-38.8	0.0	0.0	28.5	54.0	-25.5	H	A	100.4	311.0	
1.667	3.0	65.7	26.6	3.5	-37.9	0.0	0.0	57.8	74.0	-16.2	V	P	100.1	265.4	
1.667	3.0	35.5	26.6	3.5	-37.9	0.0	0.0	27.6	54.0	-26.4	V	A	100.1	265.4	
1.667	3.0	62.4	26.6	3.5	-37.9	0.0	0.0	54.6	74.0	-19.4	H	P	100.0	308.4	
1.667	3.0	34.2	26.6	3.5	-37.9	0.0	0.0	26.4	54.0	-27.6	H	A	100.0	308.4	

Rev. 4.1.2.7

Note: No other emissions were detected above the system noise floor.

9. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

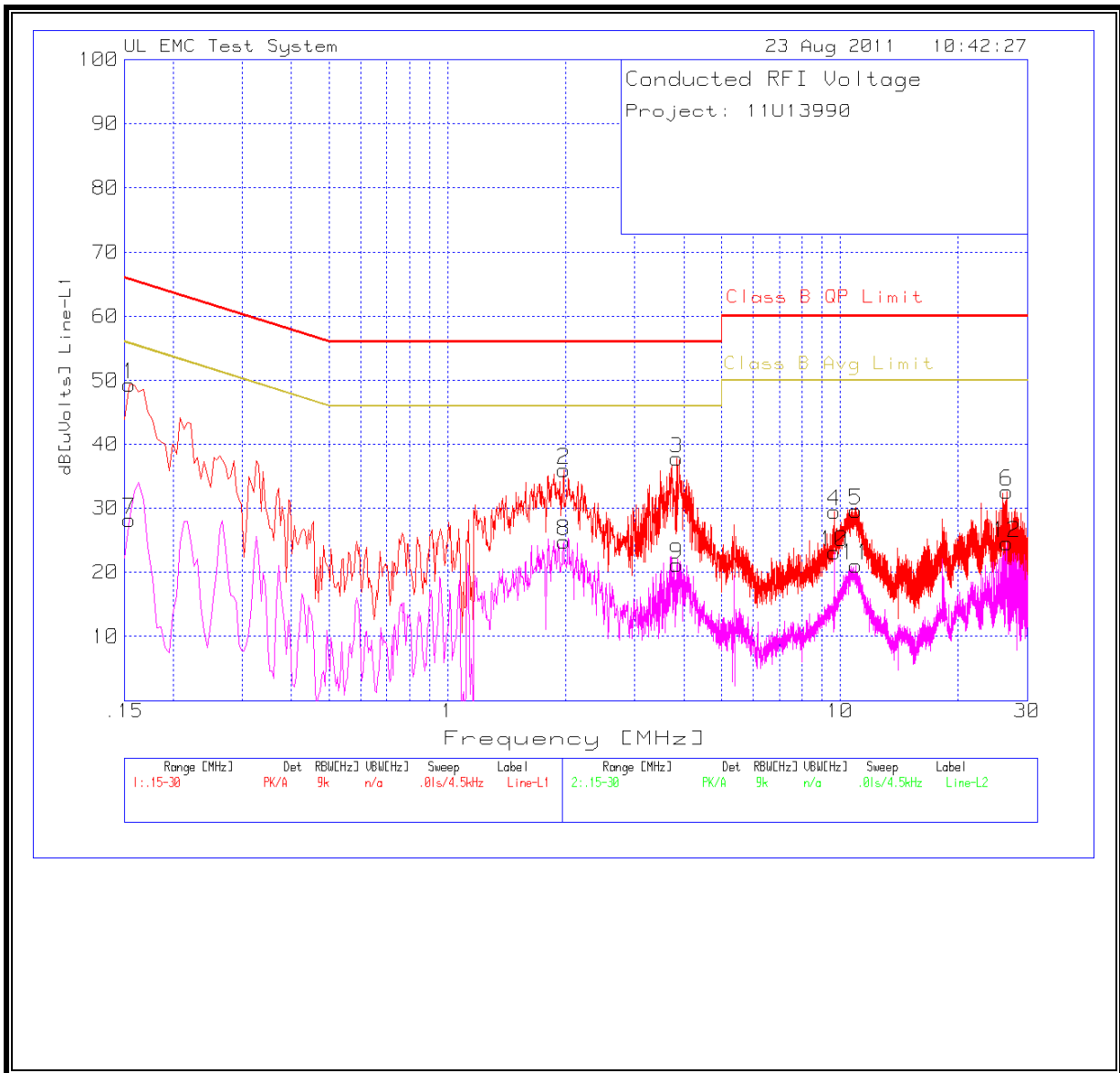
ANSI C63.4

RESULTS

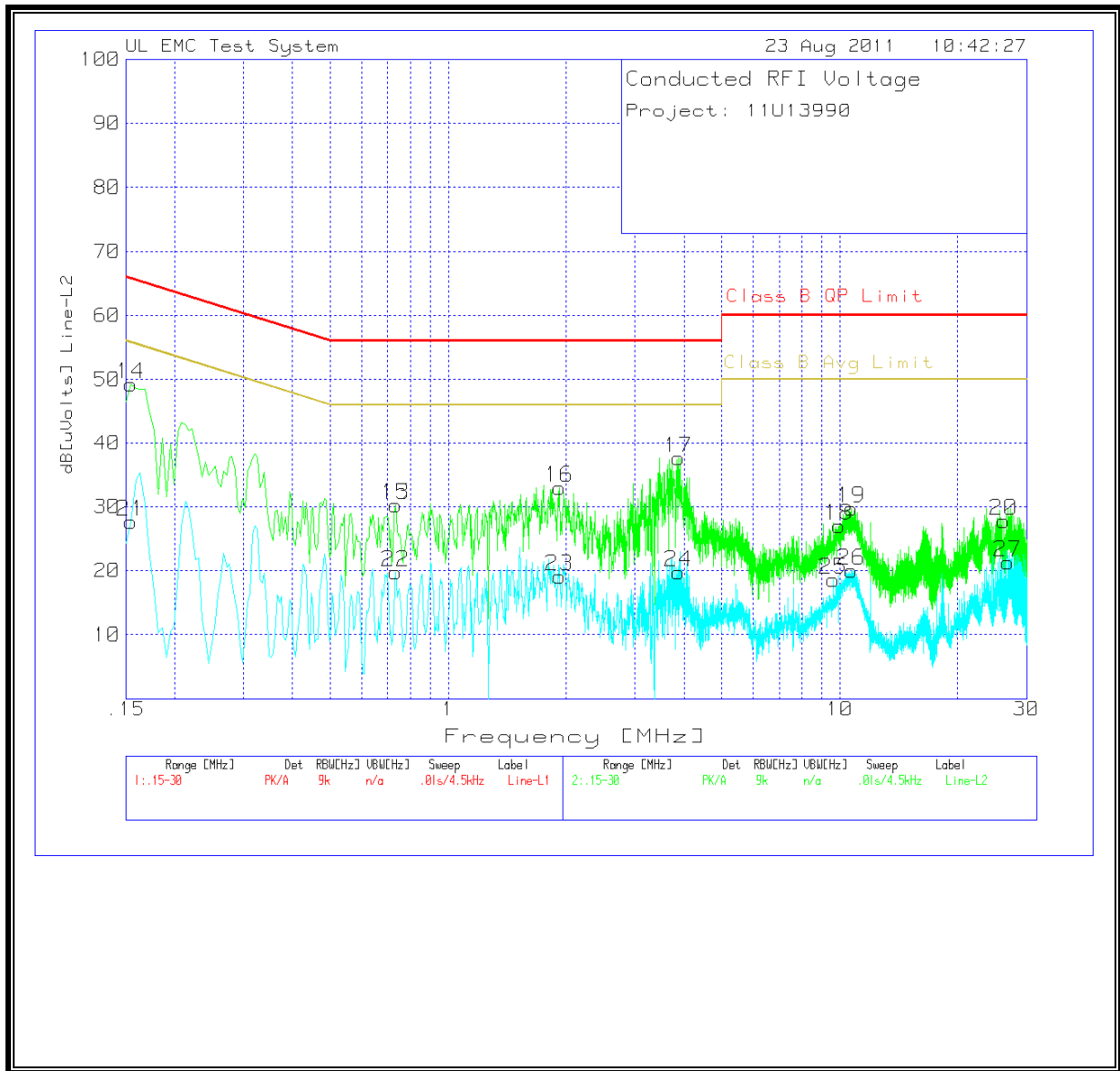
WORST EMISSIONS (WORST CASE)

Project: 11U13990									
Line-L1 .15 - 30MHz									
Test Frequency	Meter Reading	Detector	LISN [dB]	Conducted Emission Cable [dB]	dB[uVolts]	Class B QP Limit	Margin	Class B Avg Limit	Margin
0.1545	49.34	PK	0	0	49.34	65.8	-16.46	55.8	-6.46
1.977	35.98	PK	0	0	35.98	56	-20.02	46	-10.02
3.8445	37.7	PK	0	0	37.7	56	-18.3	46	-8.3
9.672	29.5	PK	0	0	29.5	60	-30.5	50	-20.5
10.995	29.63	PK	0	0	29.63	60	-30.37	50	-20.37
26.547	32.57	PK	0	0	32.57	60	-27.43	50	-17.43
0.1545	28.11	Av	0	0	28.11	65.8	-37.69	55.8	-27.69
1.977	24.82	Av	0	0	24.82	56	-31.18	46	-21.18
3.8445	21.14	Av	0	0	21.14	56	-34.86	46	-24.86
9.672	23.15	Av	0	0	23.15	60	-36.85	50	-26.85
10.9725	21.06	Av	0	0	21.06	60	-38.94	50	-28.94
26.547	24.58	Av	0	0	24.58	60	-35.42	50	-25.42
Line-L2 .15 - 30MHz									
Test Frequency	Meter Reading	Detector	LISN [dB]	Conducted Emission Cable [dB]	dB[uVolts]	Class B QP Limit	Margin	Class B Avg Limit	Margin
0.735	30.26	PK	0	0	30.26	56	-25.74	46	-15.74
0.1545	49.23	PK	0	0	49.23	65.8	-16.57	55.8	-6.57
0.735	30.26	PK	0	0	30.26	56	-25.74	46	-15.74
1.923	32.93	PK	0	0	32.93	56	-23.07	46	-13.07
3.876	37.67	PK	0	0	37.67	56	-18.33	46	-8.33
9.96	27.01	PK	0	0	27.01	60	-32.99	50	-22.99
10.698	29.67	PK	0	0	29.67	60	-30.33	50	-20.33
26.232	27.72	PK	0	0	27.72	60	-32.28	50	-22.28
0.1545	27.68	Av	0	0	27.68	65.8	-38.12	55.8	-28.12
0.735	19.75	Av	0	0	19.75	56	-36.25	46	-26.25
1.923	19.16	Av	0	0	19.16	56	-36.84	46	-26.84
3.876	19.76	Av	0	0	19.76	56	-36.24	46	-26.24
9.627	18.57	Av	0	0	18.57	60	-41.43	50	-31.43
10.698	20.01	Av	0	0	20.01	60	-39.99	50	-29.99
26.8575	21.25	Av	0	0	21.25	60	-38.75	50	-28.75

LINE 1 RESULTS



LINE 2 RESULTS



10. MAXIMUM PERMISSIBLE EXPOSURE

FCC RULES

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f ²)	6
30–300	61.4	0.163	1.0	6
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)—Continued

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
30–300	27.5	0.073	0.2	30
300–1500 .....	.....	.....	f/1500	30
1500–100,000 .....	.....	.....	1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

IC RULES

IC Safety Code 6, Section 2.2.1 (a) A person other than an RF and microwave exposed worker shall not be exposed to electromagnetic radiation in a frequency band listed in Column 1 of Table 5, if the field strength exceeds the value given in Column 2 or 3 of Table 5, when averaged spatially and over time, or if the power density exceeds the value given in Column 4 of Table 5, when averaged spatially and over time.

Table 5
Exposure Limits for Persons Not Classed As RF and Microwave Exposed Workers (Including the General Public)

1 Frequency (MHz)	2 Electric Field Strength; rms (V/m)	3 Magnetic Field Strength; rms (A/m)	4 Power Density (W/m ²)	5 Averaging Time (min)
0.003–1	280	2.19		6
1–10	280/ <i>f</i>	2.19/ <i>f</i>		6
10–30	28	2.19/ <i>f</i>		6
30–300	28	0.073	2*	6
300–1 500	1.585 <i>f</i> ^{0.5}	0.0042 <i>f</i> ^{0.5}	<i>f</i> /150	6
1 500–15 000	61.4	0.163	10	6
15 000–150 000	61.4	0.163	10	616 000 / <i>f</i> ^{1.2}
150 000–300 000	0.158 <i>f</i> ^{0.5}	4.21 × 10 ⁻⁴ <i>f</i> ^{0.5}	6.67 × 10 ⁻⁵ <i>f</i>	616 000 / <i>f</i> ^{1.2}

* Power density limit is applicable at frequencies greater than 100 MHz.

- Notes:**
1. Frequency, *f*, is in MHz.
 2. A power density of 10 W/m² is equivalent to 1 mW/cm².
 3. A magnetic field strength of 1 A/m corresponds to 1.257 microtesla (μT) or 12.57 milligauss (mG).

EQUATIONS

Power density is given by:

$$S = \text{EIRP} / (4 * \text{Pi} * D^2)$$

where

S = Power density in W/m²

EIRP = Equivalent Isotropic Radiated Power in W

D = Separation distance in m

Power density in units of W/m² is converted to units of mW/cm² by dividing by 10.

Distance is given by:

$$D = \text{SQRT} (\text{EIRP} / (4 * \text{Pi} * S))$$

where

D = Separation distance in m

EIRP = Equivalent Isotropic Radiated Power in W

S = Power density in W/m²

For multiple colocated transmitters operating simultaneously in frequency bands where the limit is identical, the total power density is calculated using the total EIRP obtained by summing the Power * Gain product (in linear units) of each transmitter.

$$\text{Total EIRP} = (P_1 * G_1) + (P_2 * G_2) + \dots + (P_n * G_n)$$

where

P_x = Power of transmitter x

G_x = Numeric gain of antenna x

In the table(s) below, Power and Gain are entered in units of dBm and dBi respectively and conversions to linear forms are used for the calculations.

LIMITS

From FCC §1.1310 Table 1 (B), the maximum value of S = 0.6 mW/cm²

From IC Safety Code 6, Section 2.2 Table 5 Column 4, S = 6 W/m²

RESULTS

Band	Mode	Separation Distance (m)	Output AV Power (dBm)	Antenna Gain (dBi)	IC Power Density (W/m^2)	FCC Power Density (mW/cm^2)
900 MHz	DSSS	0.20	12.41	2.00	0.05	0.005