



FCC 47 CFR PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

Gate Opeatro Controller with 900MHz FHSS Trasceiver

MODEL NUMBER: 001D6761

FCC ID: HBW6761

REPORT NUMBER: 10693059A

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Prepared for
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Revision History

Rev.	Issue Date	Revisions	Revised By
--		Initial Issue	

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Chamberlain Group Inc.
845 N. Larch Ave
Elmhurst, IL 60126

EUT DESCRIPTION: Gate Operator Controller with 900MHz FHSS Trascceiver

MODEL: 001D6761

SERIAL NUMBER: Prototype

DATE TESTED: April 20, 2015 – August 25, 2015

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass

UL LLC 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 UL LLC 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 UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC 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
UL LLC By:



Michael Ferrer
UL LLC

Tested By:



Bart Mucha
UL LLC

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 333 Pfingsten Road, Northbrook, IL 60062 USA.

UL NBK is accredited by NVLAP, Laboratory Code 100414-0. The full scope of accreditation can be viewed at <http://ts.nist.gov/Standards/scopes/1004140.htm>

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

Sample Calculations

Radiated Field Strength and Conducted Emissions data contained within this report is calculated on the following basis:

Field Strength (dBuV/m) = Meter Reading (dBuV) + AF (dB/m) - Gain (dB) + Cable Loss (dB)

Conducted Voltage (dBuV) = Meter Reading (dBuV) + Cable Loss (dB) + LISN IL (dB)

Conducted Current (dBuA) = Meter Reading (dBuV) + Cable Loss (dB) - Transducer Factor (dBohms)

4.3. MEASUREMENT UNCERTAINTY

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

Test	Range	Equipment	Uncertainty k=2
Radiated Emissions	30-200MHz	Bicon 10m Horz	4.27dB
Radiated Emissions	30-200MHz	Bicon 10m Vert	4.28dB
Radiated Emissions	200-1000MHz	LogP 10m Horz	3.33dB
Radiated Emissions	200-1000MHz	LogP 10m Vert	3.39dB
Radiated Emissions	30-200MHz	Bicon 3m Horz	3.30dB
Radiated Emissions	30-130MHz	Bicon 3m Vert	4.84dB
Radiated Emissions	130-200MHz	Bicon 3m Vert	4.94dB
Radiated Emissions	200-1000MHz	LogP 3m Horz	3.46dB
Radiated Emissions	200-1000MHz	LogP 3m Vert	4.98dB
Radiated Emissions	1-6GHz	Horn	5.02dB
Radiated Emissions	6-18GHz	Horn	5.34dB
Conducted Ant Port	30MHz-26GHz	Spectrum Analyzer	2.94

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a Control Board Assembly used for Commercial Gate Operators. The assembly consists main control board that includes the 900MHz FHSS transceiver and 300MHz & 400MHz receivers and other boards such as motor drive board and the power supply board.

5.2. MAXIMUM OUTPUT POWER

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

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
902.250 - 926.750	FHSS	10.10	10.23

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an detachable monopole antenna, with a maximum gain of 0.5dBi.

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was 127A0397, rev. 2.2.

The test utility software used during testing was 127A0397, rev. 2.2T.

5.5. WORST-CASE CONFIGURATION AND MODE

The device is only installed in one orientation and it only has single mode of operation / modulation.

For duty cycle calculation worst case was applied as described in operational description. The worst case was calculated by changing transmit time from the theoretical pulse duration to measured pulse duration time.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
EUT	Chamberlain	ebox assembly	-	

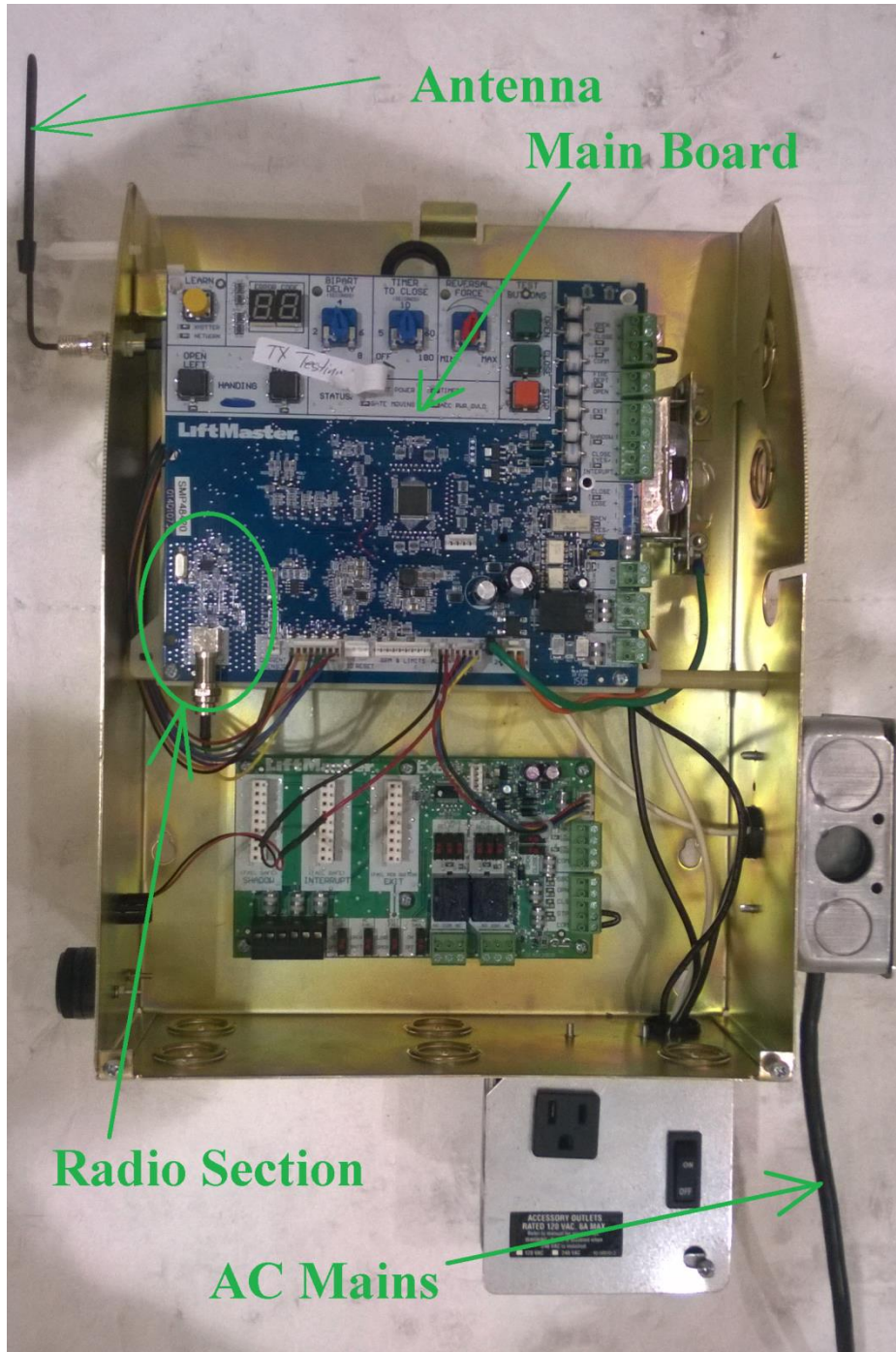
I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
0	Enclosure	1	n/a	n/a	n/a	-
1	AC Mains	1	120V/16A	3 wire	1m	-

TEST SETUP

The EUT is part of the ebox assembly used across different versions of gate operators. The transceiver is part of the main board referred to as 001D6761

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due Date
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC4328	20141830	20151231
Bicon Antenna	Chase	VBA6106A	EMC4078	20140401	20150430
Log-P Antenna	Chase	UPA6109	EMC4313	20141119	20151130
Loop Antenna	EMCO	6502/1	EMC4026	20150420	20160430
EMI Test Receiver	Rohde & Schwarz	ESU	EMC4323	20141216	20151231
Antenna Array	UL	BOMS	EMC4276	20141201	20151231
Spectrum Analyzer	Agilent	N9030A (PXA)	EMC4360	20141219	20151219

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due Date
EMI Test Receiver	Rohde & Schwarz	ESR	EMC4377	April 1, 2014	April 1, 2015
Transient Limiter	Electro-Metrics	EM7600-2	EMC4224	N/A	N/A
HighPass Filter	Solar Electronics	2803-150	88551	N/A	N/A
Attenuator	HP	8494B	2831A00838	N/A	N/A
LISN - L1	Solar	8602-50-TS-50-N	EMC4052	Jan 09, 2015	Jan 10, 2016
LISN - L2	Solar	8602-50-TS-50-N	EMC4064	Jan 09, 2015	Jan 10, 2016

7. ANTENNA PORT TEST RESULTS

8. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

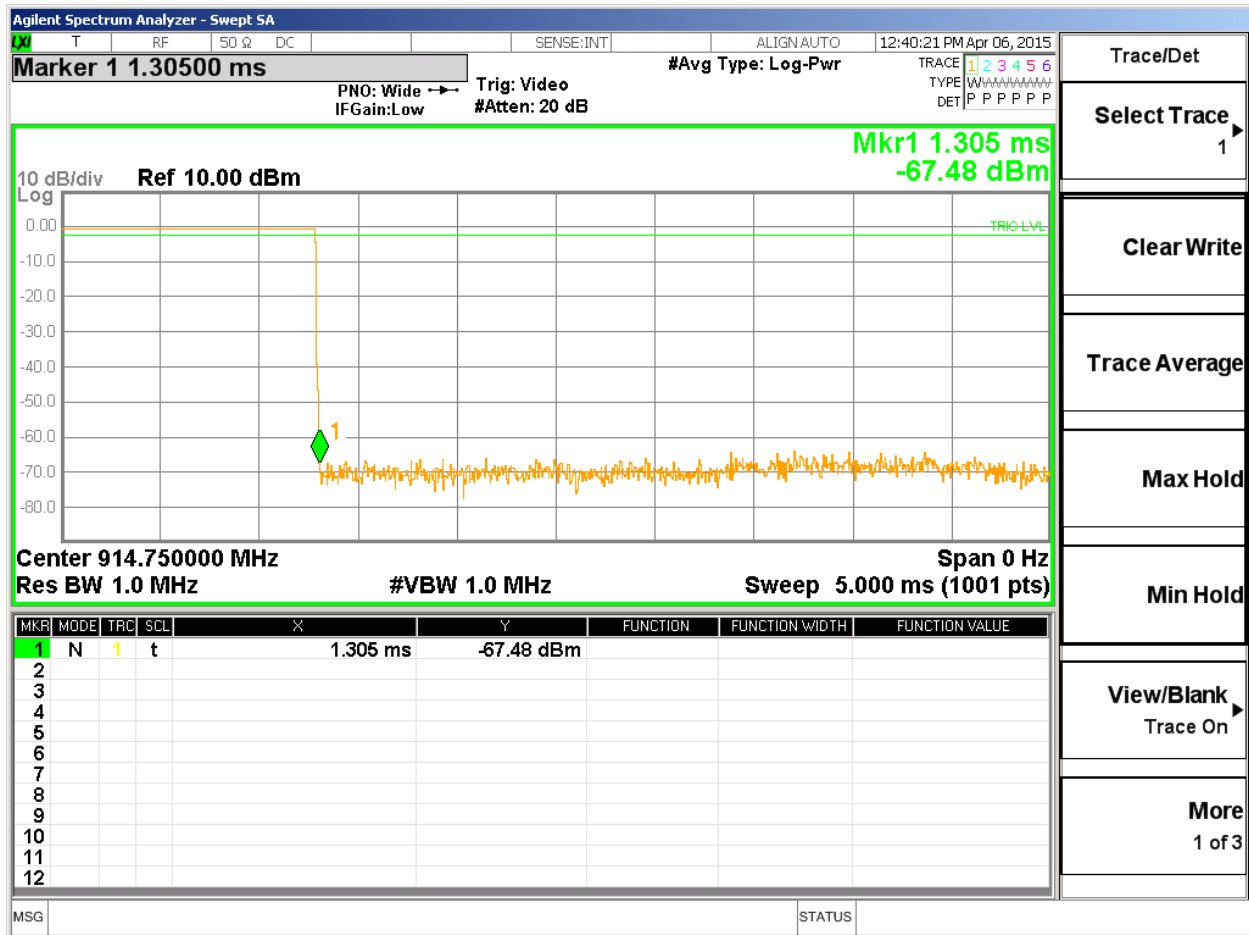
8.1. ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
Hopping On						
1	1.305	100	0.013	1.31%	37.69	N/A
*	3	100	0.030	3.00%	30.46	N/A

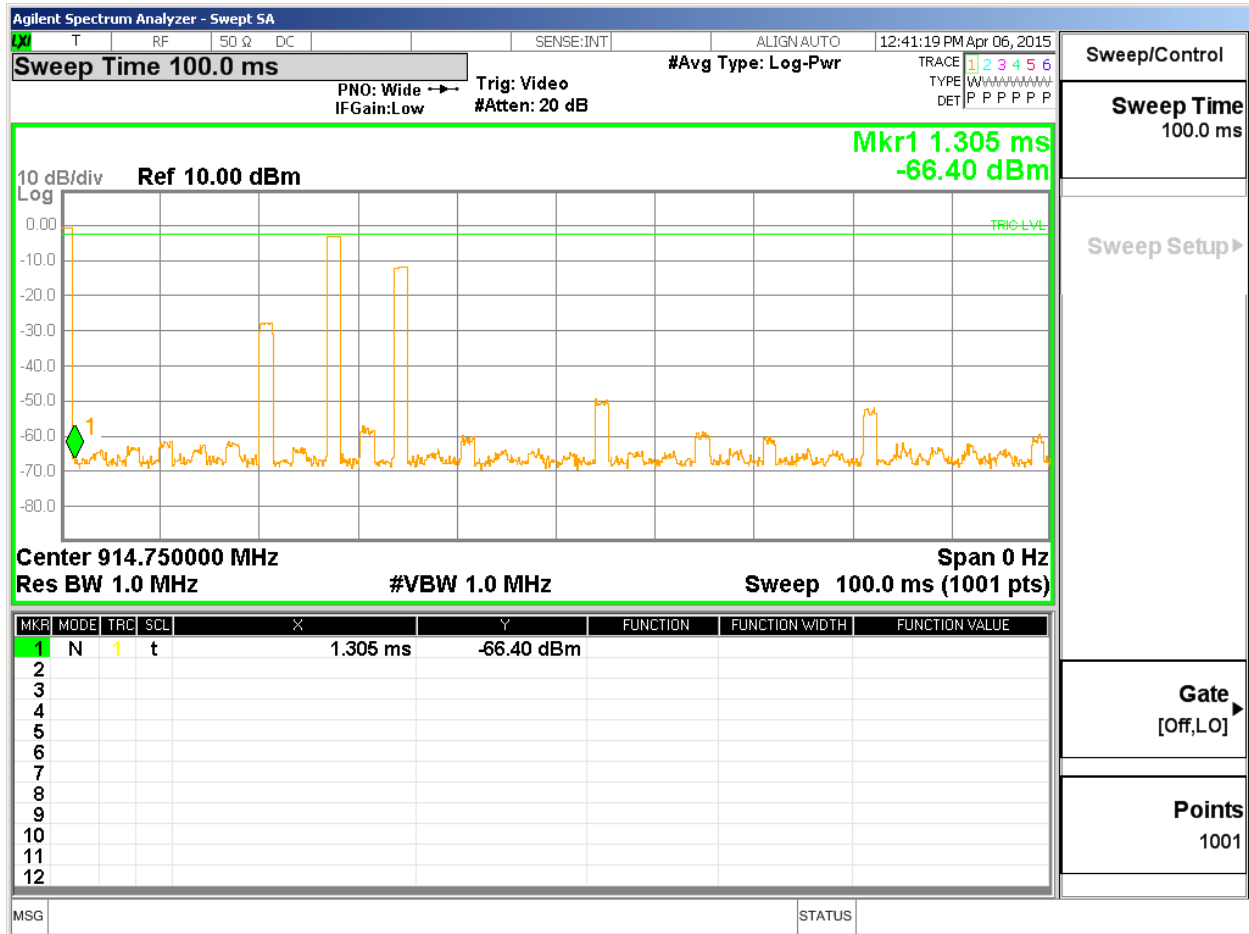
* According to manufacturer's provided operational description there is another mode of operation where longer message can be sent. The message length can be maximum 3.0mS in 100mS.

8.1.1. DUTY CYCLE PLOTS

PULSE DURAION



NUMBER OF PULSES IN 100ms



8.2. Antenna Port Measurements

8.2.1. 20 dB AND 99% BANDWIDTH

LIMIT

None; for reporting purposes only.

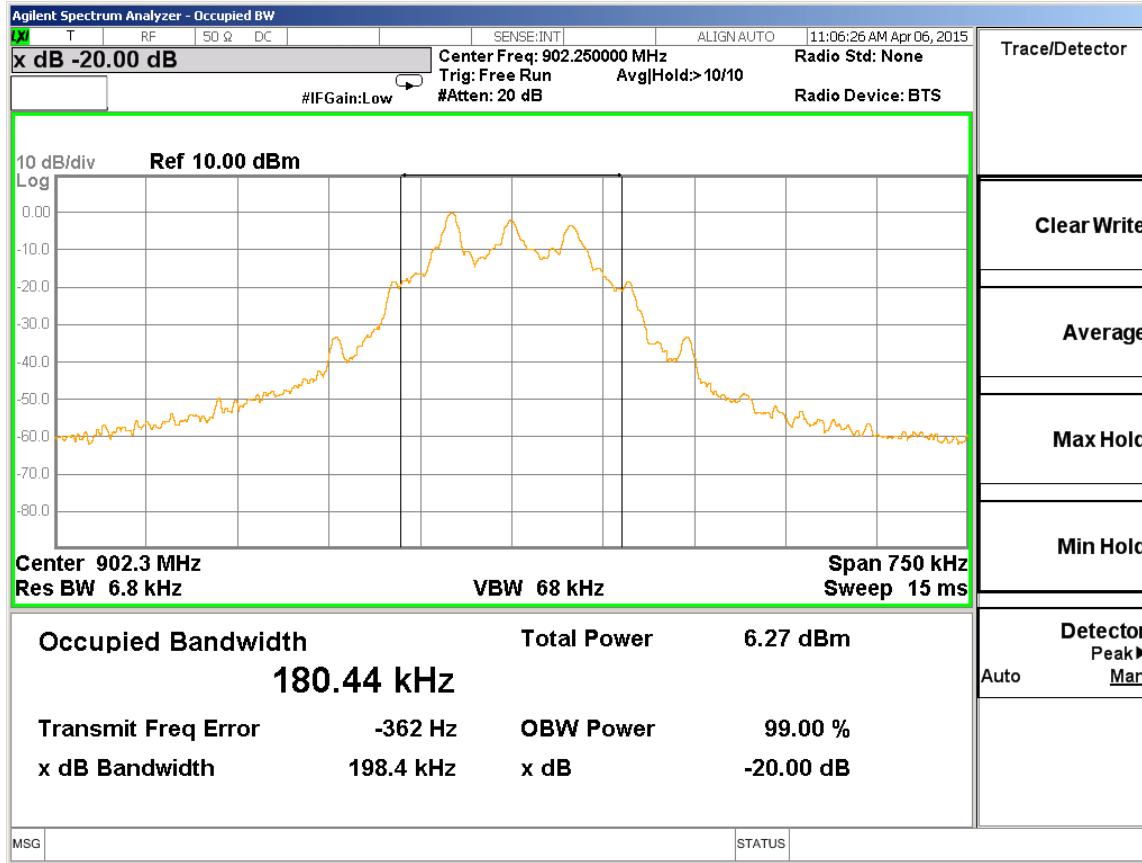
TEST PROCEDURE

Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	99% Bandwidth (kHz)
Low	902.25	198.4	181.92
Middle	914.75	200.9	188.25
High	926.75	202.9	191.51

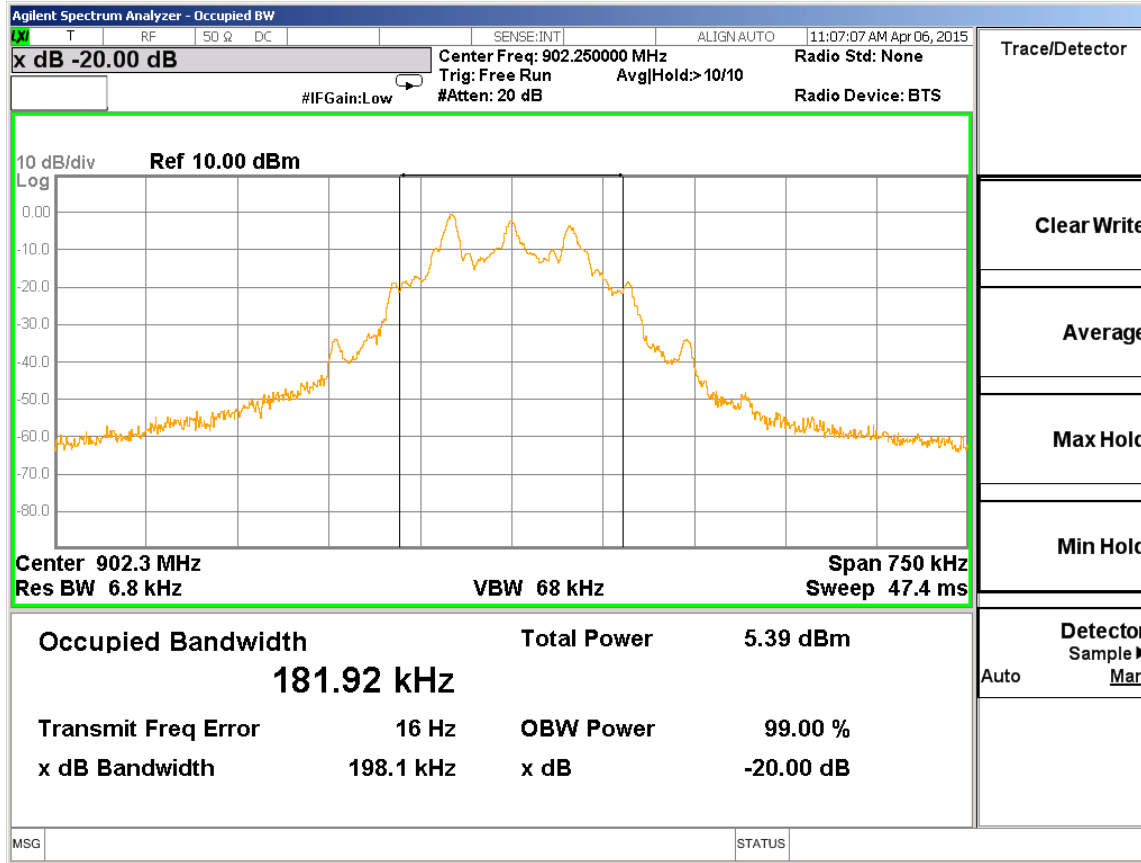
The transmitter output is connected to a spectrum analyzer. The RBW is set to $\geq 1\%$ of the 20 dB bandwidth. The VBW is set to \geq RBW. The sweep time is coupled.

RESULTS

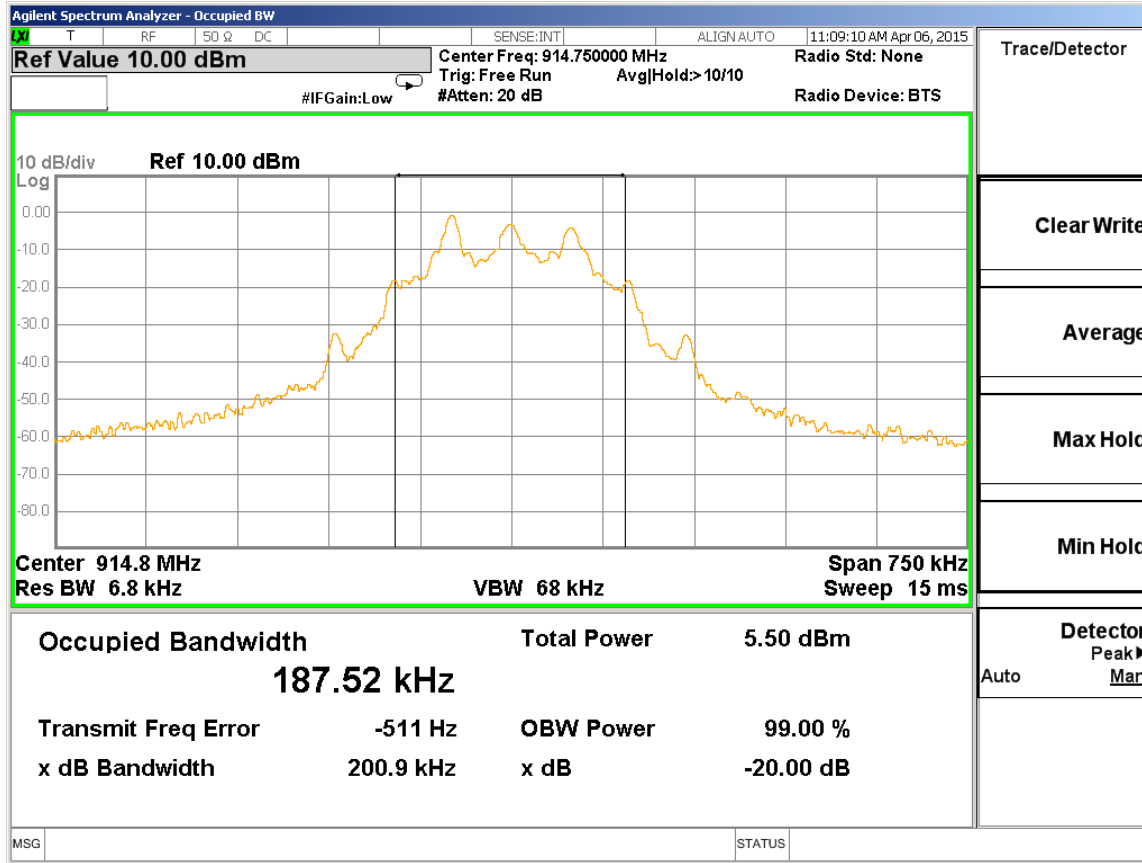
20dB BW Low Channel



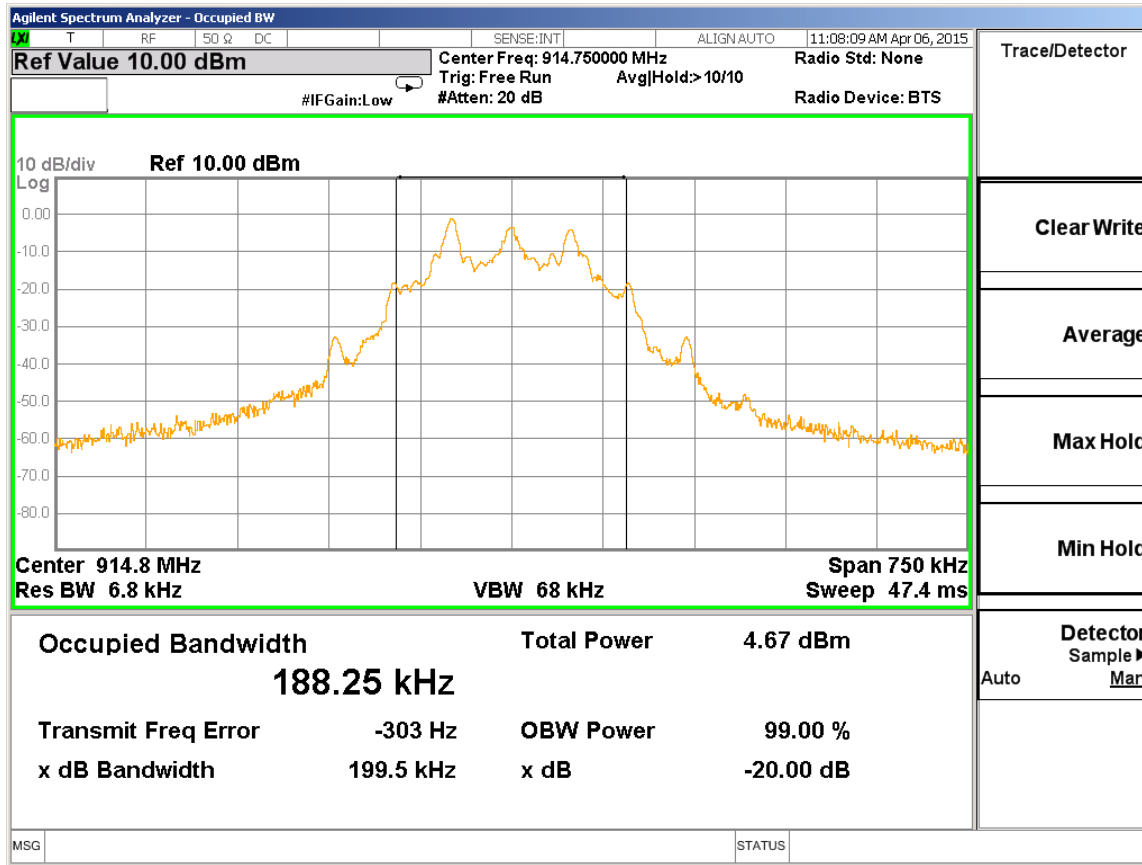
99% BW Low Channel



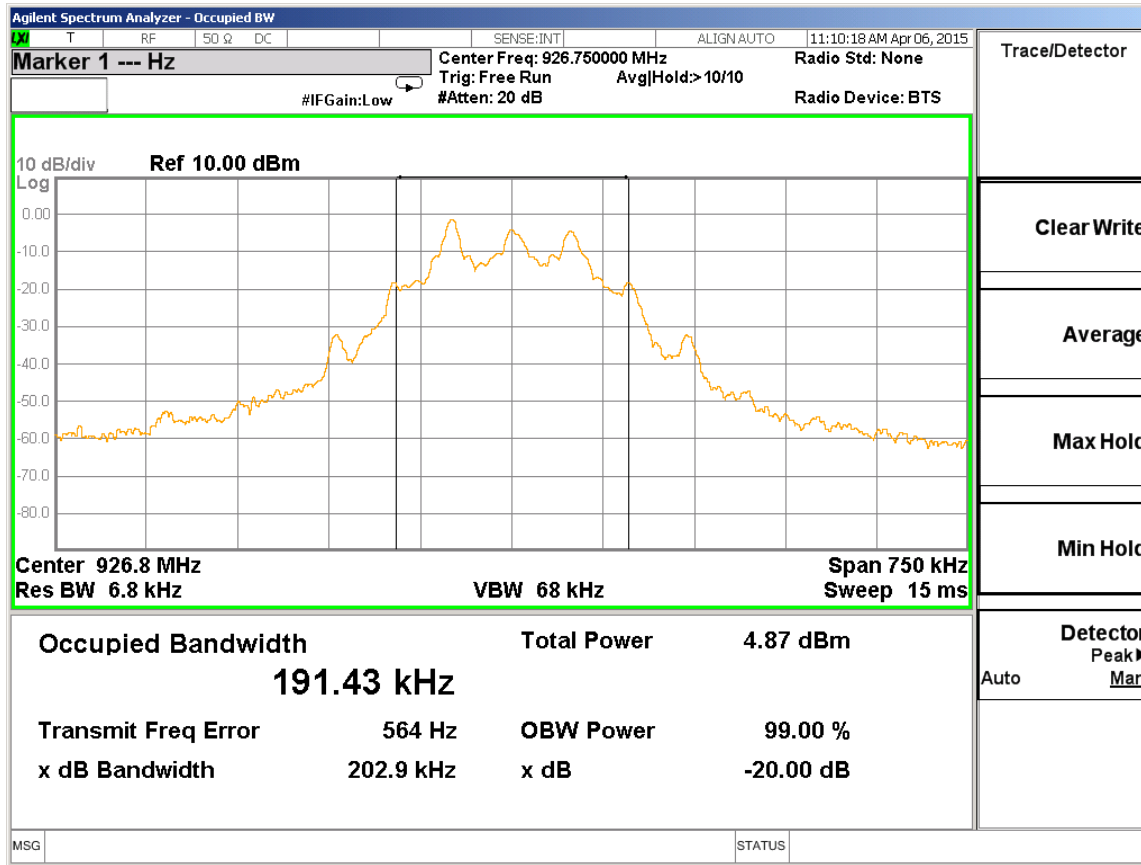
20dB BW Middle Channel



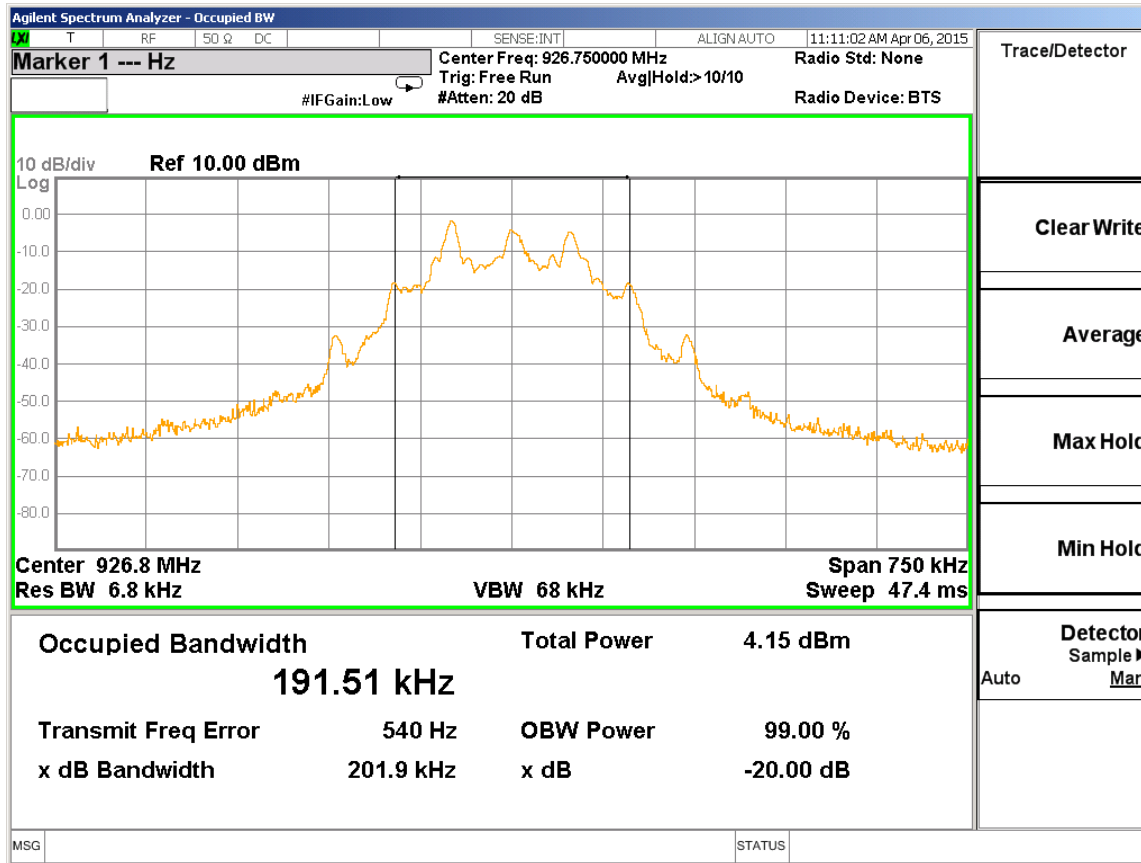
99% BW Middle Channel



20dB BW High Channel



99% BW High Channel



8.2.2. HOPPING FREQUENCY SEPARATION

LIMIT

FCC §15.247 (a) (1)

IC RSS-210 A8.1 (b)

DA 00-705

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

TEST PROCEDURE

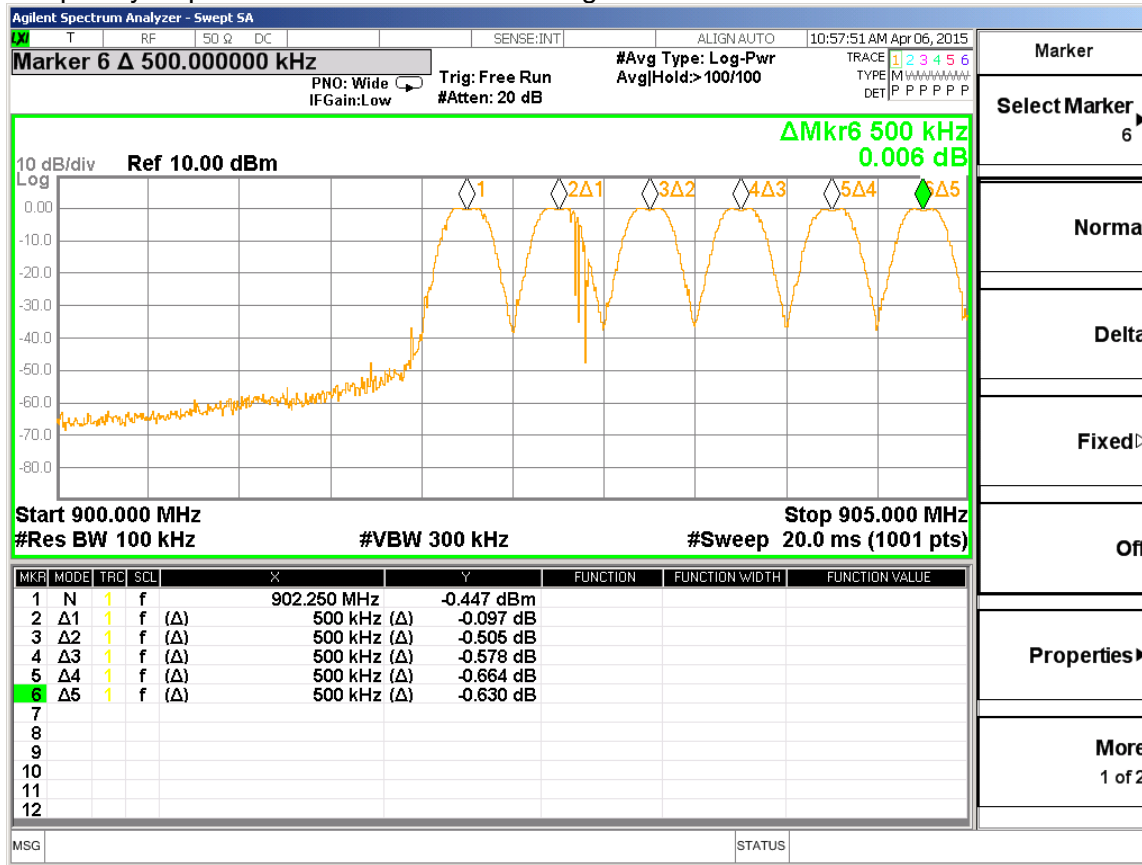
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

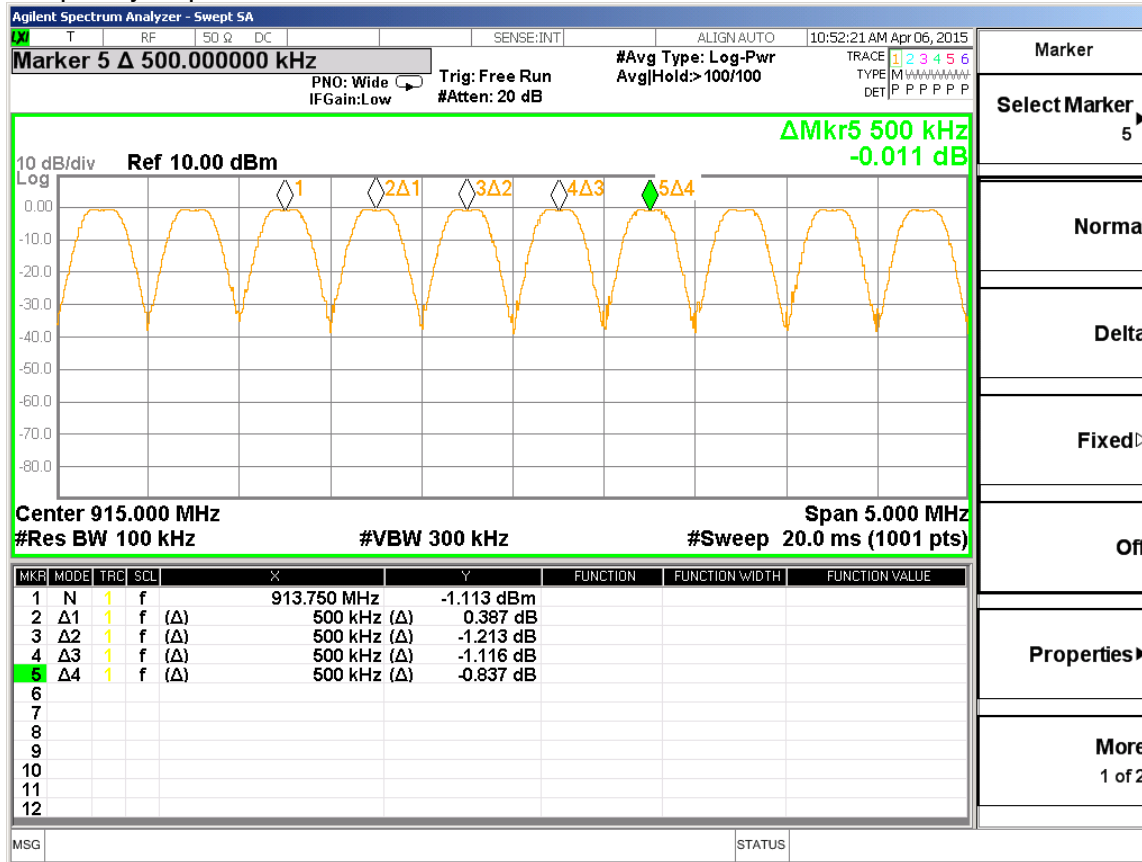
The measured frequency separation was 500kHz for all the channels.

HOPPING FREQUENCY SEPARATION

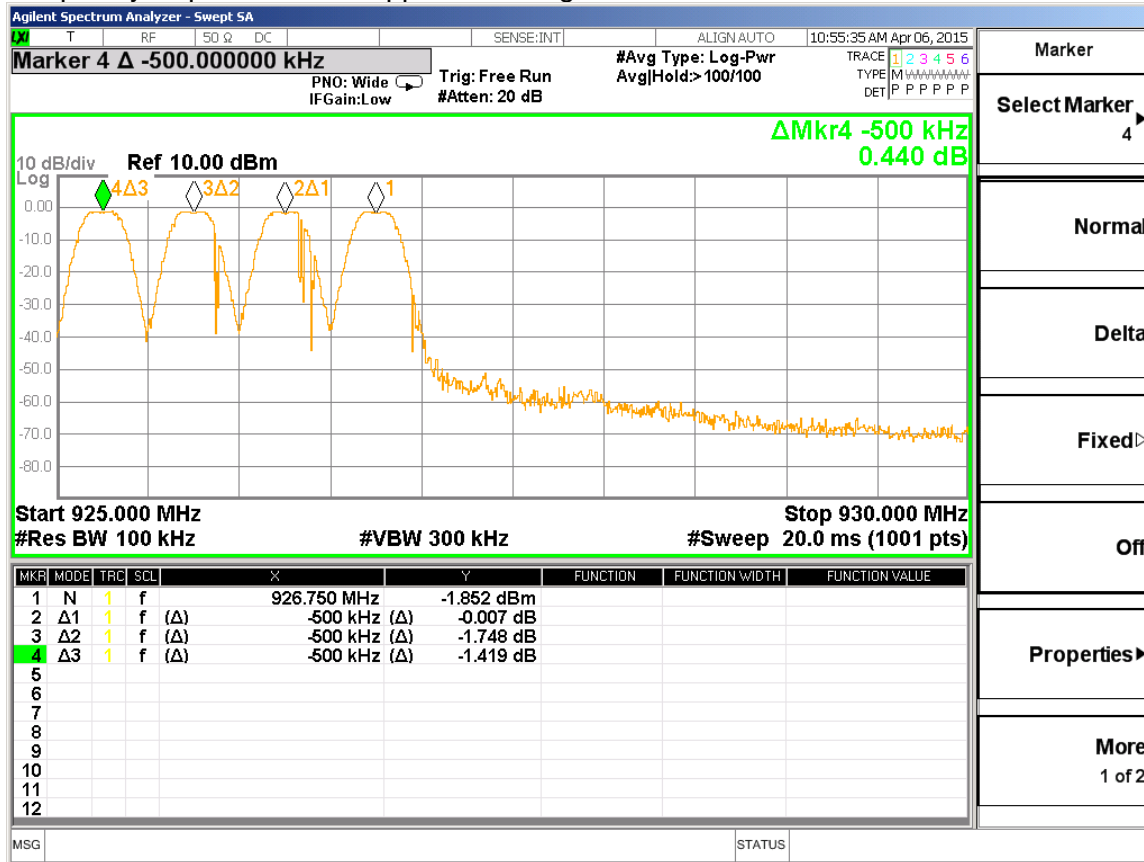
Frequency Separation Near the low band edge



Frequency Separation near center of the band



Frequency Separation near upper band edge



8.2.3. NUMBER OF HOPPING CHANNELS

LIMIT

FCC §15.247 (a) (1) (i)

IC RSS-210 A8.1 (c)

For frequency hopping systems operating in the 902–928 MHz band:

- if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies
- if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies

TEST PROCEDURE

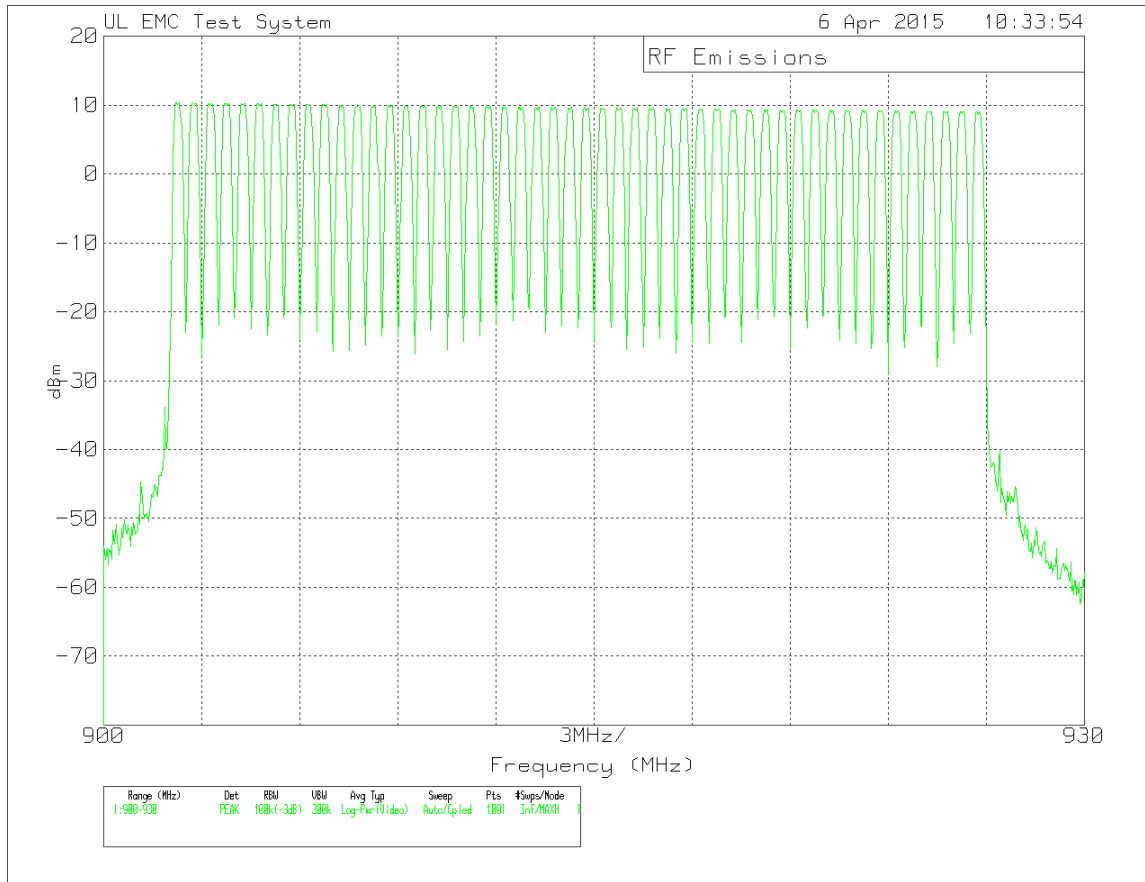
DA 00-705

The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

RESULTS

50 Hopping Frequencies were observed.

NUMBER OF HOPPING CHANNELS



8.2.4. AVERAGE TIME OF OCCUPANCY

LIMIT

FCC §15.247 (a) (1) (i)

IC RSS-210 A8.1 (c)

For frequency hopping systems operating in the 902–928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

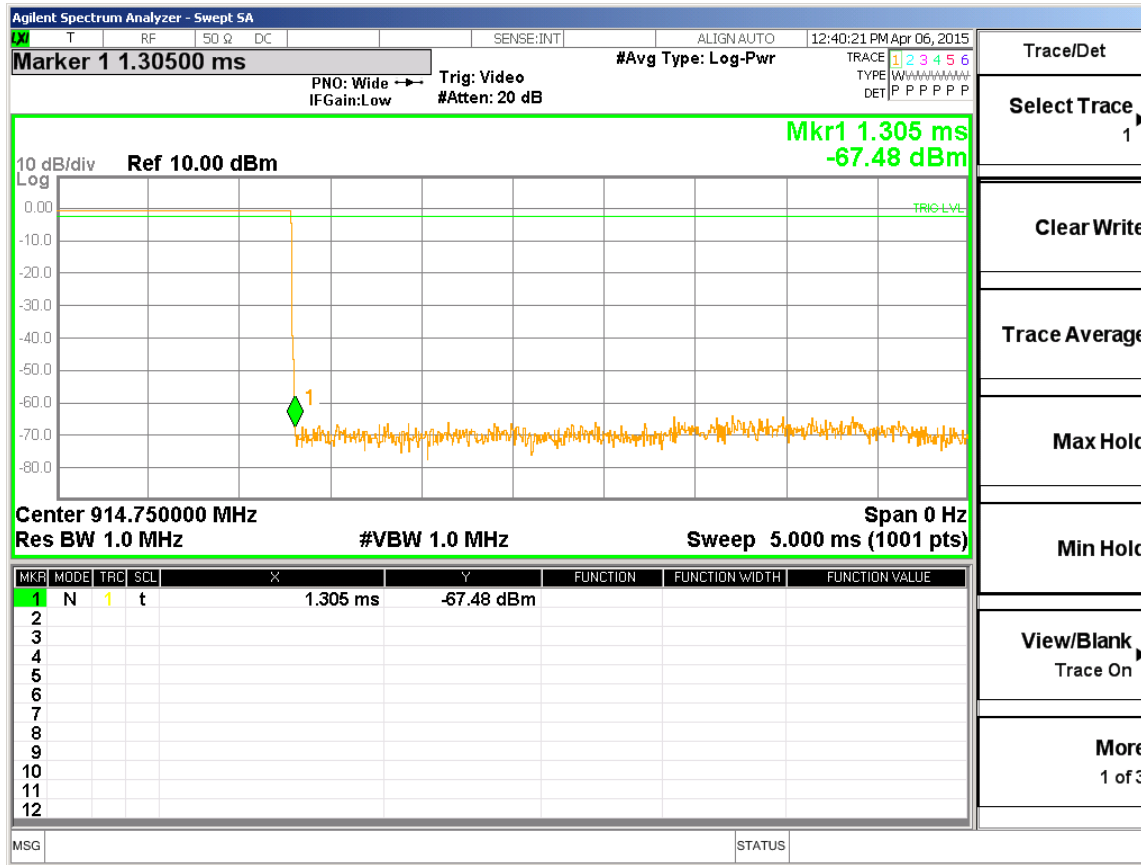
TEST PROCEDURE

DA 00-0705

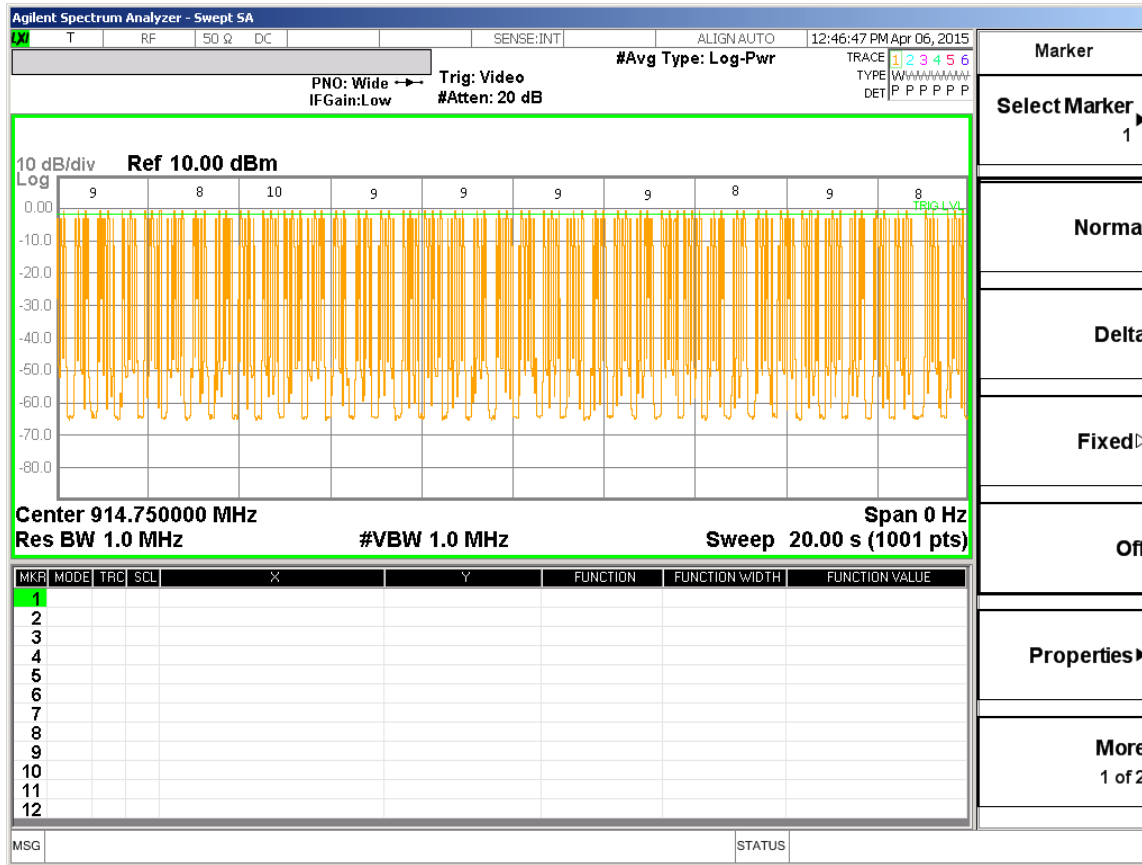
RESULTS

Maximum TX time measured in 20 seconds: 114.84mS

PULSE WIDTH



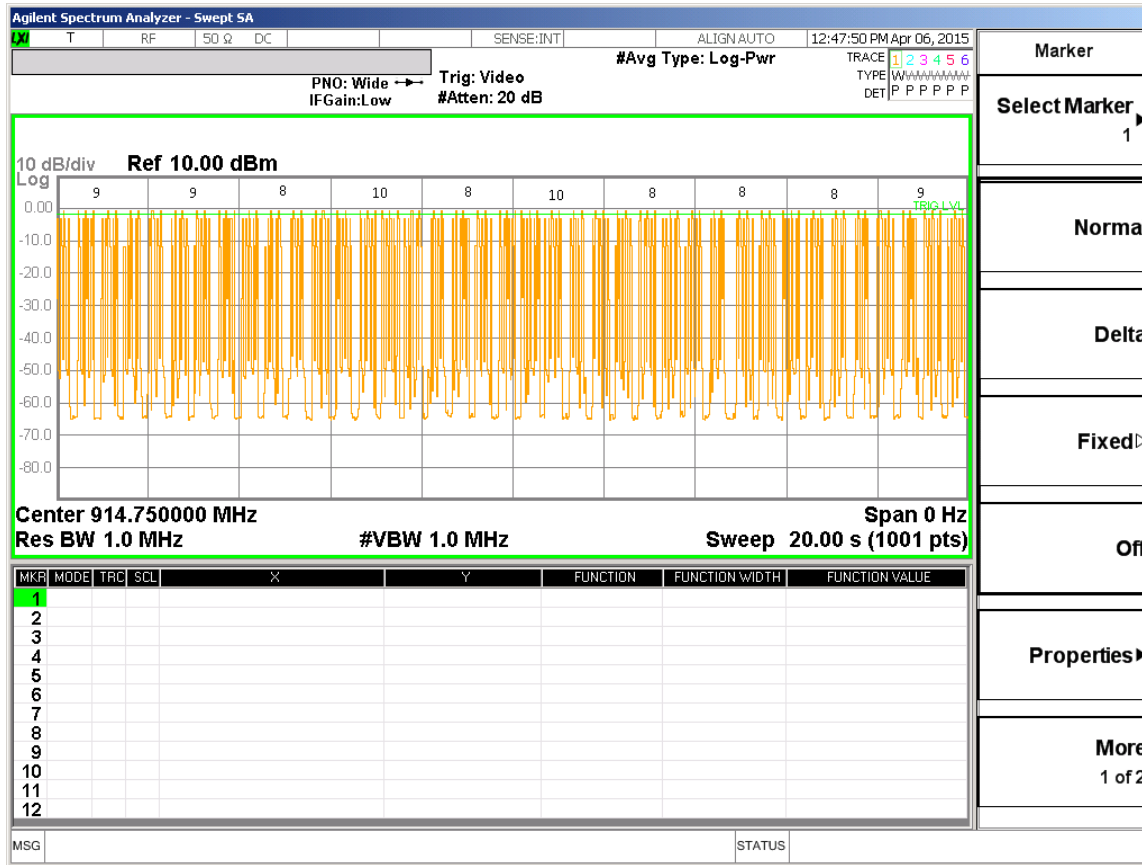
NUMBER OF PULSES IN 20 SECONDS SWEEP 1



88 transitions counted.

Total TX Time in 20 Seconds: 114.84mS

NUMBER OF PULSES IN 20 SECONDS SWEEP 2



87 transitions counted.

Total TX Time in 20 Seconds: 113.535mS

8.2.5. OUTPUT POWER

LIMIT

§15.247 (b) (1)

For frequency hopping systems operating in the 902–928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

RSS-210 Clause A8.4 (1)

For frequency hopping systems operating in the band 902-928 MHz, the maximum peak conducted output power shall not exceed 1.0 W, and the e.i.r.p. shall not exceed 4 W if the hopset uses 50 or more hopping channels; the maximum peak conducted output power shall not exceed 0.25 W, and the e.i.r.p. shall not exceed 1 W if the hopset uses less than 50 hopping channels.

TEST PROCEDURE

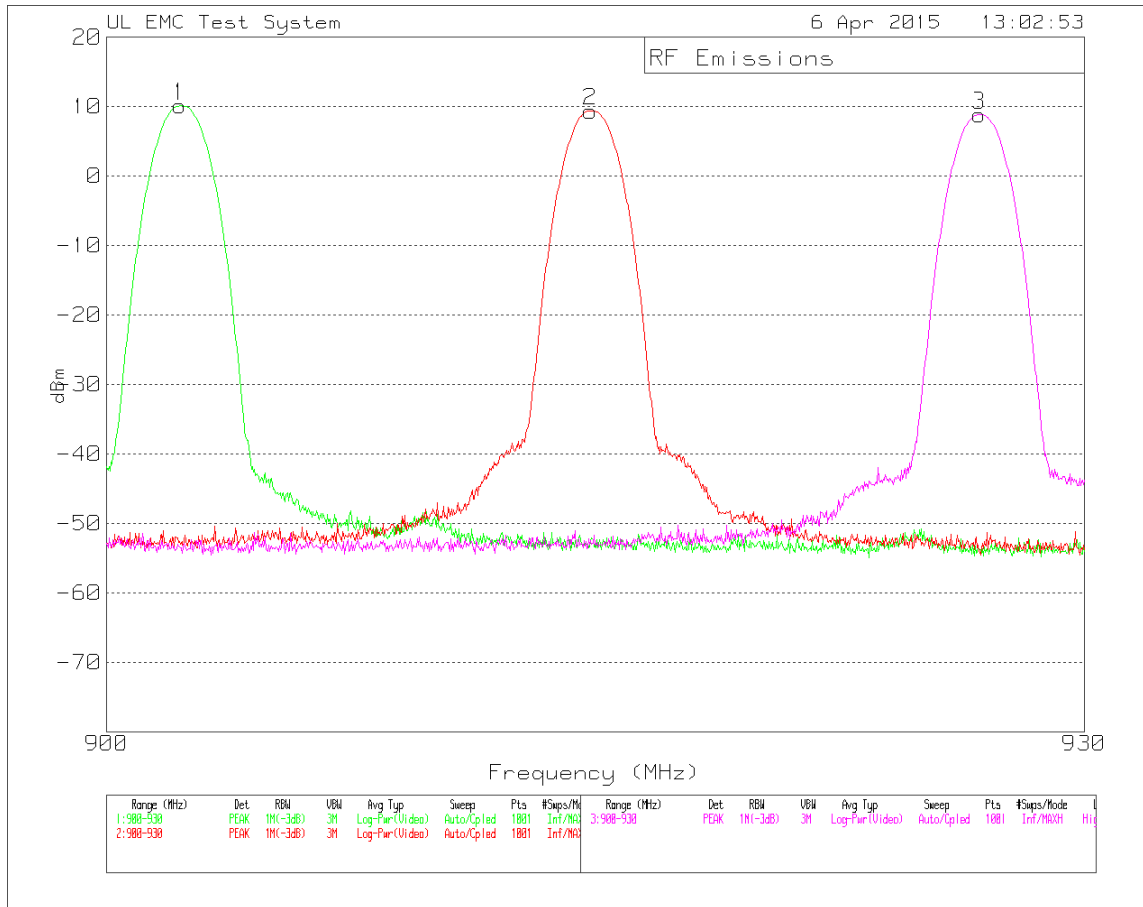
The transmitter output is connected to a spectrum analyzer the analyzer bandwidth is set to a value greater than the 20 dB bandwidth of the EUT.

RESULTS

Marker No.	Test Frequency (MHz)	Meter Reading (dBm)	Detector	Path Factor dB	Peak Power dBm	Peak Power mW
1	902.205	-0.1	PK	10.2	10.1	10.23
2	914.715	-0.82	PK	10.2	9.38	8.67
3	926.73	-1.39	PK	10.2	8.81	7.60
PK - Peak detector						

OUTPUT POWER

Low Channel, Middle and High Channels



* see tabular data above

8.2.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

IC RSS-210 A8.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section A8.4 (4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

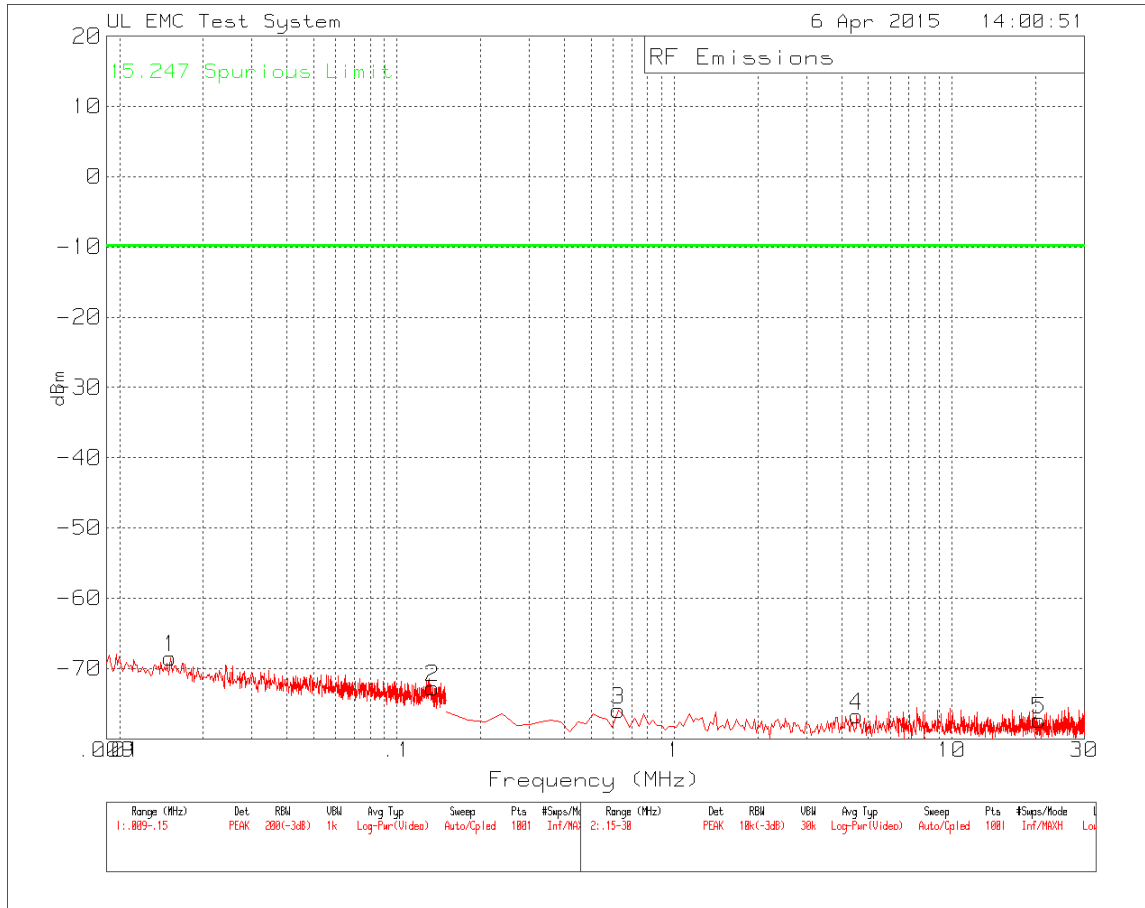
TEST PROCEDURE

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 9 kHz to 10 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

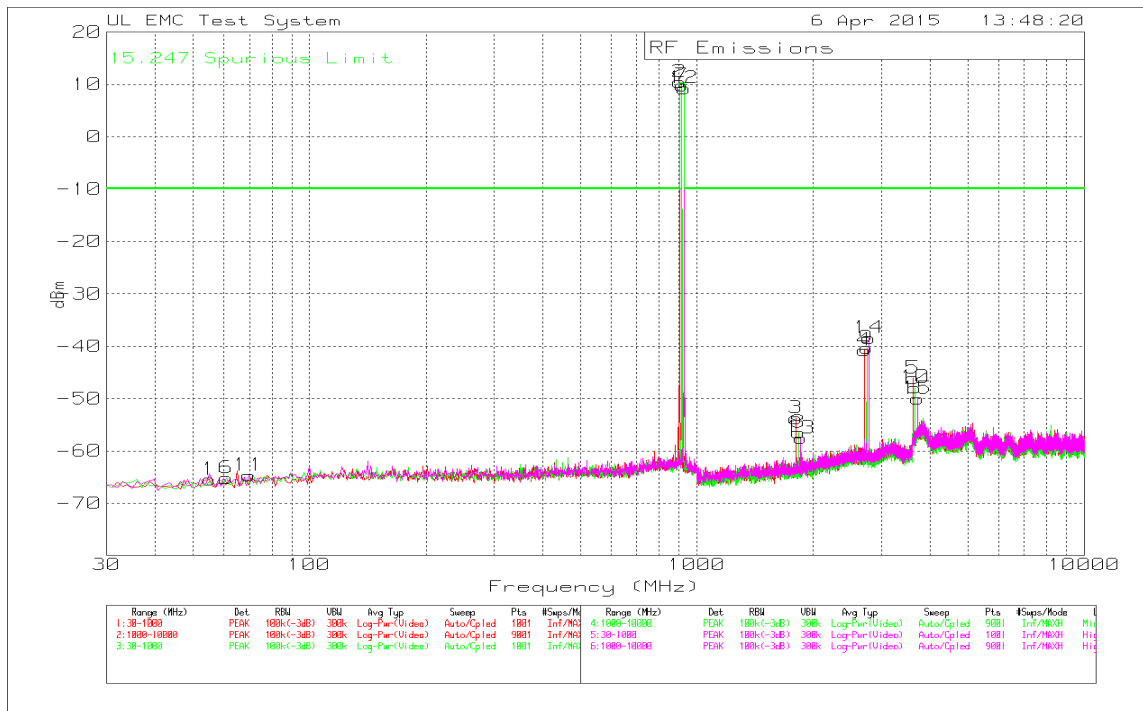
RESULTS

SPURIOUS EMISSIONS 9kHz-30MHz, HOPPING



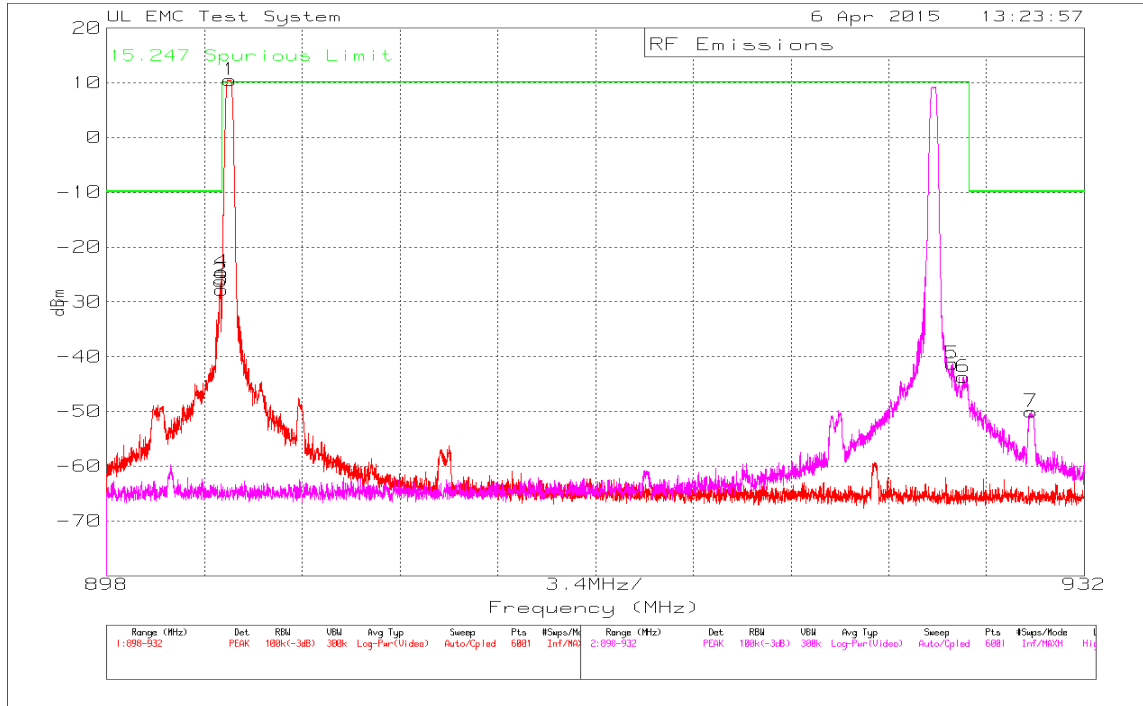
* no emissions recorded.

SPURIOUS EMISSIONS 30MHz-10GHz, LOW, MIDDLE, AND HIGH CHANNELS



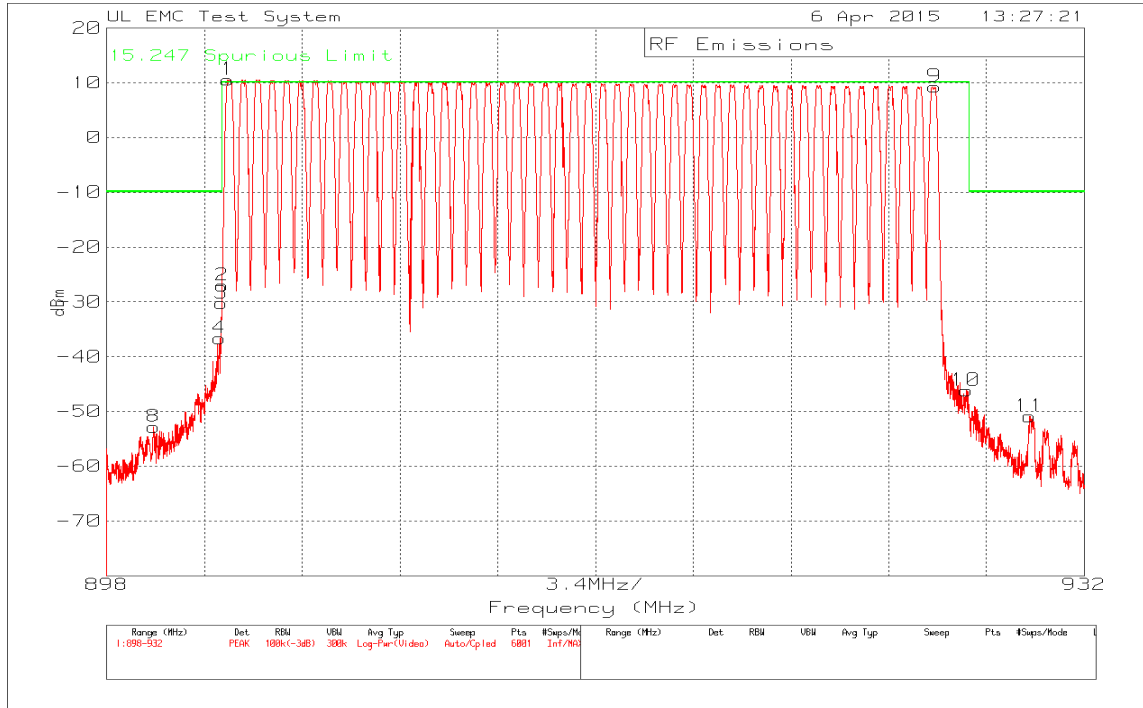
Marker No.	Test Frequency (MHz)	Meter Reading (dBm)	Detector	Path Factor dB	Level dBm	15.247 Spurious Limit dBm	Margin (dB)
Low Channel							
1	55.22	-74.88	PK	9.4	-65.48	-9.9	-55.58
2	902.03	0.3	PK	10.2	10.5	-	-
3	1804	-64.03	PK	10.3	-53.73	-9.9	-43.83
4	2707	-51.27	PK	10.5	-40.77	-9.9	-30.87
5	3609	-56.82	PK	10.7	-46.12	-9.9	-36.22
Middle Channel							
6	61.04	-74.69	PK	9.5	-65.19	-9.9	-55.29
7	914.64	-0.38	PK	10.2	9.82	-	-
8	1830	-66.89	PK	10.4	-56.49	-9.9	-46.59
9	2744	-50.82	PK	10.5	-40.32	-9.9	-30.42
10	3659	-58.61	PK	10.7	-47.91	-9.9	-38.01
High Channel							
11	69.77	-74.29	PK	9.6	-64.69	-9.9	-54.79
12	926.28	-0.92	PK	10.2	9.28	-	-
13	1854	-67.97	PK	10.4	-57.57	-9.9	-47.67
14	2780	-48.91	PK	10.5	-38.41	-9.9	-28.51
15	3707	-60.74	PK	10.7	-50.04	-9.9	-40.14
PK - Peak detector							

BANDEDGE SPOUROUS EMISSIONS – LOW AND HIGH CHANNELS



Marker No.	Test Frequency (MHz)	Meter Reading (dBm)	Detector	Path Factor dB	Level dBm	15.247 Spurious Limit	Margin (dB)
Low Channel							
1	902.2843	0.29	PK	10.2	10.49	-	-
2	901.9556	-36.38	PK	10.2	-26.18	-9.9	-16.28
3	902	-37.94	PK	10.2	-27.74	-9.9	-17.84
4	902.0066	-34.76	PK	10.2	-24.56	-	-
High Channel							
5	927.4117	-51.49	PK	10.2	-41.29	-	-
6	928	-53.93	PK	10.2	-43.73	-9.9	-33.83
7	930.1517	-60.37	PK	10.3	-50.07	-9.9	-40.17
PK - Peak detector							

BANDEDGE SPOUROUS EMISSIONS – HOPPING



Marker No.	Test Frequency (MHz)	Meter Reading (dBm)	Detector	Path Factor dB	Level dBm	15.247 Spurious Limit	Margin (dB)
Lower Band Edge							
1	902.2021	0.35	PK	10.2	10.55	-	-
2	902.0122	-37.22	PK	10.2	-27.02	-	-
3	902	-40.45	PK	10.2	-30.25	-9.9	-20.35
4	901.9216	-46.85	PK	10.2	-36.65	-9.9	-26.75
8	899.6264	-63.04	PK	10.2	-52.84	-9.9	-42.94
Upper Band Edge							
9	926.8054	-0.93	PK	10.2	9.27	-	-
10	928	-56.4	PK	10.2	-46.2	-9.9	-36.3
11	930.0979	-61.17	PK	10.3	-50.87	-9.9	-40.97
PK - Peak detector							

9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-GEN Clause 8.9 (Transmitter)

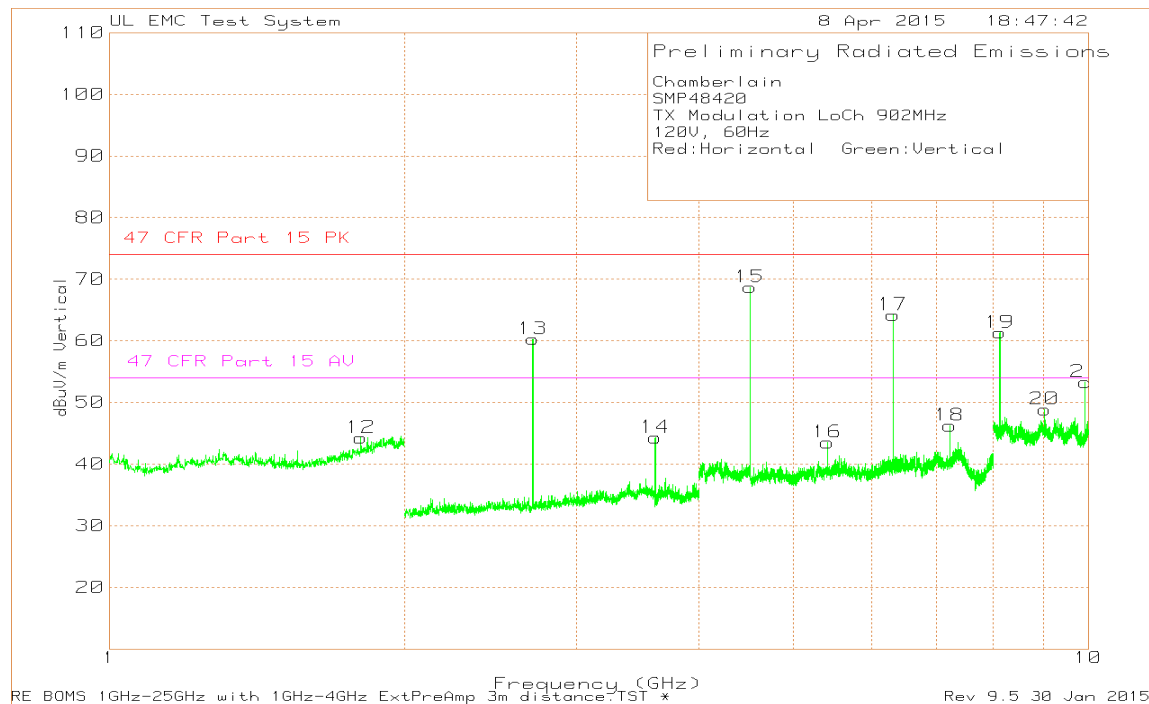
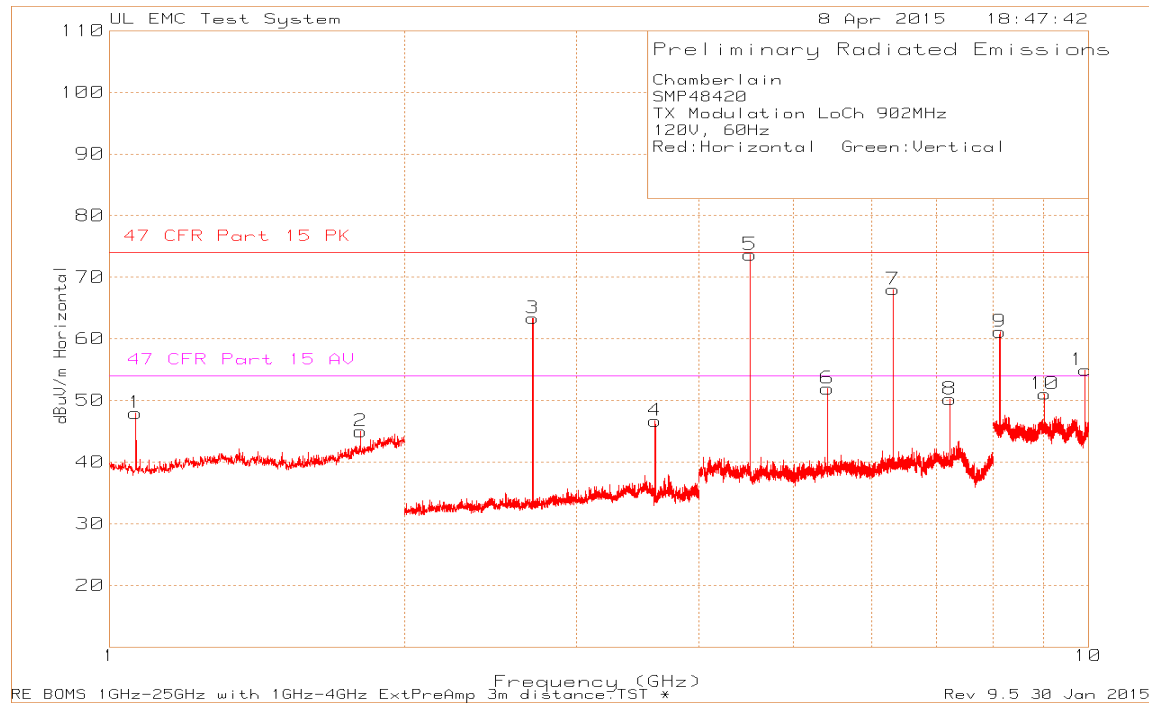
IC RSS-GEN Clause 7.1.2 (Receiver)

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

9.2. TRANSMITTER ABOVE 1 GHz

9.2.1. Spurious Emissions above 1GHz

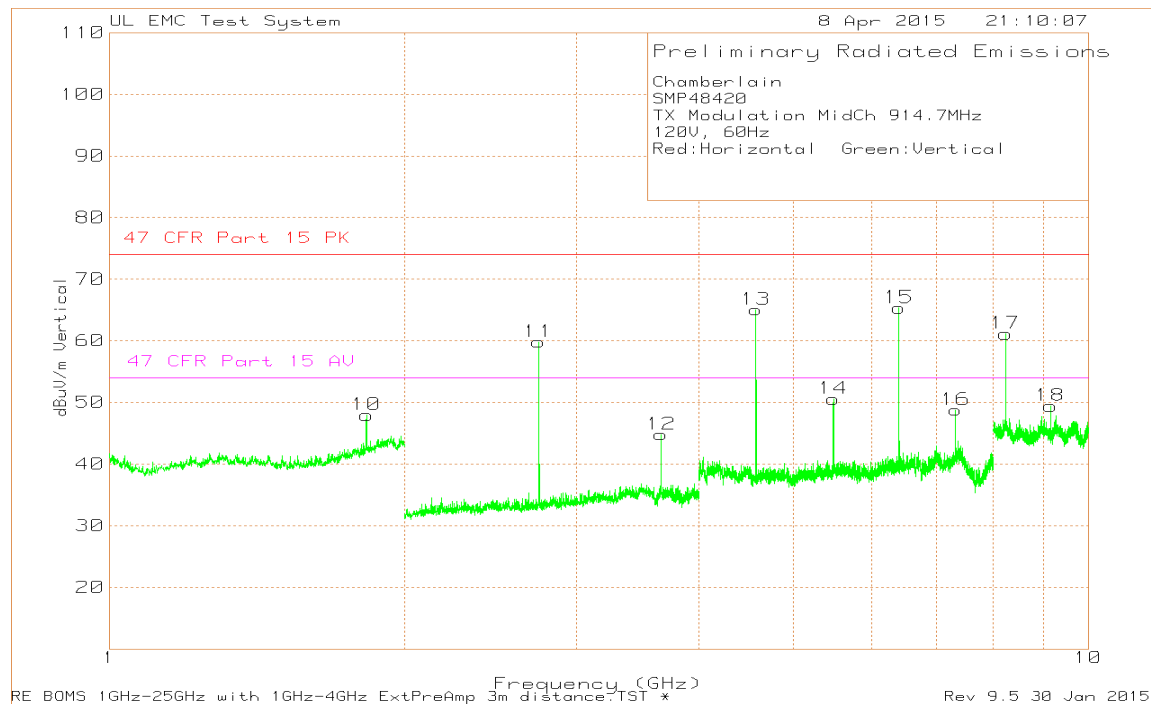
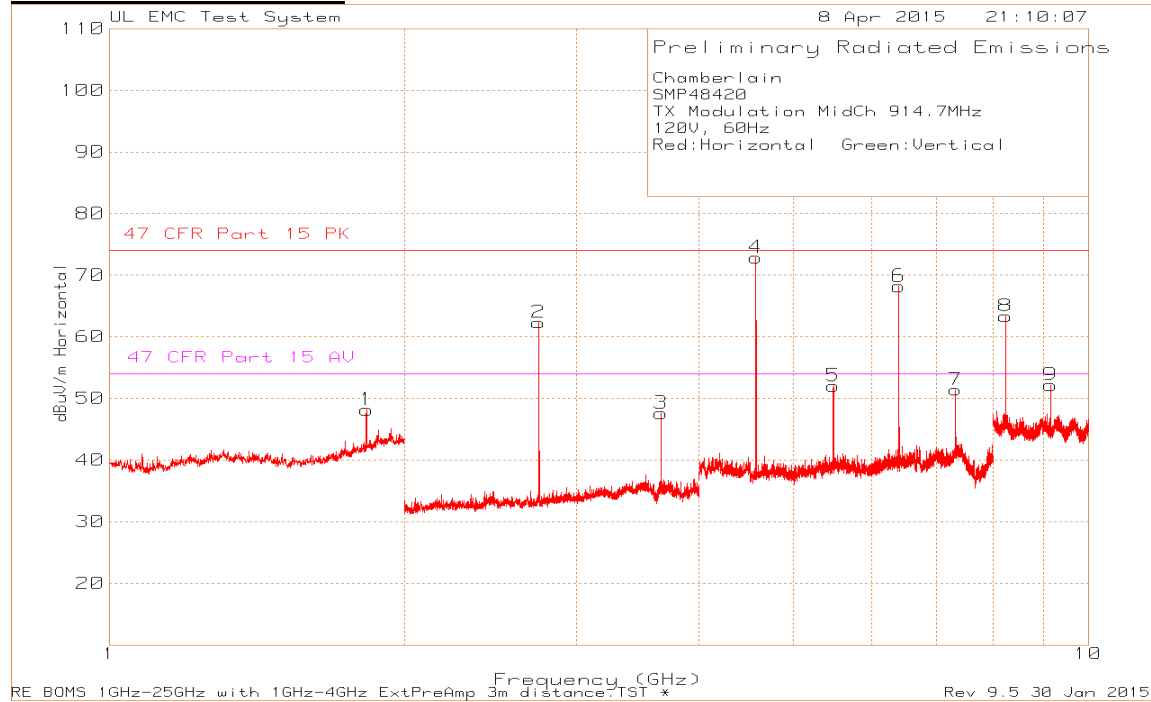
Low Channel Scan Data



Low Channel Tabular Data

Chamberlain																
SMP48420																
TX Modulation LoCh 902MHz																
120V, 60Hz																
Red:Horizontal Green:Vertical																
Trace Markers																
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Band Reject Filter Factor dB	Path Factor dB	Level dBuV/m	Limit 47 CFR Part 15 Peak dBuV/m	Margin (dB)	DC Factor dB	Level with DC dBuV/m	Limit 47 CFR Part 15 AV dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.063	76.8	Pk	27.2	0.5	-56.55	47.95	74	-26.05	-30.45	17.5	54	-36.5	0-360	100	H
2	1.805	68.4	Pk	30.2	0.4	-54	45	74	-29	-30.45	14.55	54	-39.45	0-360	200	H
3	2.7068	93.41	Pk	22.1	-	-51.43	64.08	74	-9.92	-30.45	33.63	54	-20.37	31	137	H
	2.7066	92.96	Av	22.1	-	-51.43	63.63			-30.45	33.18	54	-20.82	31	137	H
4	3.609	74.45	Pk	23.2	-	-50.94	46.71	74	-27.29	-30.45	16.26	54	-37.74	0-360	200	H
5	4.5115	97.19	Pk	27.8	-	-51.9	73.09	74	-0.91	-30.45	42.64	54	-11.36	12	136	H
	4.5111	96.68	Av	27.8	-	-51.89	72.59			-30.45	42.14	54	-11.86	12	136	H
6	5.414	73.43	Pk	27.9	-	-49.39	51.94	74	-22.06	-30.45	21.49	54	-32.51	0-360	200	H
7	6.3155	84.15	Pk	29.2	-	-47.14	66.21	74	-7.79	-30.45	35.76	54	-18.24	56	100	H
	6.3155	83.11	Av	29.2	-	-47.14	65.17			-30.45	34.72	54	-19.28	56	100	H
8	7.219	67.14	Pk	29.8	-	-46.73	50.21	74	-23.79	-30.45	19.76	54	-34.24	0-360	150	H
9	8.1207	74.74	Pk	36.2	-	-48.54	62.4	74	-11.6	-30.45	31.95	54	-22.05	339	100	H
	8.1199	72.15	Av	36.2	-	-48.55	59.8			-30.45	29.35	54	-24.65	339	100	H
10	9.023	63.4	Pk	36.1	-	-48.45	51.05	74	-22.95	-30.45	20.6	54	-33.4	0-360	150	H
11	9.925	67.6	Pk	36.4	-	-49.06	54.94	74	-19.06	-30.45	24.49	54	-29.51	0-360	200	H
12	1.805	67.66	Pk	30.2	0.4	-54	44.26	74	-29.74	-30.45	13.81	54	-40.19	0-360	100	V
13	2.7066	90.43	Pk	22.1	-	-51.43	61.1	74	-12.9	-30.45	30.65	54	-23.35	12	108	V
	2.7066	89.94	Av	22.1	-	-51.43	60.61			-30.45	30.16	54	-23.84	12	108	V
14	3.61	72	Pk	23.2	-	-50.92	44.28	74	-29.72	-30.45	13.83	54	-40.17	0-360	100	V
15	4.5113	90.61	Pk	27.8	-	-51.9	66.51	74	-7.49	-30.45	36.06	54	-17.94	11	250	V
	4.5111	89.94	Av	27.8	-	-51.89	65.85			-30.45	35.4	54	-18.6	12	250	V
16	5.414	65	Pk	27.9	-	-49.39	43.51	74	-30.49	-30.45	13.06	54	-40.94	0-360	200	V
17	6.3155	83.51	Pk	29.2	-	-47.14	65.57	74	-8.43	-30.45	35.12	54	-18.88	15	239	V
	6.3155	82.45	Av	29.2	-	-47.14	64.51			-30.45	34.06	54	-19.94	15	239	V
18	7.219	63.16	Pk	29.8	-	-46.73	46.23	74	-27.77	-30.45	15.78	54	-38.22	0-360	150	V
19	8.1199	76.35	Pk	36.2	-	-48.55	64	74	-10	-30.45	33.55	54	-20.45	341	130	V
	8.1199	74.11	Av	36.2	-	-48.55	61.76			-30.45	31.31	54	-22.69	341	130	V
20	9.023	61.21	Pk	36.1	-	-48.45	48.86	74	-25.14	-30.45	18.41	54	-35.59	0-360	100	V
21	9.926	65.94	Pk	36.4	-	-49.03	53.31	74	-20.69	-30.45	22.86	54	-31.14	0-360	150	V
Pk - Peak detector																
Av - Average detection																
* Data where Azimuth [Degs] shows 0-360 is prescan data and only duty cycle was applied. Due to large duty cycle correction factor further measurements were considered not necessary.																

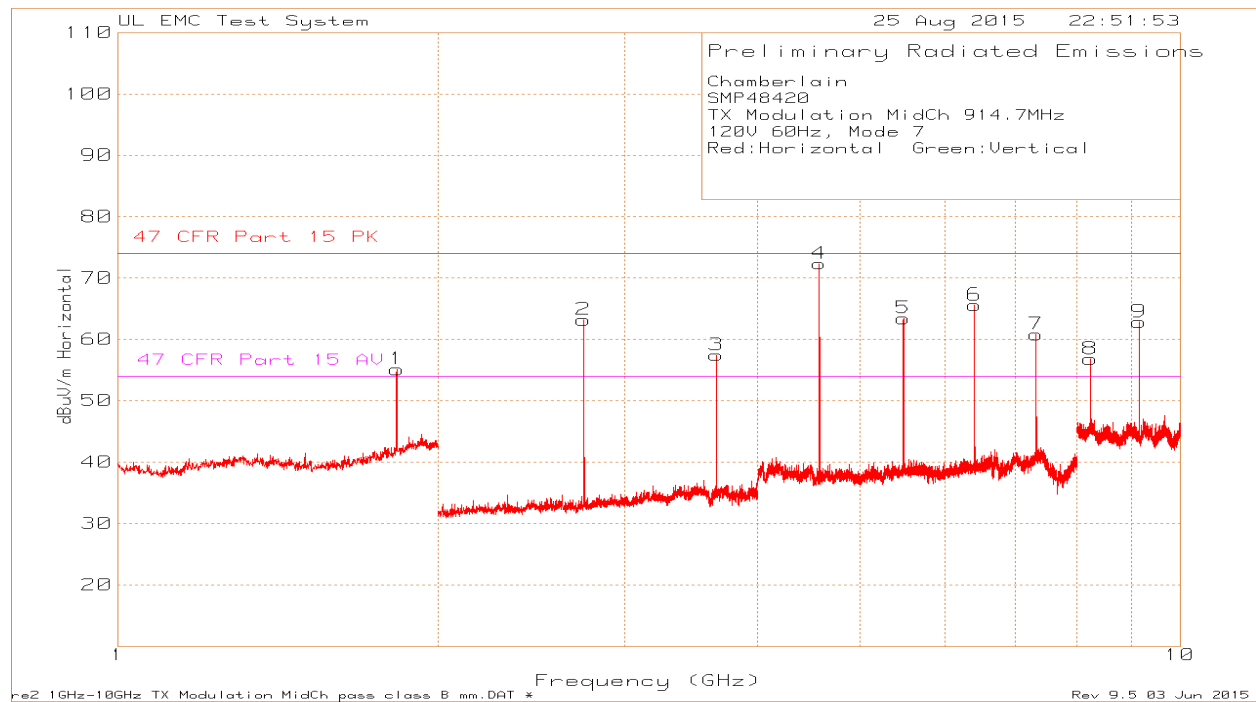
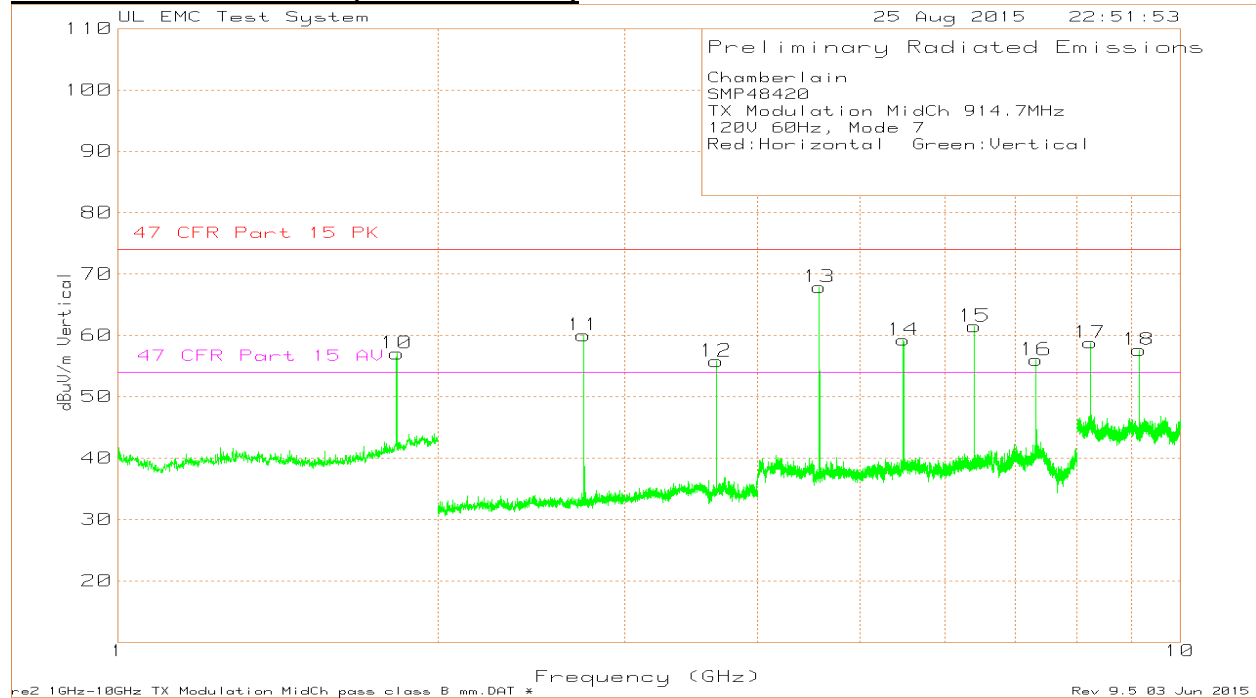
Middle Channel Scan Data



Middle Channel Tabular Data

Chamberlain																
SMP48420																
TX Modulation MidCh 914.7MHz																
120V, 60Hz																
Red:Horizontal Green:Vertical																
Trace Markers																
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Band Reject Filter dB	Path Factor dB	Level dBuV/m	Limit 15 Peak dBuV/m	Limit 47 CFR Part Margin (dB)	DC Factor dB	Level with DC dBuV/m	Limit 47 CFR Part 15 AV dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.83	71.31	Pk	30.5	0.4	-54.06	48.15	74	-25.85	-30.5	17.7	54	-36.3	0-360	100	H
2	2.7441	93.06	Pk	22.1	-	-51.27	63.89	74	-10.11	-30.5	33.44	54	-20.56	34	130	H
	2.7442	92.65	Av	22.1	-	-51.27	63.48	74	-10.52	-30.5	33.03	54	-20.97	34	130	H
3	3.66	73.83	Pk	23.4	-	-49.64	47.59	74	-26.41	-30.5	17.14	54	-36.86	0-360	200	H
4	4.5735	97.12	Pk	27.7	-	-51.8	73.02	74	-0.98	-30.5	42.57	54	-11.43	13	129	H
	4.5736	96.58	Av	27.7	-	-51.8	72.48	74	-1.52	-30.5	42.03	54	-11.97	13	129	H
5	5.489	73.42	Pk	28.1	-	-49.5	52.02	74	-21.98	-30.5	21.57	54	-32.43	0-360	200	H
6	6.403	86.15	Pk	29.2	-	-47.16	68.19	74	-5.81	-30.5	37.74	54	-16.26	0-360	150	H
7	7.318	66.67	Pk	30.6	-	-45.86	51.41	74	-22.59	-30.5	20.96	54	-33.04	0-360	150	H
8	8.2332	74.25	Pk	36.4	-	-46.96	63.69	74	-10.31	-30.5	33.24	54	-20.76	341	127	H
	8.2324	71.69	Av	36.4	-	-46.97	61.12	74	-12.88	-30.5	30.67	54	-23.33	341	127	H
9	9.147	65.63	Pk	36.3	-	-49.75	52.18	74	-21.82	-30.5	21.73	54	-32.27	0-360	150	H
10	1.83	71.11	Pk	30.5	0.4	-54.06	47.95	74	-26.05	-30.5	17.5	54	-36.5	0-360	100	V
11	2.7444	88.95	Pk	22.1	-	-51.26	59.79	74	-14.21	-30.5	29.34	54	-24.66	345	100	V
	2.7442	88.41	Av	22.1	-	-51.27	59.24	74	-14.76	-30.5	28.79	54	-25.21	345	100	V
12	3.66	71.04	Pk	23.4	-	-49.64	44.8	74	-29.2	-30.5	14.35	54	-39.65	0-360	100	V
13	4.574	89.63	Pk	27.7	-	-51.8	65.53	74	-8.47	-30.5	35.08	54	-18.92	6	255	V
	4.5736	88.94	Av	27.7	-	-51.8	64.84	74	-9.16	-30.5	34.39	54	-19.61	6	255	V
14	5.489	71.98	Pk	28.1	-	-49.5	50.58	74	-23.42	-30.5	20.13	54	-33.87	0-360	150	V
15	6.404	83.3	Pk	29.2	-	-47.17	65.33	74	-8.67	-30.5	34.88	54	-19.12	0-360	100	V
16	7.319	64.06	Pk	30.6	-	-45.87	48.79	74	-25.21	-30.5	18.34	54	-35.66	0-360	150	V
17	8.2323	73.97	Pk	36.4	-	-46.97	63.4	74	-10.6	-30.5	32.95	54	-21.05	350	104	V
	8.2324	71.27	Av	36.4	-	-46.97	60.7	74	-13.3	-30.5	30.25	54	-23.75	350	104	V
18	9.147	62.89	Pk	36.3	-	-49.75	49.44	74	-24.56	-30.5	18.99	54	-35.01	0-360	150	V
Pk - Peak detector																
Av - Average detection																
* Data where Azimuth [Degs] shows 0-360 is prescan data and only duty cycle was applied. Due to large duty cycle correction factor further measurements were considered not necessary.																

Middle Channel Scan Data (with new boards)



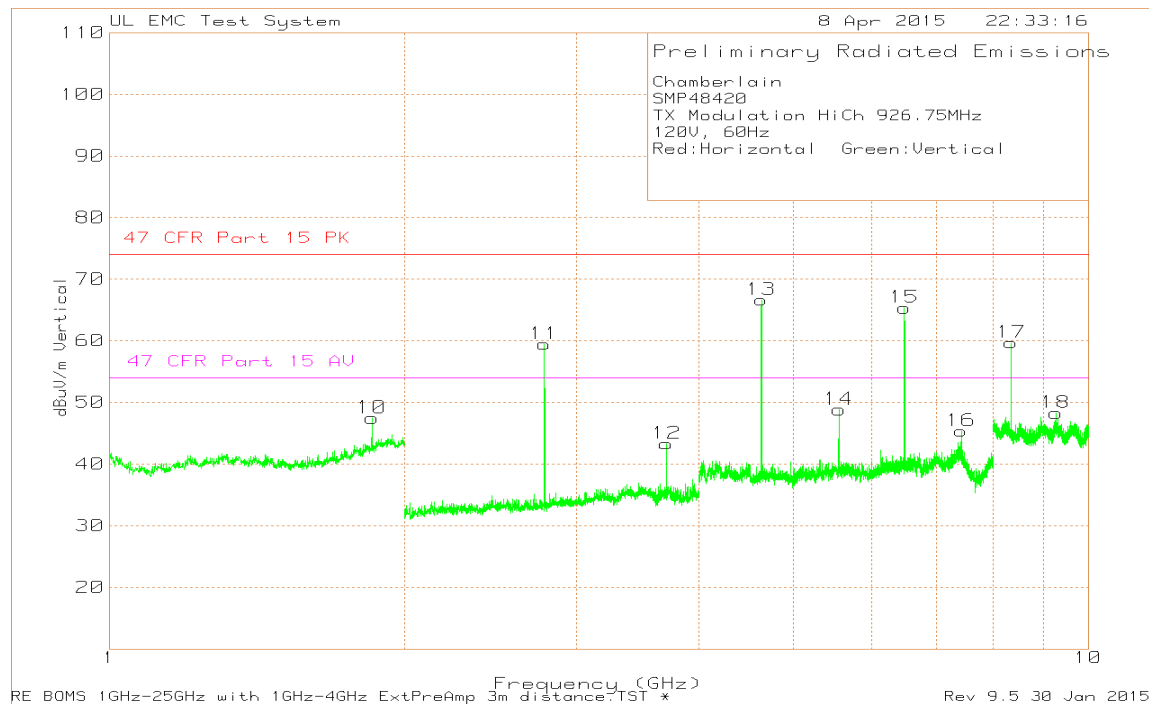
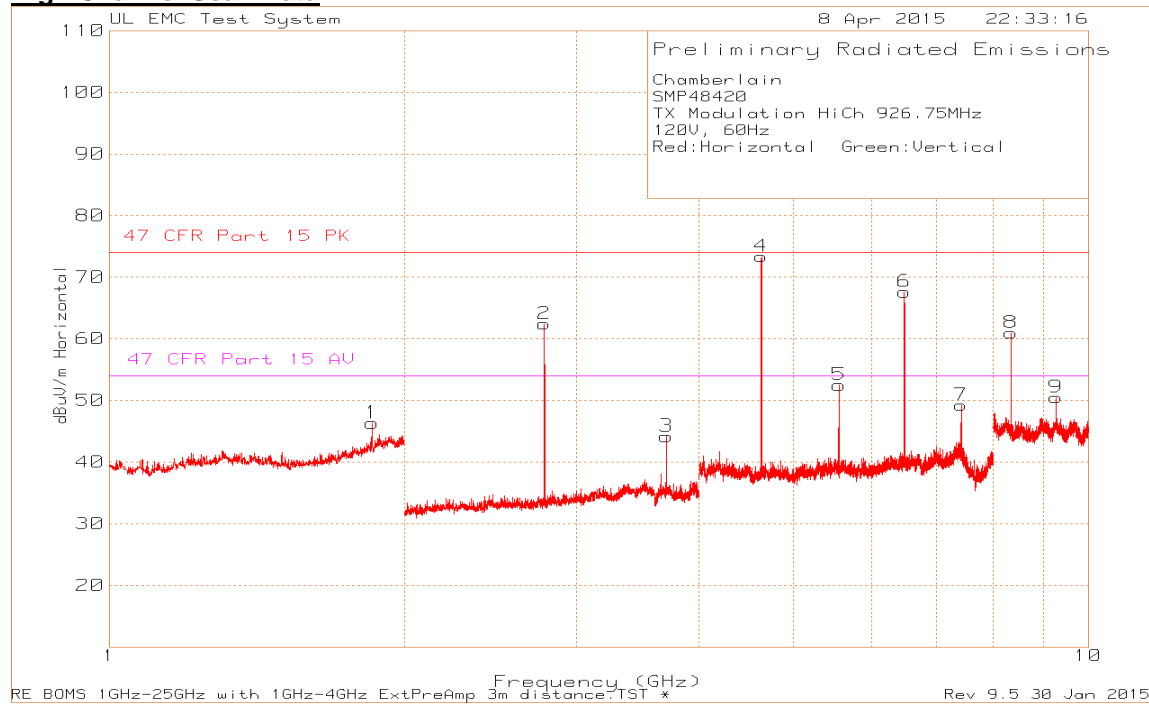
Testing with new control board does not show any differences in emissions from the original boards. Repeating testing with low and high channels was considered not necessary.

Middle Channel Tabular Data (with new boards)

Chamberlain SMP48420 TX Modulation MidCh 914.7MHz 120V 60Hz, Mode 7 Red:Horizontal Green:Vertical																
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Band Reject Filter Factor dB	Path Factor dB	Level dBuV/m	Limit 47 CFR Part 15 Peak dBuV/m	Margin (dB)	DC Factor dB	Level with DC dBuV/m	Llimit 47 CFR Part 15 AV dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polar
1	1.83	78.3	Pk	30.5	0.4	-54.06	55.14	74	-18.86	-30.45	24.69	54	-29.31	0-360	150	H
2	2.7442	92.12	Pk	22.1	-	-51.27	62.95	74	-11.05	-30.45	32.5	54	-21.5	35	147	H
	2.7441	91.65	Av	22.1	-	-51.27	62.48	74	-11.52	-30.45	32.03	54	-21.97	35	147	H
3	3.6589	84.14	Pk	23.4	-	-49.66	57.88	74	-16.12	-30.45	27.43	54	-26.57	323	152	H
	3.6588	82.78	Av	23.4	-	-49.66	56.52	74	-17.48	-30.45	26.07	54	-27.93	323	152	H
4	4.5734	96.55	Pk	27.7	-	-51.8	72.45	74	-1.55	-30.45	42	54	-12	16	129	H
	4.5734	95.97	Av	27.7	-	-51.8	71.87	74	-2.13	-30.45	41.42	54	-12.58	16	129	H
5	5.489	84.84	Pk	28.1	-	-49.5	63.44	74	-10.56	-30.45	32.99	54	-21.01	0-360	200	H
6	6.404	83.54	Pk	29.2	-	-47.17	65.57	74	-8.43	-30.45	35.12	54	-18.88	0-360	150	H
7	7.3175	77.11	Pk	30.6	-	-45.85	61.86	74	-12.14	-30.45	31.41	54	-22.59	58	100	H
	7.3176	75.38	Av	30.6	-	-45.85	60.13	74	-13.87	-30.45	29.68	54	-24.32	58	100	H
8	8.2321	70.69	Pk	36.4	-	-46.98	60.11	74	-13.89	-30.45	29.66	54	-24.34	50	173	H
	8.2323	67.12	Av	36.4	-	-46.98	56.54	74	-17.46	-30.45	26.09	54	-27.91	50	173	H
9	9.1478	77.58	Pk	36.3	-	-49.75	64.13	74	-9.87	-30.45	33.68	54	-20.32	57	146	H
	9.1469	75.06	Av	36.3	-	-49.75	61.61	74	-12.39	-30.45	31.16	54	-22.84	57	146	H
10	1.83	80.21	Pk	30.5	0.4	-54.06	57.05	74	-16.95	-30.45	26.6	54	-27.4	0-360	100	V
11	2.7442	91.28	Pk	22.1	-	-51.27	62.11	74	-11.89	-30.45	31.66	54	-22.34	19	100	V
	2.7441	90.78	Av	22.1	-	-51.27	61.61	74	-12.39	-30.45	31.16	54	-22.84	19	100	V
12	3.6587	82.58	Pk	23.4	-	-49.66	56.32	74	-17.68	-30.45	25.87	54	-28.13	29	100	V
	3.6588	81.18	Av	23.4	-	-49.66	54.92	74	-19.08	-30.45	24.47	54	-29.53	29	100	V
13	4.5734	91.68	Pk	27.7	-	-51.8	67.58	74	-6.42	-30.45	37.13	54	-16.87	351	149	V
	4.5735	91.01	Av	27.7	-	-51.8	66.91	74	-7.09	-30.45	36.46	54	-17.54	351	149	V
14	5.488	80.68	Pk	28.1	-	-49.51	59.27	74	-14.73	-30.45	28.82	54	-25.18	0-360	150	V
15	6.403	79.43	Pk	29.2	-	-47.16	61.47	74	-12.53	-30.45	31.02	54	-22.98	0-360	200	V
16	7.3175	74.27	Pk	30.6	-	-45.85	59.02	74	-14.98	-30.45	28.57	54	-25.43	6	122	V
	7.3175	72.23	Av	30.6	-	-45.85	56.98	74	-17.02	-30.45	26.53	54	-27.47	6	122	V
17	8.2328	71.63	Pk	36.4	-	-46.97	61.06	74	-12.94	-30.45	30.61	54	-23.39	345	145	V
	8.2322	68.63	Av	36.4	-	-46.98	58.05	74	-15.95	-30.45	27.6	54	-26.4	345	145	V
18	9.1478	74.64	Pk	36.3	-	-49.75	61.19	74	-12.81	-30.45	30.74	54	-23.26	18	103	V
	9.1469	71.59	Av	36.3	-	-49.75	58.14	74	-15.86	-30.45	27.69	54	-26.31	18	103	V

Pk - Peak detector
 Av - Average detection
 * Data where Azimuth [Degs] shows 0-360 is prescan data and only duty cycle was applied. Due to large duty cycle correction factor further measurements were considered not necessary.

High Channel Scan Data

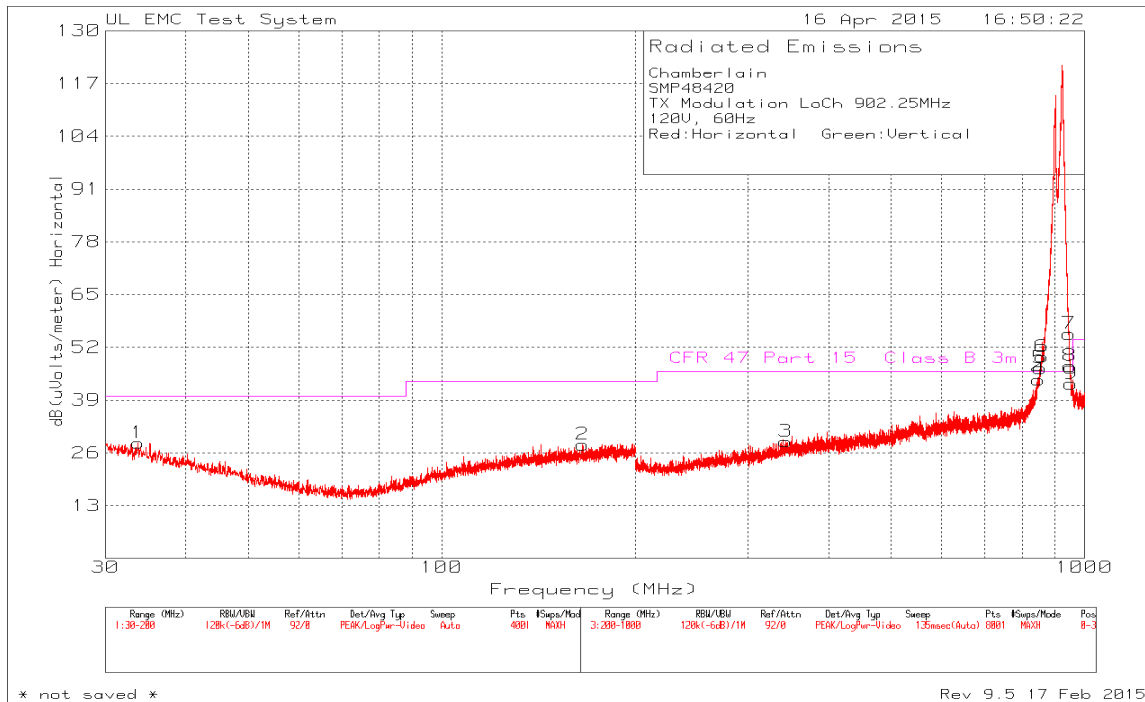
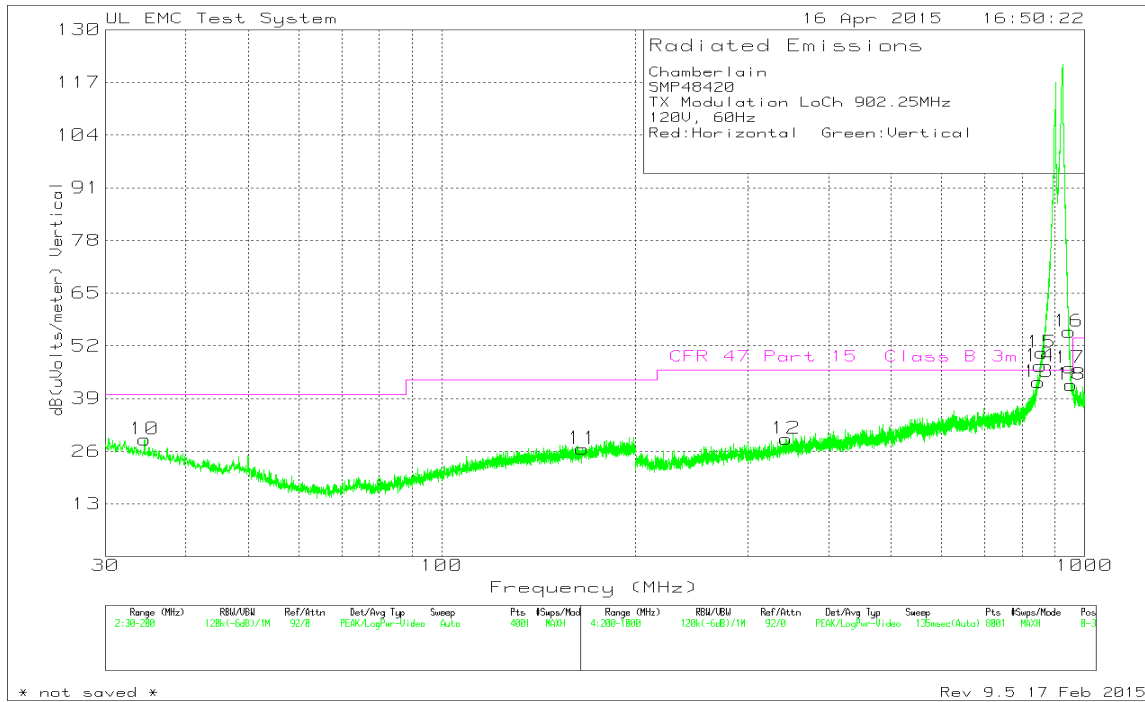


High Channel Tabular Data

Chamberlain																
SMP48420																
TX Modulation HiCh 926.75MHz																
120V, 60Hz																
Red:Horizontal Green:Vertical																
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Band Reject Filter Factor dB	Path Factor dB	Level dBuV/m	Limit 47 CFR Part 15 Peak dBuV/m	Margin (dB)	DC Factor dB	Level with DC dBuV/m	Limit 47 CFR Part 15 AV dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.854	68.92	Pk	30.9	0.4	-53.88	46.34	74	-27.66	-30.45	15.89	54	-38.11	0-360	200	H
2	2.7804	91.24	Pk	22.2	-	-51.05	62.39	74	-11.61	-30.45	31.94	54	-22.06	39	143	H
	2.7801	90.77	Av	22.2	-	-51.05	61.92	74	-12.08	-30.45	31.47	54	-22.53	39	143	H
3	3.707	70.38	Pk	23.5	-	-49.73	44.15	74	-29.85	-30.45	13.7	54	-40.3	0-360	150	H
4	4.6338	97.41	Pk	27.7	-	-51.8	73.31	74	-0.69	-30.45	42.86	54	-11.14	13	117	H
	4.6336	96.87	Av	27.7	-	-51.8	72.77	74	-1.23	-30.45	42.32	54	-11.68	13	117	H
5	5.561	74.03	Pk	28.3	-	-49.82	52.51	74	-21.49	-30.45	22.06	54	-31.94	0-360	200	H
6	6.488	86.25	Pk	29.1	-	-47.72	67.63	74	-6.37	-30.45	37.18	54	-16.82	0-360	100	H
7	7.415	64.88	Pk	31	-	-46.62	49.26	74	-24.74	-30.45	18.81	54	-35.19	0-360	150	H
8	8.3406	74.97	Pk	36.5	-	-48.74	62.73	74	-11.27	-30.45	32.28	54	-21.72	329	100	H
	8.3404	72.46	Av	36.5	-	-48.74	60.22	74	-13.78	-30.45	29.77	54	-24.23	329	100	H
9	9.268	61.77	Pk	36.4	-	-47.68	50.49	74	-23.51	-30.45	20.04	54	-33.96	0-360	200	H
10	1.854	70.06	Pk	30.9	0.4	-53.88	47.48	74	-26.52	-30.45	17.03	54	-36.97	0-360	150	V
11	2.7803	89.15	Pk	22.2	-	-51.05	60.3	74	-13.7	-30.45	29.85	54	-24.15	350	101	V
	2.7802	88.62	Av	22.2	-	-51.05	59.77	74	-14.23	-30.45	29.32	54	-24.68	350	101	V
12	3.707	69.55	Pk	23.5	-	-49.73	43.32	74	-30.68	-30.45	12.87	54	-41.13	0-360	100	V
13	4.6338	91.29	Pk	27.7	-	-51.8	67.19	74	-6.81	-30.45	36.74	54	-17.26	11	100	V
	4.6336	90.64	Av	27.7	-	-51.8	66.54	74	-7.46	-30.45	36.09	54	-17.91	11	100	V
14	5.561	70.34	Pk	28.3	-	-49.82	48.82	74	-25.18	-30.45	18.37	54	-35.63	0-360	150	V
15	6.487	84.01	Pk	29.1	-	-47.73	65.38	74	-8.62	-30.45	34.93	54	-19.07	0-360	100	V
16	7.414	60.98	Pk	31	-	-46.59	45.39	74	-28.61	-30.45	14.94	54	-39.06	0-360	200	V
17	8.3402	74.38	Pk	36.5	-	-48.74	62.14	74	-11.86	-30.45	31.69	54	-22.31	44	100	V
	8.3404	71.55	Av	36.5	-	-48.74	59.31	74	-14.69	-30.45	28.86	54	-25.14	44	100	V
18	9.268	59.59	Pk	36.4	-	-47.68	48.31	74	-25.69	-30.45	17.86	54	-36.14	0-360	100	V
Pk - Peak detector																
Av - Average detection																
* Data where Azimuth [Degs] shows 0-360 is prescan data and only duty cycle was applied. Due to large duty cycle correction factor further measurements were considered not necessary.																

9.3. Radiated Spurious Emissions BELOW 1 GHz

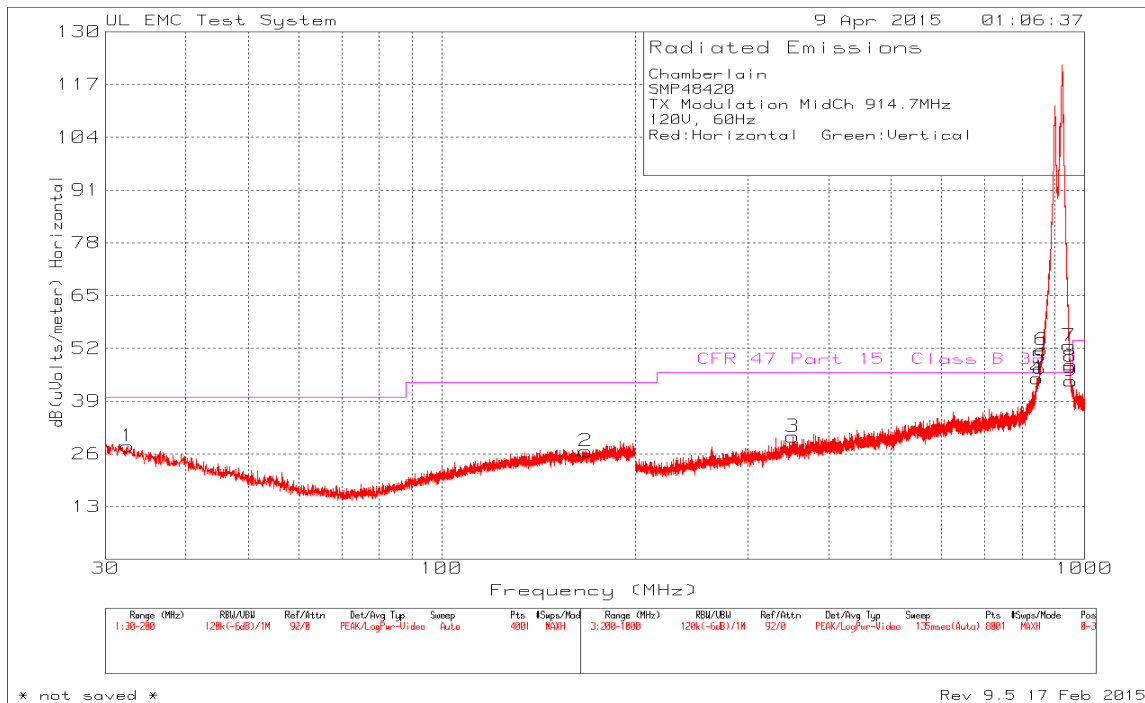
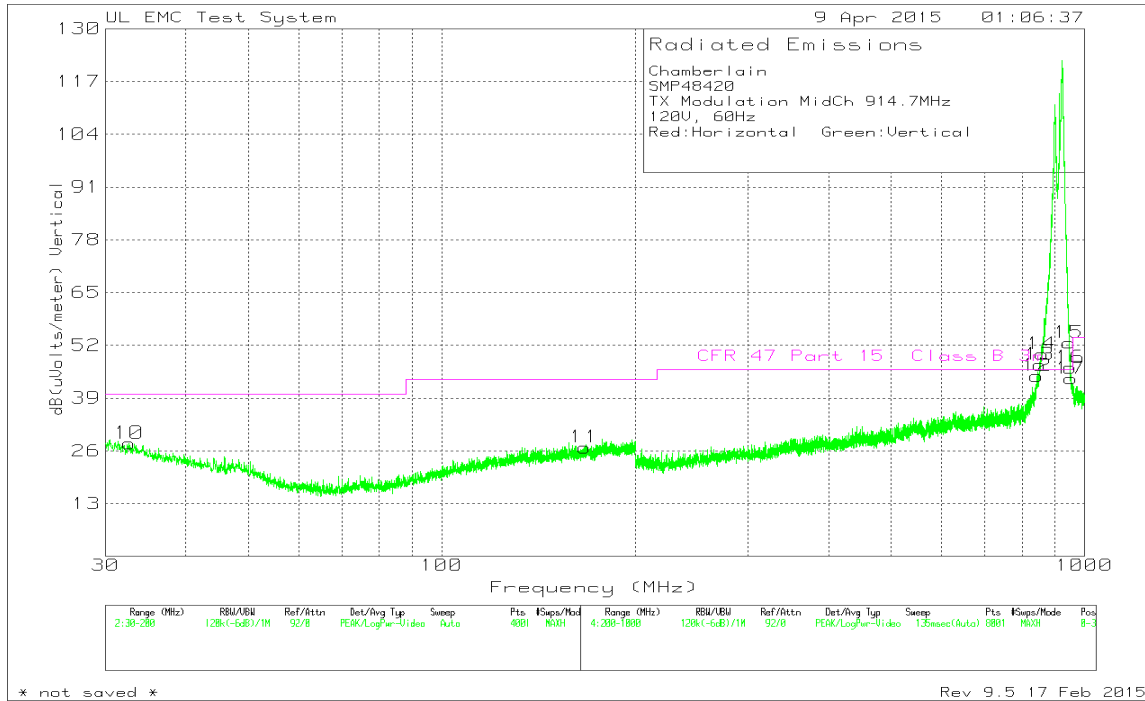
Low Channel SPURIOUS EMISSIONS 30MHz TO 1000MHz



* No emissions were recorded in restricted bands.

Chamberlain													
SMP48420													
TX Modulation LoCh 902.25MHz													
120V, 60Hz													
Red:Horizontal Green:Vertical													
Trace Markers													
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path Factor dB	10M to 3M Distance Factor dB	BRF Factor dB	Level dBuV/m	CFR 47 Part 15 Class B 3m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	33.6975	31.64	Pk	16.4	-30.1	10.5	-	28.44	-	-	0-360	100	H
2	165.7875	31.82	Pk	15.1	-29.4	10.5	-	28.02	43.52	-15.5	0-360	100	H
10	34.505	32.51	Pk	16	-30.1	10.5	-	28.91	-	-	0-360	100	V
11	165.575	30.38	Pk	15.1	-29.4	10.5	-	26.58	43.52	-16.94	0-360	100	V
3	343	31.39	Pk	14.8	-28.1	10.5	0.2	28.79	-	-	0-360	100	H
4	848.8	28.29	Pk	22.2	-26.8	10.5	9.8	43.99	-	-	0-360	100	H
5	854.1	28.44	Pk	21.9	-26.8	10.5	12.8	46.84	-	-	0-360	100	H
6	859	28.1	Pk	21.8	-26.4	10.5	15.7	49.7	-	-	0-360	100	H
7	946.6	30.73	Pk	23	-26.1	10.5	17.2	55.33	-	-	0-360	100	H
8	950.1	29.69	Pk	23	-26.6	10.5	10.8	47.39	-	-	0-360	100	H
9	953.8	28.81	Pk	23.3	-26.2	10.5	6.6	43.01	-	-	0-360	100	H
12	343.6	31.67	Pk	14.8	-28.1	10.5	0.2	29.07	-	-	0-360	100	V
13	848.9	27.37	Pk	22.2	-26.9	10.5	9.9	43.07	-	-	0-360	100	V
14	854.2	28.68	Pk	21.8	-26.8	10.5	12.8	46.98	-	-	0-360	100	V
15	858.8	28.82	Pk	21.8	-26.4	10.5	15.6	50.32	-	-	0-360	100	V
16	946.4	30.43	Pk	23	-26	10.5	17.6	55.53	-	-	0-360	100	V
17	950.4	29.38	Pk	23	-26.6	10.5	10.3	46.58	-	-	0-360	100	V
18	954	28.36	Pk	23.3	-26.2	10.5	6.4	42.36	-	-	0-360	100	V
Pk - Peak detector													
* No emissions in restricted bands.													

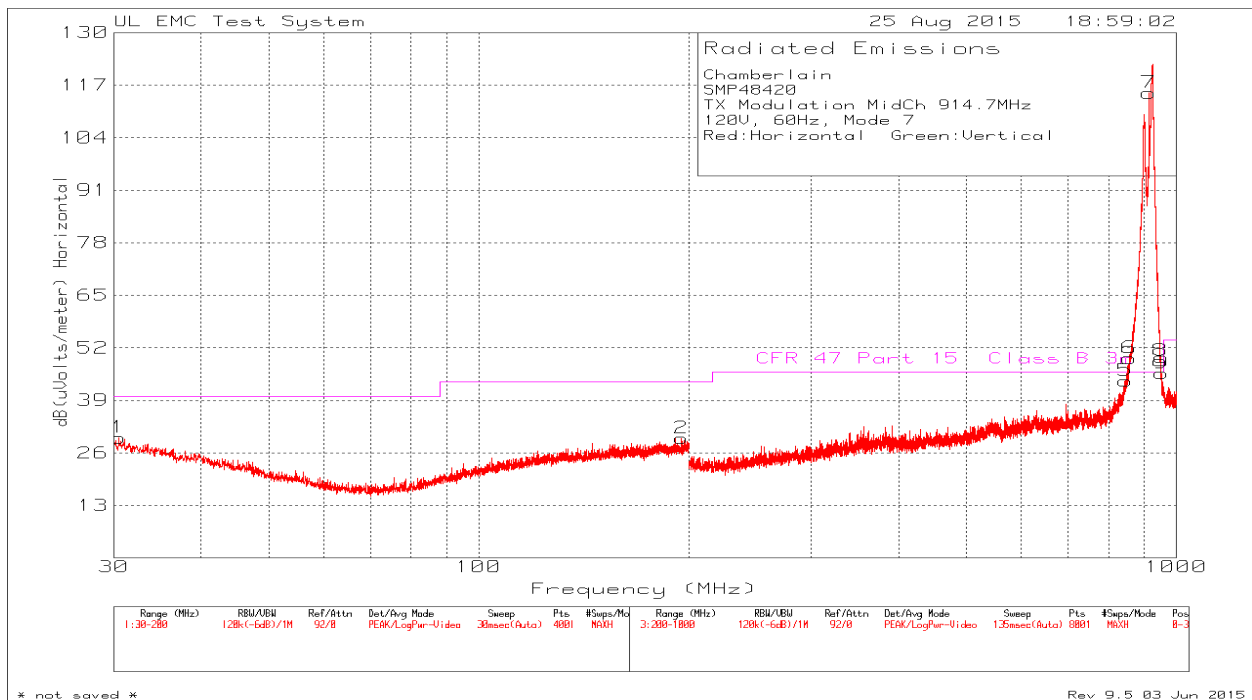
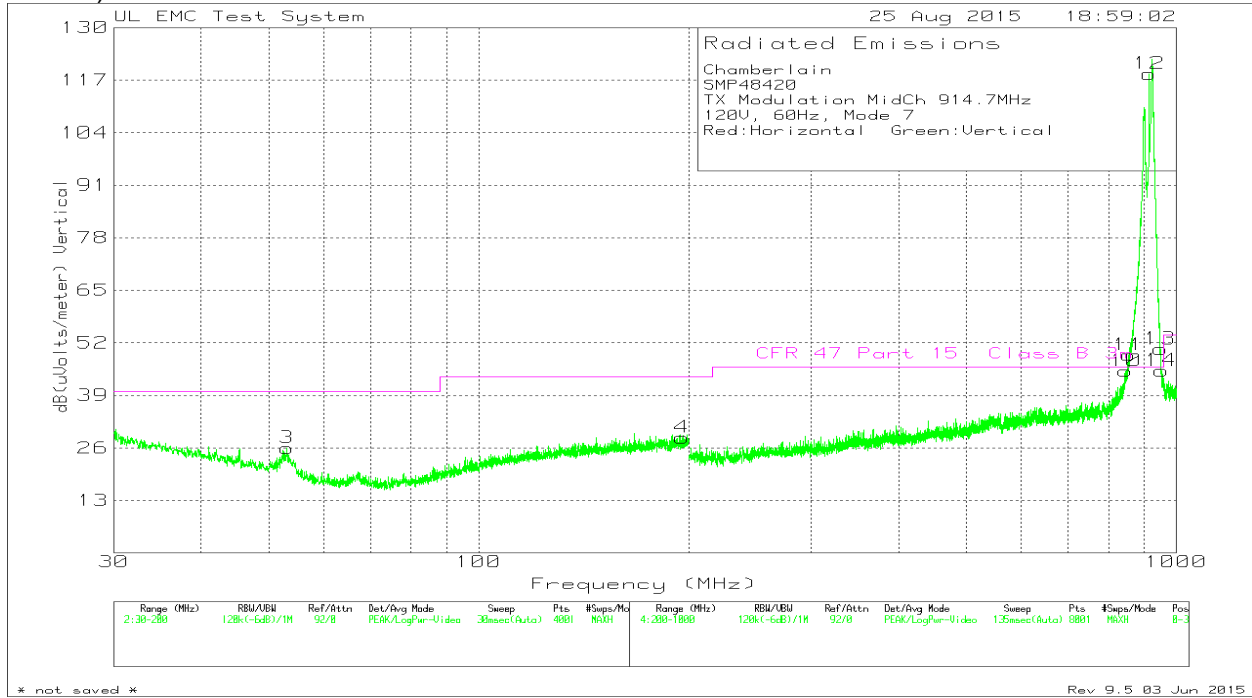
Middle Channel SPURIOUS EMISSIONS 30MHz TO 1000MHz



* No emissions were recorded in restricted bands.

Chamberlain													
SMP48420													
TX Modulation MidCh 914.7MHz													
120V, 60Hz													
Red:Horizontal Green:Vertical													
Trace Markers													
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path Factor dB	10M to 3M Distance Factor dB	BRF Factor dB	Level dBuV/m	CFR 47 Part 15 Class B 3m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	32.465	30.84	Pk	16.8	-30.2	10.5	-	-	-	-12.06	0-360	100	H
2	167.5725	30.44	Pk	15.2	-29.5	10.5	-	-	-	-16.88	0-360	100	H
10	32.635	30.82	Pk	16.7	-30.2	10.5	-	-	-	-12.18	0-360	100	V
11	166.85	30.63	Pk	15.2	-29.5	10.5	-	26.83	43.52	-16.69	0-360	100	V
3	352	32.44	Pk	15	-27.9	10.5	0.2	-	-	-15.78	0-360	100	H
4	844.1	30.62	Pk	22.4	-26.4	10.5	7.5	-	-	-1.4	0-360	100	H
5	852.9	29.5	Pk	21.9	-26.9	10.5	12.1	-	-	1.08	0-360	100	H
6	858.7	30.18	Pk	21.8	-26.4	10.5	15.5	-	-	5.56	0-360	100	H
7	947.1	29.16	Pk	23	-26.2	10.5	16.2	-	-	6.64	0-360	100	H
8	950.8	30.63	Pk	23.1	-26.6	10.5	9.8	-	-	1.41	0-360	100	H
9	953	29.47	Pk	23.2	-26.4	10.5	7.2	-	-	-2.05	0-360	100	H
12	843.6	30.62	Pk	22.4	-26.4	10.5	7.3	-	-	-1.6	0-360	100	V
13	853	29.64	Pk	21.9	-26.9	10.5	12.1	-	-	1.22	0-360	100	V
14	859	28.25	Pk	21.8	-26.4	10.5	15.7	-	-	3.83	0-360	100	V
15	946.9	28.61	Pk	23	-26.1	10.5	16.6	-	-	6.59	0-360	100	V
16	950.9	29.79	Pk	23.1	-26.6	10.5	9.7	-	-	0.47	0-360	100	V
17	953.2	29.31	Pk	23.3	-26.4	10.5	7.1	-	-	-2.21	0-360	100	V
Pk - Peak detector													
* No emissions in restricted bands.													

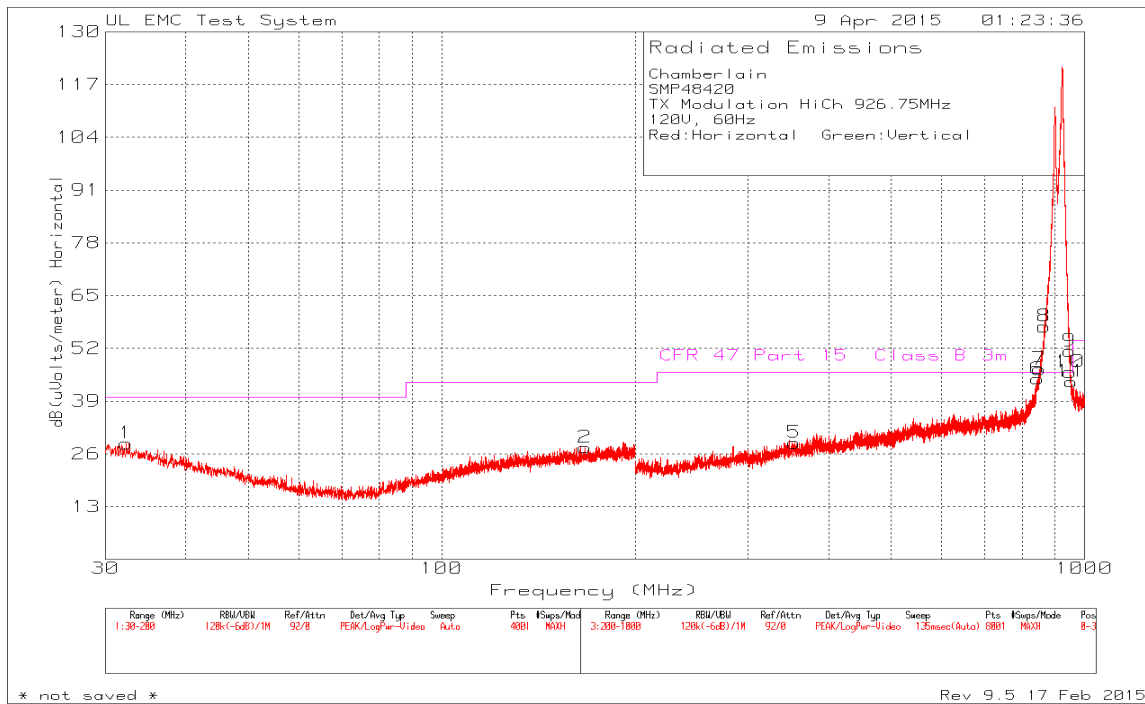
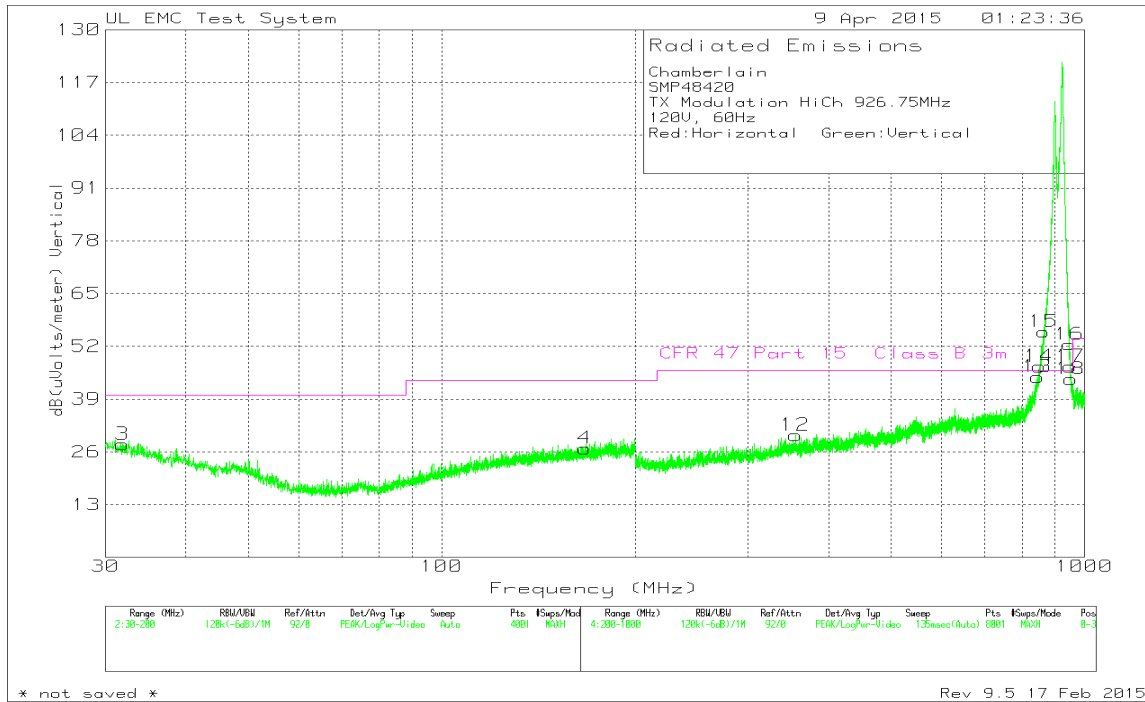
Middle Channel SPURIOUS EMISSIONS 30MHz TO 1000MHz (Testing Conducted with new boards)



* No emissions were recorded in restricted bands. Testing with new control board does not show any differences in emissions from the original boards. Repeating testing with low and high channels was considered not necessary.

Chamberlain												
SMP48420												
TX Modulation MidCh 914.7MHz												
120V, 60Hz, Mode 7												
Red:Horizontal Green:Vertical												
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Facotr dB/m	Path Factor dB	10M to 3m Factor dB	Level dBuV/m	Limit 47 CFR Part 15, Class B 3m dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	30.4675	31.84	Pk	17.6	-30.2	10.5	29.74	-	-	0-360	400	H
2	195.3675	32.15	Pk	16	-29	10.5	29.65	-	-	0-360	250	H
3	53.12	36.57	Pk	9	-30.1	10.5	25.97	-	-	0-360	400	V
4	195.7925	30.95	Pk	16.1	-29	10.5	28.55	-	-	0-360	249	V
5	846	29.14	Pk	22.3	-26.5	10.5	35.44	-	-	0-360	200	H
6	856.5	29.43	Pk	21.8	-26.5	10.5	35.23	-	-	0-360	200	H
7	914.7	45.51	Pk	23	-26.1	10.5	52.91	-	-	0-360	200	H
8	949.8	30.61	Pk	23	-26.6	10.5	37.51	-	-	0-360	200	H
9	952.5	30.71	Pk	23.2	-26.5	10.5	37.91	-	-	0-360	200	H
10	846.3	30.15	Pk	22.3	-26.5	10.5	36.45	-	-	0-360	200	V
11	854.9	30.2	Pk	21.8	-26.7	10.5	35.8	-	-	0-360	200	V
12	914.8	48.85	Pk	23	-26.1	10.5	56.25	-	-	0-360	99	V
13	949.4	31.46	Pk	23	-26.5	10.5	38.46	-	-	0-360	99	V
14	952.6	30.3	Pk	23.2	-26.5	10.5	37.5	-	-	0-360	200	V
Pk - Peak detector												

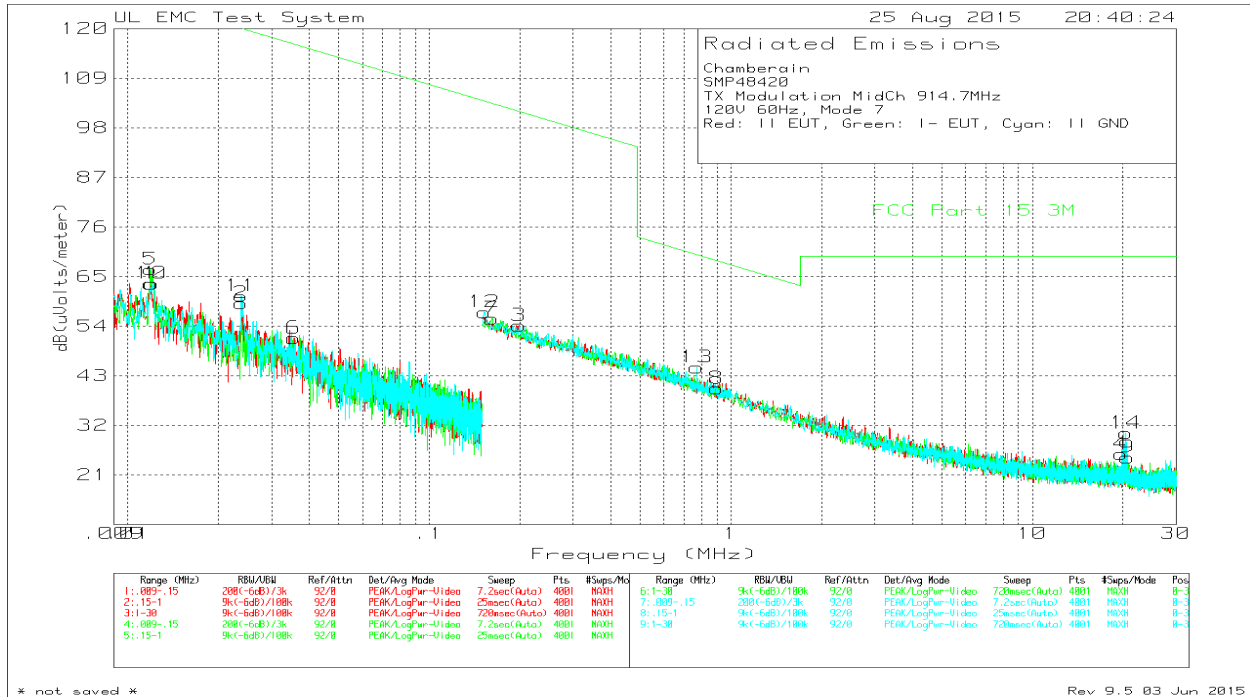
High Channel SPURIOUS EMISSIONS 30MHz TO 1000MHz



* No emissions were recorded in restricted bands.

Chamberlain													
SMP48420													
TX Modulation HiCh 926.75MHz													
120V, 60Hz													
Red:Horizontal Green:Vertical													
Trace Markers													
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path Factor dB	10M to 3M Distance Factor dB	BRF Factor dB	Level dBuV/m	CFR 47 Part 15 Class B 3m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	32.295	31.33	Pk	16.9	-30.2	10.5	-	-	-	-11.47	0-360	100	H
2	167.105	31.37	Pk	15.2	-29.5	10.5	-	27.57	43.52	-15.95	0-360	100	H
3	31.87	30.52	Pk	17	-30.2	10.5	-	-	-	-12.18	0-360	100	V
4	166.935	30.65	Pk	15.2	-29.5	10.5	-	26.85	43.52	-16.67	0-360	100	V
5	353.8	30.92	Pk	15	-27.9	10.5	0.2	-	-	-17.3	0-360	100	H
6	845.4	29.92	Pk	22.4	-26.4	10.5	8.1	-	-	-1.5	0-360	100	H
7	851.3	30.13	Pk	22	-27	10.5	11.2	-	-	0.81	0-360	100	H
8	866.1	31.58	Pk	21.9	-27	10.5	20.4	-	-	11.36	0-360	100	H
9	948.2	30.22	Pk	23	-26.4	10.5	14	-	-	5.3	0-360	100	H
10	950.3	28.79	Pk	23	-26.6	10.5	10.5	-	-	0.17	0-360	100	H
11	954.8	30.09	Pk	23.4	-26	10.5	5.8	-	-	-2.23	0-360	100	H
12	355.3	32.26	Pk	15	-27.9	10.5	0.2	-	-	-15.96	0-360	100	V
13	846	29.78	Pk	22.3	-26.5	10.5	8.4	-	-	-1.54	0-360	100	V
14	850.7	30.47	Pk	22.1	-27	10.5	10.9	-	-	0.95	0-360	100	V
15	864.3	31.08	Pk	21.8	-27	10.5	19.2	-	-	9.56	0-360	100	V
16	947.7	30.25	Pk	23	-26.3	10.5	15	-	-	6.43	0-360	100	V
17	950.5	29.94	Pk	23	-26.6	10.5	10.2	-	-	1.02	0-360	100	V
18	953.2	29.41	Pk	23.3	-26.4	10.5	7.1	-	-	-2.11	0-360	100	V
Pk - Peak detector													
* No emissions in restricted bands.													

Middle Channel SPURIOUS EMISSIONS 9kHz TO 30MHz

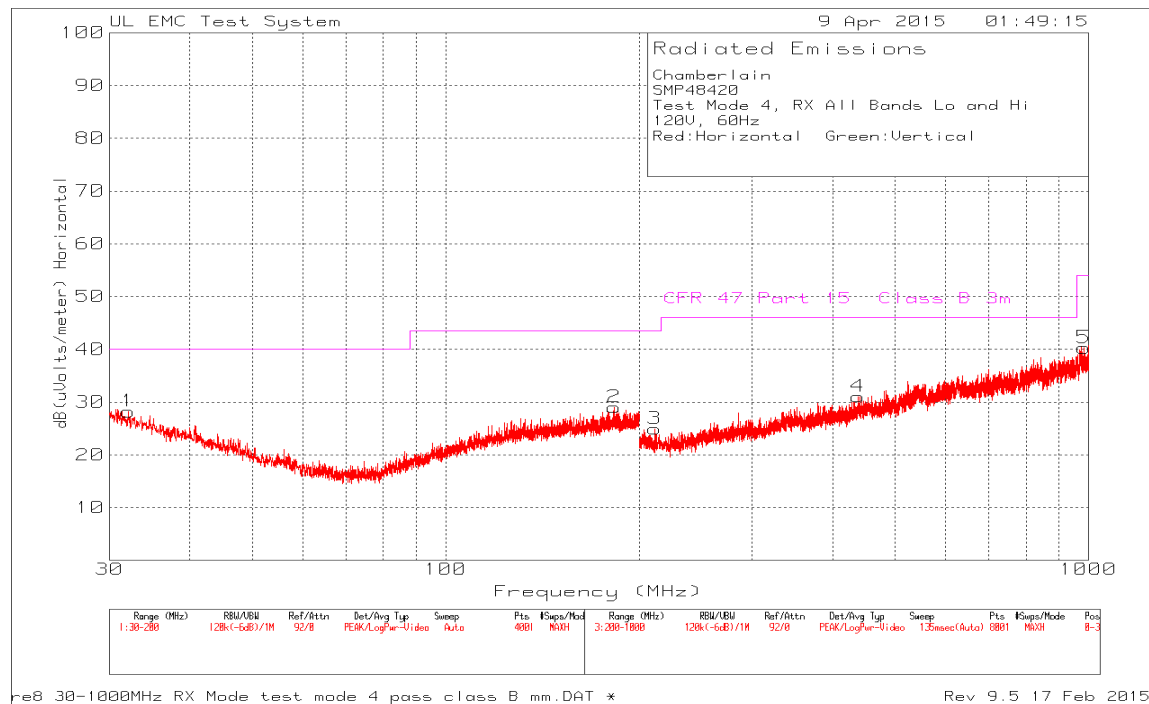
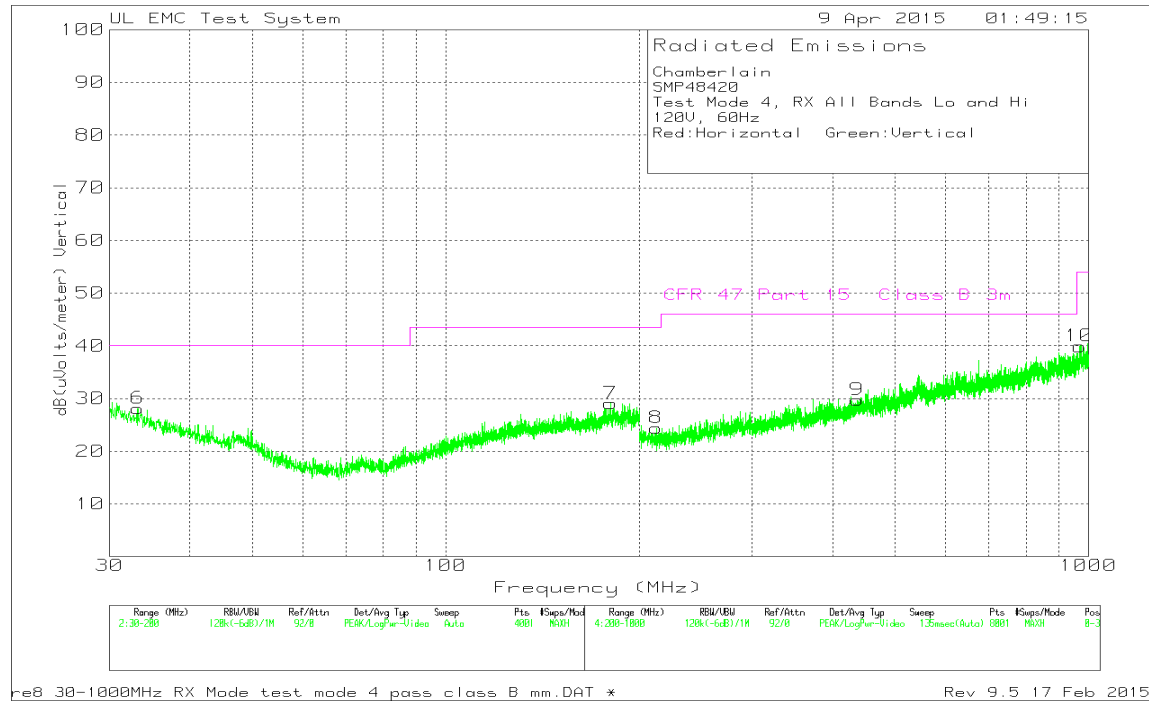


Chamberlain									
SMP48420									
TX Modulation MidCh 914.7MHz									
120V 60Hz, Mode 7									
Red: II EUT, Green: I- EUT, Cyan: II GND									
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Loop Antenna Factor dB/m	Path Factor dB	Level dBuV/m	Limit FCC Part 15 3_meter dBuV/m	Margin (dB)	Azimuth [Degs]
1	0.01194	43.23	Pk	20.2	0	63.43	126.05	-62.62	0-360
2	0.023735	42.72	Pk	16.4	0	59.12	120.08	-60.96	0-360
3	0.19814	42.09	Pk	12	0	54.09	101.66	-47.57	0-360
4	19.7195	14.71	Pk	10.7	0.2	25.61	69.54	-43.93	0-360
5	0.01187	46.29	Pk	20.3	0	66.59	126.1	-59.51	0-360
6	0.035495	36.13	Pk	15.2	0	51.33	116.59	-65.26	0-360
7	0.16129	43.51	Pk	12.2	0	55.71	103.45	-47.74	0-360
8	0.89955	27.98	Pk	12.1	0.1	40.18	68.52	-28.34	0-360
9	20.65475	13.98	Pk	10.6	0.3	24.88	69.54	-44.66	0-360
10	0.01201	43.22	Pk	20.2	0	63.42	126	-62.58	0-360
11	0.02377	44.32	Pk	16.4	0	60.72	120.07	-59.35	0-360
12	0.15213	44.88	Pk	12.2	0	57.08	103.95	-46.87	0-360
13	0.77164	32.84	Pk	12	0	44.84	69.86	-25.02	0-360
14	20.4445	19.34	Pk	10.6	0.3	30.24	69.54	-39.3	0-360
Pk - Peak detector									

* No emissions were recorded in restricted bands.

9.4. DIGITAL DEVICE

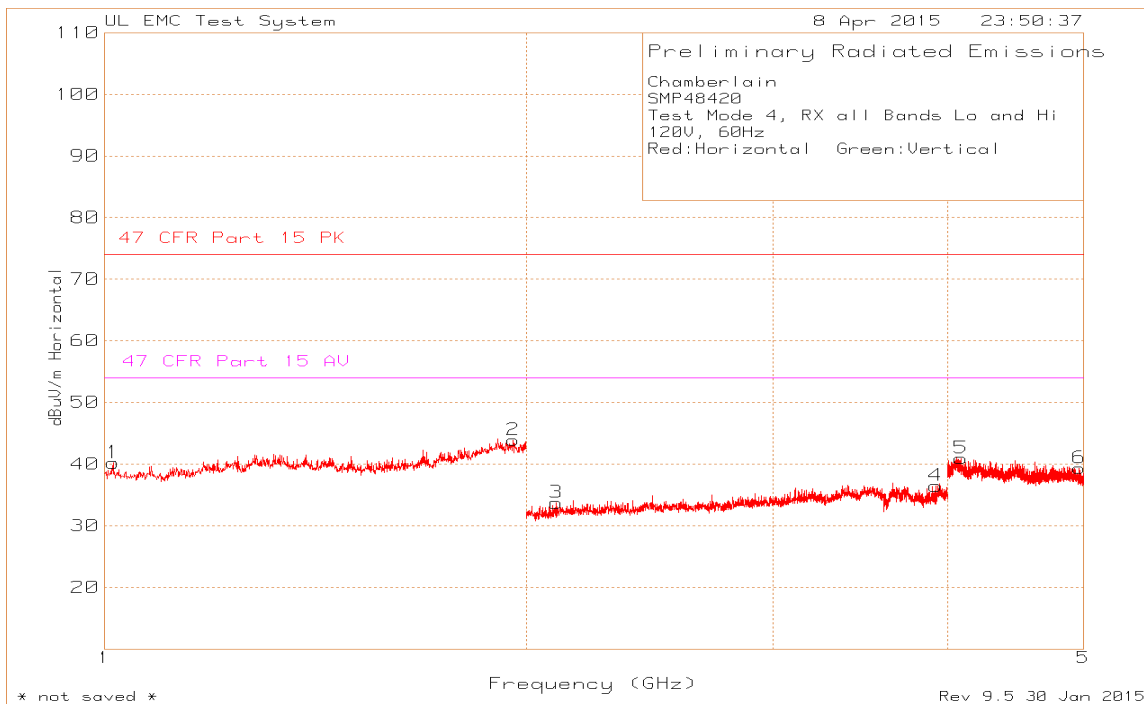
Below 1GHz Measurements



* No emissions were recorded

Chamberlain												
SMP48420												
Test Mode 4, RX All Bands Lo and Hi												
120V, 60Hz												
Red:Horizontal Green:Vertical												
Trace Markers												
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path Factor dB	10M to 3M Distance Correction Factor dB	Level dBuV/m	CFR 47 Part 15 Class B 3m dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	32.0825	30.92	Pk	17	-30.2	10.5	28.22	40	-11.78	0-360	100	H
2	182.9575	31.84	Pk	16	-29.3	10.5	29.04	43.52	-14.48	0-360	100	H
6	33.1875	31.31	Pk	16.5	-30.2	10.5	28.11	40	-11.89	0-360	100	V
7	180.6625	31.98	Pk	15.9	-29.3	10.5	29.08	43.52	-14.44	0-360	100	V
3	211.5	32.34	Pk	11.1	-29	10.5	24.94	43.52	-18.58	0-360	100	H
4	438.1	31.53	Pk	16.6	-27.6	10.5	31.03	46.02	-14.99	0-360	100	H
5	984.8	30.76	Pk	23.8	-24.8	10.5	40.26	53.97	-13.71	0-360	100	H
8	212.6	32.01	Pk	11	-29.1	10.5	24.41	43.52	-19.11	0-360	100	V
9	436.5	30.41	Pk	16.5	-27.7	10.5	29.71	46.02	-16.31	0-360	100	V
10	969.4	31.01	Pk	23.9	-25.5	10.5	39.91	53.97	-14.06	0-360	100	V
Pk - Peak detector												

Above 1GHz Measurements



* No emissions were recorded

Chamberlain													
SMP48420													
Test Mode 4, RX all Bands Lo and Hi													
120V, 60Hz													
Red:Horizontal Green:Vertical													
Trace Markers													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Path Factor dB	Level dBuV/m	Peak Limit 47 CFR Part 15 Subpart B dBuV/m	Margin (dB)	Average Limit 47 CFR Part 15 Subpart B dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	1.014	69.39	Pk	27.3	-56.51	40.18	74	-33.82	54	-13.82	0-360	99	H
2	1.958	65.86	Pk	31.5	-53.45	43.91	74	-30.09	54	-10.09	0-360	99	H
3	2.102	65.28	Pk	21.4	-52.96	33.72	74	-40.28	54	-20.28	0-360	150	H
4	3.922	63.79	Pk	23.9	-51.24	36.45	74	-37.55	54	-17.55	0-360	100	H
5	4.089	63.22	Pk	28.4	-50.69	40.93	74	-33.07	54	-13.07	0-360	150	H
6	4.968	62.32	Pk	27.8	-50.76	39.36	74	-34.64	54	-14.64	0-360	99	H
Pk - Peak detector													

10. 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

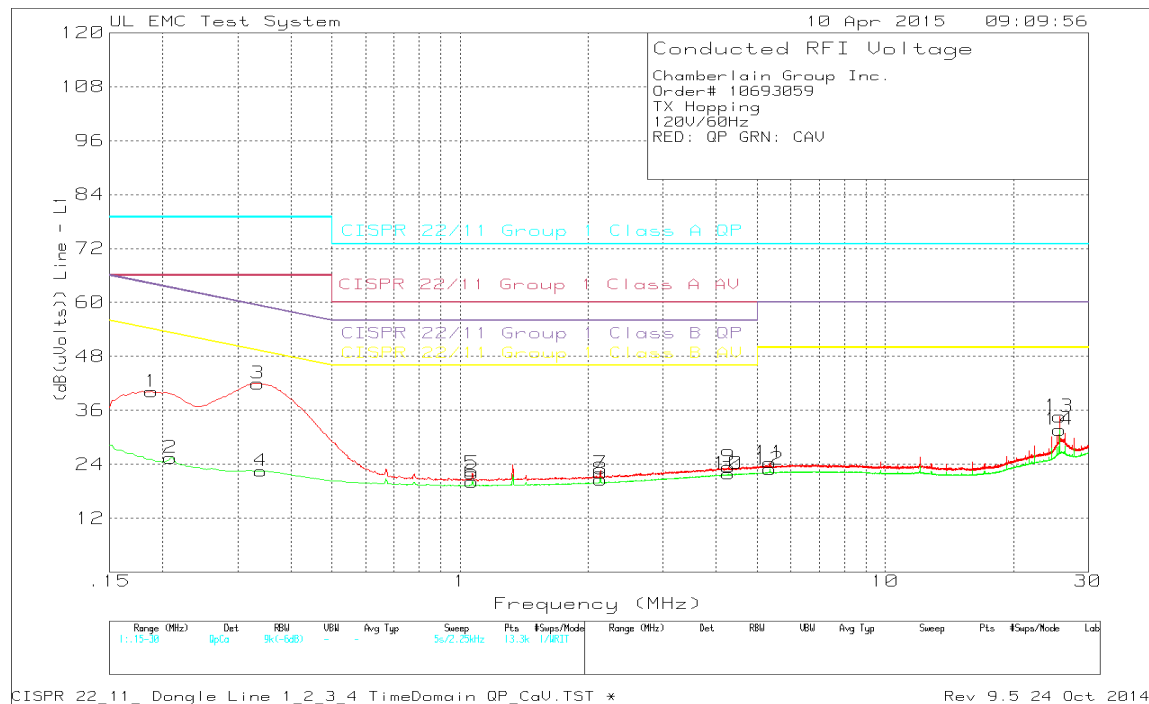
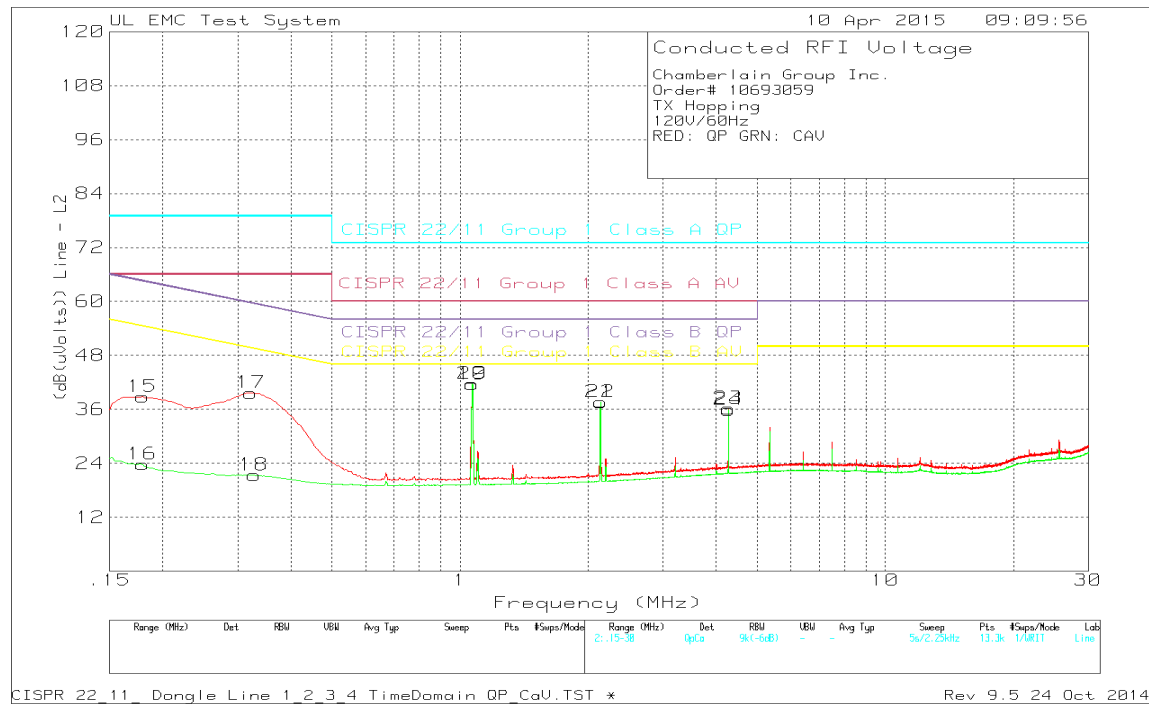
The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

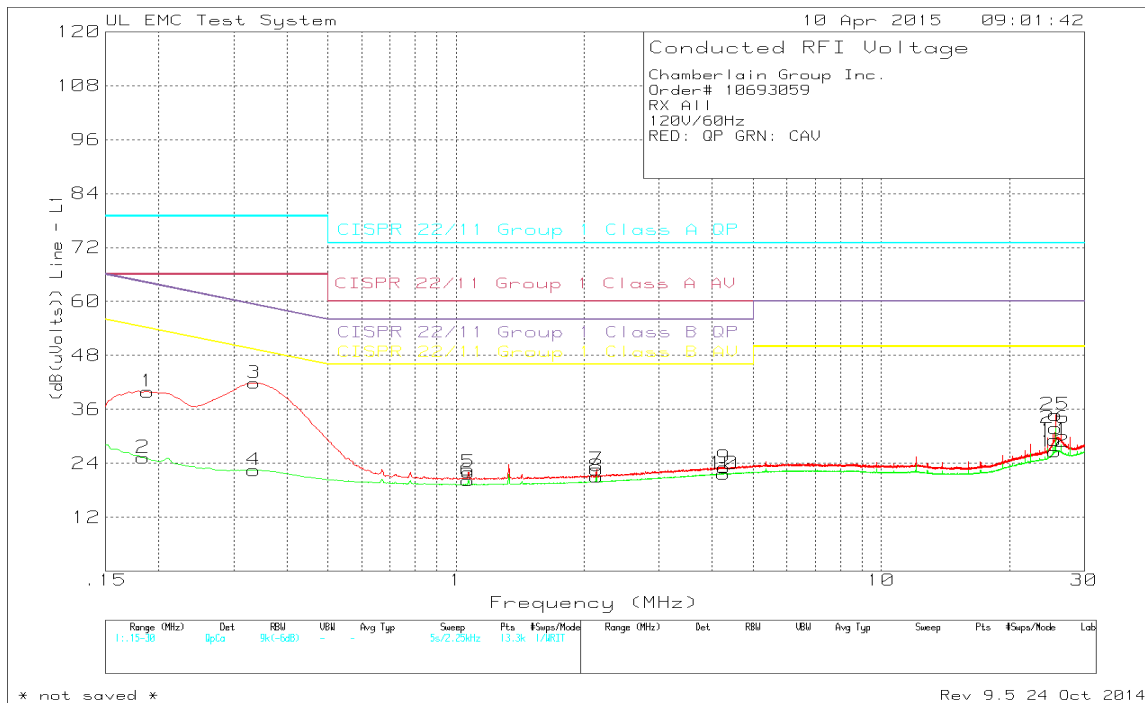
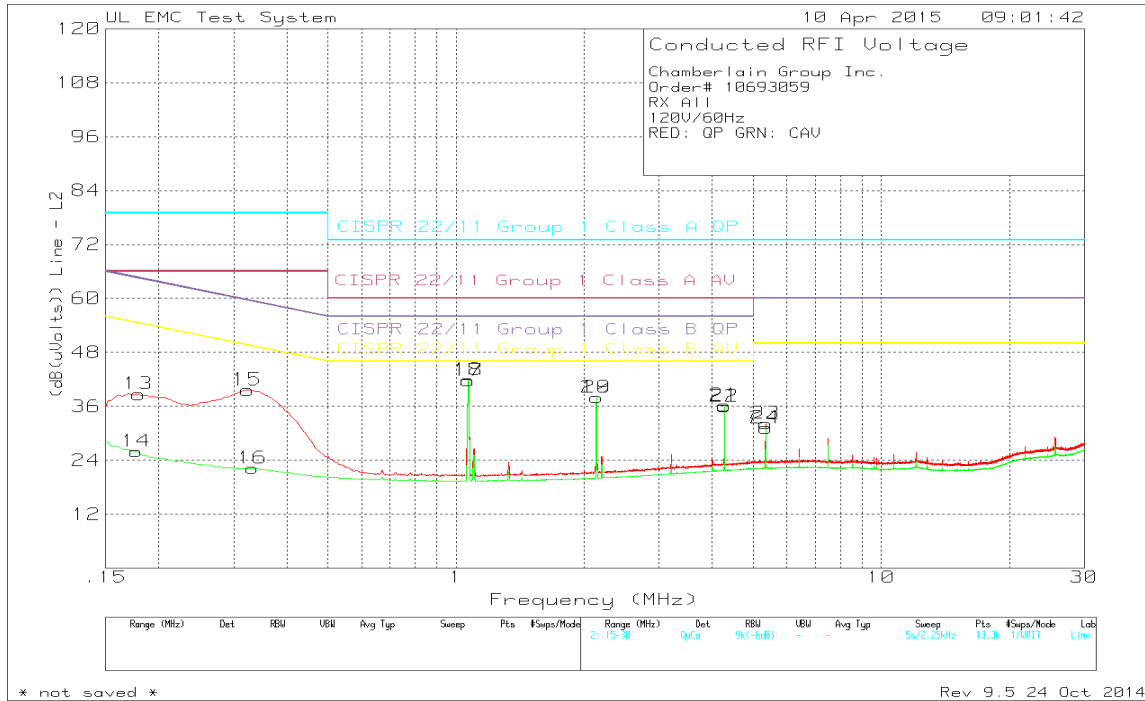
RESULTS

Conducted Emissions Data – TX Hopping Mode



Chamberlain Group Inc.										
Order# 10693059										
TX Hopping										
120V/60Hz										
RED: QP GRN: CAV										
Trace Markers										
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	LISN Factor dB	Path Factor dB	Level dBuV	Limit 47 CFR Part 15, Class B QP dBuV	QP Margin (dB)	Limit 47 CFR Part 15, Class B AV dBuV	Margin (dB)
Line 1										
1	0.18825	28.39	Qp	0.1	11.7	40.19	64.11	-23.92	-	-
2	0.2085	13.96	Ca	0.1	11.4	25.46	-	-	53.26	-27.8
3	0.3345	31.09	Qp	0.1	10.8	41.99	59.34	-17.35	-	-
4	0.34012	11.62	Ca	0.1	10.8	22.52	-	-	49.2	-26.68
5	1.068	11.27	Qp	0.1	10.6	21.97	56	-34.03	-	-
6	1.068	9.46	Ca	0.1	10.6	20.16	-	-	46	-25.84
7	2.14125	11.36	Qp	0.1	10.6	22.06	56	-33.94	-	-
8	2.14125	9.93	Ca	0.1	10.6	20.63	-	-	46	-25.37
9	4.2765	12.66	Qp	0.1	10.7	23.46	56	-32.54	-	-
10	4.2765	11.14	Ca	0.1	10.7	21.94	-	-	46	-24.06
11	5.3475	13.49	Qp	0.1	10.8	24.39	60	-35.61	-	-
12	5.3475	12	Ca	0.1	10.8	22.9	-	-	50	-27.1
13	25.656	21.5	Qp	1.4	11.7	34.6	60	-25.4	-	-
14	25.65825	18.59	Ca	1.4	11.7	31.69	-	-	50	-18.31
Line 2										
15	0.17925	26.69	Qp	0.1	12	38.79	64.52	-25.73	-	-
16	0.17925	11.67	Ca	0.1	12	23.77	-	-	54.52	-30.75
17	0.32212	28.66	Qp	0.1	10.9	39.66	59.65	-19.99	-	-
18	0.32775	10.35	Ca	0.1	10.9	21.35	-	-	49.51	-28.16
19	1.068	30.75	Qp	0.1	10.7	41.55	56	-14.45	-	-
20	1.068	30.86	Ca	0.1	10.7	41.66	-	-	46	-4.34
21	2.139	26.87	Qp	0.1	10.7	37.67	56	-18.33	-	-
22	2.139	26.84	Ca	0.1	10.7	37.64	-	-	46	-8.36
23	4.2765	25.27	Qp	0.1	10.8	36.17	56	-19.83	-	-
24	4.2765	25.01	Ca	0.1	10.8	35.91	-	-	46	-10.09
Qp - Quasi-Peak detector										
Ca - CISPR Average detection										

Conducted Emissions Data – RX Mode

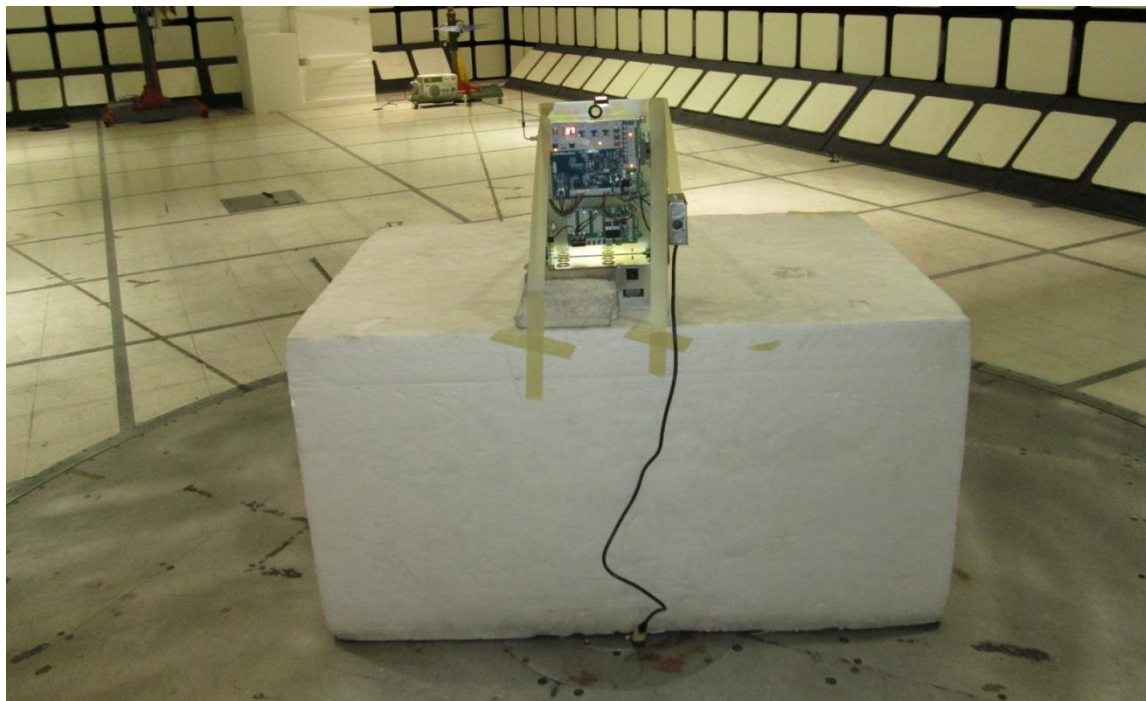


Chamberlain Group Inc.										
Order# 10693059										
RX All										
120V/60Hz										
RED: QP GRN: CAV										
Trace Markers										
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	LISN Factor dB	Path Factor dB	Level dBuV	Limit 47 CFR Part 15, Class B QP dBuV	QP Margin (dB)	Limit 47 CFR Part 15, Class B AV dBuV	Margin (dB)
Line 1										
1	0.18825	28.18	Qp	0.1	11.7	39.98	64.11	-24.13	-	-
2	0.18375	13.33	Ca	0.1	11.8	25.23	-	-	54.31	-29.08
3	0.33562	30.97	Qp	0.1	10.8	41.87	59.31	-17.44	-	-
4	0.3345	11.61	Ca	0.1	10.8	22.51	-	-	49.34	-26.83
5	1.07025	11.36	Qp	0.1	10.6	22.06	56	-33.94	-	-
6	1.068	9.5	Ca	0.1	10.6	20.2	-	-	46	-25.8
7	2.139	11.97	Qp	0.1	10.6	22.67	56	-33.33	-	-
8	2.139	10.38	Ca	0.1	10.6	21.08	-	-	46	-24.92
9	4.263	12.25	Qp	0.1	10.7	23.05	56	-32.95	-	-
10	4.2585	10.85	Ca	0.1	10.7	21.65	-	-	46	-24.35
11	25.57275	16.12	Qp	1.4	11.7	29.22	60	-30.78	-	-
12	25.57275	13.51	Ca	1.4	11.7	26.61	-	-	50	-23.39
25	25.66275	21.71	Qp	1.4	11.7	34.81	60	-25.19	-	-
26	25.6605	18.77	Ca	1.4	11.7	31.87	-	-	50	-18.13
Line 2										
13	0.17925	26.59	Qp	0.1	12	38.69	64.52	-25.83	-	-
14	0.177	13.77	Ca	0.1	12.1	25.97	-	-	54.63	-28.66
15	0.32325	28.6	Qp	0.1	10.9	39.6	59.62	-20.02	-	-
16	0.33225	11.22	Ca	0.1	10.9	22.22	-	-	49.39	-27.17
17	1.068	30.9	Qp	0.1	10.7	41.7	56	-14.3	-	-
18	1.068	31	Ca	0.1	10.7	41.8	-	-	46	-4.2
19	2.139	27.18	Qp	0.1	10.7	37.98	56	-18.02	-	-
20	2.139	27.17	Ca	0.1	10.7	37.97	-	-	46	-8.03
21	4.2765	25.28	Qp	0.1	10.8	36.18	56	-19.82	-	-
22	4.2765	25.08	Ca	0.1	10.8	35.98	-	-	46	-10.02
23	5.34525	21.19	Qp	0.1	10.9	32.19	60	-27.81	-	-
24	5.34525	20.19	Ca	0.1	10.9	31.19	-	-	50	-18.81
Qp - Quasi-Peak detector										
Ca - CISPR Average detection										

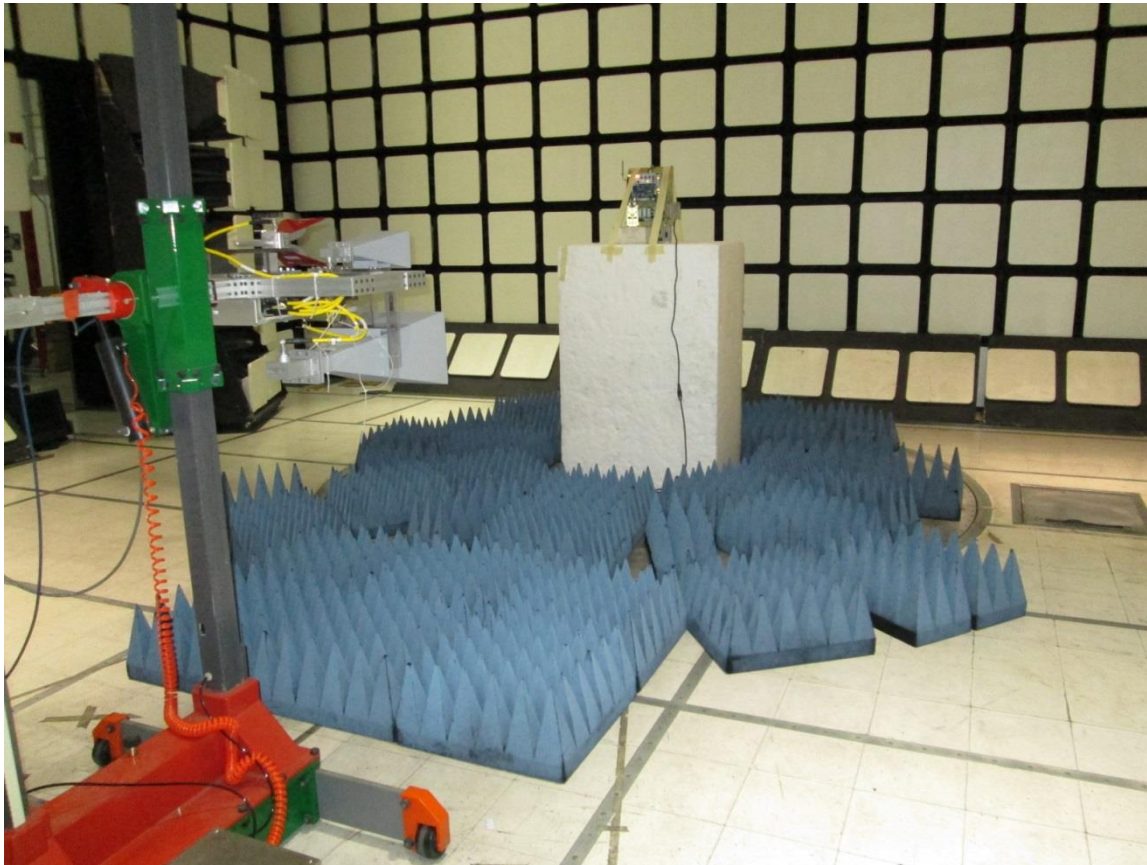
Line Conducted Emissions Measurement Setup



Radiated Emissions Measurements below 1GHz



Radiated Emissions Measurements above 1GHz



END OF REPORT