EMC Test Report

Project Number: 3044696

Report Number: 3044696EMC07 **Revision Level:** 0

Client: Intermec Technologies Corp.
6001 36th Avenue W
Everett, WA 988203
United States

Equipment Under Test: Mobile Computer

Model Name: CN51

Model Number: 1015CP01

Hardware Version: P2

Applicable Standards: FCC Part 15 Subpart C, § 15.407

RSS-210, Issue 8, December 2010

Report issued on: 17 JUL 2013

Test Result: Compliant

Tested by: Brian Forster, EMC Engineer

Reviewed by: David Schramm, EMC Manager

Remarks:
This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

Table of Contents

1 Summary of Test Results

Test Description	Test Specification	Test Result
Occupied Bandwidth	15.407	NA
Spectral Density	15.407(1)(2)(5)	Compliant
Peak Power Output	15.407(1)(2)(4)	Compliant
Peak Excursion	15.407(6)	Compliant
Radiated Spurious Emissions	15.407(b)	Compliant

1.1 *Modifications Required for Compliance*

None

2 General Information

2.1 *Client Information*

Name: Intermec
Address: 6001 36th Avenue West
City, State, Zip, Country: Everett, WA 98203 - 1264

2.1 *Test Laboratory*

Name: SGS North America, Inc.
Address: 620 Old Peachtree Road NW, Suite 100
City, State, Zip, Country: Suwanee, GA 30024, USA

Accrediting Body: A2LA
Type of lab: Testing Laboratory
Certificate Number: 3212.01

2.2 *General Information of EUT*

Marketing Name: Catalina
Model: 1015CP01
Serial Number: 333X1200044(Conducted Measurements)
328X1200002(Radiated Measurements)
Firmware Version: 1.0.0.0334
FCC ID: EHA-1015CP01X1
Frequency Range: 5150 to 5725 MHz
Modulation type: OFDM
Channel spacing: 20 MHz
Antenna: Integral

Rated Voltage: 3.8 VDC Internal Battery

Sample Received Date: 18 FEB 2013
Dates of testing: 18 FEB to 19 APR 2013

Operating Modes and Conditions

Modulations used: For fundamental and spurious measurements, the EUT was configured to operate continuously with Wi-Fi modulation enabled.

As specified in Section 5.10.5 of ANSI C63.10:2009:

- The software allowed configuration and operation on all available unlicensed wireless device channels.
- The software allowed configuration and operation using all available modulations and data rates
- The software allowed configuration and operation on all available power out levels

2.3 *EUT Connection Block Diagram*

2.4 *System Configurations*

Device reference	Manufacturer	Description	Model Number	Serial Number
A	Intermec	EUT	1015CP01	333X1200044(Conducted Measurements) 328X1200002(Radiated Measurements)

3 Occupied Bandwidth

3.1 *Test Result*

Test Description	Basic Standards	Test Result
26 dB bandwidth	15.407(1) (2)(3)	Reference Only

3.2 *Test Method*

The procedures from ANSI C63.10 (2009) clause 6.9 were used to determine the 26 dB bandwidth.

3.3 *Test Site*

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions
Temperature: 24.4 ℃
Relative Humidity: 47.8 %

3.4 *Test Equipment*

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
Receiver	ESU40	R&S	B079629	24 SEP 2013
Attenuator	BW-S30W2+	Mini-Circuits	NA	VBU

Note: The calibration period equipment is 1 year.

3.5 *Test Setup Photographs*

Test setup photographs are located in a separate exhibit.

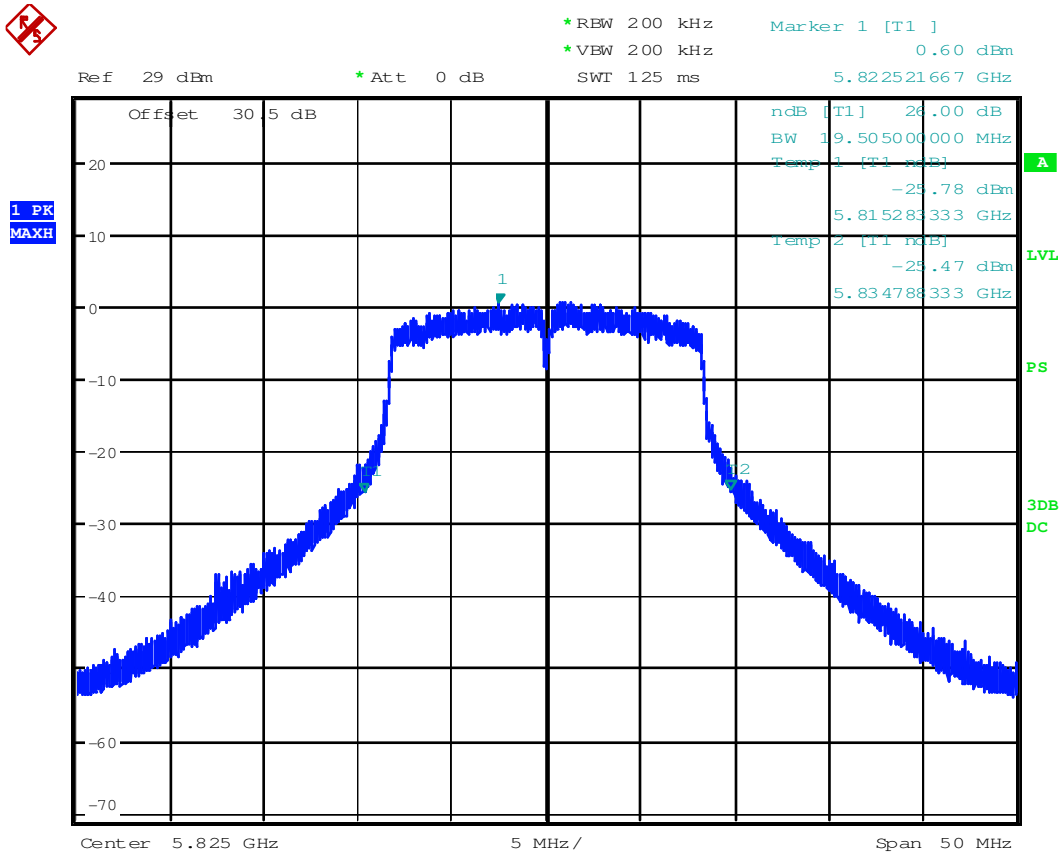
3.6 *Test Data*

802.11 n

Band (MHz)	Mode	Channel	Data Rate	26dB Bandwidth, MHz
5150 - 5250	N	36	MCS 0	20.23
5150 - 5250	N		MCS 7	20.15
5150 - 5250	N	48	MCS 0	20.42
5150 - 5250	N		MCS 7	20.16
5250 - 5350	N	52	MCS 0	20.49
5250 - 5350	N		MCS 7	20.29
5250 - 5350	N	64	MCS 0	20.41
5250 - 5350	N		MCS 7	20.09
5470 - 5725	N	100	MCS 0	20.47
5470 - 5725	N		MCS 7	20.23
5470 - 5725	N	120	MCS 0	20.49
5470 - 5725	N		MCS 7	20.33
5470 - 5725	N	140	MCS 0	20.34
5470 - 5725	N		MCS 7	20.15

802.11 a

Band (MHz)	Mode	Channel	Data Rate (MB/s)	26dB Bandwidth, MHz
5150 - 5250	A	36	6	19.79
5150 - 5250	A		36	19.47
5150 - 5250	A		54	19.52
5150 - 5250	A	48	6	19.37
5150 - 5250	A		36	19.50
5150 - 5250	A		54	19.48
5250 - 5350	A	52	6	19.49
5250 - 5350	A		54	19.46
5250 - 5350	A	64	6	19.75
5250 - 5350	A		54	19.36
5470 - 5725	A	100	6	19.92
5470 - 5725	A		54	19.43
5470 - 5725	A	120	6	19.63
5470 - 5725	A		54	19.51
5470 - 5725	A	140	6	19.50
5470 - 5725	A		54	19.42



Date: 17.APR.2013 14:36:05

4 Conducted Output Power

4.1 *Test Result*

Test Description	Test Specification	Test Result
Conducted Output Power	15.407 (1)(2)(3)	Compliant

4.2 *Test Method*

The test data was measured using a spectrum analyzer with Peak detector in Channel Power Measurement Mode and a resolution bandwidth of 1 MHz.

Limit
(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.

4.3 *Test Site*

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions
Temperature: 23.1 ℃
Relative Humidity: 35.8 %

4.4 *Test Equipment*

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
Receiver	ESU40	R&S	B079629	24 SEP 2013
Attenuator	BW-S30W2+	Mini-Circuits	NA	VBU

Note: The calibration period equipment is 1 year.

4.5 *Test Setup Photographs*

Test setup photographs are located in a separate exhibit.

4.6 *Test Data*

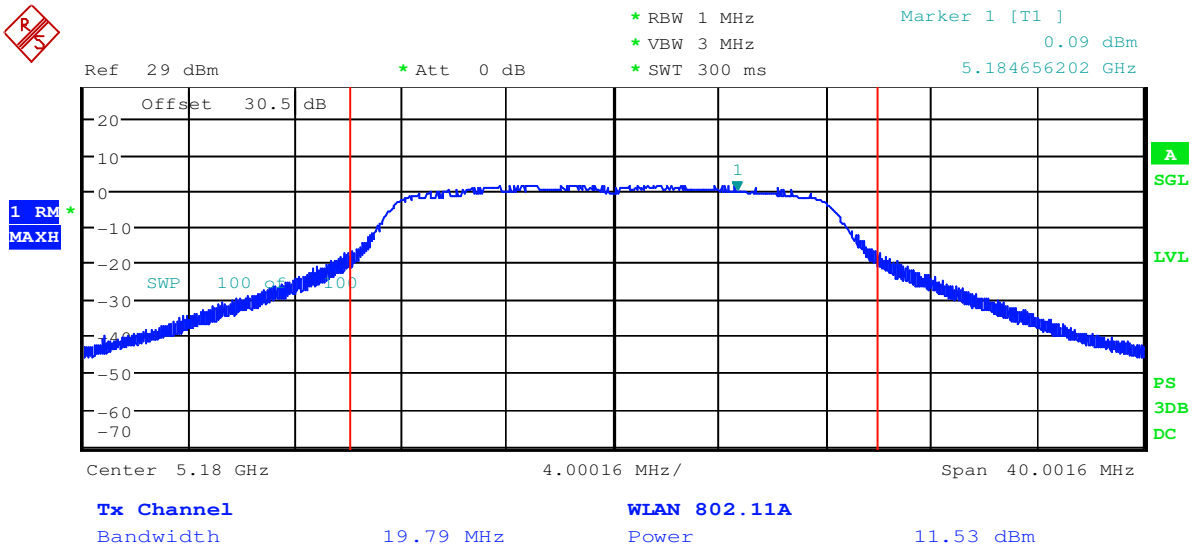
802.11 n

Band (MHz)	Mode	Channel	Data Rate	26dB Bandwidth, MHz	Limit (dBm)	Corrected Measurement dBm	Margin dB	Peak Excursion, dB
5150 - 5250	N	36	MCS 0	20.2	17.0	9.9	-7.1	9.3
5150 - 5250	N		MCS 7	20.2	17.0	4.9	-12.1	11.6
5150 - 5250	N	48	MCS 0	20.4	17.0	10.1	-6.9	9.6
5150 - 5250	N		MCS 7	20.2	17.0	4.9	-12.1	10.9
5250 - 5350	N	52	MCS 0	20.5	24.0	10.3	-13.7	9.2
5250 - 5350	N		MCS 7	20.3	24.0	5.2	-18.8	10.7
5250 - 5350	N	64	MCS 0	20.4	24.0	10.1	-13.9	9.6
5250 - 5350	N		MCS 7	20.1	24.0	5.2	-18.8	11.3
5470 - 5725	N	100	MCS 0	20.5	24.0	10.3	-13.7	9.5
5470 - 5725	N		MCS 7	20.2	24.0	5.2	-18.8	11.0
5470 - 5725	N	120	MCS 0	20.5	24.0	10.6	-13.4	9.1
5470 - 5725	N		MCS 7	20.3	24.0	5.5	-18.6	11.2
5470 - 5725	N	140	MCS 0	20.3	24.0	10.5	-13.5	9.5
5470 - 5725	N		MCS 7	20.2	24.0	5.4	-18.6	11.7

802.11 a

Band (MHz)	Mode	Channel	Data Rate (MB/s)	26dB Bandwidth, MHz	Limit (dBm)	Corrected Measurement dBm	Margin dB	Peak Excursion, dB
5150 - 5250	A	36	6	19.8	17.0	9.9	-7.0	9.6
5150 - 5250	A		36	19.5	16.9	8.1	-8.8	10.7
5150 - 5250	A		54	19.5	16.9	6.6	-10.3	11.2
5150 - 5250	A	48	6	19.4	16.9	10.0	-6.8	9.6
5150 - 5250	A		36	19.5	16.9	7.9	-9.0	10.0
5150 - 5250	A		54	19.5	16.9	6.3	-10.6	11.2
5250 - 5350	A	52	6	19.5	23.9	10.3	-13.6	9.4
5250 - 5350	A		54	19.5	23.9	6.5	-17.4	11.7
5250 - 5350	A	64	6	19.8	24.0	10.2	-13.8	9.5
5250 - 5350	A		54	19.4	23.9	6.4	-17.5	11.0
5470 - 5725	A	100	6	19.9	24.0	10.3	-13.7	9.7
5470 - 5725	A		54	19.4	23.9	6.4	-17.5	11.0
5470 - 5725	A	120	6	19.6	23.9	10.4	-13.5	9.5
5470 - 5725	A		54	19.5	23.9	6.7	-17.2	11.9
5470 - 5725	A	140	6	19.5	23.9	10.4	-13.5	9.2
5470 - 5725	A		54	19.4	23.9	6.6	-17.2	11.2

Measurement Parameters



Tx Channel **WLAN 802.11A**

Bandwidth 19.79 MHz Power 11.53 dBm

Date: 16.APR.2013 16:47:53

5 Undesirable Emissions

5.1 *Test Result*

Test Description	Test Specification	Test Result
Spurious Emissions	15.407(b)	Compliant

5.2 *Test Method*

The test data was measured using a spectrum analyzer with

- Peak detector, max hold
- Resolution bandwidth of at least 100 kHz
- Video bandwidth at least 3x RBW
- Frequency range: 1 GHz to 40 GHz

The limit is -27dBm/MHz or 68.2 dBuV/m @3m

5.3 *Test Site*

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 23.1 ℃
Relative Humidity: 37.8 %

5.4 *Test Equipment*

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
NETWORK ANALYZER	ZVL	ROHDE & SCHWARZ	B079799	1-Jul-2013
ANTENNA, BILOG	JB6	SUNOL	B079689	4-Sep-2013
RF CABLE - 7500MM (10KHZ - 18GHZ)	SF106	HUBER&SUHNER	B079713	13-Aug-2013
RF CABLE - 7500MM (10KHZ - 18GHZ)	SF106	HUBER&SUHNER	B079711	20-Sep-2013
RF CABLE	SF106	HUBER&SUHNER	B085895	31-Oct-2013
DRG HORN (MEDIUM)	3117	ETS-LINDGREN	B079699	25-Mar-2014
RF CABLE - 7500MM (10KHZ - 18GHZ)	SF106	HUBER&SUHNER	B079711	20-Sep-2013
RF CABLE - 7000MM (10KHZ - 18GHZ)	SF106	HUBER&SUHNER	B079716	20-Sep-2013
RF CABLE	SF106	HUBER&SUHNER	B085892	23-Oct-2013
DESKTOP AMPLIFIER 1-18 GHZ	NSP1800-25-HG	MITEQ	B085930	30-Oct-2013
High Pass Filter	HPM50112	Microtronics	B093647	1-Jul-2013
FIXED GAIN AMPLIFIER	NSP1840-HG	MITEQ	B087572	22-Oct-2013
DRG HORN (SMALL)	3116B	ETS-LINDGREN	B079697	1-Feb-2014
COAXIAL CABLE	SUCOFLEX 102	HUBER&SUHNER	B079822	12-Dec-2013
COAXIAL CABLE	SUCOFLEX 102	HUBER&SUHNER	B079823	12-Dec-2013
COAXIAL CABLE	SUCOFLEX 102	HUBER&SUHNER	B079824	12-Dec-2013
EMI TEST RECEIVER	ESU40	ROHDE & SCHWARZ	B079629	24-Sep-2013

Note: The calibration period equipment is 1 year.

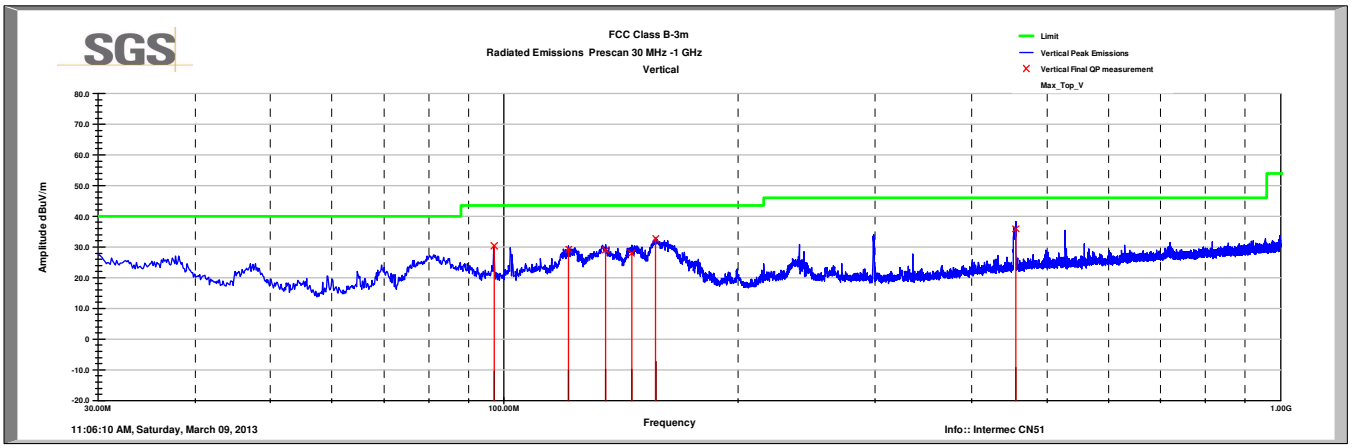
5.5 *Test Setup Photographs*

Test setup photographs are located in a separate exhibit.

5.6 *Test Data*

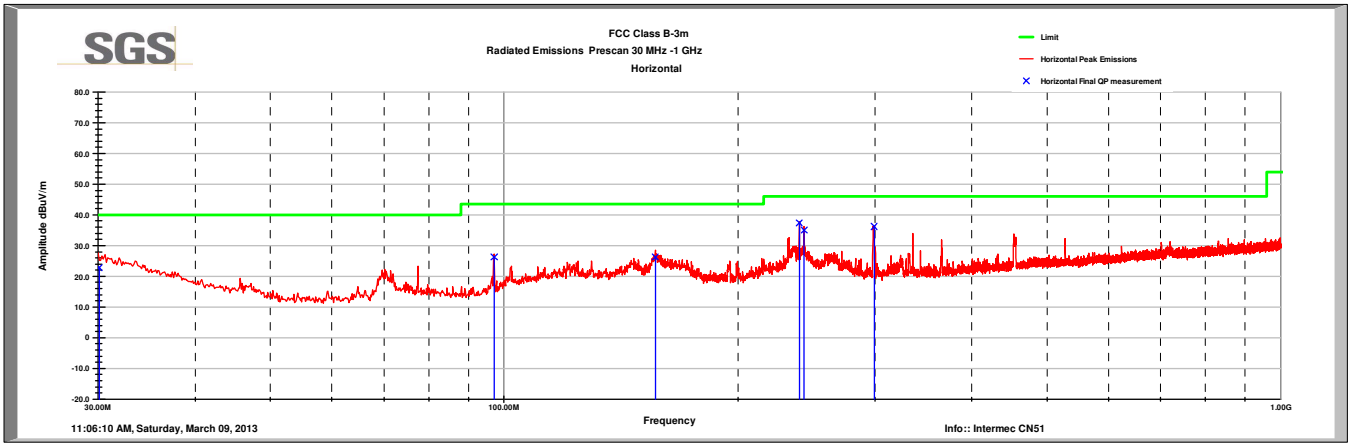
30 MHz to 1000MHz

CH 36 6MB/s
Vertical



Frequency MHz	Raw QP dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	QP Value (dBuV/m)	Limit (dBuV/m)	Margin (dB)
97.11	20.7	V	237.0	100.0	9.0	0.6	0.0	30.4	40.5	-10.1
121.05	15.0	V	237.0	100.0	13.6	0.7	0.0	29.3	40.5	-11.2
135.05	15.1	V	359.0	100.0	13.1	0.8	0.0	29.0	40.5	-11.5
145.90	14.6	V	359.0	100.0	12.6	0.8	0.0	28.0	40.5	-12.5
156.74	19.2	V	221.0	100.0	12.7	0.8	0.0	32.7	40.5	-7.8
455.98	17.3	V	359.0	100.0	17.1	1.5	0.0	36.0	47.5	-11.5

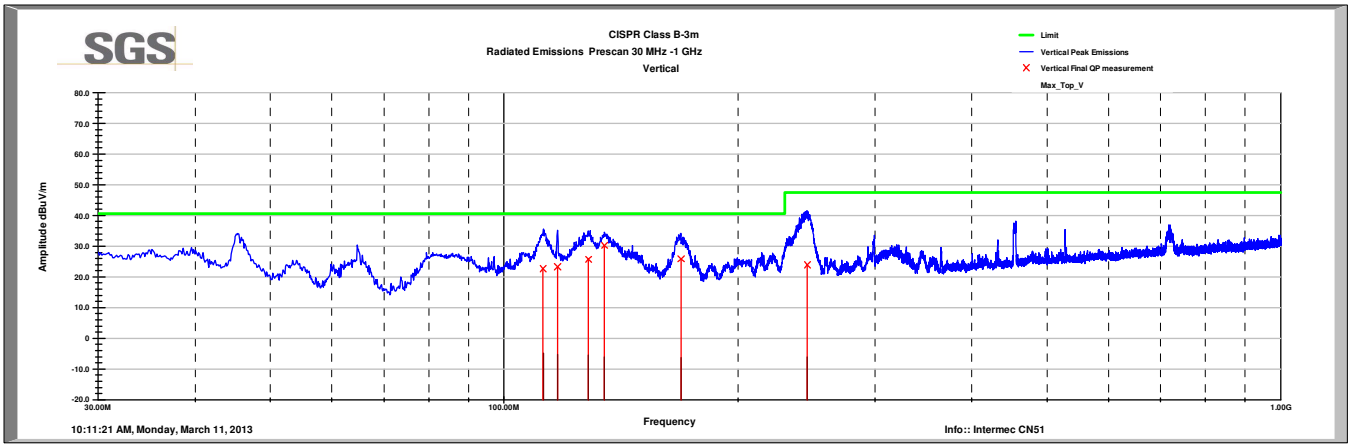
Horizontal



Frequency MHz	Raw QP dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	QP Value (dBuV/m)	Limit (dBuV/m)	Margin (dB)
30.11	1.4	H	268.0	100.0	21.0	0.3	0.0	22.8	40.5	-17.7
97.11	16.6	H	331.0	206.0	9.0	0.6	0.0	26.3	40.5	-14.2
156.53	12.8	H	242.0	178.0	12.7	0.8	0.0	26.3	40.5	-14.2
239.99	24.7	H	206.0	152.0	11.7	1.1	0.0	37.4	47.5	-10.1
243.41	22.4	H	205.0	151.0	11.6	1.1	0.0	35.0	47.5	-12.5
299.62	21.2	H	359.0	100.0	13.8	1.2	0.0	36.2	47.5	-11.3

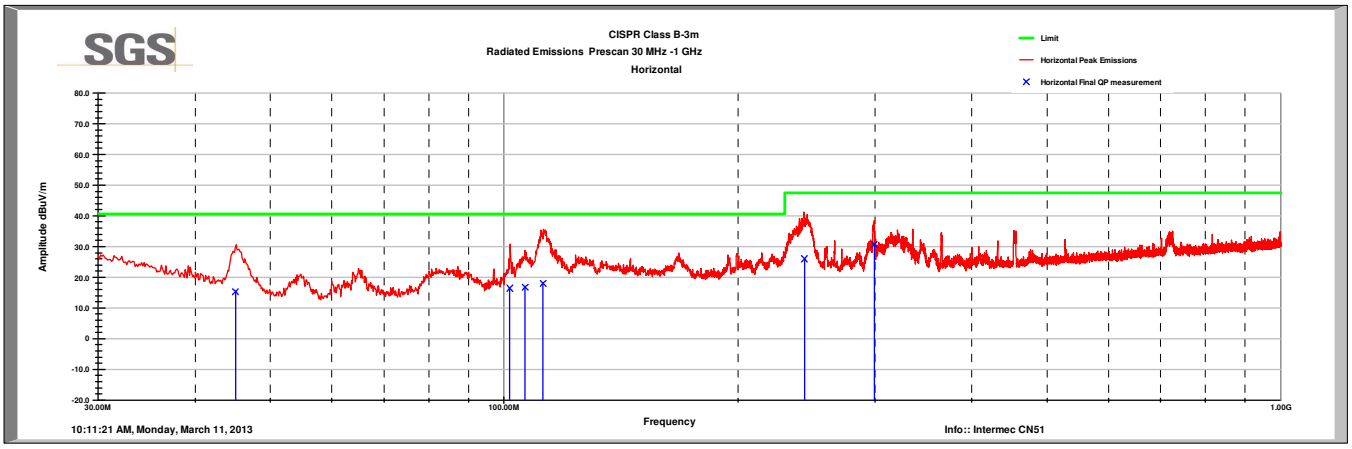
CH 64 6MB/s

Vertical



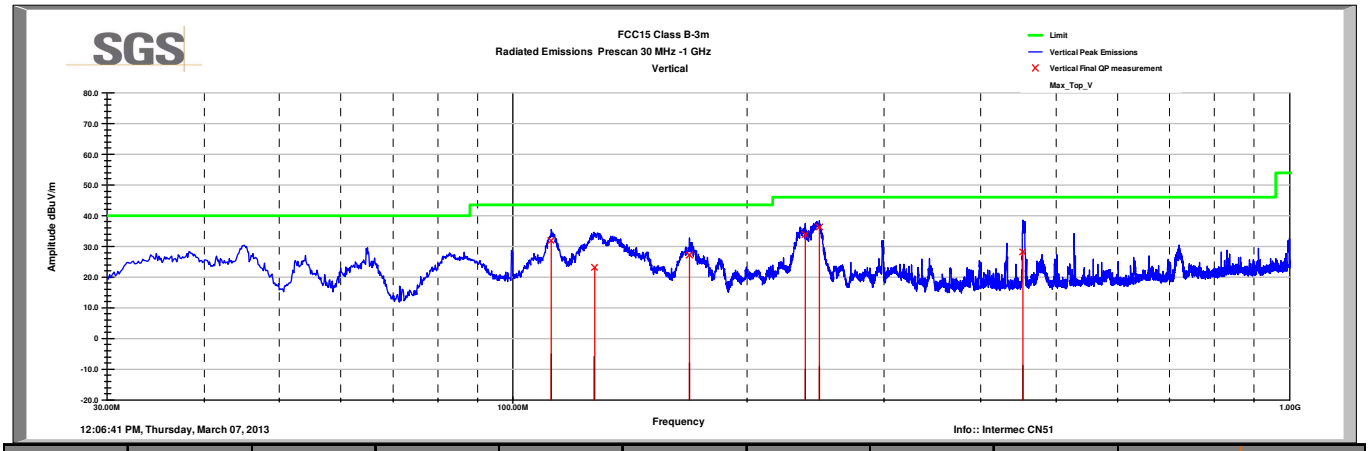
Frequency MHz	Raw QP dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	QP Value (dBuV/m)	Limit (dBuV/m)	Margin (dB)
112.24	9.1	V	201.0	100.0	12.8	0.7	0.0	22.6	40.5	-17.9
117.15	9.2	V	171.0	100.0	13.4	0.7	0.0	23.3	40.5	-17.2
128.41	11.5	V	48.0	100.0	13.5	0.7	0.0	25.7	40.5	-14.8
134.69	16.4	V	138.0	100.0	13.1	0.8	0.0	30.2	40.5	-10.3
169.03	13.0	V	246.0	100.0	12.0	0.9	0.0	25.8	40.5	-14.7
245.65	11.3	V	173.0	100.0	11.6	1.1	0.0	23.9	47.5	-23.6

Horizontal



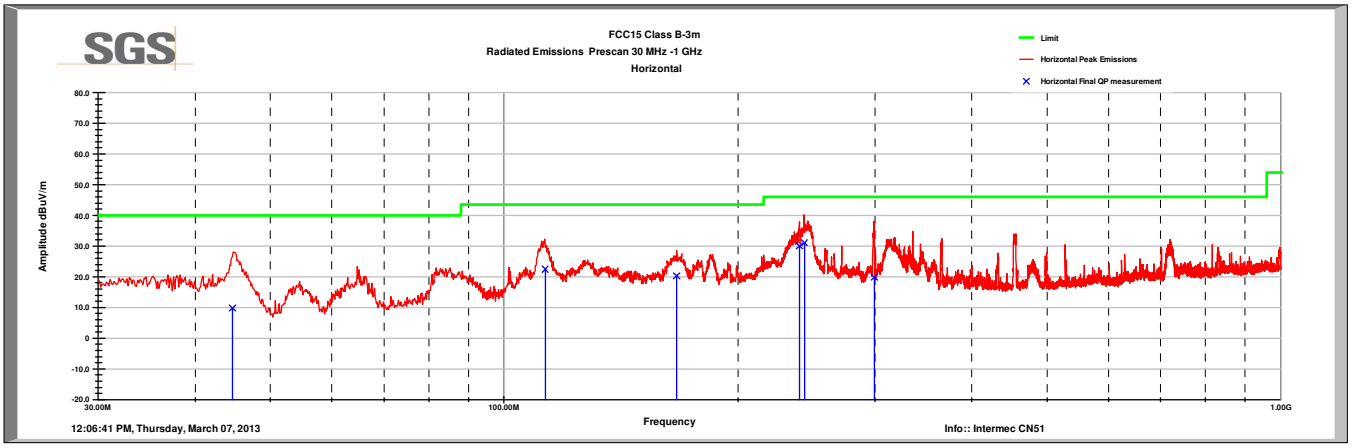
Frequency MHz	Raw QP dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	QP Value (dBuV/m)	Limit (dBuV/m)	Margin (dB)
45.08	4.8	H	26.0	213.0	10.1	0.4	0.0	15.3	40.5	-25.2
101.69	4.9	H	221.0	329.0	10.8	0.7	0.0	16.3	40.5	-24.2
106.43	4.1	H	108.0	284.0	11.9	0.7	0.0	16.7	40.5	-23.8
112.25	4.4	H	108.0	269.0	12.8	0.7	0.0	18.0	40.5	-22.5
243.52	13.3	H	171.0	142.0	11.6	1.1	0.0	26.0	47.5	-21.5
299.55	15.7	H	206.0	100.0	13.8	1.2	0.0	30.7	47.5	-16.8

CH 140 6MB/s
Vertical



Frequency MHz	Raw QP dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	QP Value (dBuV/m)	Limit (dBuV/m)	Margin (dB)
111.85	49.9	V	64.0	100.0	12.8	0.7	31.5	31.9	40.5	-8.6
127.26	40.3	V	157.0	100.0	13.6	0.7	31.5	23.1	40.5	-17.4
168.71	45.7	V	107.0	100.0	12.0	0.9	31.4	27.1	40.5	-13.4
237.70	52.6	V	26.0	100.0	11.6	1.0	31.3	33.9	47.5	-13.6
247.87	54.9	V	228.0	100.0	11.6	1.1	31.3	36.3	47.5	-11.2
453.08	40.9	V	315.0	100.0	17.1	1.5	31.2	28.2	47.5	-19.3

Horizontal



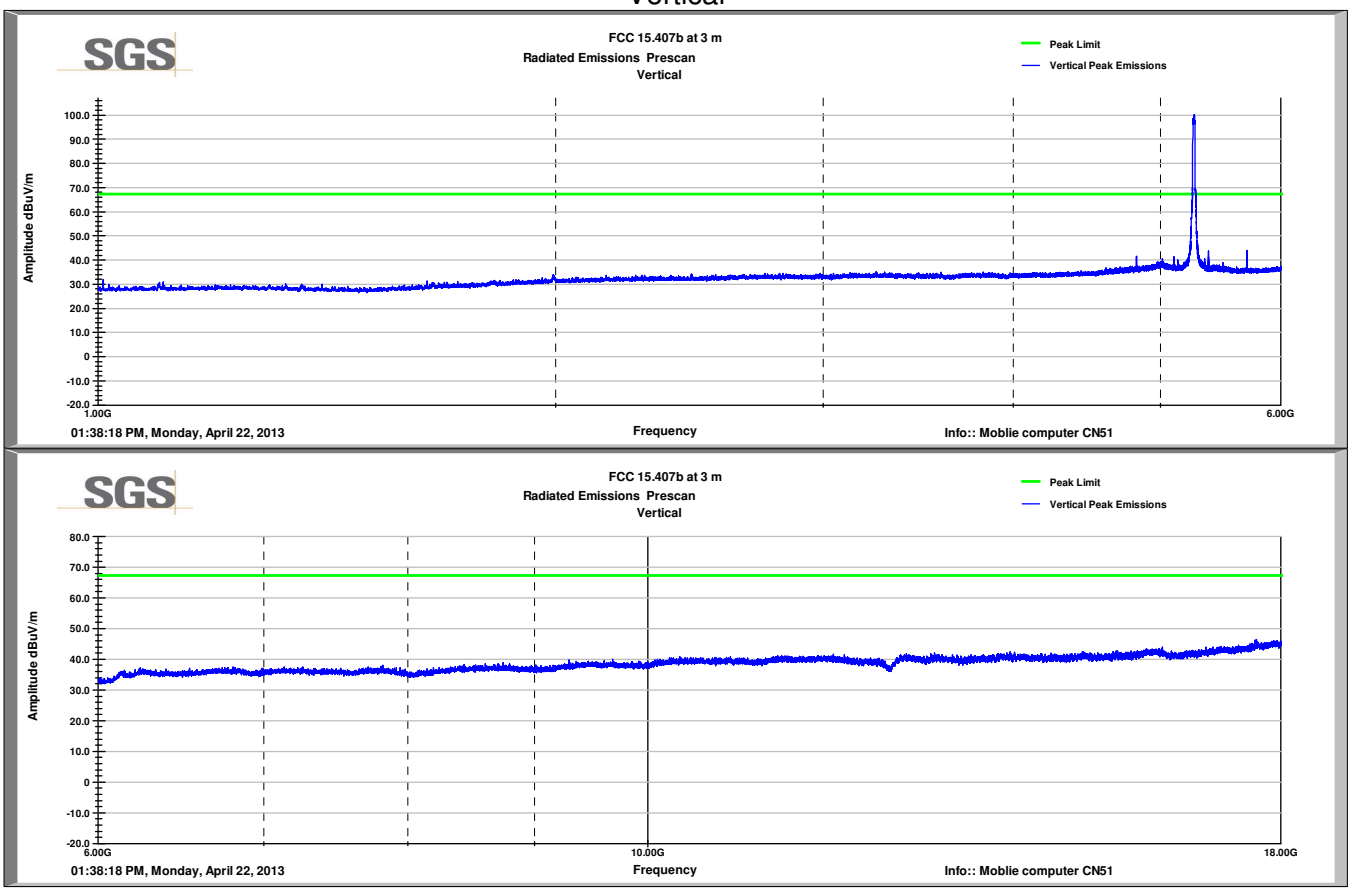
Frequency MHz	Raw QP dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	QP Value (dBuV/m)	Limit (dBuV/m)	Margin (dB)
44.70	30.7	H	109.0	100.0	10.3	0.4	31.6	9.8	40.5	-30.7
112.91	40.3	H	-1.0	100.0	13.0	0.7	31.5	22.5	40.5	-18.0
166.77	38.7	H	169.0	100.0	12.1	0.9	31.4	20.3	40.5	-20.2
240.11	48.6	H	61.0	100.0	11.7	1.1	31.3	30.0	47.5	-17.5
243.50	49.7	H	74.0	100.0	11.6	1.1	31.4	31.1	47.5	-16.4
299.66	36.2	H	128.0	100.0	13.8	1.2	31.3	19.8	47.5	-27.7

1-18GHz

802.11a

CH52 36MB

Vertical



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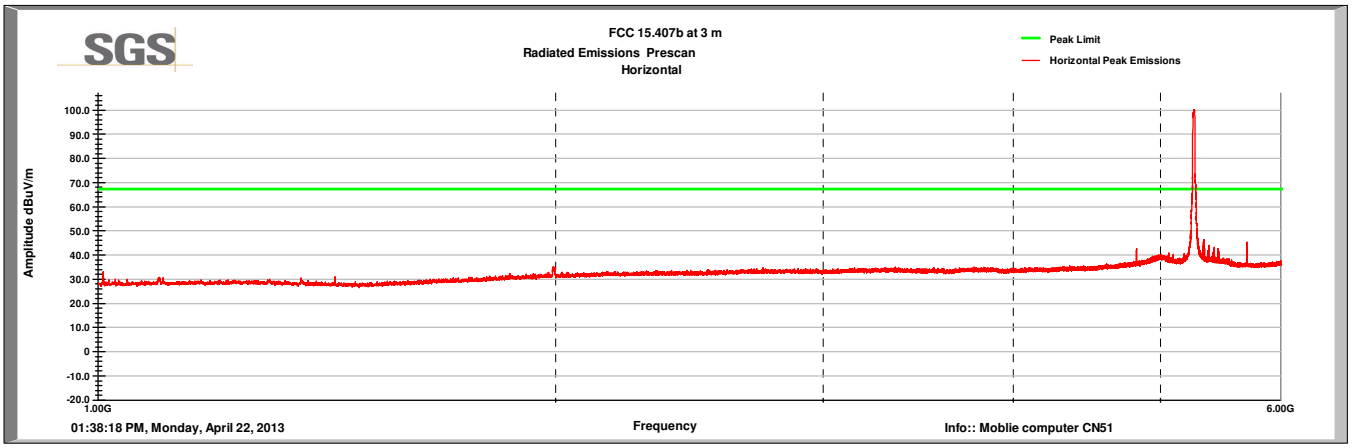
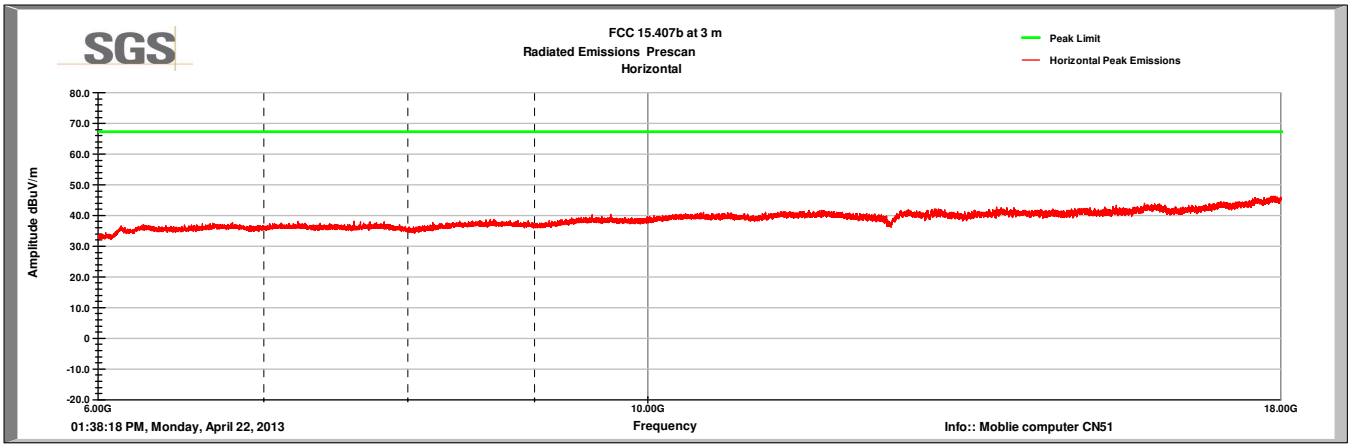
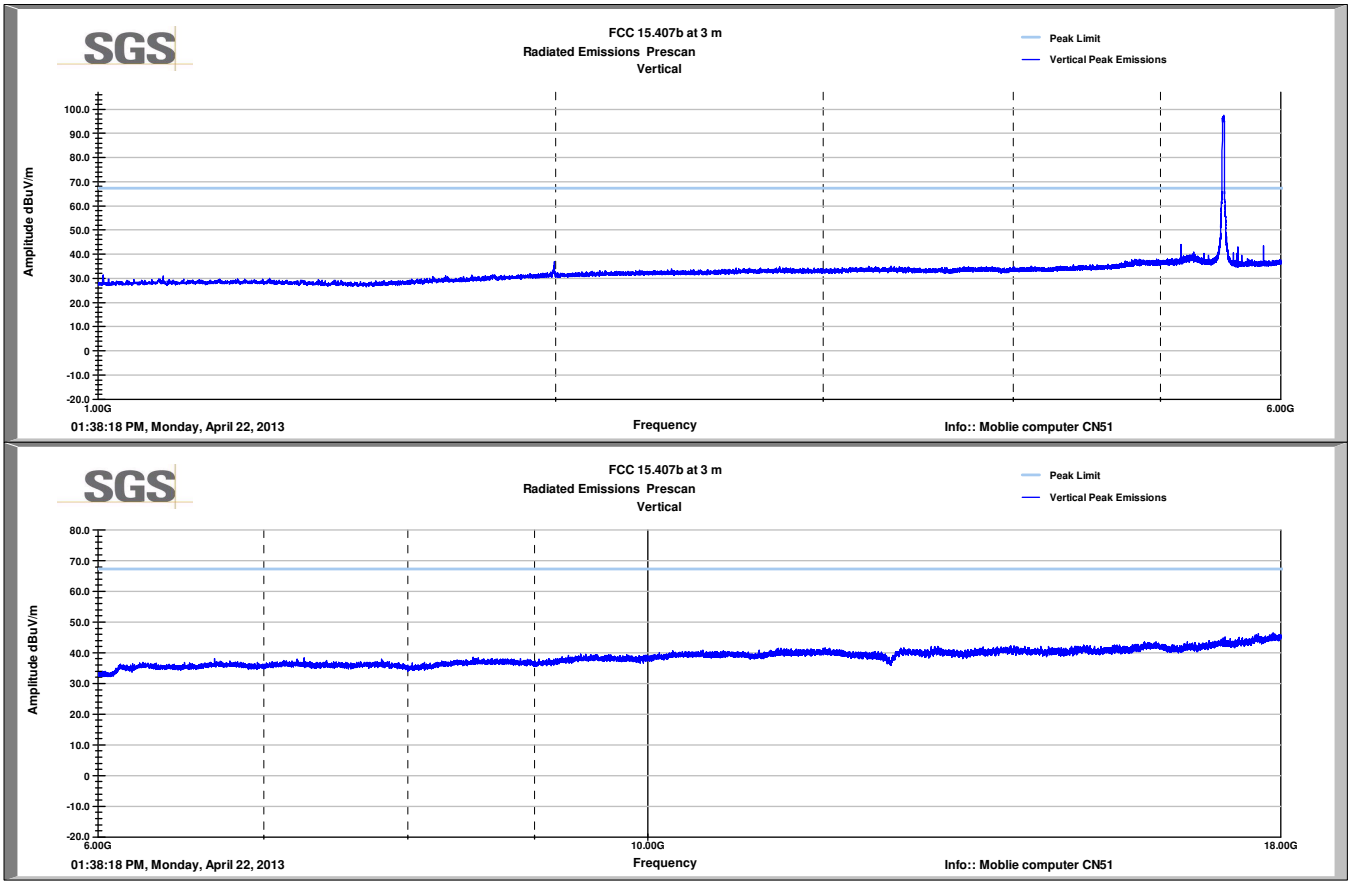




CH100 36MB
Vertical



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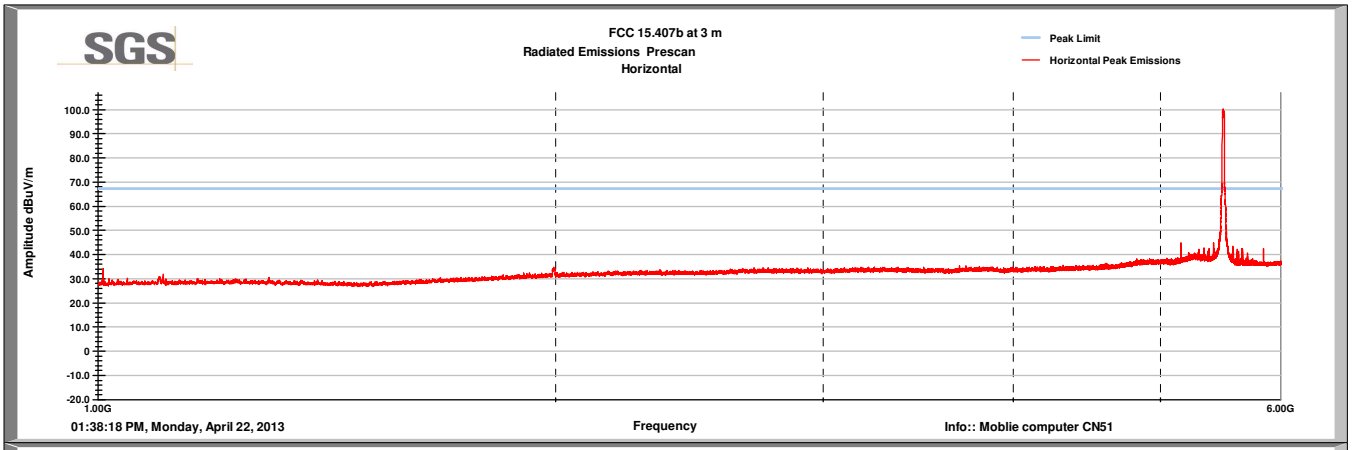
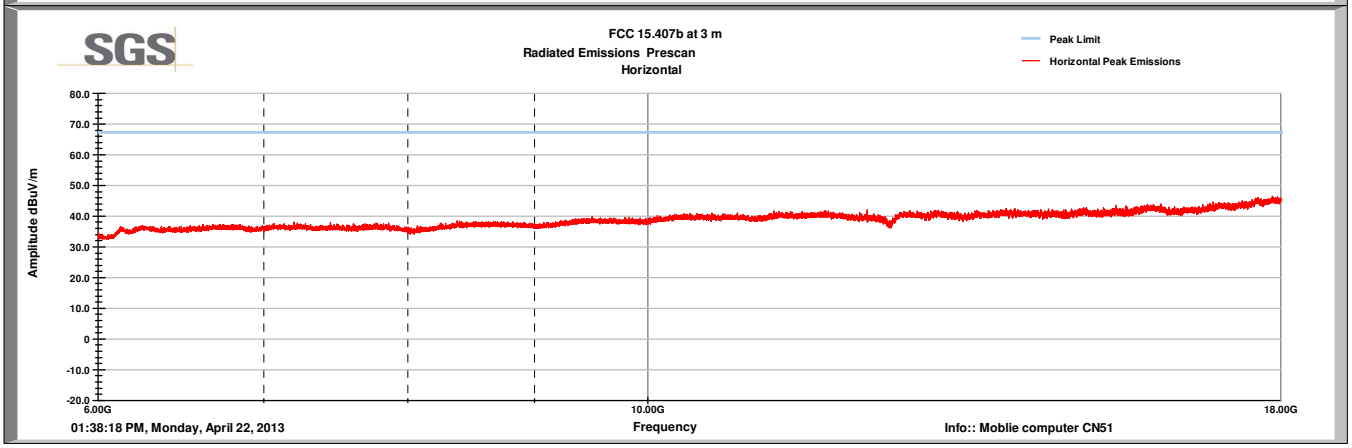
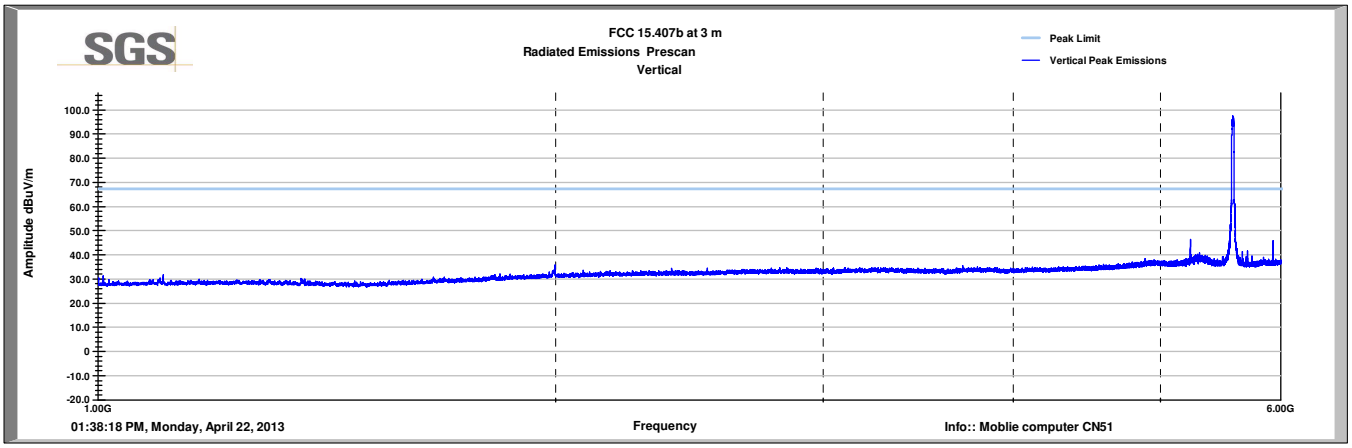
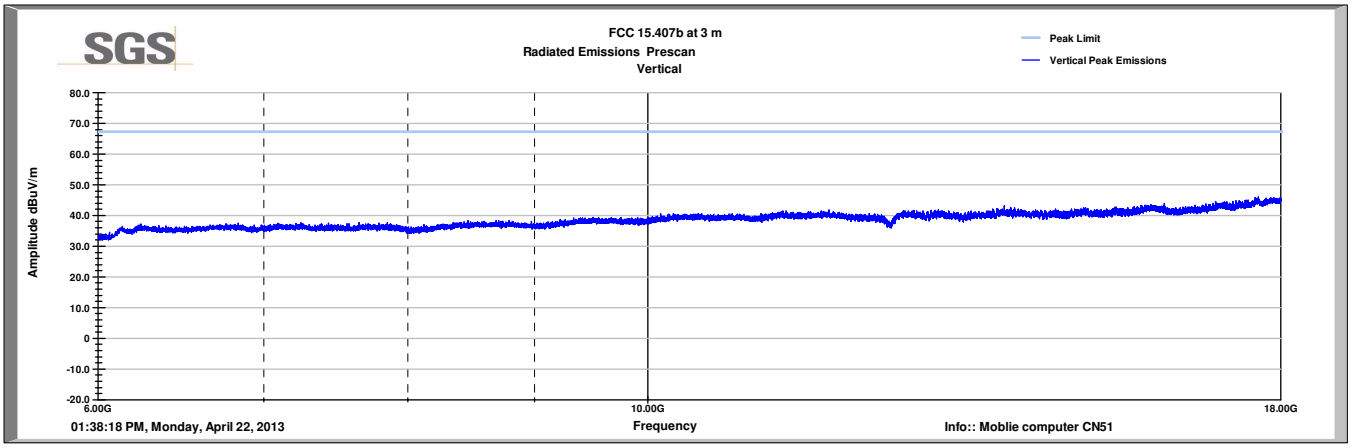


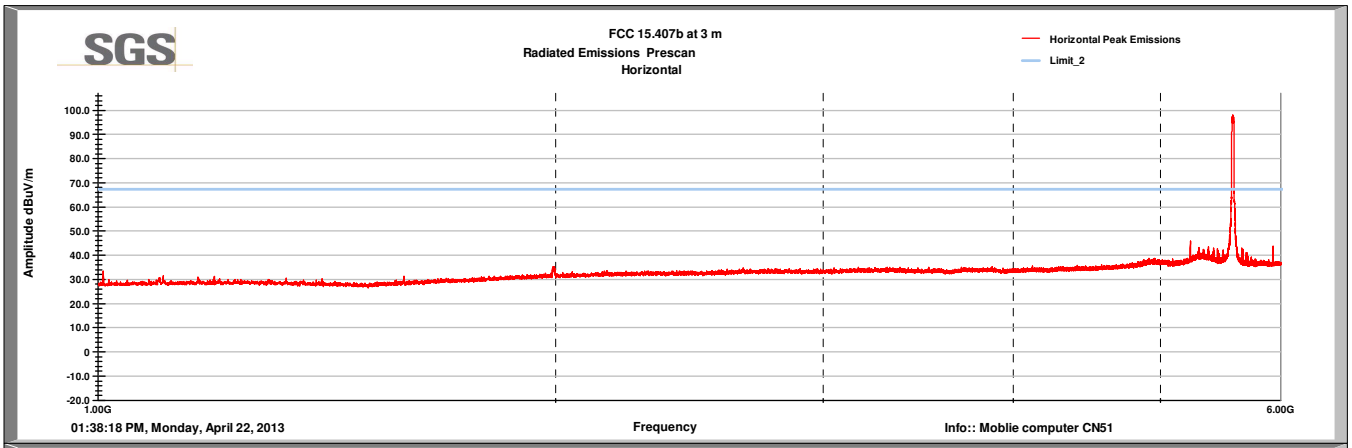


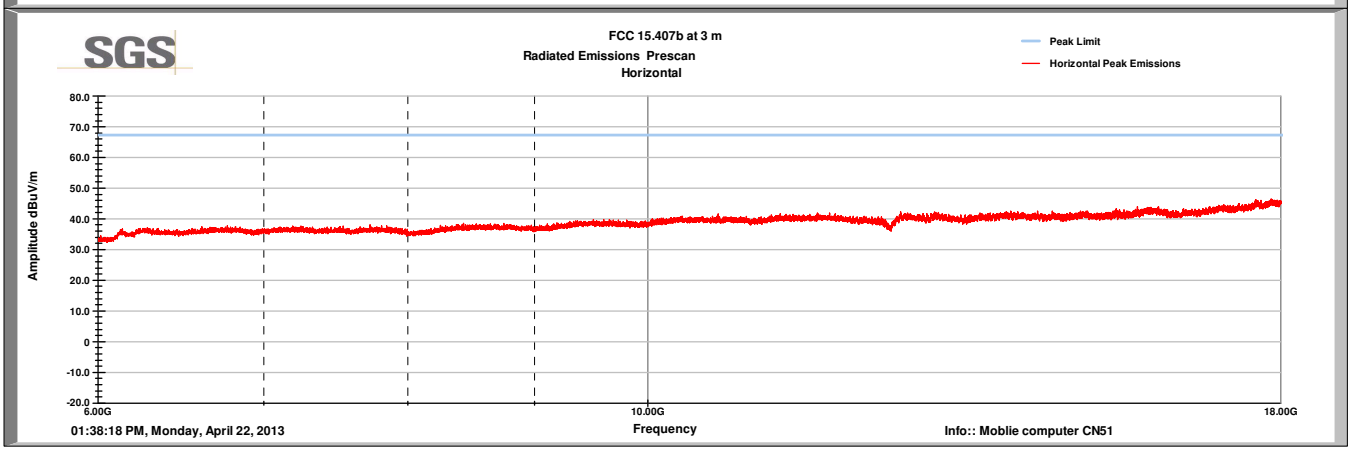
CH116 54MB
Vertical




SGS
FCC 15.407b at 3 m
Radiated Emissions Prescan
Vertical
Peak Limit
Vertical Peak Emissions
Amplitude dBuV/m
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
-10.0
-20.0
6.00G
10.00G
18.00G
01:38:18 PM, Monday, April 22, 2013
Frequency
Info:: Moblie computer CN51

Horizontal

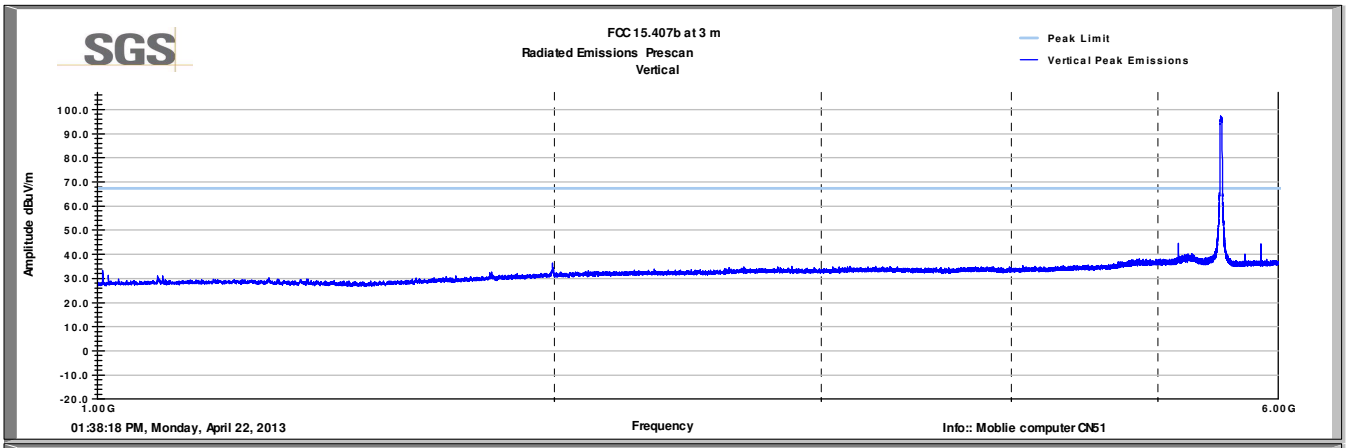

SGS
FCC 15.407b at 3 m
Radiated Emissions Prescan
Horizontal
Horizontal Peak Emissions
Limit_2
Amplitude dBuV/m
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
-10.0
-20.0
1.00G
6.00G
01:38:18 PM, Monday, April 22, 2013
Frequency
Info:: Moblie computer CN51

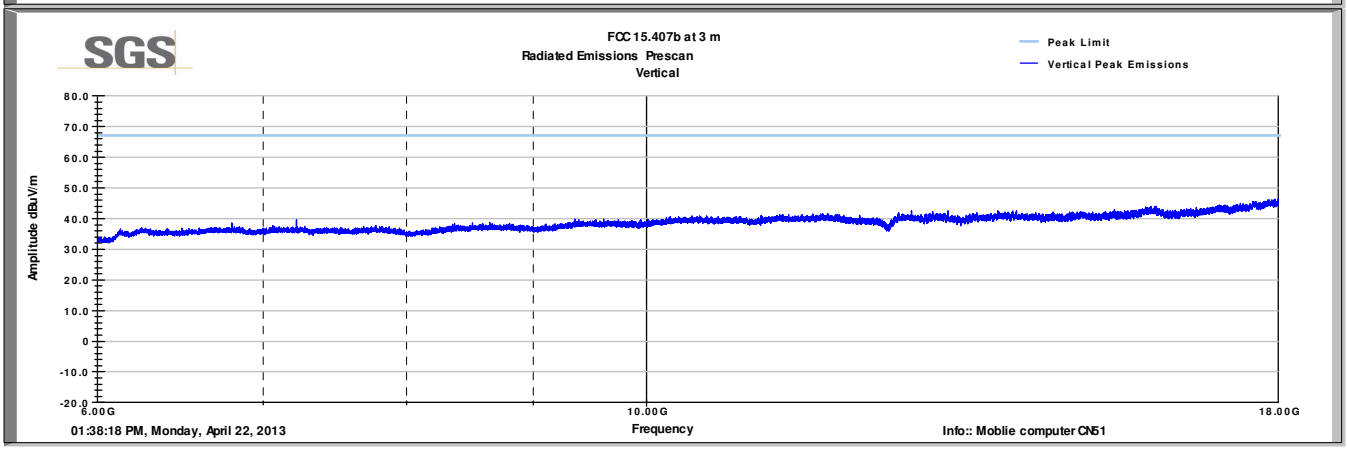

SGS
FCC 15.407b at 3 m
Radiated Emissions Prescan
Horizontal
Peak Limit
Horizontal Peak Emissions
Amplitude dBuV/m
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
-10.0
-20.0
6.00G
10.00G
18.00G
01:38:18 PM, Monday, April 22, 2013
Frequency
Info:: Moblie computer CN51

802.11n

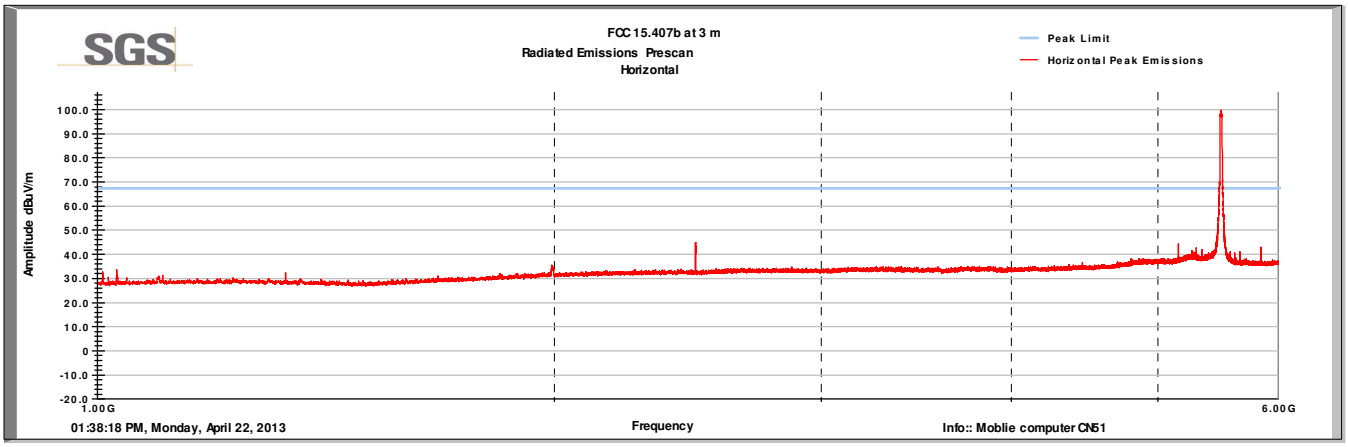
CH36 MCS0

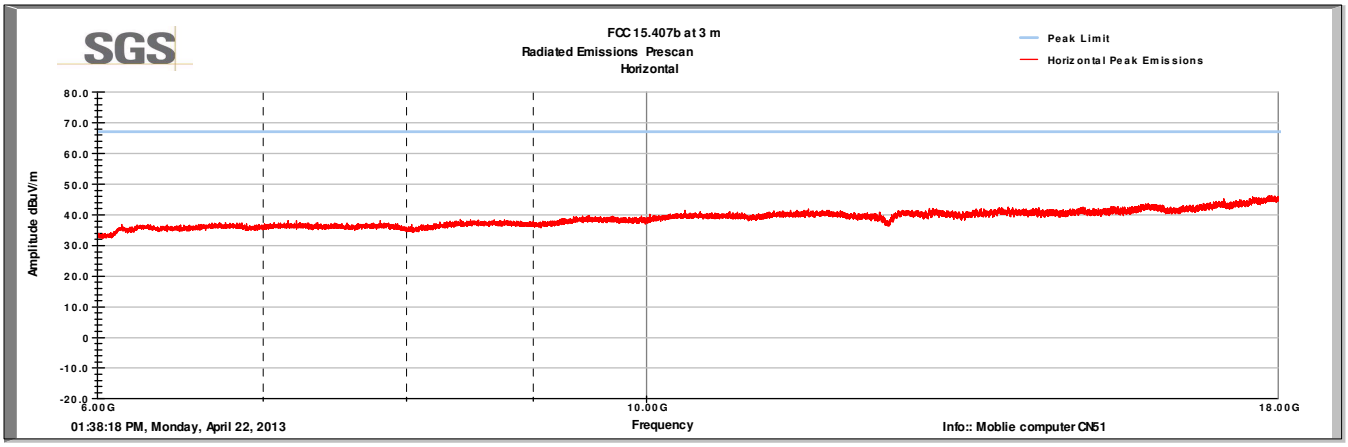
Vertical



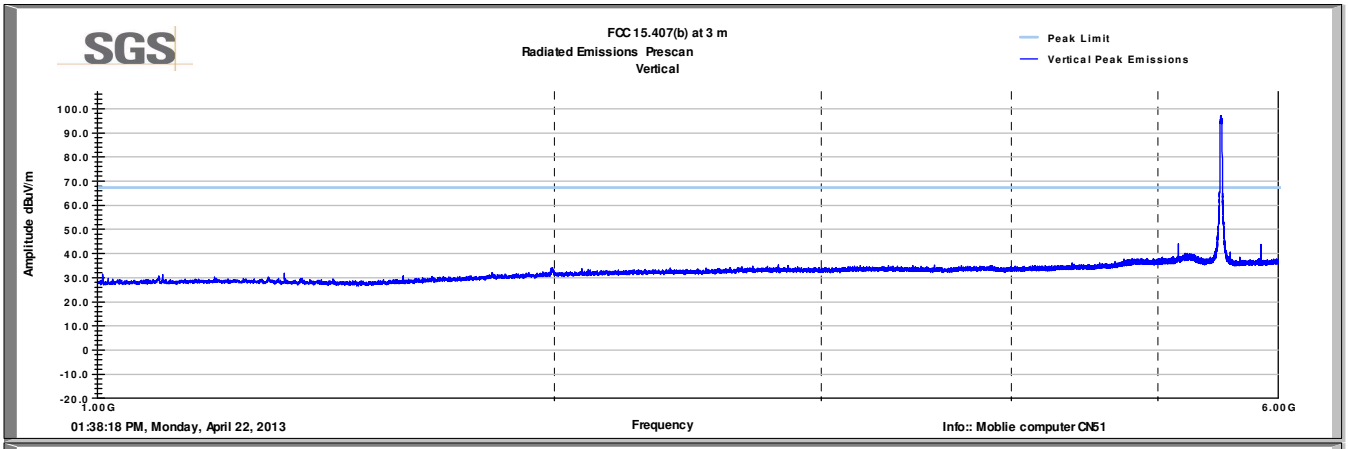


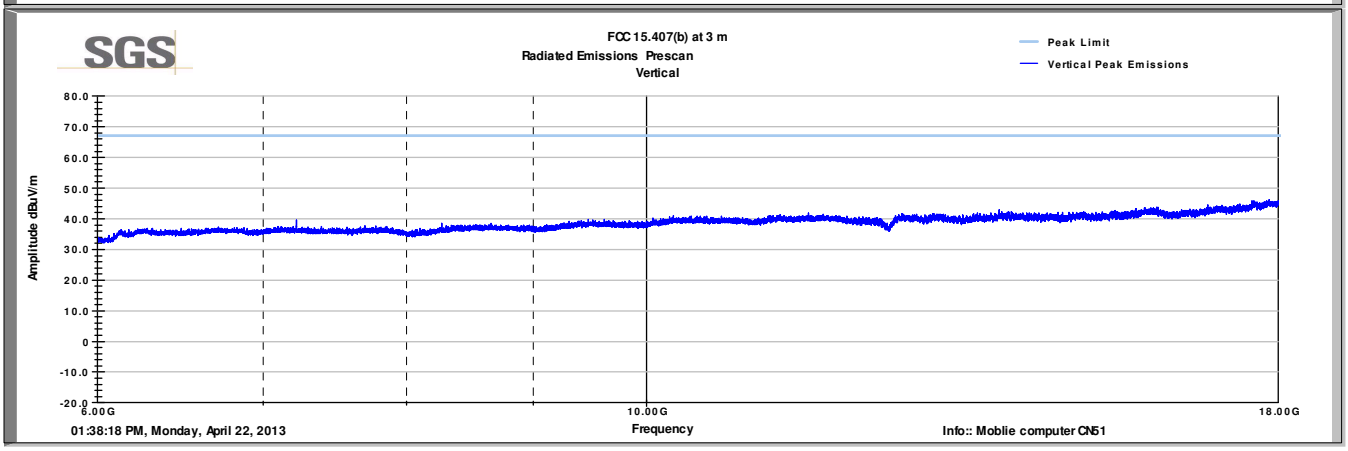
Horizontal



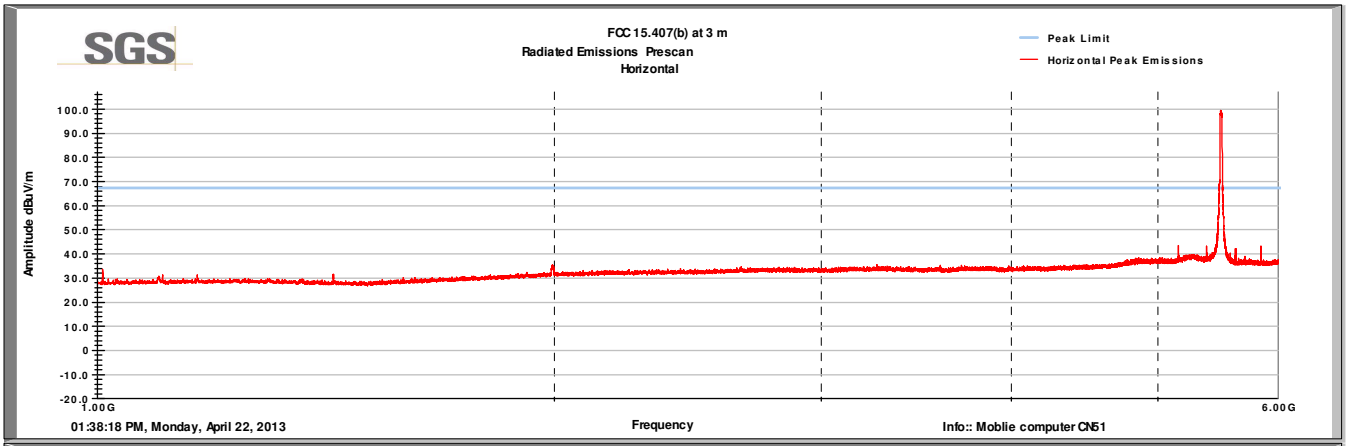


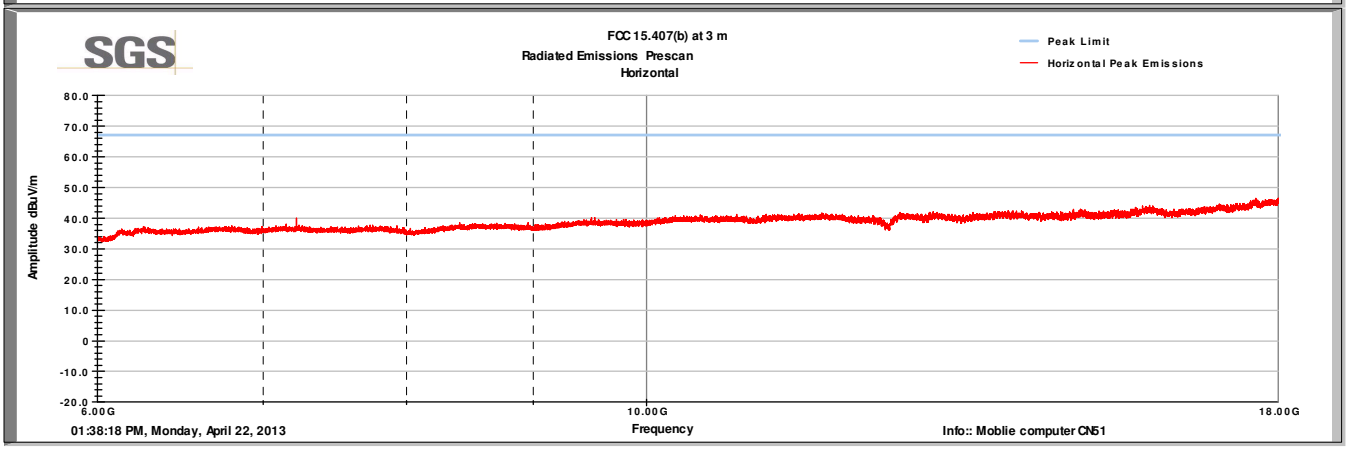
CH100 MCS0
Vertical



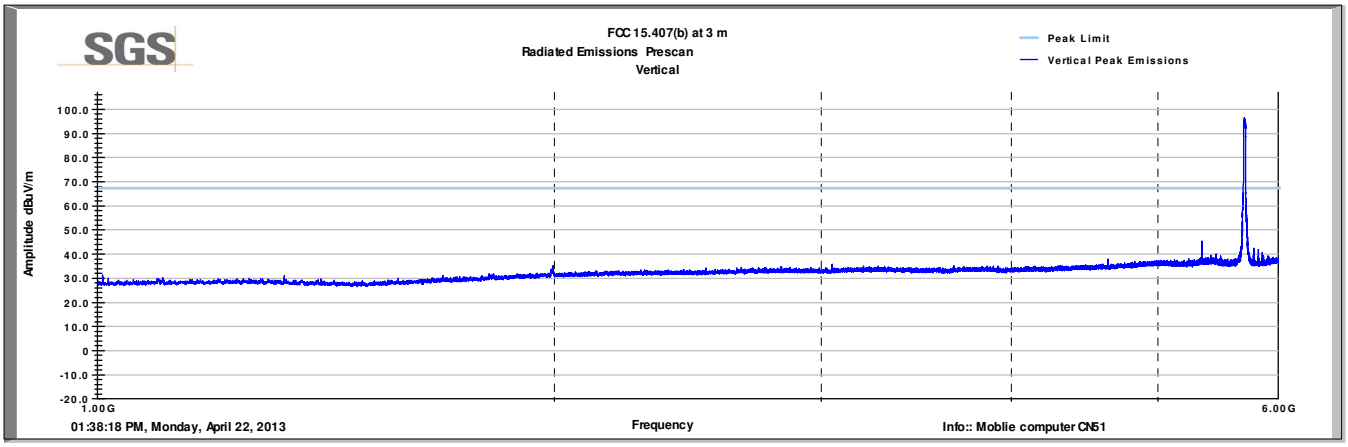


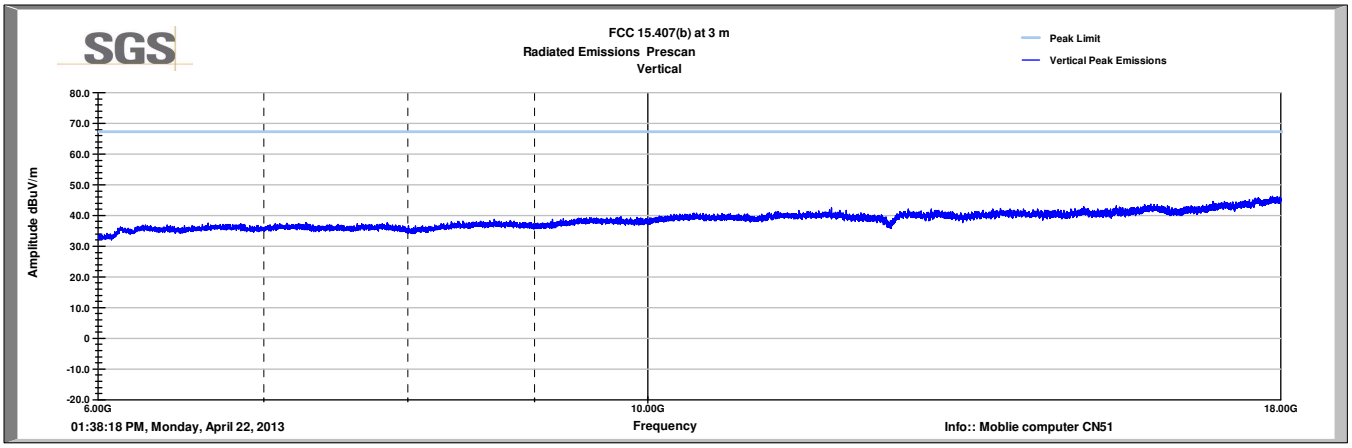
Horizontal



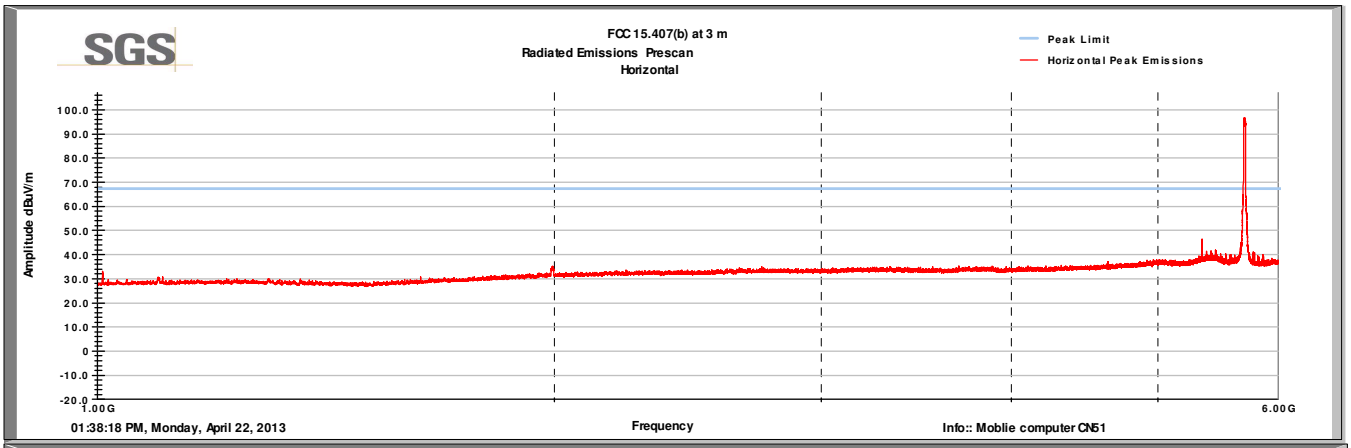


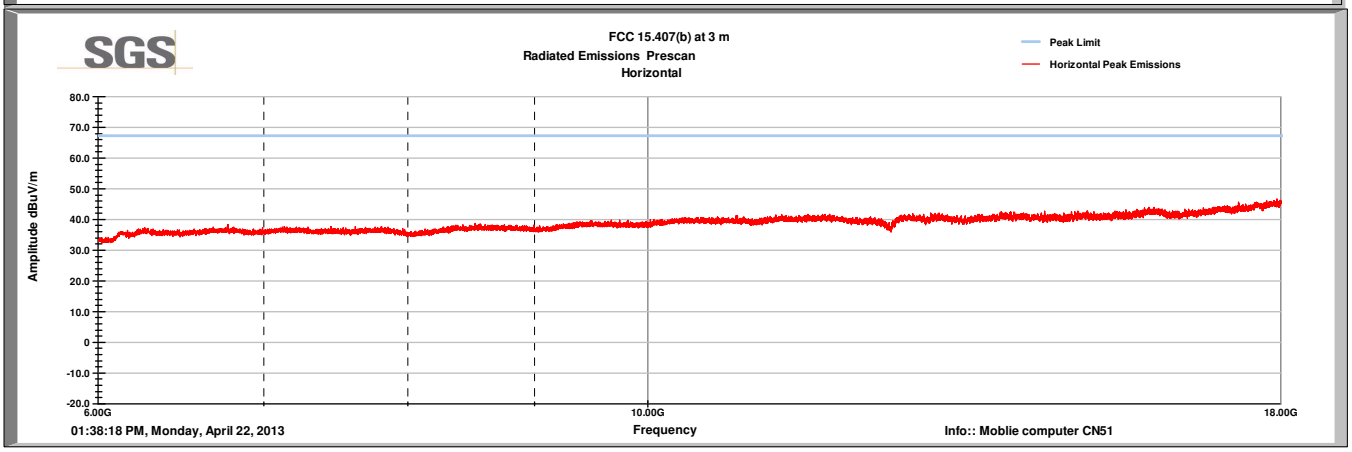
CH140 MCS7
Vertical




SGS
FCC 15.407(b) at 3 m
Radiated Emissions Prescan
Vertical
Peak Limit
Vertical Peak Emissions
Amplitude dBuV/m
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
-10.0
-20.0
6.00G
10.00G
18.00G
01:38:18 PM, Monday, April 22, 2013
Frequency
Info:: Moblie computer CN51

Horizontal


SGS
FCC 15.407(b) at 3 m
Radiated Emissions Prescan
Horizontal
Peak Limit
Horizontal Peak Emissions
Amplitude dBuV/m
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
-10.0
-20.0
1.00G
6.00G
01:38:18 PM, Monday, April 22, 2013
Frequency
Info:: Moblie computer CN51


SGS
FCC 15.407(b) at 3 m
Radiated Emissions Prescan
Horizontal
Peak Limit
Horizontal Peak Emissions
Amplitude dBuV/m
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
-10.0
-20.0
6.00G
10.00G
18.00G
01:38:18 PM, Monday, April 22, 2013
Frequency
Info:: Moblie computer CN51

18 to 40 GHz

There were no emissions above the measurement noise floor, which is at least 6 dB below the limit.

6 Power Spectral Density

6.1 *Test Result*

Test Description	Test Specification	Test Result
Power Spectral Density	15.407(1)(2)(5)	Compliant

6.2 *Test Method*

The test data was measured using a spectrum analyzer in the highest 30kHz band within the intended emission band

- Sample detector, trace averaging over 100 sweeps
- Resolution bandwidth of 1 MHz
- Video bandwidth at 3 MHz

The limits in any 1 MHz band are as follows:

Frequency Band (MHz)	Limit (dBm)
5150 - 5250	4
5250 - 5350	11
5470 - 5725	11

6.3 *Test Site*

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 24.4 ℃
Relative Humidity: 47.8 %

6.4 *Test Equipment*

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
NETWORK ANALYZER	ZVL	ROHDE & SCHWARZ	B079799	1-Jul-2013
EMI TEST RECEIVER	ESU40	ROHDE & SCHWARZ	B079629	24-Sep-2013

Note: The calibration period equipment is 1 year.

6.5 *Test Data*

802.11 n

Band (MHz)	Mode	Channel	Data Rate	Limit (dBm)	Spectral Density	Margin dB
5150 - 5250	N	36	MCS 0	4.0	-1.3	-5.3
5150 - 5250	N		MCS 7	4.0	-4.0	-8.0
5150 - 5250	N	48	MCS 0	4.0	-1.0	-5.0
5150 - 5250	N		MCS 7	4.0	-5.4	-9.4
5250 - 5350	N	52	MCS 0	11.0	-0.9	-11.9
5250 - 5350	N		MCS 7	11.0	-4.3	-15.3
5250 - 5350	N	64	MCS 0	11.0	-1.1	-12.1
5250 - 5350	N		MCS 7	11.0	-3.7	-14.7
5470 - 5725	N	100	MCS 0	11.0	-0.4	-11.4
5470 - 5725	N		MCS 7	11.0	-3.8	-14.8
5470 - 5725	N	120	MCS 0	11.0	-0.4	-11.4
5470 - 5725	N		MCS 7	11.0	-3.5	-14.5
5470 - 5725	N	140	MCS 0	11.0	-0.4	-11.4
5470 - 5725	N		MCS 7	11.0	-3.5	-14.5

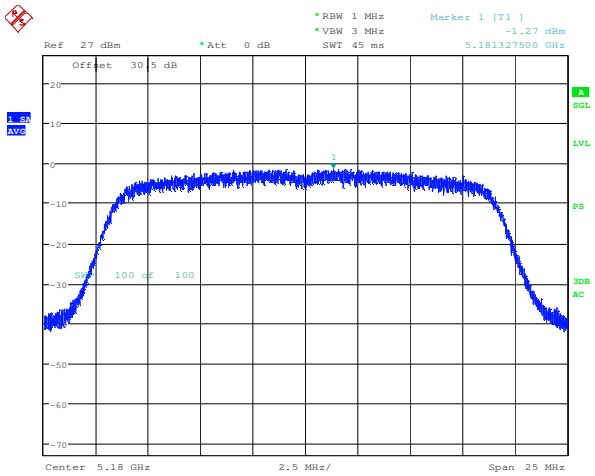
802.11 a

Band (MHz)	Mode	Channel	Data Rate (MB/s)	Limit (dBm)	Spectral Density	Margin dB
5150 - 5250	A	36	6	4.0	3.6	-0.4
5150 - 5250	A		54	4.0	1.8	-2.2
5150 - 5250	A	48	6	4.0	2.9	-1.2
5150 - 5250	A		54	4.0	2.1	-1.9
5250 - 5350	A	52	6	11.0	3.1	-8.0
5250 - 5350	A		54	11.0	2.5	-8.5
5250 - 5350	A	64	6	11.0	2.9	-8.1
5250 - 5350	A		54	11.0	2.0	-9.0
5470 - 5725	A	100	6	11.0	3.9	-7.1
5470 - 5725	A		54	11.0	2.5	-8.5
5470 - 5725	A	120	6	11.0	2.7	-8.3
5470 - 5725	A		54	11.0	1.9	-9.2
5470 - 5725	A	140	6	11.0	2.5	-8.5
5470 - 5725	A		54	11.0	2.0	-9.0

802.11n

CH36

MCS0 and MCS7



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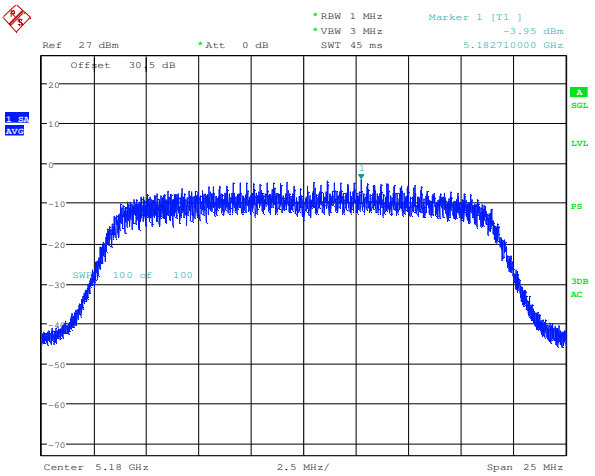

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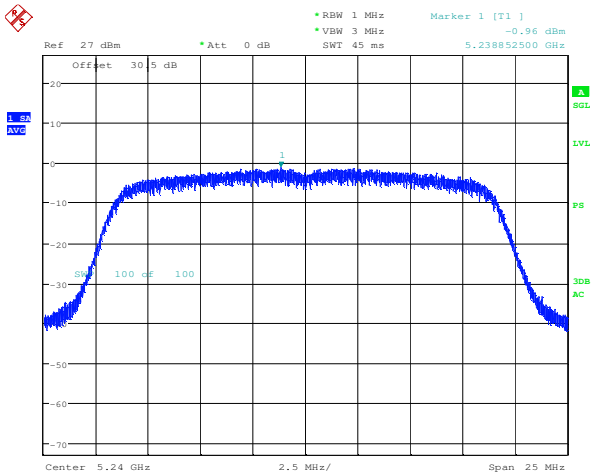
CH48

MCS0 and MCS7



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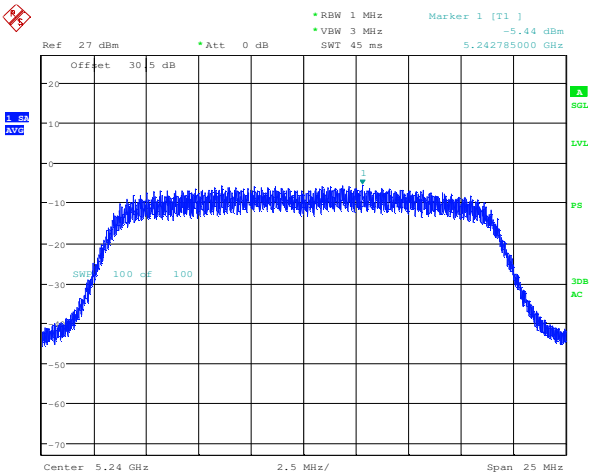

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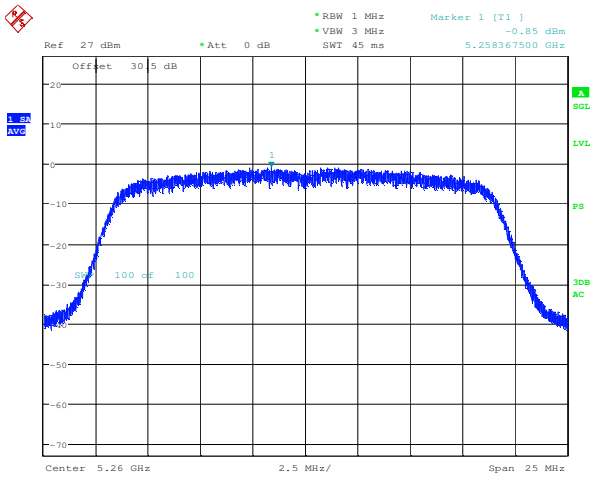
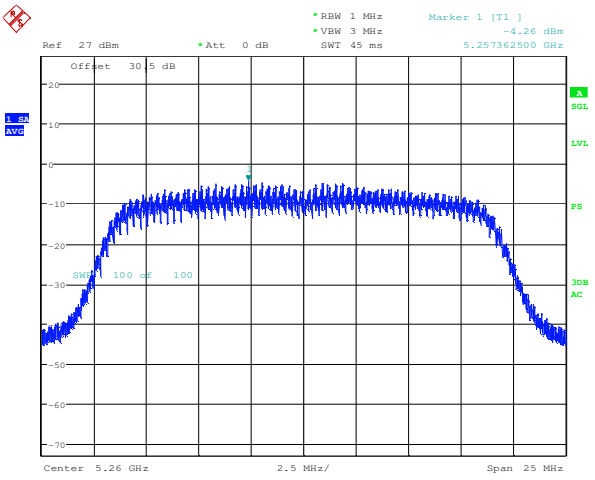
CH52
MCS0 and MCS7

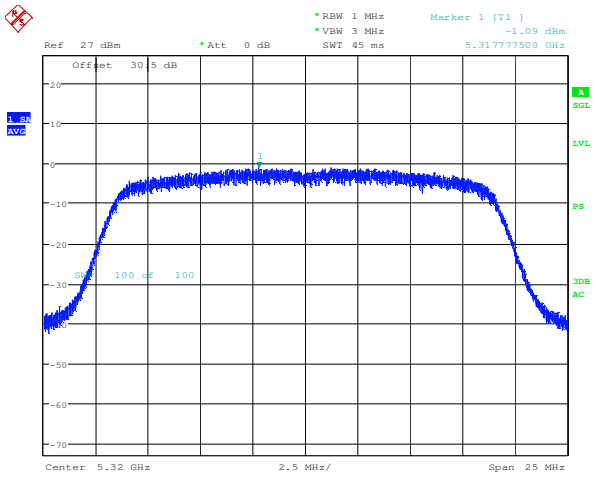


Date: 19.APR.2013 14:14:13



Date: 19.APR.2013 14:15:00

CH64
MCS0 and MCS7



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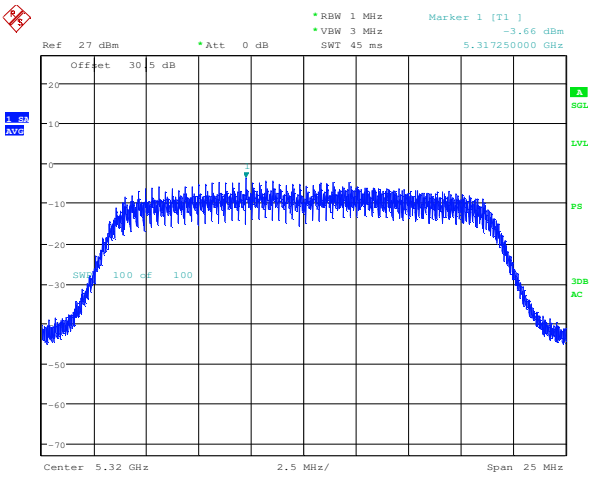

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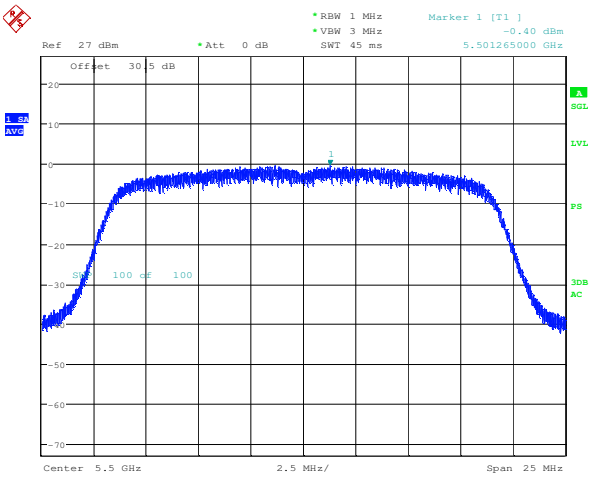
CH100
MCS0 and MCS7



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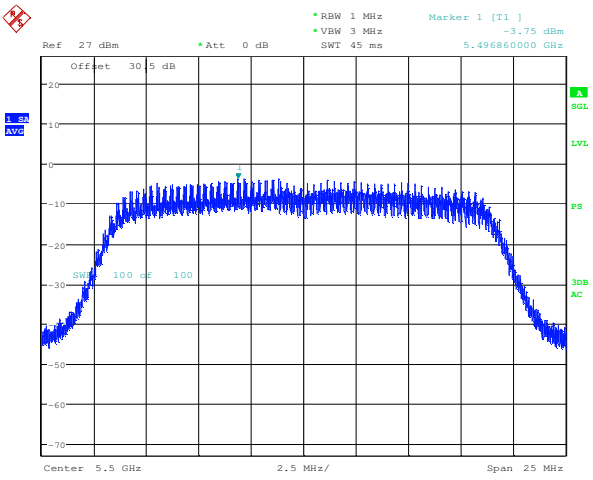

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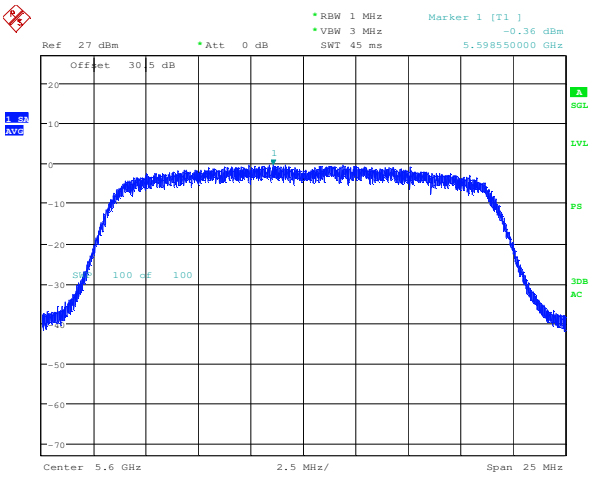
CH120
MCS0 and MCS7



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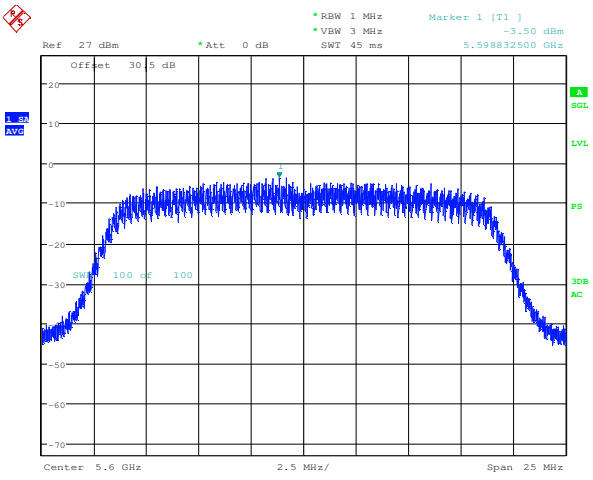

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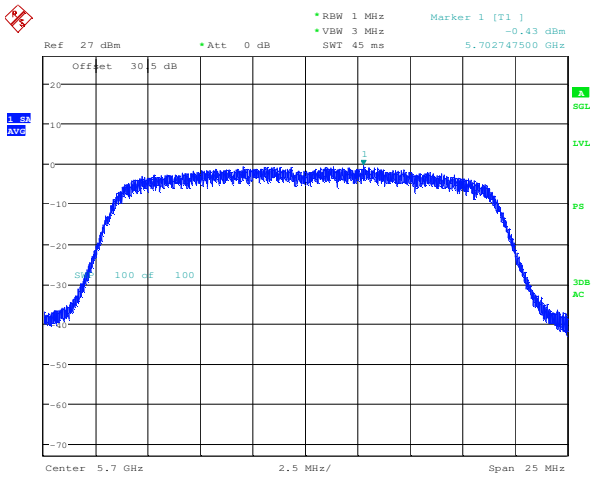
CH140
MCS0 and MCS7



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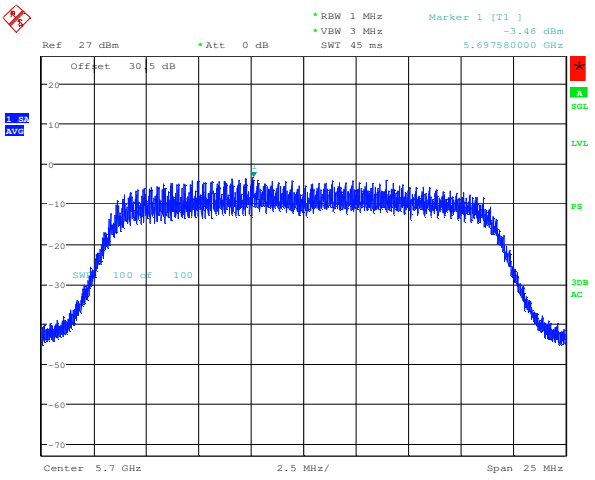

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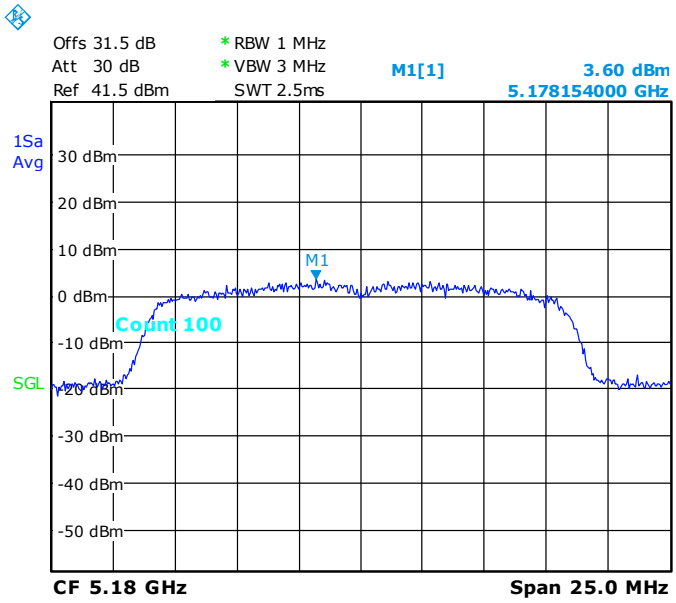
802.11a

CH36
6 and 54 MB



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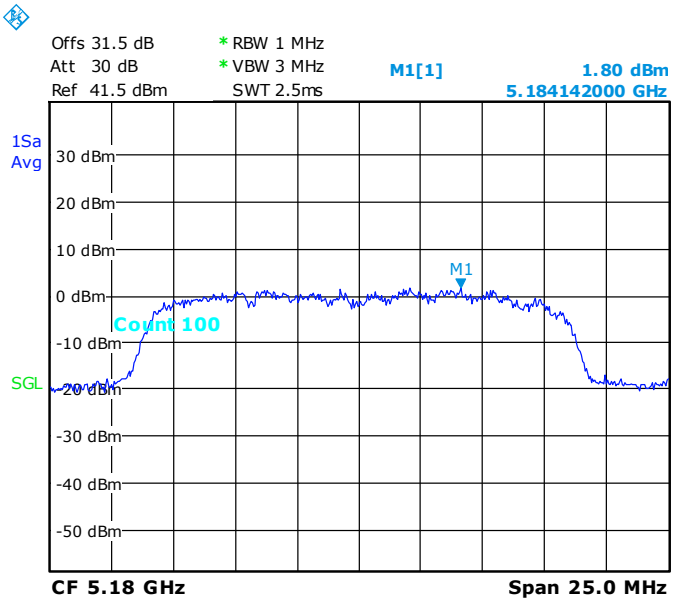

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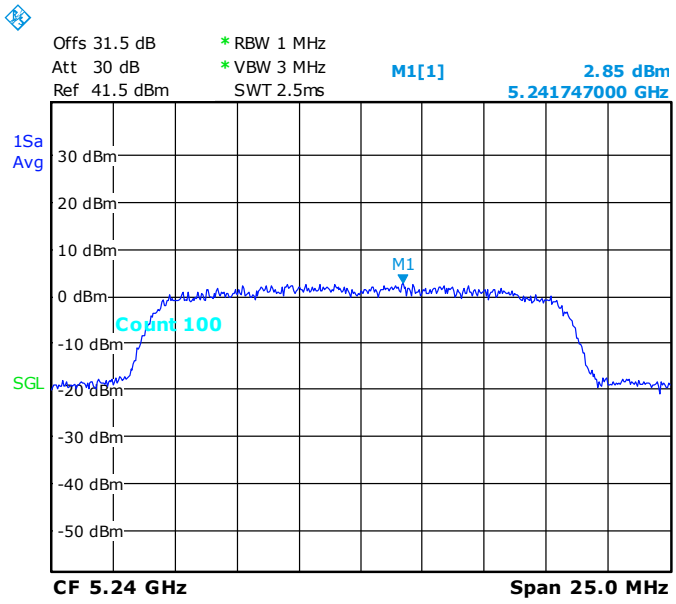
CH48
6 and 54 MB



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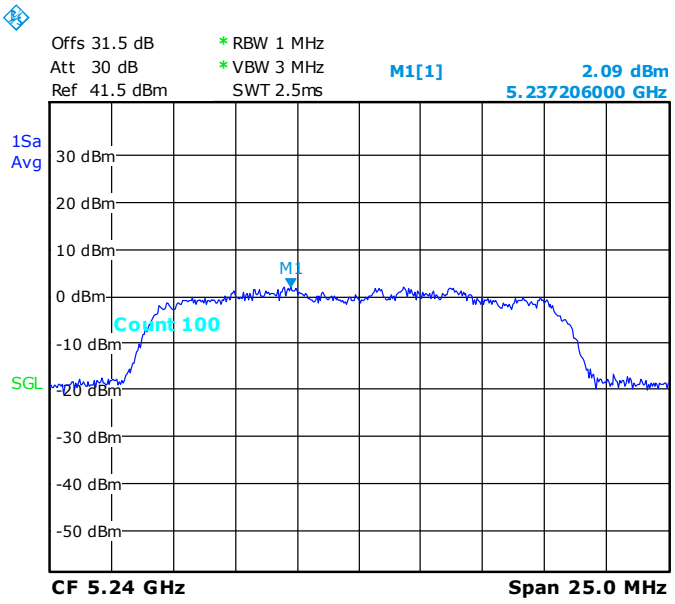

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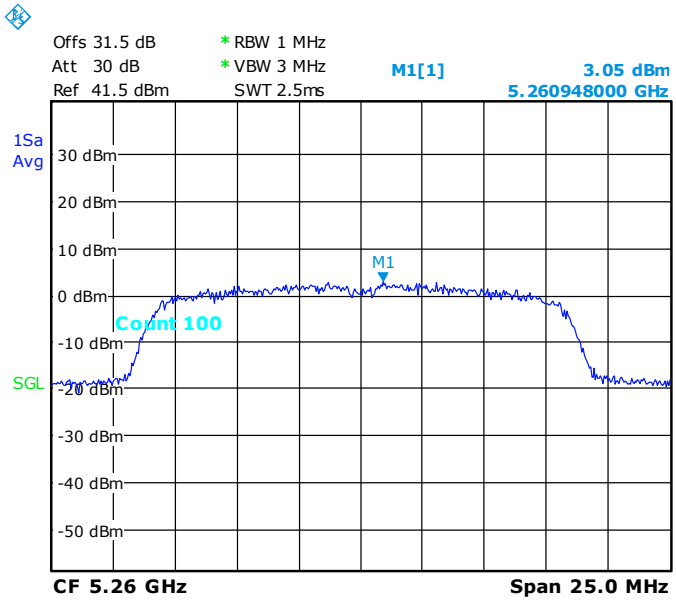
CH52
6 and 54 MB



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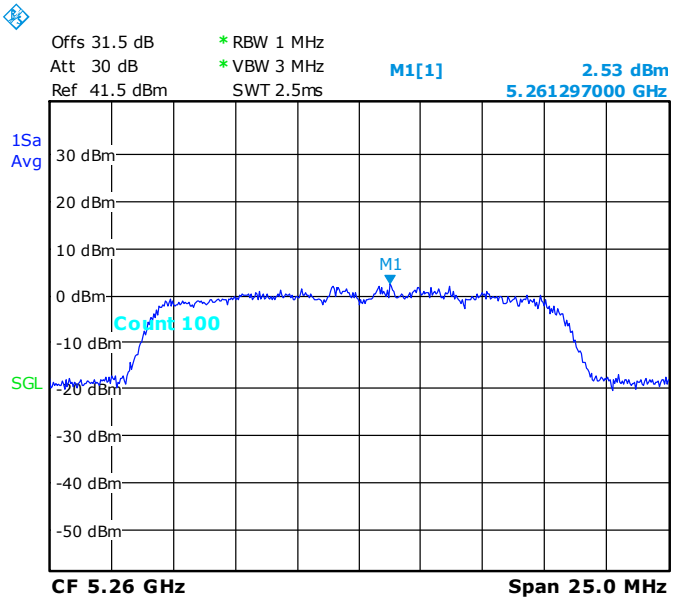

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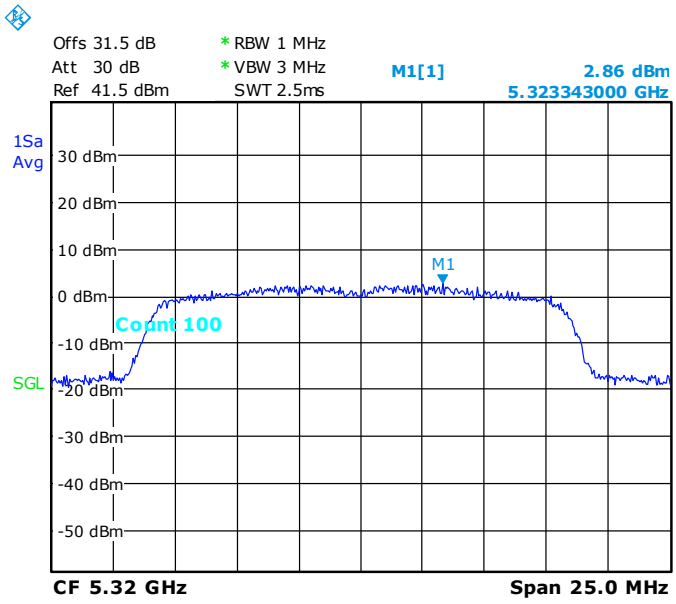
CH64
6 and 54 MB



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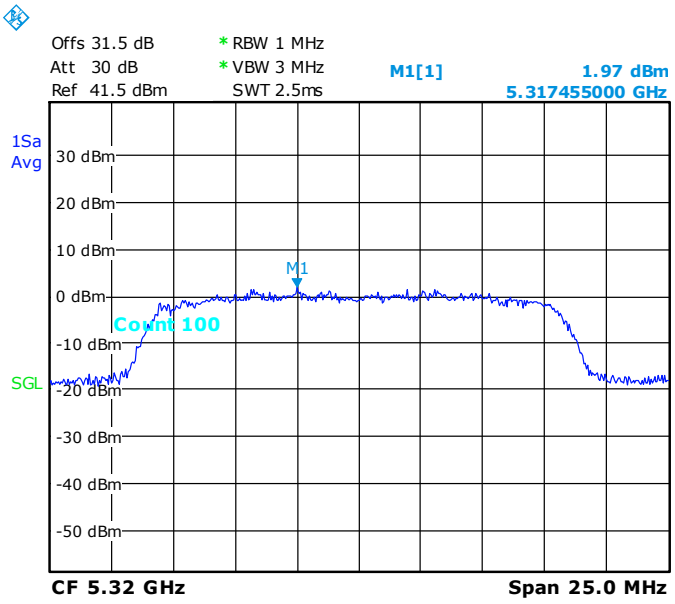

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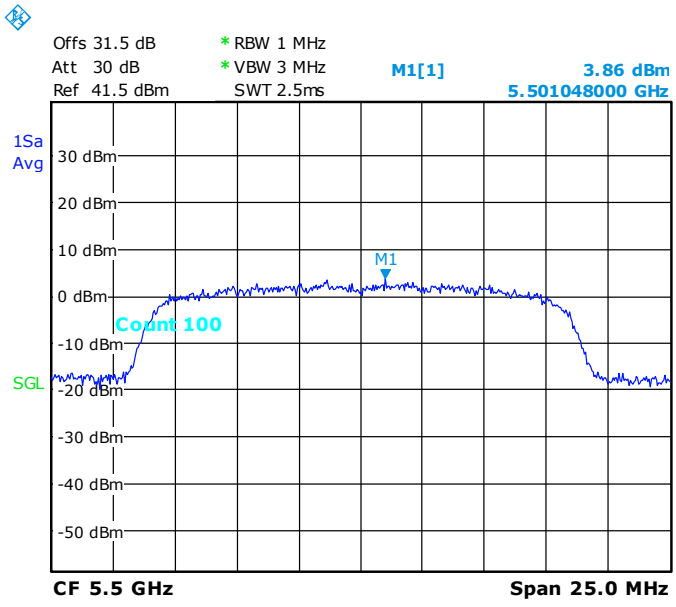
CH100
6 and 54 MB



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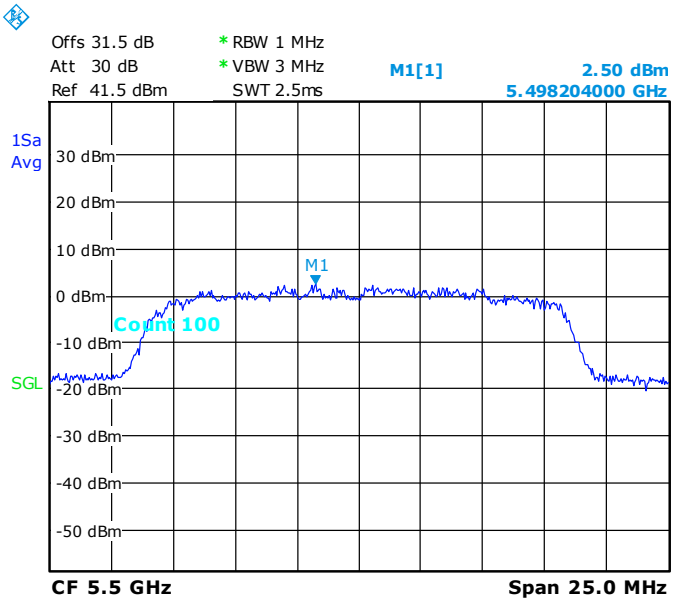

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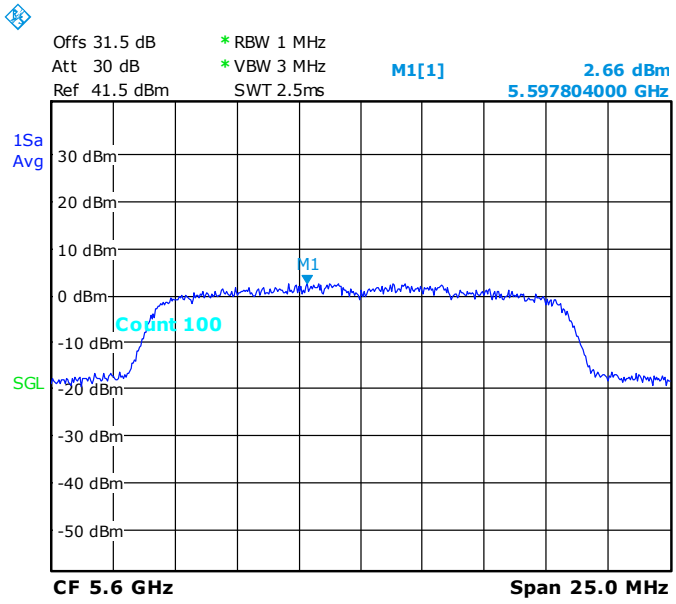
CH120
6 and 54 MB



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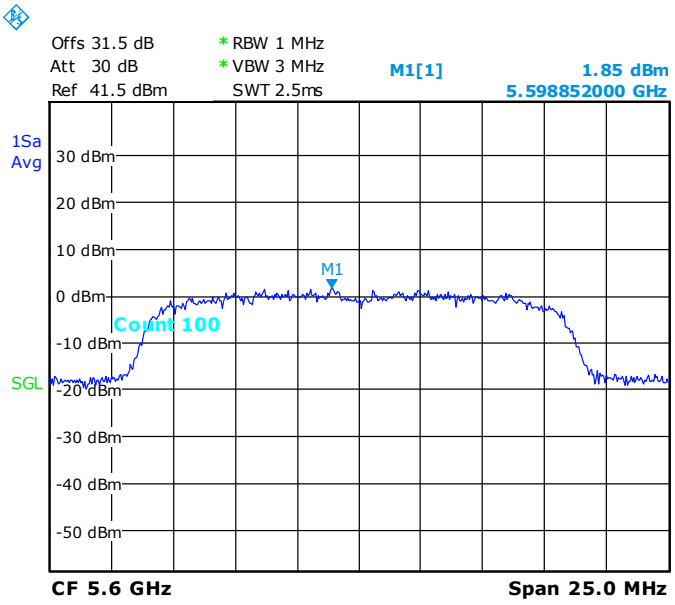

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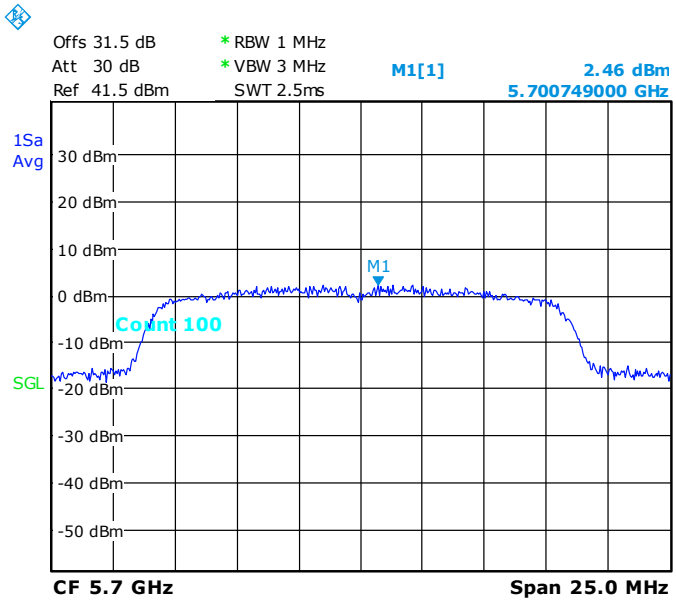
CH140
6 and 54 MB



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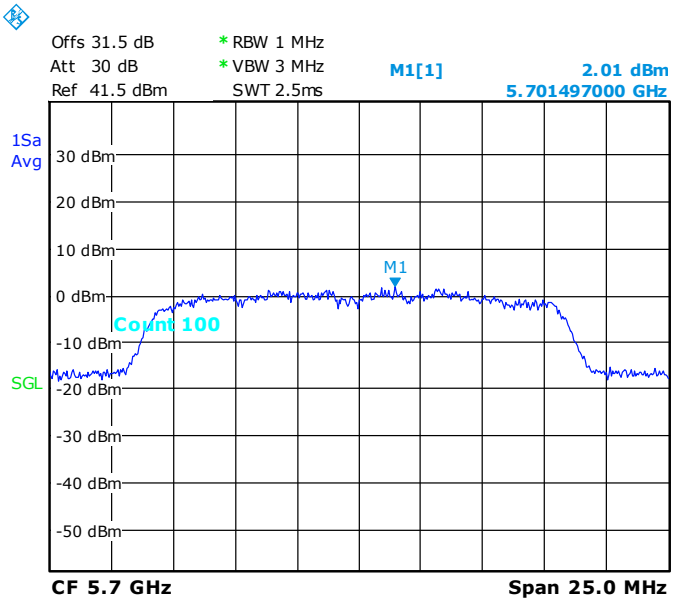


Date: 12.MAR.2013 04:59:02

7 Peak Excursion

7.1 *Test Result*

Test Description	Test Specification	Test Result
Peak Excursion	15.407 (6)	Compliant

7.2 *Test Method*

The EUT was connected to a spectrum analyzer and made to transmit continuously. The Spectrum Analyzer was configured with the same Bandwidth, Sweep and Span settings as for the Output power measurement. One trace was set with an RMS detector and trace averaging as prescribed in KDB789033 and trace averaged over 100 sweeps, simultaneously a second trace was recorded with Peak detector and MaxHold settings enabled. A marker was used on each trace to locate the highest emission, the difference between each maximum was calculated and reported as the Peak Excursion and compared to the limit.

Limit : "The ratio of the peak excursion of the modulation envelope to the maximum conducted power shall not exceed 13dB across any 1 MHz bandwidth…"

7.3 *Test Site*

3m Absorber Lined Shielded Enclosure (ALSE), Suwanee, GA

Environmental Conditions
Temperature: 23.8 ℃
Relative Humidity: 46.6 %

7.4 *Test Equipment*

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
Receiver	ESU40	R&S	B079629	24 SEP 2013
Attenuator	BW-S30W2+	Mini-Circuits	B079794	VBU
Network Analzyer	ZVL	R&S	B079799	1 JUL 2013

Note: The calibration period equipment is 1 year.

7.5 *Test Setup Photographs*

Test setup photographs are located in a separate exhibit.

7.6 *Test Data*

Peak Excursion Data

802.1N

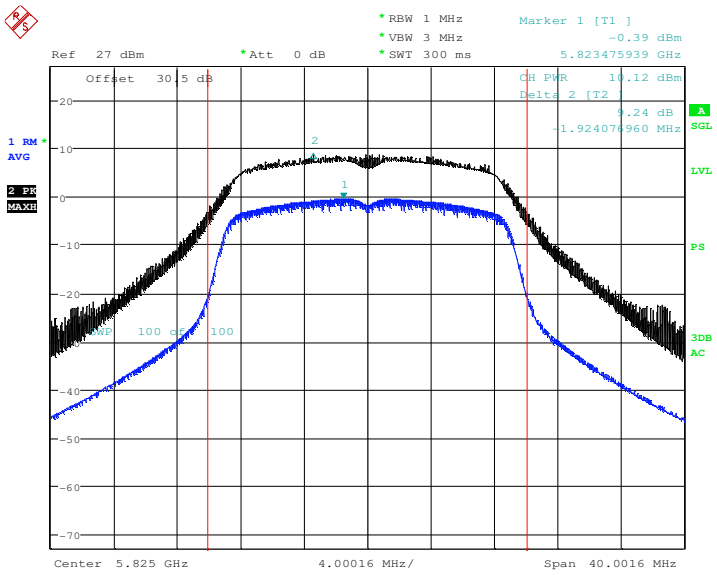
Band (MHz)	Mode	Channel	Data Rate	Limit (dBm)	Peak Excursion, dB	Margin dB
5150 - 5250	N	36	MCS 0	13.0	9.3	-3.7
5150 - 5250	N		MCS 7	13.0	11.6	-1.4
5150 - 5250	N	48	MCS 0	13.0	9.6	-3.4
5150 - 5250	N		MCS 7	13.0	10.9	-2.1
5250 - 5350	N	52	MCS 0	13.0	9.2	-3.8
5250 - 5350	N		MCS 7	13.0	10.7	-2.3
5250 - 5350	N	64	MCS 0	13.0	9.6	-3.4
5250 - 5350	N		MCS 7	13.0	11.3	-1.8
5470 - 5725	N	100	MCS 0	13.0	9.5	-3.5
5470 - 5725	N		MCS 7	13.0	11.0	-2.0
5470 - 5725	N	120	MCS 0	13.0	9.1	-3.9
5470 - 5725	N		MCS 7	13.0	11.2	-1.8
5470 - 5725	N	140	MCS 0	13.0	9.5	-3.5
5470 - 5725	N		MCS 7	13.0	11.7	-1.3

802.11 A

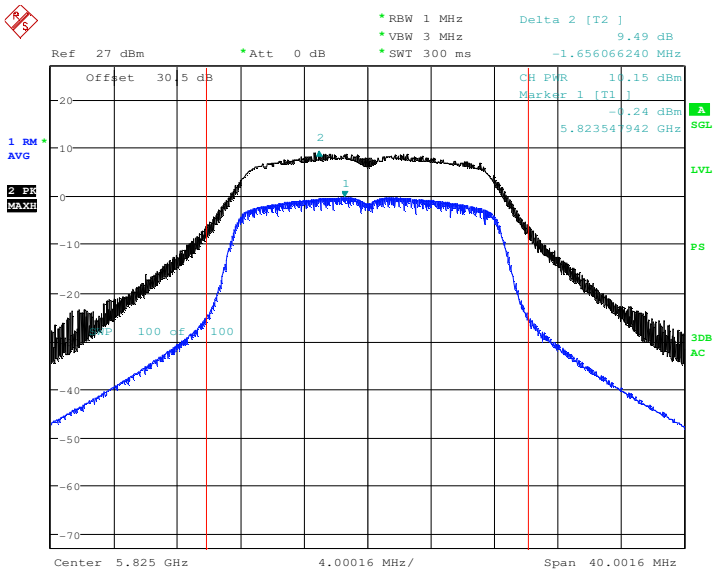
Band (MHz)	Mode	Channel	Data Rate (MB/s)	Limit (dBm)	Peak Excursion, dB	Margin dB
5150 - 5250	A	36	6	13.0	9.6	-3.4
5150 - 5250	A		36	13.0	10.7	-2.3
5150 - 5250	A		54	13.0	11.2	-1.8
5150 - 5250	A	48	6	13.0	9.6	-3.4
5150 - 5250	A		36	13.0	10.0	-3.0
5150 - 5250	A		54	13.0	11.2	-1.8
5250 - 5350	A	52	6	13.0	9.4	-3.6
5250 - 5350	A		54	13.0	11.7	-1.3
5250 - 5350	A	64	6	13.0	9.5	-3.5
5250 - 5350	A		54	13.0	11.0	-2.0
5470 - 5725	A	100	6	13.0	9.7	-3.3
5470 - 5725	A		54	13.0	11.0	-2.0
5470 - 5725	A	120	6	13.0	9.5	-3.5
5470 - 5725	A		54	13.0	11.9	-1.1
5470 - 5725	A	140	6	13.0	9.2	-3.8
5470 - 5725	A		54	13.0	11.2	-1.8

Measurement Parameters

802.11 N



802.11 A



8 Conducted Emissions

8.1 *Test Result*

Test Description	Basic Standards	Test Result
Conducted Emissions	15.107, Class B ANSI C63.4:2009	Compliant

8.2 *Test Method*

With the receivers resolution bandwidth was set to 9 kHz the initial preliminary exploratory scans were performed over the measuring frequency range (0.15MHz to 30MHz) using a max hold mode incorporating a Peak detector and Average detector and using the TILE! software. The final test data was measured using a Quasi-Peak detector and Average detector and compared against the limits indicated in the table below.

Frequency Range	Class A Limits (dBuV)		Class B Limits (dBuV)	
	FCC	CISPR	FCC	CISPR
0.15 to 0.5 MHz	Avg 66 QP 79		Avg 56 to 46 QP 66 to 56	
0.5 to 5 MHz	Avg 60 QP 73		Avg 46 Pk 56	
5 to 30 MHz	Avg 60 QP 73		Avg 50 Pk 60	

8.3 *Test Site*

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions
Temperature: 24.4 ℃
Relative Humidity: 47.8 %

8.4 *Test Equipment*

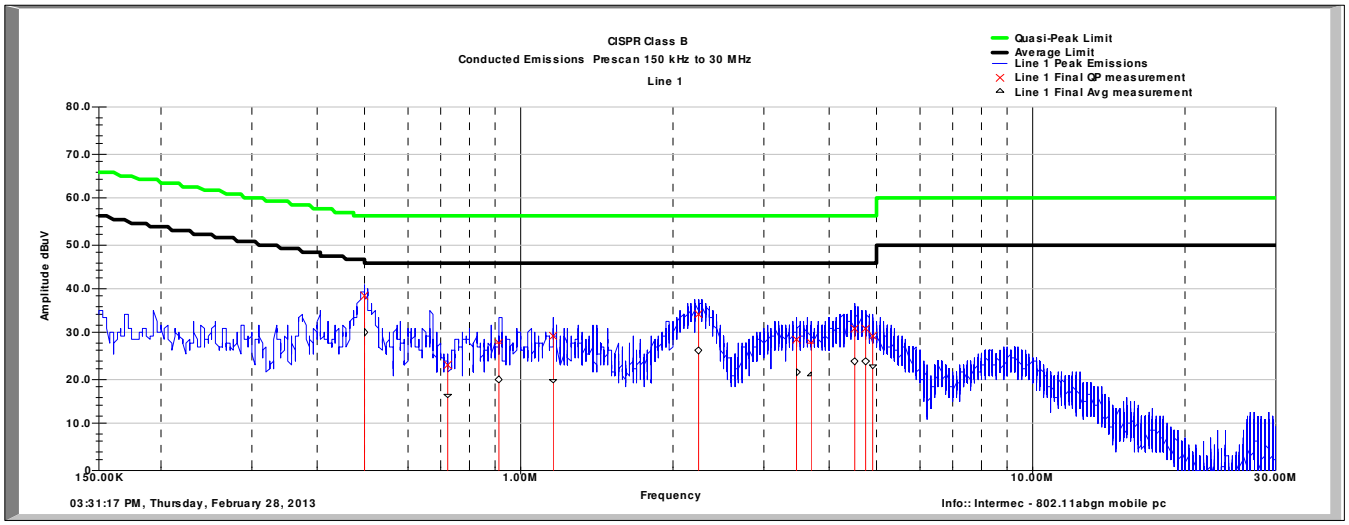
Equipment	Model	Manufacturer	Asset Number	Cal Due Date
LISN	NNB51	TESEQ	B085882	6 OCT 2012
Receiver	ESU40	R & S	B079629	25 AUG 2012

Note: The calibration period equipment is 1 year.

Software:
“Conducted Emissions” TILE! profile dated 10 Nov 2011

8.5 *Test Data*

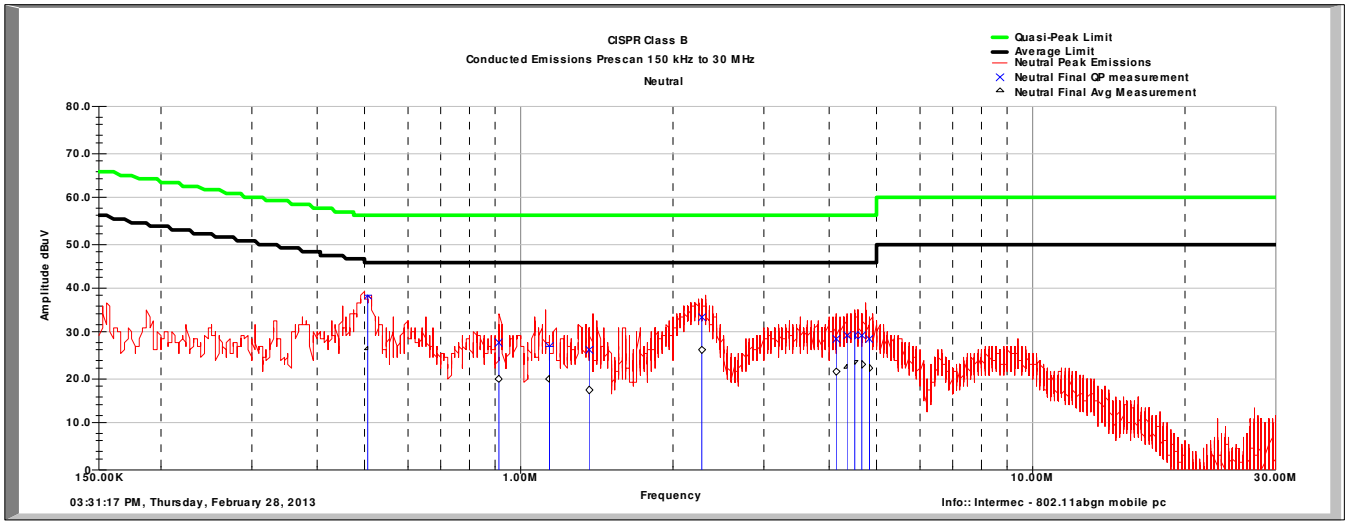
802.11a CH36
Line 1 Conducted Emissions Plot



Line 1 Conducted Emissions Data

Frequency MHz	QP Value dBuV	QP Limit dBuV	Margin dB	Avg Value dBuV	Avg Limit dBuV	Avg Margin dB
0.499	38.5	56.0	-17.5	30.2	46.0	-15.8
0.721	23.1	56.0	-32.9	16.3	46.0	-29.7
0.911	28.3	56.0	-27.7	19.7	46.0	-26.3
1.156	29.4	56.0	-26.6	19.5	46.0	-26.5
2.228	34.5	56.0	-21.5	26.4	46.0	-19.6
3.490	28.5	56.0	-27.5	21.3	46.0	-24.7
3.676	28.3	56.0	-27.7	21.0	46.0	-25.0
4.498	31.2	56.0	-24.8	24.0	46.0	-22.0
4.709	30.8	56.0	-25.2	23.8	46.0	-22.2
4.870	29.6	56.0	-26.4	22.7	46.0	-23.3

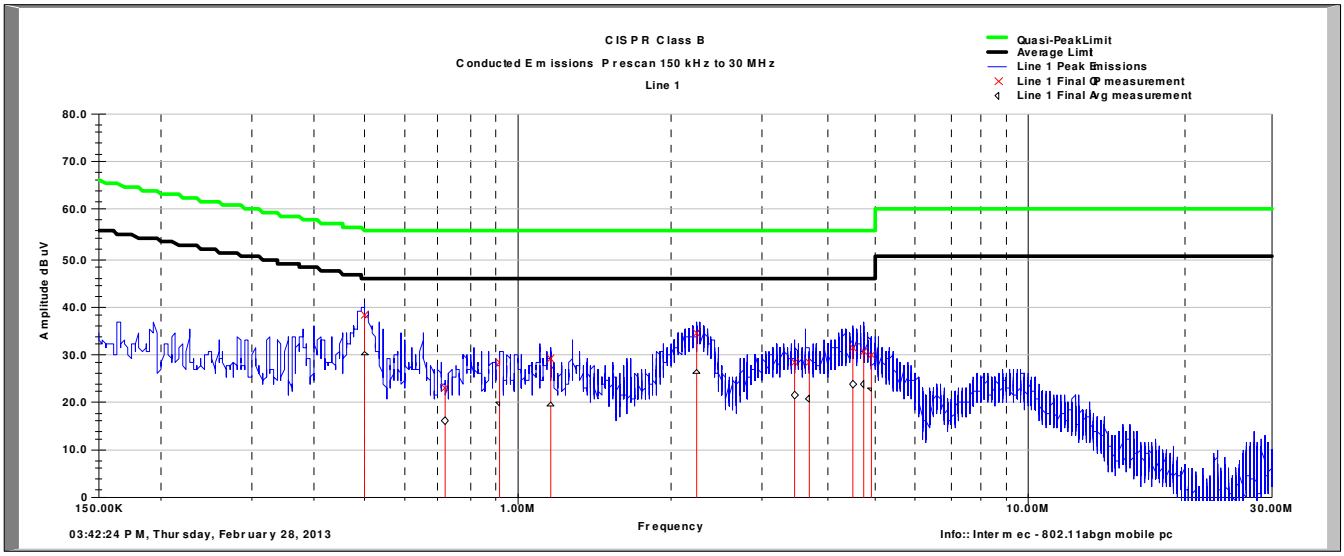
Neutral Conducted Emissions Plot



Neutral Conducted Emissions Data

Frequency MHz	QP Value dBuV	QP Limit dBuV	QP Margin dB	Avg Value dBuV	Avg Limit dBuV	Avg Margin dB
0.502	38.0	56.0	-18.0	26.6	46.0	-19.4
0.910	27.9	56.0	-28.1	19.8	46.0	-26.2
1.136	27.5	56.0	-28.5	19.8	46.0	-26.2
1.372	26.4	56.0	-29.6	17.3	46.0	-28.7
2.263	33.8	56.0	-22.2	26.5	46.0	-19.5
4.159	28.6	56.0	-27.4	21.7	46.0	-24.3
4.331	29.6	56.0	-26.4	22.6	46.0	-23.4
4.540	29.7	56.0	-26.3	23.6	46.0	-22.4
4.678	29.1	56.0	-26.9	22.9	46.0	-23.1
4.837	28.5	56.0	-27.5	22.2	46.0	-23.8

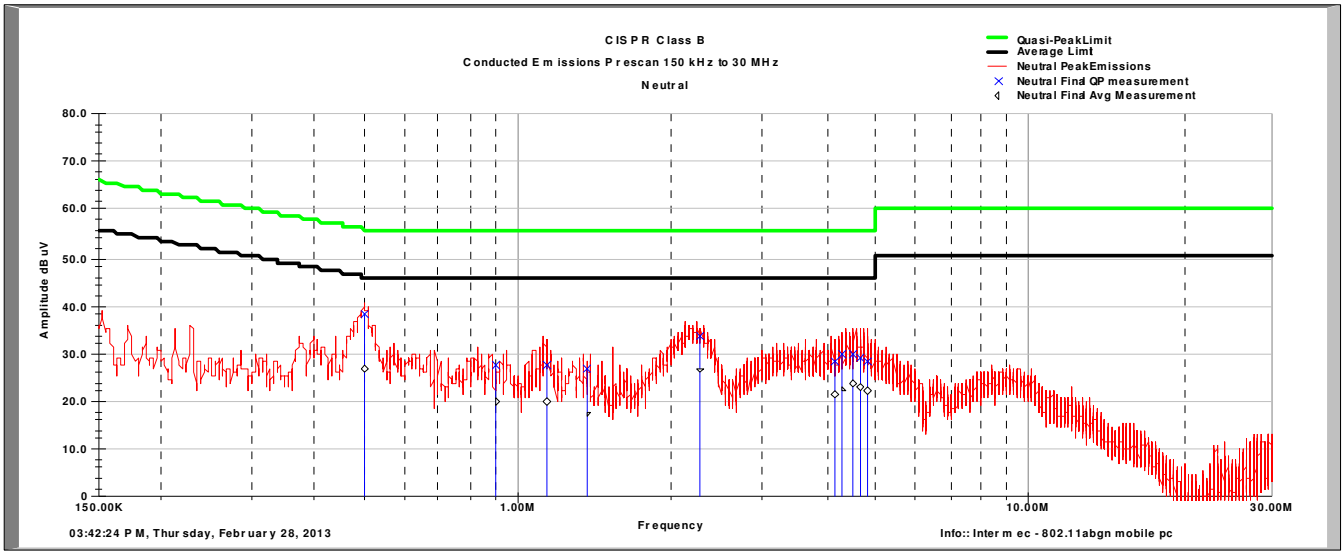
CH48
Line 1 Conducted Emissions Plot



Line 1 Conducted Emissions Data

Frequency MHz	QP Value dBuV	QP Limit dBuV	Margin dB	Avg Value dBuV	Avg Limit dBuV	Avg Margin dB
0.499	38.5	56.0	-17.5	30.2	46.0	-15.8
0.721	23.1	56.0	-32.9	16.3	46.0	-29.7
0.911	28.3	56.0	-27.7	19.7	46.0	-26.3
1.156	29.4	56.0	-26.6	19.5	46.0	-26.5
2.228	34.5	56.0	-21.5	26.4	46.0	-19.6
3.490	28.5	56.0	-27.5	21.3	46.0	-24.7
3.676	28.3	56.0	-27.7	21.0	46.0	-25.0
4.498	31.2	56.0	-24.8	24.0	46.0	-22.0
4.709	30.8	56.0	-25.2	23.8	46.0	-22.2
4.870	29.6	56.0	-26.4	22.7	46.0	-23.3

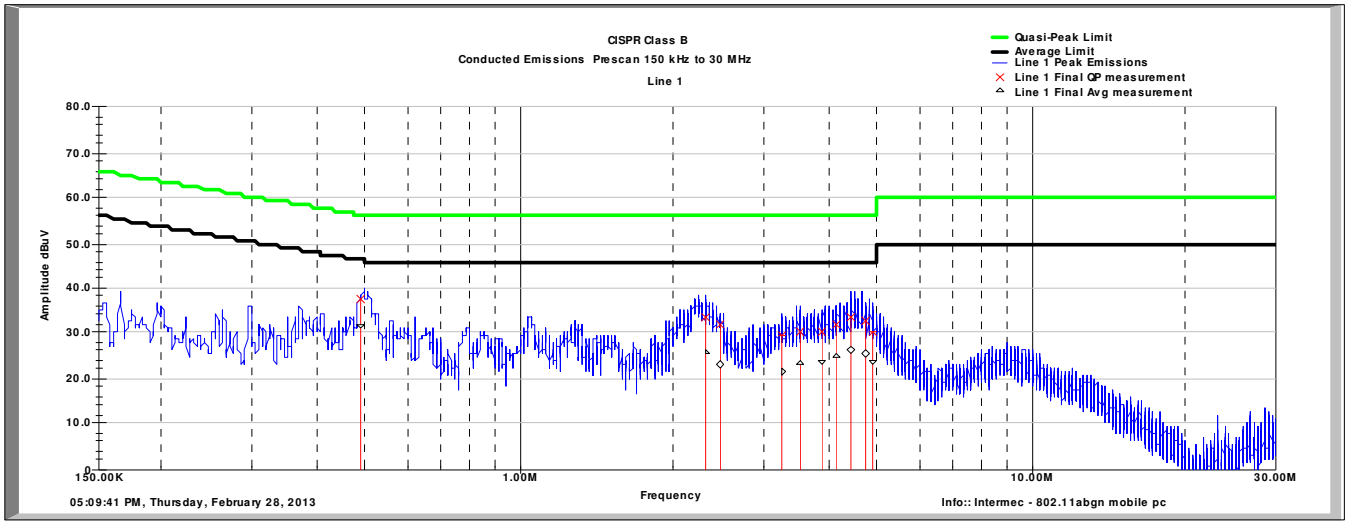
Neutral Conducted Emissions Plot



Neutral Conducted Emissions Data

Frequency MHz	QP Value dBuV	QP Limit dBuV	QP Margin dB	Avg Value dBuV	Avg Limit dBuV	Avg Margin dB
0.502	38.0	56.0	-18.0	26.6	46.0	-19.4
0.910	27.9	56.0	-28.1	19.8	46.0	-26.2
1.136	27.5	56.0	-28.5	19.8	46.0	-26.2
1.372	26.4	56.0	-29.6	17.3	46.0	-28.7
2.263	33.8	56.0	-22.2	26.5	46.0	-19.5
4.159	28.6	56.0	-27.4	21.7	46.0	-24.3
4.331	29.6	56.0	-26.4	22.6	46.0	-23.4
4.540	29.7	56.0	-26.3	23.6	46.0	-22.4
4.678	29.1	56.0	-26.9	22.9	46.0	-23.1
4.837	28.5	56.0	-27.5	22.2	46.0	-23.8

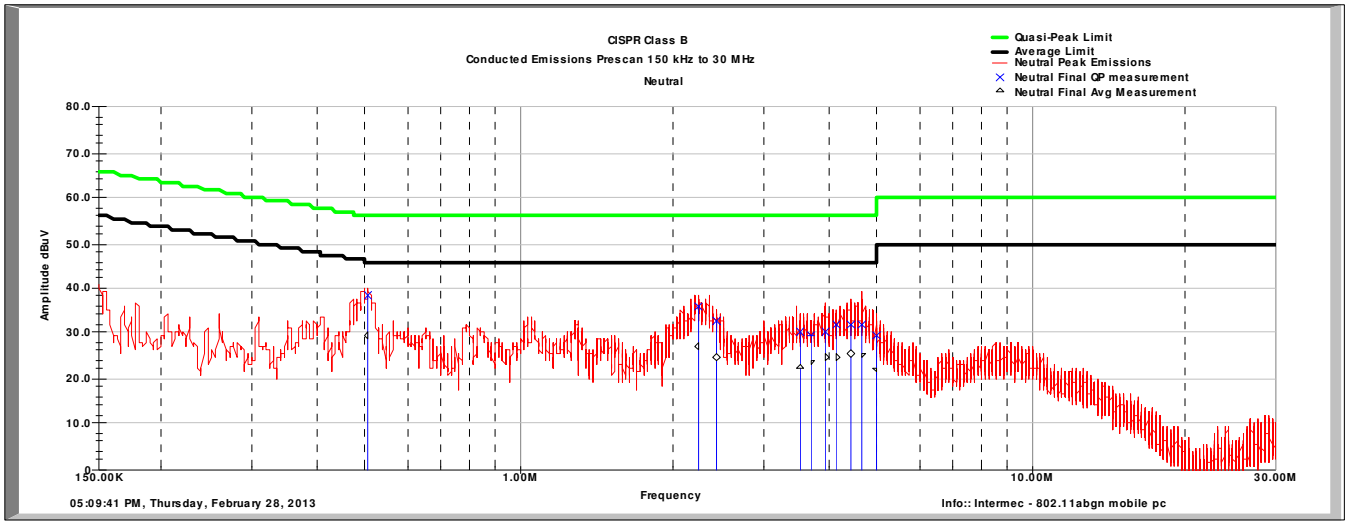
CH100
Line 1 Conducted Emissions Plot



Line 1 Conducted Emissions Data

Frequency MHz	QP Value dBuV	QP Limit dBuV	Margin dB	Avg Value dBuV	Avg Limit dBuV	Avg Margin dB
0.490	37.9	56.2	-18.3	31.6	46.2	-14.6
2.318	33.2	56.0	-22.8	25.8	46.0	-20.2
2.452	31.6	56.0	-24.4	23.0	46.0	-23.0
3.266	29.9	56.0	-26.1	21.6	46.0	-24.4
3.515	30.5	56.0	-25.5	23.3	46.0	-22.7
3.903	30.2	56.0	-25.8	23.5	46.0	-22.5
4.162	32.2	56.0	-23.8	25.0	46.0	-21.0
4.421	33.5	56.0	-22.5	26.1	46.0	-19.9
4.708	32.6	56.0	-23.4	25.4	46.0	-20.6
4.892	29.9	56.0	-26.1	23.6	46.0	-22.4

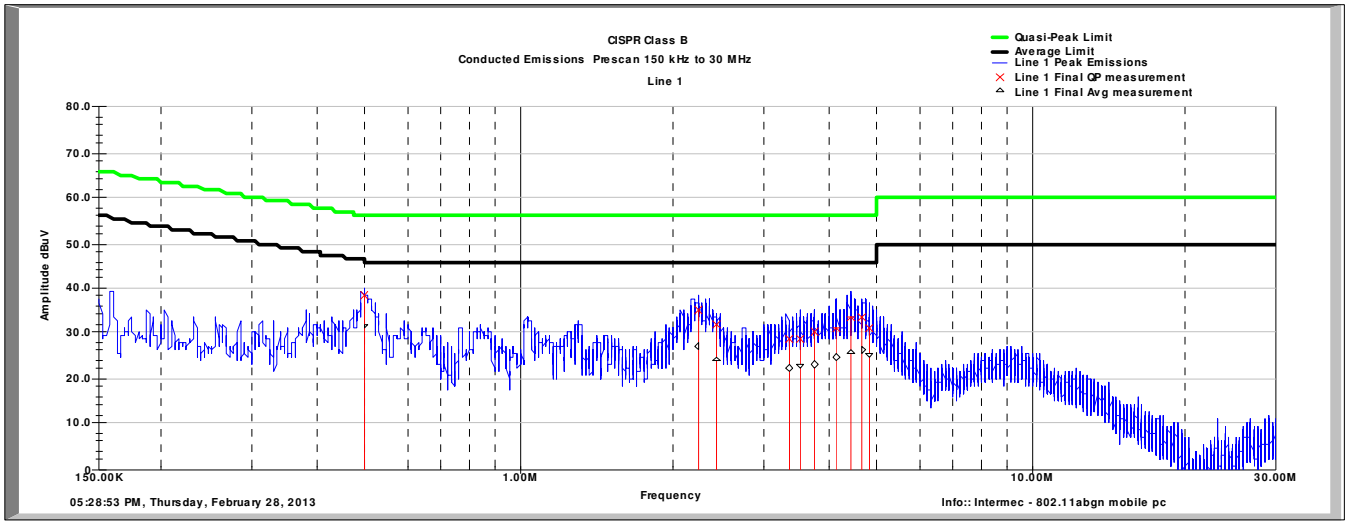
Neutral Conducted Emissions Plot



Neutral Conducted Emissions Data

Frequency MHz	QP Value dBuV	QP Limit dBuV	QP Margin dB	Avg Value dBuV	Avg Limit dBuV	Avg Margin dB
0.501	38.1	56.0	-17.9	29.4	46.0	-16.6
2.218	35.6	56.0	-20.4	27.0	46.0	-19.0
2.424	32.4	56.0	-23.6	24.8	46.0	-21.2
3.513	30.0	56.0	-26.0	22.5	46.0	-23.5
3.725	29.9	56.0	-26.1	23.5	46.0	-22.5
3.971	30.2	56.0	-25.8	24.4	46.0	-21.6
4.181	31.8	56.0	-24.2	24.8	46.0	-21.2
4.420	32.3	56.0	-23.7	25.5	46.0	-20.5
4.685	31.9	56.0	-24.1	25.2	46.0	-20.8
4.940	29.3	56.0	-26.7	21.9	46.0	-24.1

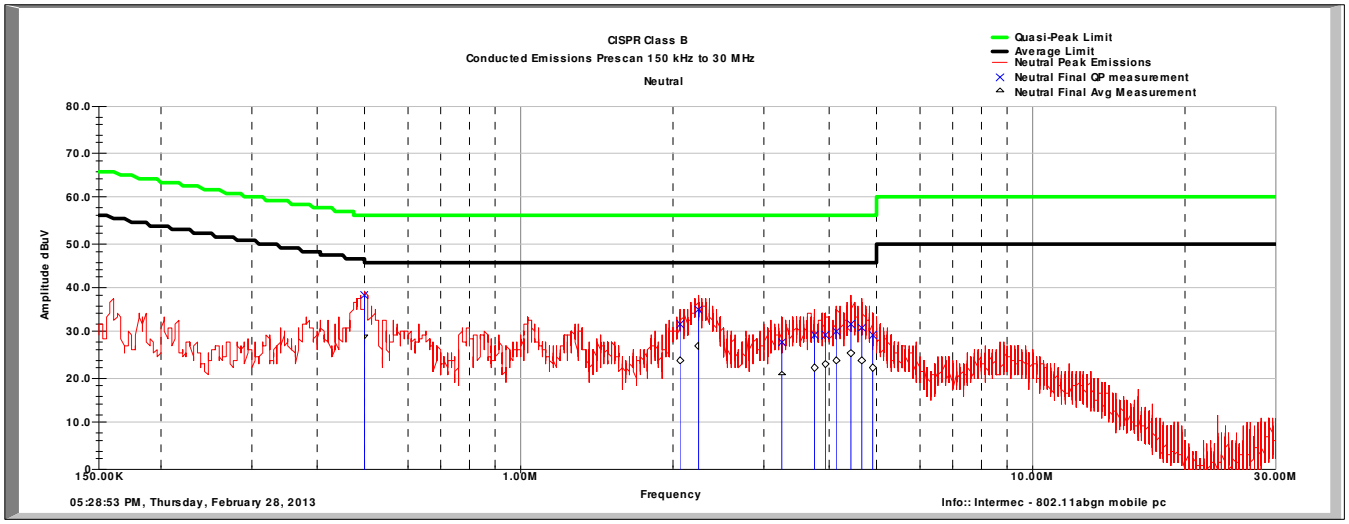
CH116
Line 1 Conducted Emissions Plot



Line 1 Conducted Emissions Data

Frequency MHz	QP Value dBuV	QP Limit dBuV	Margin dB	Avg Value dBuV	Avg Limit dBuV	Avg Margin dB
0.499	38.4	56.0	-17.6	31.6	46.0	-14.4
2.216	35.1	56.0	-20.9	27.1	46.0	-18.9
2.425	31.8	56.0	-24.2	24.1	46.0	-21.9
3.350	29.0	56.0	-27.0	22.0	46.0	-24.0
3.535	28.3	56.0	-27.7	22.7	46.0	-23.3
3.774	30.2	56.0	-25.8	23.0	46.0	-23.0
4.153	30.7	56.0	-25.3	24.7	46.0	-21.3
4.420	33.1	56.0	-22.9	25.7	46.0	-20.3
4.683	33.3	56.0	-22.7	26.2	46.0	-19.8
4.827	31.3	56.0	-24.7	25.2	46.0	-20.8

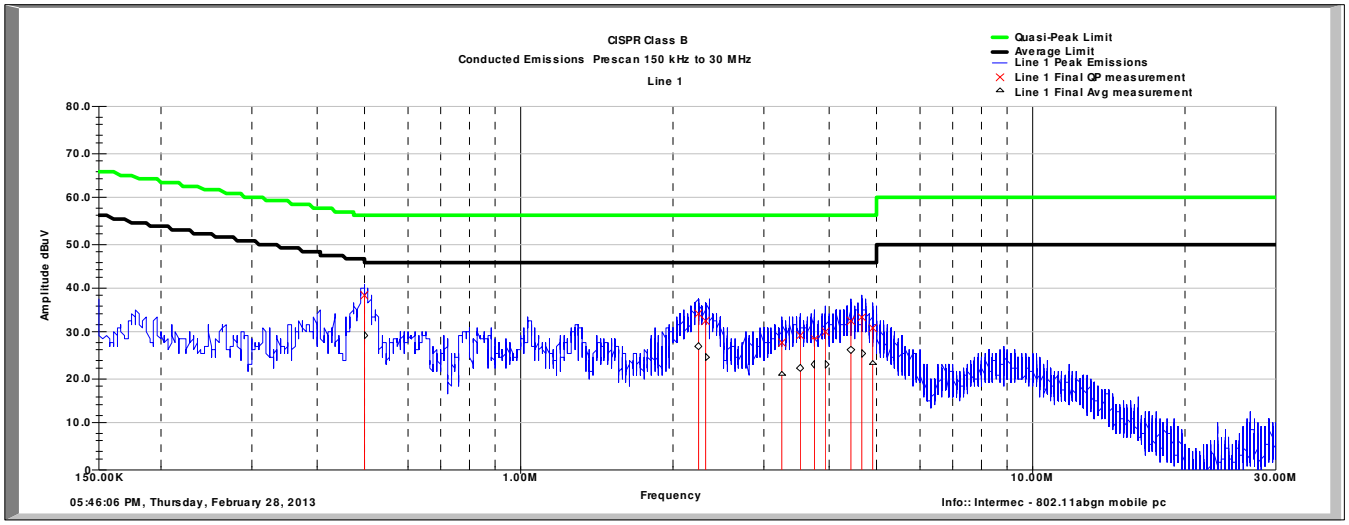
Neutral Conducted Emissions Plot



Neutral Conducted Emissions Data

Frequency MHz	QP Value dBuV	QP Limit dBuV	QP Margin dB	Avg Value dBuV	Avg Limit dBuV	Avg Margin dB
0.500	38.2	56.0	-17.8	29.3	46.0	-16.7
2.065	31.7	56.0	-24.3	23.7	46.0	-22.3
2.215	35.1	56.0	-20.9	27.2	46.0	-18.8
3.235	27.7	56.0	-28.3	21.0	46.0	-25.0
3.774	29.3	56.0	-26.7	22.4	46.0	-23.6
3.969	29.3	56.0	-26.7	23.1	46.0	-22.9
4.153	30.0	56.0	-26.0	23.6	46.0	-22.4
4.441	31.8	56.0	-24.2	25.5	46.0	-20.5
4.664	30.8	56.0	-25.2	23.7	46.0	-22.3
4.879	29.6	56.0	-26.4	22.4	46.0	-23.6

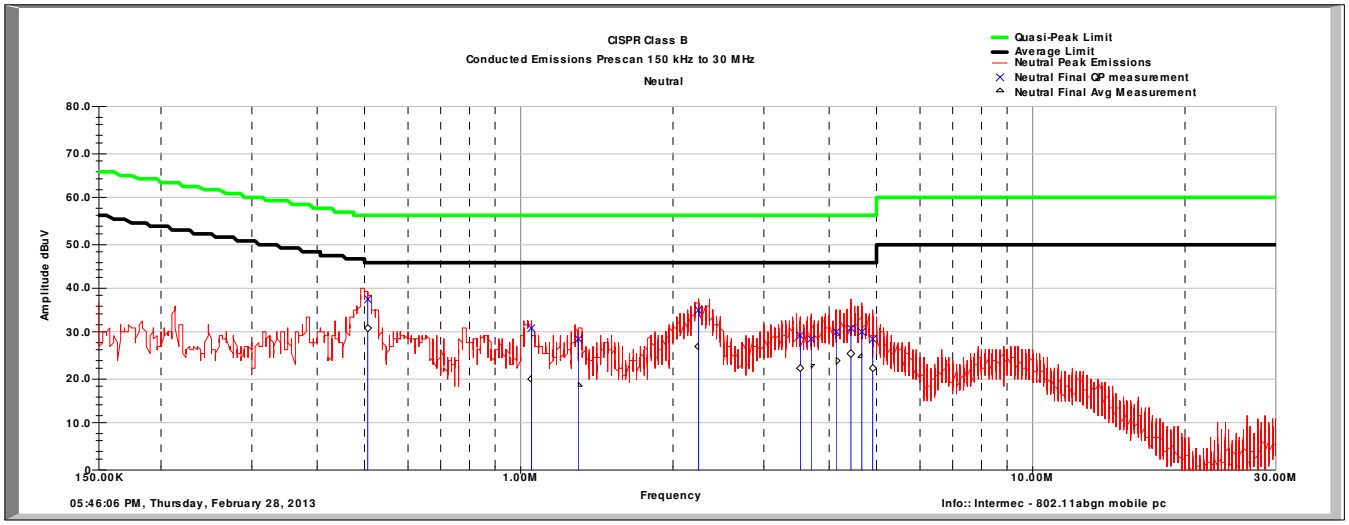
CH140
Line 1 Conducted Emissions Plot



Line 1 Conducted Emissions Data

Frequency MHz	QP Value dBuV	QP Limit dBuV	Margin dB	Avg Value dBuV	Avg Limit dBuV	Avg Margin dB
0.500	38.6	56.0	-17.4	29.6	46.0	-16.4
2.222	34.5	56.0	-21.5	27.1	46.0	-18.9
2.320	32.4	56.0	-23.6	24.7	46.0	-21.3
3.234	28.2	56.0	-27.8	21.0	46.0	-25.0
3.509	29.5	56.0	-26.5	22.3	46.0	-23.7
3.738	29.1	56.0	-26.9	23.1	46.0	-22.9
3.977	30.1	56.0	-25.9	23.1	46.0	-22.9
4.442	32.4	56.0	-23.6	26.1	46.0	-19.9
4.682	33.3	56.0	-22.7	25.6	46.0	-20.4
4.891	30.9	56.0	-25.1	23.3	46.0	-22.7

Neutral Conducted Emissions Plot



Neutral Conducted Emissions Data

Frequency MHz	QP Value dBuV	QP Limit dBuV	QP Margin dB	Avg Value dBuV	Avg Limit dBuV	Avg Margin dB
0.505	37.5	56.0	-18.5	30.9	46.0	-15.1
1.047	30.7	56.0	-25.3	19.7	46.0	-26.3
1.308	28.6	56.0	-27.4	18.6	46.0	-27.4
2.219	35.2	56.0	-20.8	27.0	46.0	-19.0
3.513	29.3	56.0	-26.7	22.1	46.0	-23.9
3.723	28.5	56.0	-27.5	22.6	46.0	-23.4
4.181	30.5	56.0	-25.5	23.7	46.0	-22.3
4.418	31.4	56.0	-24.6	25.4	46.0	-20.6
4.620	30.4	56.0	-25.6	25.0	46.0	-21.0
4.886	28.6	56.0	-27.4	22.2	46.0	-23.8

9 Revision History

Revision Level	Description of changes	Revision Date
0	Initial release	17 JUL 2013