

EMC Test Report

Project Number: 2733706

Report Number: 2733706EMC04 **Revision Level:** 2

Client: Sonim Technologies Inc.

Equipment Under Test: Cellular/PCS CDMA/EvDO Phone with Bluetooth

Marketing Name: Sonim XP Strike

Model: Sonim XP3410-A-R1 (C21F010AA)

Hardware Version: A

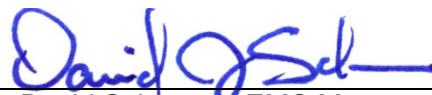
Applicable Standards: FCC Part 15 Subpart C, § 15.247

ANSI C63.10: 2009

Report issued on: 26 SEP 2012

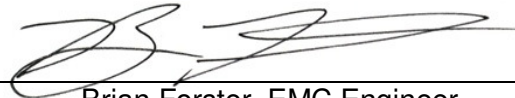
Test Result: Compliant

Tested by:



David Schramm, EMC Manager

Reviewed by:



Brian Forster, EMC Engineer

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.

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1 Summary of Test Results

Test Description	Test Specification	Test Result
Occupied Bandwidth	15.247(a) (1)	Compliant
Peak Power Output	15.247(a) (1)	Compliant
Conducted Spurious Emissions	15.247(d)	Compliant
Band Edge	15.247(d)	Compliant
Radiated Spurious Emissions	15.247(d), 15.35(b), 15.209	Compliant
Dwell Time	15.247(a) (1)(iii)	Compliant
Channel separation	15.247(a) (1)(iii)	Compliant
Number of hopping frequencies	15.247(a) (1)(iii)	Compliant
AC Powerline Conducted Emission	15.107, 15.207	Compliant

1.1 Modifications Required for Compliance

None

2 General Information

2.1 Client Information

Name: Sonim Technologies Inc.
 Address: 1875 S. Grant Street, Suite 200
 City, State, Zip, Country: San Mateo, CA 94402, USA

2.2 Test Laboratory

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

2.3 General Information of EUT

Marketing Name: Sonim XP Strike
 Model: Sonim XP3410-A-R1 (C21F010AA)
 Serial Number: Radiated: A1000012926881, Conducted: A1000012926680
 Build Version: B2.5
 Firmware Version: XP3410_0200B00_0150T
 FCC ID: WYPC21F010AA
 Frequency Range: 2402 to 2480 MHz
 Number of channels: 79
 Modulation type: GFSK, $\pi/4$ -DQPSK, 8DPSK
 Channel spacing: 1 MHz
 Antenna: Integral

Rated Voltage: 3.8 VDC Internal Battery

Sample Received Date: 20 July 2012
 Dates of testing: 15 August to 17 August 2012

Operating Modes and Conditions

The EUT was configured in software to allow the Bluetooth tester to the control the EUT to run continuously exercising all modes of operation.

During testing, the EUT was powered with a fully charged battery.

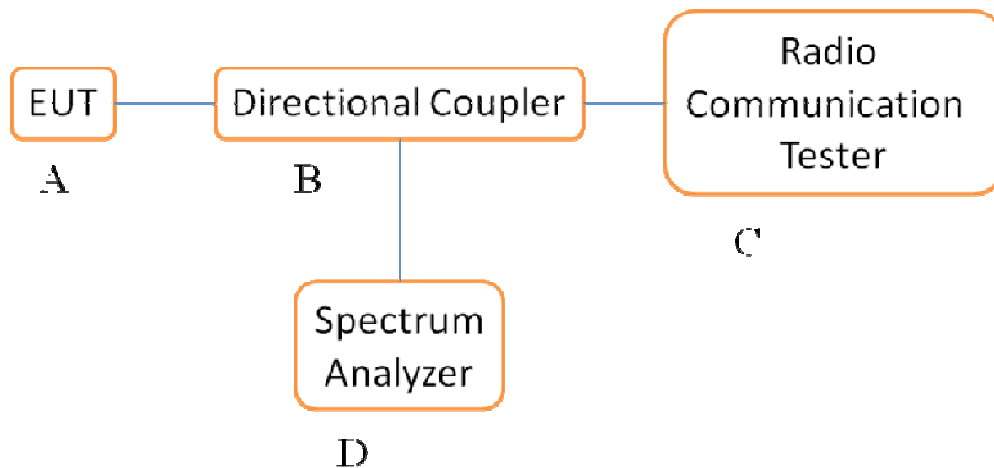
During testing, the hopping sequence was stopped in accordance with Section 5.1 of ANSI C63.10-2009 so that the low, mid and high channels could be tested independently.

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

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

- Software was designed to allow the EUT to operate
 - at 100 % duty cycle
 - at the worst-case duty cycle to allow measurements in instances where an average correction factor needs to be determined to calculate the average field strength from the measured peak field strength
- 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
- Since this is a frequency hopping system, the software allowed the hopping sequence to be turned off

2.4 EUT Connection Block Diagram



2.5 System Configurations

Device reference	Manufacturer	Description	Model Number	Serial Number
A	Sonim	EUT	Sonim XP3410-A-R1 (C21F010AA)	A1000012926680 A1000012926881
B	Agilent / HP	Directional Coupler	778D / 11692D	2604A13577 / 1212A02572
C	R&S	Bluetooth Tester	CBT / 1153.9000K35	100372
D	R&S	Spectrum Analyzer	ESU40	B079629

3 Occupied Bandwidth

3.1 Test Result

Test Description	Basic Standards	Test Result
20 dB bandwidth	15.247(a) (1)	Pass

3.2 Test Method

The procedures from ANSI C63.10 (2009) clause 6.9 were used to determine the 20 dB bandwidth.

3.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 24.4 °C

Relative Humidity: 47.8 %

3.4 Test Equipment

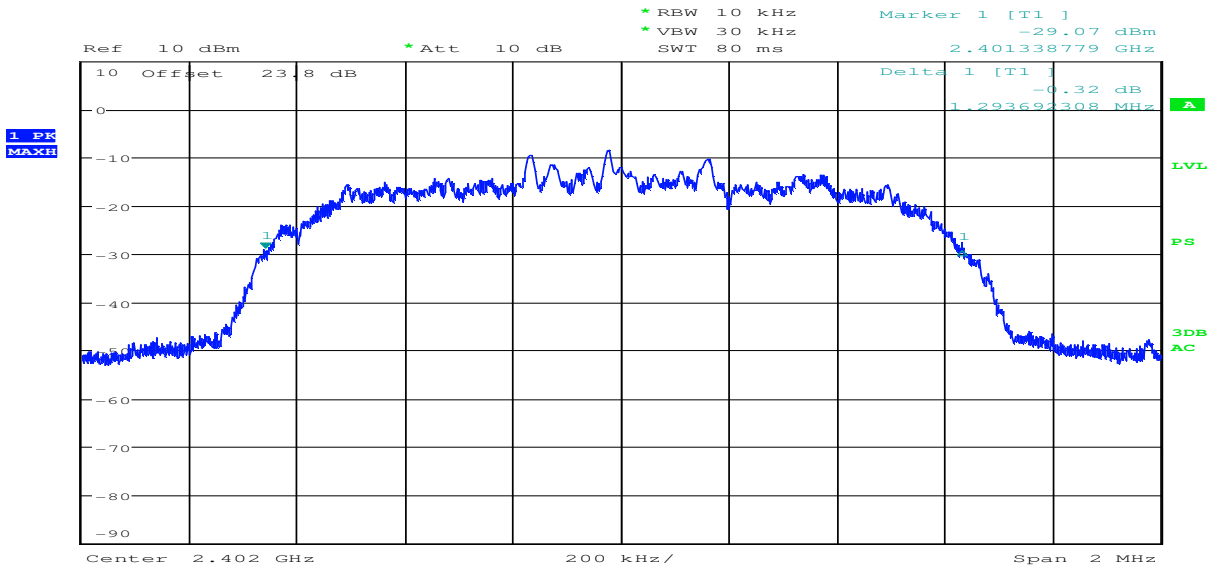
Equipment	Model	Manufacturer	Asset Number	Cal Due Date
Receiver	ESU40	R&S	B079629	25 AUG 2012
Directional Coupler	778D	Agilent / HP	B087456	14 OCT 2012
Directional Coupler	11692D	Agilent / HP	B079666	14 OCT 2012
Cable	Sucoflex 102	Huber+Suhner	B079824	23 NOV 2012
Cable	Sucoflex 102	Huber+Suhner	B079822	23 NOV 2012

Note: The calibration period equipment is 1 year.

3.5 Test Data

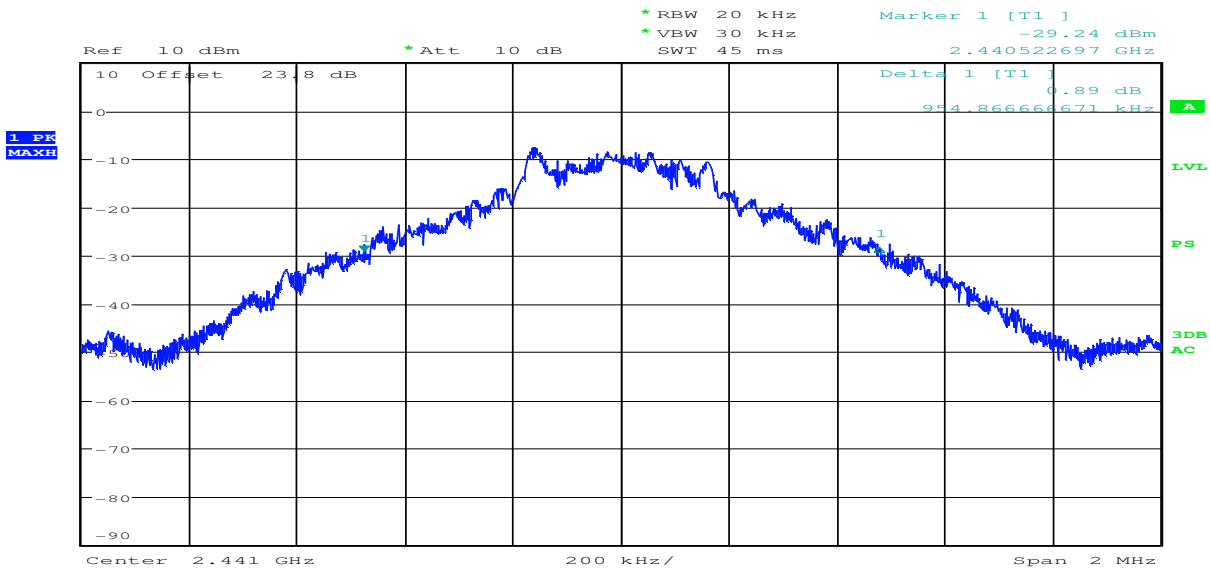
Frequency	Channel No	Modulation	20 dB bandwidth kHz
2402	0	GFSK	926
		$\pi/4$ -DQPSK	1299
		8DPSK	1294
2441	39	GFSK	954
		$\pi/4$ -DQPSK	1283
		8DPSK	1298
2480	78	GFSK	978
		$\pi/4$ -DQPSK	1299
		8DPSK	1299

20 dB Bandwidth Plot, Low Channel 8DPSK



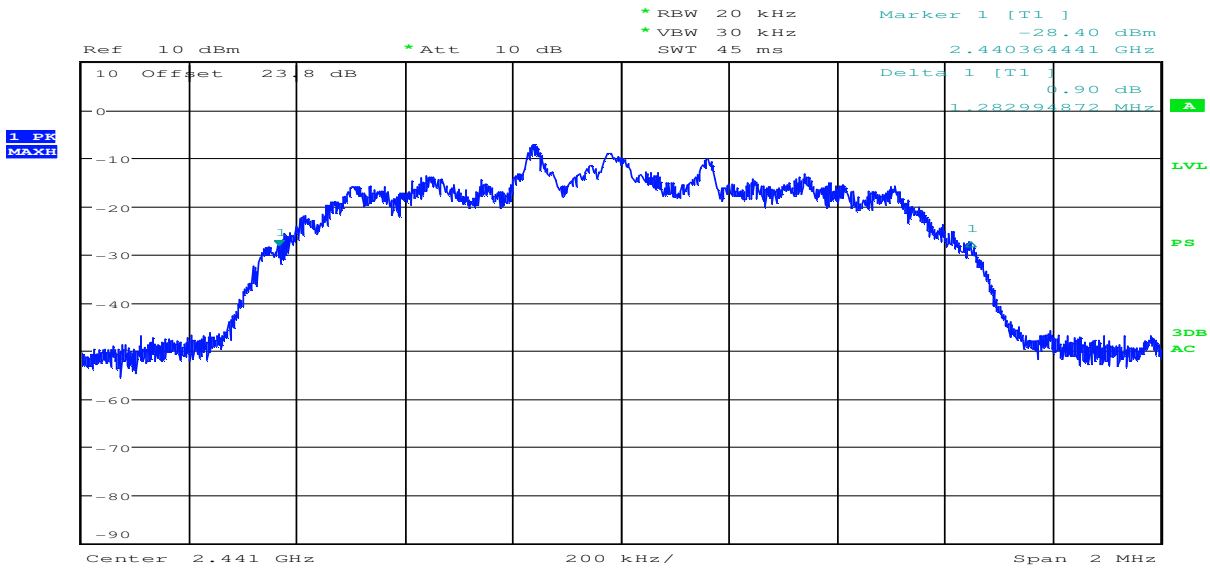
Date: 15.AUG.2012 20:07:11

20 dB Bandwidth Plot, Mid Channel GFSK



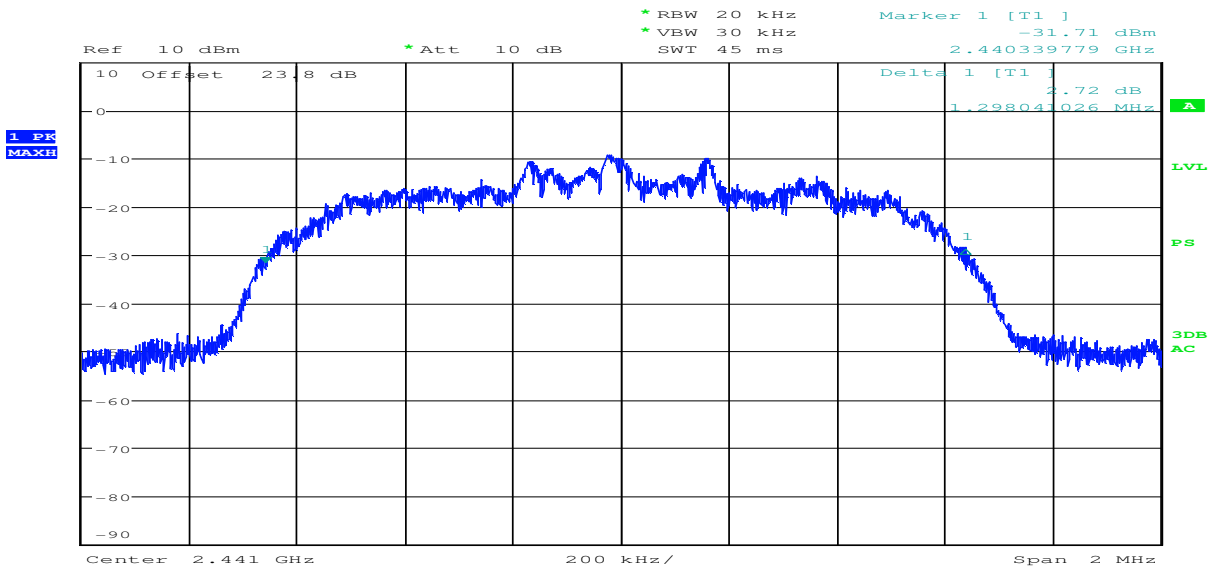
Date: 15.AUG.2012 20:14:17

20 dB Bandwidth Plot, Mid Channel $\pi/4$ -DQPSK



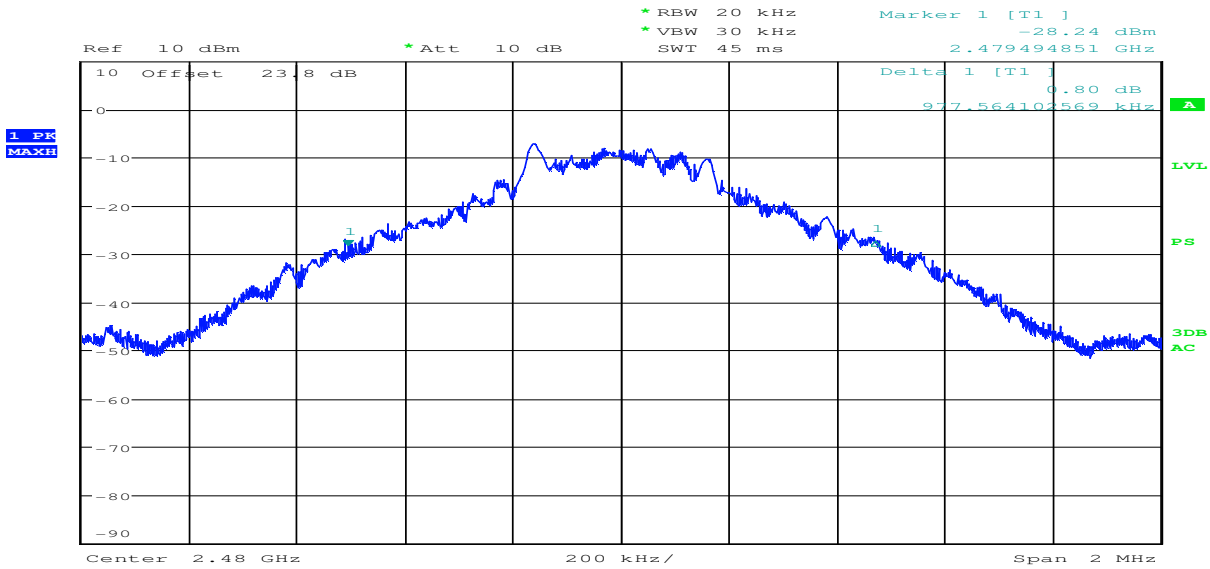
Date: 15.AUG.2012 20:12:52

20 dB Bandwidth Plot, Mid Channel 8DPSK



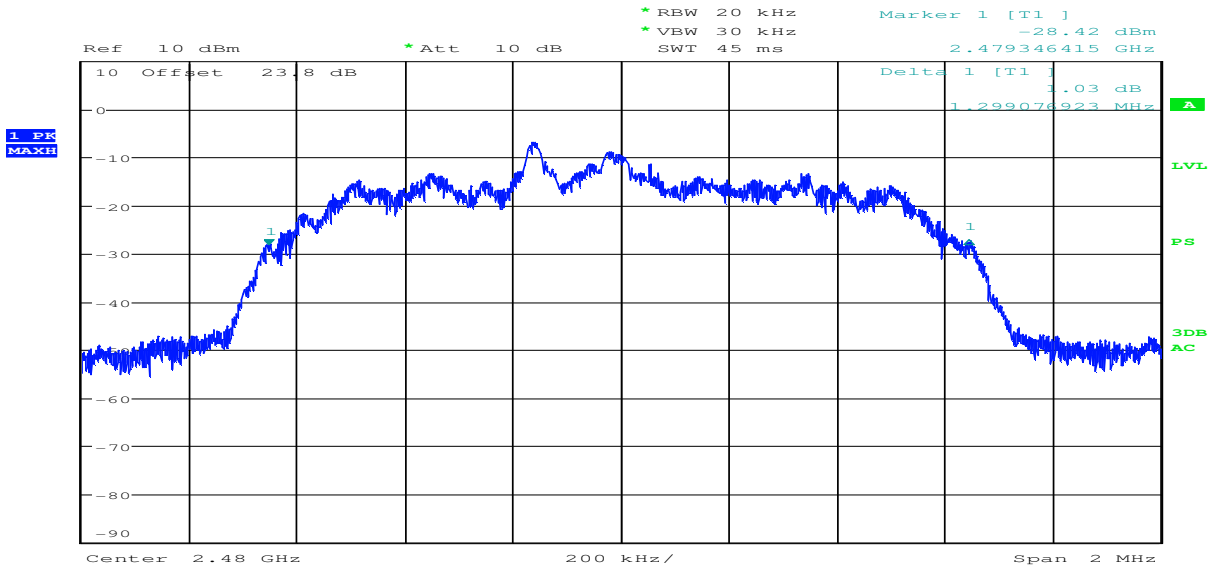
Date: 15.AUG.2012 20:11:41

20 dB Bandwidth Plot, High Channel GFSK



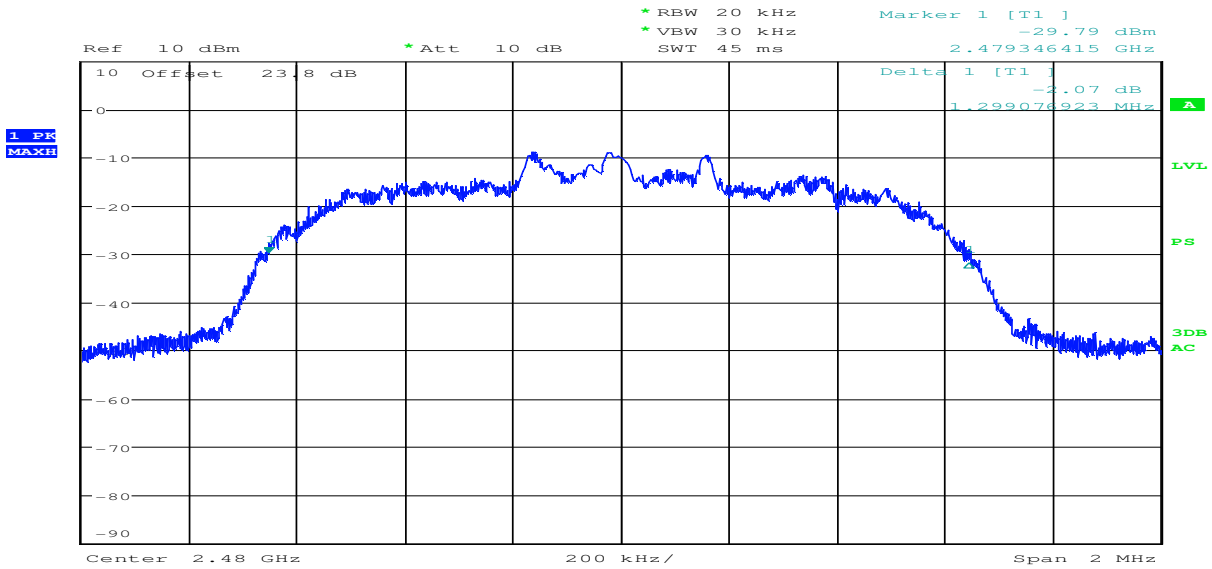
Date: 15.AUG.2012 20:19:40

20 dB Bandwidth Plot, High Channel $\pi/4$ -DQPSK



Date: 15.AUG.2012 20:20:30

20 dB Bandwidth Plot, High Channel 8DPSK



Date: 15.AUG.2012 20:22:29

4 Peak Output Power

4.1 Test Result

Test Description	Test Specification	Test Result
Peak Output Power	15.247(a) (1)	Compliant

4.2 Test Method

The test data was measured using a spectrum analyzer with Peak detector and a resolution bandwidth of 3 MHz.

Limit

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt.

4.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 24.4 °C
Relative Humidity: 47.8 %

4.4 Test Equipment

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
Receiver	ESU40	R&S	B079629	25 AUG 2012
Directional Coupler	778D	Agilent / HP	B087456	14 OCT 2012
Directional Coupler	11692D	Agilent / HP	B079666	14 OCT 2012
Coaxial Cable	Sucoflex 102	Huber+Suhner	B079824	23 NOV 2012
Coaxial Cable	Sucoflex 102	Huber+Suhner	B079822	23 NOV 2012

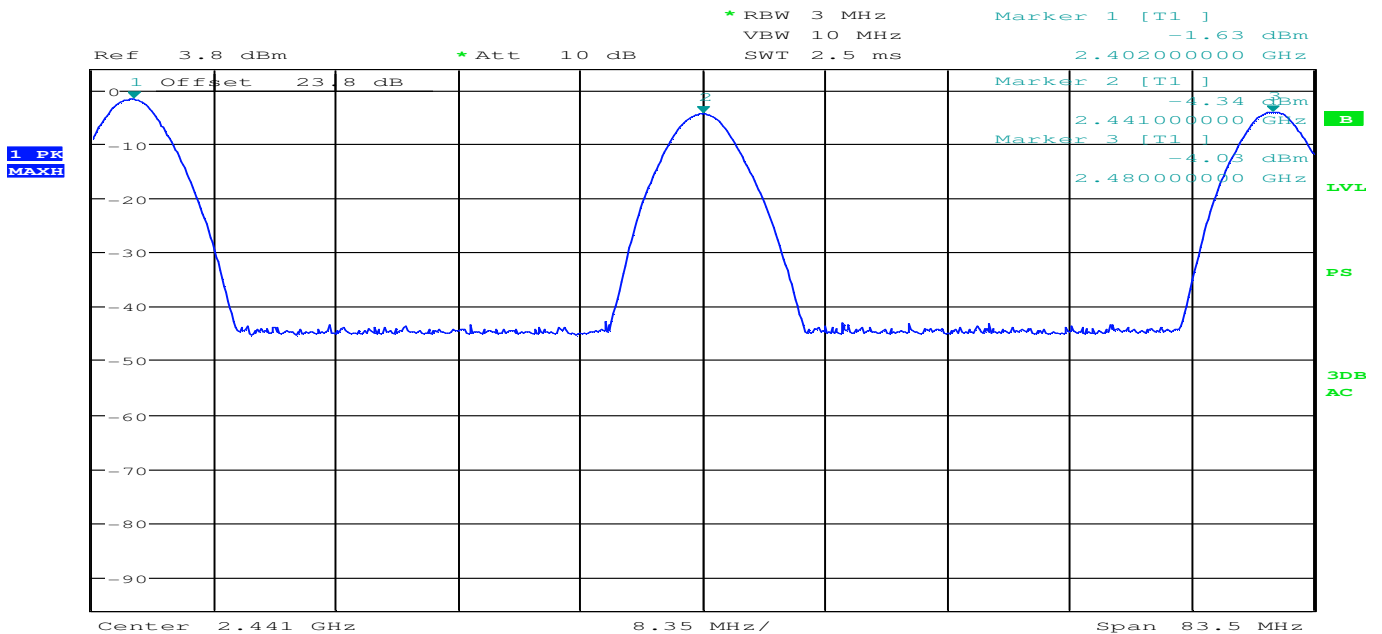
Note: The calibration period equipment is 1 year.

4.5 Test Data

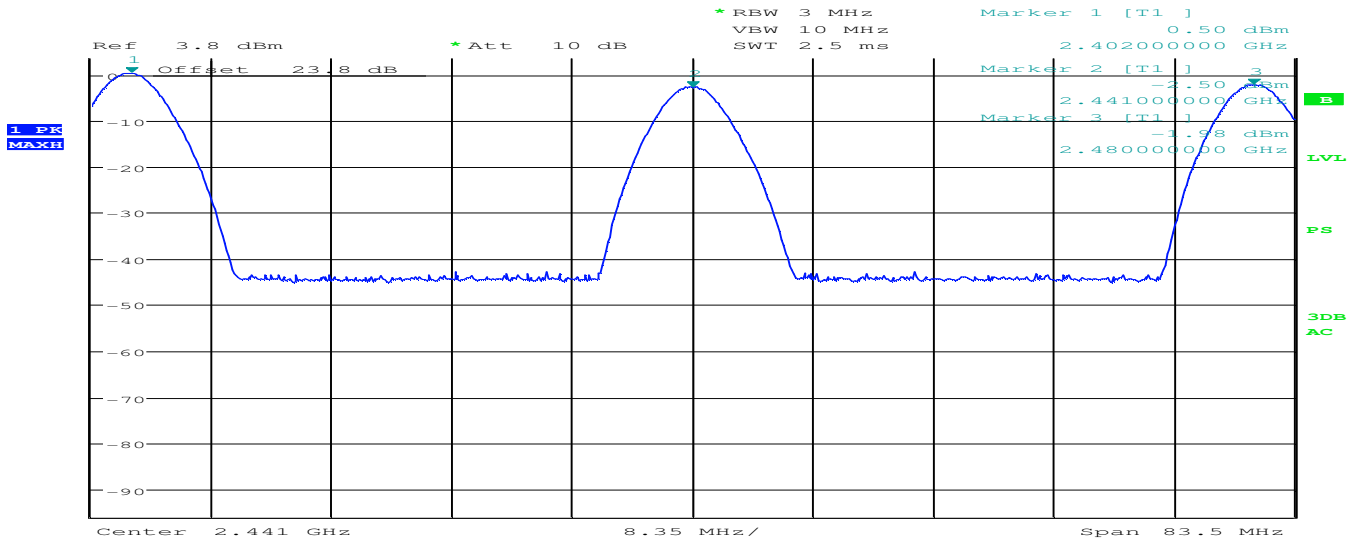
Frequency	Channel No	Modulation	Peak Power dBm
2402	0	GFSK	-1.6
		DPSK	0.7
2441	39	GFSK	-4.3
		DPSK	-2.1
2480	78	GFSK	-4.0
		DPSK	-1.7

Frequency	Channel No	Modulation	Peak Power dBm
2402	0	GFSK	-1.6
		$\pi/4$ -DQPSK	0.5
		8DPSK	0.7
2441	39	GFSK	-4.3
		$\pi/4$ -DQPSK	-2.5
		8DPSK	-2.1
2480	78	GFSK	-4.0
		$\pi/4$ -DQPSK	-2.0
		8DPSK	-1.7

Conducted Output Power, GFSK

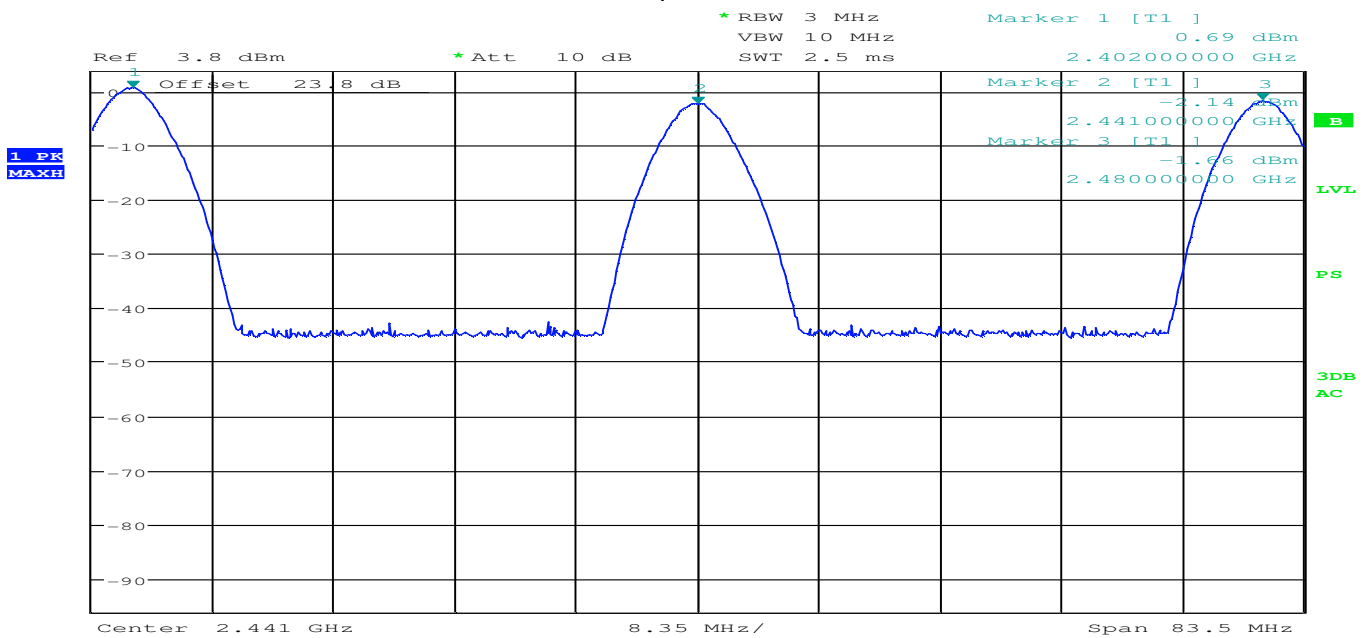


Conducted Output Power, $\pi/4$ -DQPSK



Date: 16.AUG.2012 10:32:01

Conducted Output Power, 8DPSK



5 Conducted Spurious Emissions

5.1 Test Result

Test Description	Test Specification	Test Result
Conducted Spurious Emissions	15.247(d)	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: 30 MHz to 25 GHz

The limit is 20 dB below the measured peak power.

GFSK and 8DPSK were determined to be the worst case modes of operation for this test.

5.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 24.4 °C

Relative Humidity: 47.8 %

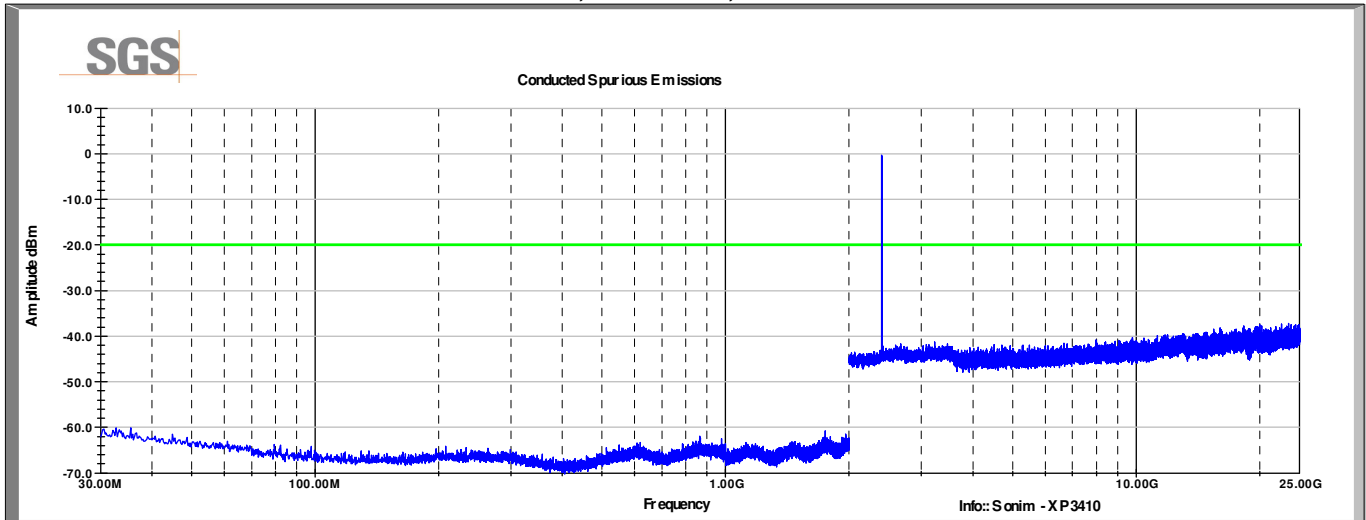
5.4 Test Equipment

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
Receiver	ESU40	R&S	B079629	25 AUG 2012
Directional Coupler	778D	Agilent / HP	B087456	14 OCT 2012
Directional Coupler	11692D	Agilent / HP	B079666	14 OCT 2012
Coaxial Cable	Sucoflex 102	Huber+Suhner	B079824	23 NOV 2012
Coaxial Cable	Sucoflex 102	Huber+Suhner	B079822	23 NOV 2012

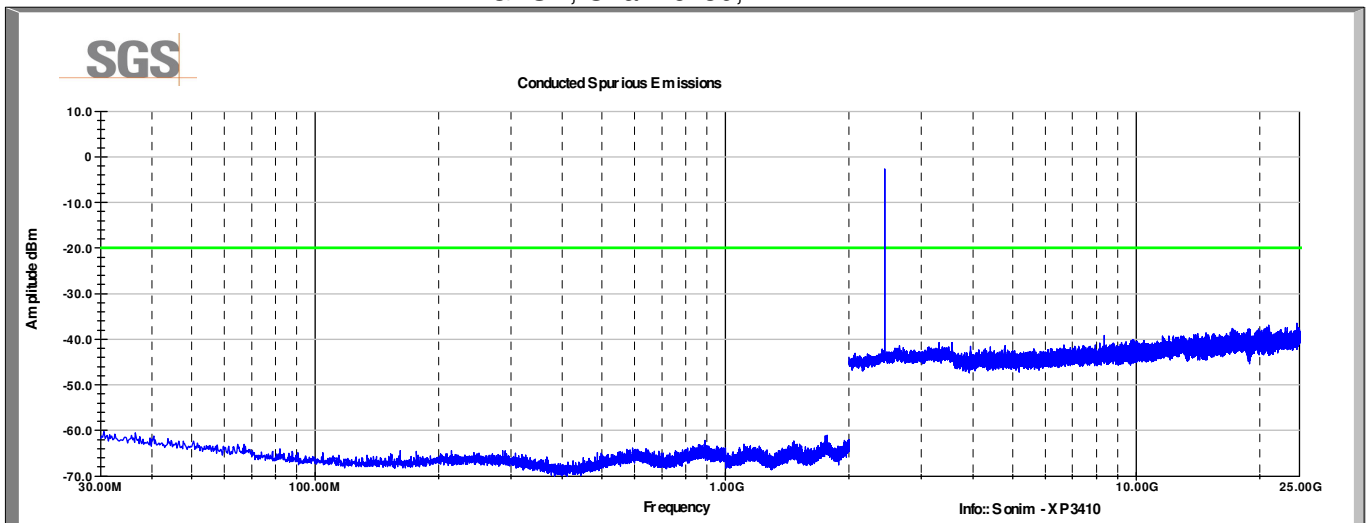
Note: The calibration period equipment is 1 year.

5.5 Test Data

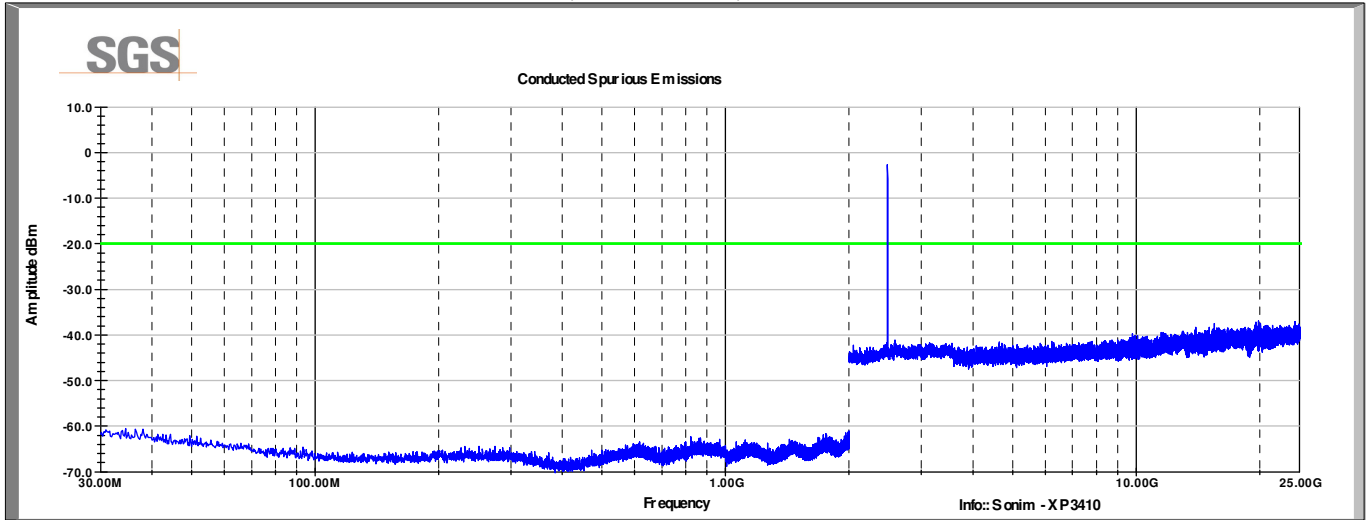
GFSK, Channel 0, 2402 MHz



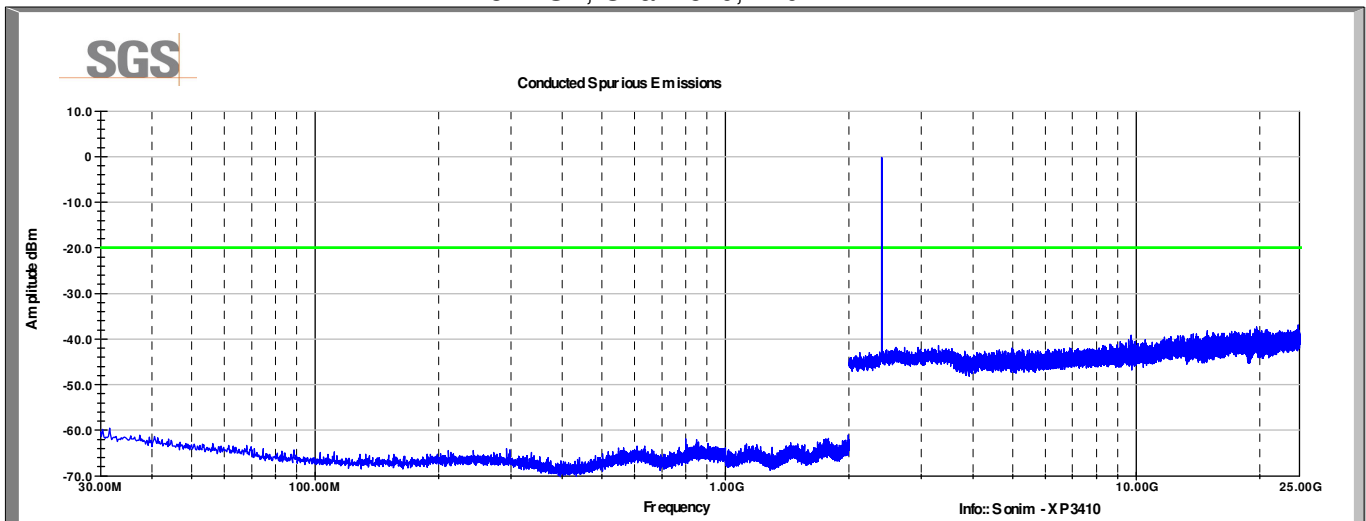
GFSK, Channel 39, 2441 MHz



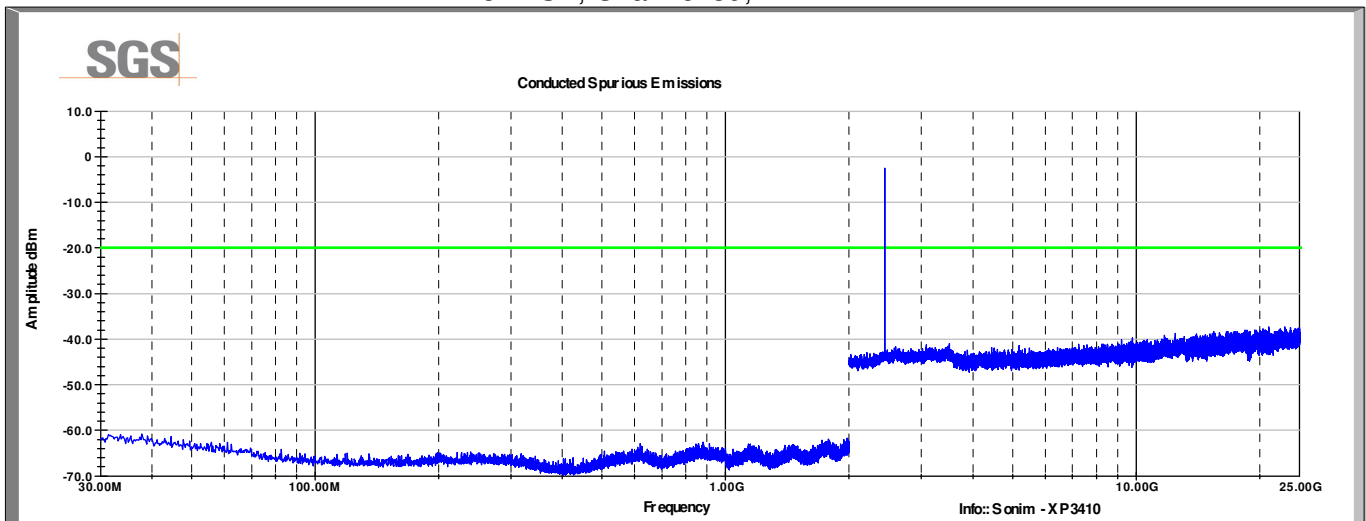
GFSK, Channel 78, 2480 MHz



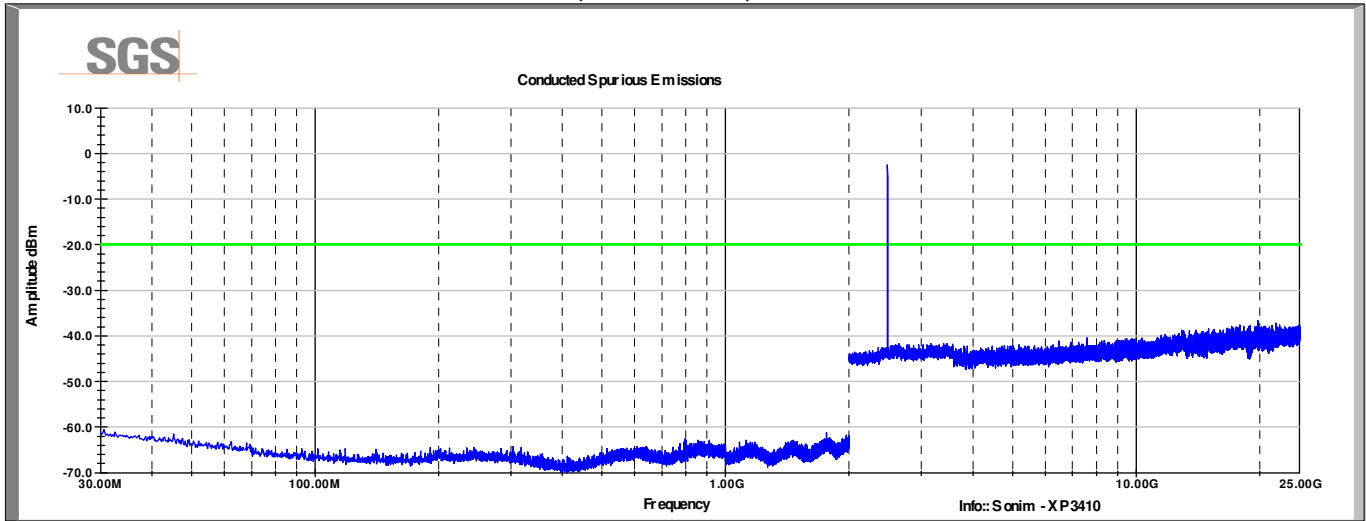
8DPSK, Channel 0, 2402 MHz



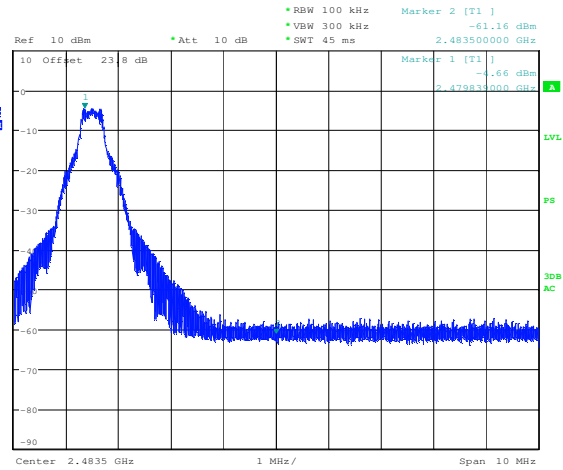
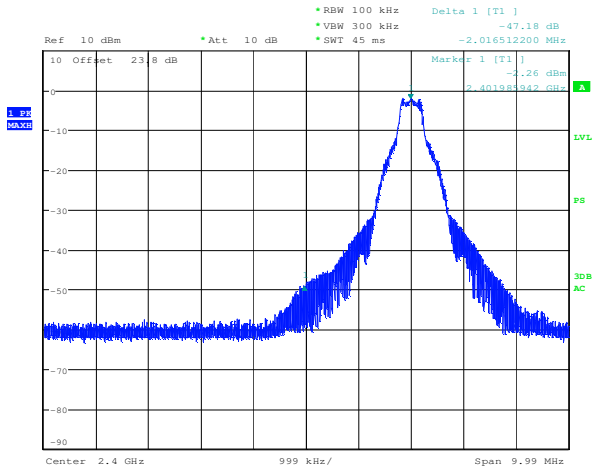
8DPSK, Channel 39, 2441 MHz



8DPSK, Channel 78, 2480 MHz



GFSK
Lower band edge / Upper band edge

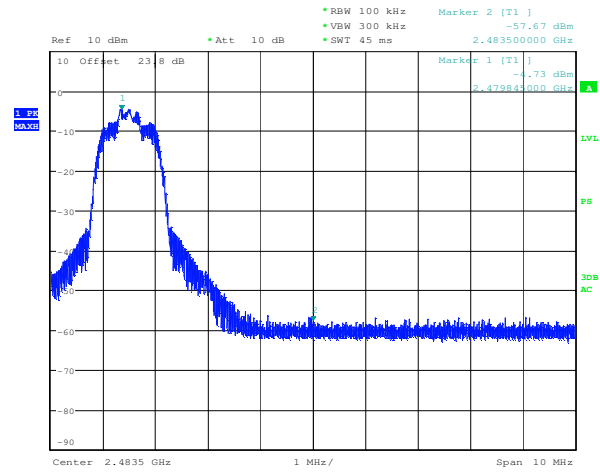
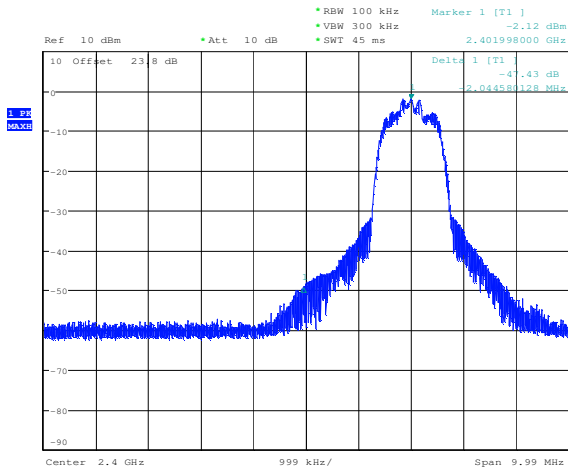


Date: 15.AUG.2012 20:34:20

Date: 15.AUG.2012 20:29:44

Note: the 23.8 dB offset was calculated from the total insertion loss of the directional coupler and cables used for this measurement.

8DPSK Lower band edge / Upper band edge



Date: 15.AUG.2012 20:36:38

Date: 15.AUG.2012 20:26:33

Note: the 23.8 dB offset was calculated from the total insertion loss of the directional coupler and cables used for this measurement.

6 Field Strength of Spurious Radiation

6.1 Test Result

Test Description	Test Specification	Test Result
Field strength of spurious radiation	15.247(d) and 15.209 RSS 210 2.6, A2.9 (1)(2)	Compliant

6.2 Test Method

The initial preliminary exploratory scans were performed over the frequency range as indicated in the tables below using the max hold function and incorporating a Peak detector and using TILE! software. The final test data was measured using a Quasi-Peak detector below 1GHz and a Peak detector above 1GHz. For harmonics of the fundamental, Average measurements were made by correcting the peak value with the duty cycle correction factor. For emissions other than harmonics of the fundamental, the Average measurements were made using the Average detector. The receivers resolution bandwidth was set to 120 kHz for measurements taken in the 30MHz to 1GHz frequency range and 1MHz for measurements for 1GHz and higher. Measurements were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna height was varied from 1 m to 4 m and the EUT was rotated 360° to find the maximum emitting point for each frequency. The radiated measurements were recorded and compared to the limits indicated in the table below.

For the 15.247(d) requirement, emissions outside of the restricted bands must be 20 dB below the highest emission of the fundamental measured in a 100 kHz band.

Test distance:

30 MHz to 1 GHz - The EUT to measurement antenna distance is 3 meters

1 to 18 GHz - The EUT to measurement antenna distance is 3 meters

18 to 40 GHz - The EUT to measurement antenna distance is 1 meter

Frequency	Limits ⁽¹⁾		Peak Limits dBuV/m
	Microvolts/m	dBuV/m	
30 - 88 MHz	100	40 ⁽²⁾	--
88 - 216 MHz	150	43.5 ⁽²⁾	--
216 - 960 MHz	200	46 ⁽²⁾	--
960 - 1000 MHz	500	54 ⁽²⁾	--
1 - 40 GHz	500	54 ⁽³⁾	74

(1) These limits are applicable to emissions outside of the intentional transmit frequency band.

(2) Quasi-peak limit

(3) Average limit

6.3 Test Site

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

Environmental Conditions

Temperature: 23.8 °C

Relative Humidity: 46.6 %

6.4 Test Equipment

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
Bilog Antenna	6143A	Teseq	B085931	7 OCT 2012
Receiver	ESU40	R & S	B079629	25 AUG 2012
Pre-Amplifier	NSP1800-25-HG	Miteq	B085930	14 Oct 2012
Pre-Amplifier	NSP1800-25-HG	Miteq	B085930	14 Oct 2012
Coaxial Cable	Sucoflex 106	Huber+Suhner	B079715	24 Aug 2012
Coaxial Cable	Sucoflex 106	Huber+Suhner	B079660	13 Aug 2013
Coaxial Cable	Sucoflex 106	Huber+Suhner	B085888	26 Sep 2012
Coaxial Cable	Sucoflex 102	Huber+Suhner	B079824	23 NOV 2012
Coaxial Cable	Sucoflex 102	Huber+Suhner	B079822	23 NOV 2012

Note: The calibration period equipment is 1 year.

6.5 Test Setup Photographs

Test setup photographs are located in a separate exhibit.

6.6 Test Data

Peak Data

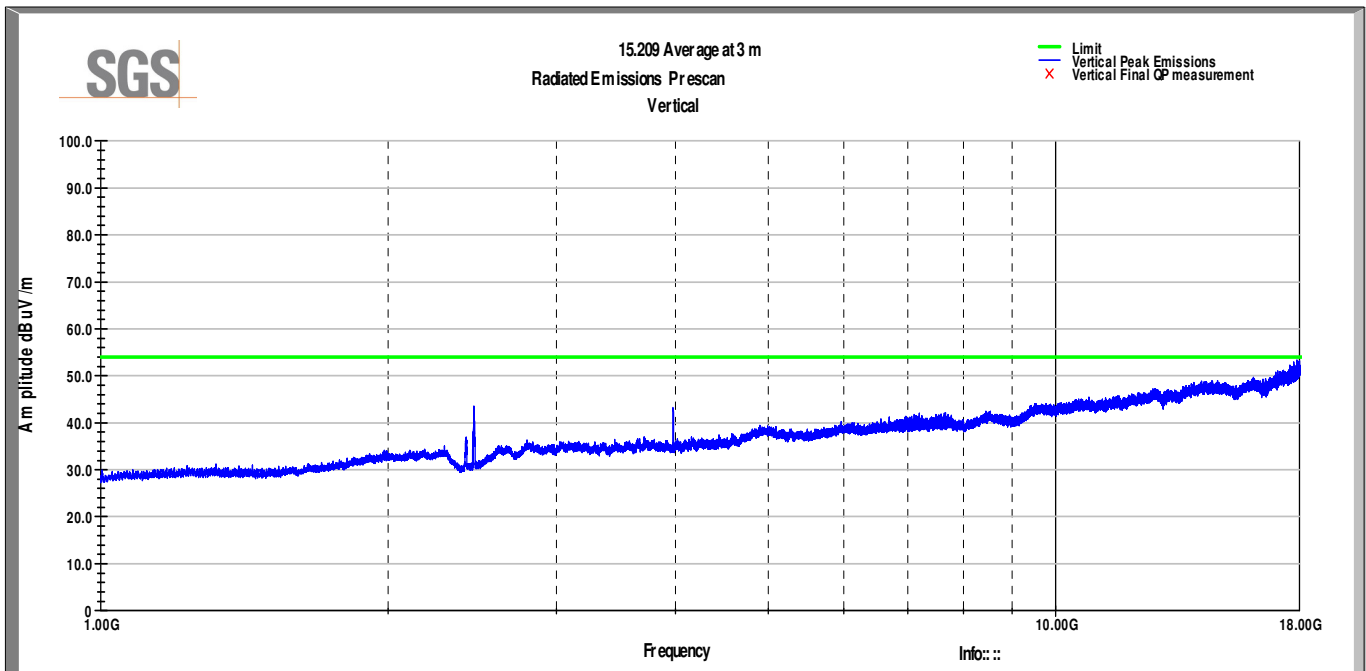
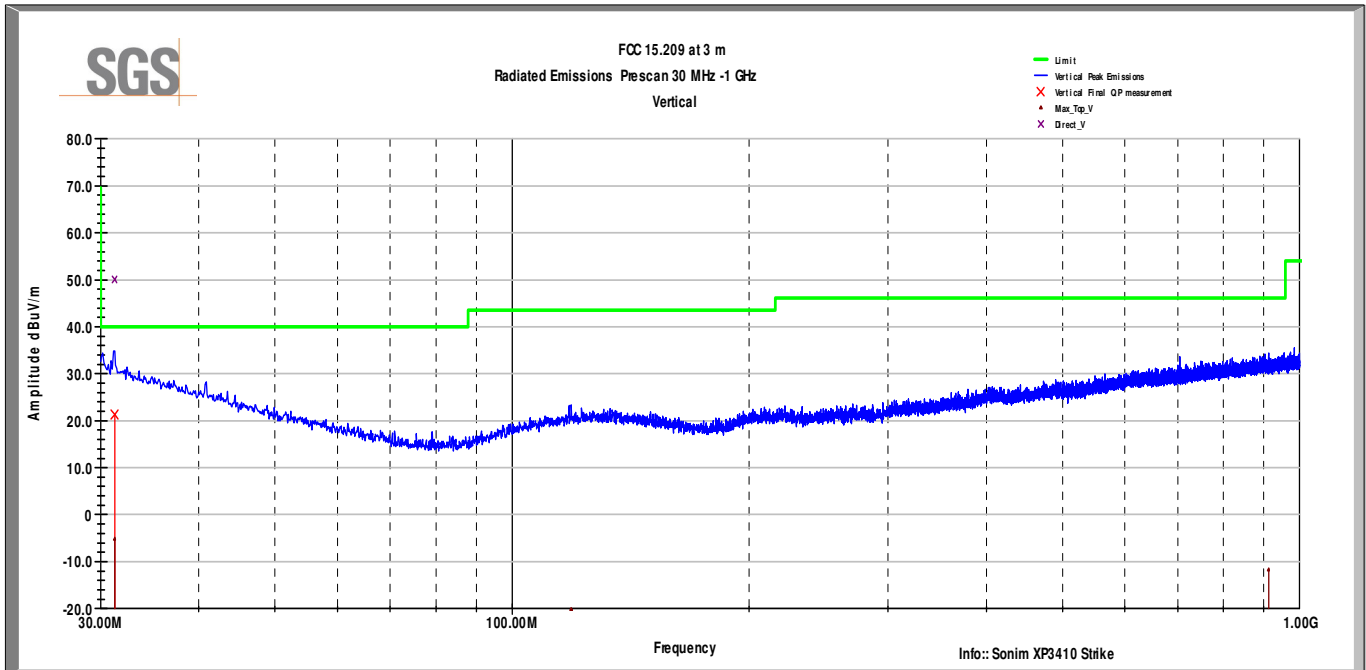
Frequency MHz	Peak Level dBuV	Chan. / Mode	Polarity / Axis (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	Peak Value dBuV/m	Limit (dBuV/m)	Margin (dB)
2483.50	66.4	High / DPSK	H / Side	336.0	123.0	32.3	3.7	44.2	58.2	74.0	-15.8
2483.50	63.9	High / DPSK	V / Side	179.2	110.0	32.3	3.7	44.2	55.7	74.0	-18.3
2483.50	58.2	High / DPSK	H / Upright	56.3	114.0	32.3	3.7	44.2	50.0	74.0	-24.0
2483.50	64.2	High / DPSK	V / Upright	95.3	177.5	32.3	3.7	44.2	56.0	74.0	-18.0
2483.50	60.5	High / DPSK	V / Flat	0.0	155.6	32.3	3.7	44.2	52.3	74.0	-21.7
2483.50	66.8	High / DPSK	H / Flat	283.3	127.3	32.3	3.7	44.2	58.6	74.0	-15.4
Peak Value = Peak Level + AF + CL - Amp											
Margin = Peak Value - Limit											

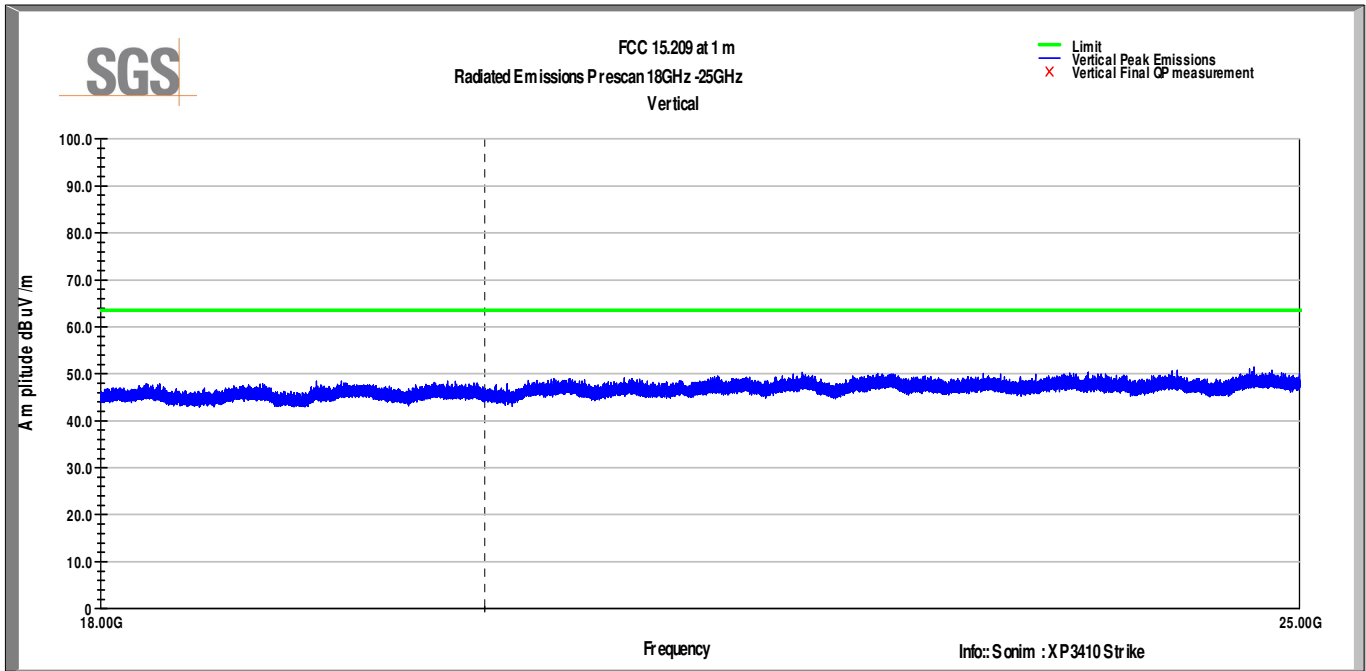
Pre-scan tests using the peak detector show there were no other peak emissions within 20 dB of the limit. This applies to both the 15.209 and 15.247(d) requirements.

Quasi-Peak and Average Data

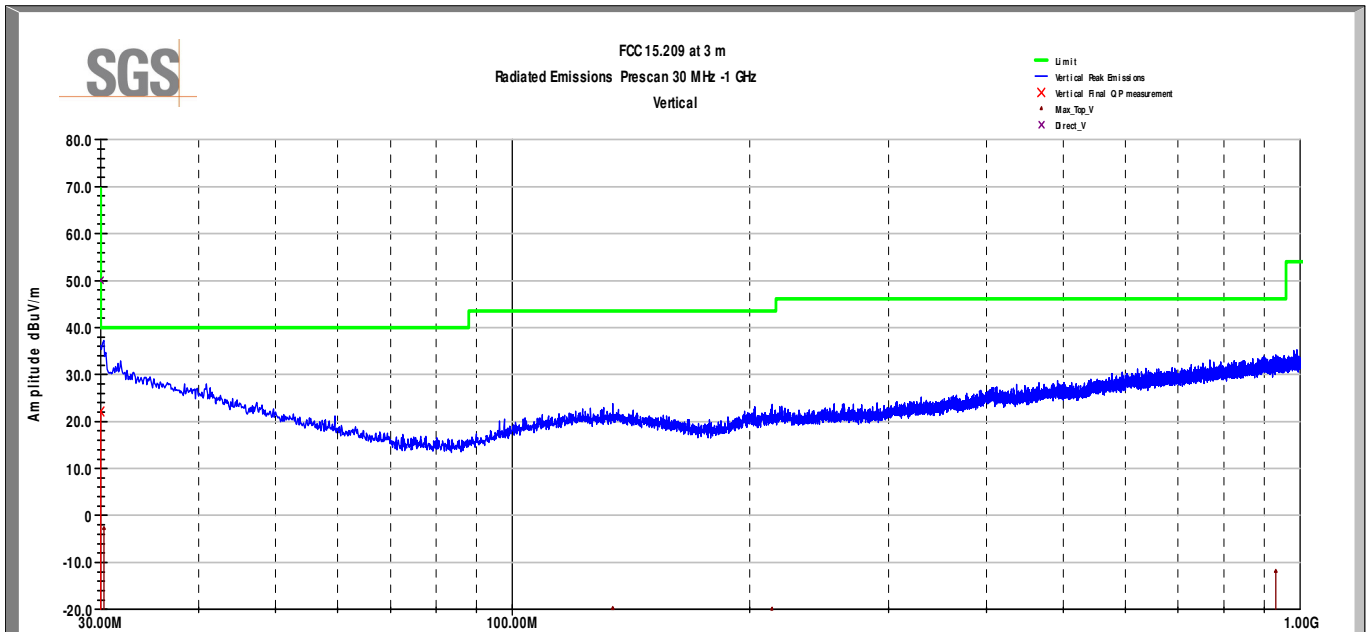
Frequency MHz	Raw QP dBuV	Chan. / Mode	Polarity / Axis (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	QP Value dBuV/m	Limit (dBuV/m)	Margin (dB)
30.00	11.9	Low / DPSK	V / Side	319.0	105.0	23.8	0.4	0.0	22.1	40.0	-17.9
30.10	11.4	High / DPSK	V / Upright	267.0	355.0	23.7	0.4	0.0	21.8	40.0	-18.2
31.26	11.4	Mid / DPSK	V / Flat	300.0	346.0	23.0	0.4	0.0	21.3	40.0	-18.7
31.65	9.0	High / DPSK	H / Upright	294.0	400.0	22.8	0.4	0.0	21.1	40.0	-18.9
136.80	6.5	High / DPSK	V / Upright	359.0	278.0	13.4	0.8	0.0	11.9	43.5	-31.7
138.16	9.3	High / DPSK	H / Upright	108.0	400.0	13.2	0.8	0.0	11.6	43.5	-31.9
214.20	7.4	High / DPSK	V / Upright	322.0	257.0	13.3	1.0	0.0	12.3	43.5	-31.3
955.87	7.6	High / DPSK	V / Upright	291.0	377.0	22.5	2.1	0.0	24.9	46.0	-21.1
957.42	9.4	High / DPSK	H / Upright	169.0	400.0	22.5	2.1	0.0	24.8	46.0	-21.2
Frequency MHz	Raw Avg dBuV	Chan. / Mode	Polarity / Axis (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	CL (dB)	Amp (dB)	Avg Value dBuV/m	Limit (dBuV/m)	Margin (dB)
2390.00	43.2	Low / DPSK	H / Side	17.3	123.0	32.3	3.6	44.1	35.0	54.0	-19.0
2390.00	42.9	Low / DPSK	V / Side	178.9	115.8	32.3	3.6	44.1	34.7	54.0	-19.3
2390.00	43.9	Low / DPSK	H / Upright	45.8	256.0	32.3	3.6	44.1	35.7	54.0	-18.3
2390.00	42.5	Low / GFSK	V / Flat	306.2	100.0	32.3	3.6	44.1	34.3	54.0	-19.7
2390.00	43.8	Low / DPSK	V / Flat	306.2	100.0	32.3	3.6	44.1	35.6	54.0	-18.4
2483.50	48.2	High / DPSK	H / Side	336.0	123.0	32.3	3.7	44.2	40.0	54.0	-14.0
2483.50	61.2	High / DPSK	V / Side	179.2	110.0	32.3	3.7	44.2	53.0	54.0	-1.0
2483.50	54.9	High / DPSK	H / Upright	56.3	114.0	32.3	3.7	44.2	46.7	54.0	-7.3
2483.50	60.7	High / DPSK	V / Upright	95.3	177.5	32.3	3.7	44.2	52.5	54.0	-1.5
2483.50	56.0	High / DPSK	V / Flat	0.0	155.6	32.3	3.7	44.2	47.8	54.0	-6.2
2483.50	48.2	High / DPSK	H / Flat	283.3	127.3	32.3	3.7	44.2	40.0	54.0	-14.0
3977.93	37.7	Low / DPSK	V / Side	0.0	100.0	33.5	4.7	44.3	31.6	54.0	-22.4
QP Value = Level + AF + CL - Amp											
Avg Value = Level + AF + CL - Amp											
Margin = Avg Value - Limit											
Note: * Employed Marker-delta method of ANSI C63.10: 2009 Clause 6.9.3											

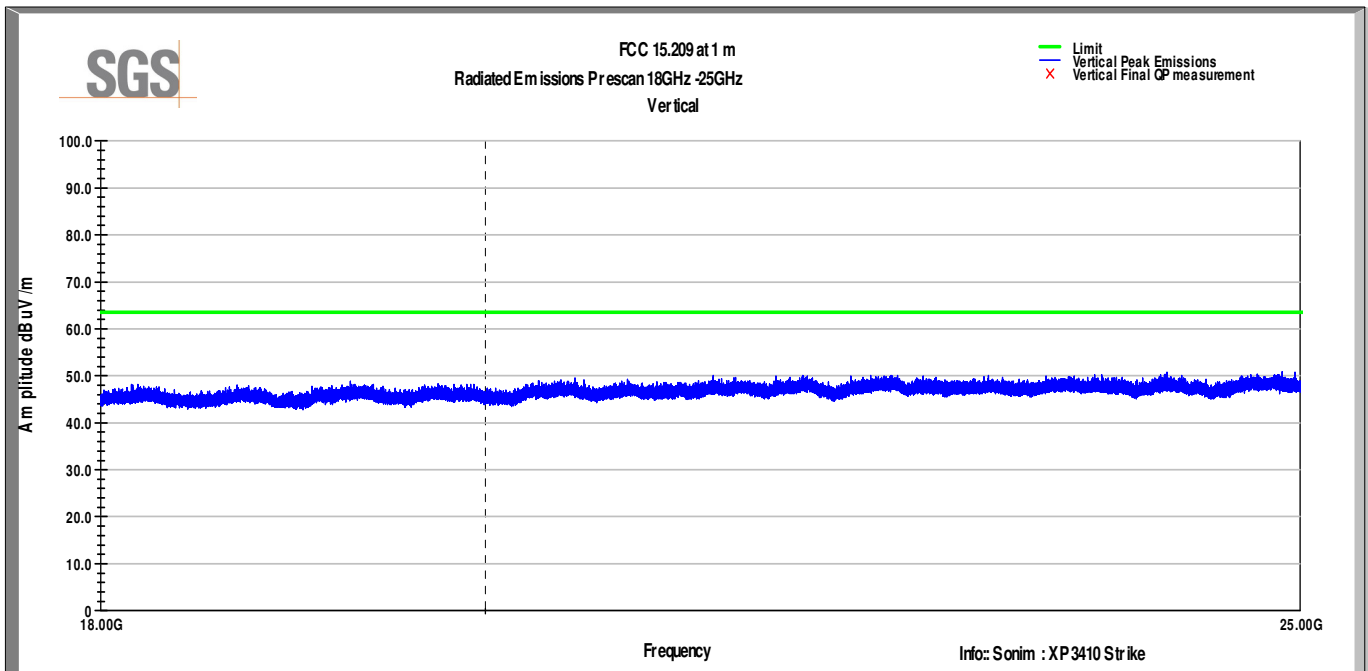
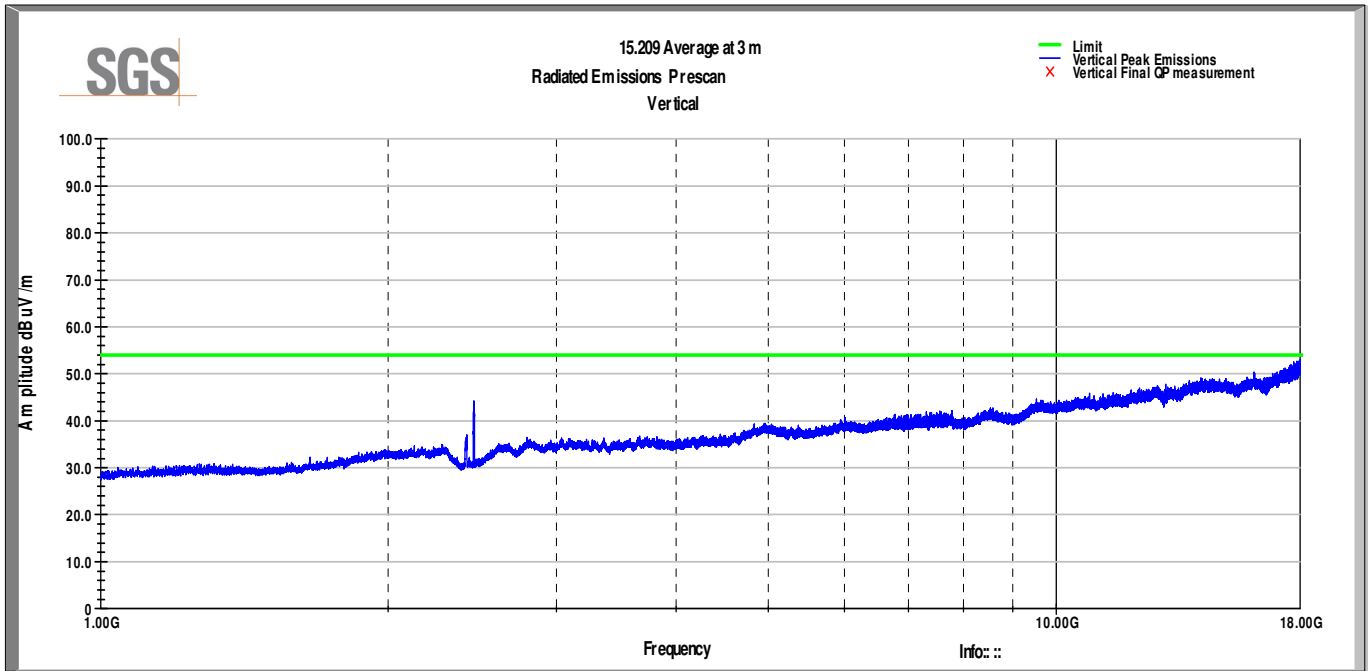
Vertical - Low Channel



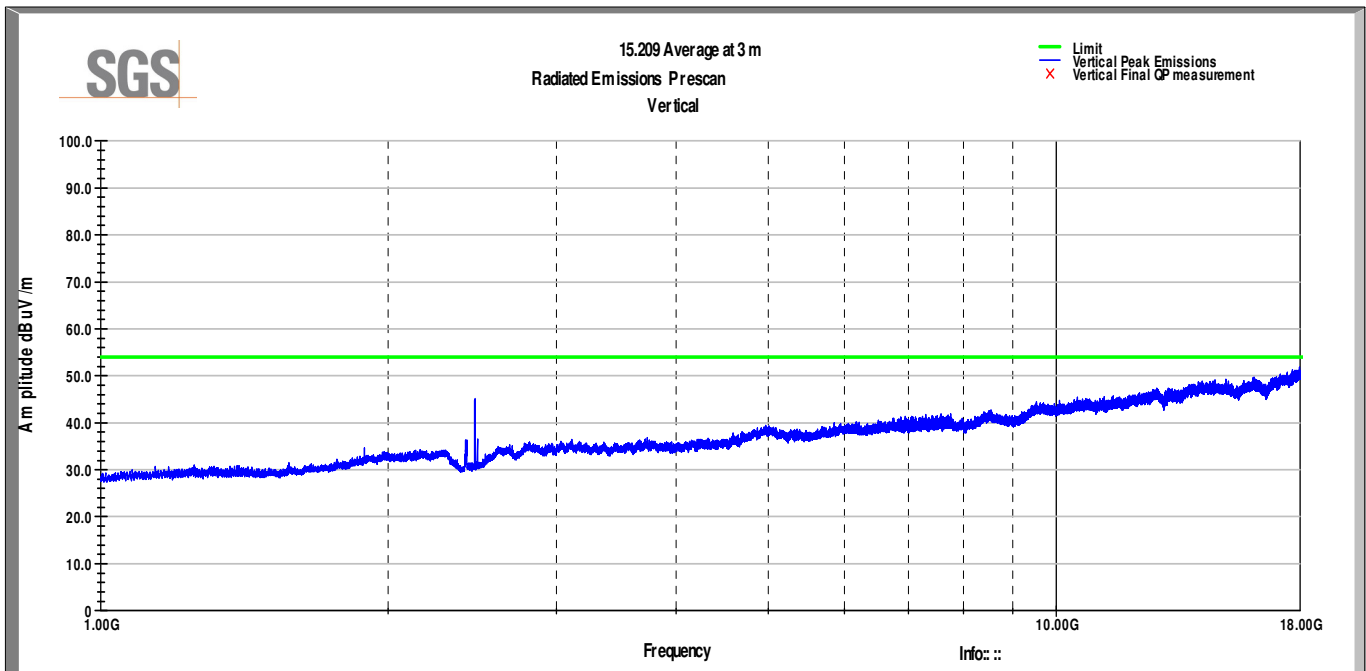
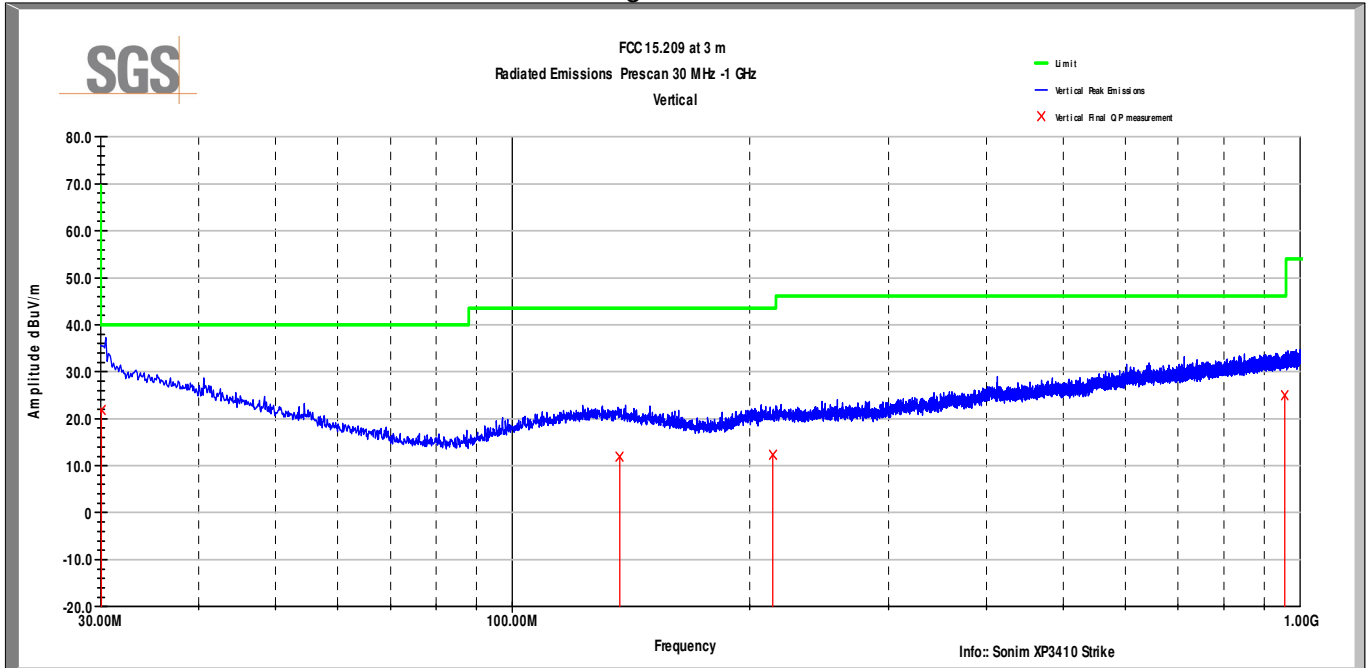


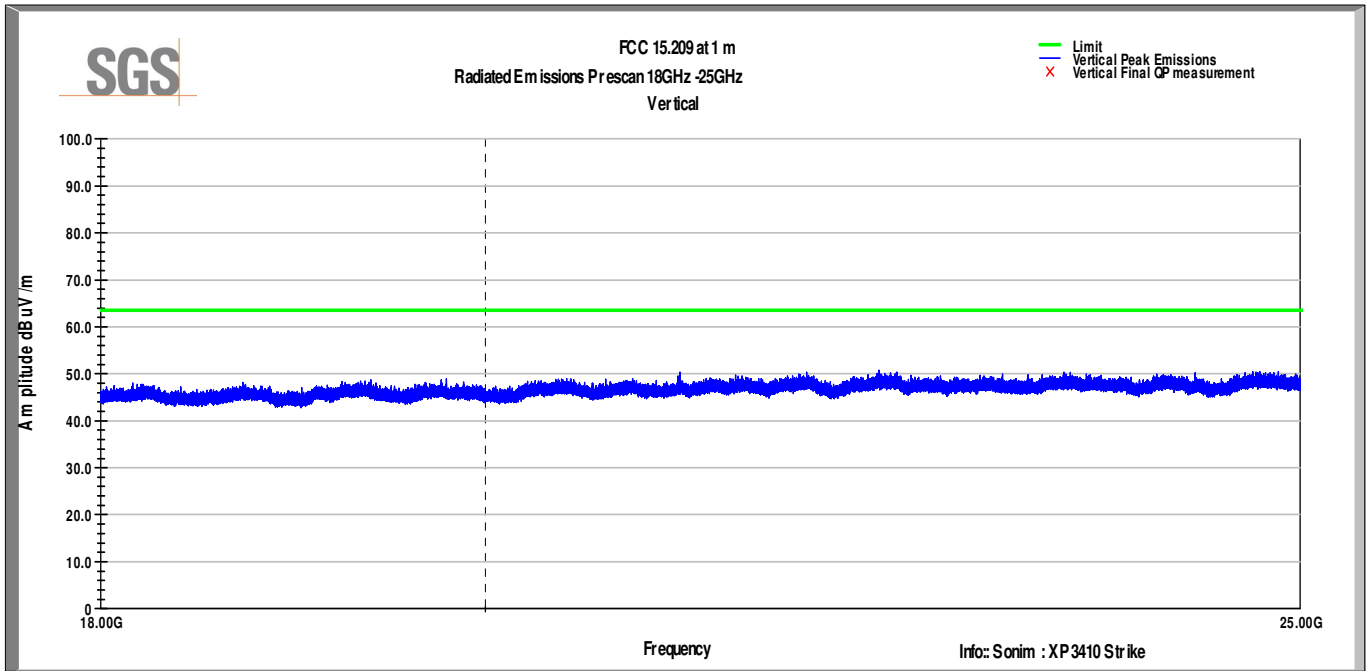
Mid Channel



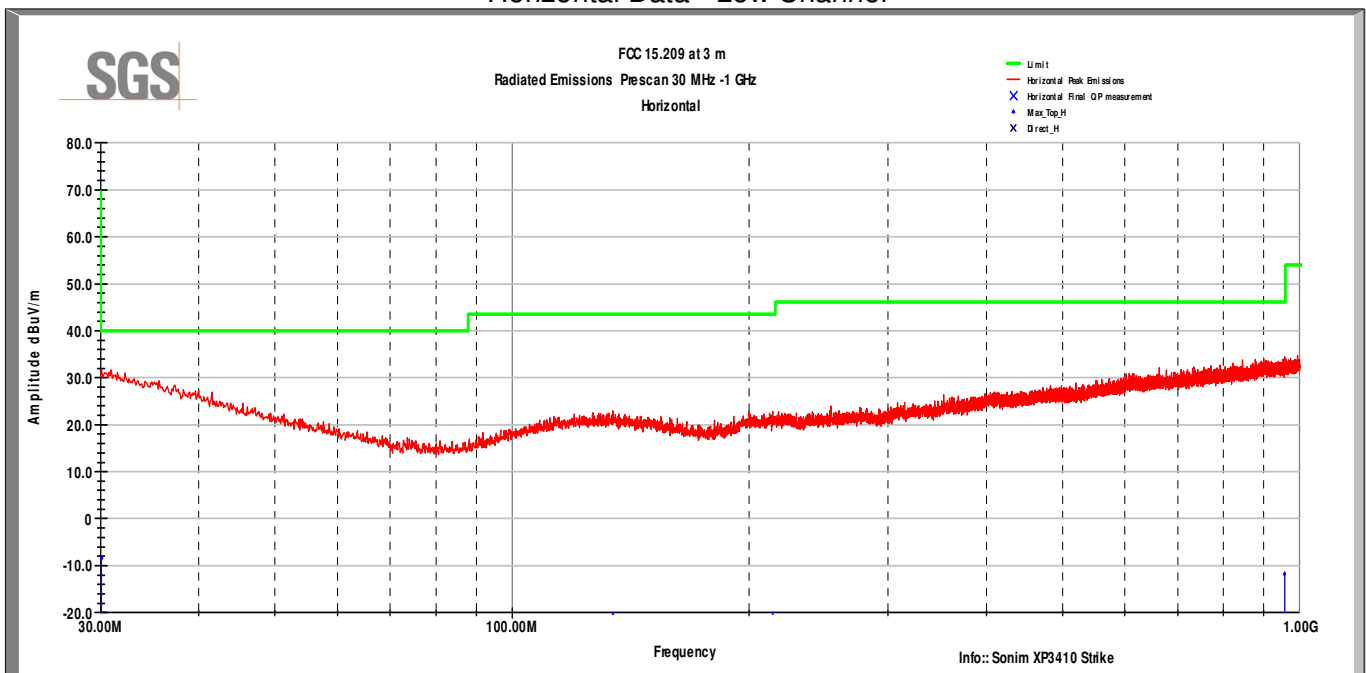


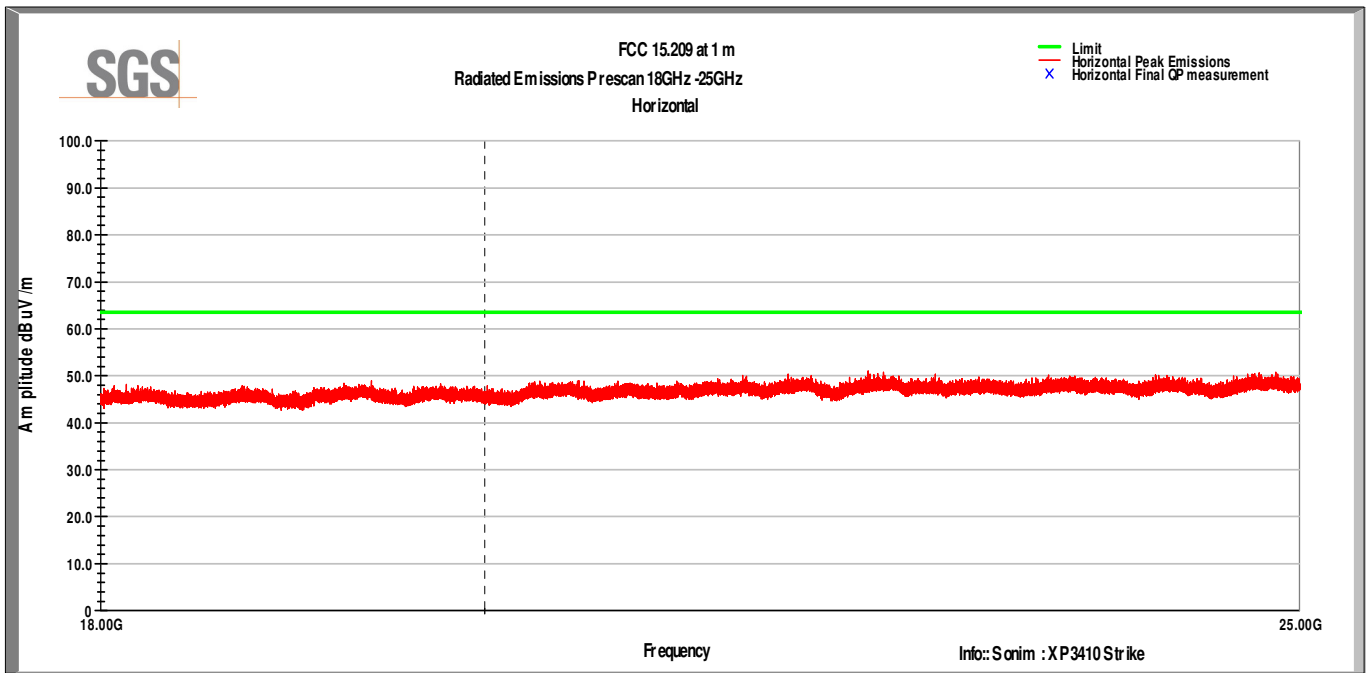
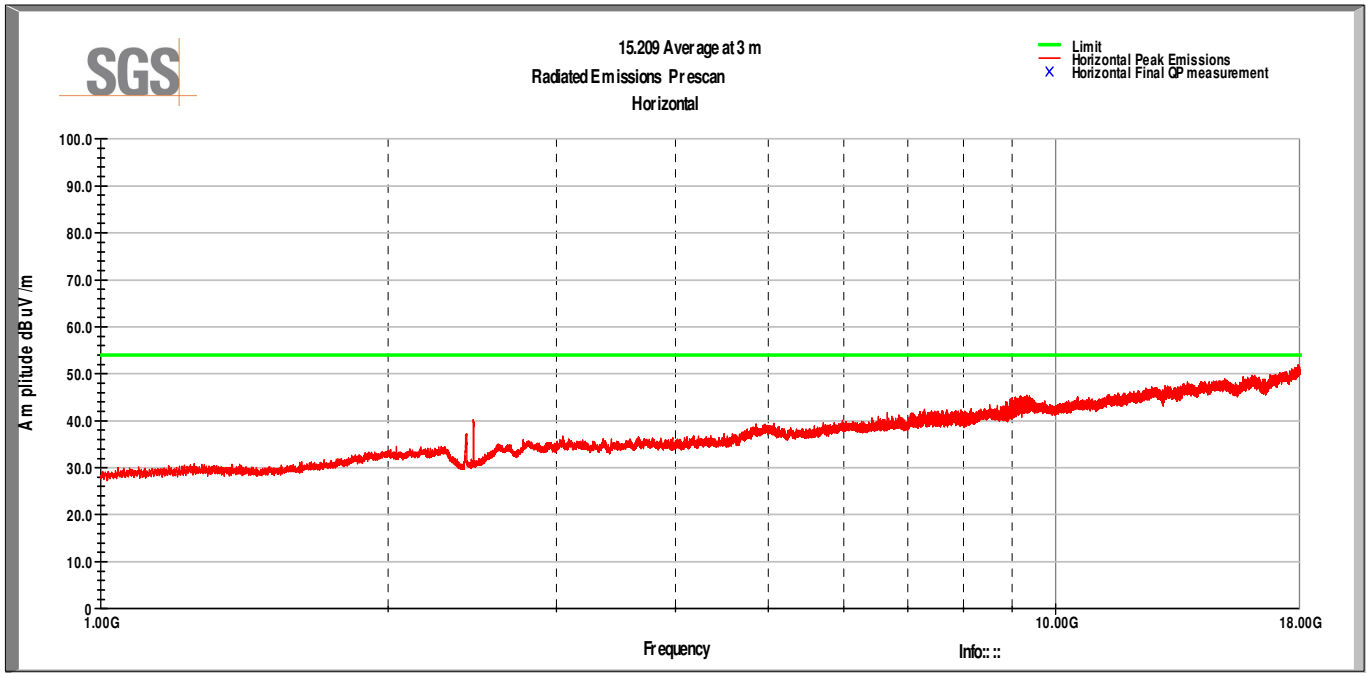
High Channel



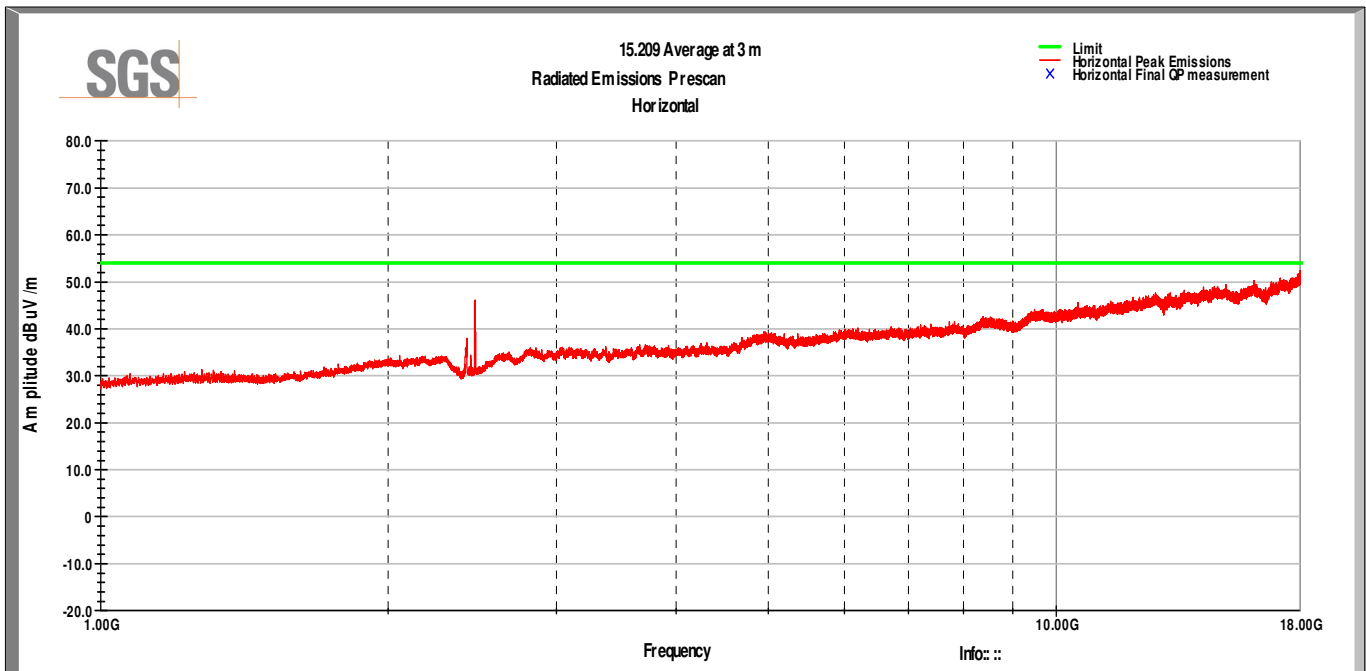
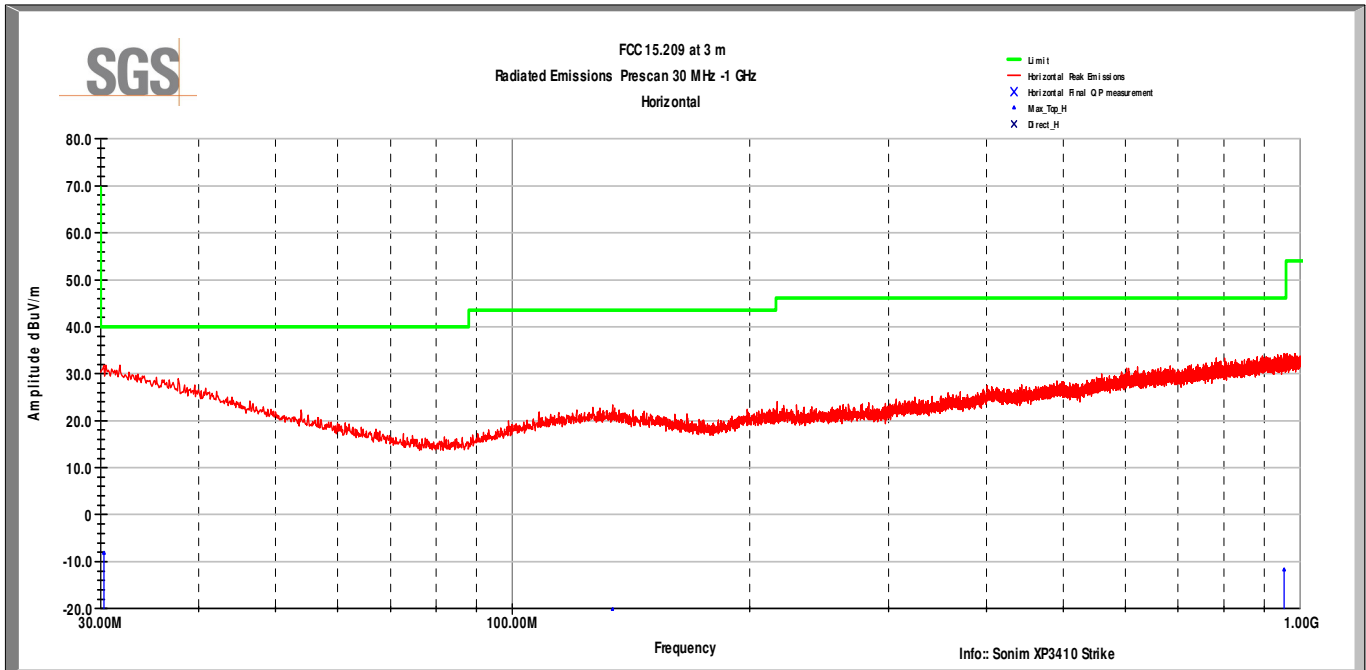


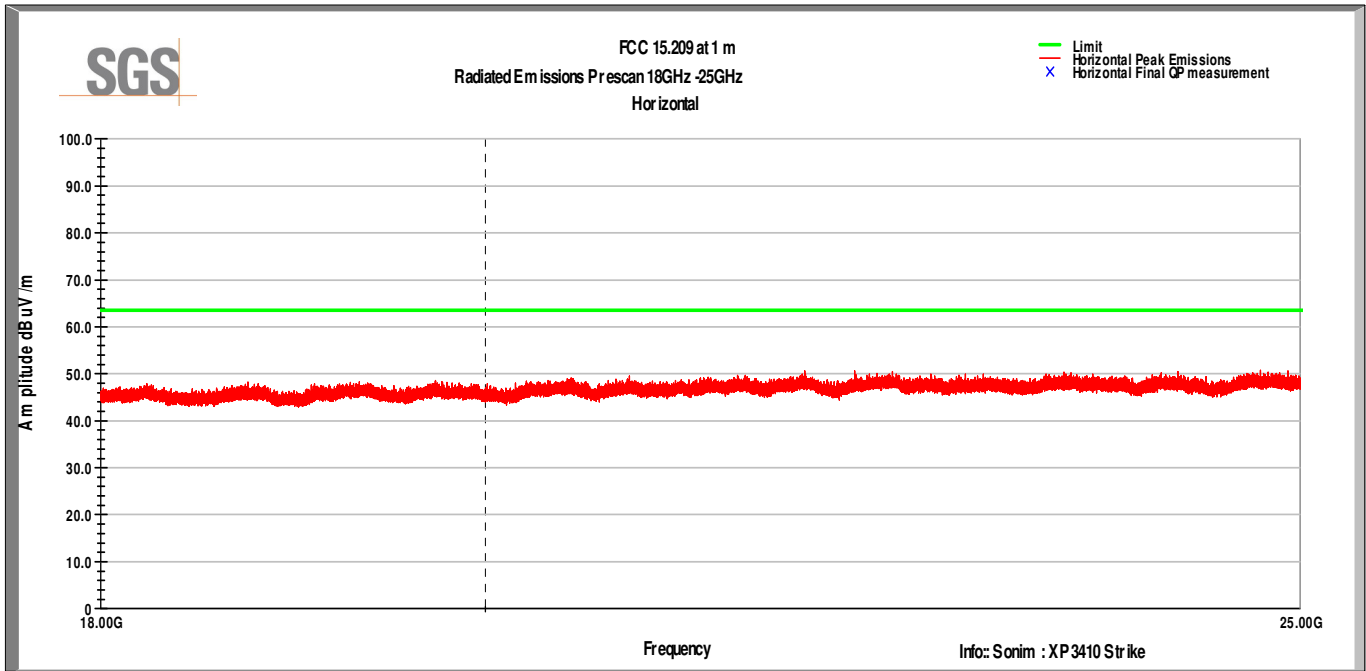
Horizontal Data - Low Channel



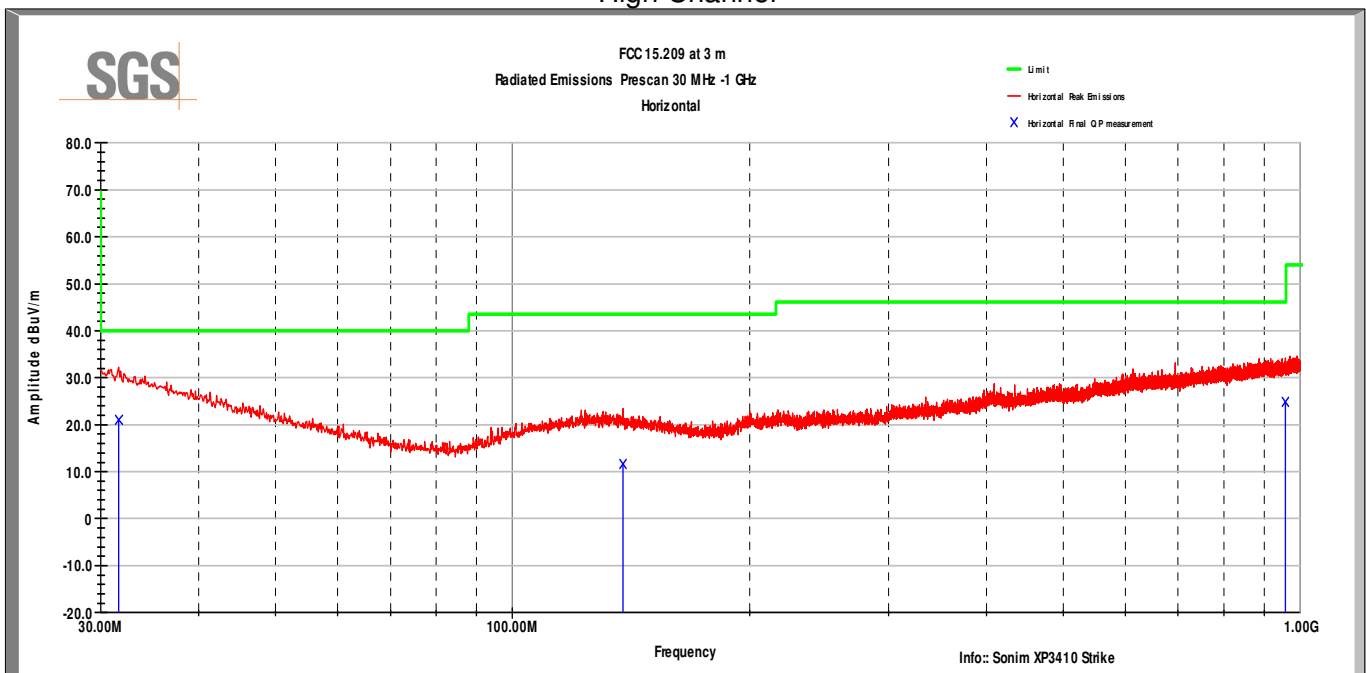


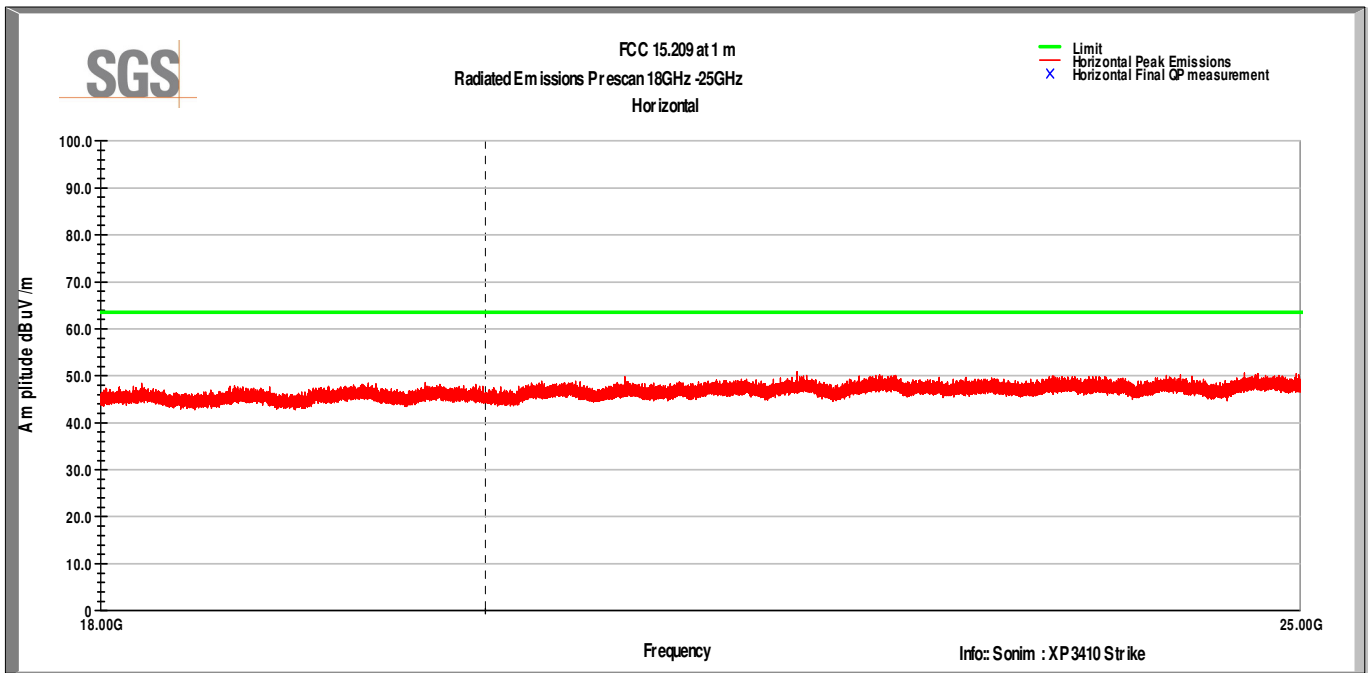
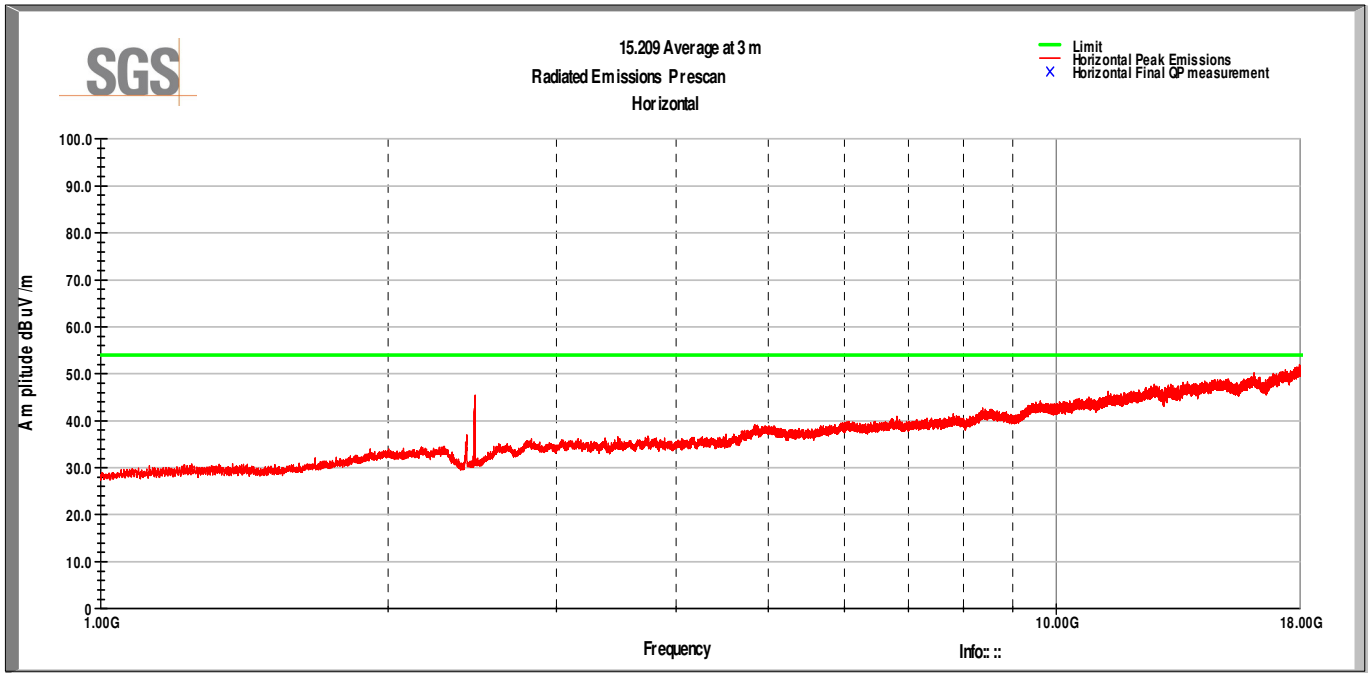
Mid Channel





High Channel





7 Dwell Time

7.1 Test Result

Test Description	Basic Standards	Test Result
Dwell Time	15.247(a) (1) (iii)	Pass

7.2 Test Method

The EUT was connected to the spectrum analyzer and Bluetooth tester by a directional coupler with known insertion loss characteristics.

The time slot length is measured of the three different packet types which are available in the Bluetooth Technology. Those are DH1, DH3, and DH5 packets.

The dwell time is calculated by:

$$\text{Dwell time} = \text{time slot length} * \text{hop rate} * 31.6 / \text{number of hopping channels}$$

With:

- Hop rate = $1600 * 1/s$ for DH1 packets = 1600
- Hop rate = $1600 / 3 * 1/s$ for DH3 packets = 533.33
- Hop rate = $1600 / 5 * 1/s$ for DH5 packets = 320
- Number of hopping channels = 79
- $31.6 \text{ s} = 0.4 \text{ seconds}$ multiplied by the number of hopping channels = $0.4\text{s} * 79$

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

7.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 24.4 °C

Relative Humidity: 47.8 %

7.4 Test Equipment

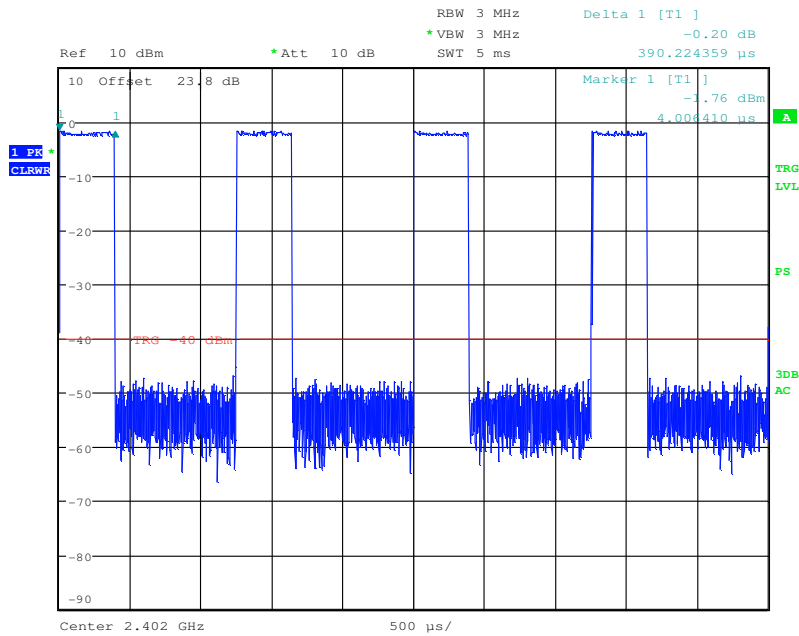
Equipment	Model	Manufacturer	Asset Number	Cal Due Date
Receiver	ESU40	R&S	B079629	25 AUG 2012
Directional Coupler	778D	Agilent / HP	B087456	14 OCT 2012
Directional Coupler	11692D	Agilent / HP	B079666	14 OCT 2012
Cable	Sucoflex 102	Huber+Suhner	B079824	23 NOV 2012
Cable	Sucoflex 102	Huber+Suhner	B079822	23 NOV 2012

Note: The calibration period equipment is 1 year.

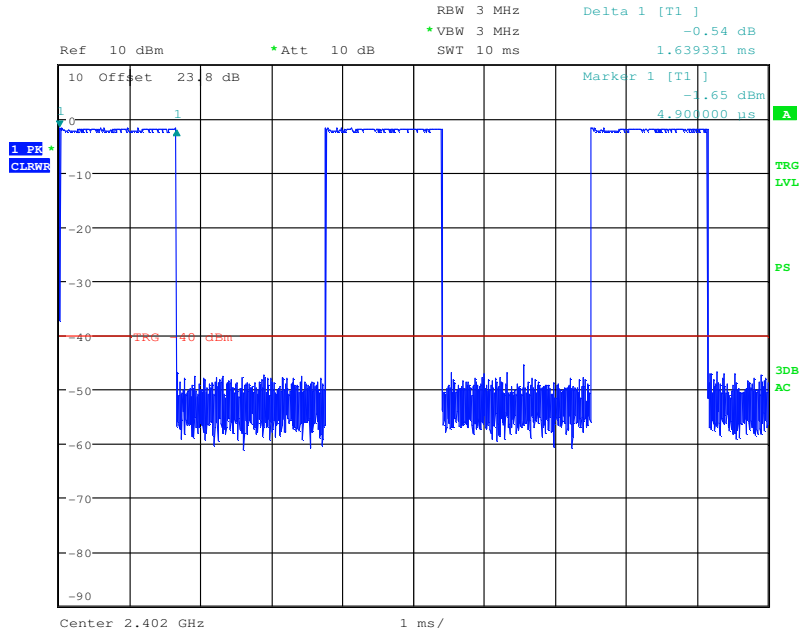
7.5 Test Data

Packet type	Time slot length ms	Dwell time	Dwell time ms
DH1	0.3902	Time slot length * 1600*31.6/79	249.728
DH3	1.6393	Time slot length * 1600/3*31.6/79	349.717
DH5	2.8894	Time slot length * 1600/5*31.6/79	369.843

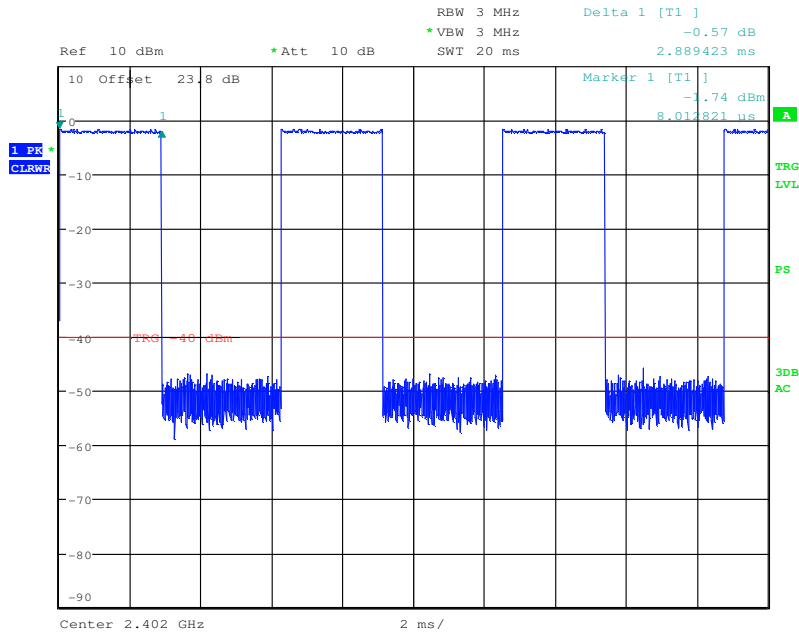
Mid channel, DH1



Mid channel, DH3



Mid channel, DH5



8 Channel Separation

8.1 Test Result

Test Description	Basic Standards	Test Result
Channel separation	15.247(a) (1)	Pass

8.2 Test Method

The EUT was connected to the spectrum analyzer and Bluetooth tester by a directional coupler with known insertion loss characteristics.

The test data was measured using a spectrum analyzer with

- Peak detector, max hold
- Span: 3 MHz
- Center Frequency: 2441 MHz
- Resolution bandwidth of at least 30 kHz
- Video bandwidth: 3 MHz RBW
- Sweep time: coupled

8.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 24.4 °C

Relative Humidity: 47.8 %

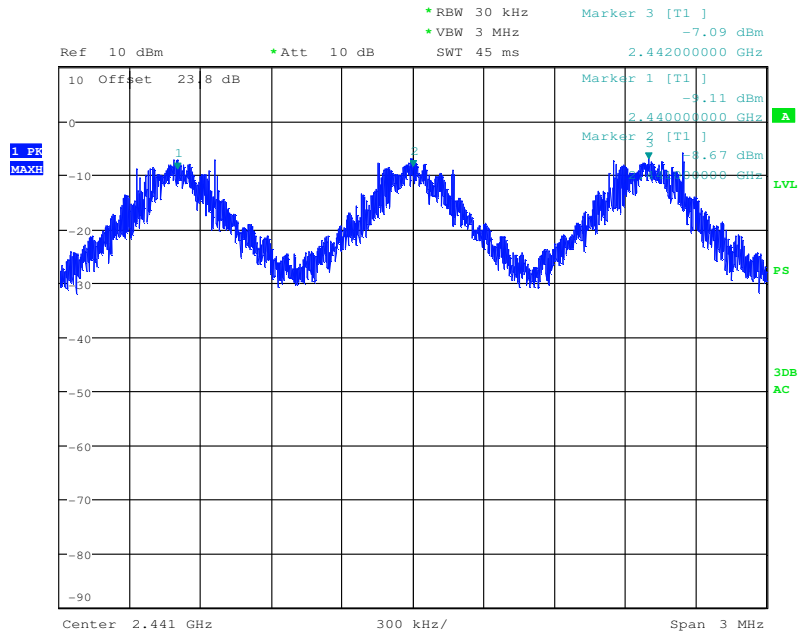
8.4 Test Equipment

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
Receiver	ESU40	R&S	B079629	25 AUG 2012
Directional Coupler	778D	Agilent / HP	B087456	14 OCT 2012
Directional Coupler	11692D	Agilent / HP	B079666	14 OCT 2012
Cable	Sucoflex 102	Huber+Suhner	B079824	23 NOV 2012
Cable	Sucoflex 102	Huber+Suhner	B079822	23 NOV 2012

Note: The calibration period equipment is 1 year.

8.5 Test Data

Channel Separation is 1 MHz



9 Number of hopping frequencies

9.1 Test Result

Test Description	Basic Standards	Test Result
Number of hopping frequencies	15.247(a) (1) (iii)	Pass

9.2 Test Method

The EUT was connected to the spectrum analyzer and Bluetooth tester by a directional coupler with known insertion loss characteristics.

The test data was measured using a spectrum analyzer with

- Peak detector, max hold
- Span: 84 MHz
- Center Frequency: 2441 MHz
- Resolution bandwidth of at least 30 kHz
- Video bandwidth at least 300 kHz RBW
- Sweep time: coupled

9.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 24.4 °C

Relative Humidity: 47.8 %

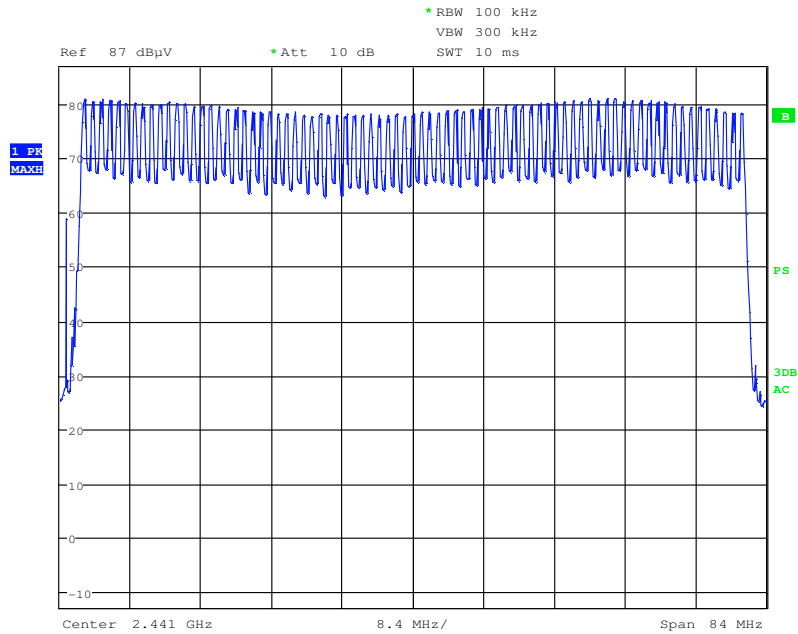
9.4 Test Equipment

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
Receiver	ESU40	R&S	B079629	25 AUG 2012
Directional Coupler	778D	Agilent / HP	B087456	14 OCT 2012
Directional Coupler	11692D	Agilent / HP	B079666	14 OCT 2012
Cable	Sucoflex 102	Huber+Suhner	B079824	23 NOV 2012
Cable	Sucoflex 102	Huber+Suhner	B079822	23 NOV 2012

Note: The calibration period equipment is 1 year.

9.5 Test Data

Number of channels: 79



10 Conducted Emissions

10.1 Test Result

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

10.2 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	

10.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 24.4 °C

Relative Humidity: 47.8 %

10.4 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:

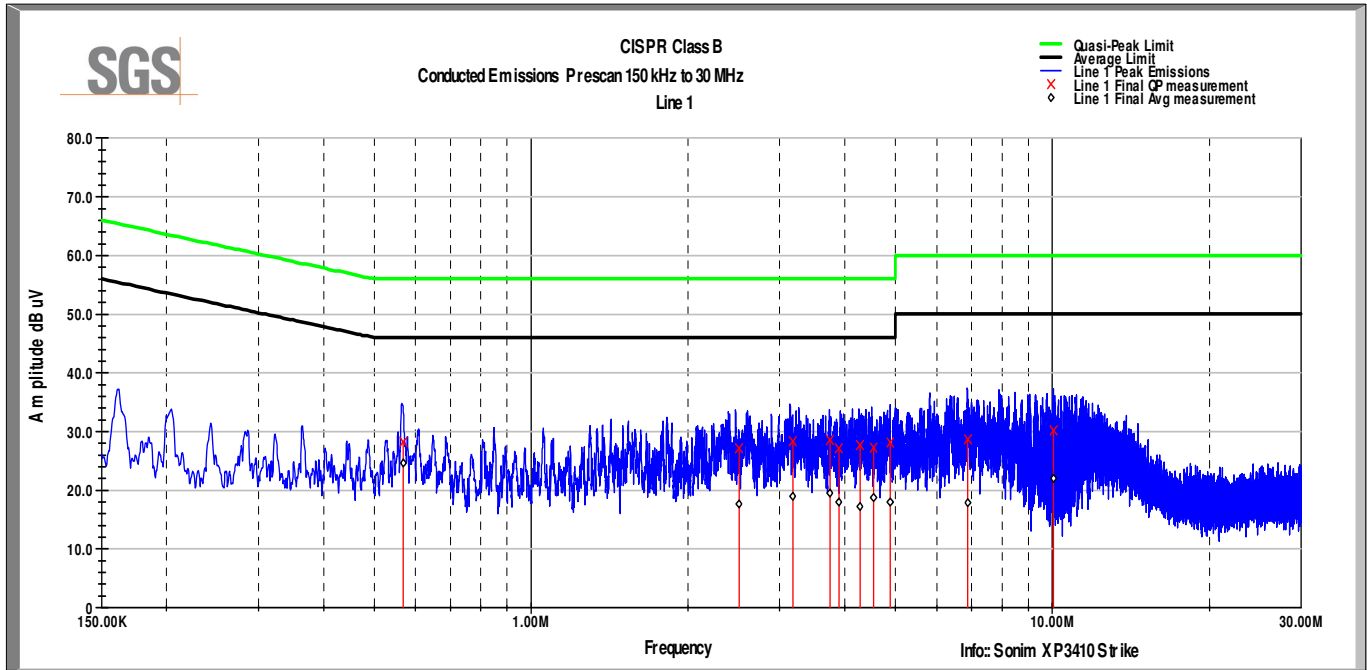
“Conducted Emissions” TILE! profile dated 10 Nov 2011

10.5 Test Setup Photographs

Test setup photographs are located in a separate exhibit.

10.6 Test Data

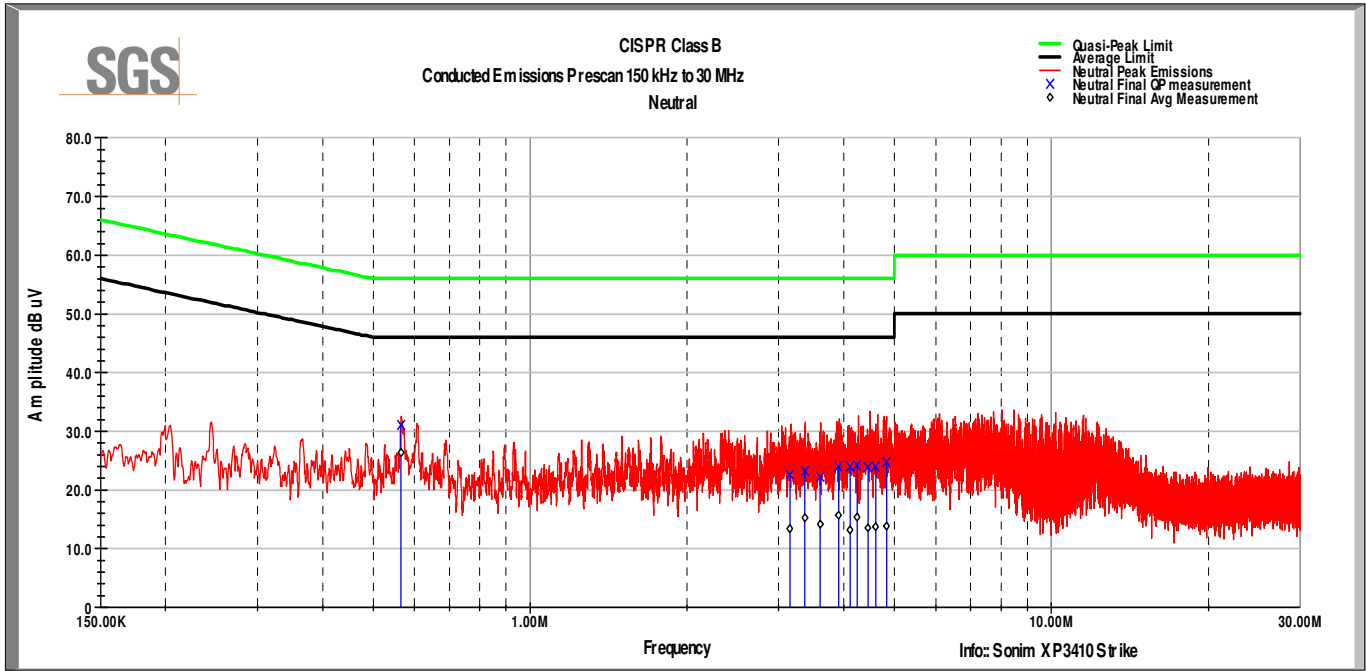
Line 1 Conducted Emissions Plot



Line 1 Conducted Emissions Data

Frequency MHz	QP Value dBuV	QP Limit dBuV	Margin dB	Avg Value dBuV	Avg Limit dBuV	Avg Margin dB
0.57	28.3	56.0	-27.7	24.7	46.0	-21.3
2.50	27.2	56.0	-28.8	17.7	46.0	-28.3
3.18	28.3	56.0	-27.7	19.0	46.0	-27.0
3.74	28.6	56.0	-27.4	19.5	46.0	-26.5
3.89	27.1	56.0	-28.9	18.0	46.0	-28.0
4.28	27.7	56.0	-28.3	17.3	46.0	-28.7
4.54	27.3	56.0	-28.7	18.7	46.0	-27.3
4.89	28.1	56.0	-27.9	18.0	46.0	-28.0
6.88	28.7	60.0	-31.3	17.9	50.0	-32.1
10.06	30.2	60.0	-29.8	22.0	50.0	-28.0

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
0.57	31.1	56.0	-24.9	26.4	46.0	-19.6
3.15	22.6	56.0	-33.4	13.5	46.0	-32.5
3.37	23.2	56.0	-32.8	15.3	46.0	-30.7
3.60	22.3	56.0	-33.7	14.2	46.0	-31.8
3.91	24.0	56.0	-32.0	15.7	46.0	-30.3
4.11	24.0	56.0	-32.0	13.2	46.0	-32.8
4.24	24.2	56.0	-31.8	15.4	46.0	-30.6
4.45	23.9	56.0	-32.1	13.6	46.0	-32.4
4.60	23.9	56.0	-32.1	13.7	46.0	-32.3
4.83	24.8	56.0	-31.2	13.8	46.0	-32.2

11 Revision History

Revision Level	Description of changes	Revision Date
0	Initial release	28 Aug 2012
1	Added hardware "A" to cover page. On page 4, converted "Hardware Version" to "Build Version". Updated the customer's suite number.	29 Aug 2012
2	Revised per reviewer's comments	26 Sep 2012