RF Test Report

Project Number: **4133100**

Report Number: **4133100EMC01** **Revision Level:** **0**

Client: **Crestron Electronics Inc.**

Equipment Under Test: **Zigbee Load Controller**

Model: **ZUMMESH-JBOX-16A-LV**

FCC ID: **EROGLWRSDIMHSW**

IC ID: **5683C-GLWRSDIMHSW**

Applicable Standards: **(ANSI C63.10: 2013) FCC Part 15 Subpart C, § 15.247**
RSS-247, Issue 2, February 2017
RSS-GEN, Issue 4, November 2014

Report issued on: **26 March 2018**

Test Result: **Compliant**

Tested by: _____
Jeremy Pickens, Senior EMC Engineer

Reviewed by: _____
David Schramm, Operations 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.

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1 Summary of Test Results

Test Description	Test Specification		Test Result
Bandwidth	15.247(d)	RSS-247 S5.2 (1) RSS-GEN S6.6	Compliant
Transmitter Output Power	15.247(b)(3)	RSS-247 S5.4 (4)	Compliant
Power Spectral Density	15.247(e)	RSS-247 S5.2 (2)	Compliant
Conducted Spurious Emissions / Band edge	15.247(d)	RSS-247 S5.5	Compliant
Radiated Spurious Emissions / Restricted Bands	15.35(b),15.209	RSS-GEN S6.13 RSS-GEN S8.10	Compliant
Antenna Requirement	15.203	RSS-GEN S8.3	Compliant
AC Powerline Conducted Emission	15.107, 15.207	RSS-GEN S8.8	Compliant

1.1 *Modifications Required for Compliance*

None

2 General Information

2.1 *Client Information*

Name:	Crestron Electronics Inc
Address:	15 Volvo Drive
City, State, Zip, Country:	Rockleigh, NJ 07647, USA

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

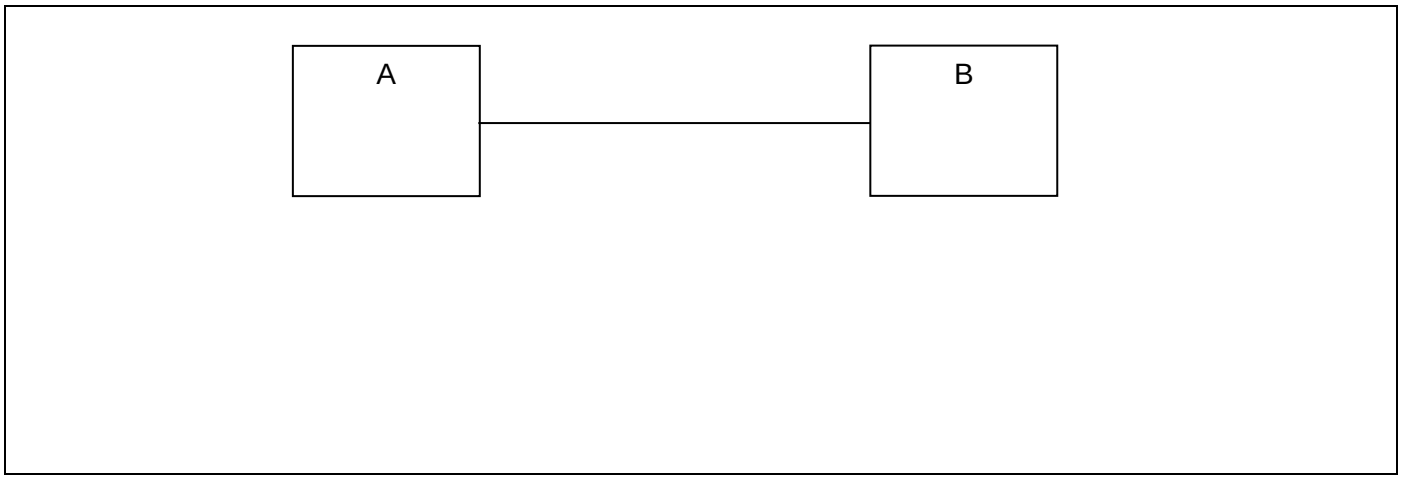
2.2 *General Information of EUT*

Type of Product:	Zigbee Load Controller
Model Number:	ZUMMESH-JBOX-16A-LV
Serial Number:	CNA9250788
Frequency Range:	2405-2480MHz
Modulation:	802.15.4 (Zigbee)
Antenna:	0.5dBi Chip Antenna (Johanson Technology, P/N: 2450AT18A100E)
Rated Voltage:	5Vdc
Test Voltage:	5Vdc
Sample Received Date:	21 April 2017
Dates of testing:	28 April 2017 (Radiated Spurious Emissions) 27 March 2018 (Antenna Port Conducted Measurements an radiated emissions <1GHz))

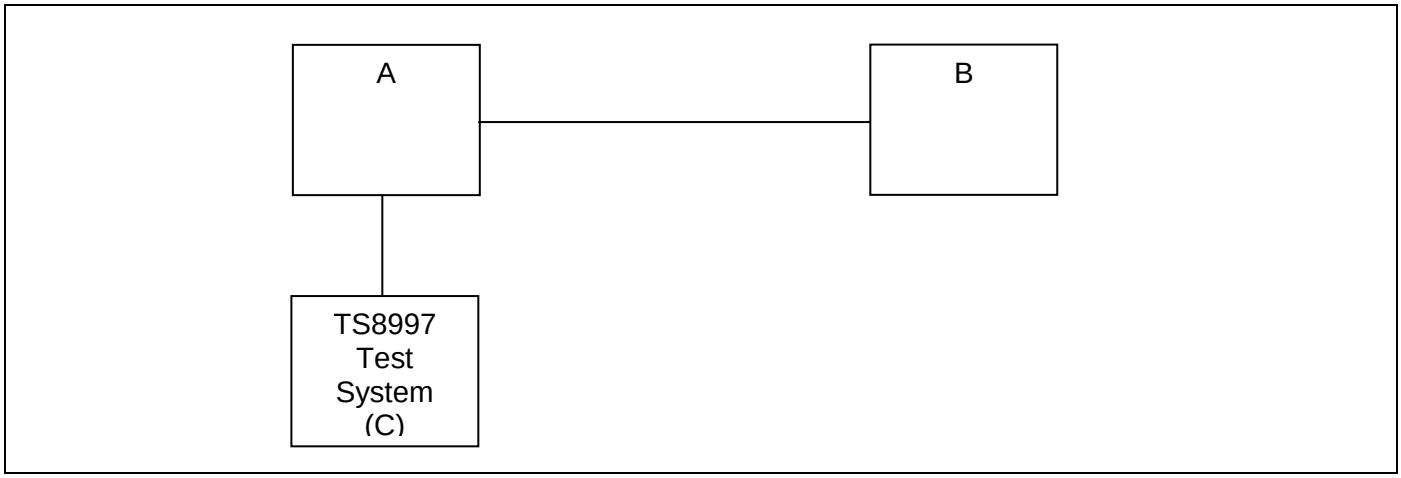
2.3 *Operating Modes and Conditions*

Continuous traffic was generated using test commands. The device was programmed to transmit at 100% duty cycle at low, middle, and high channels.
Channel 11, 2405MHz
Channel 18, 2440MHz
Channel 26, 2480MHz

2.4 *Radiated System Configuration*



2.5 *Conducted System Configuration*



Device reference	Manufacturer	Description	Model Number	Serial Number
A	Crestron	Zigbee Load Controller	ZUMMESH-JBOX-16A-LV	CNA9250788
B	Rigol	DC power supply	DP711	DP7A182700833
C	Rohde & Schwarz	Wireless Test System	TS8997	Not Labeled

3 Bandwidth

3.1 *Test Result*

Test Description	Test Specification		Test Result
6 dB bandwidth / 99% OBW	15.247(d)	RSS-247 S5.2 (1) RSS-GEN S6.6	Compliant

3.2 *Test Method*

The procedures from ANSI C63.10: 2013 clause 11.8 and 558074 D01 DTS Meas Guidance v04 were used to determine the 6 dB bandwidth and 99% OBW.

3.3 *Test Site*

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions
Temperature: 22.9 °C
Relative Humidity: 36.4 %

3.4 *Test Equipment*

Test End Date: 27-Mar-2018 Tester: JOP

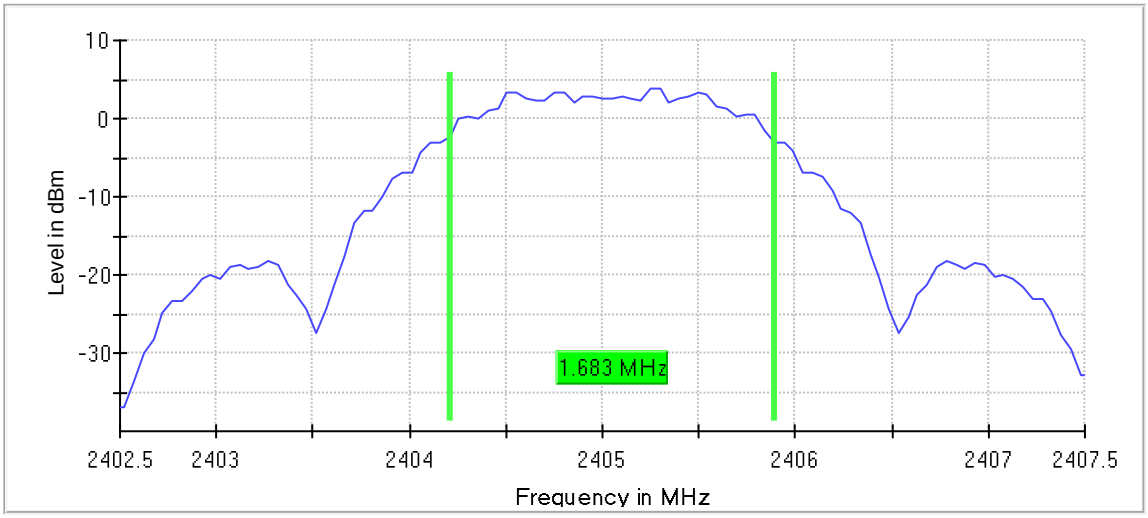
Equipment	Model	Manufacturer	Asset Number	Cal Due Date
SIGNAL ANALYZER	FSV30	ROHDE & SCHWARZ	B085749	1-Nov-2019
RF CABLE	SF102	HUBER & SUHNER	B079822	27-Jul-2018
OPEN SWITCH AND CONTROL UNIT	OSP 120	ROHDE & SCHWARZ	S/N: 101182	CNR
ATTENUATOR, 10DB	10DB	ROHDE & SCHWARZ	B095591	28-Jul-2018

Note: The equipment calibration period is 1 year except for the FSV which is on a 2-year calibration cycle.

3.5 *Test Data - 6 dB Bandwidth*

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)	Result
2405.000000	1.683168	0.500000	---	2404.207921	2405.891089	3.8	PASS
2440.000000	1.683168	0.500000	---	2439.207921	2440.891089	3.7	PASS
2480.000000	1.732673	0.500000	---	2479.158416	2480.891089	-5.7	PASS

Representative Plot



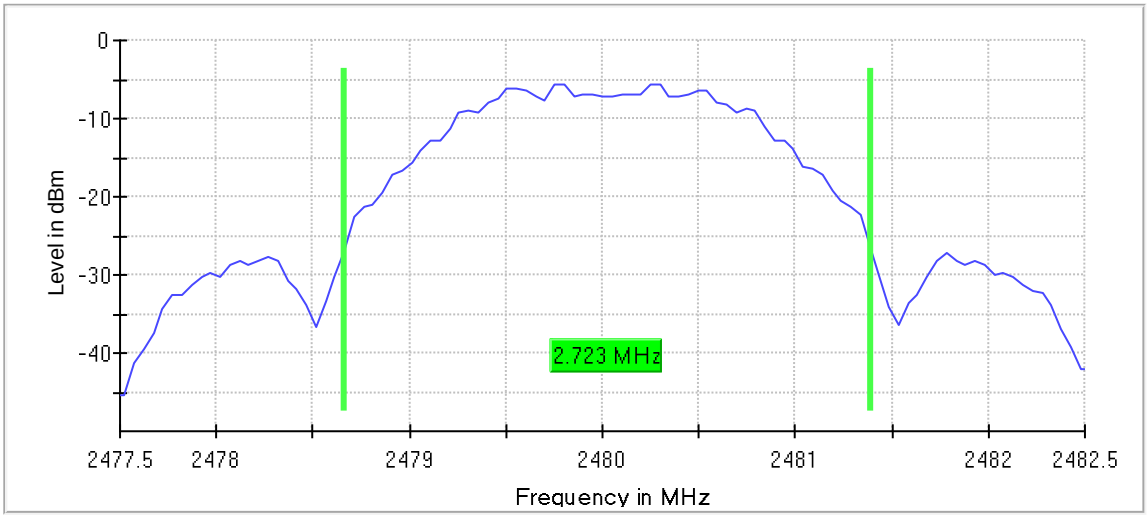
Representative Measurement Settings

Setting	Instrument Value	Target Value
Start Frequency	2.40250 GHz	2.40250 GHz
Stop Frequency	2.40750 GHz	2.40750 GHz
Span	5.000 MHz	5.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	101	~ 50
Sweeptime	18.938 µs	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	17 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.20 dB	0.50 dB

3.6 *Test Data – 99% Bandwidth*

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)	Result
2405.000000	2.722773	---	---	2403.663366	2406.386139	3.9	PASS
2440.000000	2.722773	---	---	2438.663366	2441.386139	3.8	PASS
2480.000000	2.722773	---	---	2478.663366	2481.386139	-5.7	PASS

Representative Plot



Representative Measurement Settings

Setting	Instrument Value	Target Value
Start Frequency	2.47750 GHz	2.47750 GHz
Stop Frequency	2.48250 GHz	2.48250 GHz
Span	5.000 MHz	5.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	101	~ 100
Sweeptime	18.938 µs	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	14 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.00 dB	0.50 dB

4 Output Power

4.1 *Test Result*

Test Description	Test Specification		Test Result
Peak Output Power	15.247(b) (3)	RSS-247 S5.4 (4)	Compliant

4.2 *Test Method*

Fundamental power measurements were recorded using the peak power procedures from ANSI C63.10: 2013 clause 11.9 and KDB 558074 D01 Measurement Guidance v04.

Limit
(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. For using antennas with greater than 6dBi of gain, the limit is reduced in dB by the amount the gain exceeds 6dBi

4.3 *Test Site*

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions
Temperature: 22.9 °C
Relative Humidity: 36.4 %

4.4 *Test Equipment*

Test End Date: 27-Mar-2018 Tester: JOP

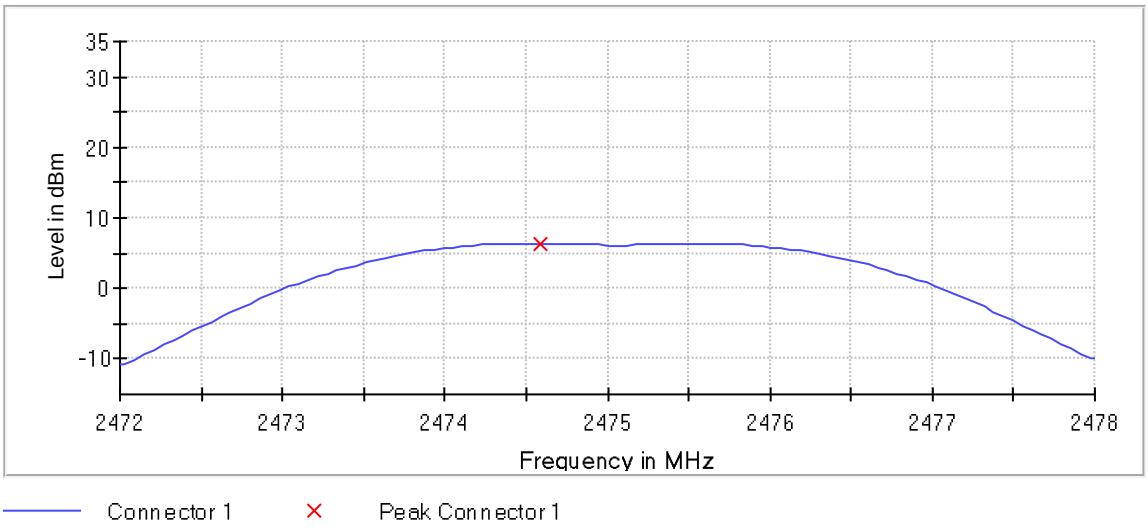
Equipment	Model	Manufacturer	Asset Number	Cal Due Date
SIGNAL ANALYZER	FSV30	ROHDE & SCHWARZ	B085749	1-Nov-2019
RF CABLE	SF102	HUBER & SUHNER	B079822	27-Jul-2018
OPEN SWITCH AND CONTROL UNIT	OSP 120	ROHDE & SCHWARZ	S/N: 101182	CNR
ATTENUATOR, 10DB	10DB	ROHDE & SCHWARZ	B095591	28-Jul-2018

Note: The equipment calibration period is 1 year except for the FSV which is on a 2-year calibration cycle.

4.5 *Test Data*

DUT Frequency (MHz)	Peak Power (dBm)	Limit Max (dBm)	Result
2405.000000	6.2	30.0	PASS
2440.000000	6.4	30.0	PASS
2475.000000	6.4	30.0	PASS
2480.000000	-3.2	30.0	PASS

Representative Plot



Representative Measurement Settings

Setting	Instrument Value	Target Value
Start Frequency	2.47200 GHz	2.47200 GHz
Stop Frequency	2.47800 GHz	2.47800 GHz
Span	6.000 MHz	6.000 MHz
RBW	2.000 MHz	>= 1.683 MHz
VBW	10.000 MHz	>= 6.000 MHz
SweepPoints	101	~ 101
Sweeptime	953.450 ns	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	4 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.09 dB	0.50 dB

5 Power Spectral Density

5.1 *Test Result*

Test Description	Test Specification		Test Result
Power Spectral Density	15.247(e)	RSS-247 S5.2 (2)	Compliant

5.2 *Test Method*

Fundamental power spectral density measurements were recorded using the peak PSD procedures from ANSI C63.10: 2013 clause 11.10 and KDB 558074 D01 Measurement Guidance v04.

Limit
The limit is 8 dBm.

5.3 *Test Site*

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions
Temperature: 22.9 °C
Relative Humidity: 36.4 %

5.4 *Test Equipment*

Test End Date: 27-Mar-2018 Tester: JOP

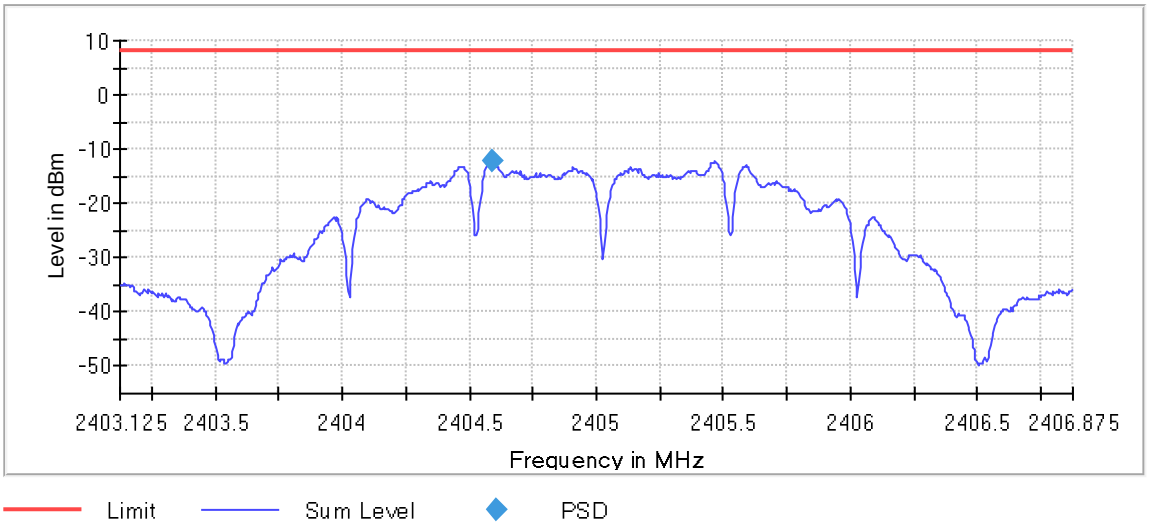
Equipment	Model	Manufacturer	Asset Number	Cal Due Date
SIGNAL ANALYZER	FSV30	ROHDE & SCHWARZ	B085749	1-Nov-2019
RF CABLE	SF102	HUBER & SUHNER	B079822	27-Jul-2018
OPEN SWITCH AND CONTROL UNIT	OSP 120	ROHDE & SCHWARZ	S/N: 101182	CNR
ATTENUATOR, 10DB	10DB	ROHDE & SCHWARZ	B095591	28-Jul-2018

Note: The equipment calibration period is 1 year except for the FSV which is on a 2-year calibration cycle.

5.5 *Test Data*

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2405.000000	2404.587500	-12.073	8.0	PASS
2440.000000	2440.467500	-11.601	8.0	PASS
2475.000000	2475.467500	-11.906	8.0	PASS
2480.000000	2479.582500	-21.835	8.0	PASS

Representative Plot



Representative Measurement Settings

Setting	Instrument Value	Target Value
Start Frequency	2.40313 GHz	2.40313 GHz
Stop Frequency	2.40688 GHz	2.40688 GHz
Span	3.750 MHz	3.750 MHz
RBW	10.000 kHz	<= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	750	~ 750
Sweeptime	3.750 s	3.750 s
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	31 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.40 dB	0.50 dB

6 Conducted Spurious Emissions

6.1 *Test Result*

Test Description	Test Specification		Test Result
Conducted Spurious Emissions	15.247(d)	RSS-247 S5.5	Compliant

6.2 *Test Method*

Spurious emissions in non-restricted frequency bands were recorded using the methods defined in ANSI C63.10: 2013 clause 11.11 and KDB 558074 D01 Measurement Guidance v04.

Lowest, middle, and highest channels were investigated.

Because the maximum conducted peak output power was used to determine compliance with the output power limits, the limit is 20 dB below the maximum in-band peak PSD level in 100 kHz.

6.3 *Test Site*

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions
Temperature: 22.9 °C
Relative Humidity: 36.4 %

6.4 *Test Equipment*

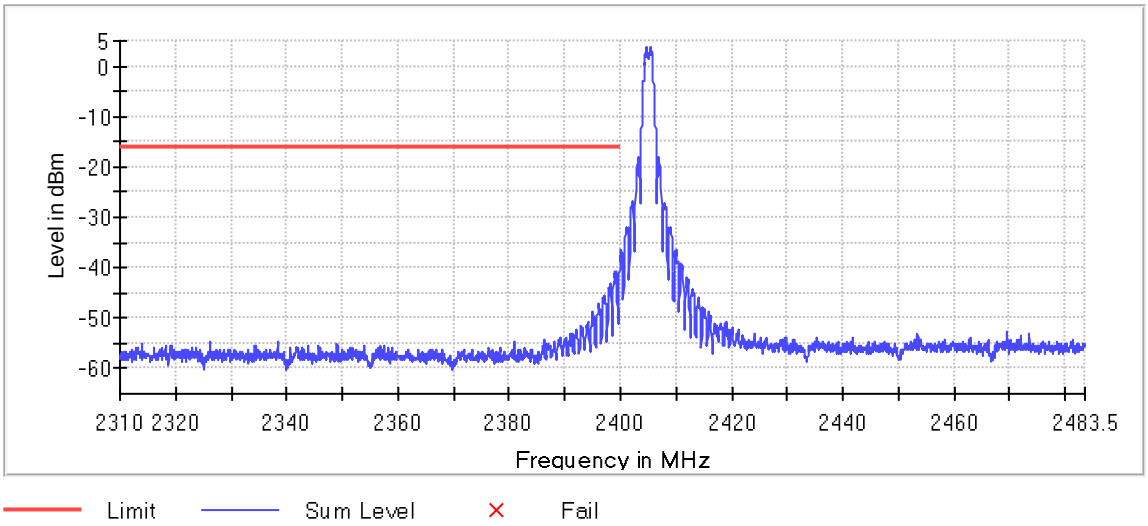
Test End Date: 27-Mar-2018 Tester: JOP

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
SIGNAL ANALYZER	FSV30	ROHDE & SCHWARZ	B085749	1-Nov-2019
RF CABLE	SF102	HUBER & SUHNER	B079822	27-Jul-2018

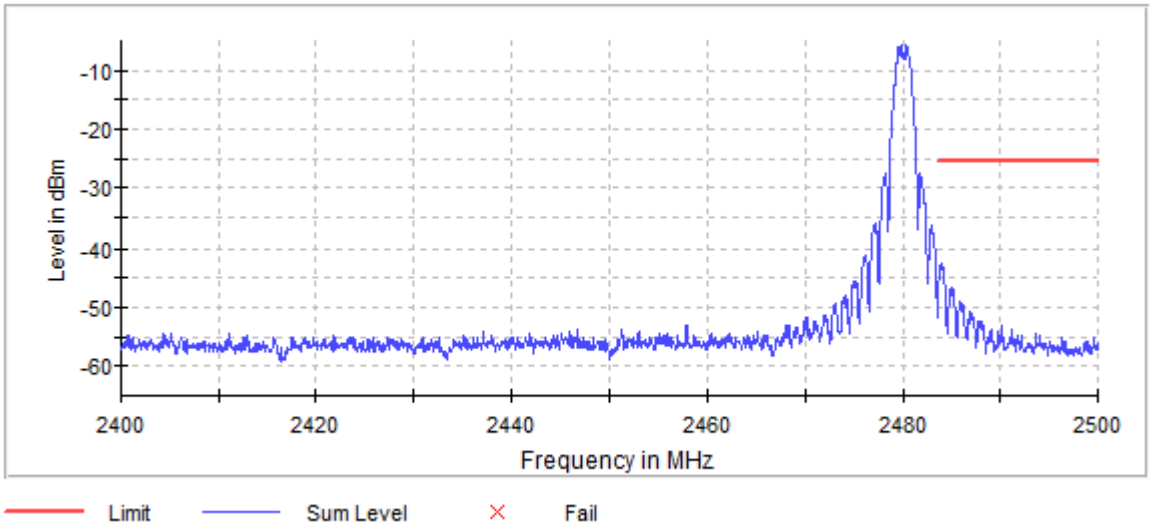
Note: The equipment calibration period is 1 year except for the FSV which is on a 2-year calibration cycle.

6.5 *Test Data – DTS Bandedge*

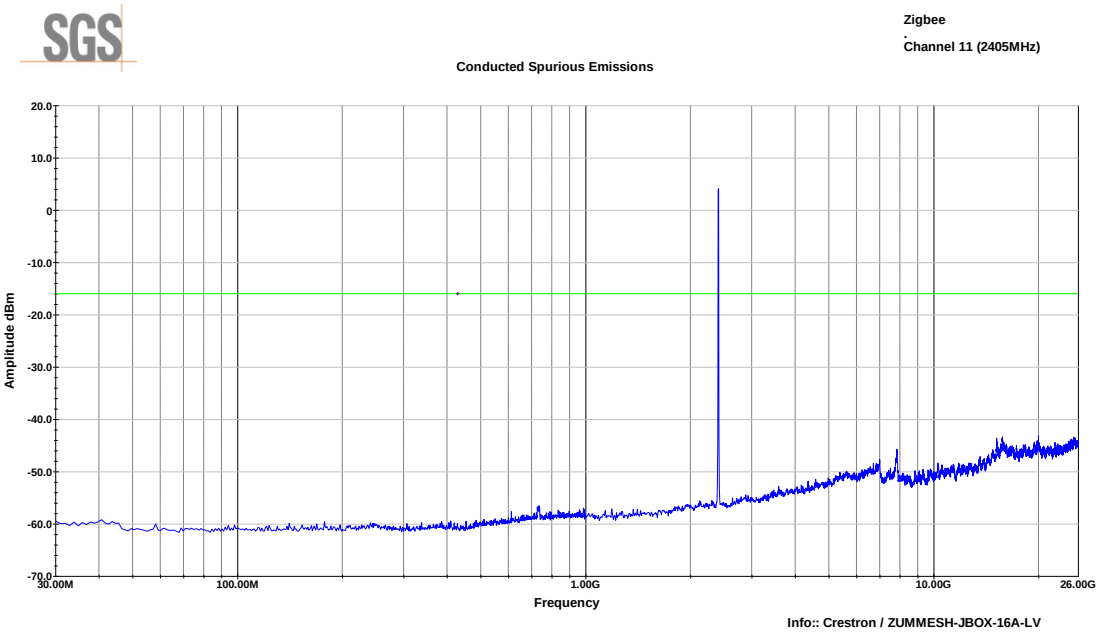
Lower band edge



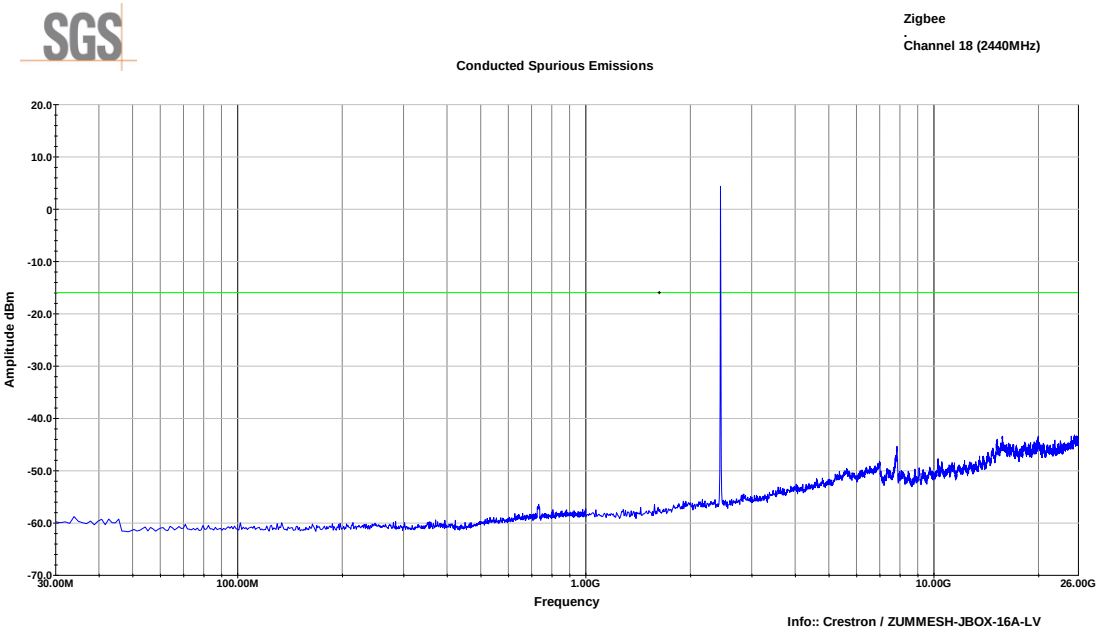
Upper band edge



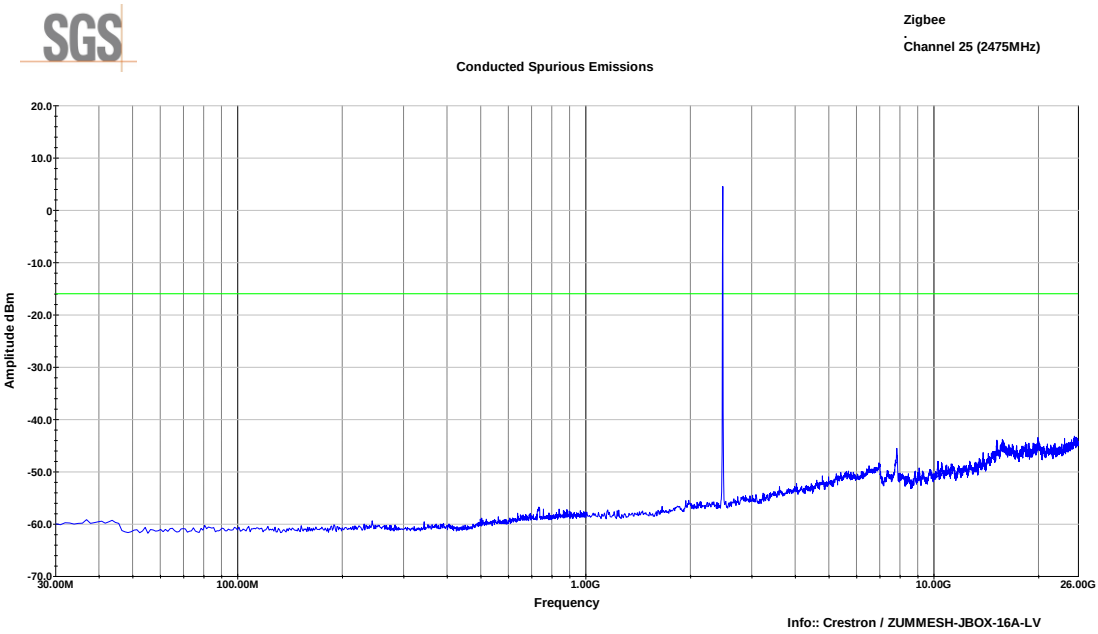
Test Data – Conducted Spurious Emissions
Conducted Spurs –Channel 11



Conducted Spurs –Channel 18



Conducted Spurs –Channel 25



7 Field Strength of Spurious Radiation

7.1 *Test Result*

Test Description	Test Specification		Test Result
Spurious Emissions	15.247 (d) and 15.209	RSS-247 S5.5	Compliant

7.2 *Test Method*

Radiated emission measurements were performed with the chip antenna installed as intended. The measurement methods defined in ANSI C63.10: 2013 were used.

Lowest, middle, and highest channels were investigated. For this evaluation, Channel 25 was used us the upper channel for spurious emissions measurements. This was chosen due to the significant power reduction at Channel 26.

Test distance:

1 to 18 GHz - The EUT to measurement antenna distance was 3 meters
18 to 26 GHz - The EUT to measurement antenna distance was 3 meters

Limits within restricted bands of operation:

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

7.3 *Test Site*

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 23.1 °C
Relative Humidity: 53.9 %

7.4 *Test Equipment*

Measurements >1GHz

Test End Date: 28-Apr-2017 Tester: JOP

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
EMI TEST RECEIVER	ESU40	ROHDE & SCHWARZ	S/N: 100196	6-Dec-2017
RF CABLE	NMS-290-236.2-NMS	FLORIDA RF LABS	B095020	29-Jul-2017
RF CABLE	SUCOFLEX 100	HUBER & SUHNER	B108523	4-Aug-2017
LOW NOISE AMPLIFIER	TS-PR18	ROHDE & SCHWARZ	15003	29-Jul-2017
ANTENNA, DRG HORN (MEDIUM)	3117	ETS LINDGREN	B079691	27-Jul-2017
HORN(SMALL)	LB-180400-20-C-KF	A-INFO	15007	21-Mar-2018
RF CABLE	SF102	HUBER & SUHNER	B079822	27-Jul-2017
RF CABLE	SF102	HUBER & SUHNER	B079824	27-Jul-2017
LOW NOISE AMPLIFIER	NSP1840-HG	MITEQ	B087572	29-Jul-2017
FILTER, HIGH PASS (>2400MHZ)	HPM50110	MICRO-TRONICS	B079792	28-Jul-2017

Note: The equipment calibration period is 1 year.

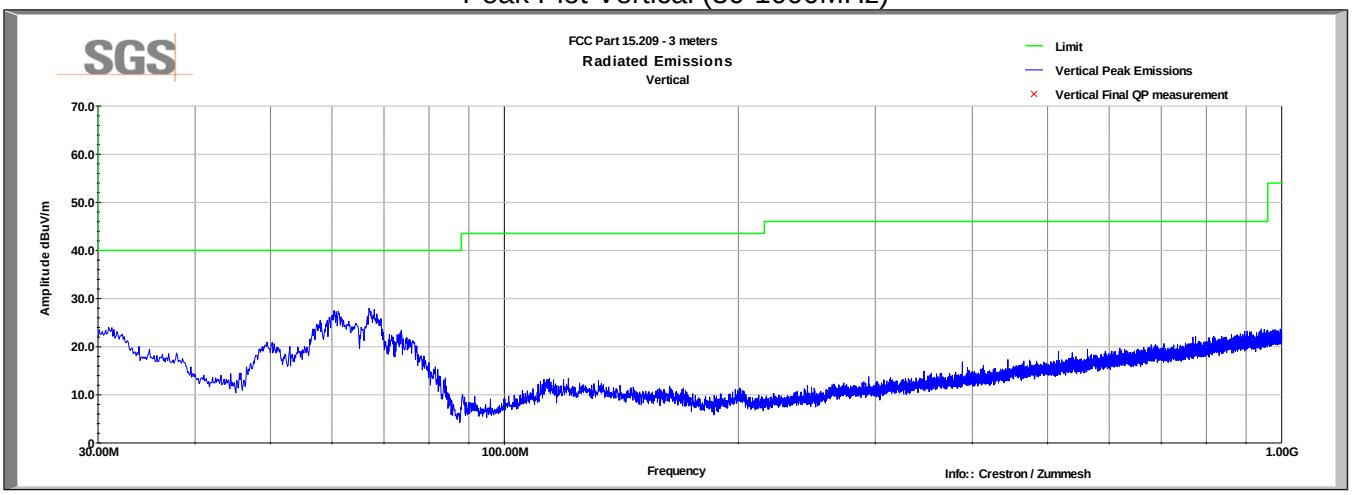
Measurements <1GHz

Test End Date: 27-Mar-2018 Tester: JOP

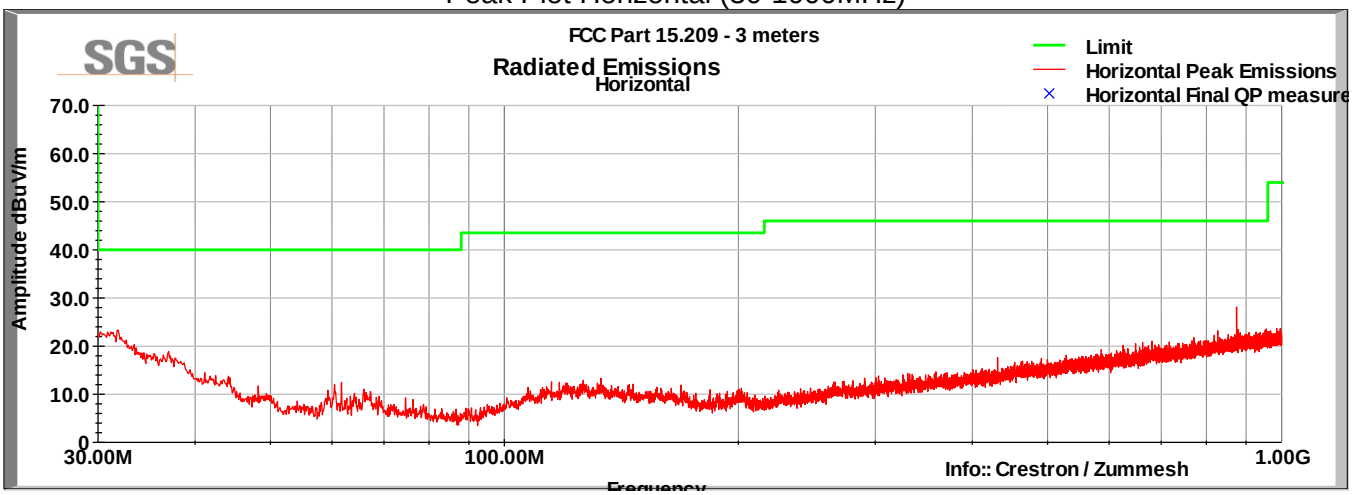
Equipment	Model	Manufacturer	Asset Number	Cal Due Date
EMI TEST RECEIVER	ESU40	ROHDE & SCHWARZ	B079629	25-Apr-2018
ANTENNA, BILOG	JB6	SUNOL	B079690	29-Nov-2018
RF CABLE	SF106	HUBER & SUHNER	B079661	25-Jul-2018
RF CABLE	SF106	HUBER & SUHNER	B079713	24-Jul-2018
RF CABLE	UC-N-MM-78	MAURY MICROWAVE	17017	25-Jul-2018
RF CABLE	104PE	HUBER & SUHNER	B079793	24-Jul-2018
LOW NOISE AMPLIFIER	TS-PR18	ROHDE & SCHWARZ	B094463	6-Mar-2019

7.5 *Test Data – Peak Plots*

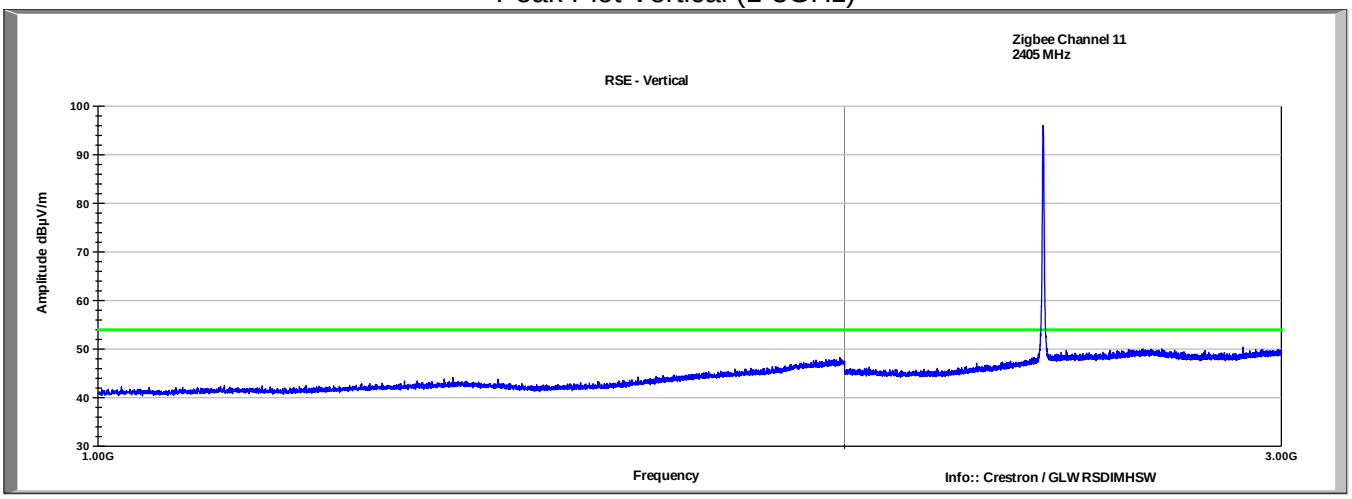
Low Channel (Channel 11, 2405MHz)
Peak Plot Vertical (30-1000MHz)



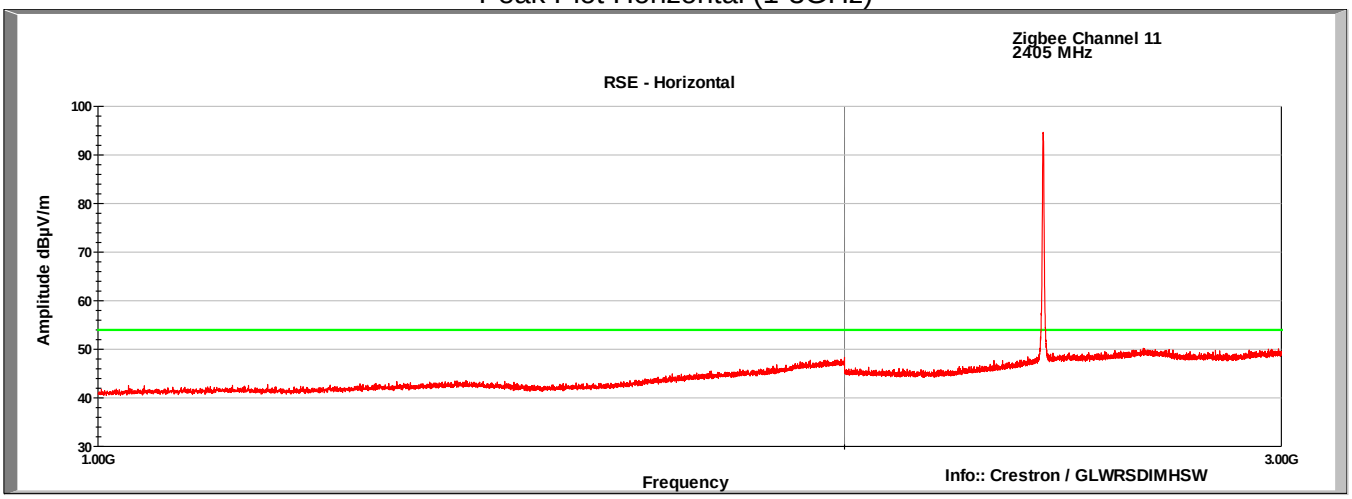
Low Channel (Channel 11, 2405MHz)
Peak Plot Horizontal (30-1000MHz)



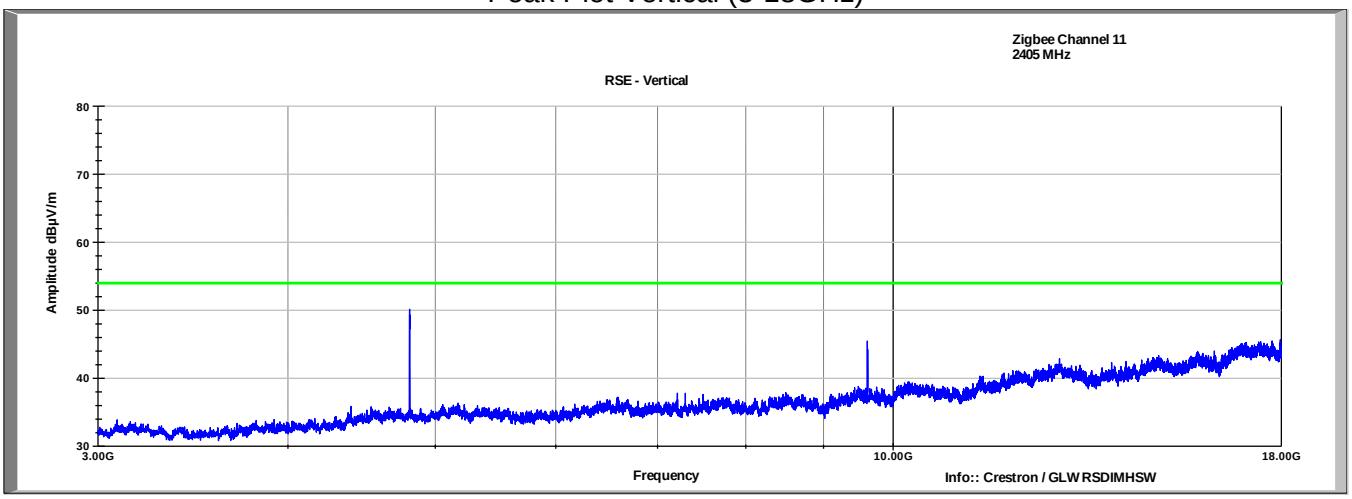
Low Channel (Channel 11, 2405MHz)
Peak Plot Vertical (1-3GHz)



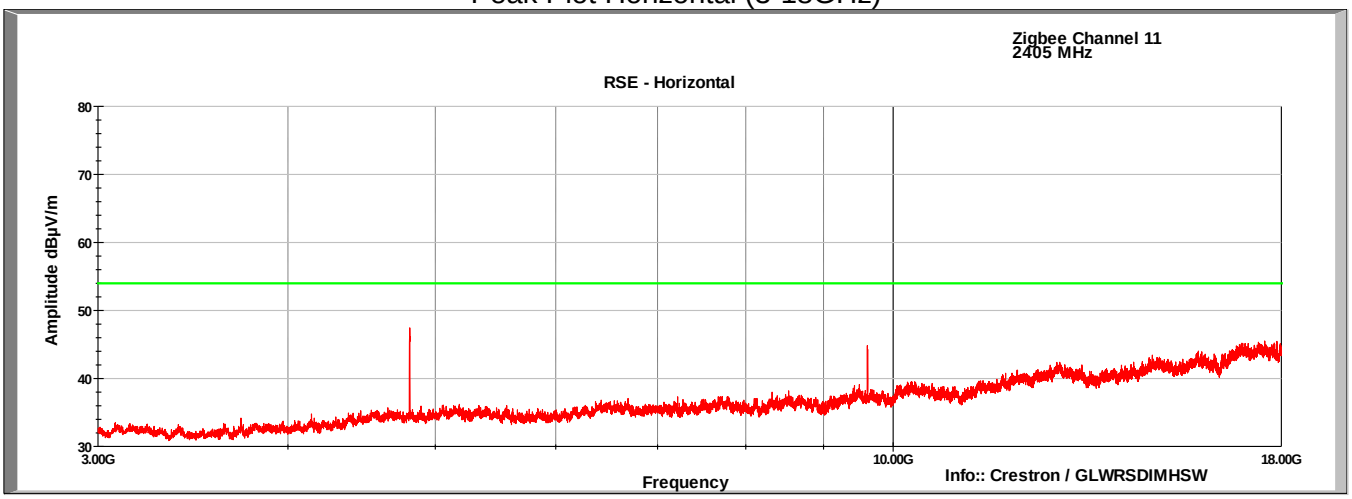
Low Channel (Channel 11, 2405MHz)
Peak Plot Horizontal (1-3GHz)



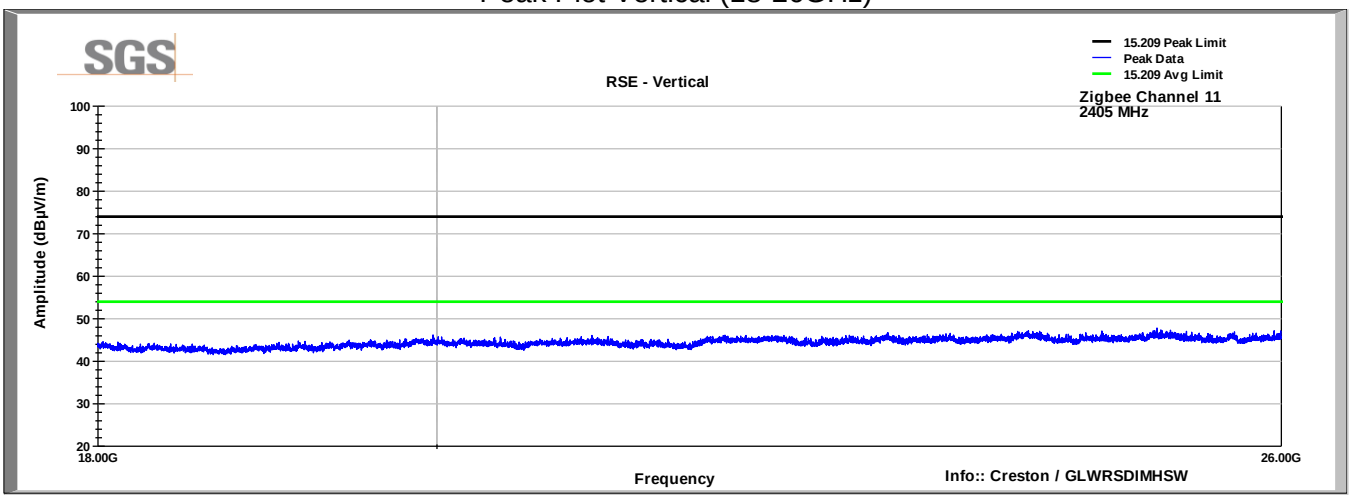
Low Channel (Channel 11, 2405MHz)
Peak Plot Vertical (3-18GHz)



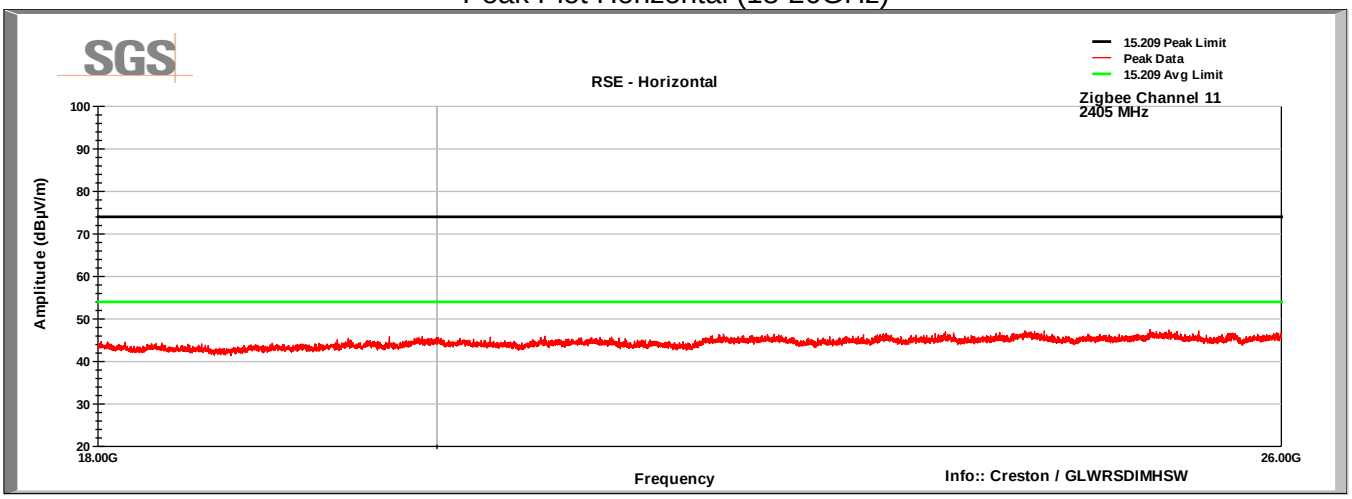
Low Channel (Channel 11, 2405MHz)
Peak Plot Horizontal (3-18GHz)



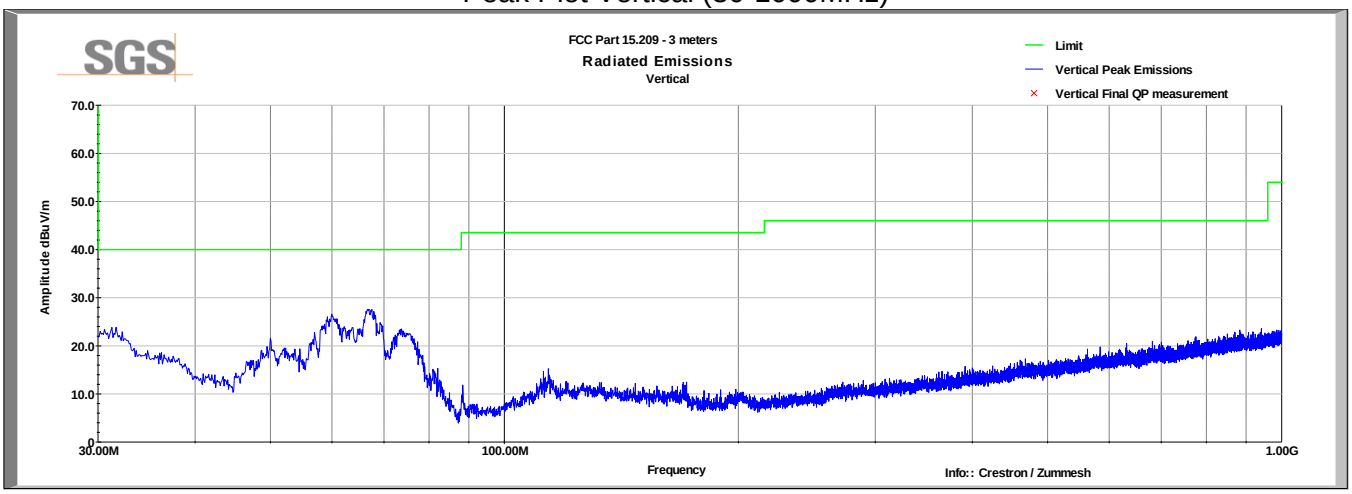
Low Channel (Channel 11, 2405MHz)
Peak Plot Vertical (18-26GHz)



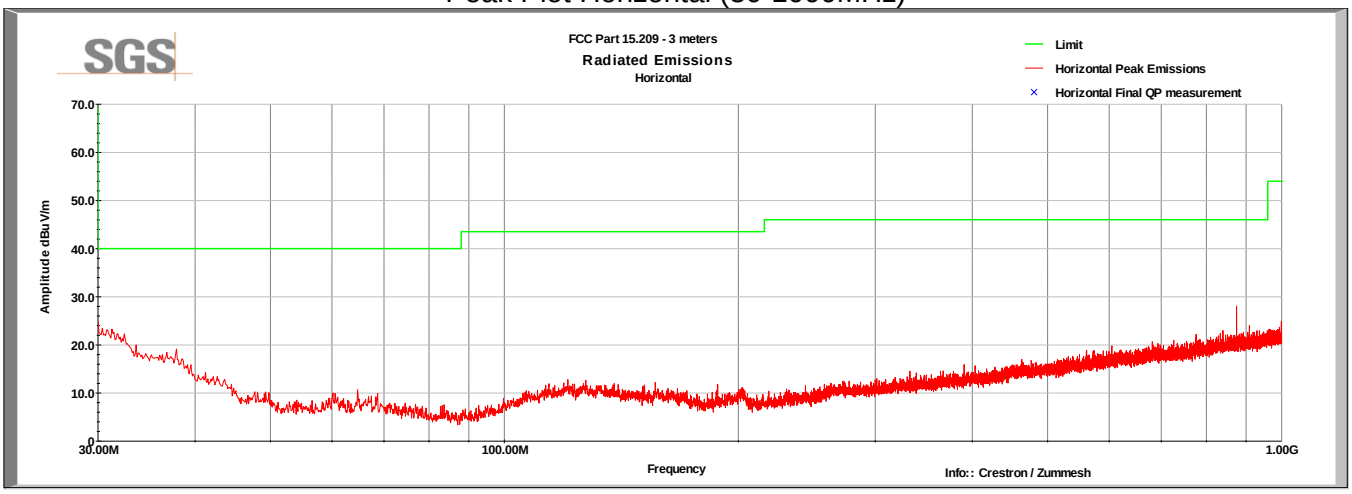
Low Channel (Channel 11, 2405MHz)
Peak Plot Horizontal (18-26GHz)



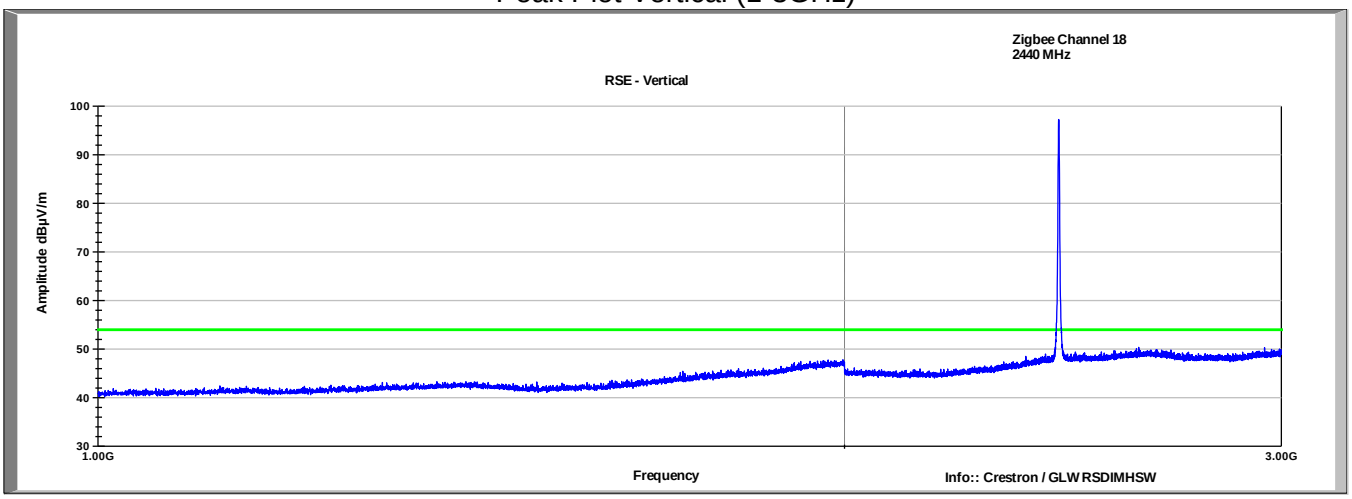
Low Channel (Channel 18, 2440MHz)
Peak Plot Vertical (30-1000MHz)



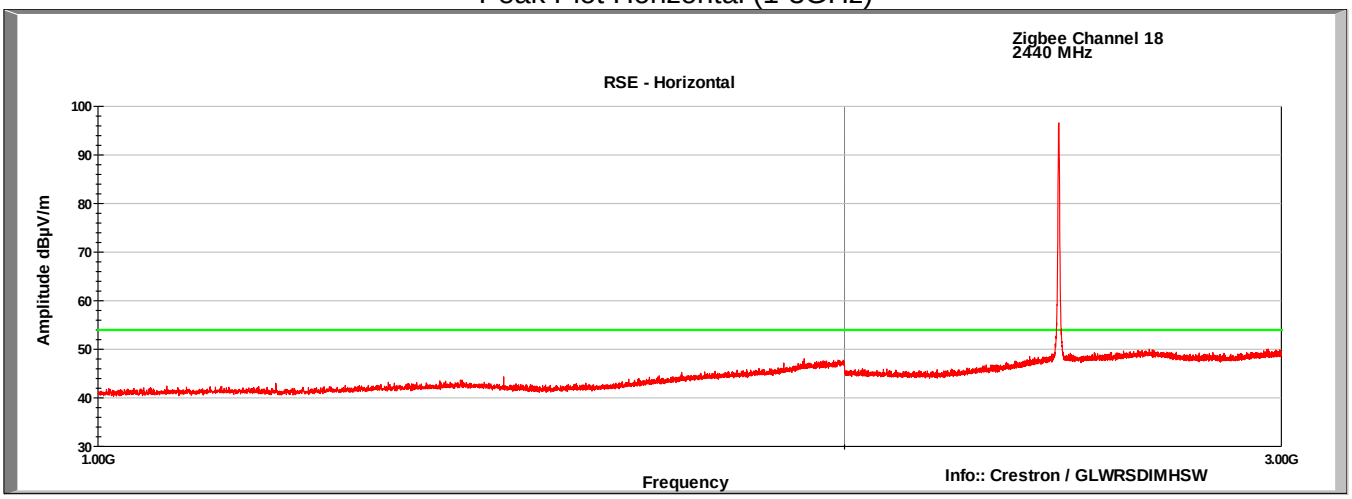
Low Channel (Channel 18, 2440MHz)
Peak Plot Horizontal (30-1000MHz)



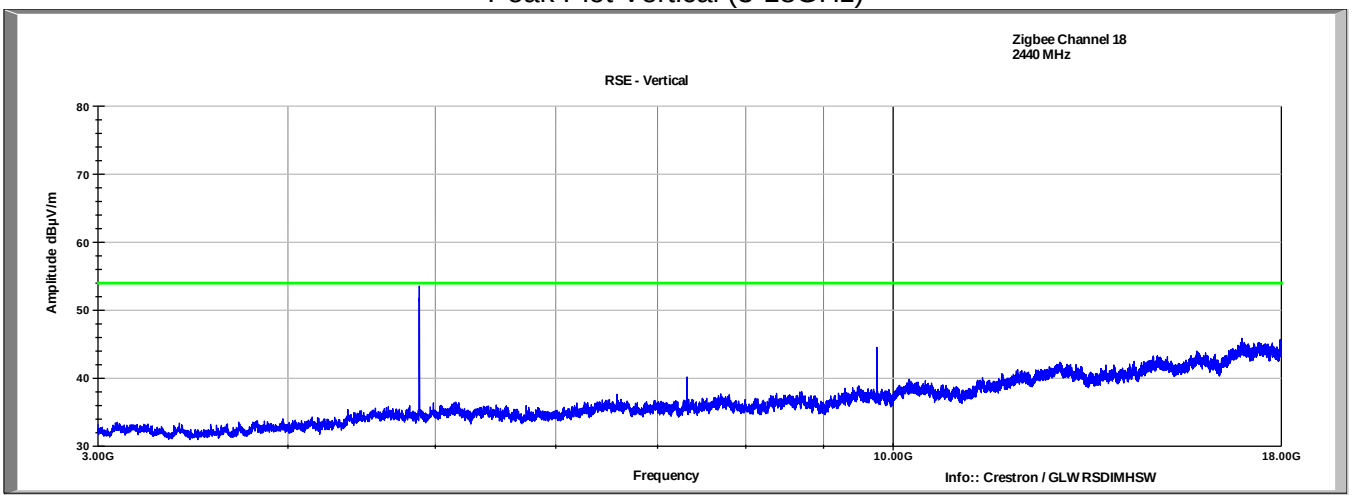
Low Channel (Channel 18, 2440MHz)
Peak Plot Vertical (1-3GHz)



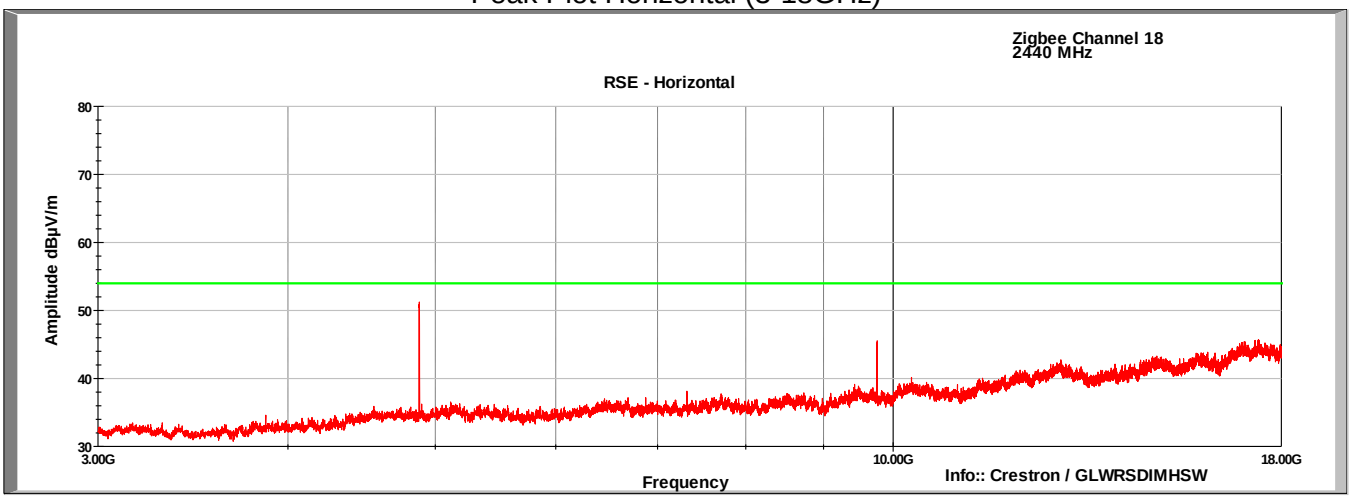
Low Channel (Channel 18, 2440MHz)
Peak Plot Horizontal (1-3GHz)



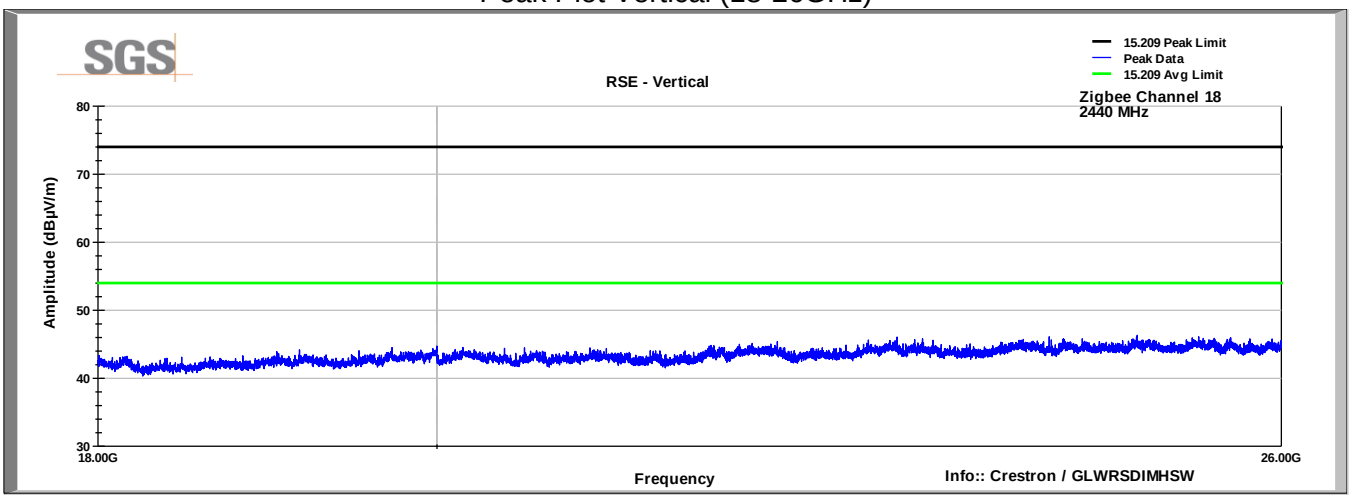
Low Channel (Channel 18, 2440MHz)
Peak Plot Vertical (3-18GHz)



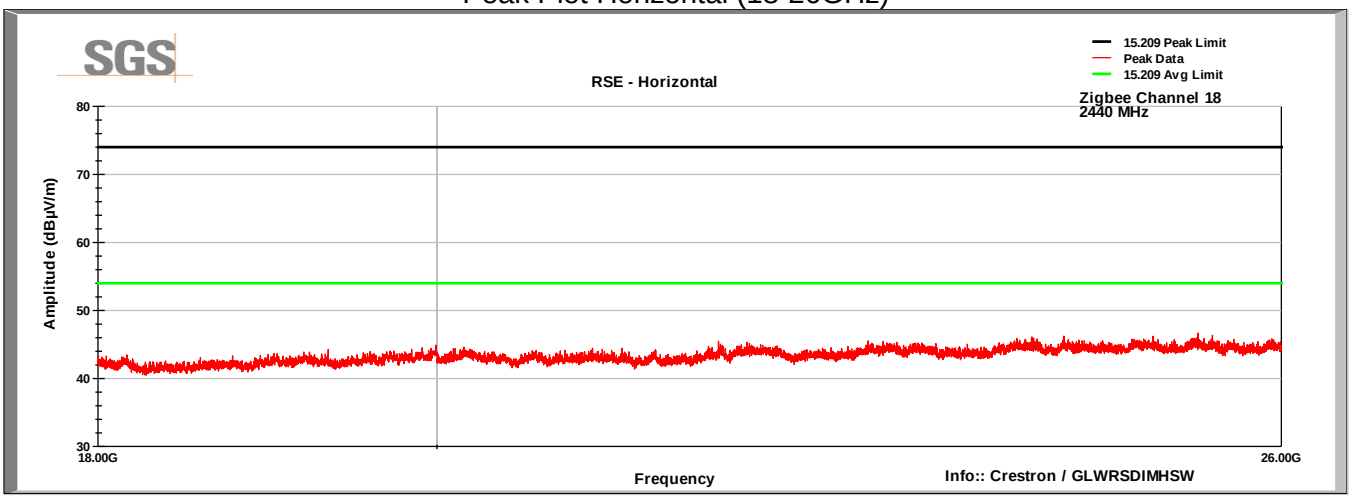
Low Channel (Channel 18, 2440MHz)
Peak Plot Horizontal (3-18GHz)



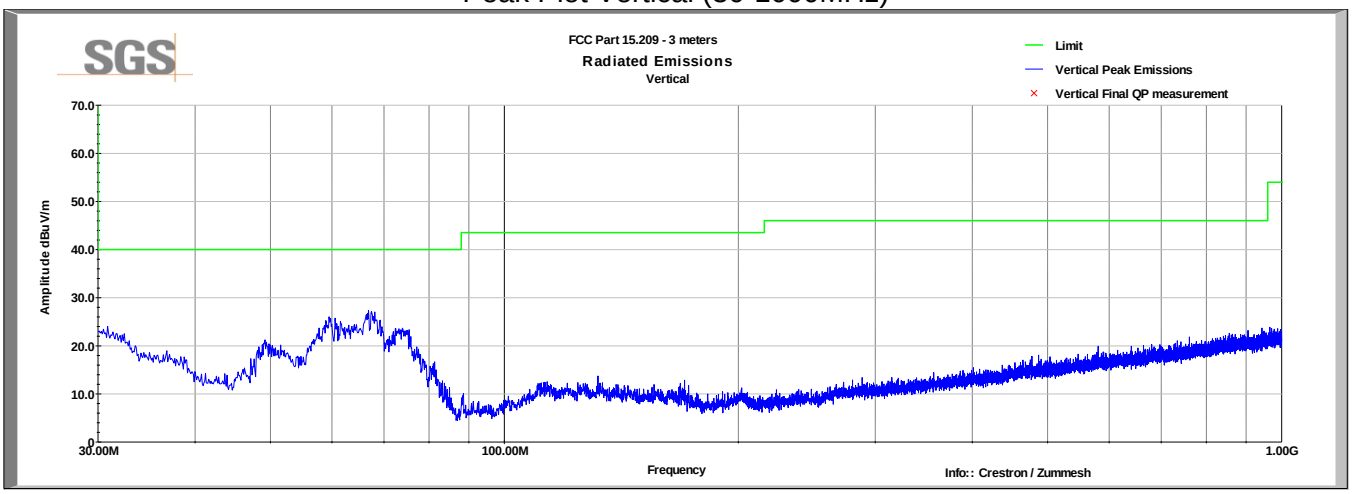
Mid Channel (Channel 18, 2440MHz)
Peak Plot Vertical (18-26GHz)



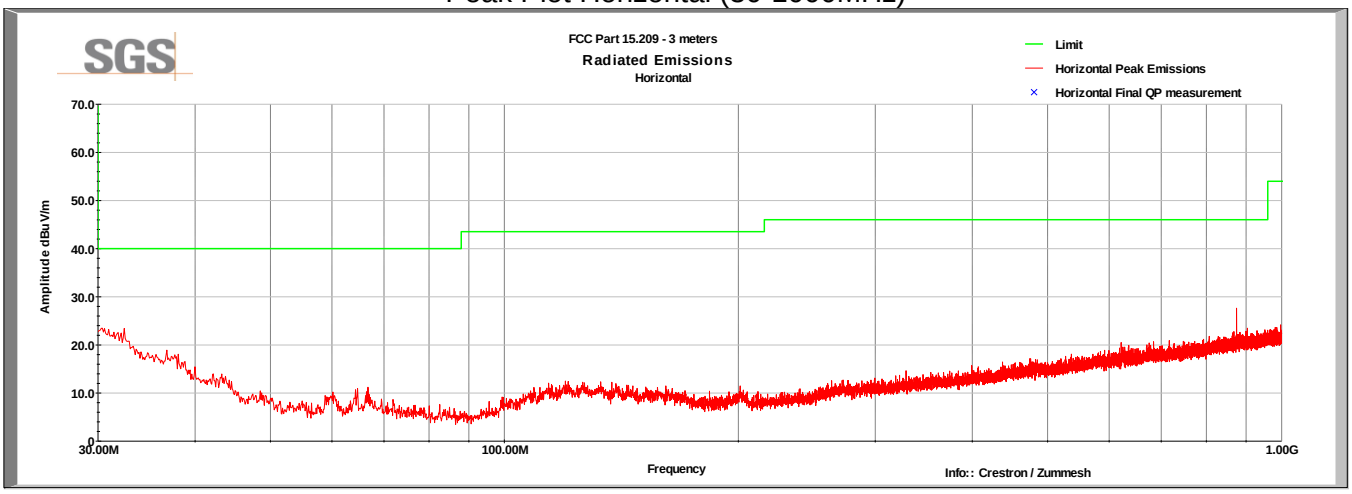
Mid Channel (Channel 18, 2440MHz)
Peak Plot Horizontal (18-26GHz)



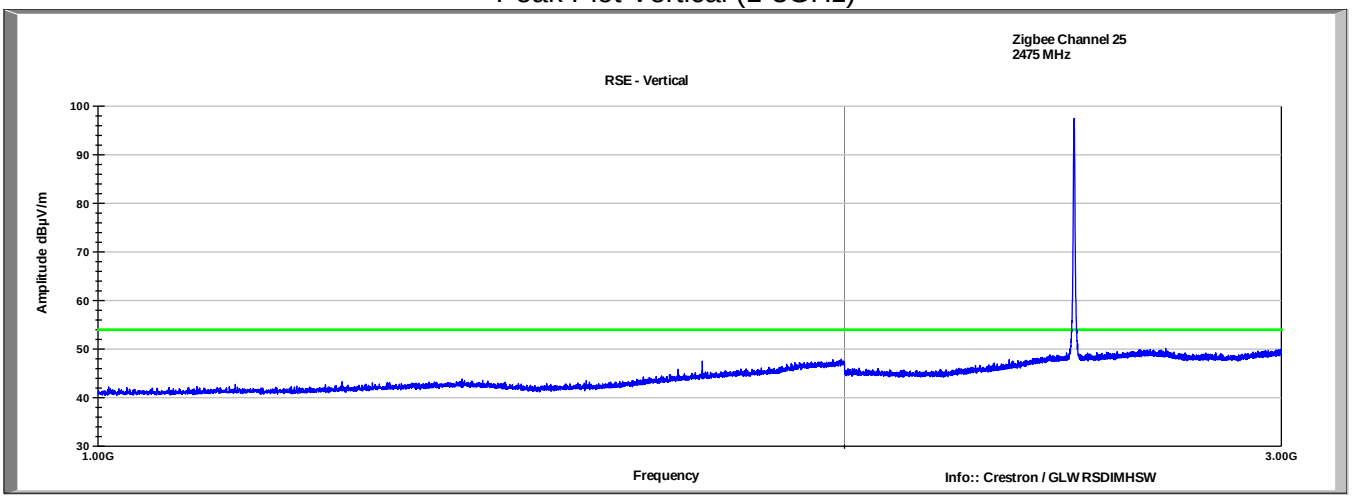
Low Channel (Channel 25, 2475MHz)
Peak Plot Vertical (30-1000MHz)



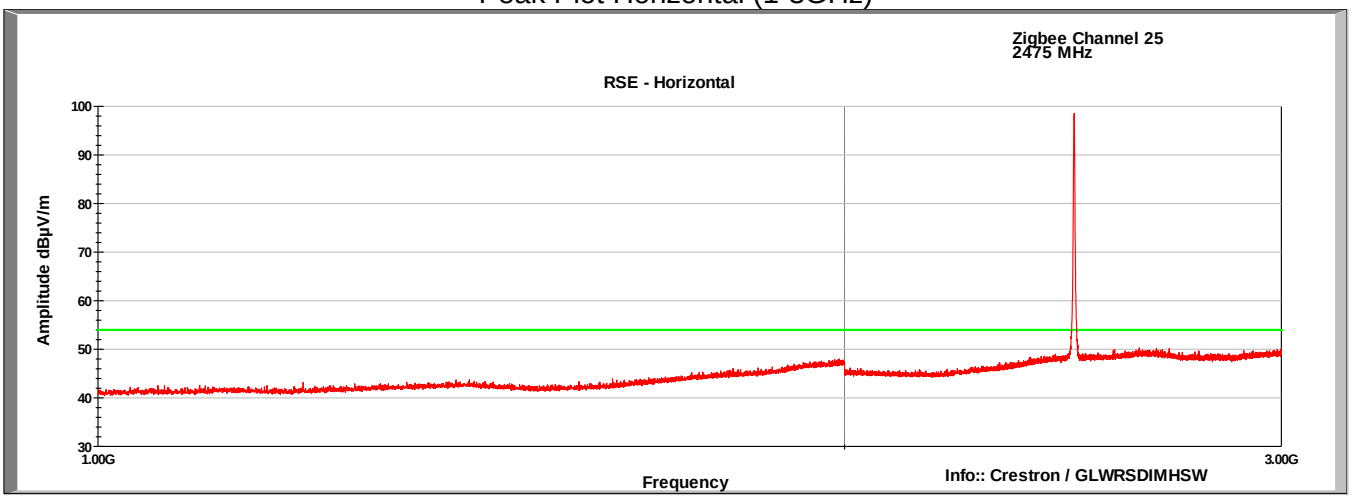
Low Channel (Channel 25, 2475MHz)
Peak Plot Horizontal (30-1000MHz)



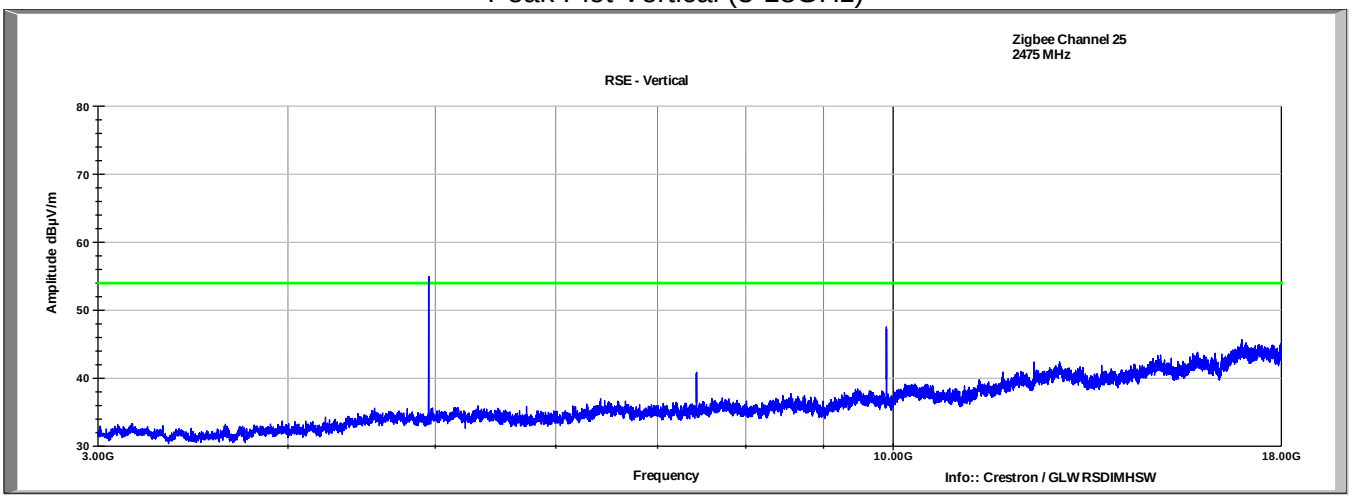
High Channel (Channel 25, 2475MHz)
Peak Plot Vertical (1-3GHz)



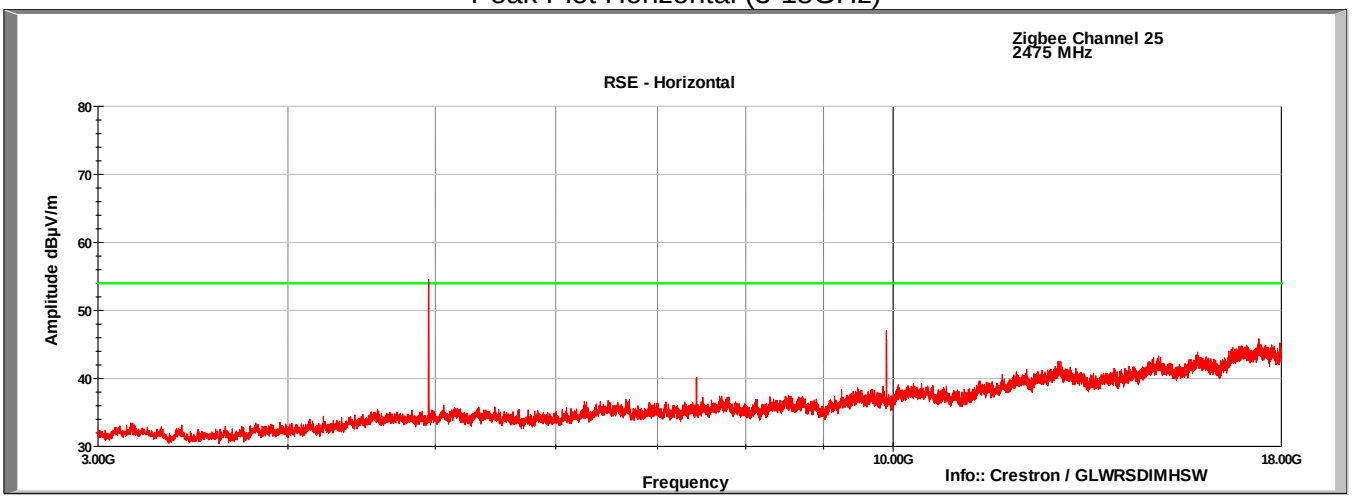
High Channel (Channel 25, 2475MHz)
Peak Plot Horizontal (1-3GHz)



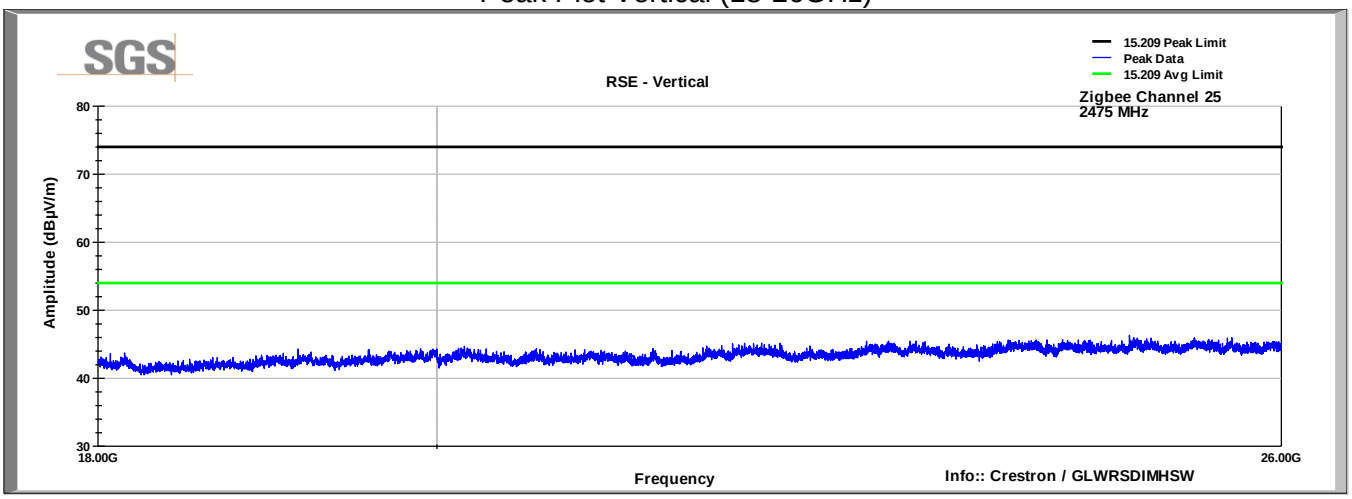
High Channel (Channel 25, 2475MHz)
Peak Plot Vertical (3-18GHz)



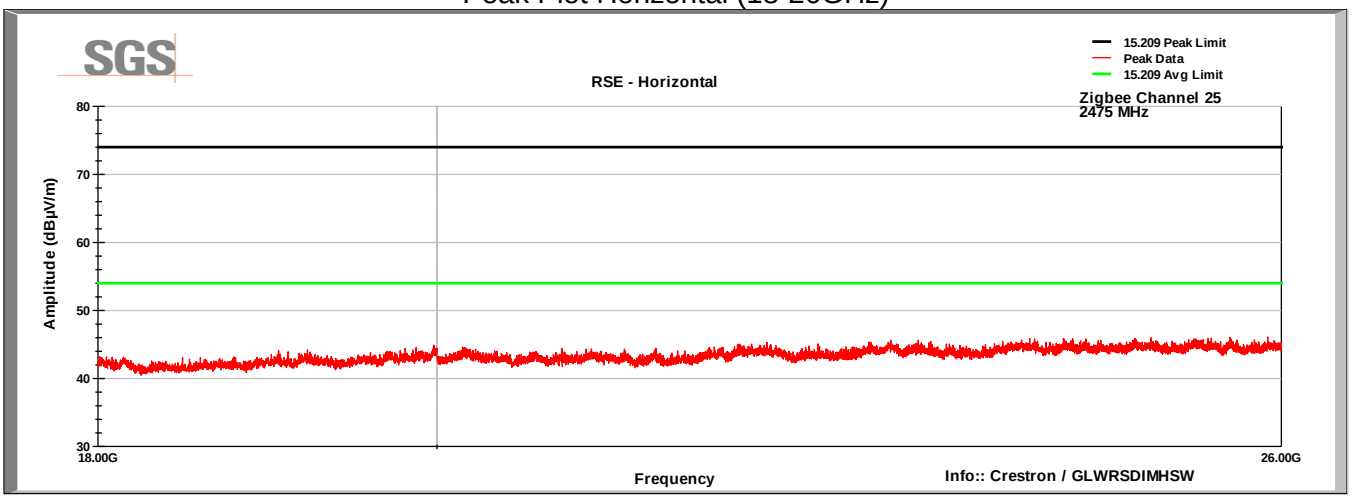
High Channel (Channel 25, 2475MHz)
Peak Plot Horizontal (3-18GHz)



High Channel (Channel 25, 2475MHz)
Peak Plot Vertical (18-26GHz)



High Channel (Channel 25, 2475MHz)
Peak Plot Horizontal (18-26GHz)



7.6 *Test Data – Tabular Data*

Frequency MHz	Raw Meas (dBuV)	Polarity (V/H)	Correction (dB/m)	Corr Value dBuV/m	Limit (dBuV/m)	Margin (dB)	Detector
Channel 11 (2405MHz)							
4810.00	47.4	V	2.7	50.1	74.0	-23.9	Peak
4810.00	35.9	V	2.7	38.6	54.0	-15.4	Average
4810.00	44.7	H	2.7	47.4	74.0	-26.6	Peak
4810.00	33.2	H	2.7	35.9	54.0	-18.1	Average
Channel 18 (2440MHz)							
4880.00	50.9	V	2.7	53.6	74.0	-20.4	Peak
4880.00	39.4	V	2.7	42.1	54.0	-11.9	Average
4880.00	48.4	H	2.7	51.1	74.0	-22.9	Peak
4880.00	36.9	H	2.7	39.6	54.0	-14.4	Average
Channel 25 (2475MHz)							
4950.00	52.3	V	2.7	55.0	74.0	-19.0	Peak
4950.00	40.8	V	2.7	43.5	54.0	-10.5	Average
4950.00	51.8	H	2.7	54.5	74.0	-19.5	Peak
4950.00	40.3	H	2.7	43.0	54.0	-11.0	Average

Average measurements were obtained by applying a 11.5dB duty-cycle correction factor (DCCF) to the peak reading. Maximum duty-cycle values were provided by the manufacturer and under no condition can it be changed or modified by the device or end user.

8 Radiated Emissions at Band Edge / Restricted Band

8.1 *Test Result*

Test Description	Test Specification		Test Result
Spurious Emissions	15.205 / 15.209	RSS-GEN S8.9 / 8.10	Compliant

8.2 *Test Method*

Peak and average field strength measurements were performed at the restricted band edges of 2390MHz and 2483.5MHz. Measurements were made using the radiated methods defined in FCC KDB publication 558074 D01 DTS Meas Guidance.

8.3 *Test Site*

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions
Temperature: 23.1 °C
Relative Humidity: 53.9 %

8.4 *Test Equipment*

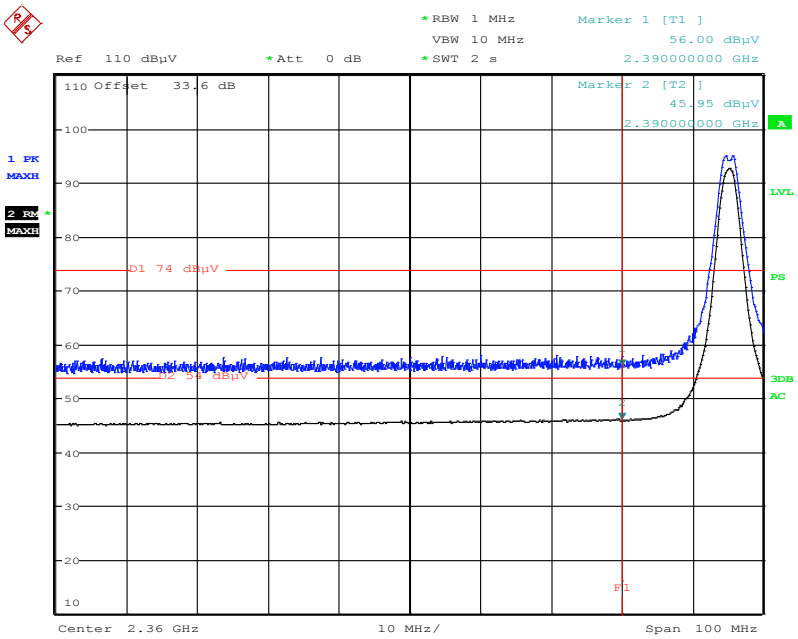
Test End Date: 28-Apr-2017 Tester: JOP

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
EMI TEST RECEIVER	ESU40	ROHDE & SCHWARZ	S/N: 100196	6-Dec-2017
RF CABLE	NMS-290-236.2-NMS	FLORIDA RF LABS	B095020	29-Jul-2017
RF CABLE	SUCOFLEX 100	HUBER & SUHNER	B108523	4-Aug-2017
RF CABLE	SF106	HUBER & SUHNER	B079712	27-Jul-2017
ANTENNA, DRG HORN (MEDIUM)	3117	ETS LINDGREN	B079691	27-Jul-2017

Note: The equipment calibration period is 1 year.

8.5 *Test Data*

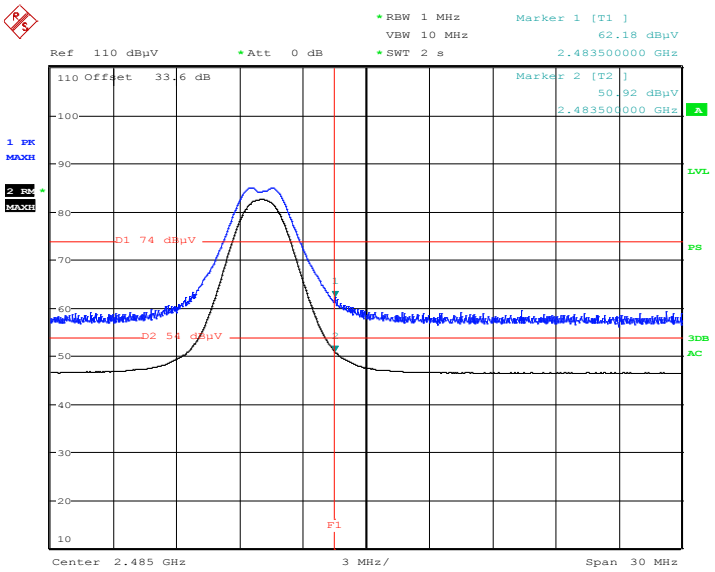
Channel 11



Date: 28.APR.2017 04:59:39

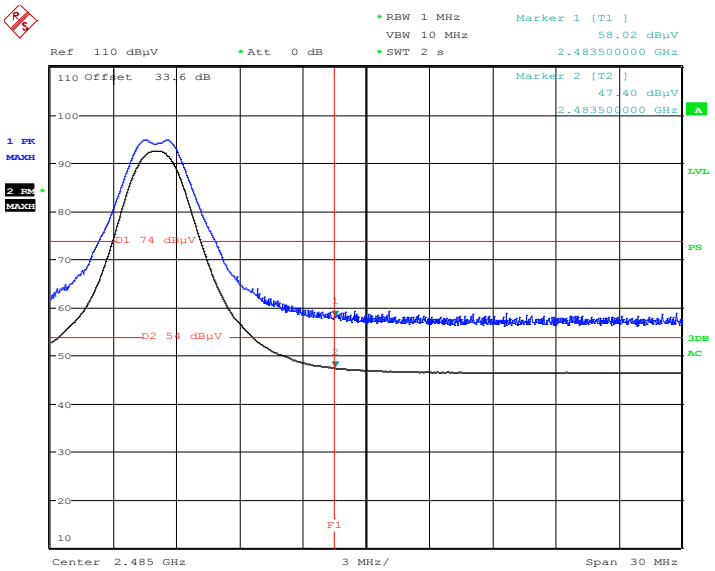
Channel	Frequency (MHz)	Reading (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Measurement Detector
11	2390	56	74	-18	Peak
11	2390	46	54	-8	RMS

Channel 26



Date: 28.APR.2017 05:06:24

Channel 25



Date: 28.APR.2017 05:09:15

Channel	Frequency (MHz)	Reading (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Measuremnt Detector
25	2483.5	58	74	-16	Peak
25	2483.5	47.4	54	-6.6	RMS
26	2483.5	62.2	74	-11.8	Peak
26	2483.5	50.9	54	-3.1	RMS

9 Conducted Emissions

9.1 *Test Result*

Test Description	Basic Standards	Test Result
Conducted Emissions Class B	RSS-GEN, Issue 4 ANSI C63.4:2014	Compliant

9.2 *Test Method*

With the receiver 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 B Limits (dBuV)
0.15 to 0.5 MHz	Avg 56 to 46 QP 66 to 56
0.5 to 5 MHz	Avg 46 Pk 56
5 to 30 MHz	Avg 50 Pk 60

9.3 *Test Site*

SGS EMC Laboratory, Suwanee, GA
Environmental Conditions
Temperature: 23.0 °C
Relative Humidity: 48.5 %

9.4 *Test Equipment*

Test End Date: 27-Mar-2018 Tester: JOP

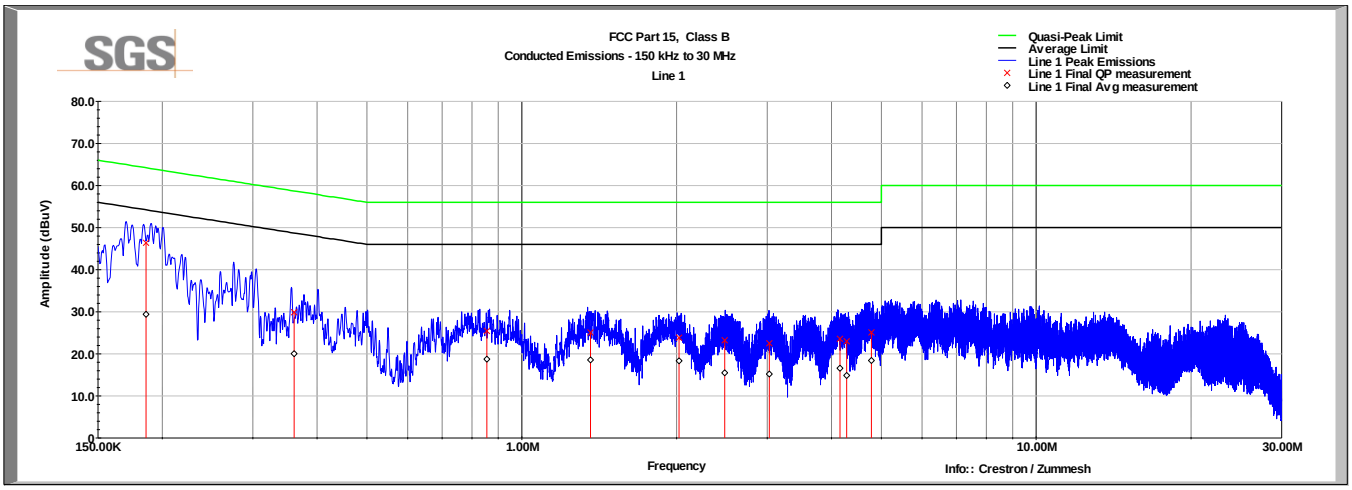
Equipment	Model	Manufacturer	Asset Number	Cal Due Date
EMI TEST RECEIVER	ESU8	ROHDE & SCHWARZ	B085759	25-Jul-2018
RF CABLE	UC-N-MM-275	MAURY MICROWAVE	17015	25-Jul-2018
LINE IMPEDANCE STABILIZATION NETWORK	NNB 51	TESEQ	B087573	21-Nov-2018

Note: The equipment calibration period is 1 year.

Software:
“Conducted Emissions” TILE! profile dated December 2015

9.5 *Test Data*

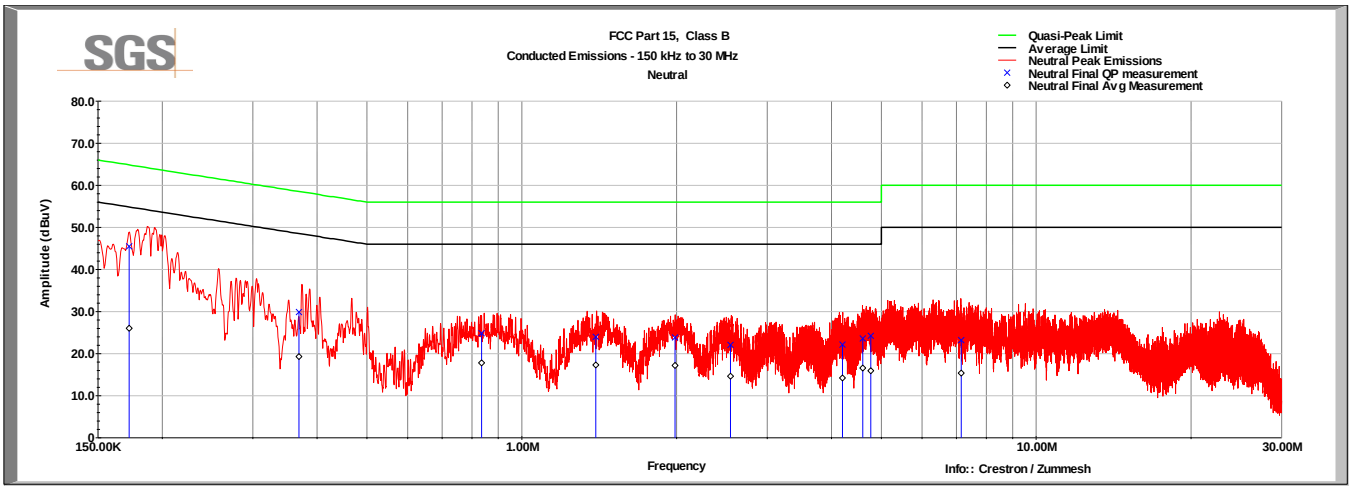
Line 1 Conducted Plot



Line 1 Conducted Emissions

Frequency MHz	QP Value dBuV	QP Limit dBuV	QP Margin dB	Avg Value dBuV	Avg Limit dBuV	Avg Margin dB
0.186	46.4	64.2	-17.9	29.4	54.2	-24.9
0.361	29.9	58.7	-28.8	20.0	48.7	-28.7
0.855	25.4	56.0	-30.6	18.7	46.0	-27.3
1.360	25.1	56.0	-30.9	18.5	46.0	-27.5
2.022	23.8	56.0	-32.2	18.3	46.0	-27.7
2.480	23.2	56.0	-32.8	15.5	46.0	-30.5
3.028	22.5	56.0	-33.5	15.2	46.0	-30.8
4.155	23.6	56.0	-32.4	16.6	46.0	-29.4
4.283	23.0	56.0	-33.0	14.8	46.0	-31.2
4.783	25.1	56.0	-30.9	18.4	46.0	-27.6

Neutral Conducted Plot



Neutral Conducted Emissions

Frequency MHz	QP Value dBuV	QP Limit dBuV	QP Margin dB	Avg Value dBuV	Avg Limit dBuV	Avg Margin dB
0.173	45.5	64.8	-19.4	26.0	54.8	-28.8
0.369	29.9	58.5	-28.7	19.3	48.5	-29.2
0.835	24.8	56.0	-31.2	17.8	46.0	-28.2
1.393	24.0	56.0	-32.0	17.3	46.0	-28.7
1.986	23.8	56.0	-32.2	17.2	46.0	-28.8
2.545	22.1	56.0	-33.9	14.6	46.0	-31.4
4.202	22.1	56.0	-33.9	14.2	46.0	-31.8
4.600	23.6	56.0	-32.4	16.6	46.0	-29.4
4.769	24.2	56.0	-31.8	15.9	46.0	-30.1
7.151	23.2	60.0	-36.8	15.4	50.0	-34.6

10 Revision History

Revision Level	Description of changes	Revision Date
0	Initial release	26 March 2018