

EMC Test Report

Project Number: 4272209

Report Number: 4272209EMC03

Revision Level: 1

Client: Curiouser Products Inc

Equipment Under Test: Smart Mirror

Model: M1R0

FCC ID: 2AOSD-RLSYM1R0

IC ID: 23685-RLSY

Applicable Standards: ANSI C63.10: 2013 (FCC Part 15 Subpart C, § 15.247)

RSS-247, Issue 2

RSS-GEN Issue 4

Report issued on: 3 August 2018

Test Result: Compliant

Tested by:


Shawn McGuinness, EMC Engineering Leader

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.

This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

Table of Contents

1	SUMMARY OF TEST RESULTS	4
1.1	MODIFICATIONS REQUIRED FOR COMPLIANCE	4
2	GENERAL INFORMATION	5
2.1	CLIENT INFORMATION	5
2.2	TEST LABORATORY	5
2.3	GENERAL INFORMATION OF EUT	5
2.4	OPERATING MODES AND CONDITIONS	5
2.5	EUT CONNECTION BLOCK DIAGRAM – CONDUCTED MEASUREMENTS	6
2.6	EUT CONNECTION BLOCK DIAGRAM – RADIATED MEASUREMENTS	6
2.7	SYSTEM CONFIGURATIONS	7
3	BANDWIDTH	8
3.1	TEST RESULT	8
3.2	TEST METHOD	8
3.3	TEST SITE	8
3.4	TEST EQUIPMENT	8
3.5	TEST DATA - 6 dB BANDWIDTH	9
3.6	TEST DATA – 99% BANDWIDTH	10
4	OUTPUT POWER	11
4.1	TEST RESULT	11
4.2	TEST METHOD	11
4.3	TEST SITE	11
4.4	TEST EQUIPMENT	11
4.5	TEST DATA	12
5	POWER SPECTRAL DENSITY	13
5.1	TEST RESULT	13
5.2	TEST METHOD	13
5.3	TEST SITE	13
5.4	TEST EQUIPMENT	13
5.5	TEST DATA	14
6	CONDUCTED SPURIOUS EMISSIONS / BAND EDGE	15
6.1	TEST RESULT	15
6.2	TEST METHOD	15
6.3	TEST SITE	15
6.4	TEST EQUIPMENT	15
6.5	TEST DATA – DTS BAND EDGE	16
6.6	TEST DATA – CONDUCTED SPURIOUS EMISSIONS	17
7	FIELD STRENGTH OF SPURIOUS RADIATION	19
7.1	TEST RESULT	19
7.2	TEST METHOD	19
7.3	TEST SITE	19
7.4	TEST EQUIPMENT	20
7.5	TEST DATA – PEAK PLOTS	21
7.6	TEST DATA – TABULAR DATA	33
8	RADIATED EMISSIONS AT BAND EDGE / RESTRICTED BAND	34
8.1	TEST RESULT	34
8.2	TEST METHOD	34

8.3	TEST SITE	34
8.4	TEST EQUIPMENT	34
8.5	TEST DATA – RESTRICTED BAND EDGE	35
9	CONDUCTED EMISSIONS	36
9.1	TEST RESULT.....	36
9.2	TEST METHOD.....	36
9.3	TEST SITE	36
9.4	TEST EQUIPMENT	36
9.5	TEST DATA.....	37
10	REVISION HISTORY	39

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 (1)
AC Powerline Conducted Emissions	15.107, 15.207	RSS-GEN S8.8	Compliant

1) Internal PCB trace antenna

1.1 Modifications Required for Compliance

None

2 General Information

2.1 Client Information

Name: Curiouser Products Inc
Address: 524 Broadway 11th Floor
City, State, Zip, Country: New York, NY 10013, 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

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

2.3 General Information of EUT

Type of Product: Smart Mirror
Model Number: 1
Serial Number: M1R010050

Frequency Range: 2402-2480MHz
Data Modes: Bluetooth Low Energy
Antenna: Internal, PCB – Molex, P/N: 146153-0100, 3.0dB Gain.

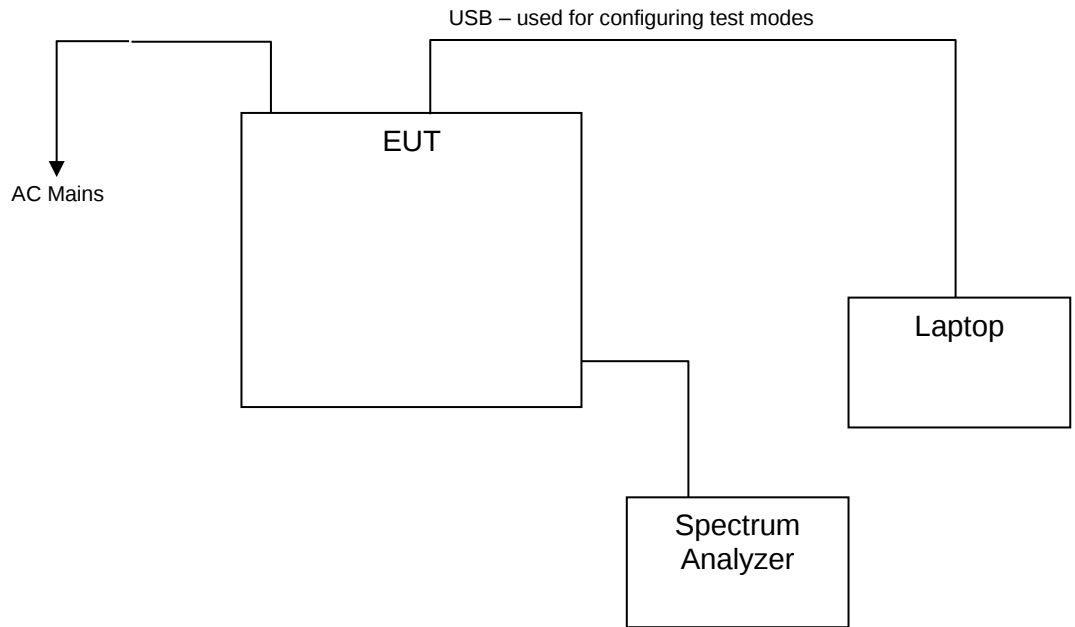
Rated Voltage: 120Vac, 60Hz
Test Voltage: 120Vac, 60Hz

Sample Received Date: 20 February 2018
Dates of testing: 15 March – 06 June 2018

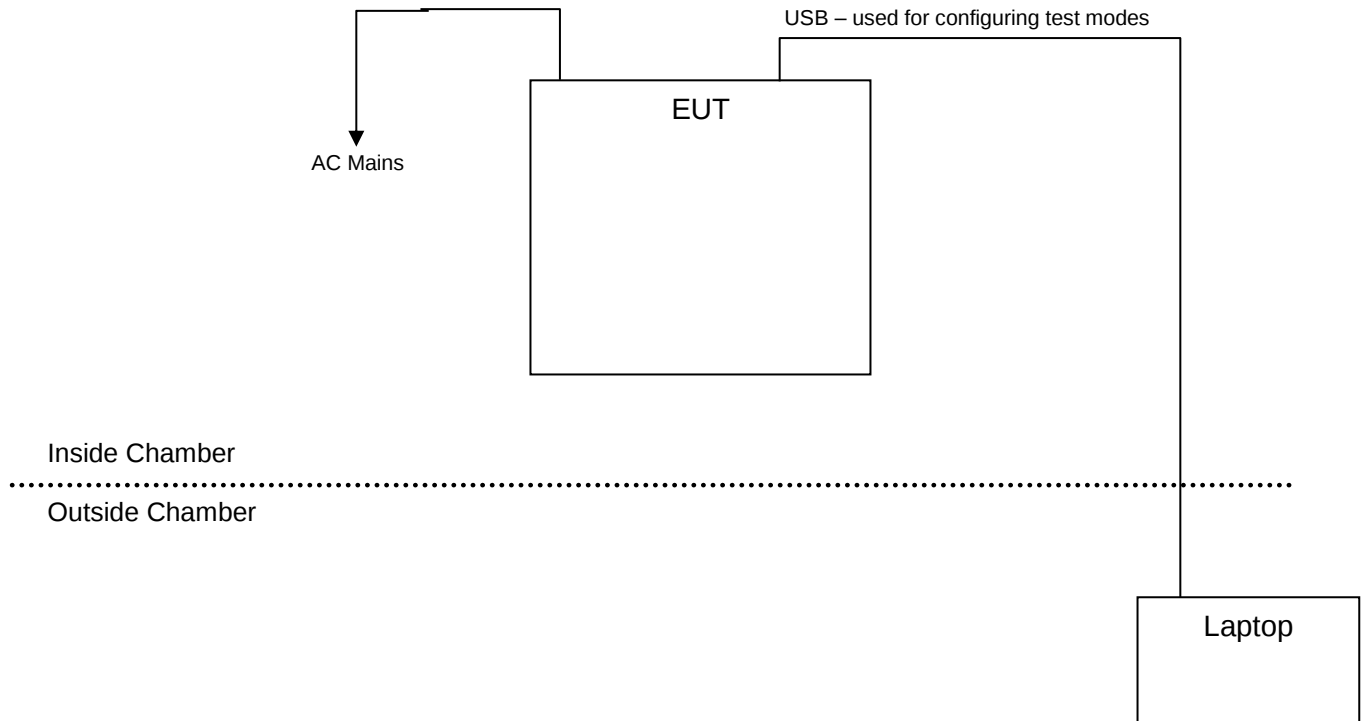
2.4 Operating Modes and Conditions

Continuous traffic was generated using test commands. Where the duty cycle measured below 99% and an RMS detector was employed, corrections of $10 \cdot \log(1/D)$ were applied according to KDB publication 558074 D01 DTS Meas Guidance v04 .

2.5 EUT Connection Block Diagram – Conducted Measurements



2.6 EUT Connection Block Diagram – Radiated Measurements



2.7 System Configurations

Device reference	Manufacturer	Description	Model Number	Serial Number
A	Curiouser Products Inc	Smart Mirror	M1R0	M1R010050
B	HP	Notebook	15-1233wm	5CD6415H9V

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: 23.1 °C
 Relative Humidity: 34.5 %

3.4 Test Equipment

Test End Date: 22-Mar-2018

Tester: JOP

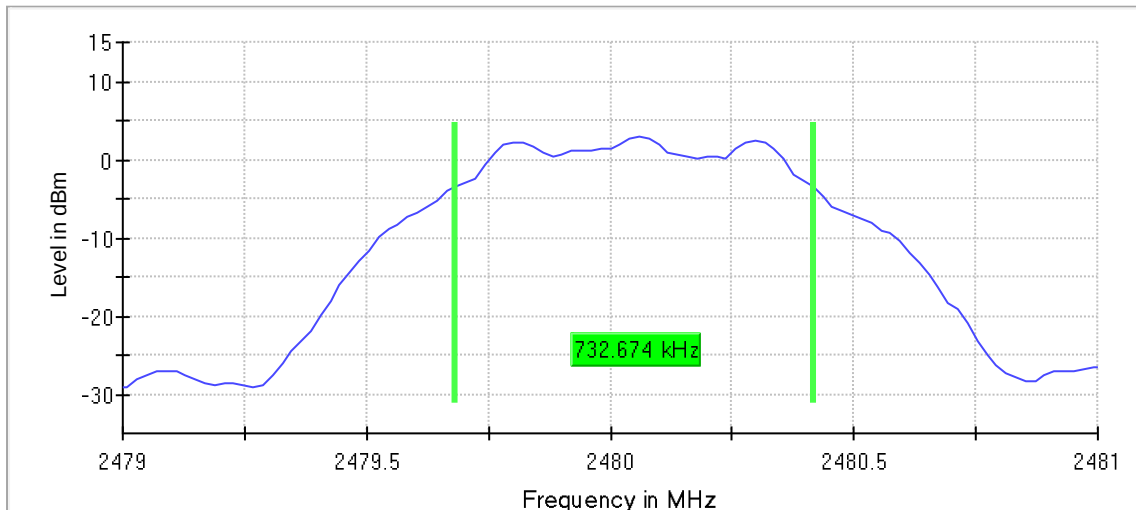
Equipment	Model	Manufacturer	Asset Number	Cal Due Date
RF CABLE	SF102	HUBER & SUHNER	B079822	25-Jul-2019
SIGNAL ANALYZER	FSV30	ROHDE & SCHWARZ	B085749	1-Nov-2019
Switch platform with integrated power sensors	OPS120	ROHDE & SCHWARZ	15039	15-Dec-2019

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
2402.000000	0.732674	0.500000	---	2401.683168	2402.415842	2.4	PASS
2440.000000	0.732674	0.500000	---	2439.683168	2440.415842	1.9	PASS
2480.000000	0.732674	0.500000	---	2479.683168	2480.415842	2.8	PASS

Representative Plot



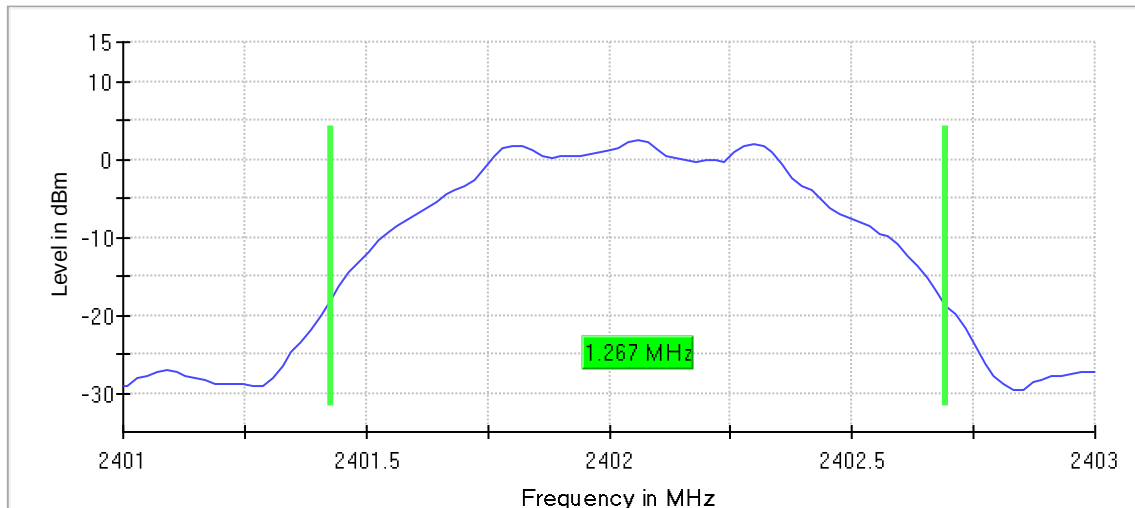
Representative Measurement Settings

Setting	Instrument Value	Target Value
Start Frequency	2.47900 GHz	2.47900 GHz
Stop Frequency	2.48100 GHz	2.48100 GHz
Span	2.000 MHz	2.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	101	~ 20
Sweeptime	18.938 μ s	AUTO
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 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	8 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.07 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
2402.000000	1.267326	---	---	2401.425743	2402.693069	2.4	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	2.40100 GHz	2.40100 GHz
Stop Frequency	2.40300 GHz	2.40300 GHz
Span	2.000 MHz	2.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	101	~ 40
SweepTime	18.938 μ s	AUTO
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 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	7 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.11 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 peak power measurements were recorded using the 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 (e.g. for a 7.4dBi antenna, the limit is reduced from 30dBm to 28.6dBm)

4.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 23.1 °C
 Relative Humidity: 34.5 %

4.4 Test Equipment

Test End Date: 22-Mar-2018

Tester: JOP

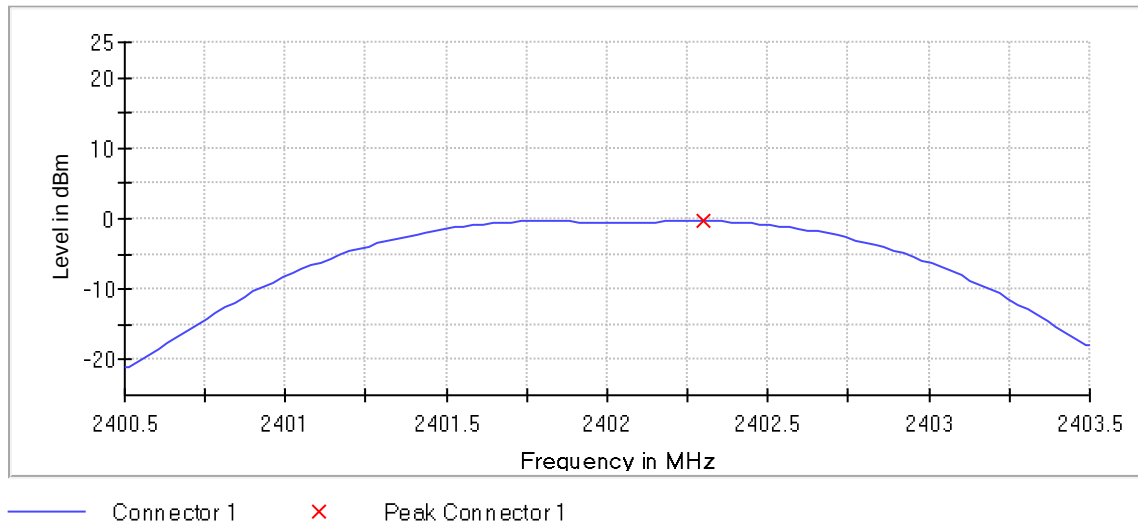
Equipment	Model	Manufacturer	Asset Number	Cal Due Date
RF CABLE	SF102	HUBER & SUHNER	B079822	25-Jul-2019
SIGNAL ANALYZER	FSV30	ROHDE & SCHWARZ	B085749	1-Nov-2019
Switch platform with integrated power sensors	OPS120	ROHDE & SCHWARZ	15039	15-Dec-2019

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
2402.000000	-0.4	30.0	PASS
2440.000000	-0.7	30.0	PASS
2480.000000	0.1	30.0	PASS

Representative Plot



Representative Measurement Settings

Setting	Instrument Value	Target Value
Start Frequency	2.40050 GHz	2.40050 GHz
Stop Frequency	2.40350 GHz	2.40350 GHz
Span	3.000 MHz	3.000 MHz
RBW	1.000 MHz	>= 732.675
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	101	~ 101
SweepTime	1.907 μ s	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	4 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.05 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

Power spectral density measurements were recorded using the 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: 23.1 °C
 Relative Humidity: 34.5 %

5.4 Test Equipment

Test End Date: 22-Mar-2018

Tester: JOP

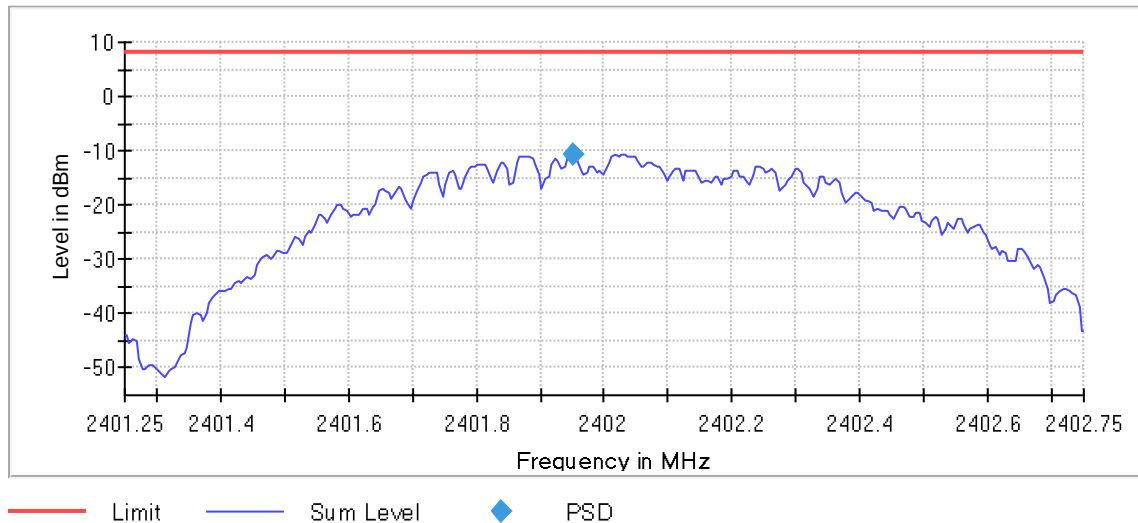
Equipment	Model	Manufacturer	Asset Number	Cal Due Date
RF CABLE	SF102	HUBER & SUHNER	B079822	25-Jul-2019
SIGNAL ANALYZER	FSV30	ROHDE & SCHWARZ	B085749	1-Nov-2019
Switch platform with integrated power sensors	OPS120	ROHDE & SCHWARZ	15039	15-Dec-2019

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

5.5 Test Data

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2402.000000	2401.952500	-10.552	8.0	PASS
2440.000000	2439.952500	-10.942	8.0	PASS
2480.000000	2479.952500	-10.167	8.0	PASS

Representative Plot



Representative Measurement Settings

Setting	Instrument Value	Target Value
Start Frequency	2.40125 GHz	2.40125 GHz
Stop Frequency	2.40275 GHz	2.40275 GHz
Span	1.500 MHz	1.500 MHz
RBW	10.000 kHz	<= 10.000 kHz
VBW	30.000 kHz	>= 30.000 kHz
SweepPoints	300	~ 300
SweepTime	1.500 ms	AUTO
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
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	4 / max. 150	max. 150
Stable	2 / 2	2
Max Stable Difference	0.08 dB	0.50 dB

6 Conducted Spurious Emissions / Band Edge

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 in any 100 kHz band outside of the authorized band is 20 dB below the maximum in-band peak level.

6.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 23.1 °C
 Relative Humidity: 34.5 %

6.4 Test Equipment

Test End Date: 22-Mar-2018

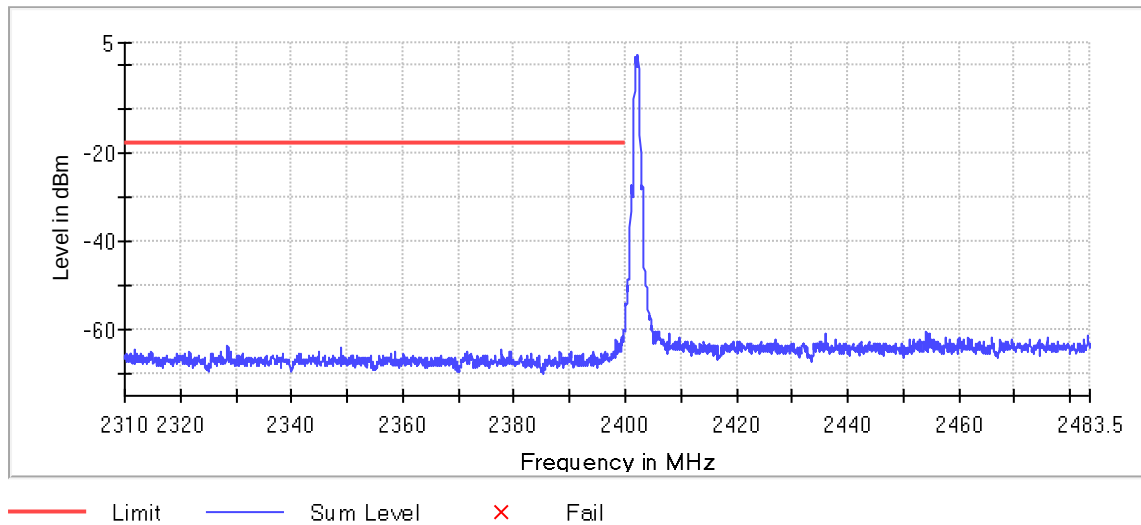
Tester: JOP

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
RF CABLE	SF102	HUBER & SUHNER	B079822	25-Jul-2019
SIGNAL ANALYZER	FSV30	ROHDE & SCHWARZ	B085749	1-Nov-2019
Switch platform with integrated power sensors	OPS120	ROHDE & SCHWARZ	15039	15-Dec-2019

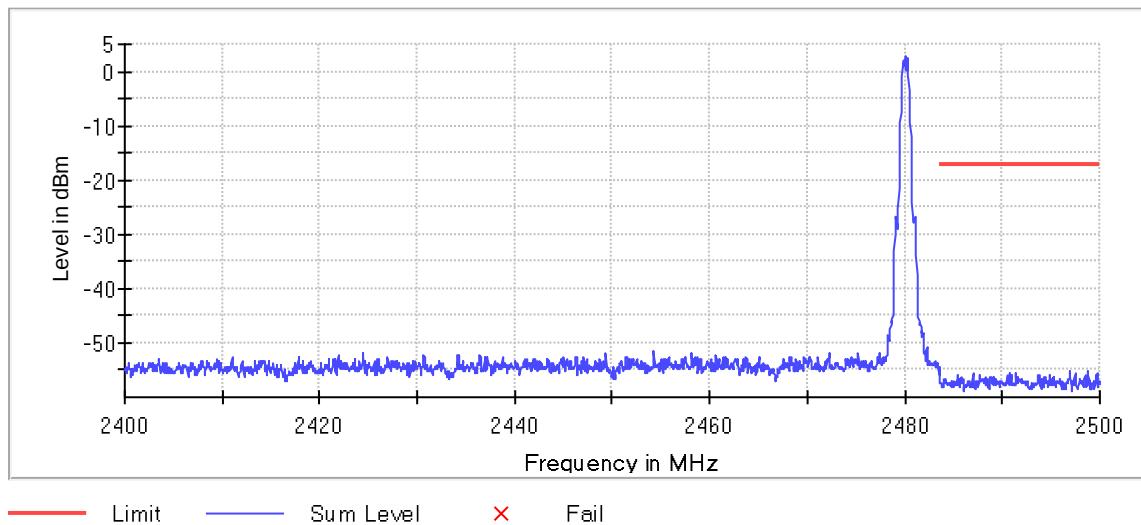
Note: The equipment calibration period is 1 year except for the FSV which is on a 2-year calibration

6.5 Test Data – DTS Band Edge

BLE - Lower band edge:

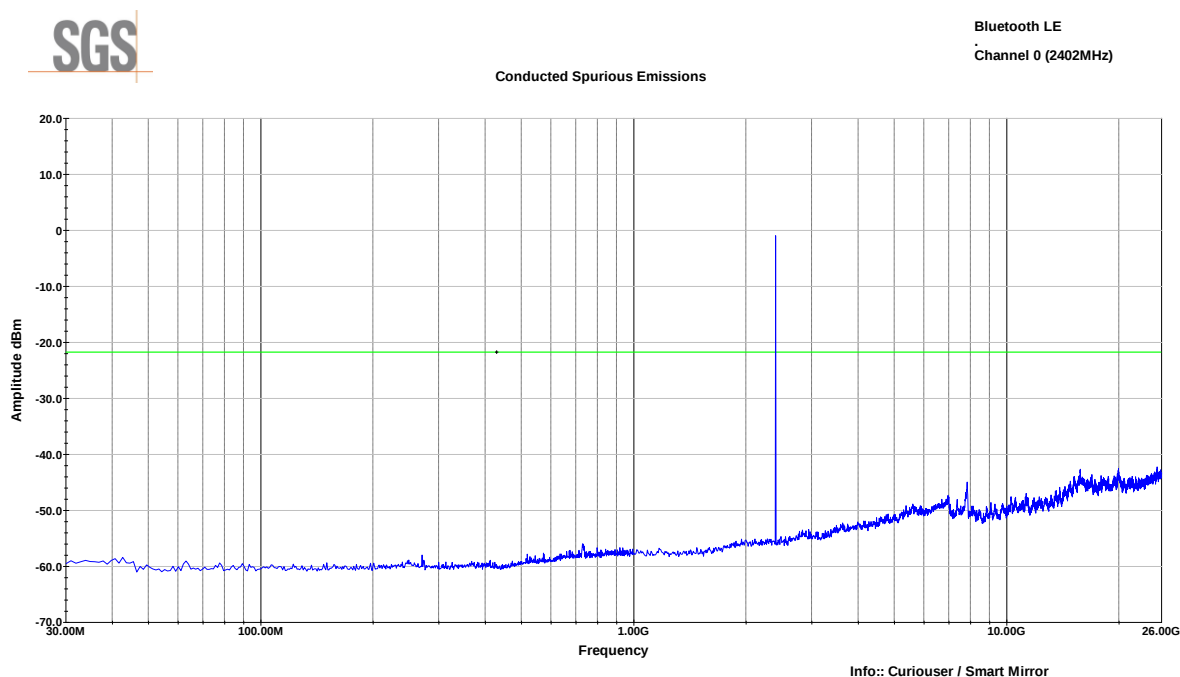


BLE - Upper band edge:

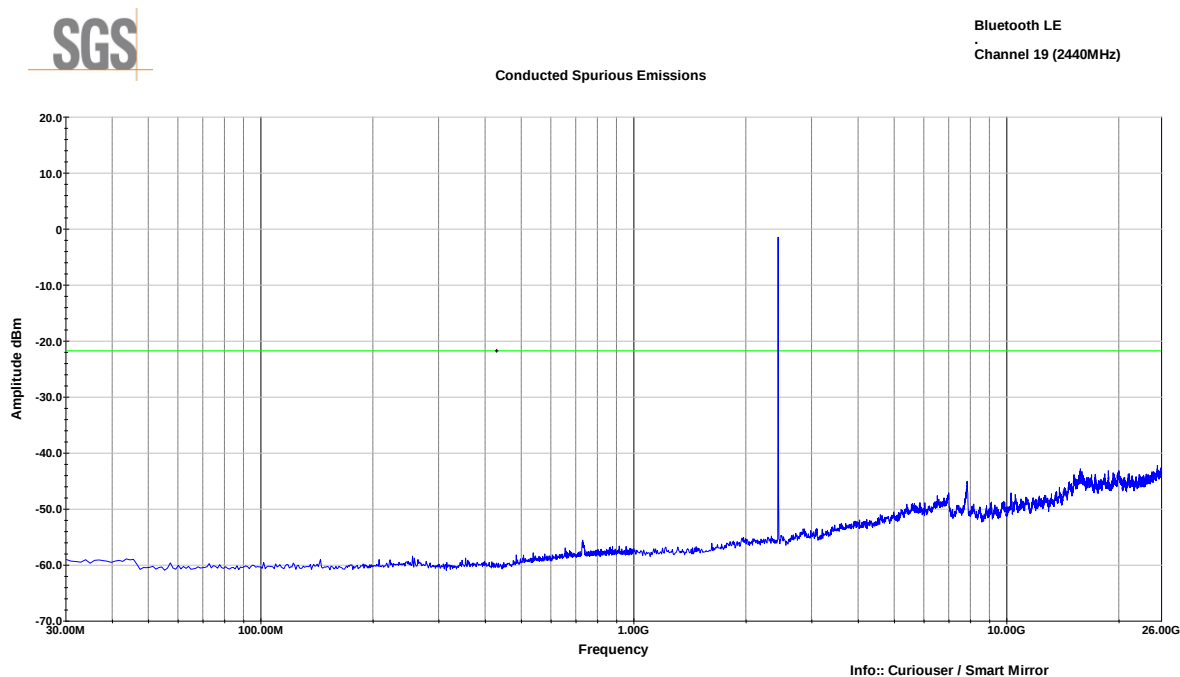


6.6 Test Data – Conducted Spurious Emissions

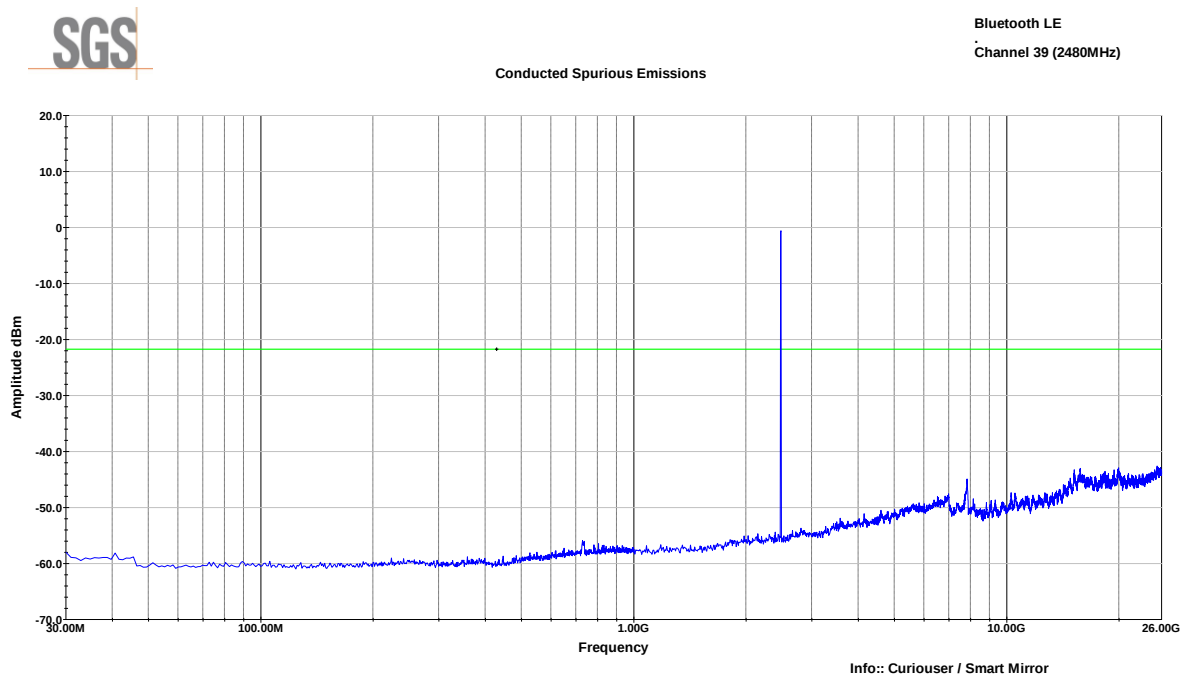
Conducted Spurs – Channel 0



Conducted Spurs – Channel 19



Conducted Spurs – Channel 39



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

The measurement methods defined in ANSI C63.10: 2013 were used.

Lowest, middle, and highest channels were investigated – the device was commanded to continuously transmit on channels 0, 19, and 39.

Test distance:

- 9k to 30 MHz – Near field prescan to determine if there were any emissions.
- 30 to 1000 MHz - The EUT to measurement antenna distance was 3 meters
- 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: 23.5 °C
- Relative Humidity: 31.2 %
- Atmospheric Pressure: 97.9 kPa

7.4 Test Equipment

Test End Date: 20-Mar-2018

Tester: JOP

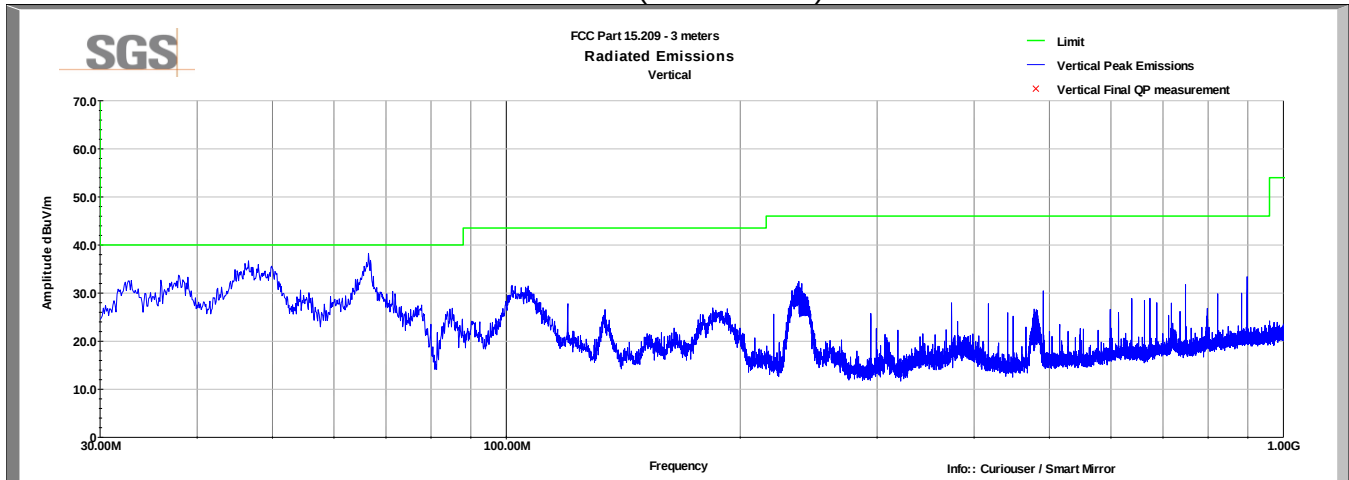
Equipment	Model	Manufacturer	Asset Number	Cal Due Date
EMI TEST RECEIVER	ESU40	ROHDE & SCHWARZ	B079629	25-Apr-2018
EMI TEST RECEIVER	ESU8	ROHDE & SCHWARZ	B085759	25-Jul-2018
ANTENNA, BILOG	JB6	SUNOL	B079690	29-Nov-2018
RF CABLE	SF106	HUBER & SUHNER	B079661	25-Jul-2018
RF CABLE	SF106	HUBER & SUHNER	B079713	24-Jul-2018
RF CABLE	UC-N-MM-78	MAURY MICROWAVE	17017	25-Jul-2018
RF CABLE	SUCOFLEX 100	HUBER & SUHNER	B108523	24-Jul-2018
LOW NOISE AMPLIFIER	TS-PR18	ROHDE & SCHWARZ	B094463	6-Mar-2019
ANTENNA, DRG HORN (MEDIUM)	3117	ETS LINDGREN	B079691	27-Jul-2018
RF CABLE	SF106	HUBER & SUHNER	B079712	24-Jul-2018
RF CABLE	104PE	HUBER & SUHNER	B079793	24-Jul-2018
FILTER, HIGH PASS (>2800MHZ)	HPM50111	MICRO-TRONICS	B085747	27-Jul-2018
LOW NOISE AMPLIFIER	TS-PR18	ROHDE & SCHWARZ	15003	28-Jul-2018
HORN(SMALL)	LB-180400-20-C-KF	A-INFO	15007	21-Mar-2018
RF CABLE	SF102	HUBER & SUHNER	B079822	27-Jul-2018
RF CABLE	SF102	HUBER & SUHNER	B079824	26-Jul-2018
LOW NOISE AMPLIFIER	NSP1840-HG	MITEQ	B087572	28-Jul-2018
ANTENNA, LOOP, ACTIVE	6502	ETS LINDGREN	B085752	22-Aug-2018

Note: The equipment calibration period is 1 year.

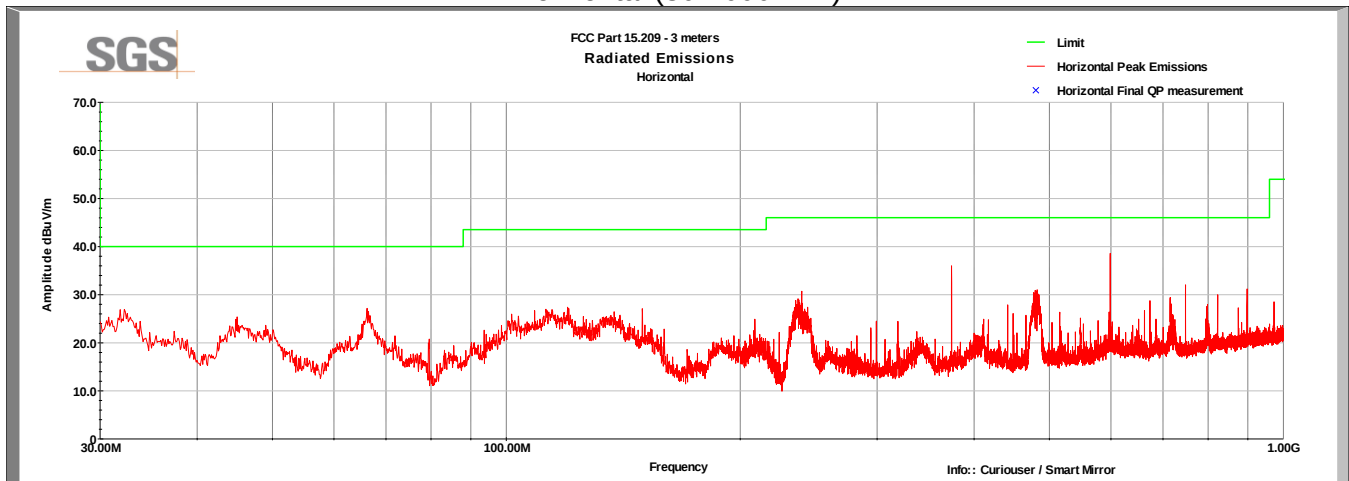
7.5 Test Data – Peak Plots

No emissions were detected in the range 9kHz to 30MHz.

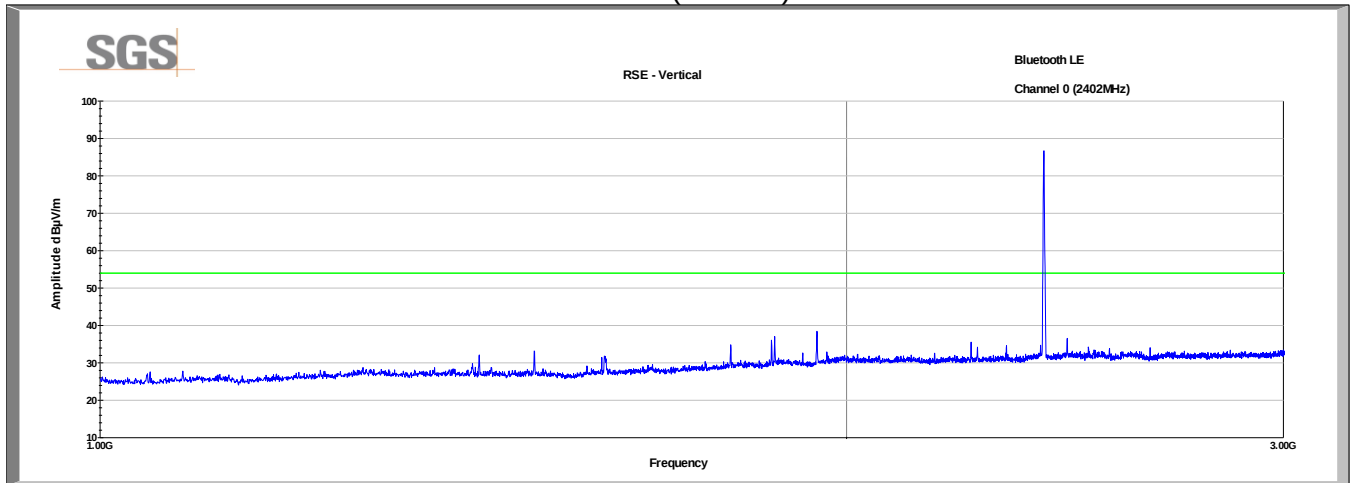
BLE Channel 0
 Vertical (30-1000MHz)



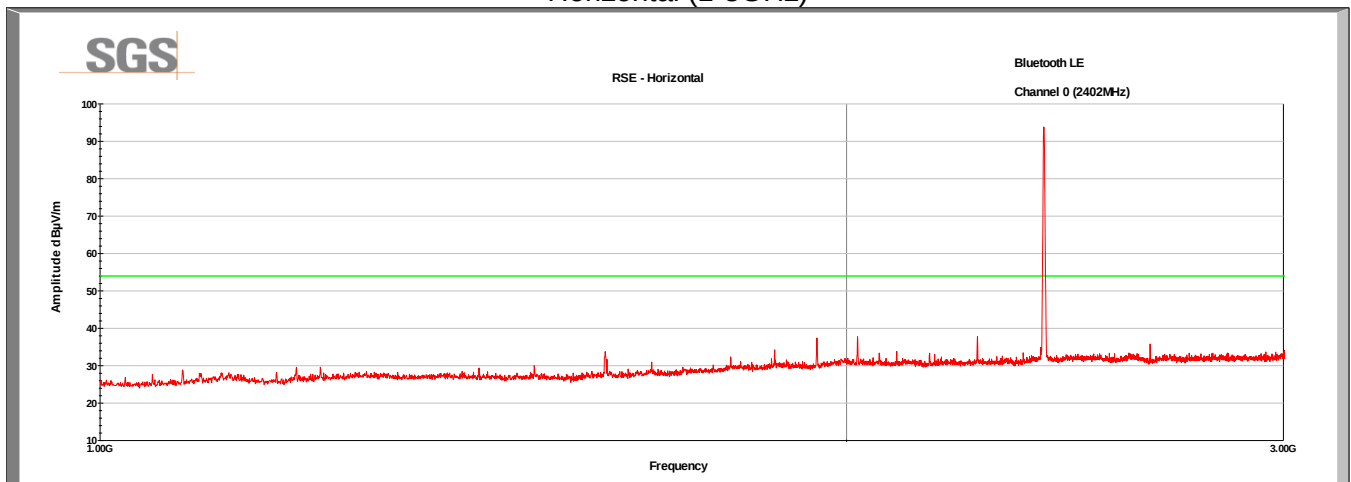
BLE Channel 0
 Horizontal (30-1000MHz)



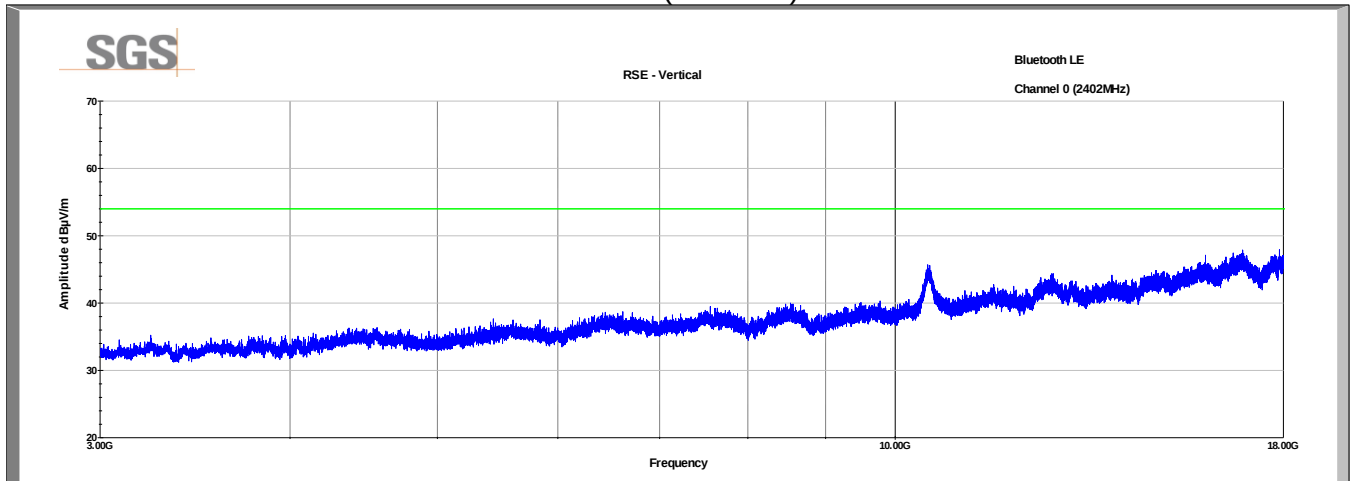
BLE Channel 0 Vertical (1-3GHz)



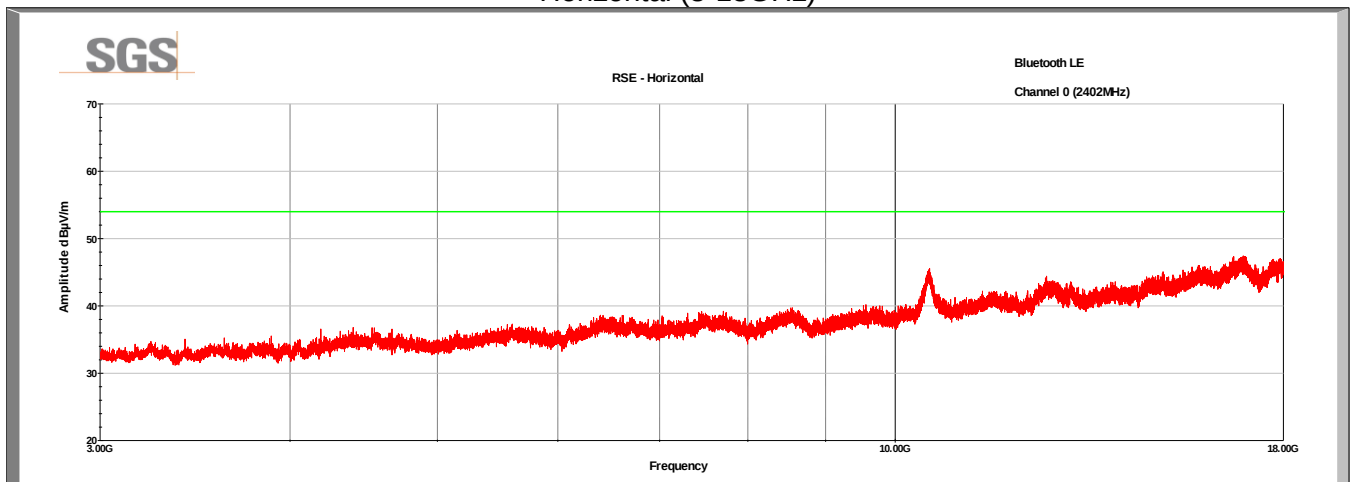
BLE Channel 0 Horizontal (1-3GHz)



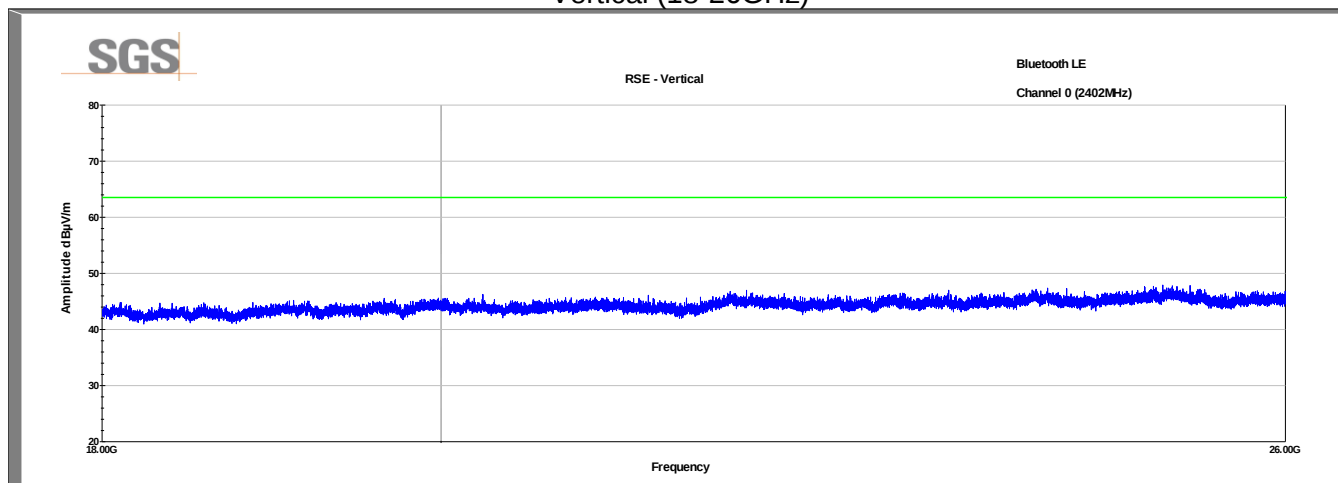
BLE Channel 0 Vertical (3-18GHz)



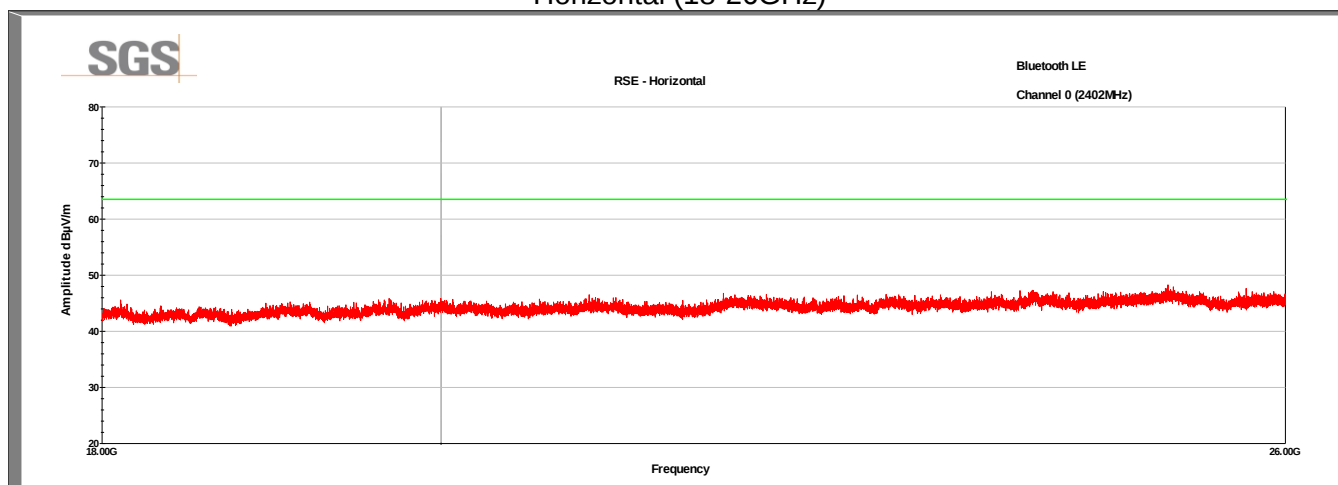
BLE Channel 0 Horizontal (3-18GHz)



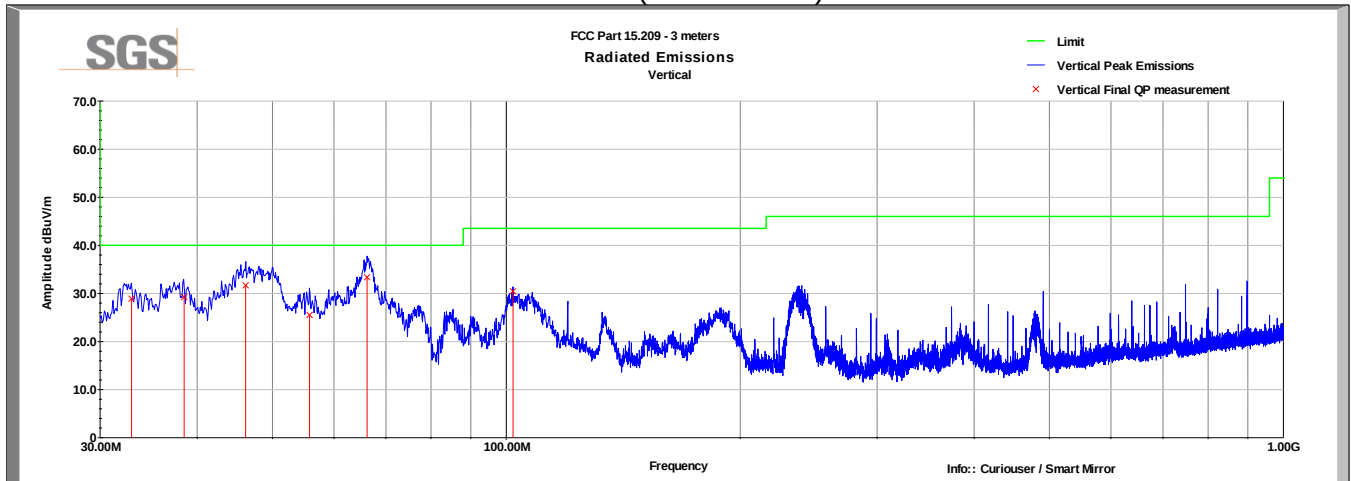
BLE Channel 0
 Vertical (18-26GHz)



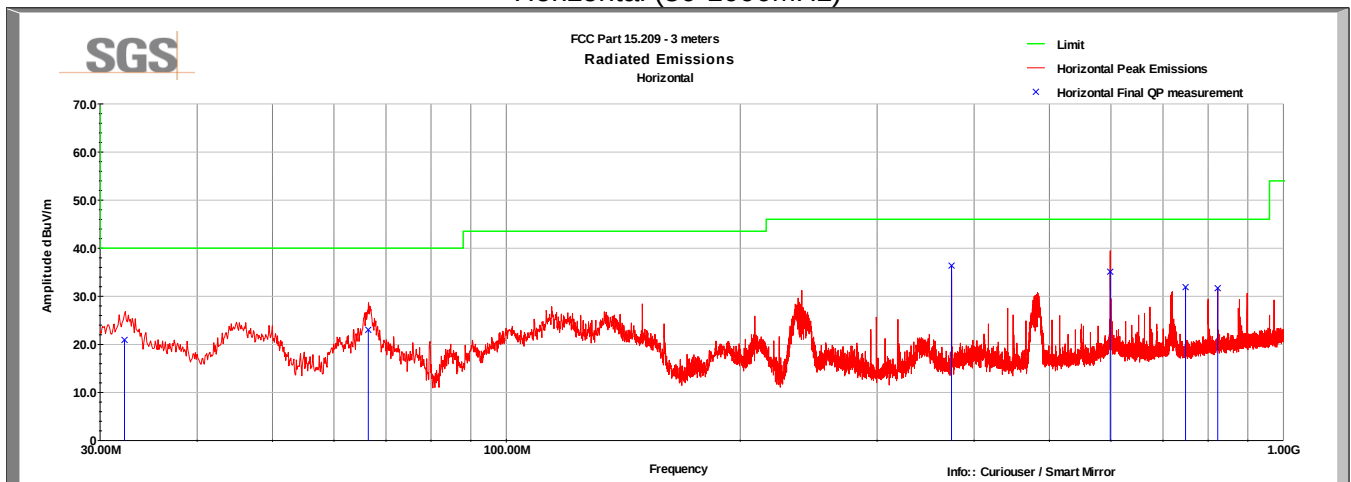
BLE Channel 0
 Horizontal (18-26GHz)



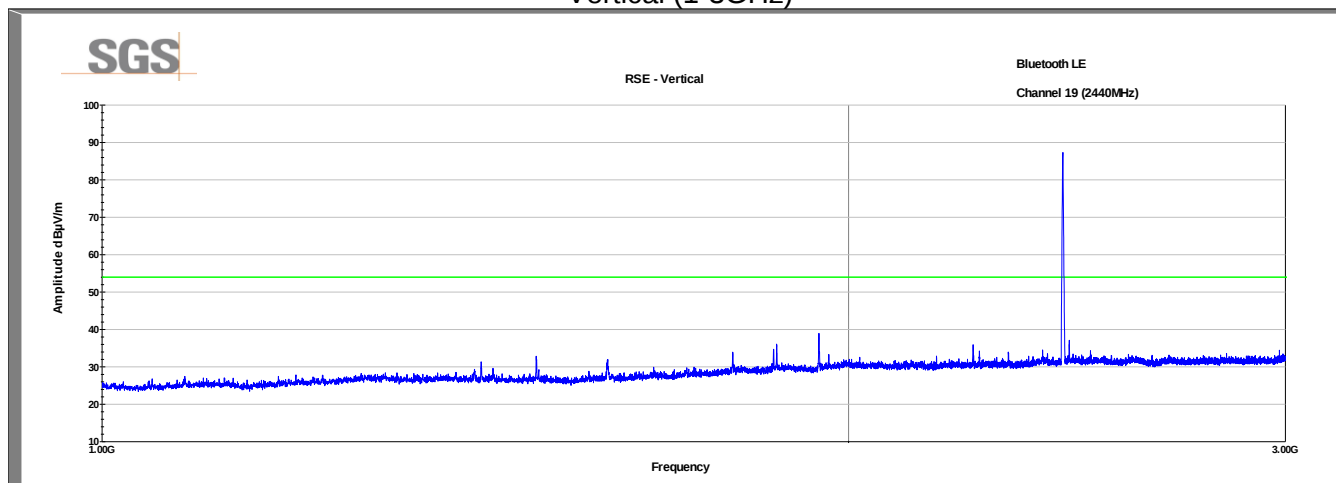
BLE Channel 19 Vertical (30-1000MHz)



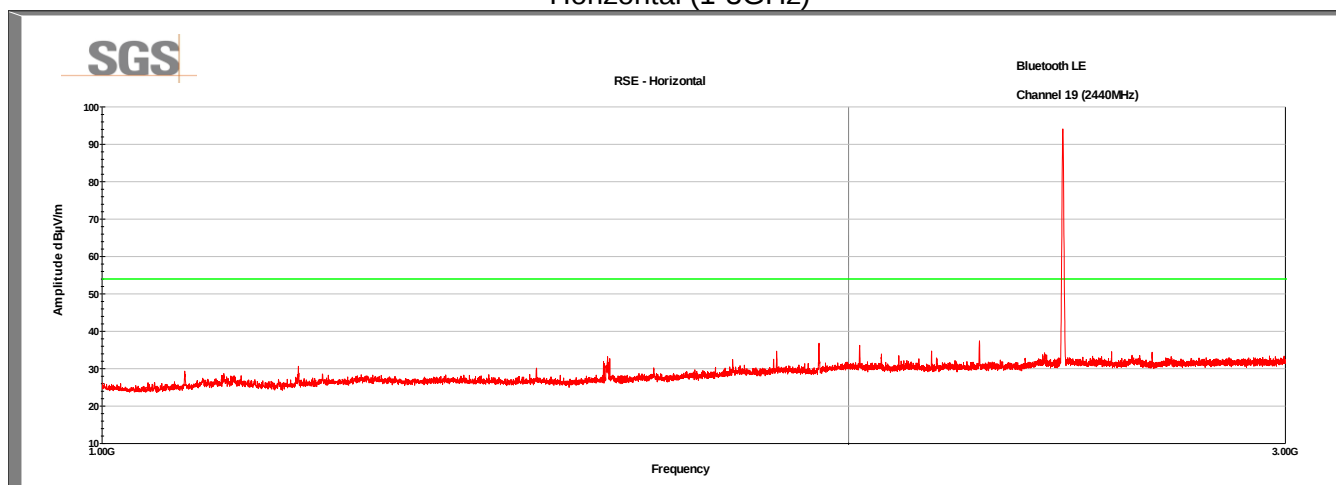
BLE Channel 19 Horizontal (30-1000MHz)



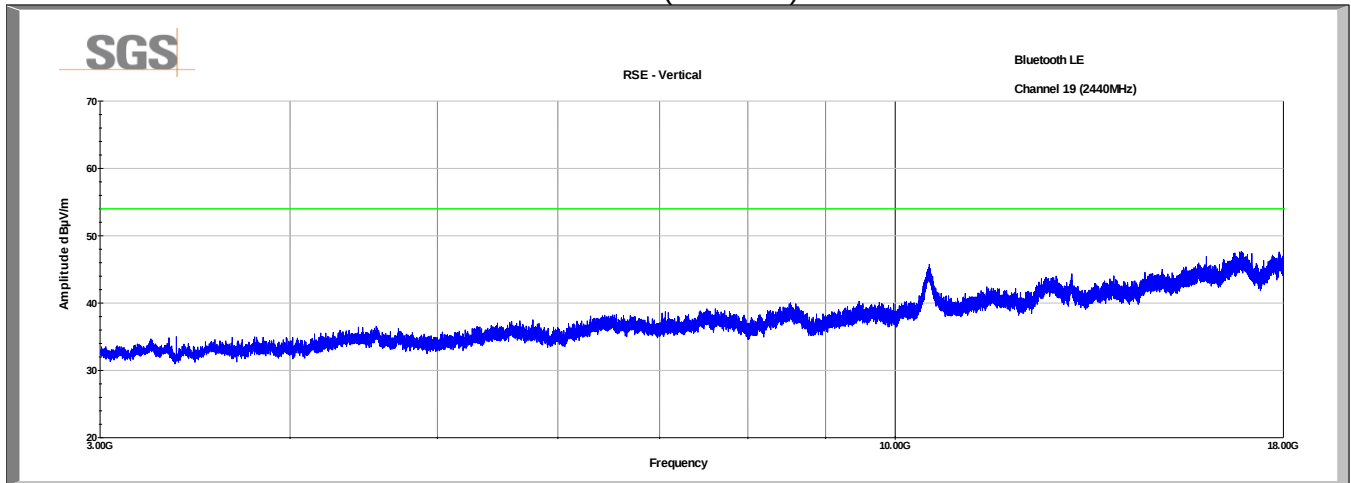
BLE Channel 19 Vertical (1-3GHz)



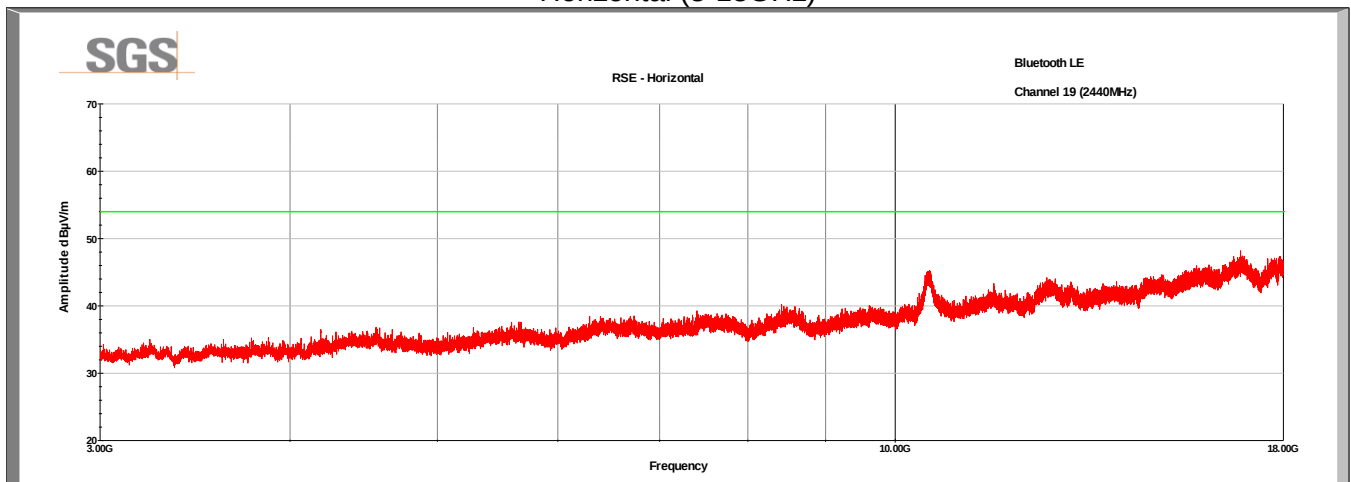
BLE Channel 19 Horizontal (1-3GHz)



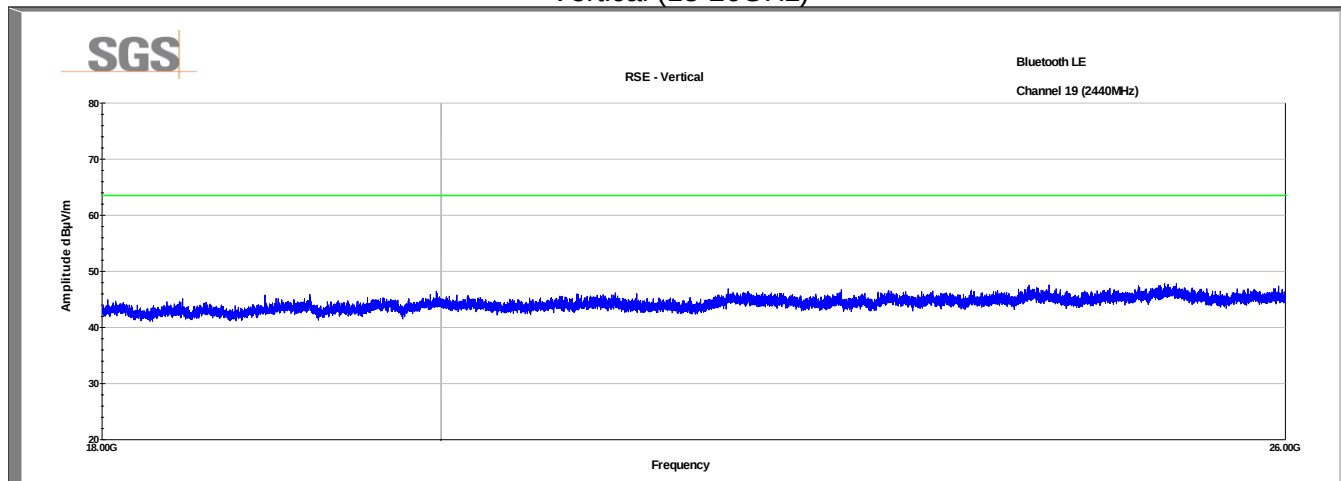
BLE Channel 19 Vertical (3-18GHz)



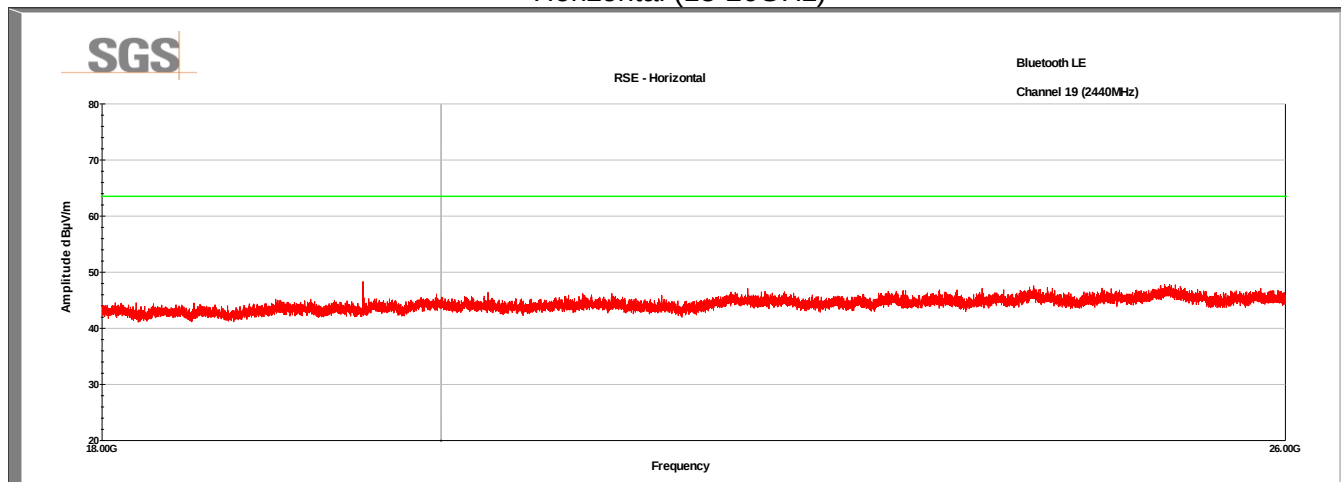
BLE Channel 19 Horizontal (3-18GHz)



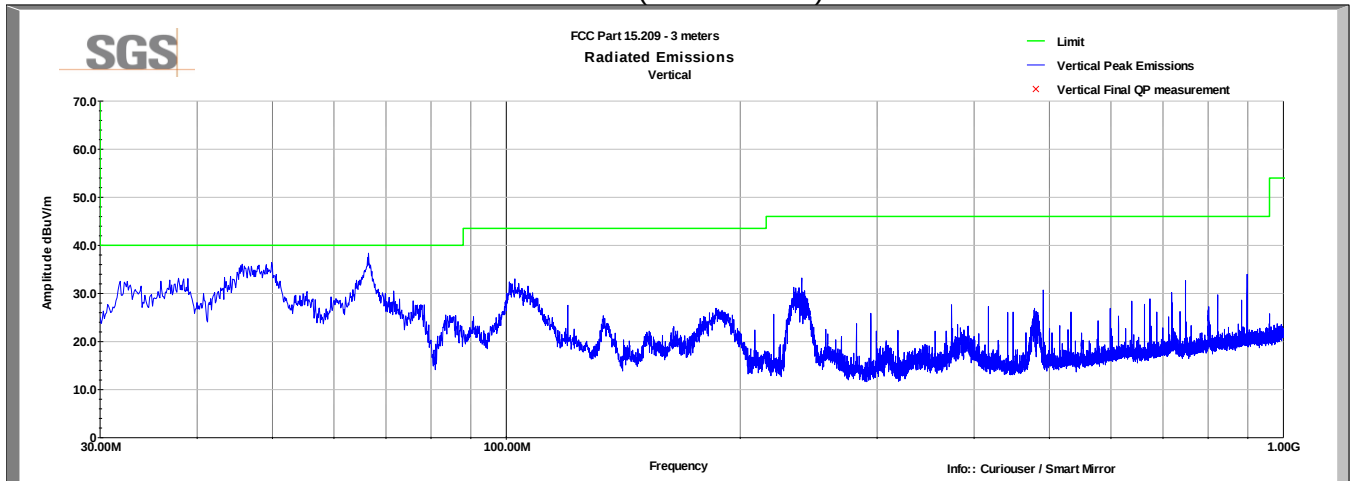
BLE Channel 19 Vertical (18-26GHz)



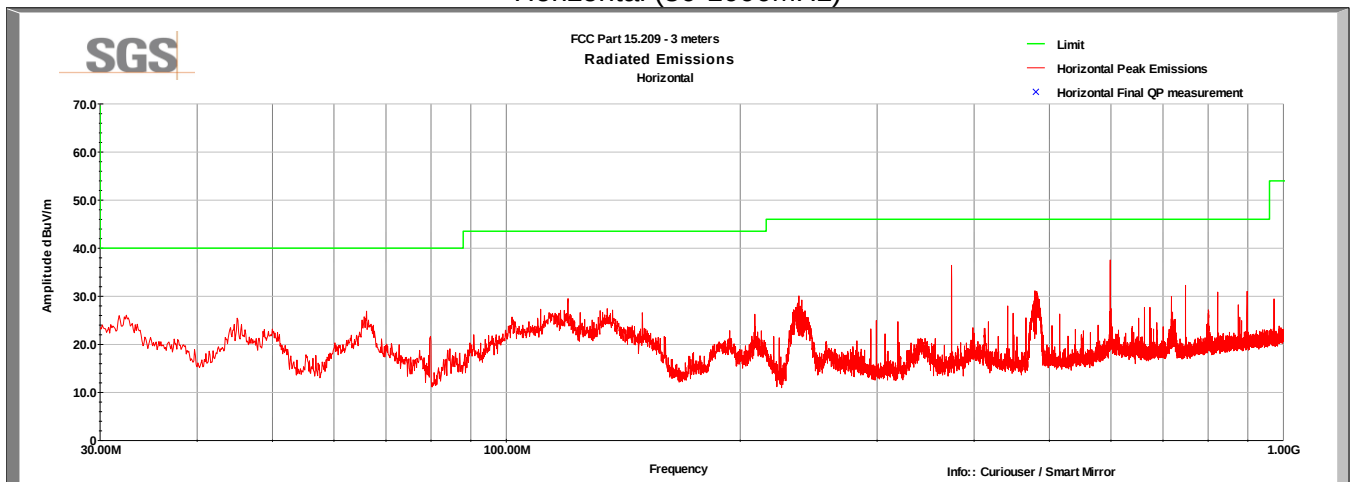
BLE Channel 19 Horizontal (18-26GHz)



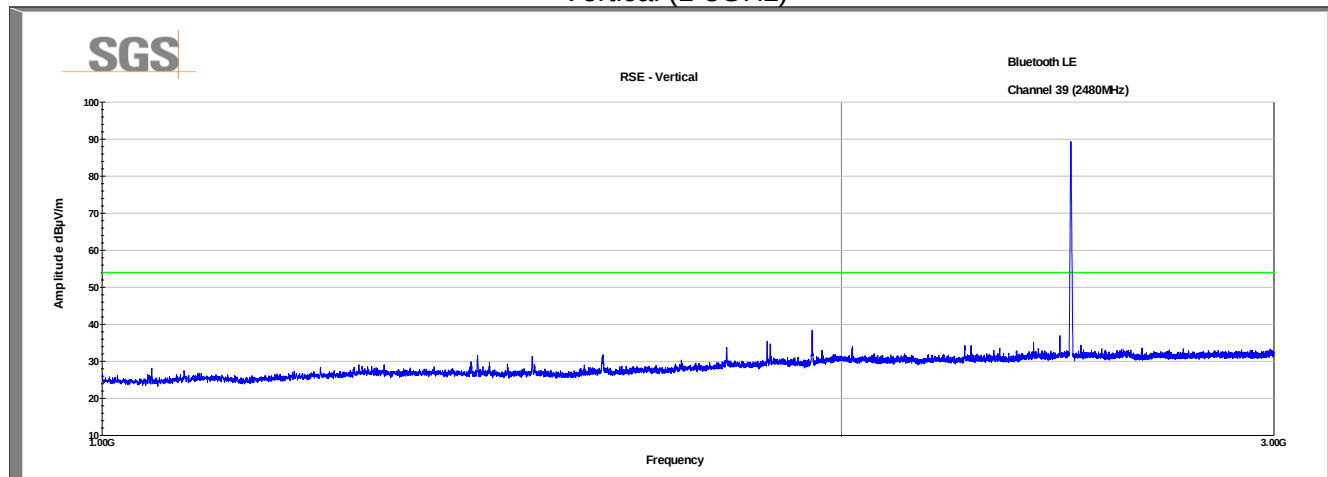
BLE Channel 39 Vertical (30-1000MHz)



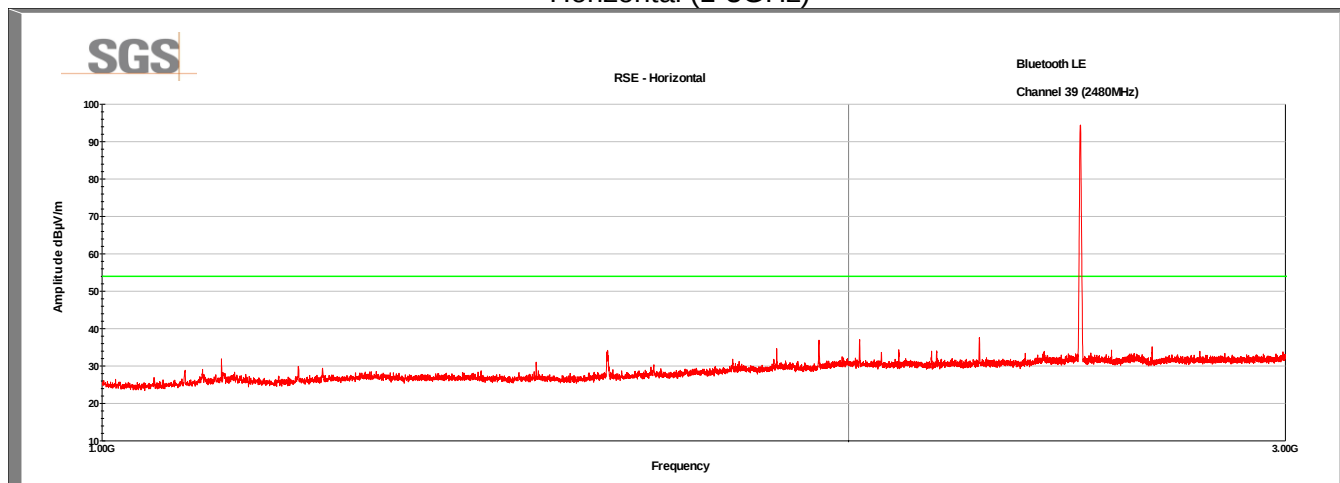
BLE Channel 39 Horizontal (30-1000MHz)



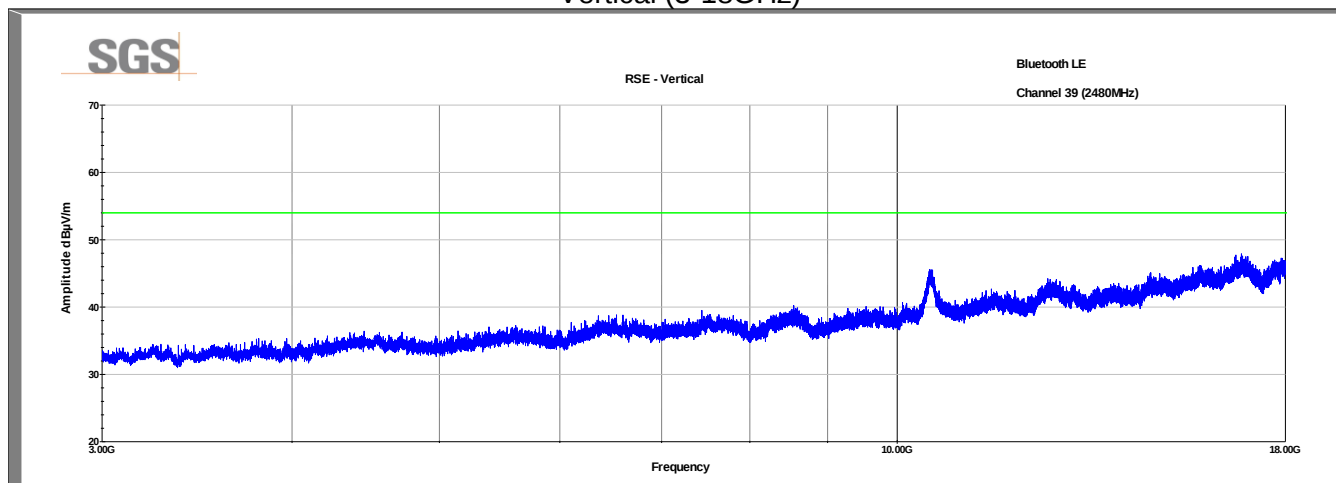
BLE Channel 39 Vertical (1-3GHz)



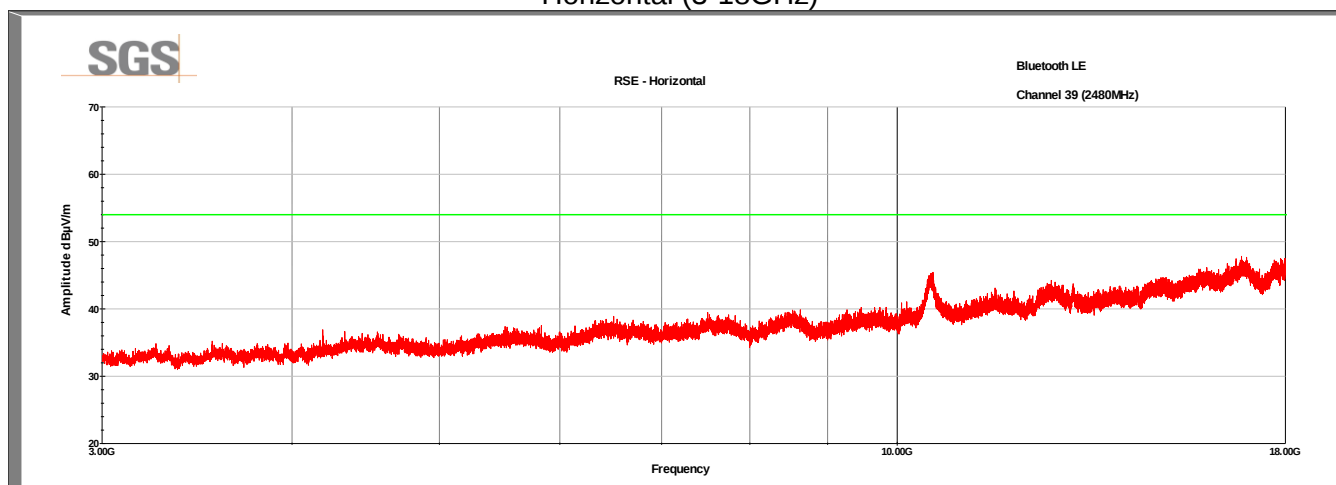
BLE Channel 39 Horizontal (1-3GHz)



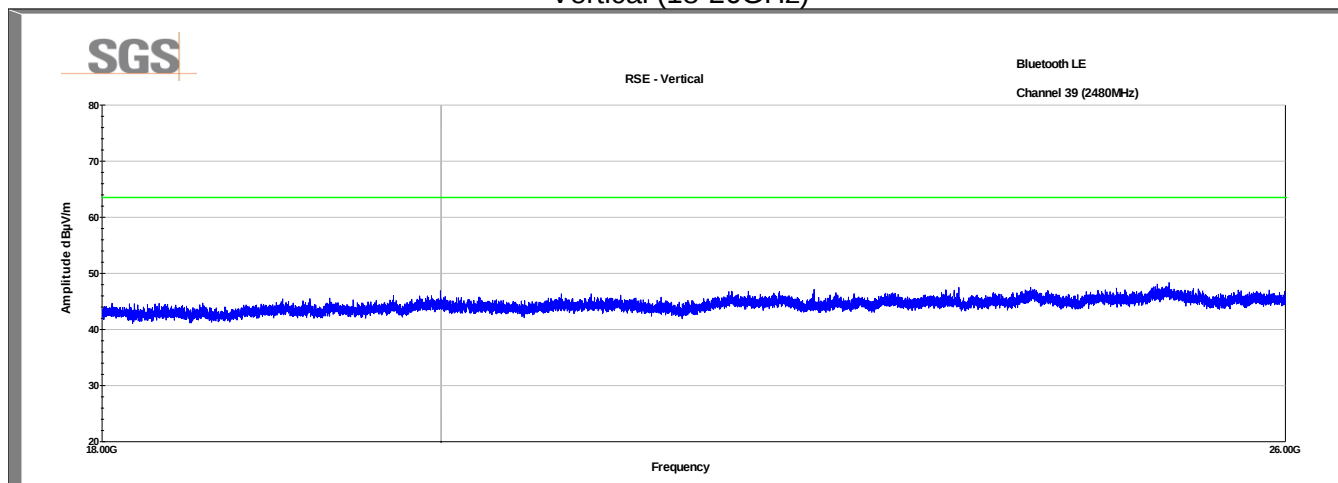
BLE Channel 39 Vertical (3-18GHz)



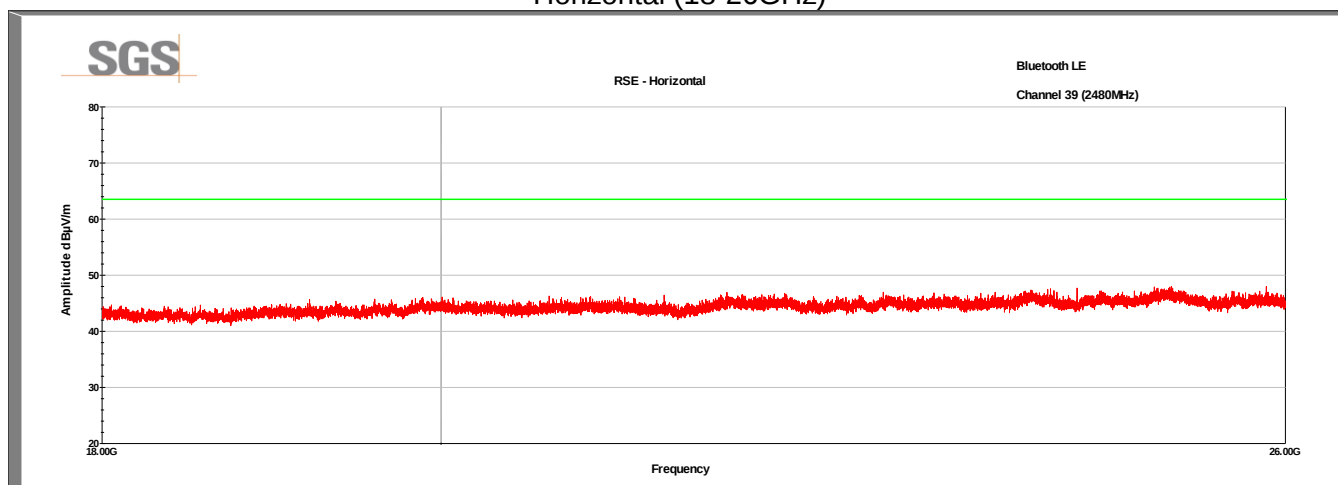
BLE Channel 39 Horizontal (3-18GHz)



BLE Channel 39
 Vertical (18-26GHz)



BLE Channel 39
 Horizontal (18-26GHz)



7.6 Test Data – Tabular Data

Frequency MHz	Raw QP (dBuV)	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	Loss (dB)	Amp (dB)	QP Value (dBuV/m)	Limit (dBuV/m)	Margin (dB)
32.93	40.3	V	271.0	175.0	20.1	0.5	32.0	28.9	40.0	-11.1
38.48	45.1	V	276.0	175.0	15.8	0.5	32.2	29.3	40.0	-10.7
46.18	53.3	V	294.0	175.0	10.5	0.6	32.7	31.7	40.0	-8.3
55.82	50.3	V	299.0	175.0	7.5	0.7	33.0	25.5	40.0	-14.5
66.19	57.8	V	24.0	175.0	8.1	0.7	33.2	33.4	40.0	-6.6
101.98	52.4	V	359.0	175.0	10.9	0.9	33.8	30.4	43.5	-13.1
32.26	31.8	H	25.0	175.0	20.6	0.5	31.9	20.9	40.0	-19.1
66.43	47.5	H	280.0	175.0	8.1	0.7	33.3	23.0	40.0	-17.0
374.18	52.4	H	34.0	175.0	15.7	1.8	33.5	36.4	46.0	-9.6
598.67	46.5	H	0.0	175.0	19.7	2.3	33.3	35.1	46.0	-10.9
748.34	41.4	H	45.0	175.0	21.2	2.5	33.3	31.9	46.0	-14.1
823.18	39.9	H	249.0	175.0	22.4	2.7	33.3	31.7	46.0	-14.3
QP Value = Level + AF + CL - Amp										
Margin = QP Value - Limit										

Below 1GHz, there was no discernible difference among the different transmit channels. Data provided for Channel 19. There were no spurs above 1GHz that fell within 10dB of the limit.

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

Field strength measurements were performed at the restricted band edges of 2390MHz and 2483.5MHz for each modulation. Measurements were made using the conducted methods defined in ANSI C63.10, Section 11.12.2.

Offset Calculations:

Offset calculations so that conducted measurements on the spectrum analyzer in dBμV represent field strength measurements in dBμV/m.

$$\text{Offset} = -20\log(D) + 104.8 - 107 + \text{CL} + \text{DC} + \text{AG}$$

$$\text{Offset}_{3m} = -11.7 + \text{CL} + \text{DC} + \text{AG}$$

D = 3m	Distance
CL = 2.2 dB	Cable Loss
DC = 1.9 dB (64.8%)	Duty Cycle Correction Factor
AG = 3.0 dB	Antenna Gain

$$\text{Offset} = -4.6 \text{ dB}$$

8.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 23.8 °C
 Relative Humidity: 37.6 %

8.4 Test Equipment

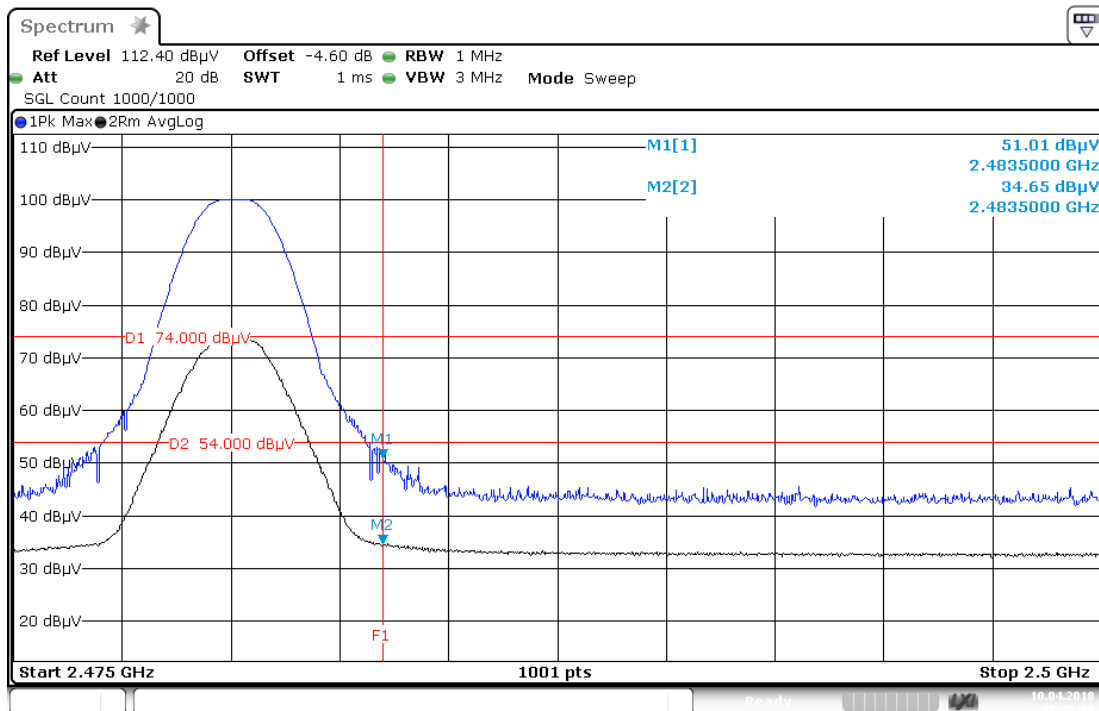
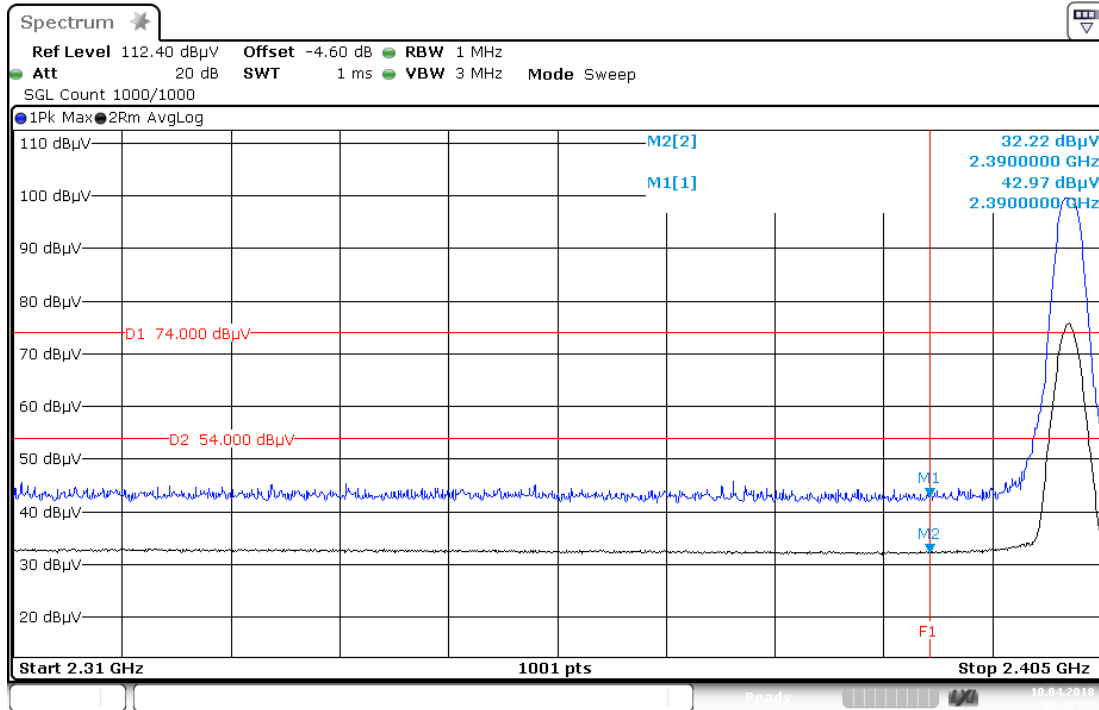
Test End Date: 10-Apr-2018

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 cycle.

8.5 Test Data – Restricted Band Edge



9 Conducted Emissions

9.1 Test Result

Test Description	Basic Standards	Test Result
Conducted Emissions, Class B	RSS-GEN 7.2.4 15.207 ANSI C63.4:2014	Compliant

9.2 Test Method

With the receivers resolution bandwidth was set to 9 kHz the 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) 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

9.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 23.8°C
 Relative Humidity: 22.2%

9.4 Test Equipment

Test End Date: 6-Jun-2018

Tester: SKM

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
LINE IMPEDANCE STABILIZATION NETWORK	NNB 51	TESEQ	B087573	21-Nov-2018
RF CABLE	UC-N-MM-78	MAURY MICROWAVE	17016	25-Jul-2018
EMI TEST RECEIVER	ESU8	ROHDE & SCHWARZ	B085759	25-Jul-2018

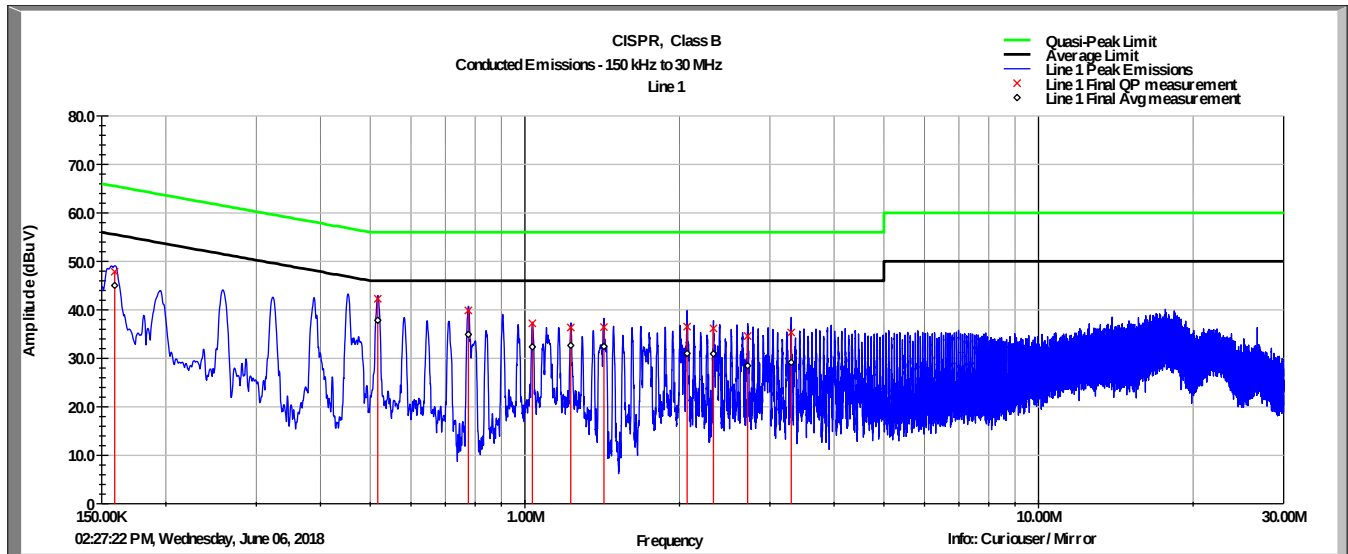
Note: The equipment calibration period is 1 year.

Software:

"Conducted Emissions" TILE! profile dated Dec 2015

9.5 Test Data

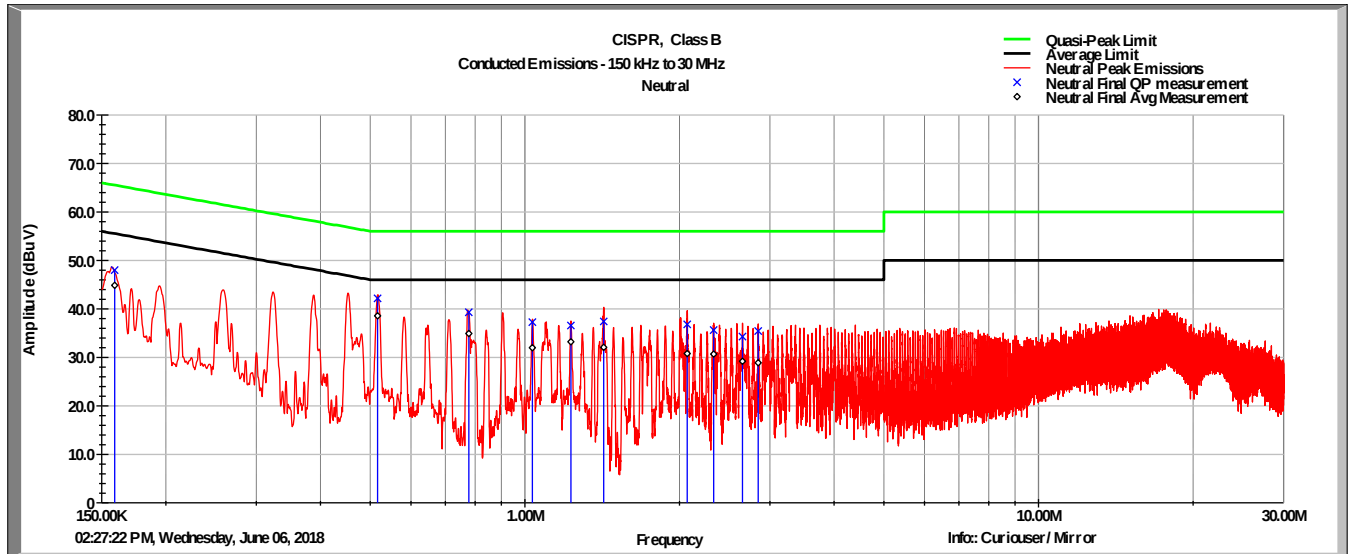
Line 1 Conducted Emissions Plot 150-30MHz



Line 1 Conducted Emissions Data 150-30MHz

Frequency MHz	QP Value dBuV	QP Limit dBuV	QP Margin dB	Avg Value dBuV	Avg Limit dBuV	Avg Margin dB
0.159	47.9	65.5	-17.7	45.0	55.5	-10.5
0.517	42.3	56.0	-13.7	37.8	46.0	-8.2
0.776	39.9	56.0	-16.1	34.9	46.0	-11.1
1.034	37.2	56.0	-18.8	32.3	46.0	-13.7
1.228	36.3	56.0	-19.7	32.7	46.0	-13.3
1.425	36.4	56.0	-19.6	32.4	46.0	-13.6
2.069	36.5	56.0	-19.5	31.0	46.0	-15.0
2.329	36.2	56.0	-19.8	30.9	46.0	-15.1
2.715	34.6	56.0	-21.4	28.5	46.0	-17.5
3.300	35.3	56.0	-20.7	29.2	46.0	-16.8

Neutral Conducted Emissions Plot 150-30MHz



Neutral Conducted Emissions Data 150-30MHz

Frequency MHz	QP Value dBuV	QP Limit dBuV	QP Margin dB	Avg Value dBuV	Avg Limit dBuV	Avg Margin dB
0.159	48.0	65.5	-17.6	44.8	55.5	-10.7
0.517	42.2	56.0	-13.8	38.6	46.0	-7.4
0.778	39.3	56.0	-16.7	34.9	46.0	-11.1
1.034	37.3	56.0	-18.7	32.0	46.0	-14.0
1.229	36.6	56.0	-19.4	33.2	46.0	-12.8
1.424	37.4	56.0	-18.6	32.1	46.0	-13.9
2.070	36.8	56.0	-19.2	30.8	46.0	-15.2
2.331	35.6	56.0	-20.4	30.7	46.0	-15.3
2.653	34.3	56.0	-21.7	29.2	46.0	-16.8
2.846	35.4	56.0	-20.6	28.9	46.0	-17.1

10 Revision History

Revision Level	Description of changes	Revision Date
0	Initial release	7 June 2018
1	Corrected client address	3 August 2018