

RF Test Report

Project Number: 4453608**Proposal Number:** 8572**Report Number:** 4453608EMC01**Revision Level:** 2**Client:** Elster Solutions LLC**Equipment Under Test:** Mini Network Interface Card**Model:** MNIC**Applicable Standards:** FCC Part 15 Subpart C, § 15.247

RSS-247, Issue 2

ANSI C63.10: 2013

RSS-GEN, Issue 6

Report issued on: 26 July 2019**Test Result:** Compliant

Tested by:



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Paul Lorenzo, EMC Technician

Reviewed by:



David Schramm, Operations Manager for
Shawn McGuinness, EMC Engineering Leader

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
Peak Output Power	15.247(b)(2)	RSS-247 S5.4a	Compliant
Radiated Spurious Emissions	15.205 / 15.209	RSS-GEN 8.9	Compliant
AC Powerline Conducted Emission	15.107, 15.207	RSS-GEN 8.8	Compliant

1.1 Modifications Required for Compliance

None

2 General Information

2.1 Client Information

Name: Elster Solutions LLC
Address: 208 S. Rogers Lane
City, State, Zip, Country: Raleigh, NC 27610

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: Mini Network Interface Card
Model: MNIC
Serial Number: Not Labeled
FCC ID: QZC-MNIC
Frequency Range: 902.4-927.6MHz
Data Modes: Mode 2 (high power with data rate 150kbps)
Antenna: PCB Trace Antenna
Antenna Gain: 1.71dBi

Rated Voltage: 90-276Vac 50/60Hz
Tested Voltage: 120Vac 60Hz

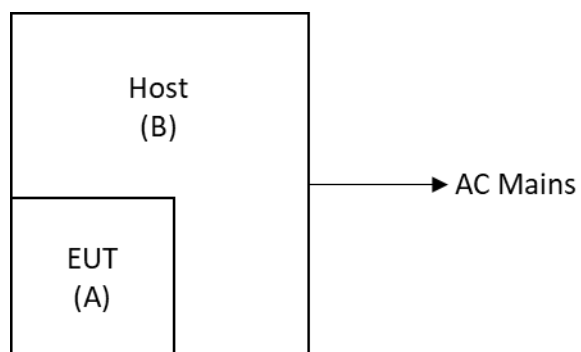
Sample Received Date: 12 December 2018
Dates of testing: 12 April – 19 July 2019

2.3 *Operating Modes and Conditions*

The client programmed three different transmitter modules to transmit at Low, Mid and High Channels (902.4MHz, 916.5MHz, 927.6MHz).

The modules was installed in the host which was programmed by the client to continuously transmit when powered on.

2.4 *EUT Connection Block Diagram*



2.5 System Configurations

Device reference	Manufacturer	Description	Model Number	Serial Number
A	Elster Solutions LLC	Mini Network Interface Card	MNIC	Not Labeled
Support Equipment				
B	Honeywell	EdgeControl Node – Load Control Transceiver	FC340A-H-LC	Not Labeled

2.6 Cable List

Cable reference	Port Name	Start	End	Cable Length (m)	Ferrite installed?	Shielded?
1	AC power	AC	EUT	1.1	No	No

4 Peak Output Power

4.1 Test Result

Test Description	Test Specification		Test Result
Peak Output Power	15.247(b)(2)	RSS-247 S5.4a	Compliant

4.2 Test Method

Fundamental peak power measurements were recorded using the procedures from ANSI C63.10: 2013 clause 7.8.5 and KDB 558074 D01 Measurement Guidance v05r02.

Limit

For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels.

4.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 21.8°C
Relative Humidity: 51.7%
Atmospheric Pressure: 97.69kPa

4.4 Test Equipment

Test End Date: 11-Jun-2019

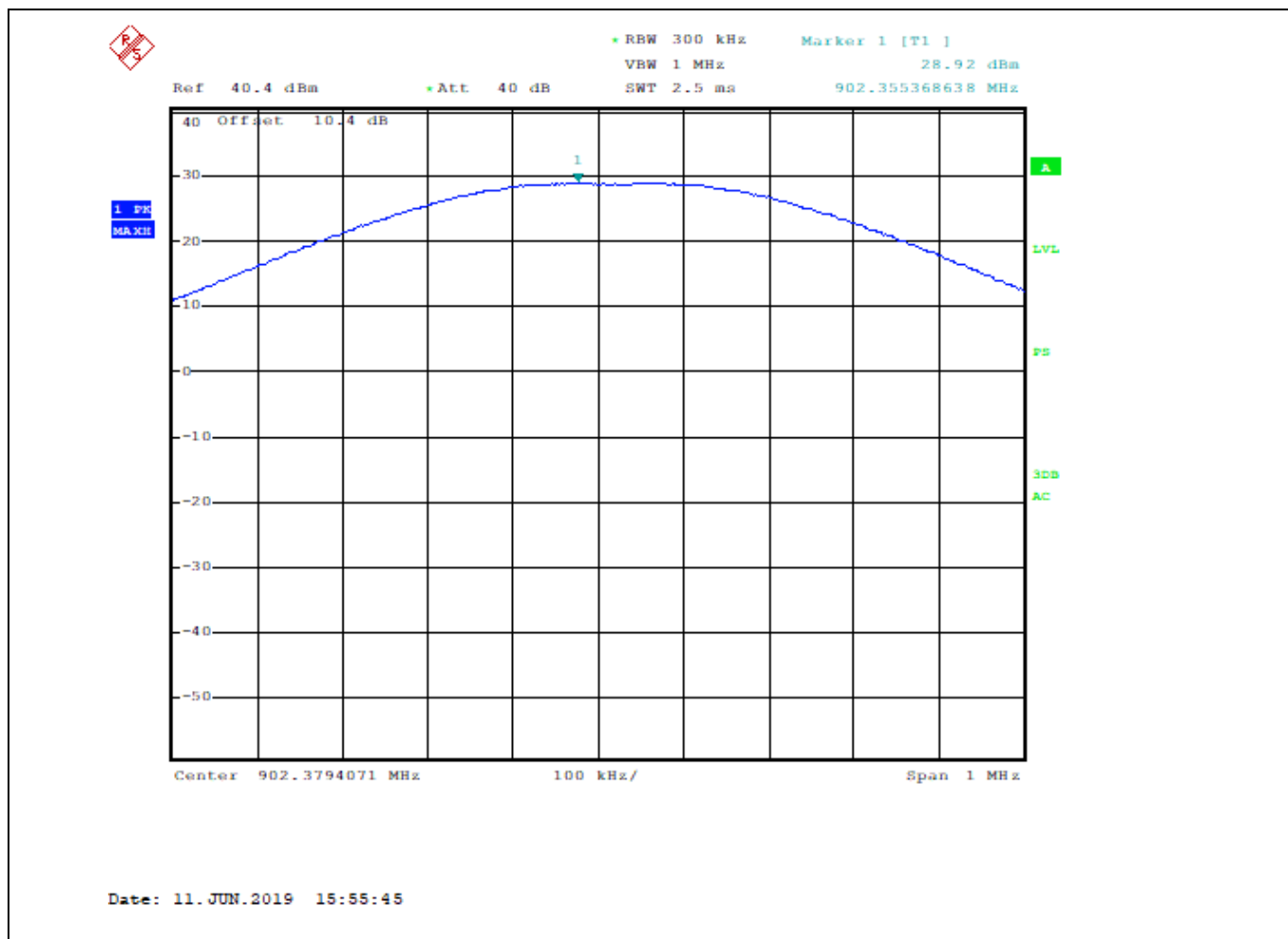
Tester: PL

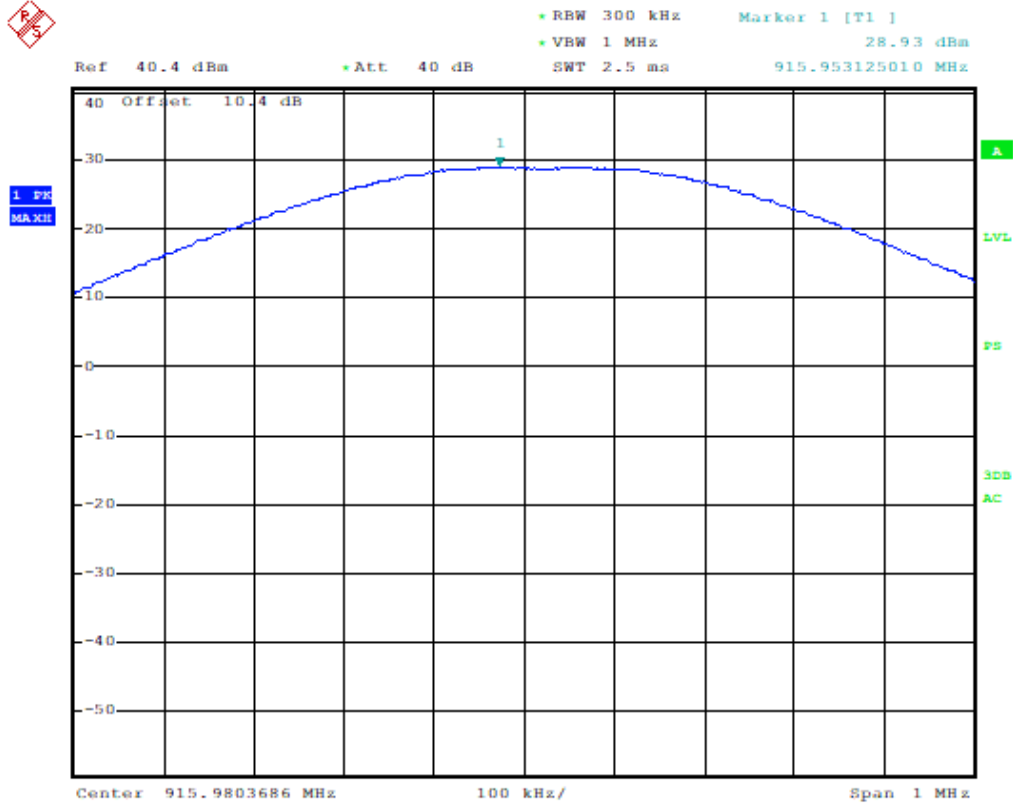
Equipment	Model	Manufacturer	Asset Number	Cal Due Date
ATTENUATOR, 10DB (TS8997)	10DB	ROHDE & SCHWARZ	B095594	25-Jul-2019
RF CABLE (TS8997)	141	HUBER & SUHNER	B095588	25-Jul-2019
EMI TEST RECEIVER	ESU40	ROHDE & SCHWARZ	B079629	2-Jul-2019

Note: The equipment calibration period is 1 year.

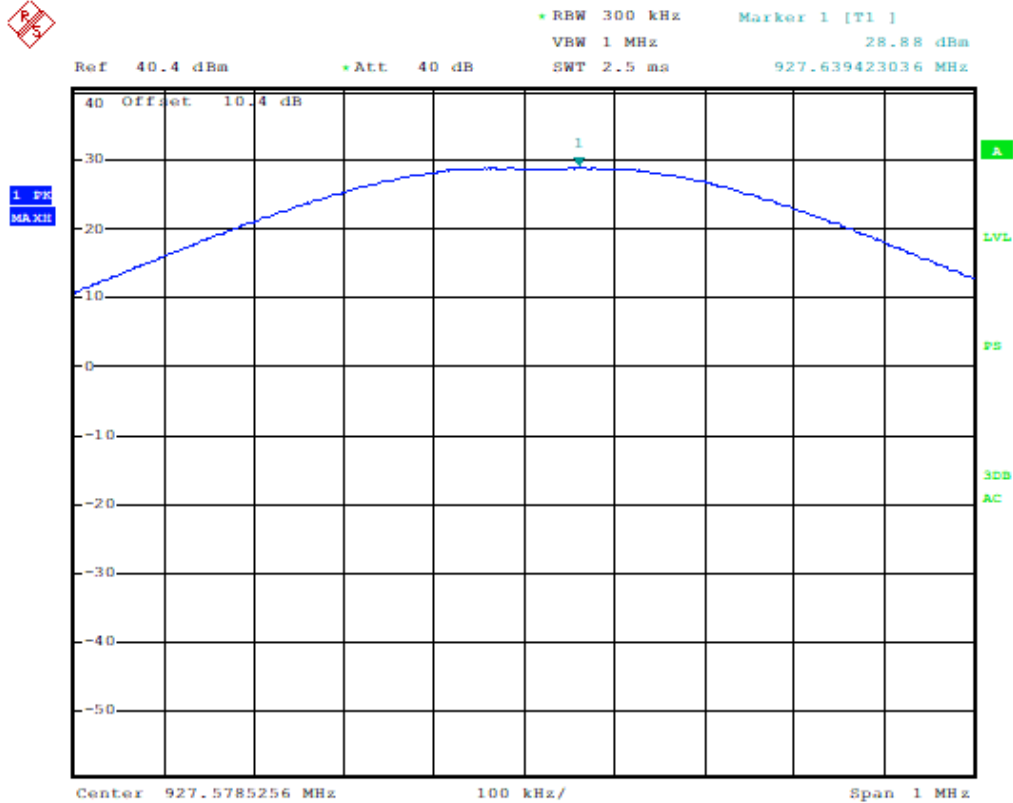
4.5 Test Data

DUT Frequency (MHz)	Peak Power (dBm)	Limit Max (dBm)	Result
902.355368638	28.92	30.0	PASS
915.953125010	28.93	30.0	PASS
927.639423036	28.88	30.0	PASS





Date: 11.JUN.2019 16:03:39



Date: 11.JUN.2019 16:08:18

5 Field Strength of Spurious Radiation

5.1 Test Result

Test Description	Test Specification		Test Result
Field strength of spurious radiation	15.209 / 15.205	RSS-GEN 8.9	Compliant

5.2 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 2.5 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.

There is a limit on spurious emissions produced by an intentional radiator in any 100 kHz Bandwidth outside the intentional emission band of -20dBc provided the radiator complies with the limits specified in 15.205© and 15.209(a).

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

5.3 Test Site

10m Absorber Lined Shielded Enclosure (ALSE), Suwanee, GA

Environmental Conditions 11 June 2019

Temperature: 22.1°C

Relative Humidity: 53.3%

Atmospheric Pressure: 97.66kPa

5.4 Test Equipment

30-1000MHz

Test End Date: 11-Jun-2019

Tester: PL

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
ANTENNA, BILOG	JB6	SUNOL	B079690	11-Dec-2019
RF CABLE	SF106	HUBER & SUHNER	B079712	24-Jul-2019
RF CABLE	SF106	HUBER & SUHNER	B079713	24-Jul-2019
RF CABLE	SF106	HUBER & SUHNER	B079659	23-Jul-2019
RF CABLE	SUCOFLEX 100	HUBER & SUHNER	B108523	24-Jul-2019
LOW NOISE AMPLIFIER	TS-PR18	ROHDE & SCHWARZ	15003	24-Jan-2020
EMI TEST RECEIVER	ESU40	ROHDE & SCHWARZ	B079629	2-Jul-2019

1-10GHz

Test End Date: 11-Jun-2019

Tester: PL

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
ANTENNA, DRG HORN (MEDIUM)	3117	ETS LINDGREN	B079691	10-Aug-2020
RF CABLE	SF102	HUBER & SUHNER	B079822	25-Jul-2019
RF CABLE	SUCOFLEX 100	HUBER & SUHNER	B108523	24-Jul-2019
LOW NOISE AMPLIFIER	TS-PR18	ROHDE & SCHWARZ	15003	24-Jan-2020
EMI TEST RECEIVER	ESU40	ROHDE & SCHWARZ	B079629	2-Jul-2019
FILTER, HIGH PASS (>1150MHz)	HPM50108	MICRO-TRONICS	B079802	26-Jul-2019

Note: The calibration period equipment is 1 year.

Software: "RSE 30-1000 MHz T7 180823 TILE! profile dated Nov 2018

Software: "RSE 1-18 GHz T7 180716" TILE! profile dated Oct 2018

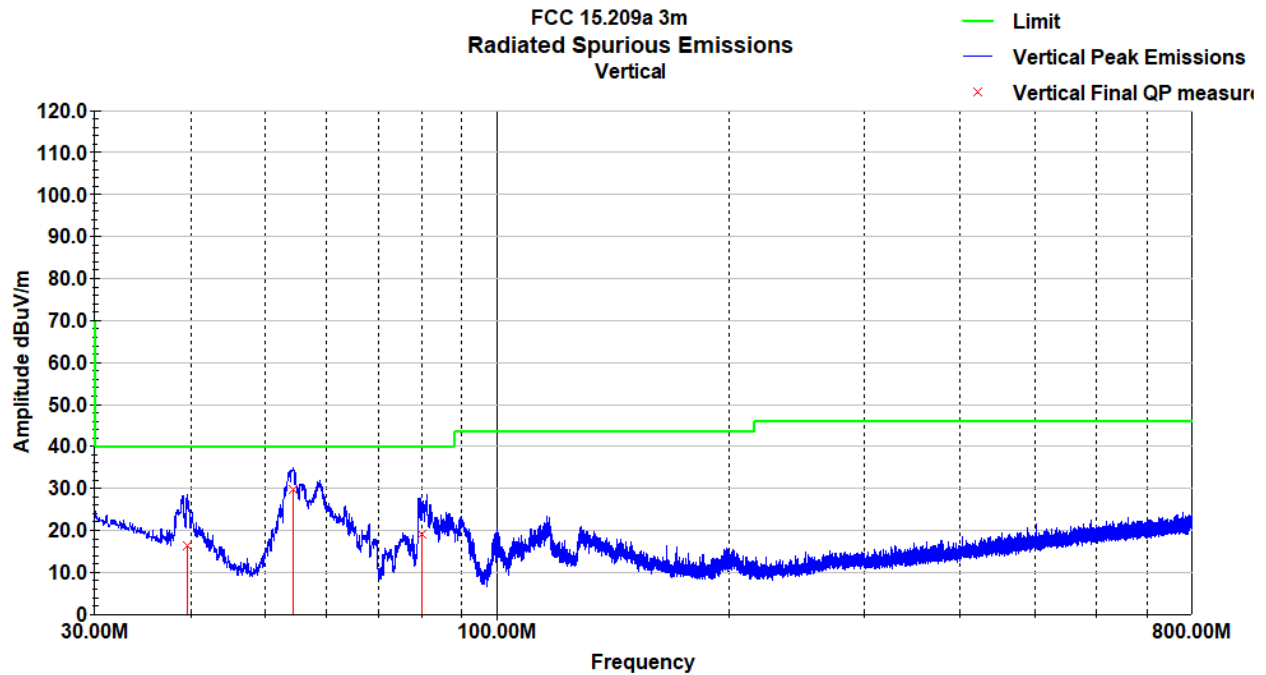
5.5 Test Setup Photographs

Test setup photographs are in a separate exhibit.

5.6 Test Data

5.6.1 30-800 MHz

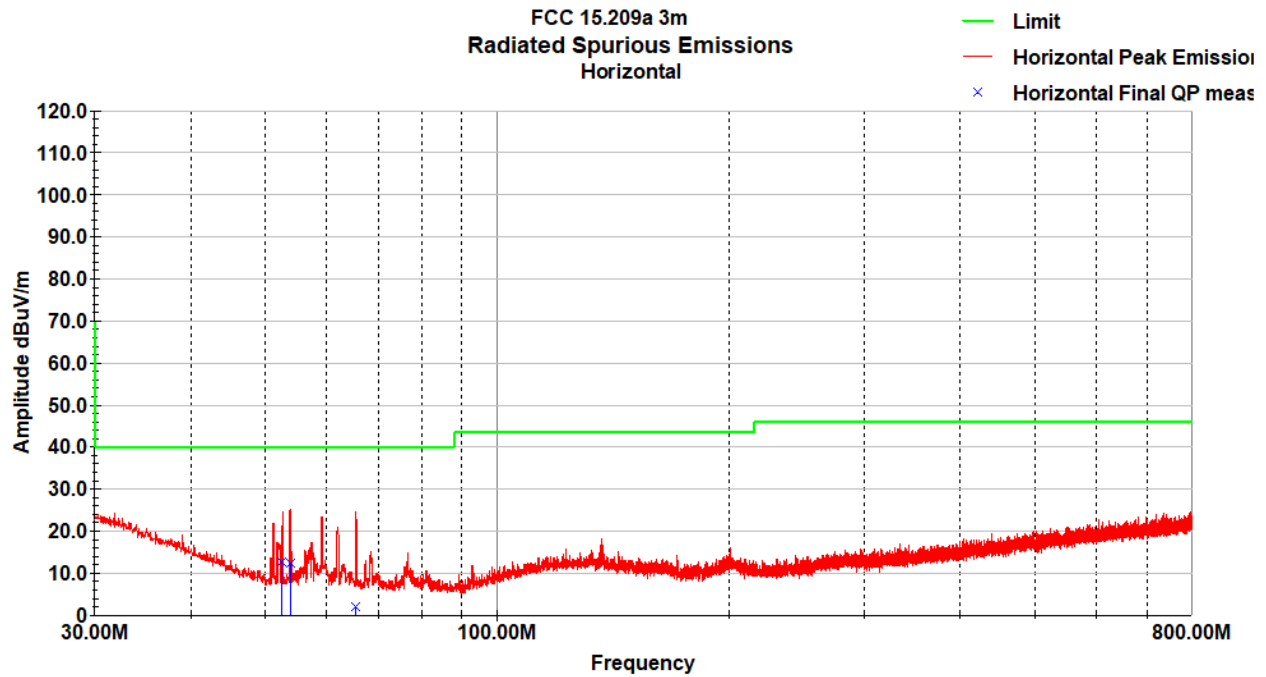
Vertical Radiated Emissions Plot Low Channel – Y Axis



Vertical Radiated Emissions Data Low Channel – Y Axis

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)
39.57	34.2	V	184.0	288.0	14.7	0.6	33.0	16.5	40.0	-23.5
54.30	54.9	V	342.0	212.0	7.6	0.8	33.6	29.6	40.0	-10.4
79.74	44.4	V	345.0	199.0	7.9	0.9	34.0	19.2	40.0	-20.8
QP Value = Level + AF + CL - Amp										
Margin = QP Value - Limit										

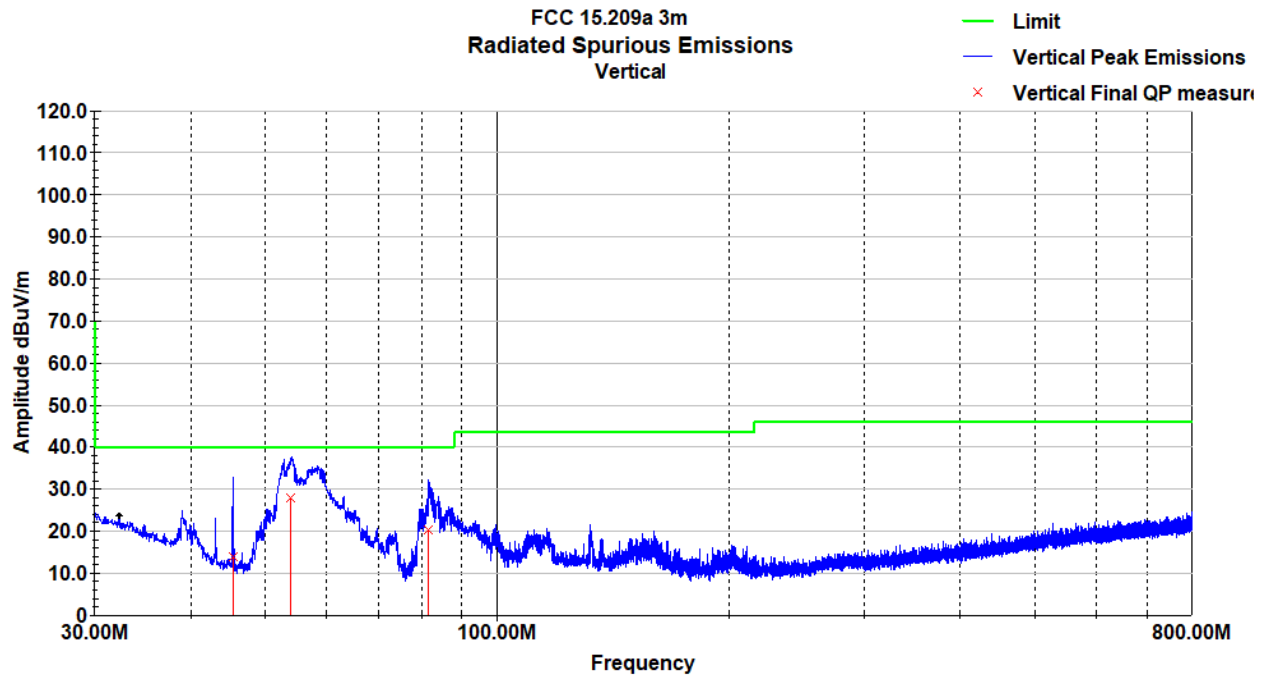
Horizontal Radiated Emissions Plot Low Channel – Z Axis



Horizontal Radiated Emissions Plot Low Channel – Z Axis

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)
52.48	37.3	H	174.0	150.0	8.0	0.8	33.4	12.6	40.0	-27.4
53.87	37.4	H	187.0	150.0	7.6	0.8	33.5	12.3	40.0	-27.7
65.48	27.1	H	193.0	149.0	7.8	0.8	33.8	2.1	40.0	-37.9
QP Value = Level + AF + CL - Amp										
Margin = QP Value - Limit										

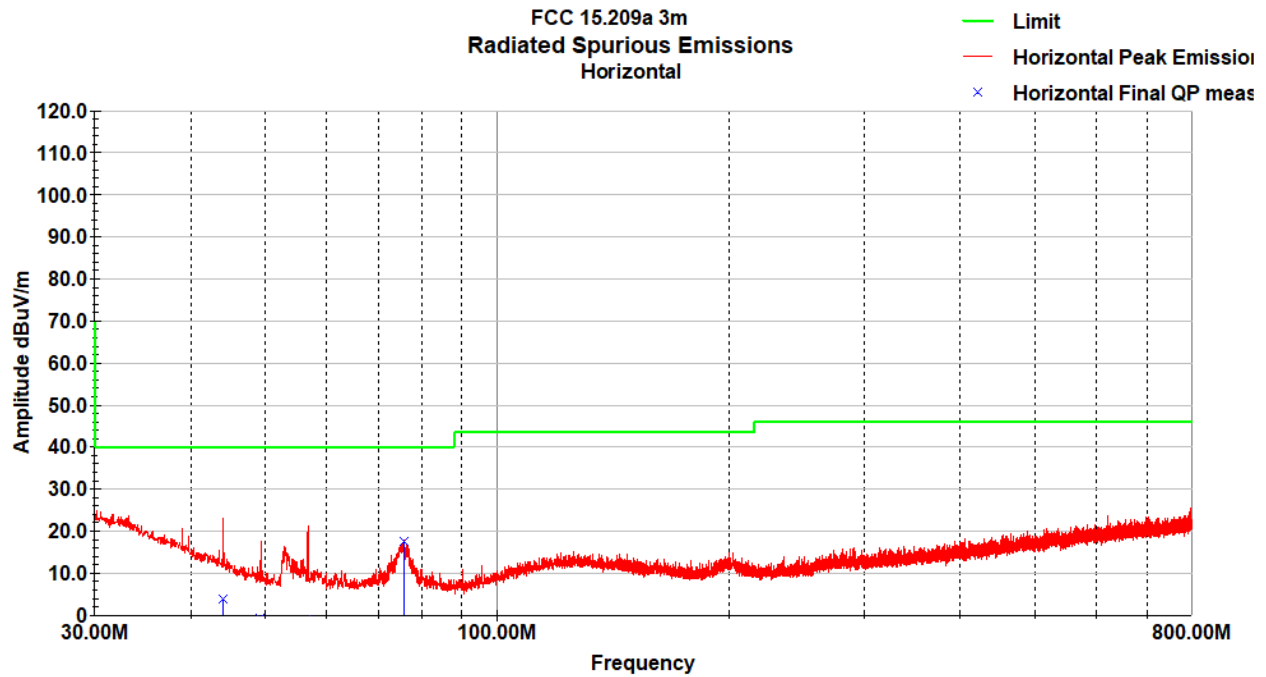
Vertical Radiated Emissions Plot Mid Channel – Y Axis



Vertical Radiated Emissions Data Mid Channel – Y Axis

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)
45.43	35.5	V	329.0	216.0	10.8	0.7	33.0	14.0	40.0	-26.0
54.00	53.2	V	320.0	151.0	7.6	0.8	33.5	28.1	40.0	-11.9
81.34	45.8	V	307.0	154.0	7.8	0.9	34.2	20.4	40.0	-19.6
QP Value = Level + AF + CL - Amp										
Margin = QP Value - Limit										

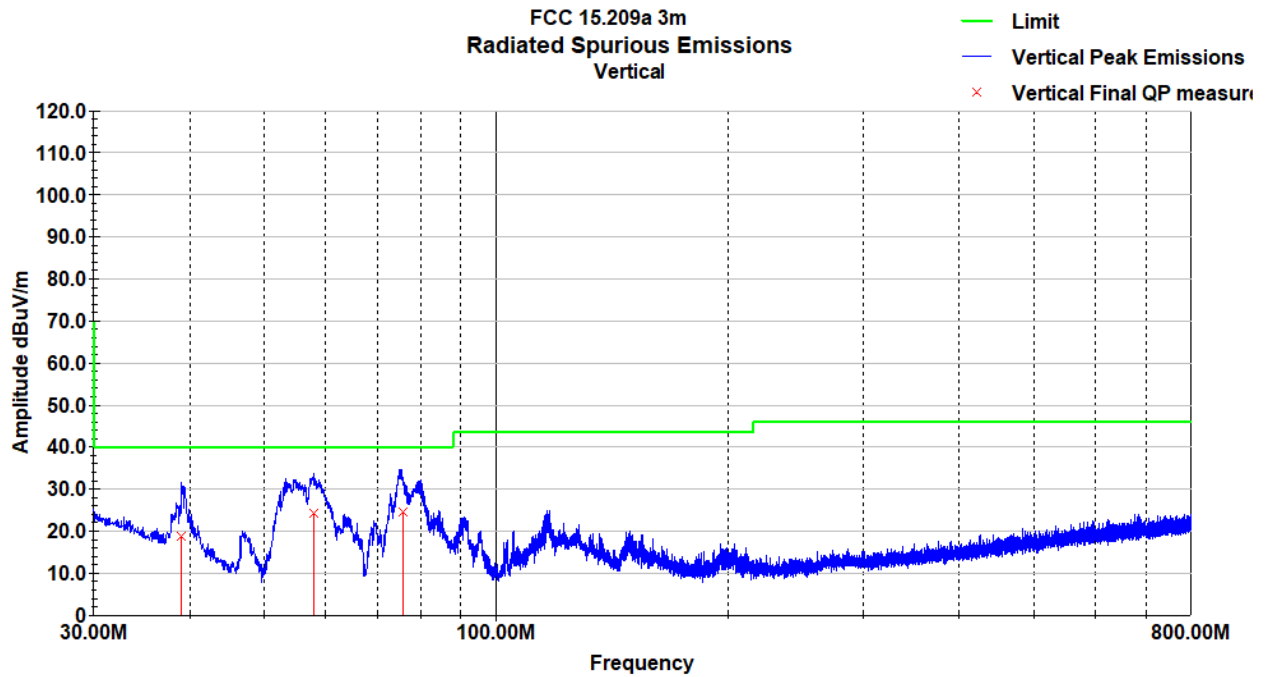
Horizontal Radiated Emissions Plot Mid Channel – Z Axis



Horizontal Radiated Emissions Plot Mid Channel – Z Axis

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)
44.07	24.5	H	197.0	145.0	11.7	0.7	32.8	4.0	40.0	-36.0
75.80	42.5	H	249.0	397.0	8.1	0.9	34.0	17.5	40.0	-22.5
QP Value = Level + AF + CL - Amp										
Margin = QP Value - Limit										

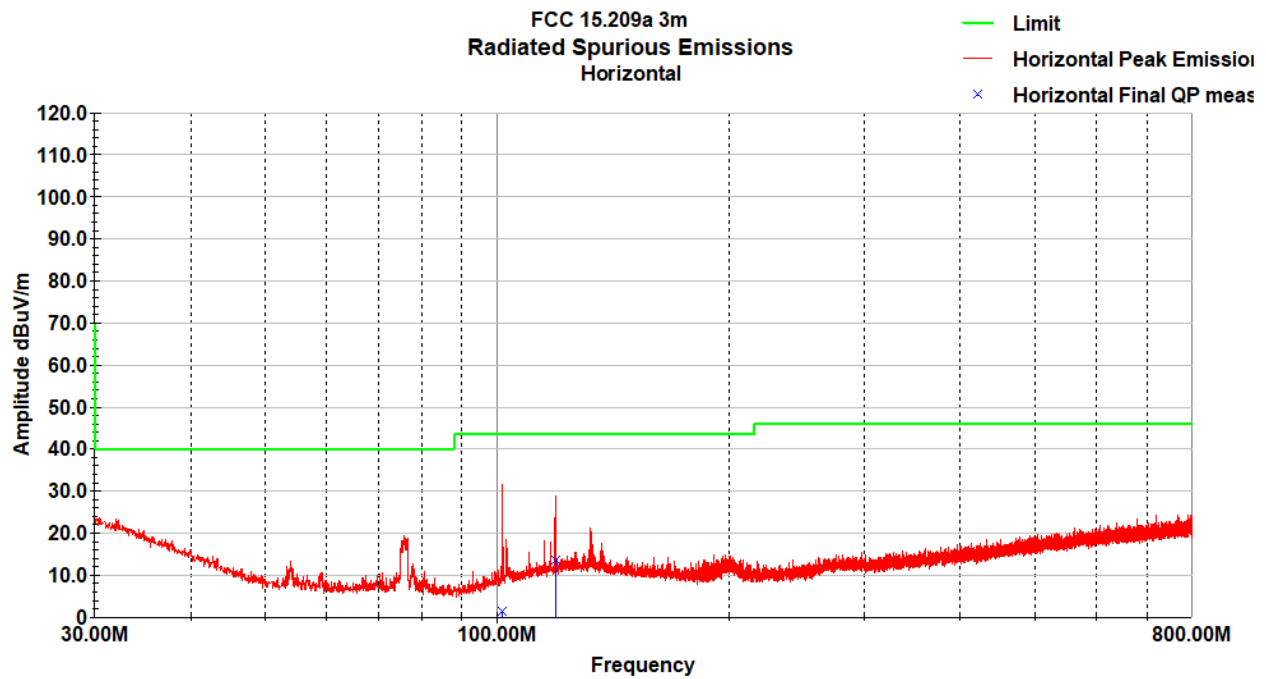
Vertical Radiated Emissions Plot High Channel – Y Axis



Vertical Radiated Emissions Data High Channel – Y Axis

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)
39.02	35.4	V	201.0	194.0	15.1	0.6	32.4	18.8	40.0	-21.2
58.01	49.8	V	205.0	130.0	7.3	0.8	33.6	24.3	40.0	-15.7
75.61	49.5	V	326.0	120.0	8.1	0.9	34.0	24.5	40.0	-15.5
QP Value = Level + AF + CL - Amp										
Margin = QP Value - Limit										

Horizontal Radiated Emissions Plot High Channel – Z Axis

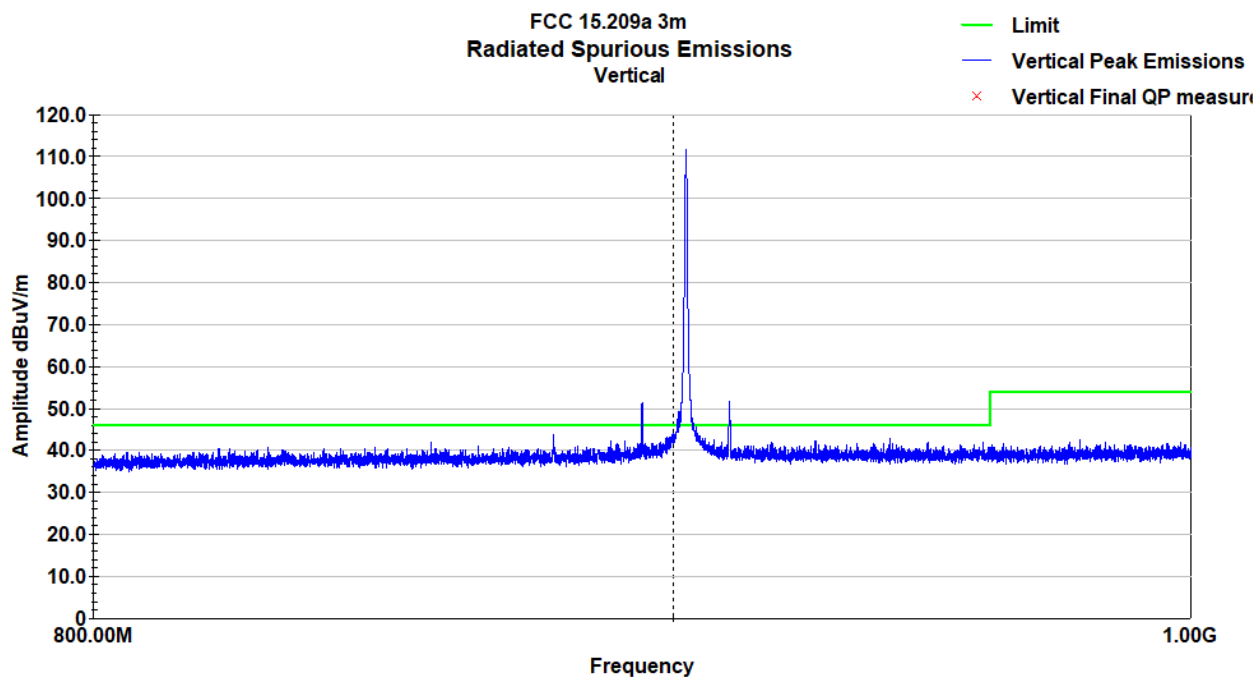


Horizontal Radiated Emissions Plot High Channel – Z Axis

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)
101.48	24.2	H	119.0	336.0	10.6	1.1	34.7	1.3	43.5	-42.2
119.09	33.6	H	68.0	384.0	13.6	1.1	34.7	13.7	43.5	-29.9
QP Value = Level + AF + CL - Amp										
Margin = QP Value - Limit										

5.6.2 800-1000MHz

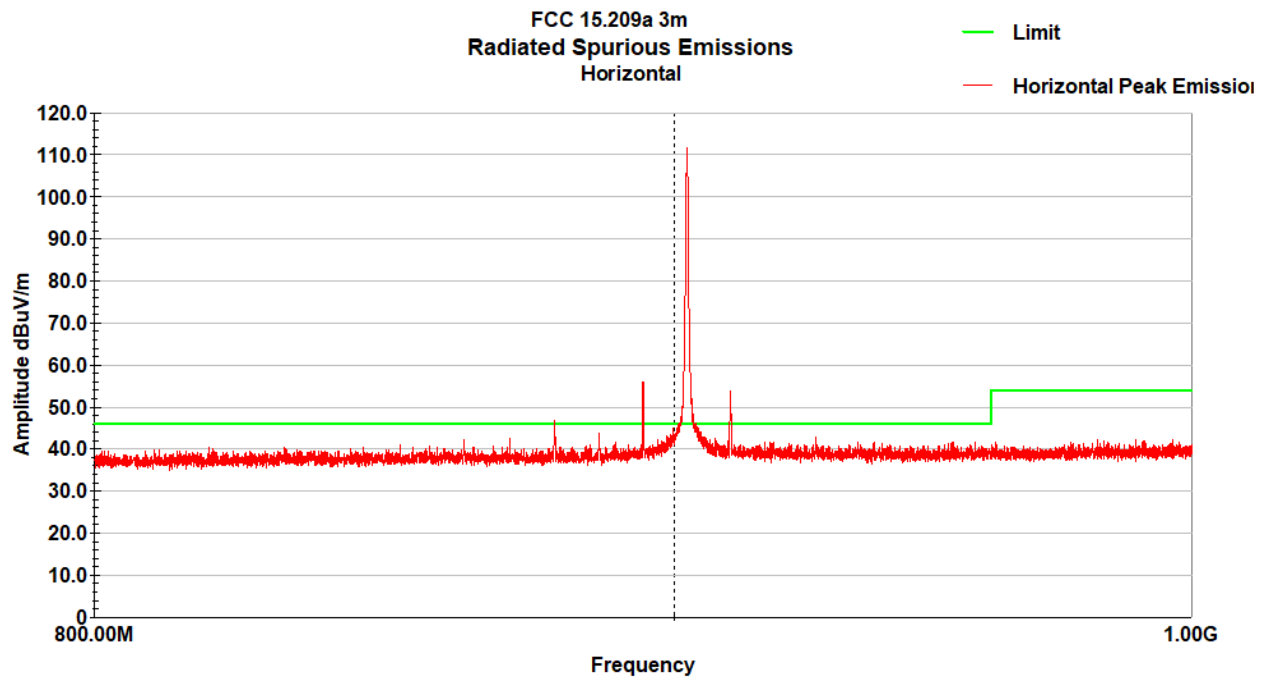
Vertical Radiated Emissions Plot Low Channel – Y Axis



Vertical Radiated Emissions Data Low Channel – Y Axis

Final measurements were not taken because there are no emissions within a restricted band.

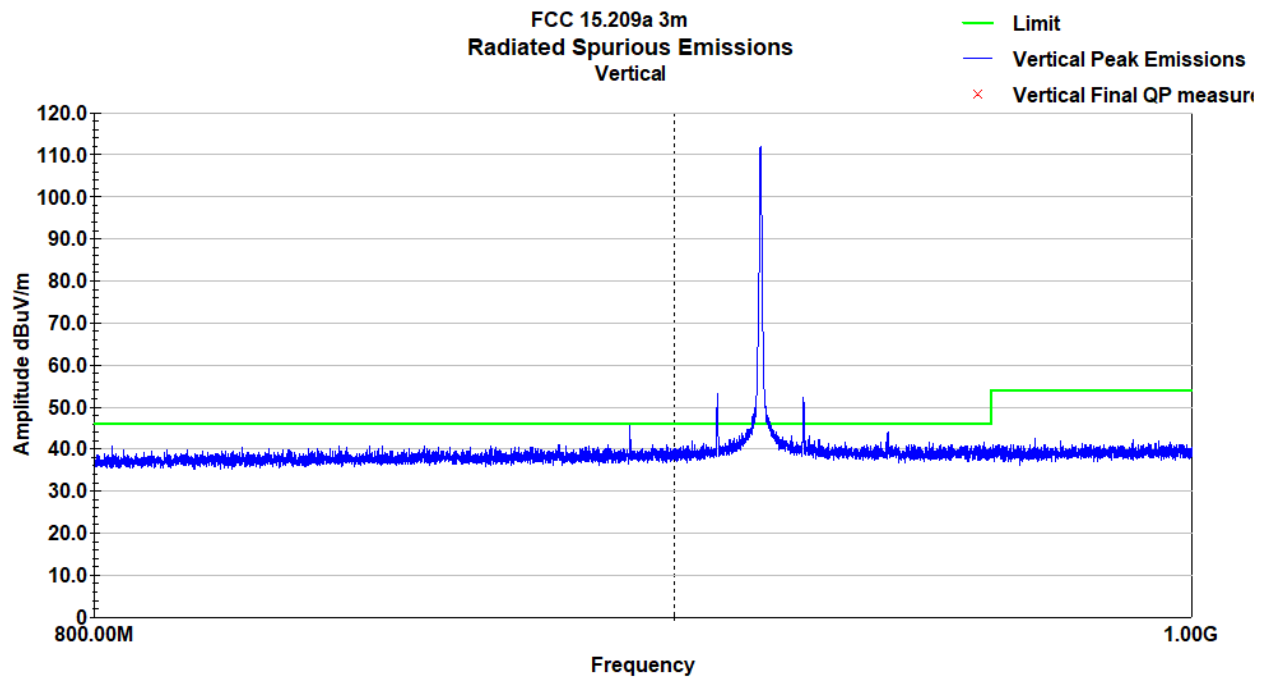
Horizontal Radiated Emissions Plot Low Channel – Z Axis



Horizontal Radiated Emissions Plot Low Channel – Z Axis

Final measurements were not taken because there are no emissions within a restricted band.

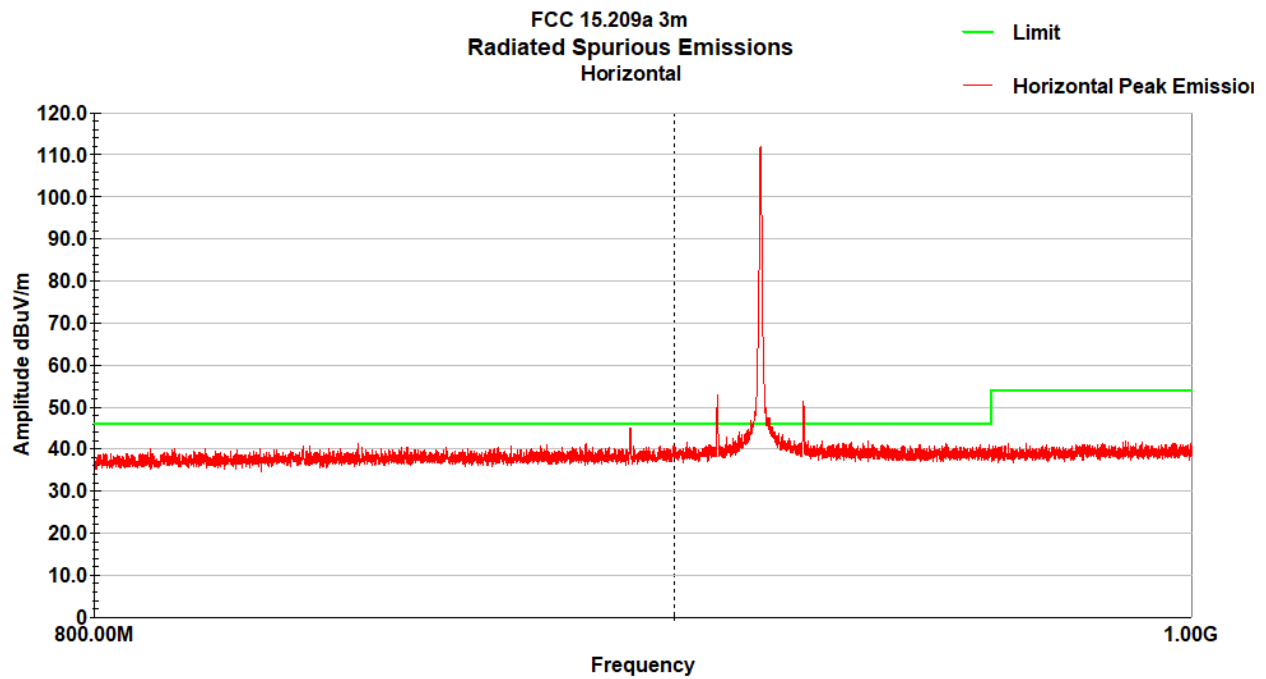
Vertical Radiated Emissions Plot Mid Channel – Y Axis



Vertical Radiated Emissions Data Mid Channel – Y Axis

Final measurements were not taken because there are no emissions within a restricted band.

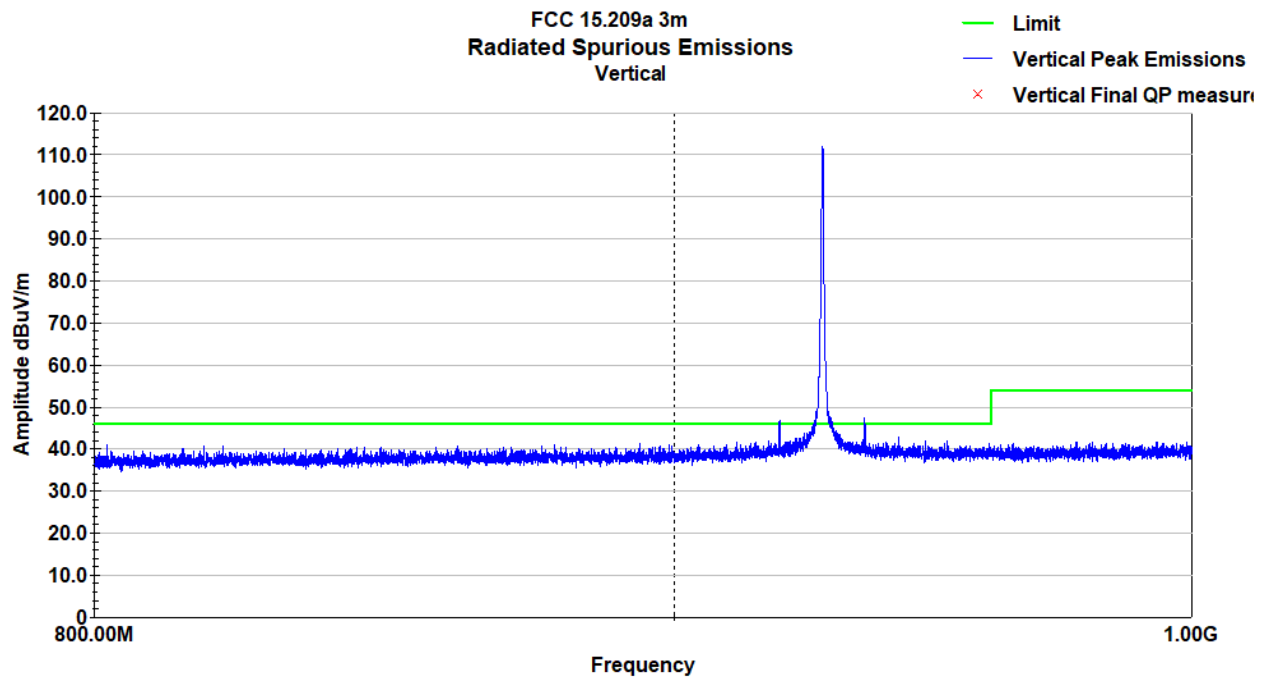
Horizontal Radiated Emissions Plot Mid Channel – Z Axis



Horizontal Radiated Emissions Plot Mid Channel – Z Axis

Final measurements were not taken because there are no emissions within a restricted band.

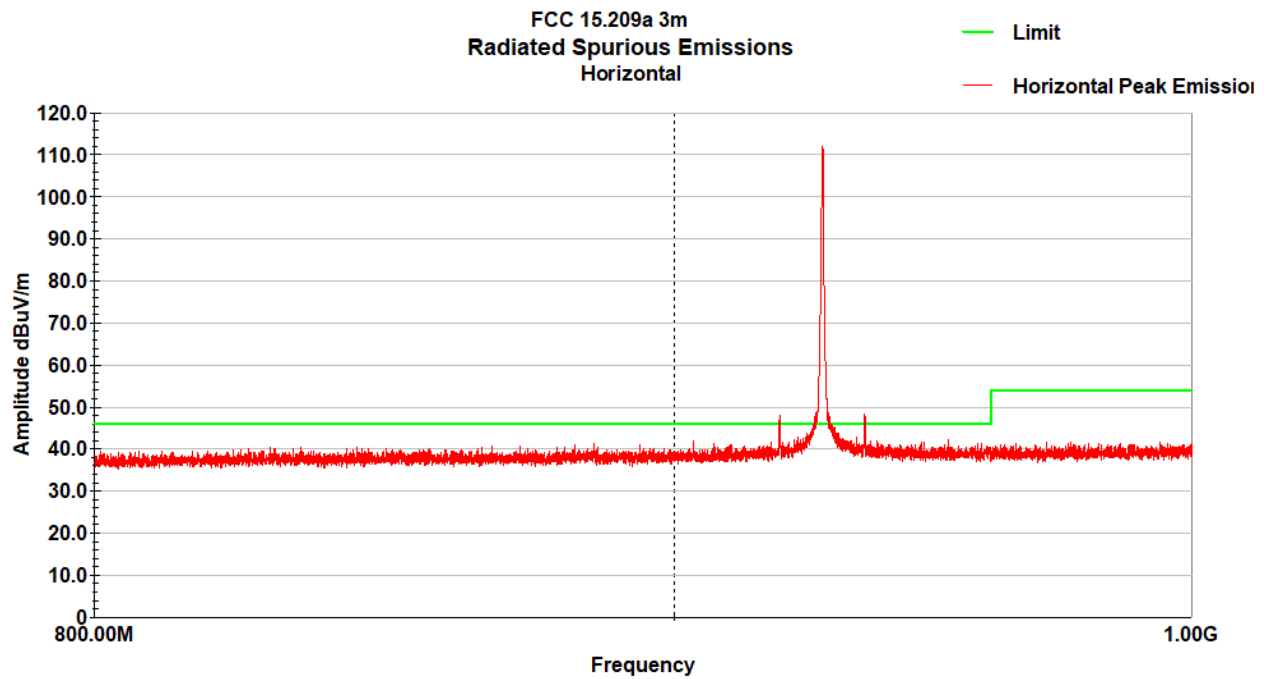
Vertical Radiated Emissions Plot High Channel – Y Axis



Vertical Radiated Emissions Data High Channel – Y Axis

Final measurements were not taken because there are no emissions within a restricted band.

Horizontal Radiated Emissions Plot High Channel – Z Axis

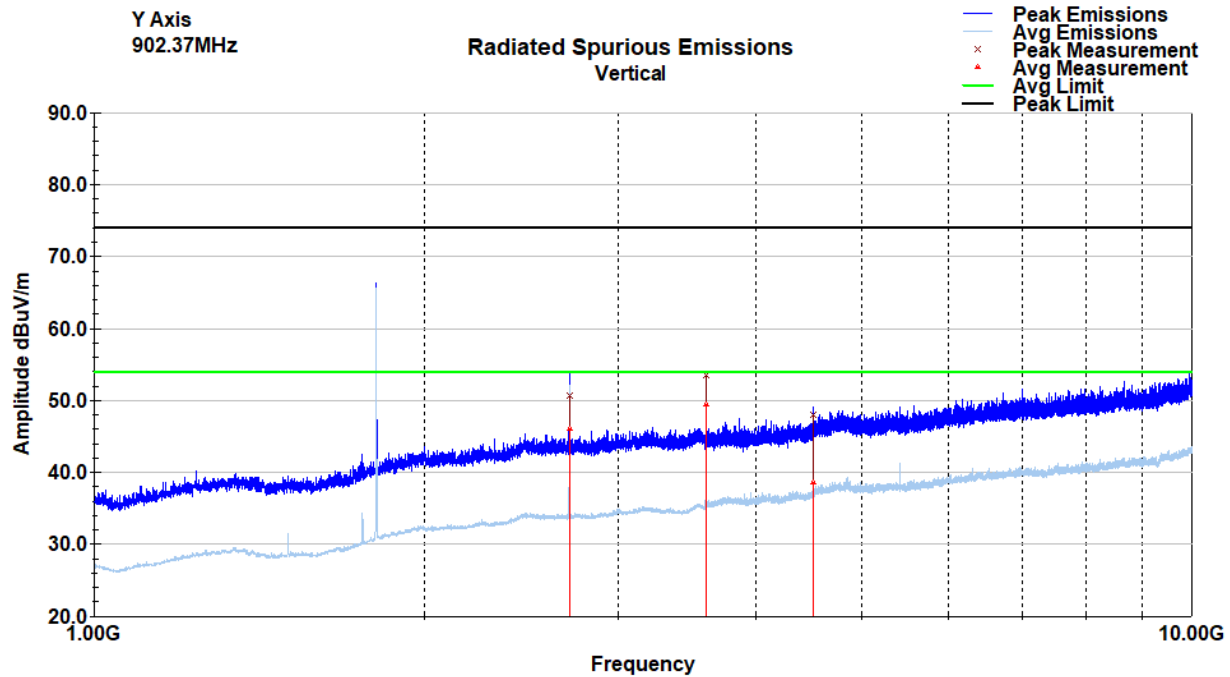


Horizontal Radiated Emissions Plot High Channel – Z Axis

Final measurements were not taken because there are no emissions within a restricted band.

5.6.3 1-10 GHz

Vertical Radiated Emissions Plot Low Channel – Y Axis



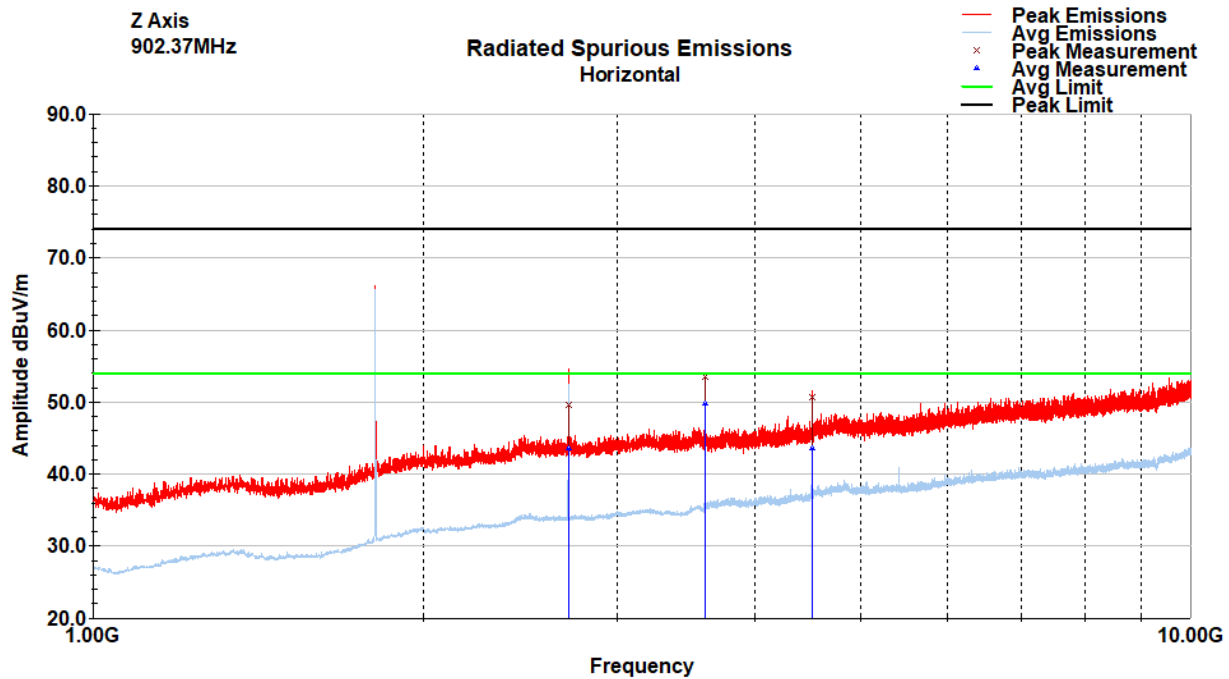
Vertical Radiated Emissions Data Low Channel – Y Axis Average

Frequency MHz	Raw Avg dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	Loss (dB)	Amp (dB)	Final Avg dBuV/m	Limit (dBuV/m)	Margin (dB)
2707.16	45.7	V	44.0	238.0	32.2	2.6	34.4	46.1	54.0	-7.9
3609.44	47.9	V	292.0	152.0	33.0	3.0	34.4	49.5	54.0	-4.5
4512.08	35.4	V	315.0	174.0	34.1	3.4	34.3	38.6	54.0	-15.4
Final Avg = Raw Avg + AF + Loss - Amp										
Margin = Final Avg - Limit										

Peak

Frequency MHz	Raw Pk dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	Loss (dB)	Amp (dB)	Final Pk dBuV/m	Limit dBuV/m	Margin dB
2707.16	50.3	V	44.0	238.0	32.2	2.6	34.4	50.7	74.0	-23.3
3609.44	52.0	V	292.0	152.0	33.0	3.0	34.4	53.6	74.0	-20.4
4512.08	44.8	V	315.0	174.0	34.1	3.4	34.3	48.0	74.0	-26.0
Final Pk = Raw Pk + AF + Loss - Amp										
Margin = Final Pk - Limit										

Horizontal Radiated Emissions Plot Low Channel – Z Axis



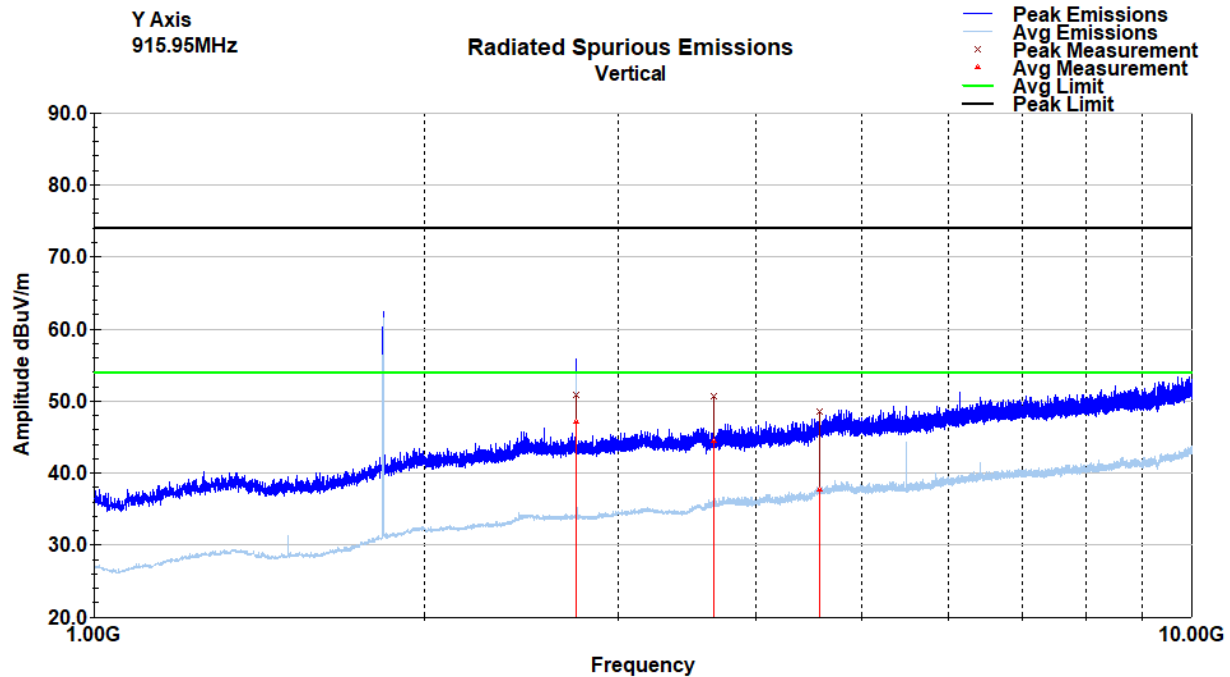
Horizontal Radiated Emissions Plot Low Channel – Z Axis Average

Frequency MHz	Raw Avg dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	Loss (dB)	Amp (dB)	Avg Value dBuV/m	Limit (dBuV/m)	Margin (dB)
2706.92	43.3	H	252.0	178.0	32.2	2.6	34.4	43.6	54.0	-10.3
3609.68	48.2	H	15.0	169.0	33.0	3.0	34.4	49.8	54.0	-4.2
4512.20	40.3	H	260.0	191.0	34.1	3.4	34.3	43.5	54.0	-10.5
Final Avg = Raw Avg + AF + Loss - Amp										
Margin = Final Avg - Limit										

Peak

Frequency MHz	Raw Pk dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	Loss (dB)	Amp (dB)	Final Pk dBuV/m	Limit dBuV/m	Margin dB
2706.92	49.3	H	252.0	178.0	32.2	2.6	34.4	49.7	74.0	-24.3
3609.68	52.0	H	15.0	169.0	33.0	3.0	34.4	53.5	74.0	-20.5
4512.20	47.5	H	260.0	191.0	34.1	3.4	34.3	50.7	74.0	-23.3
Final Pk = Raw Pk + AF + Loss - Amp										
Margin = Final Pk - Limit										

Vertical Radiated Emissions Plot Mid Channel – Y Axis



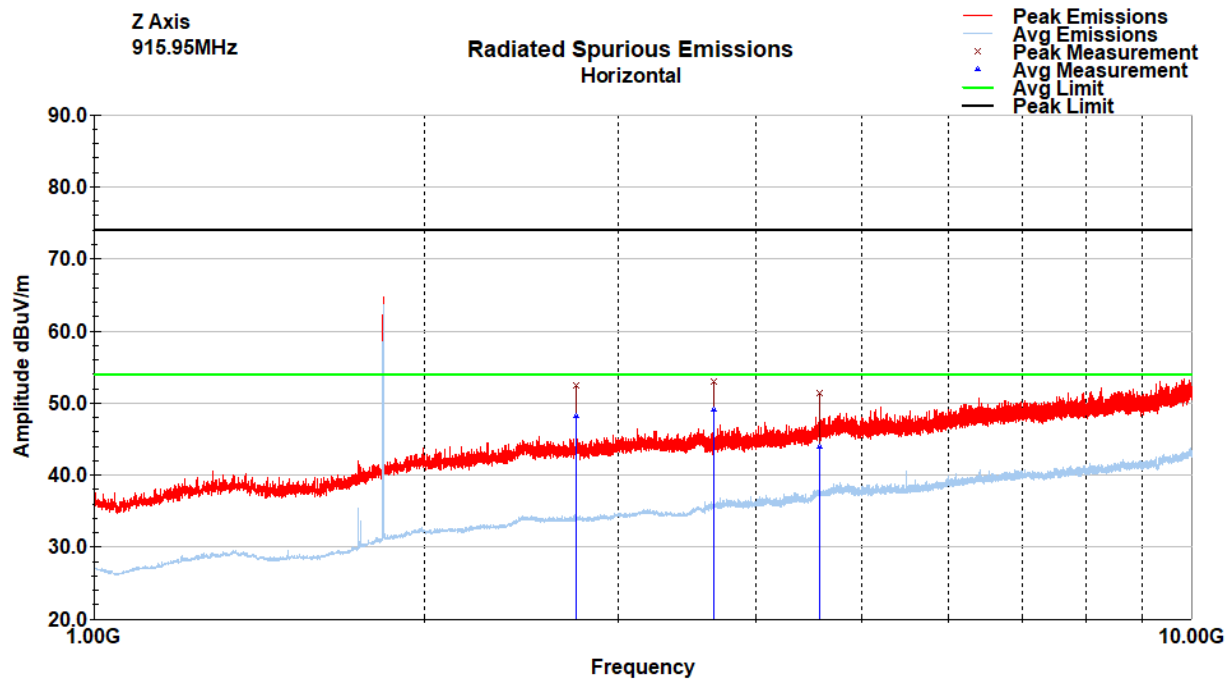
Vertical Radiated Emissions Data Mid Channel – Y Axis Average

Frequency MHz	Raw Avg dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	Loss (dB)	Amp (dB)	Final Avg dBuV/m	Limit (dBuV/m)	Margin (dB)
2747.88	46.6	V	250.0	249.0	32.2	2.6	34.3	47.1	54.0	-6.9
3663.64	42.7	V	25.0	250.0	33.1	3.1	34.3	44.5	54.0	-9.5
4579.44	34.3	V	334.0	103.0	34.4	3.4	34.3	37.8	54.0	-16.2
Final Avg = Raw Avg + AF + Loss - Amp										
Margin = Final Avg - Limit										

Peak

Frequency MHz	Raw Pk dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	Loss (dB)	Amp (dB)	Final Pk dBuV/m	Limit dBuV/m	Margin dB
2747.88	50.4	V	250.0	249.0	32.2	2.6	34.3	50.9	74.0	-23.1
3663.64	48.8	V	25.0	250.0	33.1	3.1	34.3	50.6	74.0	-23.4
4579.44	45.0	V	334.0	103.0	34.4	3.4	34.3	48.5	74.0	-25.5
Final Pk = Raw Pk + AF + Loss - Amp										
Margin = Final Pk - Limit										

Horizontal Radiated Emissions Plot Mid Channel – Z Axis



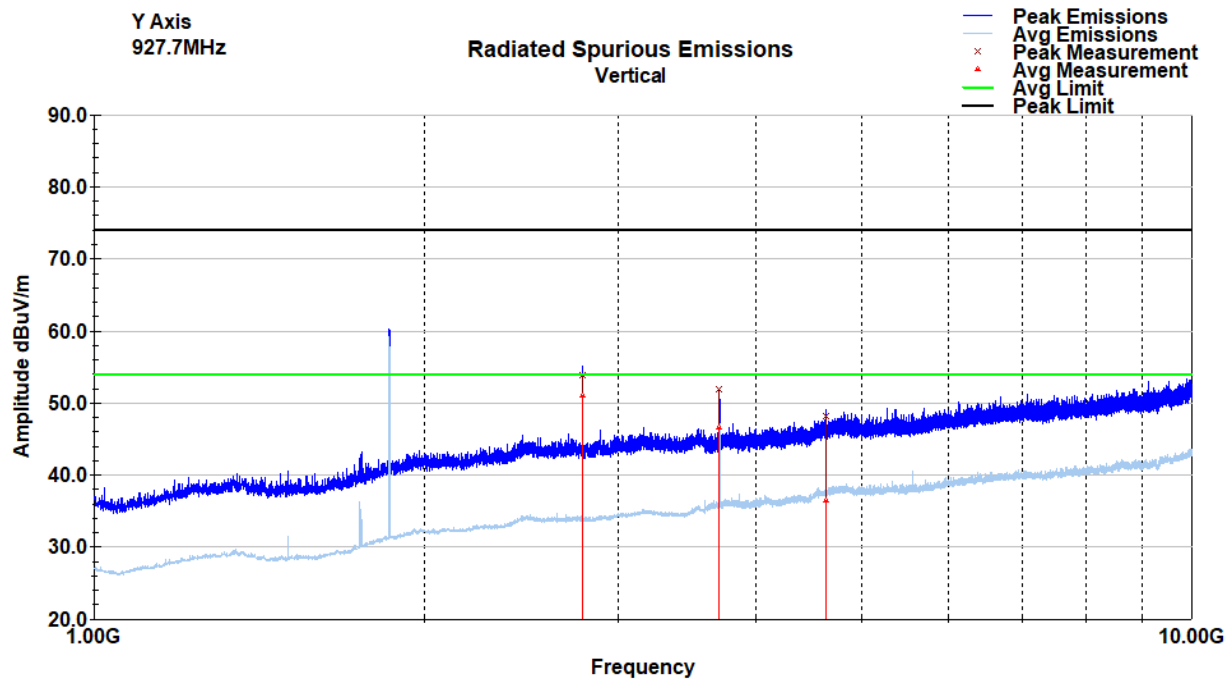
Horizontal Radiated Emissions Plot Mid Channel – Z Axis Average

Frequency MHz	Raw Avg dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	Loss (dB)	Amp (dB)	Avg Value dBuV/m	Limit (dBuV/m)	Margin (dB)
2748.12	47.6	H	201.0	228.0	32.2	2.6	34.3	48.1	54.0	-5.8
3664.12	47.3	H	119.0	196.0	33.1	3.1	34.3	49.1	54.0	-4.9
4580.04	40.5	H	243.0	186.0	34.4	3.4	34.3	44.0	54.0	-10.0
Final Avg = Raw Avg + AF + Loss - Amp										
Margin = Final Avg - Limit										

Peak

Frequency MHz	Raw Pk dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	Loss (dB)	Amp (dB)	Final Pk dBuV/m	Limit dBuV/m	Margin dB
2748.12	51.9	H	201.0	228.0	32.2	2.6	34.3	52.5	74.0	-21.5
3664.12	51.1	H	119.0	196.0	33.1	3.1	34.3	52.9	74.0	-21.1
4580.04	47.9	H	243.0	186.0	34.4	3.4	34.3	51.4	74.0	-22.6
Final Pk = Raw Pk + AF + Loss - Amp										
Margin = Final Pk - Limit										

Vertical Radiated Emissions Plot High Channel – Y Axis



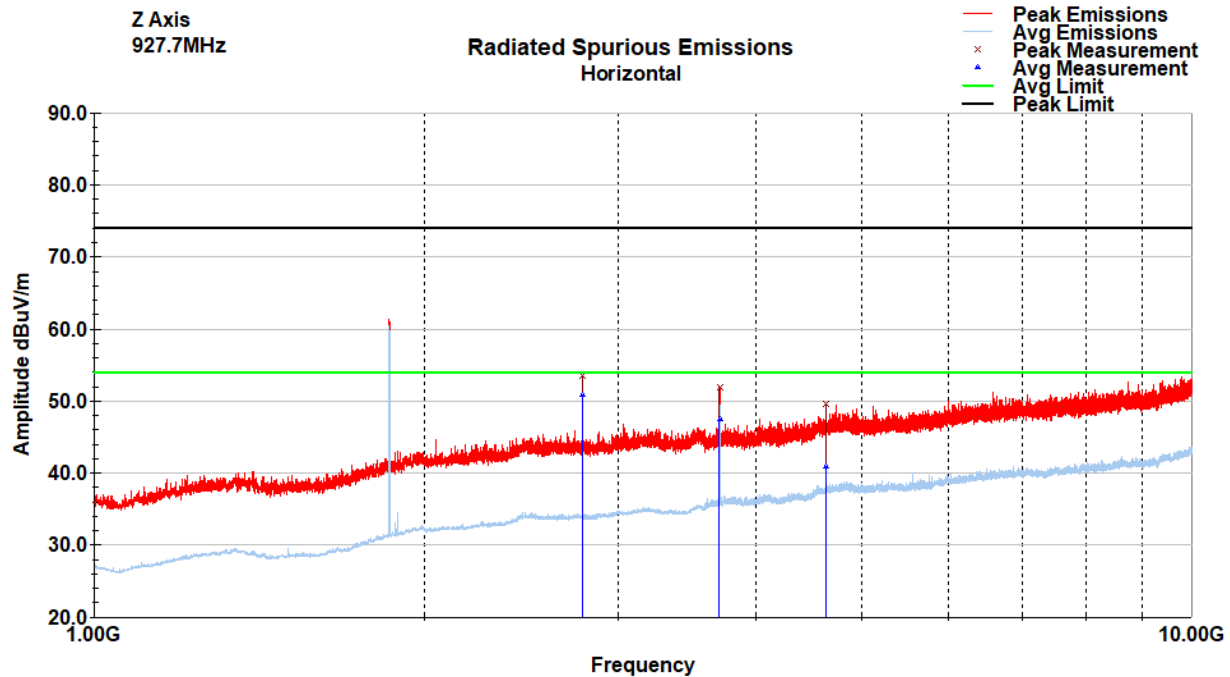
Vertical Radiated Emissions Data High Channel – Y Axis Average

Frequency MHz	Raw Avg dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	Loss (dB)	Amp (dB)	Final Avg dBuV/m	Limit (dBuV/m)	Margin (dB)
2782.92	50.4	V	226.0	109.0	32.3	2.6	34.4	51.0	54.0	-3.0
3710.16	44.7	V	299.0	170.0	33.2	3.1	34.4	46.6	54.0	-7.4
4636.92	32.9	V	145.0	207.0	34.5	3.4	34.3	36.6	54.0	-17.4
Final Avg = Raw Avg + AF + Loss - Amp										
Margin = Final Avg - Limit										

Peak

Frequency MHz	Raw Pk dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	Loss (dB)	Amp (dB)	Final Pk dBuV/m	Limit dBuV/m	Margin dB
2782.92	53.2	V	226.0	109.0	32.3	2.6	34.4	53.8	74.0	-20.2
3710.16	50.1	V	299.0	170.0	33.2	3.1	34.4	52.0	74.0	-22.0
4636.92	44.6	V	145.0	207.0	34.5	3.4	34.3	48.2	74.0	-25.8
Final Pk = Raw Pk + AF + Loss - Amp										
Margin = Final Pk - Limit										

Horizontal Radiated Emissions Plot High Channel – Z Axis



Horizontal Radiated Emissions Plot High Channel – Z Axis

Average

Frequency MHz	Raw Avg dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	Loss (dB)	Amp (dB)	Avg Value dBuV/m	Limit (dBuV/m)	Margin (dB)
2782.68	50.2	H	193.0	187.0	32.3	2.6	34.4	50.8	54.0	-3.2
3710.28	45.5	H	114.0	213.0	33.2	3.1	34.4	47.4	54.0	-6.6
4638.36	37.2	H	211.0	184.0	34.5	3.4	34.3	40.9	54.0	-13.1
Final Avg = Raw Avg + AF + Loss - Amp										
Margin = Final Avg - Limit										

Peak

Frequency MHz	Raw Pk dBuV	Polarity (V/H)	Azimuth (degrees)	Height (cm)	AF (dB/m)	Loss (dB)	Amp (dB)	Final Pk dBuV/m	Limit dBuV/m	Margin dB
2782.68	53.0	H	193.0	187.0	32.3	2.6	34.4	53.5	74.0	-20.5
3710.28	50.0	H	114.0	213.0	33.2	3.1	34.4	51.9	74.0	-22.1
4638.36	46.0	H	211.0	184.0	34.5	3.4	34.3	49.6	74.0	-24.4
Final Pk = Raw Pk + AF + Loss - Amp										
Margin = Final Pk - Limit										

6 AC Powerline Conducted Emissions

6.1 Test Result

Test Description	Test Specification		Test Result
Conducted Emissions	15.107 / 15.207	RSS-GEN 8.8	Compliant

6.2 Test Method

With the receiver's resolution bandwidth was set to 9 kHz, exploratory scans were performed over the measuring frequency range (0.15 MHz to 30 MHz) 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	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

6.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions:

Temperature: 27.4°C

Relative Humidity: 50.3%

Atmospheric Pressure 98.19kpa

6.4 Test Equipment

Test End Date: 7-May-2019

Tester: PL

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
LINE IMPEDANCE STABILIZATION NETWORK	NNB 51	TESEQ	B087573	3-Dec-2019
RF CABLE	UC-N-MM-78	MAURY MICROWAVE	17017	24-Jul-2019
EMI TEST RECEIVER	ESU40	ROHDE & SCHWARZ	B079629	2-Jul-2019

Notes:

The calibration period equipment is 1 year.

CNR – Calibration Not Required

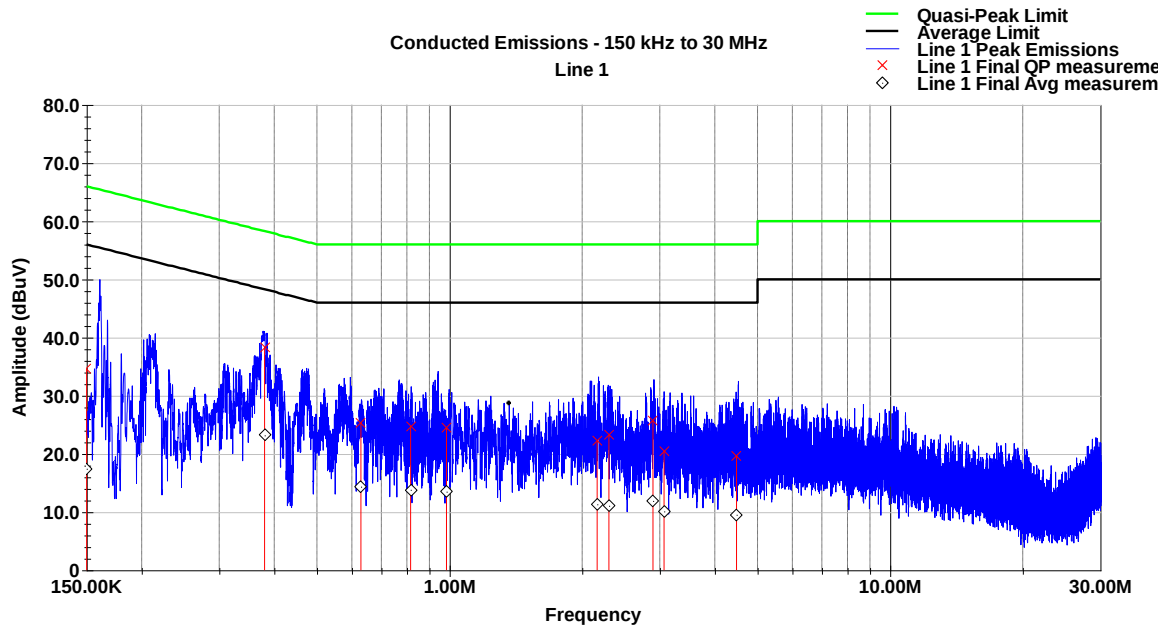
Software: "181112 Conducted Emissions Tile7" TILE! profile dated 12 Nov 2018

6.5 Test Setup Photographs

Test setup are in a separate exhibit.

6.6 Test Data

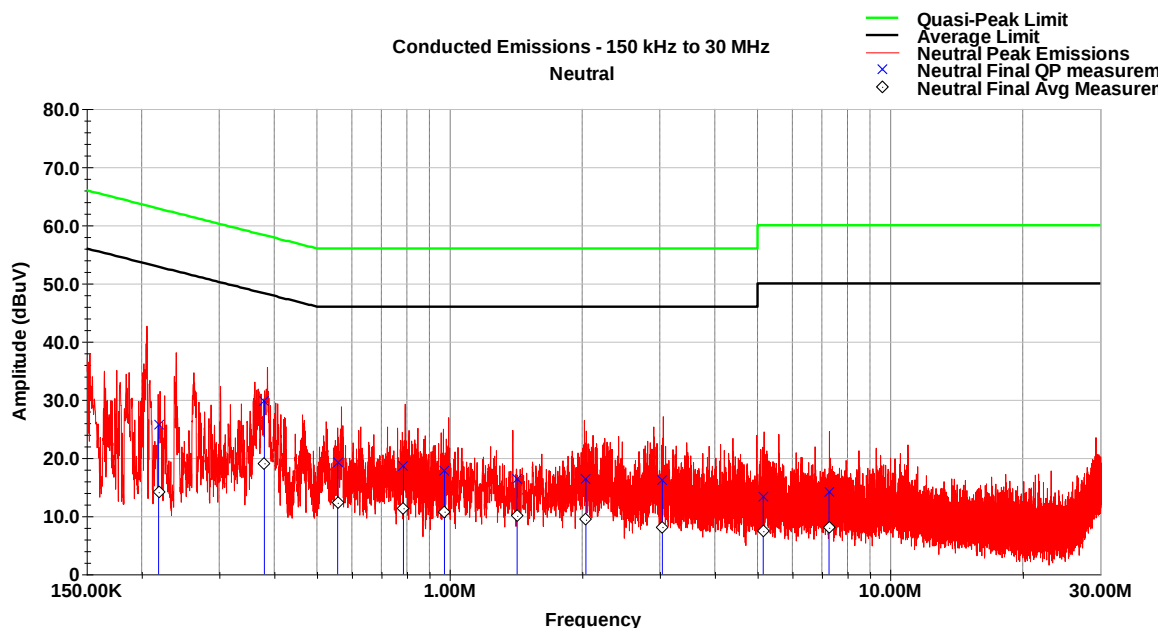
Line 1 Conducted Emissions Plot



Line 1 Conducted Emissions Data

Frequency MHz	QP Value dBuV	QP Limit dBuV	QP Margin dB	Avg Value dBuV	Avg Limit dBuV	Avg Margin dB
0.150	34.5	66.0	-31.5	17.4	56.0	-38.6
0.380	38.4	58.3	-19.9	23.2	48.3	-25.1
0.629	25.4	56.0	-30.6	14.4	46.0	-31.6
0.816	24.8	56.0	-31.2	13.8	46.0	-32.2
0.984	24.4	56.0	-31.6	13.5	46.0	-32.5
2.162	22.3	56.0	-33.7	11.3	46.0	-34.7
2.300	23.2	56.0	-32.8	11.1	46.0	-34.9
2.896	25.7	56.0	-30.3	11.9	46.0	-34.1
3.068	20.5	56.0	-35.5	10.1	46.0	-35.9
4.480	19.6	56.0	-36.4	9.5	46.0	-36.5

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
0.218	25.7	62.9	-37.2	14.1	52.9	-38.7
0.380	29.8	58.3	-28.5	19.1	48.3	-29.2
0.557	19.1	56.0	-36.9	12.3	46.0	-33.7
0.786	18.6	56.0	-37.4	11.4	46.0	-34.6
0.974	17.8	56.0	-38.2	10.8	46.0	-35.2
1.423	16.3	56.0	-39.7	10.0	46.0	-36.0
2.039	16.4	56.0	-39.6	9.4	46.0	-36.6
3.041	16.1	56.0	-39.9	8.1	46.0	-37.9
5.150	13.3	60.0	-46.7	7.4	50.0	-42.6
7.268	14.1	60.0	-45.9	8.0	50.0	-42.0

7 Revision History

Revision Level	Description of changes	Revision Date
0	Initial release	23 April 2019
1	Updated RSE with data for client adjusted MNIC boards. Removed Test Setup Pictures Updated Block Diagram and System Configuration Added Peak Output Power section Changed client information to match grant	26 June 2019
2	Updated model number throughout report. Section 1 – Test Summary table updated Section 4.1 – References updated for FHSS device Section 6.1 – Updated Results to include RSS GEN ref. Section 6.2 – Updated test method Section 7 – Updated test method for Intentional Radiators (removed Class A/B references). Updated data to reflect the correct limit. Updated regulatory references.	26 July 2019