

RF Test Report

Project Number: 4494805**Quotation Number:** 02212019TH-1.3**Report Number:** 4494805EMC02**Revision Level:** 3**Client:** Lifeline Systems Inc**Equipment Under Test:** Medical Alert System**Model Name:** Wireless Communicator**Model Number:** 7200C**FCC ID:** BDZ7200C**IC:** 655C-7200C**Applicable Standards:** FCC Part 15 Subpart C, § 15.249

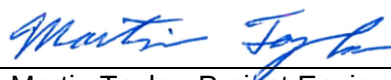
RSS-210, Issue 10, December 2019 (Annex F)

RSS-GEN, Issue 5, March 2019 Amendment 1

ANSI C63.10: 2013

Report issued on: 20 January 2020**Test Result:** Compliant

Tested by:



Martin Taylor, Project 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
Field Strength of Fundamental	15.249(a), RSS-210 F.1(a)	Compliant
Field Strength of Spurious Radiation	15.249(a)(d) and 15.209 RSS-210 F.1(a)(b)(e)	Compliant
Fixed, Point-to-Point	15.249(b)	Not Applicable
20 dB Bandwidth	15.215(c)	Reported
99% Occupied Bandwidth	RSS-GEN 6.7	Reported
AC Powerline Conducted Emissions	15.107, 15.207, RSS-GEN 8.8	Compliant

1.1 Modifications Required for Compliance

None

2 General Information

2.1 Client Information

Name: Lifeline Systems Inc
Address: 111 Lawrence Street
City, State, Zip, Country: Framingham, MA 01702 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

Equipment Under Test: Medical Alert System
Model Name: Wireless Communicator
Model Number: 7200C
Serial Number: 9040234871, 9040234870
IMEI Number: 356935081116433, 356935081109347
FCC ID: BDZ7200C
IC: 655C-7200C

Tx Frequency Range: 917 – 921 MHz (ISM Band)
Antenna Type: Two Internal PCB Antennas (selectable)
Type: Pre-Production

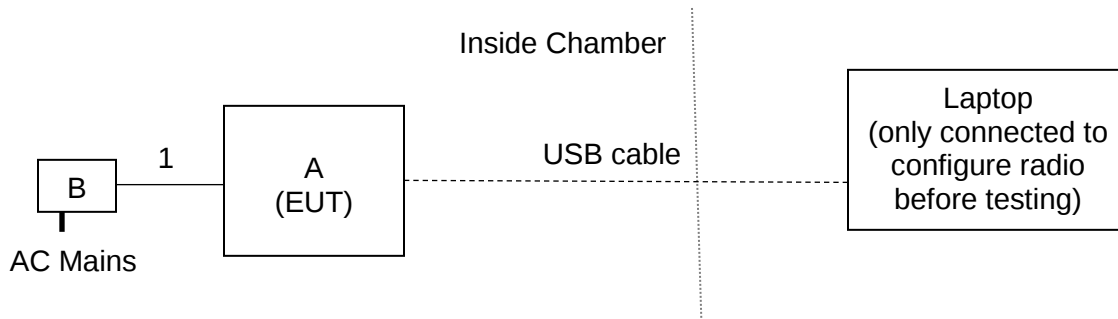
Rated Voltage: 100-240Vac, 50/60Hz
Test Voltage: 120Vac, 60Hz

Sample Received Date: 08 July 2019
Dates of testing: 09-10 July and 15 August 2019

2.4 Operating Modes and Conditions

The EUT had an internal battery pack installed and was connected to the AC Mains using the supplied AC/DC wall adapter. The EUT was running test mode software which allowed it to be commanded to turn on a continuous transmit signal at maximum power at different channels in the 900 MHz ISM Band. The EUT only used channels with center frequencies ranging from 917 to 921 MHz.

2.5 EUT Connection Block Diagram



2.6 System Configurations

Device Reference	Manufacturer	Description	Model Number	Serial Number
A	Lifeline Systems Inc	Wireless Communicator (EUT)	7200C	9040234871 9040234870
B	Lifeline Systems Inc	AC/DC Adapter	MANGO018-12B-USA2	Not labeled

2.7 Cable List

Cable reference	Port Name	Start	End	Cable Length (m)	Ferrite installed?	Shielded?
1	DC Power	AC/DC Adapter	Wireless Communicator	3.5	No	No

3 Field Strength of Fundamental

3.1 Test Result

Test Description	Test Specification	Test Result
Field Strength of Fundamental	15.249(a) RSS-210 F.1(a)	Compliant

3.2 Test Method

The test data was measured using a Quasi-Peak detector below 1GHz and a Peak detector above 1GHz. The receiver's 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.

Used	Fundamental Frequency	QP / Average Limits			Peak Limits dBuV/m
		Millivolts/meter	Microvolts/m	dBuV/m	
Yes	902 - 928 MHz	50	50000	94 ⁽¹⁾	--
No	2400 - 2483.5 MHz	50	50000	94 ⁽²⁾	114
No	5725 - 5875 MHz	50	50000	94 ⁽²⁾	114
No	24 - 24.25 GHz	250	250000	108 ⁽²⁾	128

(1) Quasi-peak limit

(2) Average limit

3.3 Test Site

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

Environmental Conditions

Temperature: 23.6 °C

Relative Humidity: 46.7 %

Atmospheric Pressure: 97.9 kPa

3.4 Test Equipment

Test End Date: 10-Jul-2019

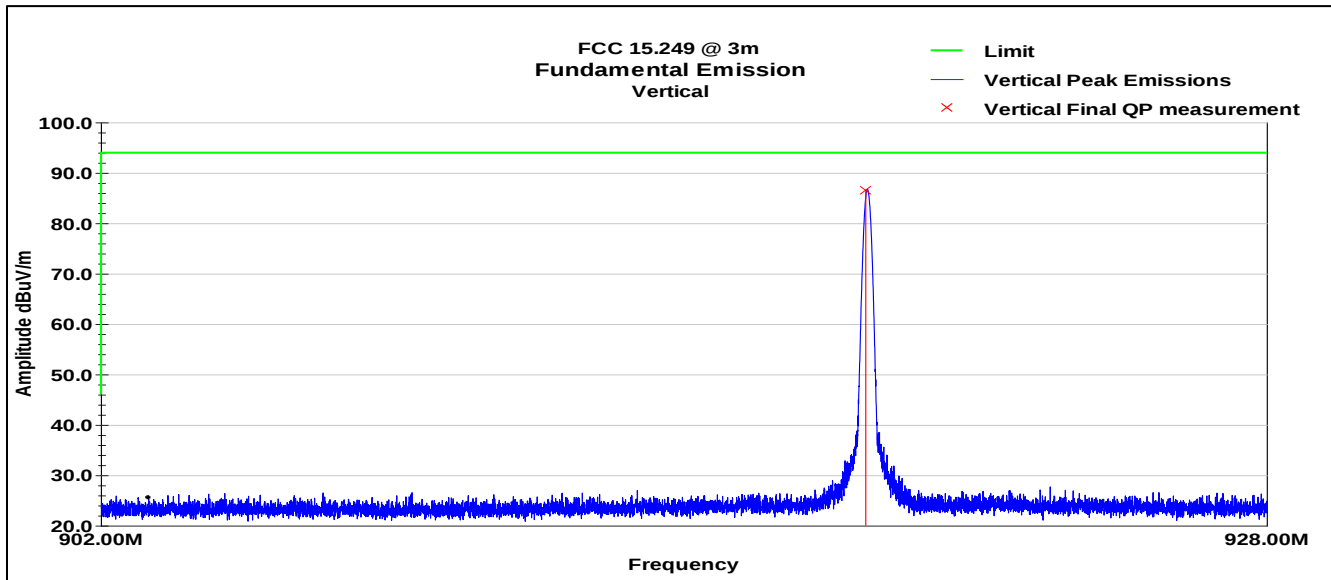
Tester: MT

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
ANTENNA, BILOG	JB6	SUNOL	B079689	30-Oct-2019
RF CABLE	SF106	HUBER & SUHNER	B079661	30-Sep-2019
RF CABLE	NFS-290-78.7-NFS	FLORIDA RF LABS	B095019	30-Sep-2019
RF CABLE	LMR-240	TIMES MICROWAVE SYSTEMS	B092136	30-Sep-2019
RF CABLE	SUCOFLEX 100	HUBER & SUHNER	B108523	30-Sep-2019
LOW NOISE AMPLIFIER	TS-PR18	ROHDE & SCHWARZ	15003	24-Jan-2020
EMI TEST RECEIVER	ESU40	ROHDE & SCHWARZ	B079629	15-Aug-2019

Note: The equipment calibration period is 1 year.

3.5 Test Data

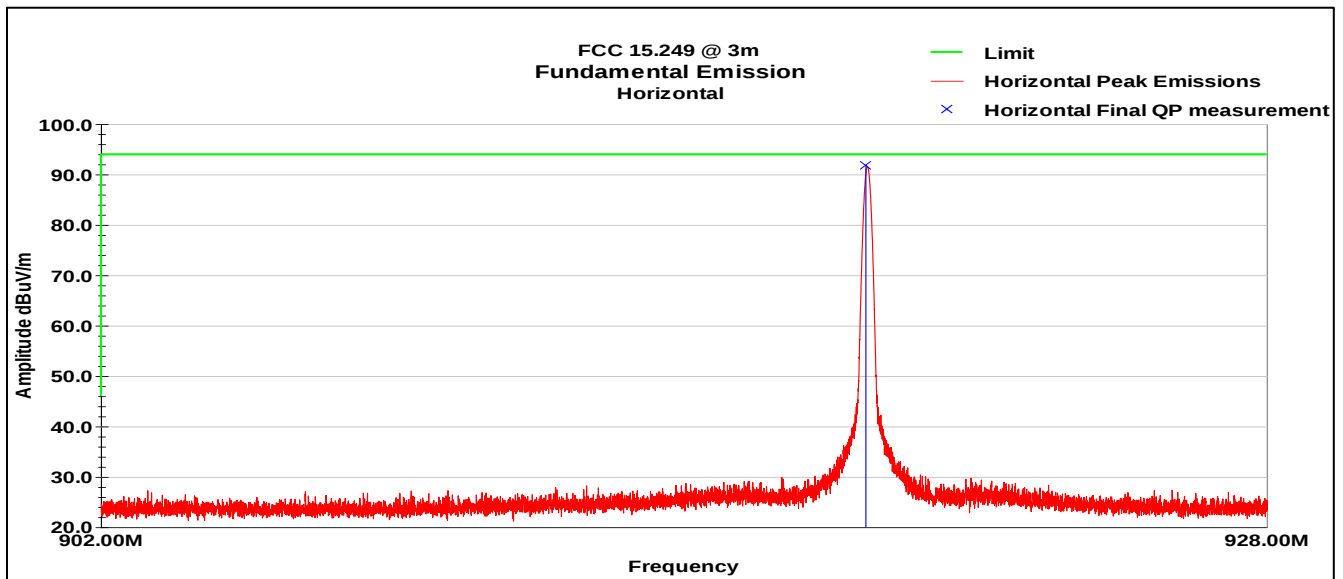
Vertical Plot



Vertical 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)
918.98	95.5	V	283.0	110.0	23.1	2.5	34.5	86.6	94.0	-7.4
QP Value = Level + AF + CL - Amp										
Margin = QP Value - Limit										

Horizontal Plot



Horizontal 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)
918.98	100.8	H	91.0	152.0	23.1	2.5	34.5	91.9	94.0	-2.1
QP Value = Level + AF + CL - Amp										
Margin = QP Value - Limit										

4 Field Strength of Spurious Radiation

4.1 Test Result

Test Description	Test Specification	Test Result
Field Strength of Spurious Radiation	15.249(a)(d) and 15.209 RSS-210 F.1(a)(b)(e)	Compliant

4.2 Test Method

The initial exploratory scans were performed over the frequency ranges as indicated in the table below using the max hold function using TILE! software. The pre-scans were performed with the EUT oriented in each of its three orthogonal axes to determine the orientation that produces the highest emissions. The final test data was measured using a Quasi-Peak detector below 1GHz and Peak and Average detectors above 1GHz. The receiver's resolution bandwidth was set to 120 kHz for measurements taken in the 30MHz to 1GHz frequency range and 1MHz for measurements 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.

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

(1) Quasi-peak limit

(2) Average limit

4.3 Test Site

Absorber Lined Shielded Enclosure (ALSE), Suwanee, GA

Environmental Conditions	30-1000 MHz	1-10 GHz
Enclosure:	10m chamber	3m chamber
Temperature:	22.6 °C	22.3 °C
Relative Humidity:	52.3 %	57.7 %
Atmospheric Pressure:	97.6 kPa	98.0 kPa

4.4 Test Equipment

30-1000 MHz

Test End Date: 9-Jul-2019

Tester: MT

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
ANTENNA, BILOG	JB6	SUNOL	B079690	11-Dec-2019
RF CABLE	SF106	HUBER & SUHNER	B079712	30-Sep-2019
RF CABLE	SF106	HUBER & SUHNER	B079713	30-Sep-2019
RF CABLE	SF106	HUBER & SUHNER	B079659	30-Sep-2019
RF CABLE	SUCOFLEX 100	HUBER & SUHNER	B108523	30-Sep-2019
LOW NOISE AMPLIFIER	TS-PR18	ROHDE & SCHWARZ	15003	24-Jan-2020
EMI TEST RECEIVER	ESU40	ROHDE & SCHWARZ	B079629	15-Aug-2019

1-10 GHz

Test End Date: 10-Jul-2019

Tester: MT

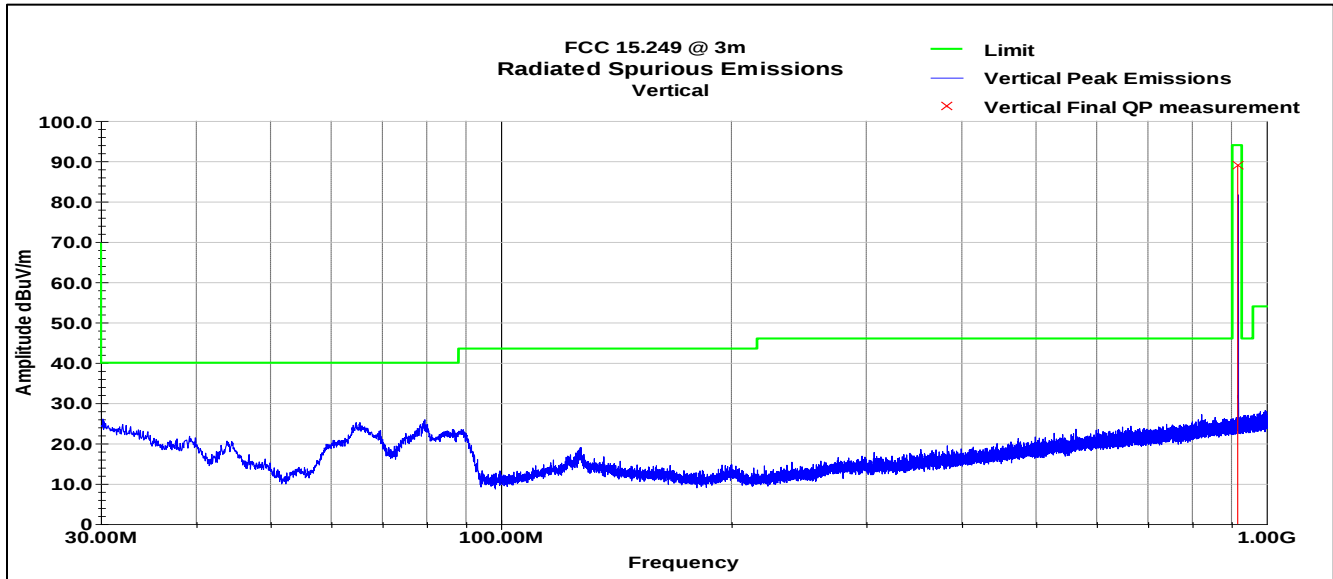
Equipment	Model	Manufacturer	Asset Number	Cal Due Date
ANTENNA, DRG HORN (MEDIUM)	3117	ETS LINDGREN	B079699	2-Jul-2020
RF CABLE	NMS-290-236.2-NMS	FLORIDA RF LABS	B095020	23-Jul-2019
RF CABLE	SUCOFLEX 100	HUBER & SUHNER	B108523	30-Sep-2019
LOW NOISE AMPLIFIER	TS-PR18	ROHDE & SCHWARZ	15003	24-Jan-2020
EMI TEST RECEIVER	ESU40	ROHDE & SCHWARZ	B079629	15-Aug-2019

Note: The equipment calibration period is 1 year.

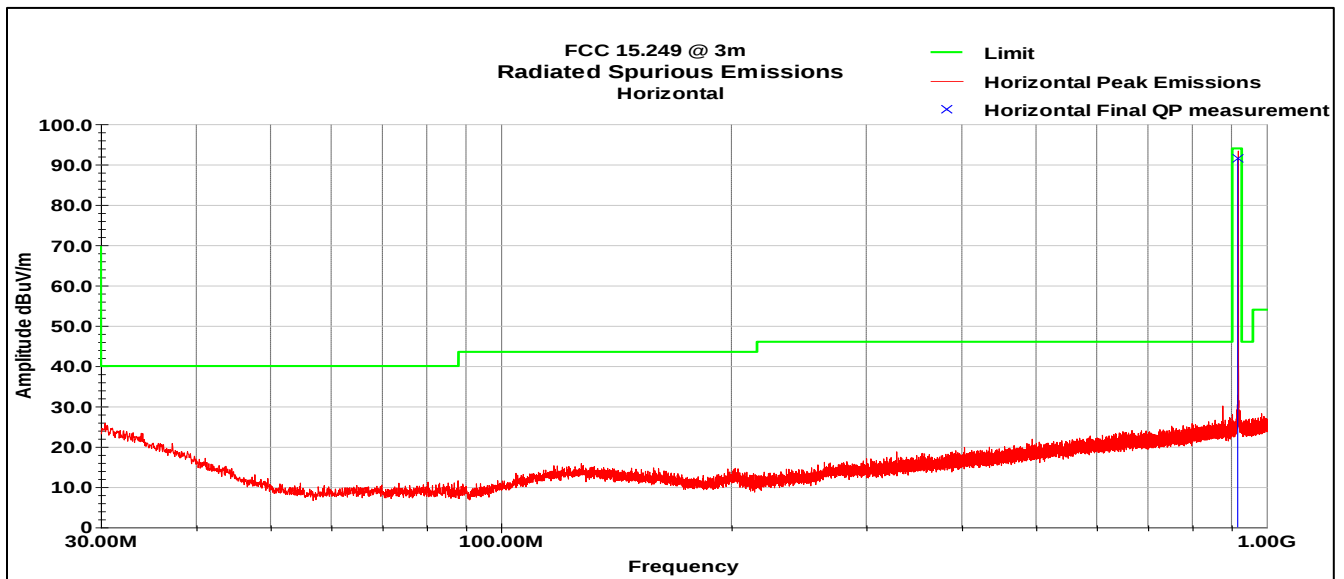
4.5 Test Data

4.5.1 30-1000 MHz

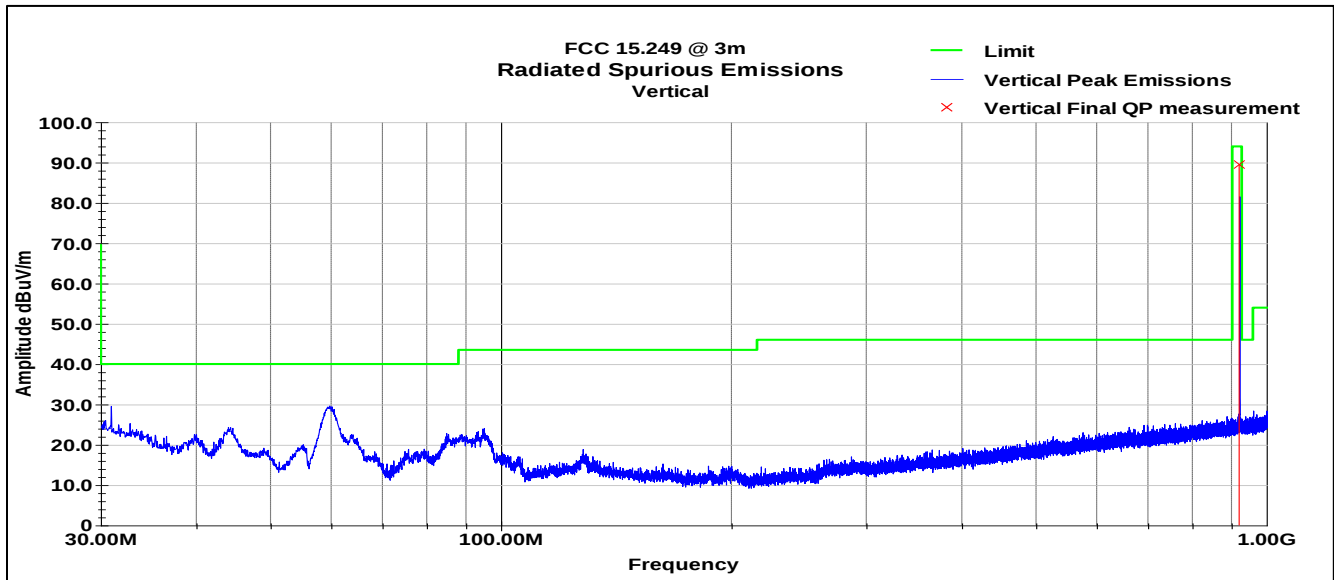
ISM Band Low Channel (917 MHz) Vertical Plot



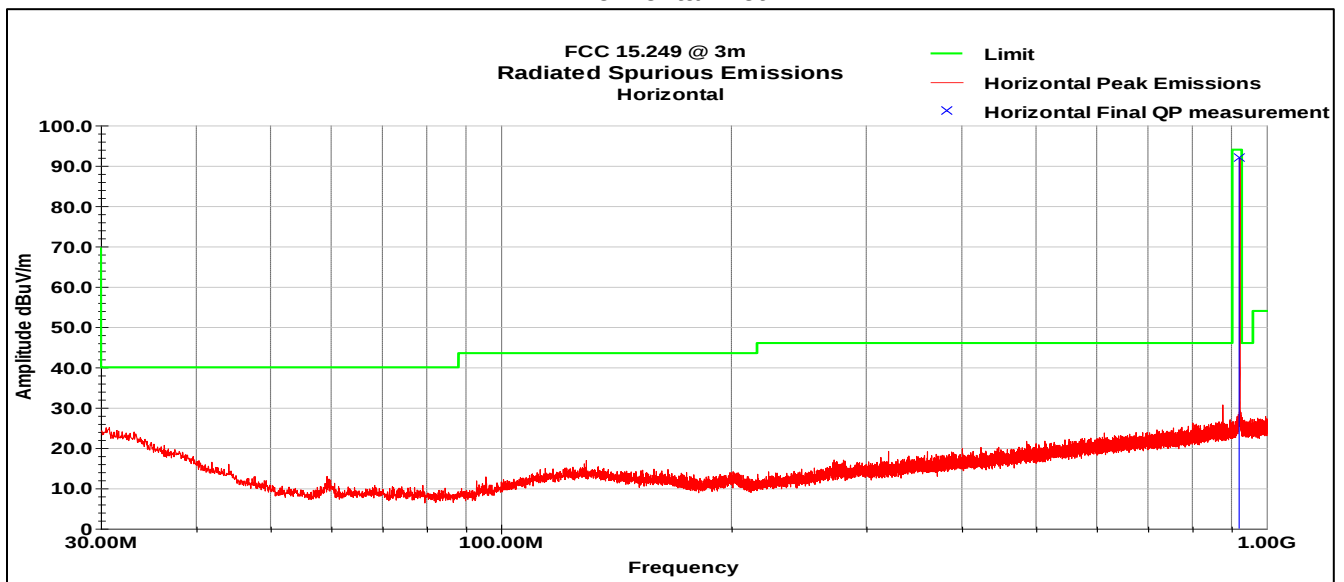
Horizontal Plot



ISM Band High Channel (921 MHz) Vertical Plot

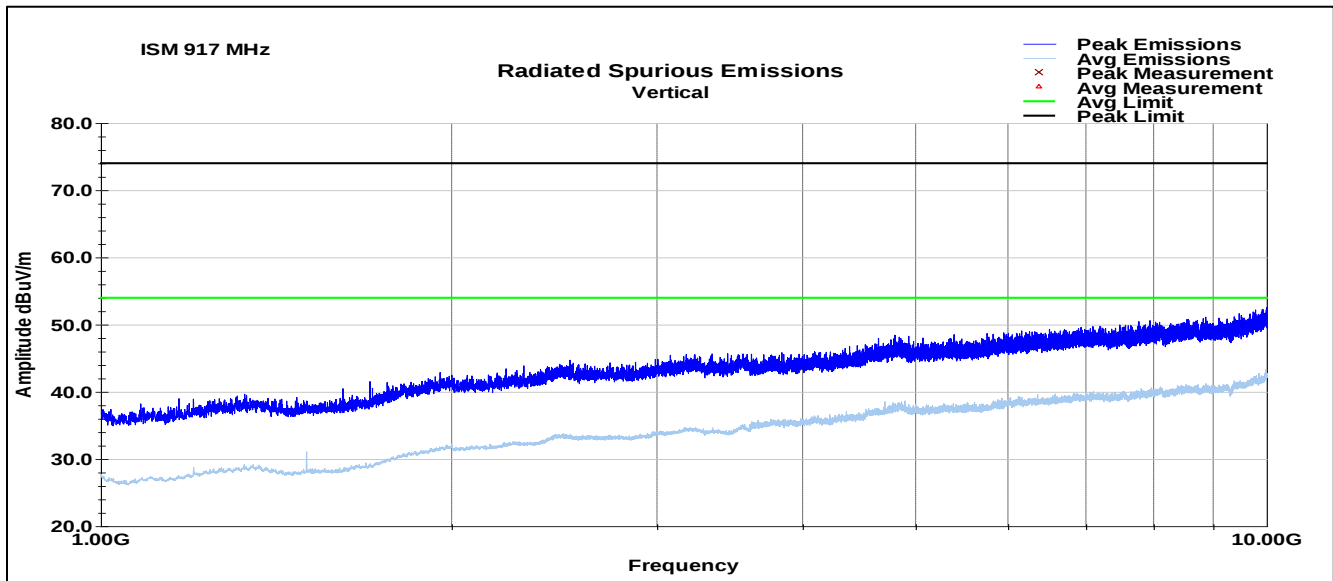


Horizontal Plot

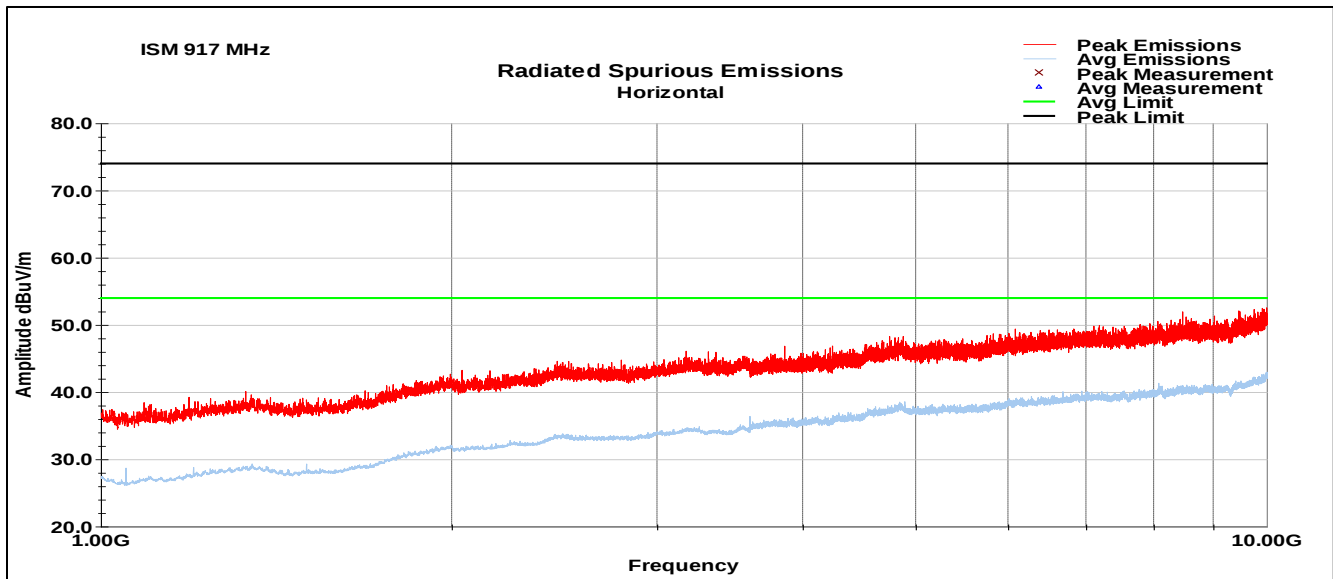


4.5.2 1-10 GHz

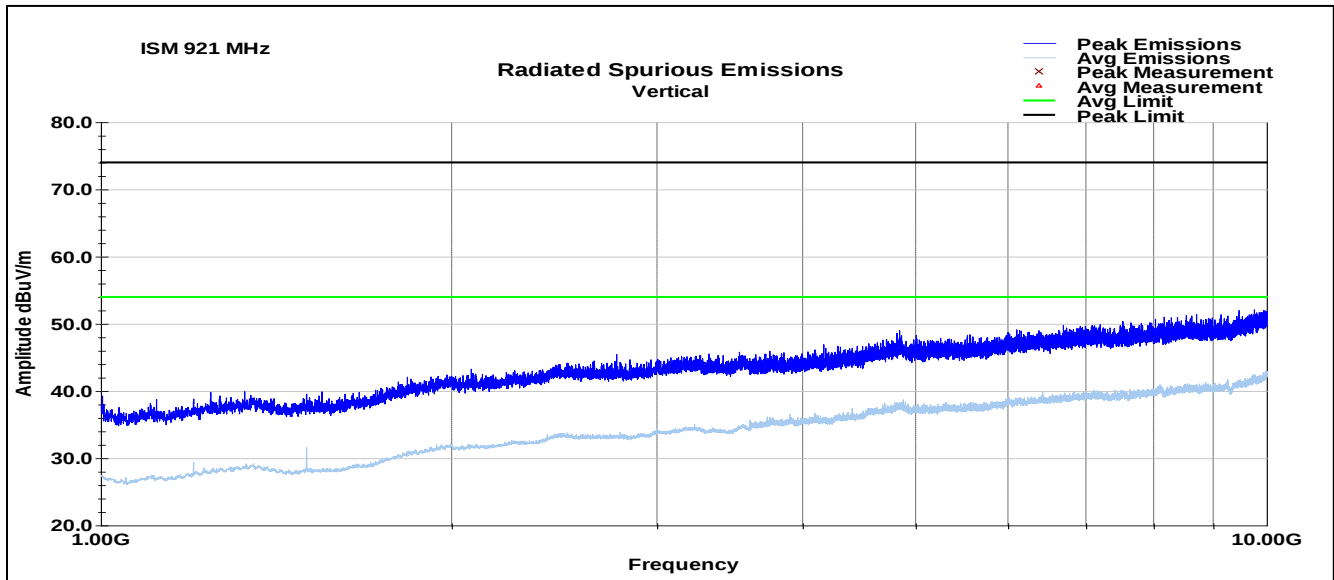
ISM Band Low Channel (917 MHz) Vertical Plot



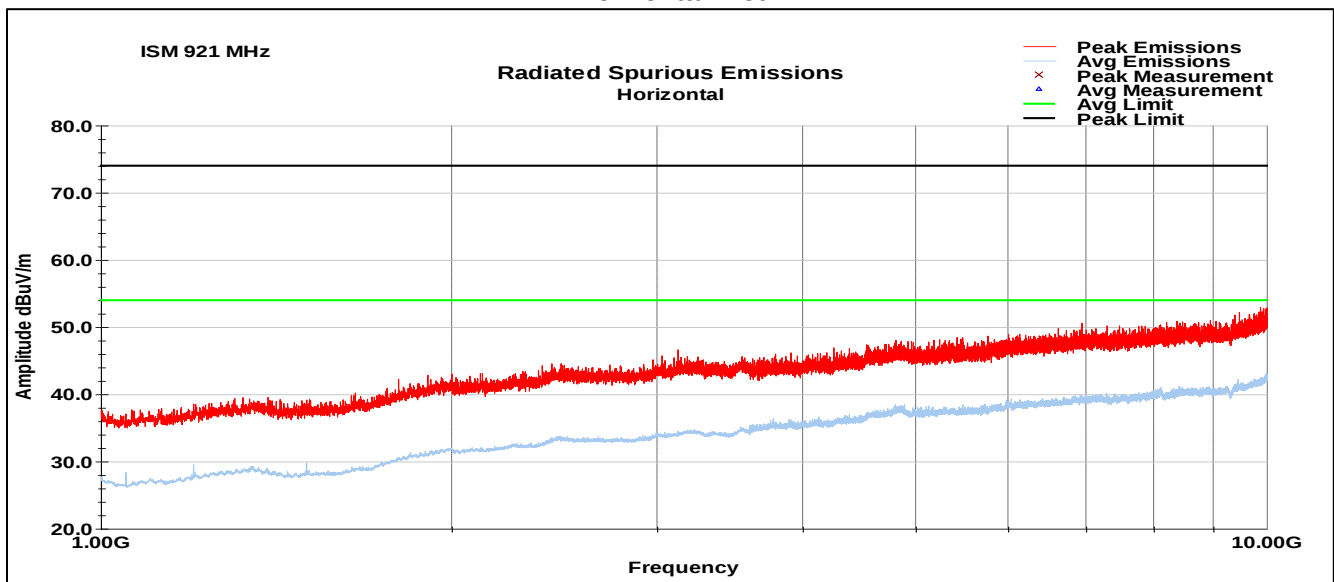
Horizontal Plot



ISM Band High Channel (921 MHz) Vertical Plot



Horizontal Plot



5 Bandwidth

5.1 Test Result

Test Description	Basic Standards	Test Result
20 dB Bandwidth	15.215(c)	Reported
99% Occupied Bandwidth	RSS-GEN 6.7	Reported

5.2 Test Method

The procedures from ANSI C63.10 clause 6.9 were used to determine the 20 dB Bandwidth and the 99% Occupied Bandwidth.

5.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 22.9 °C

Relative Humidity: 48.3 %

Atmospheric Pressure: 97.5 kPa

5.4 Test Equipment

Test End Date: 15-Aug-2019

Tester: MT

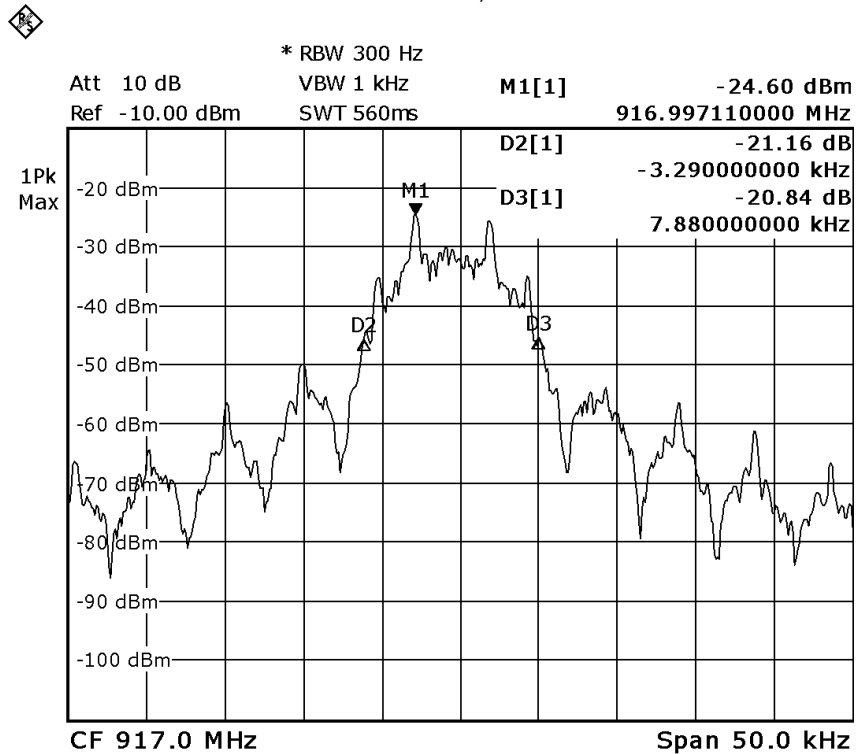
Equipment	Model	Manufacturer	Asset Number	Cal Due Date
NETWORK / SPECTRUM ANALYZER	ZVL6	ROHDE & SCHWARZ	B079799	16-Apr-2020
RF CABLE (TS8997)	141	Huber & Suhner	B095586	30-Sep-2019

Note: The equipment calibration period is 1 year.

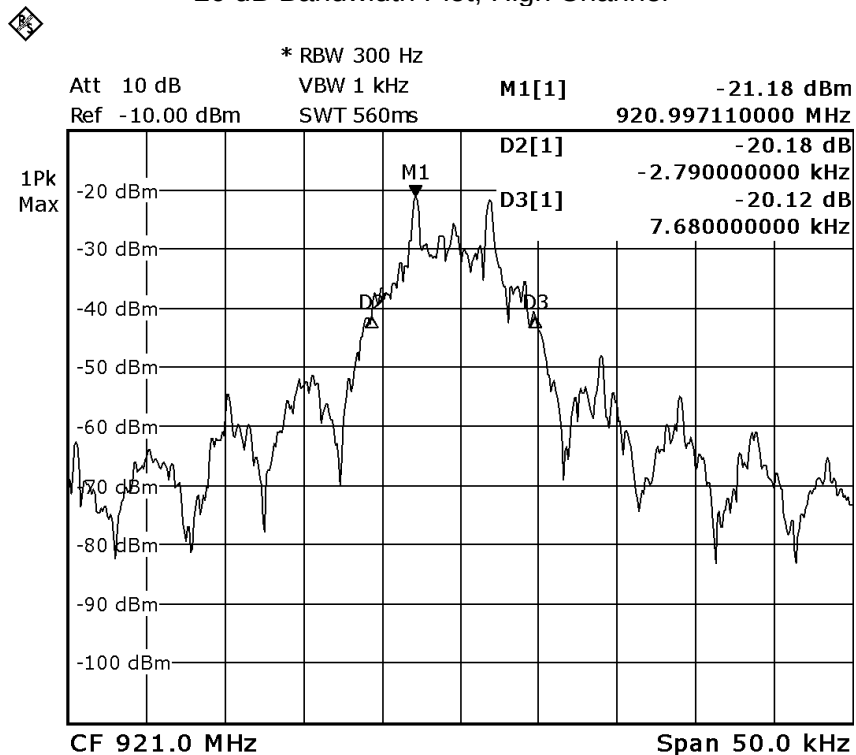
5.5 Test Data

Test Description	EUT Frequency	Bandwidth
20 dB Bandwidth	917 MHz	11.17 kHz
20 dB Bandwidth	921 MHz	10.47 kHz
99% Occupied Bandwidth	917 MHz	10.48 kHz
99% Occupied Bandwidth	921 MHz	10.78 kHz

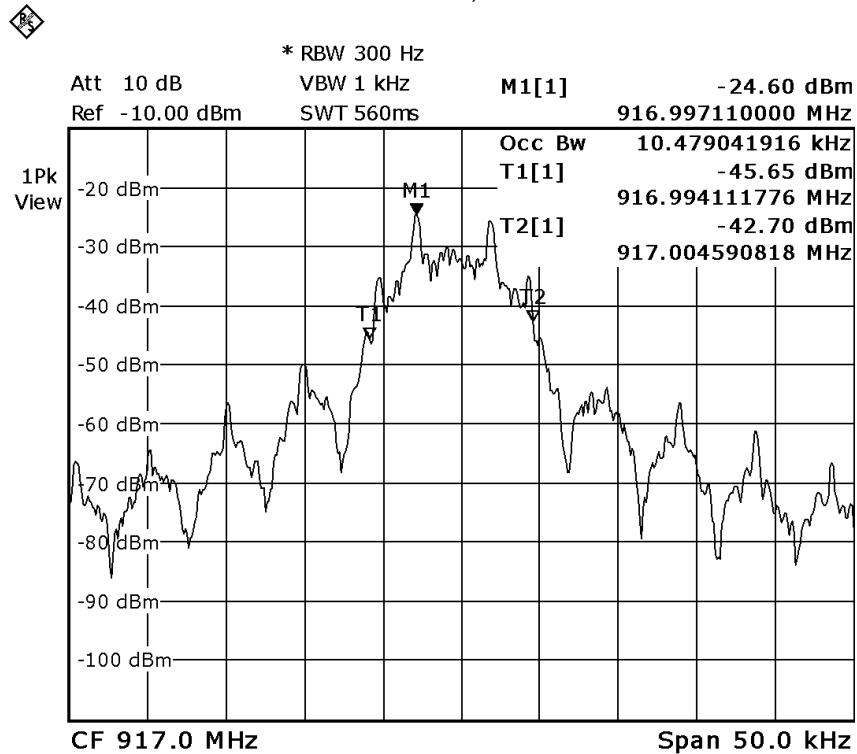
20 dB Bandwidth Plot, Low Channel



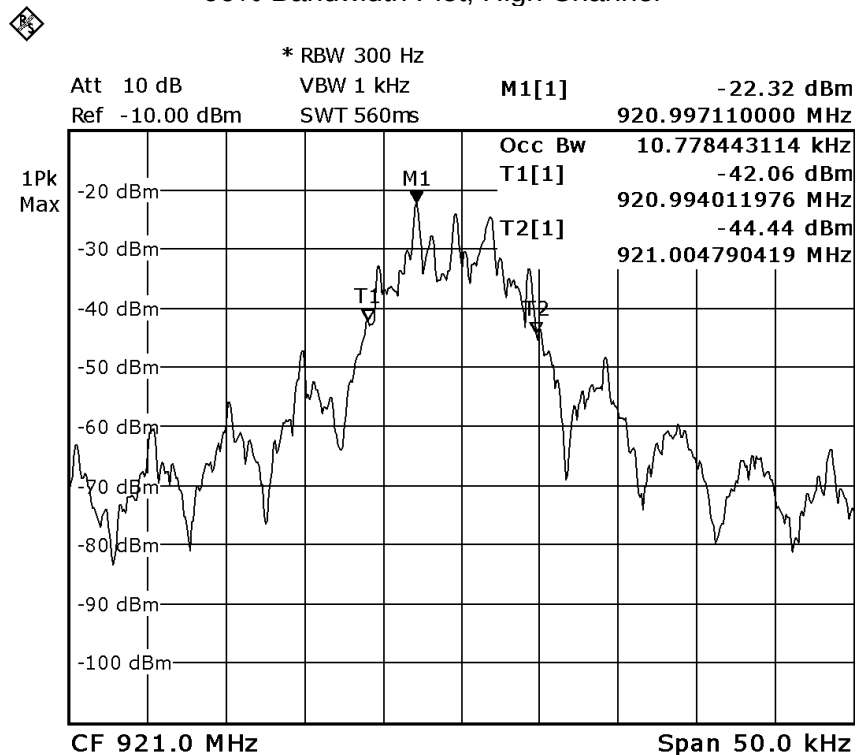
20 dB Bandwidth Plot, High Channel



99% Bandwidth Plot, Low Channel



99% Bandwidth Plot, High Channel



6 AC Powerline Conducted Emissions

6.1 Test Result

Test Description	Basic Standards	Test Result
AC Powerline Conducted Emissions, Class B	FCC 15.107, 15.207 RSS-GEN 8.8 ANSI C63.10: 2013	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: 23.5 °C

Relative Humidity: 45.2 %

Atmospheric Pressure 97.7 kPa

6.4 Test Equipment

Test End Date: 10-Jul-2019

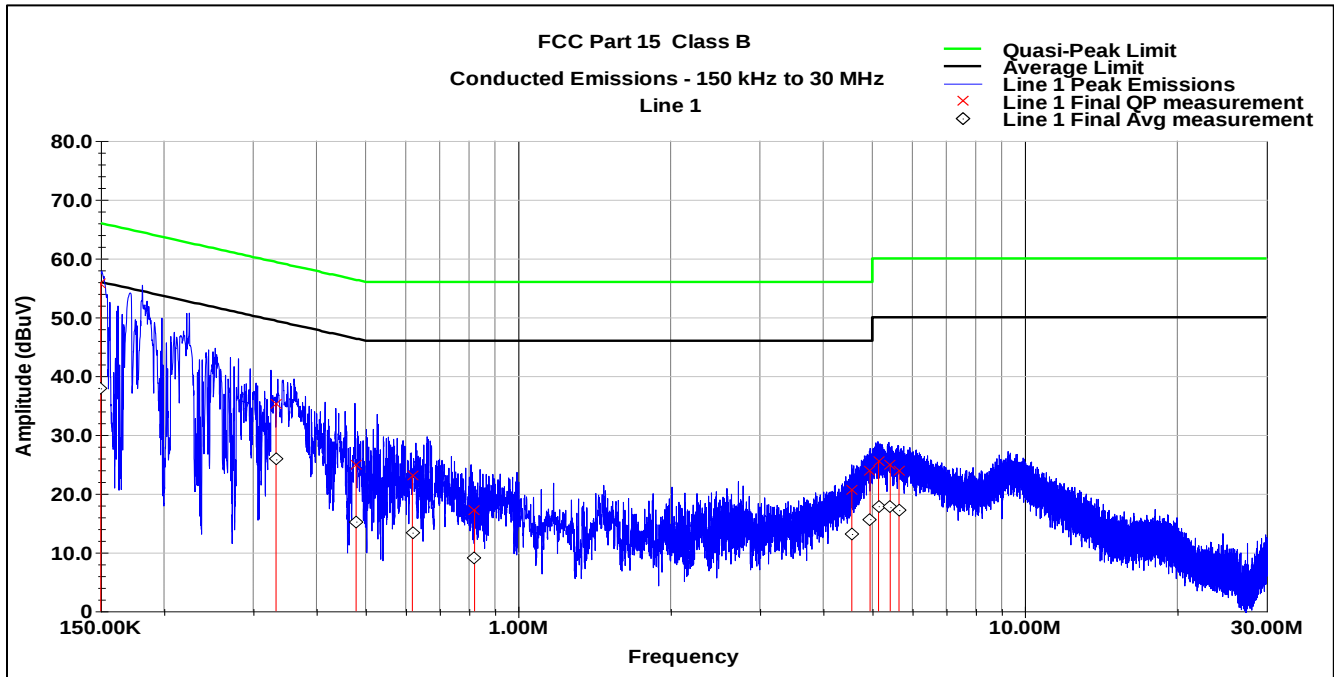
Tester: MT

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	30-Sep-2019
EMI TEST RECEIVER	ESU8	ROHDE & SCHWARZ	B085759	17-Aug-2019

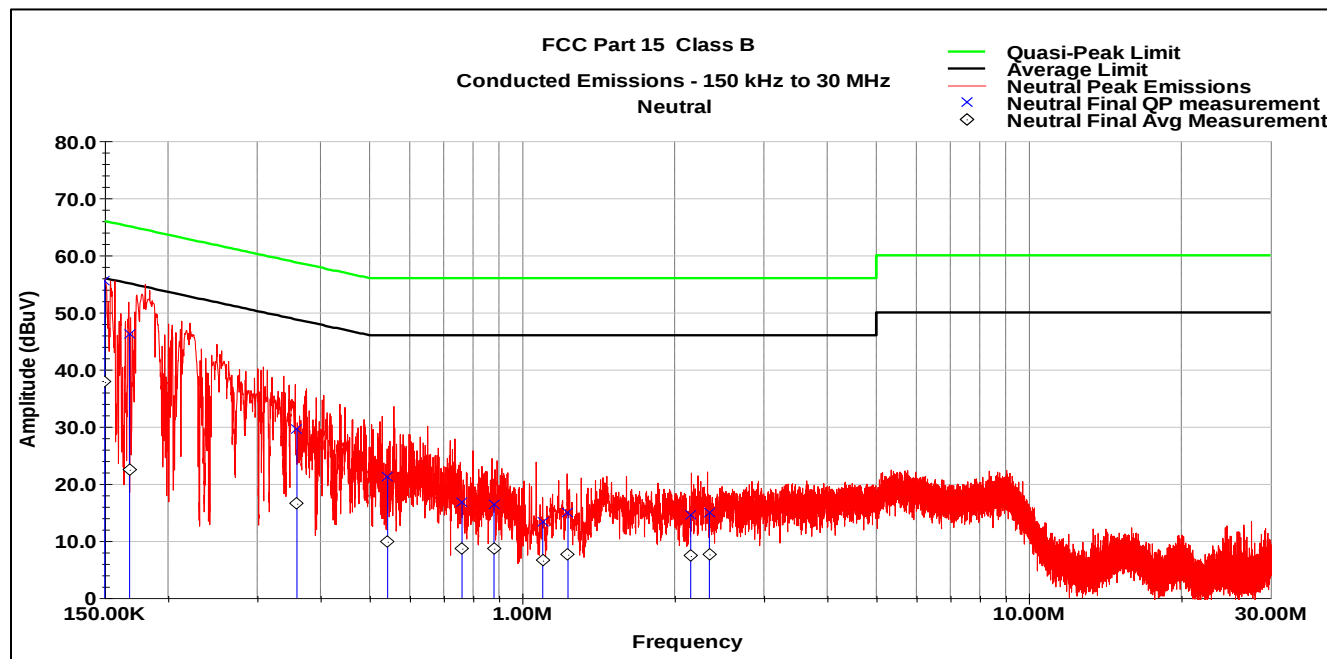
Note: The equipment calibration period is 1 year.

Software: "181112 Conducted Emissions TILE7" TILE! profile dated 12 Nov 2018

6.5 Test Data



Frequency MHz	QP Value dBuV	QP Limit dBuV	QP Margin dB	Avg Value dBuV	Avg Limit dBuV	Avg Margin dB
0.150	55.8	66.0	-10.2	37.9	56.0	-18.1
0.333	35.2	59.4	-24.2	25.8	49.4	-23.6
0.479	25.0	56.3	-31.4	15.3	46.3	-31.1
0.618	23.1	56.0	-32.9	13.4	46.0	-32.6
0.820	17.2	56.0	-38.8	9.0	46.0	-37.0
4.555	20.6	56.0	-35.4	13.1	46.0	-32.9
4.950	23.9	56.0	-32.1	15.7	46.0	-30.3
5.144	25.4	60.0	-34.6	17.9	50.0	-32.1
5.424	25.0	60.0	-35.0	17.7	50.0	-32.3
5.646	24.0	60.0	-36.0	17.2	50.0	-32.8



Frequency MHz	QP Value dBuV	QP Limit dBuV	QP Margin dB	Avg Value dBuV	Avg Limit dBuV	Avg Margin dB
0.150	55.6	66.0	-10.4	37.8	56.0	-18.2
0.168	46.2	65.1	-18.9	22.5	55.1	-32.6
0.359	29.7	58.7	-29.0	16.5	48.7	-32.2
0.543	21.2	56.0	-34.8	9.9	46.0	-36.1
0.761	16.7	56.0	-39.3	8.6	46.0	-37.4
0.880	16.4	56.0	-39.6	8.6	46.0	-37.4
1.098	13.4	56.0	-42.6	6.5	46.0	-39.5
1.232	15.0	56.0	-41.0	7.6	46.0	-38.4
2.151	14.6	56.0	-41.4	7.4	46.0	-38.6
2.342	14.9	56.0	-41.1	7.6	46.0	-38.4

7 Revision History

Revision Level	Description of changes	Revision Date
Draft	--	03 September 2019
0	Initial release	12 September 2019
1	Removed incorrect FCC classification in section 2.3	11 November 2019
2	Added AC Powerline Conducted Emissions test (sections 1 & 6)	11 December 2019
3	Updated standards references on title page	20 January 2020