EMC Test Report

Project Number:	**4494805**	**Quotation Number:**	**02212019TH-1.3**
Report Number:	**4494805EMC03**	**Revision Level:**	**2**
Client:	**Lifeline Systems Inc**		

Equipment Under Test:	**Medical Alert System**
Model Name:	**Wireless Communicator**
Model Number:	**7200C**
FCC ID:	**BDZ7200C**
IC:	**655C-7200C**
FCC Rule Parts:	**Part 2, Part 24(E), Part 27**
Industry Canada:	**RSS-GEN, Issue 5, Amendment 1, March 2019**
	RSS-130, Issue 2, February 2019
	RSS-133, Issue 6, Amendment 1, January 2018
	RSS-139, Issue 3, July 2015
Applicable Standards:	**ANSI C63.26: 2015**

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.

Table of Contents

1 Summary of Test Results

Reference Sections		Test Description	Test Condition	Test Result
FCC	IC			
2.1046	RSS-GEN (6.12)	Conducted Output Power	Conducted	(see Note 1)
24.232(d) 27.50(d)(5)	RSS-130 (4.4) RSS-133 (6.4) RSS-139 (6.5)	Peak-to-Average Ratio		(see Note 1)
2.1049 24.238(b) 27.53(h)(3)	RSS-GEN (6.7) RSS-133 (2.3)	Occupied Bandwidth Emission Bandwidth		(see Note 1)
2.1051 24.238(a) 27.53(g) 27.53(h)	RSS-130 (4.6.1) RSS-133 (6.5.1) RSS-139 (6.6)	Band Edge / Conducted Spurious Emissions		(see Note 1)
27.50(c)(9)	--	Effective Radiated Power	Radiated	(see Note 1)
24.232(c) 27.50(d)(4)	RSS-130 (4.4) RSS-133 (6.4) RSS-139 (6.5)	Effective Isotropic Radiated Power		(see Note 1)
2.1053 24.238(a) 27.53(g) 27.53(h)	RSS-GEN (6.13) RSS-130 (4.6) RSS-133 (6.5.1) RSS-139 (6.6)	Radiated Spurious Emissions		Compliant
2.1055 24.235 27.54	RSS-GEN (6.11) RSS-130 (4.3) RSS-133 (6.3) RSS-139 (6.4)	Frequency Stability	Conducted	(see Note 1)
15.107	RSS-GEN (7.2)	AC Powerline Conducted Emissions		Compliant

Note 1: See separate test report on LARA-R203 LTE radio module (MDE_UBLOX_1712_FCCb_rev1).

1.1 *Modifications Required to 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

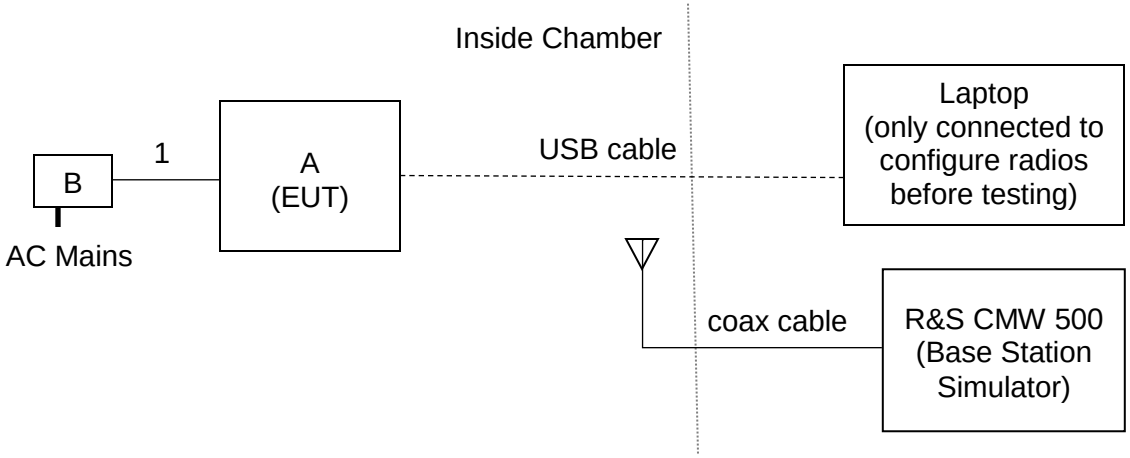
2.3 *General Information of EUT*

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:	1850 – 1910 MHz (LTE Band 2) 1710 – 1755 MHz (LTE Band 4) 699 – 716 MHz (LTE Band 12)
FCC Classification:	PCS Licensed Transmitter PCB
Type:	Pre-Production
Rated Voltage:	100-240Vac, 50/60Hz
Test Voltage:	120Vac, 60Hz
Sample Received Date:	08 July 2019
Dates of testing:	08-09 July 2019

2.4 *Operating Modes and Conditions*

The EUT was tested under normal operating conditions, but with a Rohde & Schwarz test SIM installed. The EUT had an internal battery pack installed and was connected to the AC Mains using the supplied AC/DC wall adapter. When the EUT was turned on it was configured to establish a 4G LTE call with a R&S CMW 500 Wideband Radio Communication Tester which was used to control the EUT to operate with maximum transmit (uplink) power in LTE Bands 2, 4 and 12.

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 (EUT)	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 Radiated Spurious Emissions

3.1 *Test Result*

Test Description	Basic Standards		Test Result
Radiated Spurious Emissions	FCC 2.1053 FCC 24.238(a) FCC 27.53(g) FCC 27.53(h)	RSS-GEN (6.13) RSS-130 (4.6) RSS-133 (6.5.1) RSS-139 (6.6)	Compliant

3.2 *Test Method*

The radiated power emanating from the EUT of the band edge (out-of-band) and spurious band emissions are measured by means of a calibrated spectrum analyzer. The spectrum is investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to at least the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower. The power of any emissions outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) measured in watts by at least 43 + 10 log (P) dB.

The EUT was manipulated through each of its three orthogonal axes with the measurement oriented in both vertical and horizontal polarizations.

A radio link was established between the EUT and a Radio Communications Tester. The output power of the EUT was set to maximum value by using the maximum power setting on the Radio Communications Tester.

The measurements were performed at the middle channel of each band tested.

3.3 *Test Site*

Absorber Lined Shielded Enclosure (ALSE), Suwanee, GA

Environmental Conditions	30-1000 MHz	1-18 GHz	18-20 GHz
Enclosure:	10m chamber	3m chamber	3m chamber
Temperature:	22.5 °C	22.4 °C	22.6 °C
Relative Humidity:	58.4 %	52.9 %	55.0 %
Atmospheric Pressure:	97.8 kPa	97.3 kPa	97.3 kPa

3.4 *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	23-Jul-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

1-18 GHz

Test End Date: 8-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
FILTER, HIGH PASS (>2800MHZ)	HPM50111	MICRO-TRONICS	B085747	30-Sep-2019
FILTER, HIGH PASS (>1150MHZ)	HPM50108	MICRO-TRONICS	B079802	30-Sep-2019

18-20GHz

Test End Date: 8-Jul-2019 Tester: MT

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
ANTENNA, HORN (SMALL)	LB-180400-20-C-KF	A-INFO	15007	23-Jul-2019
RF CABLE	SF102	HUBER & SUHNER	B079822	17-Jul-2020
RF CABLE	SF102	HUBER & SUHNER	B079823	17-Jul-2020
LOW NOISE AMPLIFIER	NSP1840-HG	MITEQ	B087572	30-Sep-2019
EMI TEST RECEIVER	ESU40	ROHDE & SCHWARZ	B079629	15-Aug-2019

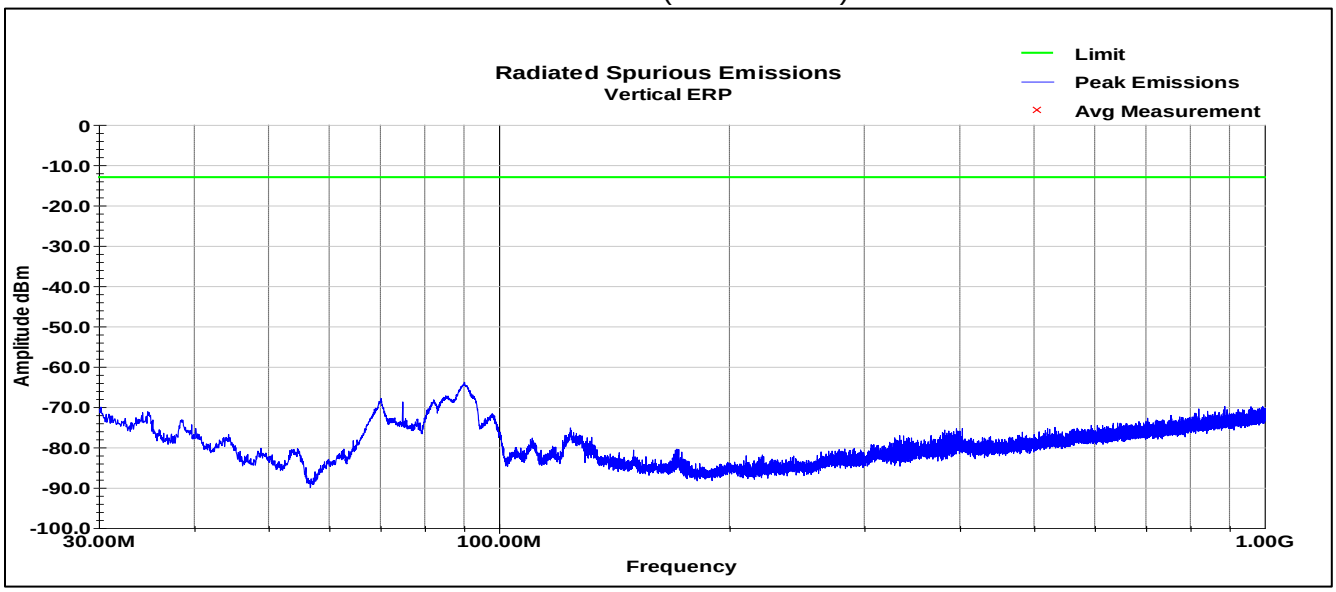
- Unless otherwise noted, equipment is on a 1-year calibration cycle.

3.5 *Test Data*

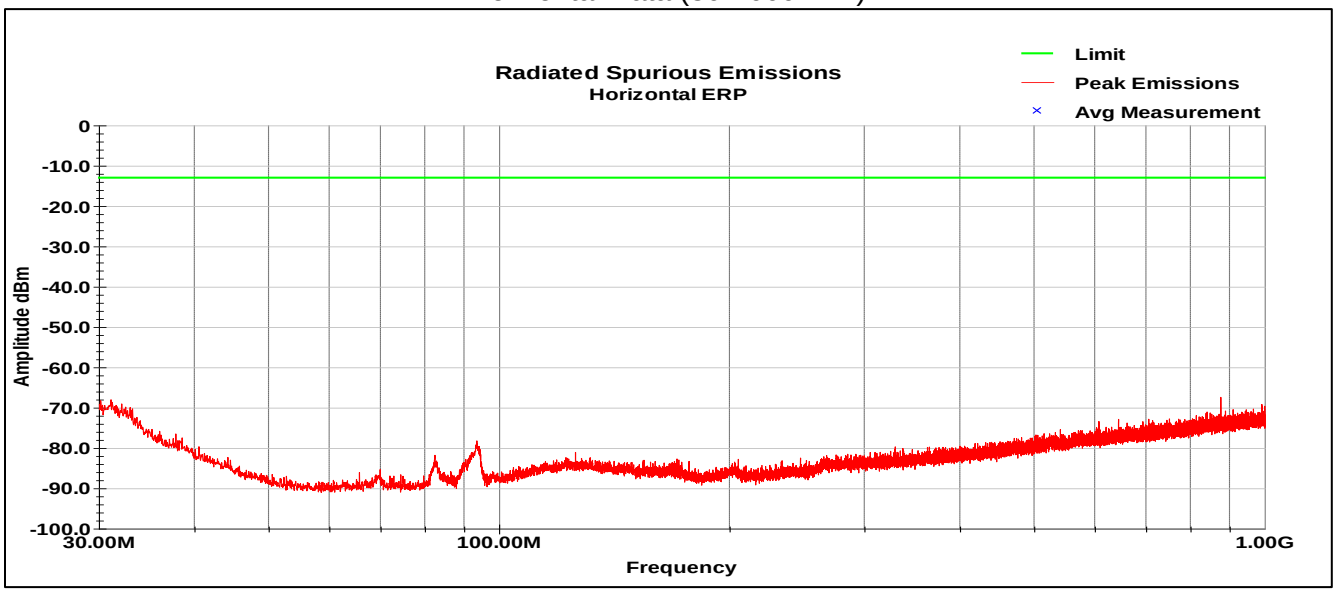
LTE Band 2, QPSK modulation, 10MHz

Mid Channel (18900)

Vertical Data (30-1000MHz)



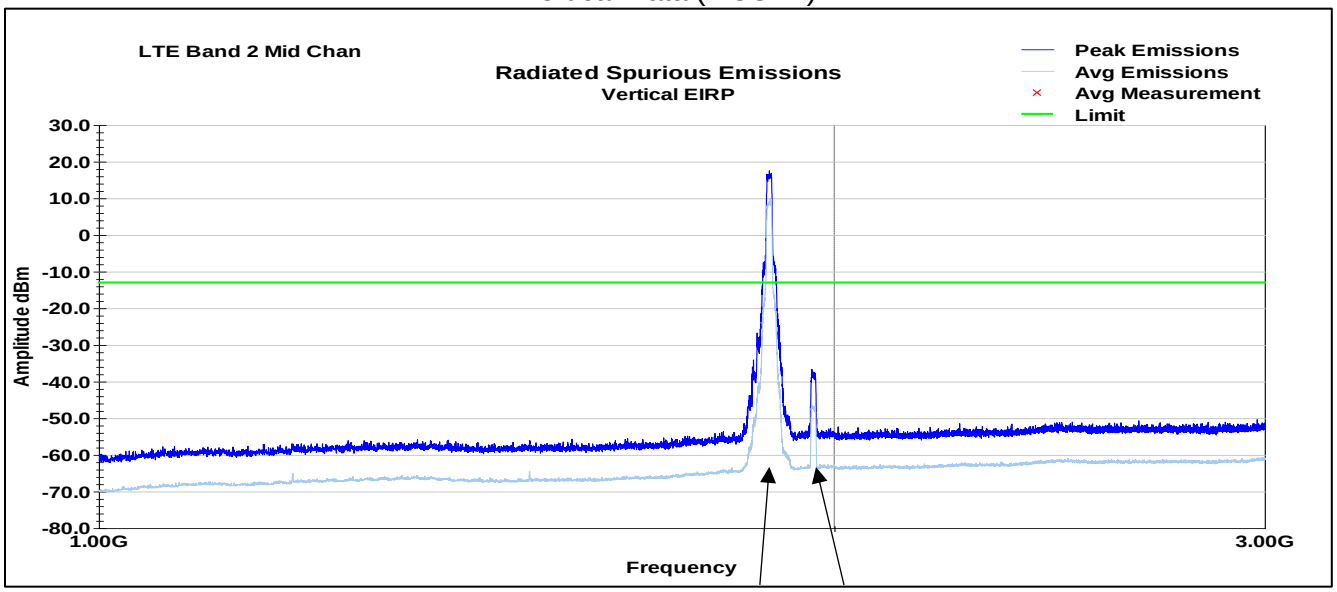
Horizontal Data (30-1000MHz)



LTE Band 2, QPSK modulation, 10MHz

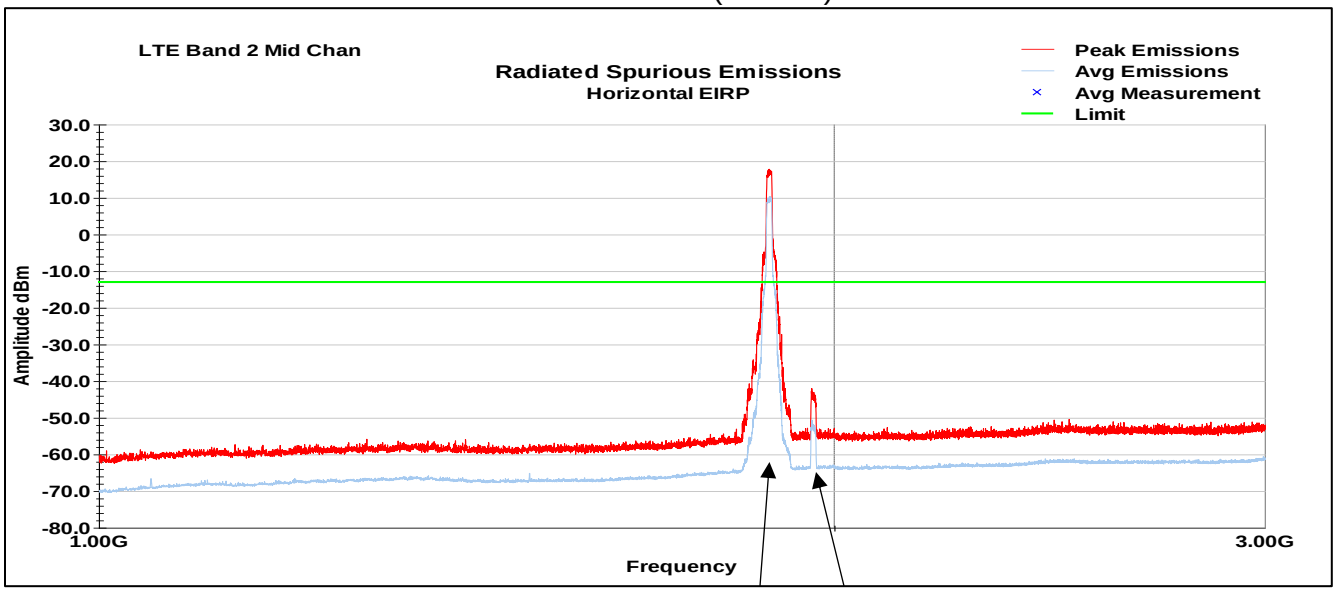
Mid Channel (18900)

Vertical Data (1-3GHz)



Uplink Downlink

Horizontal Data (1-3GHz)

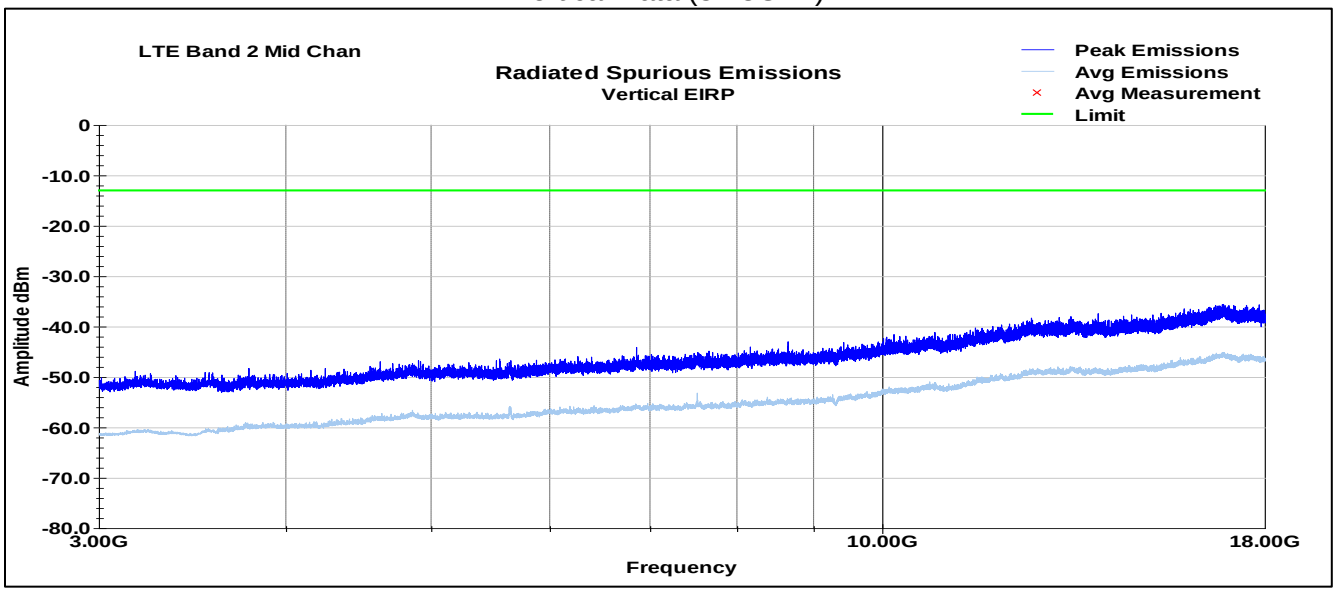


Uplink Downlink

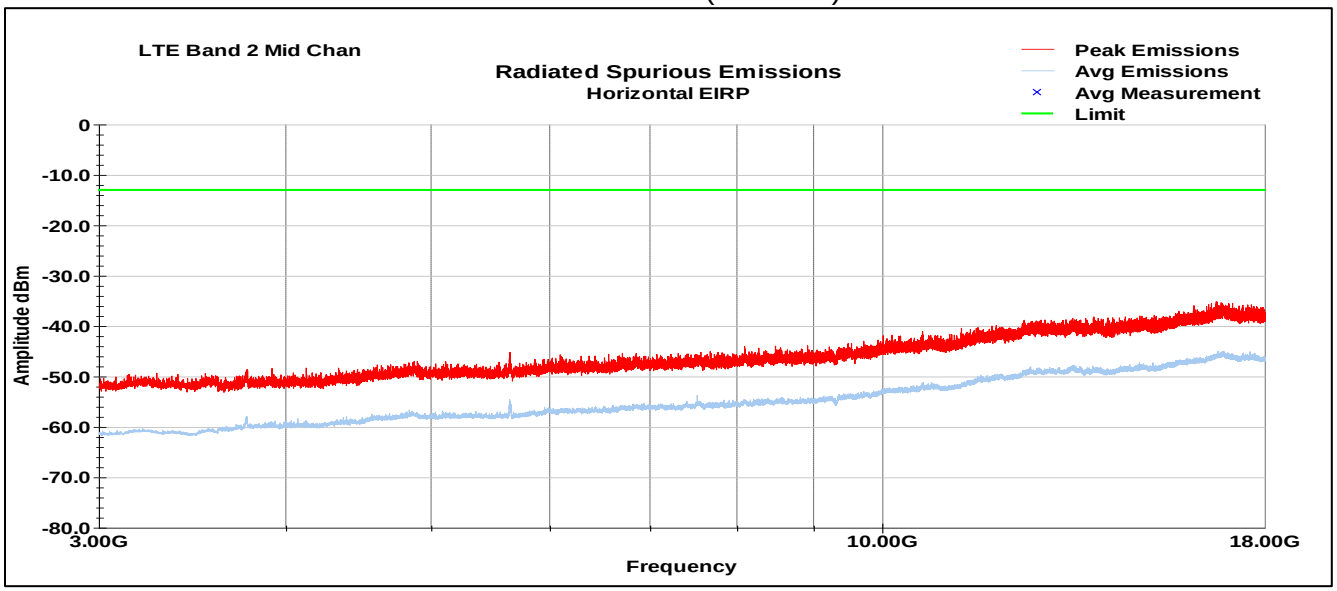
LTE Band 2, QPSK modulation, 10MHz

Mid Channel (18900)

Vertical Data (3-18GHz)



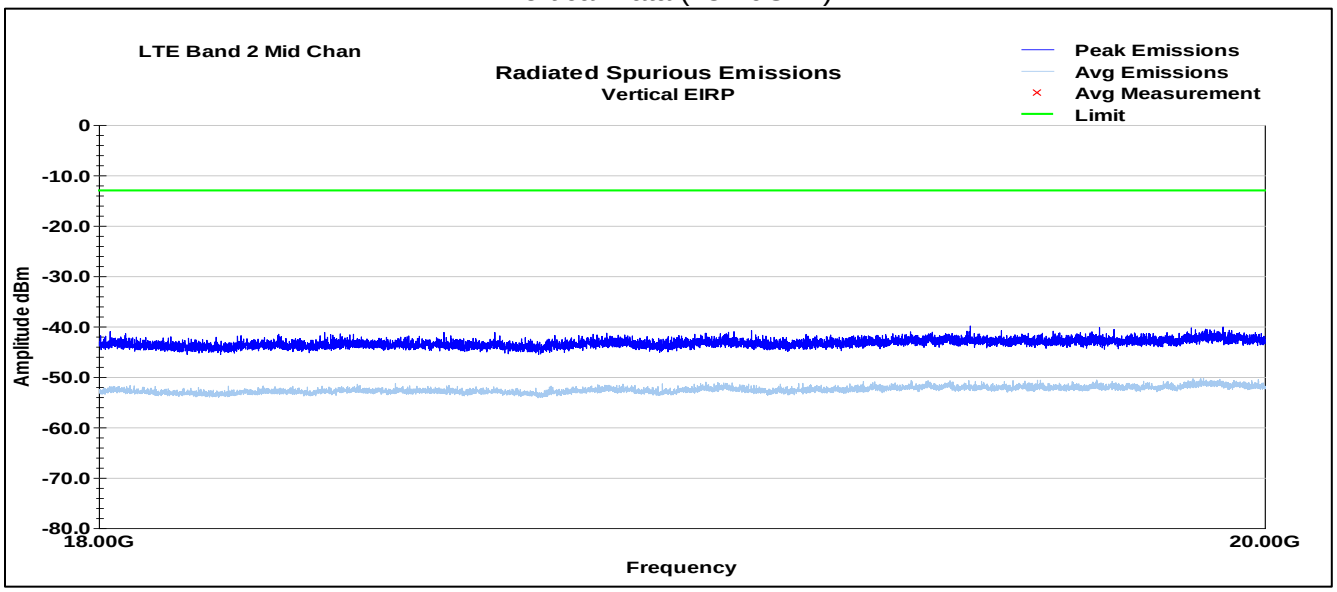
Horizontal Data (3-18GHz)



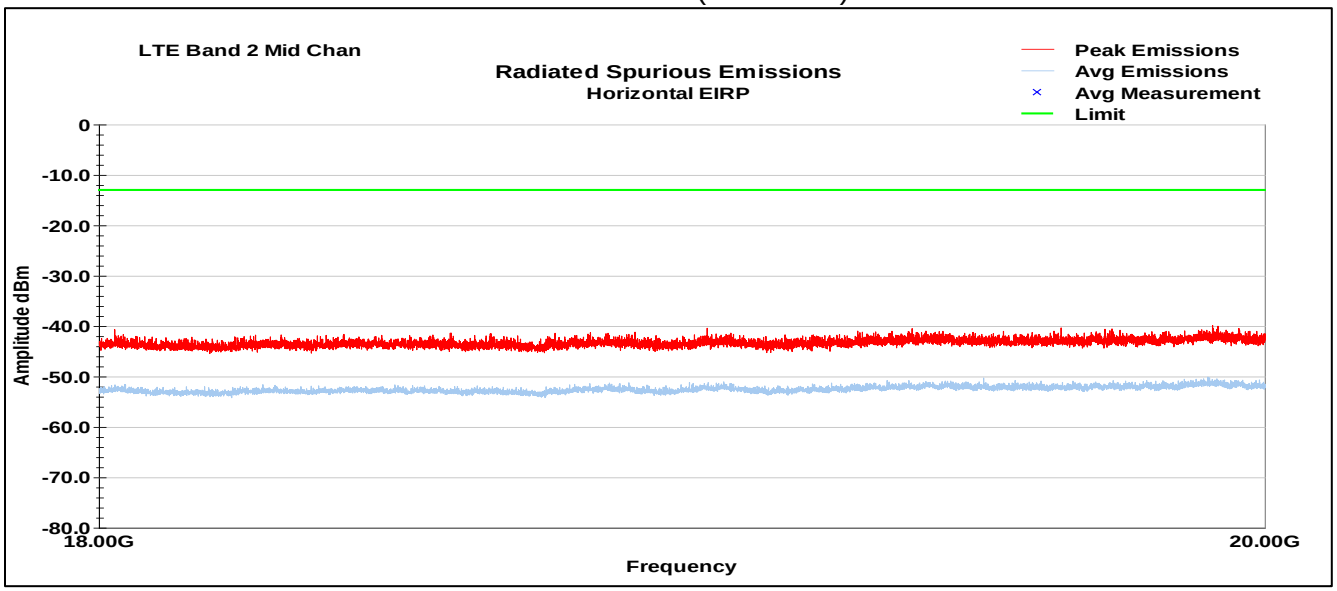
LTE Band 2, QPSK modulation, 10MHz

Mid Channel (18900)

Vertical Data (18-20GHz)



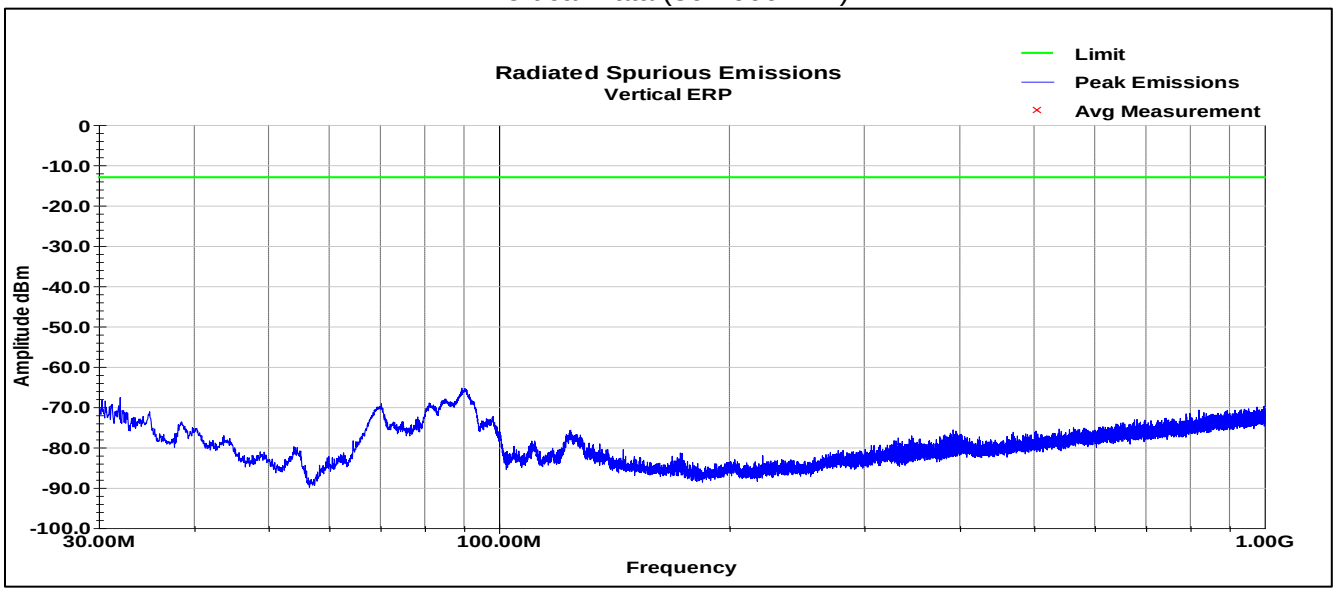
Horizontal Data (18-20GHz)



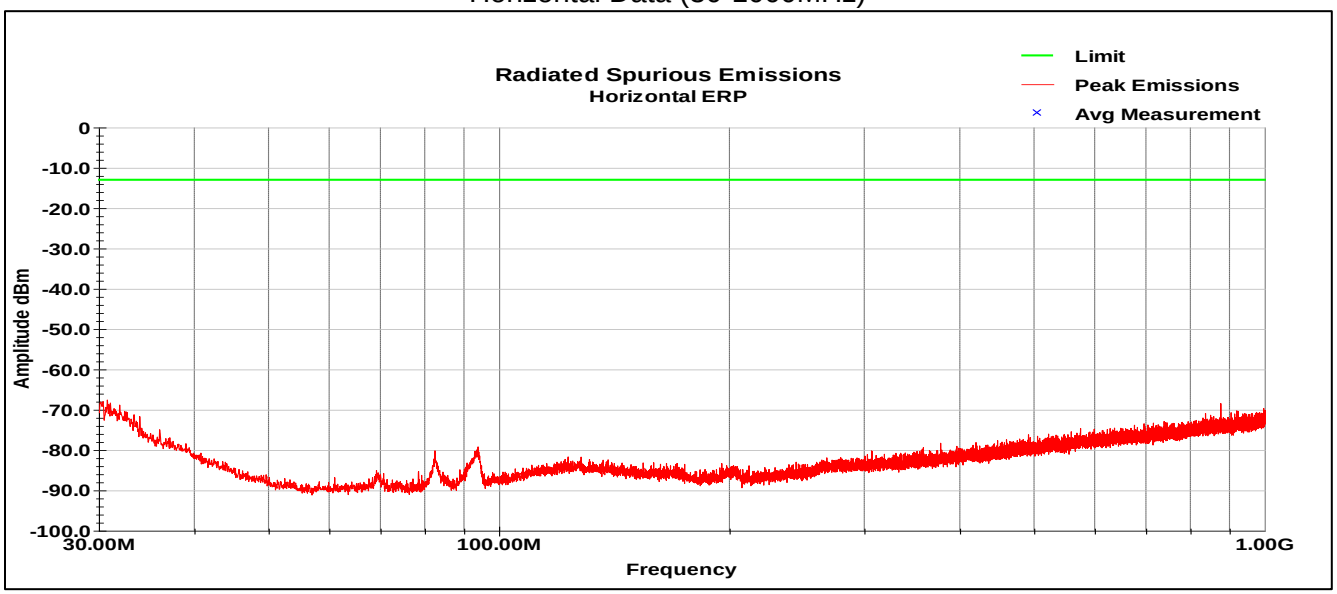
LTE Band 4, QPSK modulation, 10MHz

Mid Channel (20175)

Vertical Data (30-1000MHz)



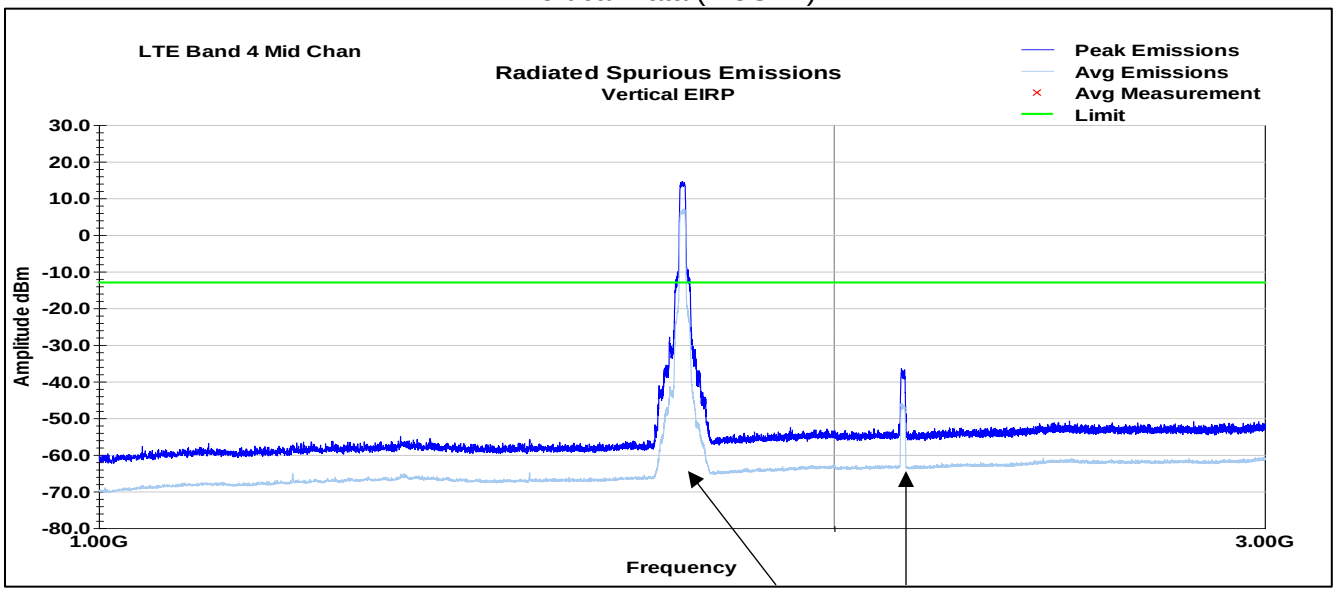
Horizontal Data (30-1000MHz)



LTE Band 4, QPSK modulation, 10MHz

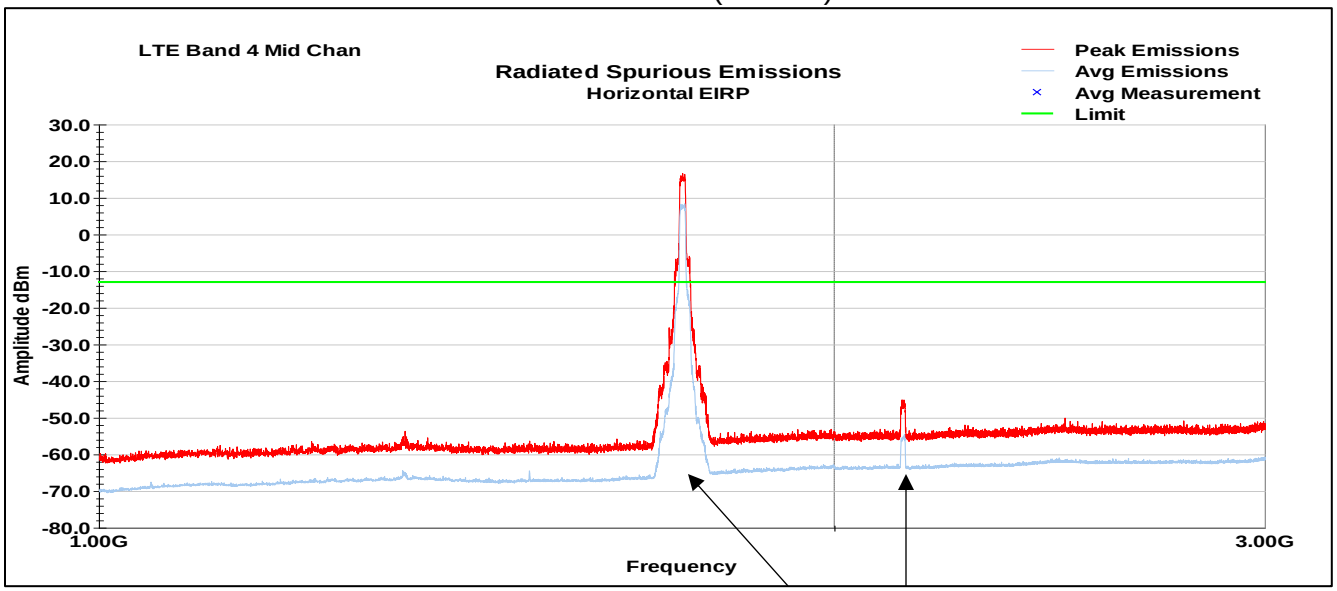
Mid Channel (20175)

Vertical Data (1-3GHz)



Uplink Downlink

Horizontal Data (1-3GHz)

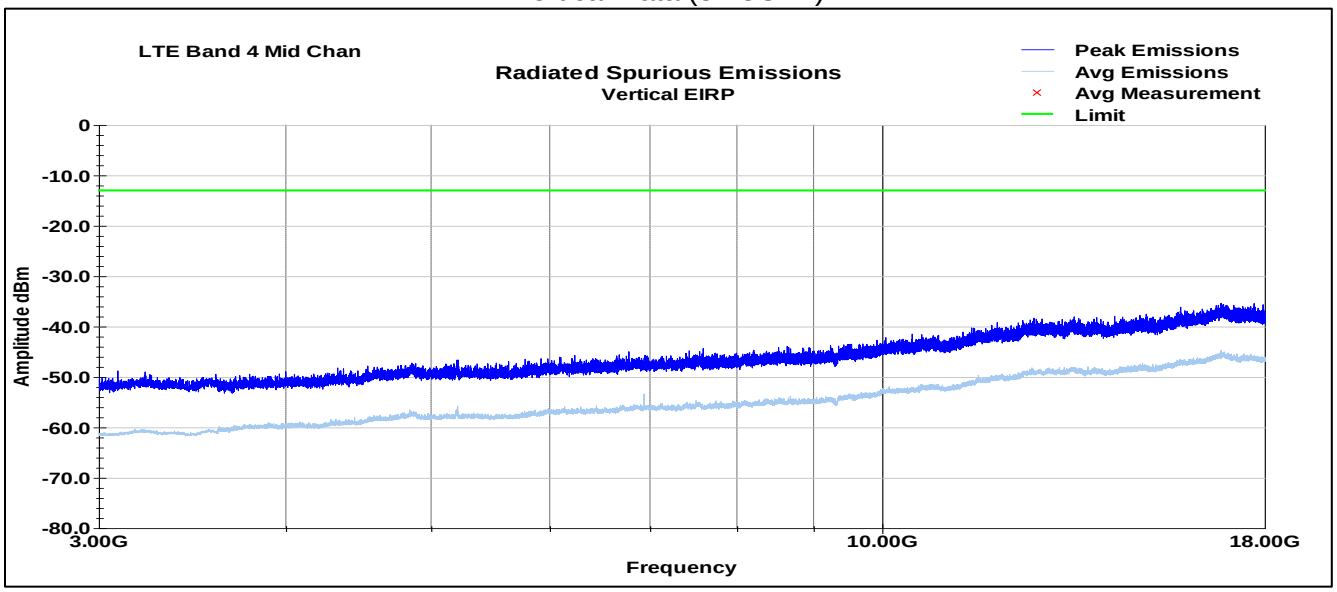


Uplink Downlink

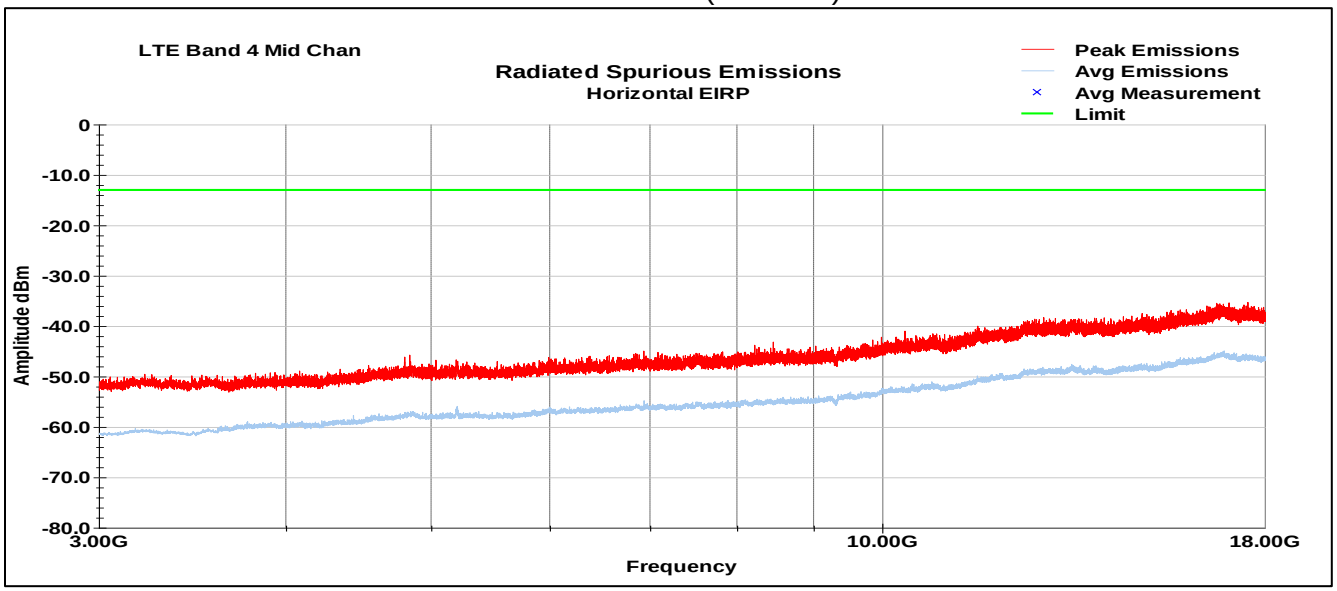
LTE Band 4, QPSK modulation, 10MHz

Mid Channel (20175)

Vertical Data (3-18GHz)



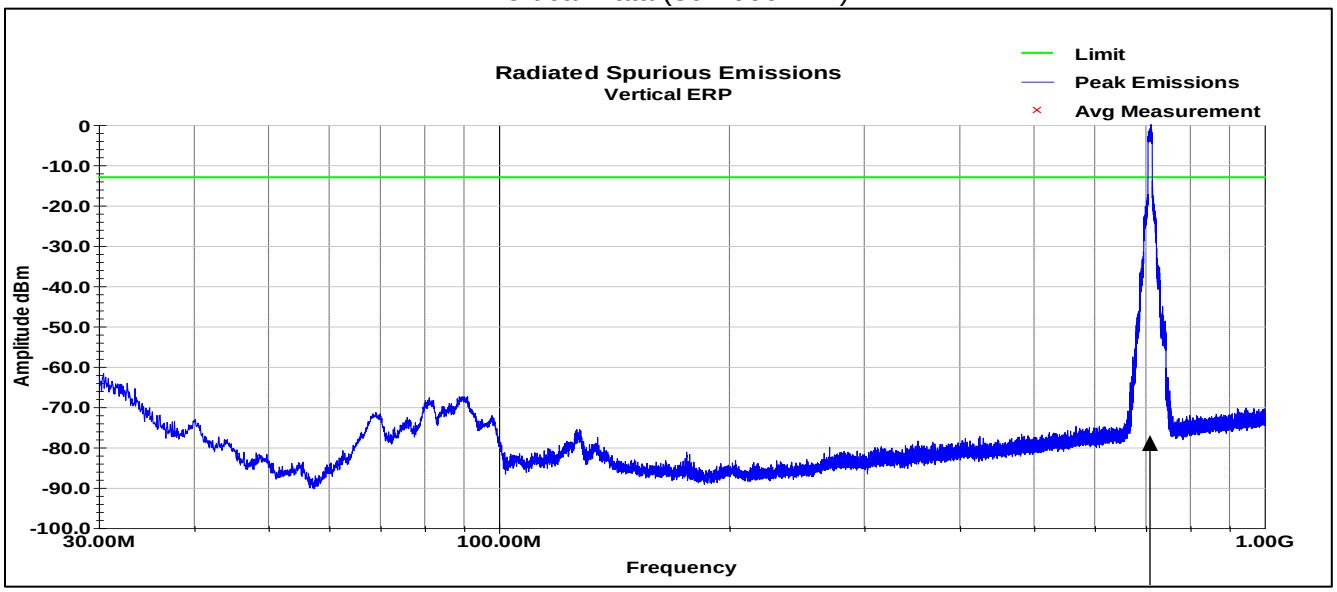
Horizontal Data (3-18GHz)



LTE Band 12, QPSK modulation, 10MHz

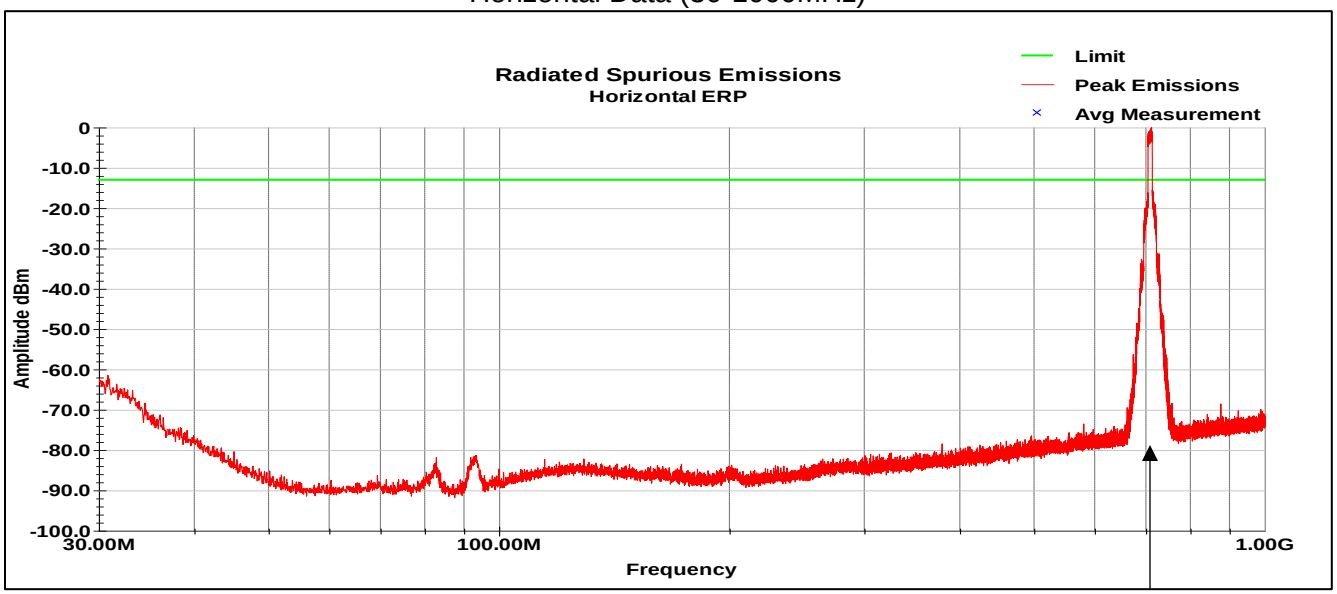
Mid Channel (23095)

Vertical Data (30-1000MHz)



Uplink + Downlink

Horizontal Data (30-1000MHz)

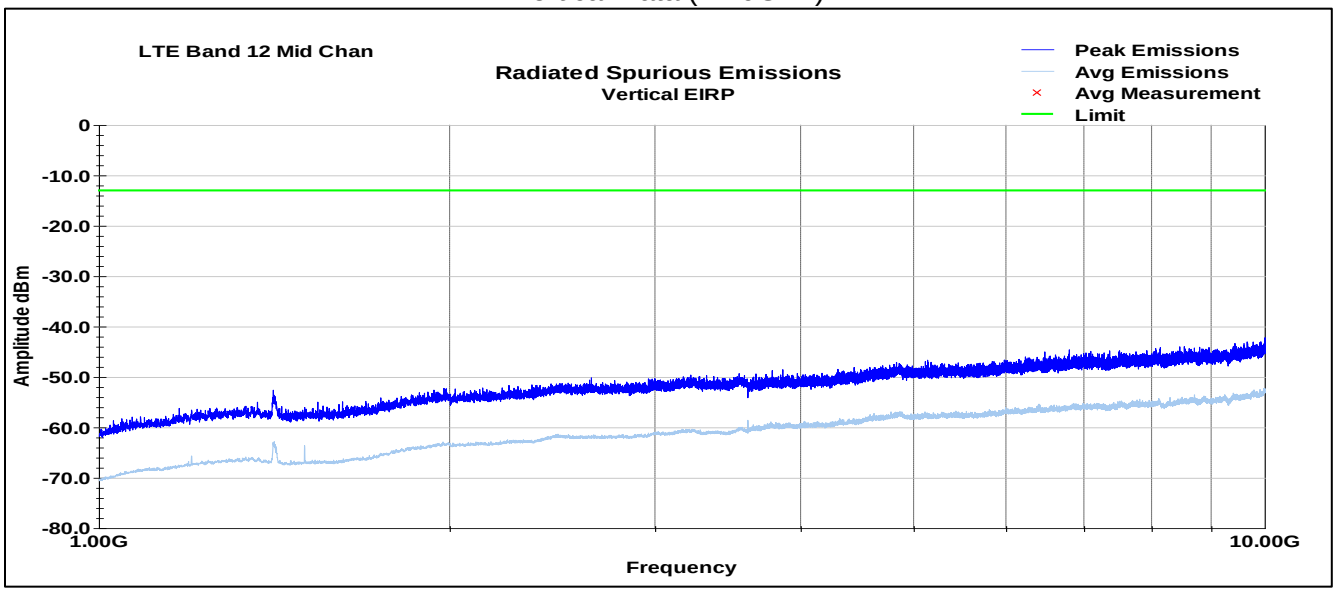


Uplink + Downlink

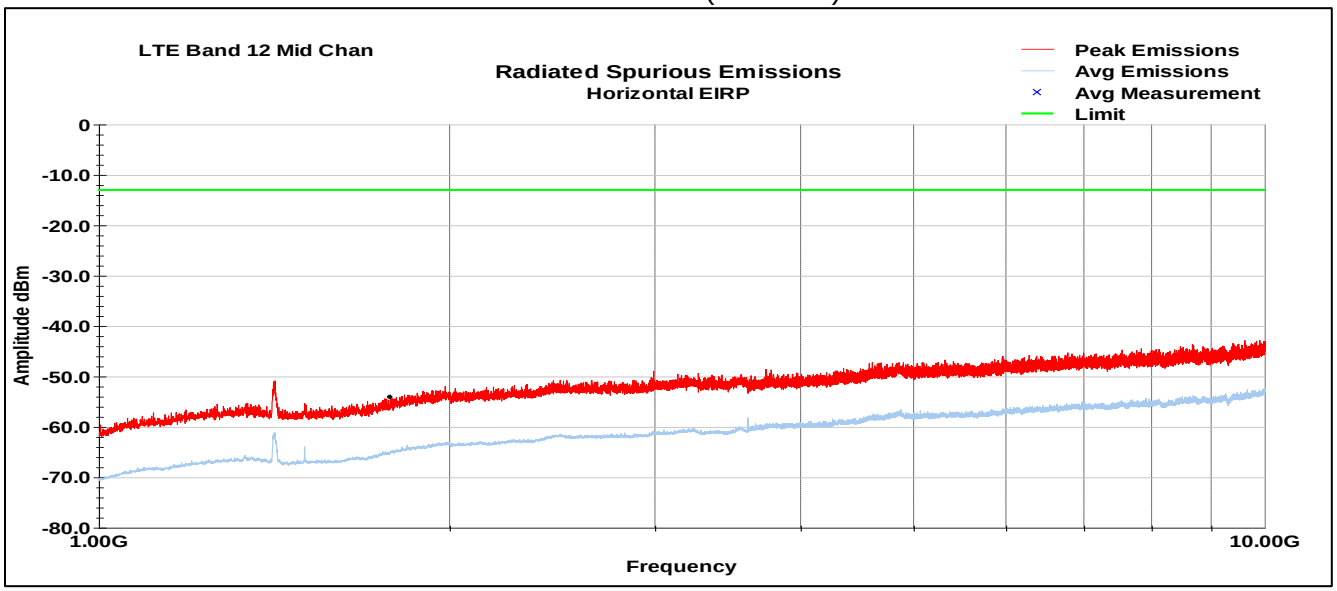
LTE Band 12, QPSK modulation, 10MHz

Mid Channel (23095)

Vertical Data (1-10GHz)



Horizontal Data (1-10GHz)



4 AC Powerline Conducted Emissions

4.1 *Test Result*

Test Description	Basic Standards	Test Result
AC Powerline Conducted Emissions, Class B	ANSI C63.04: 2014	Compliant

4.2 *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

4.3 *Test Site*

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions:

Temperature:	23.5 °C
Relative Humidity:	45.2 %
Atmospheric Pressure	97.7 kPa

4.4 *Test Equipment*

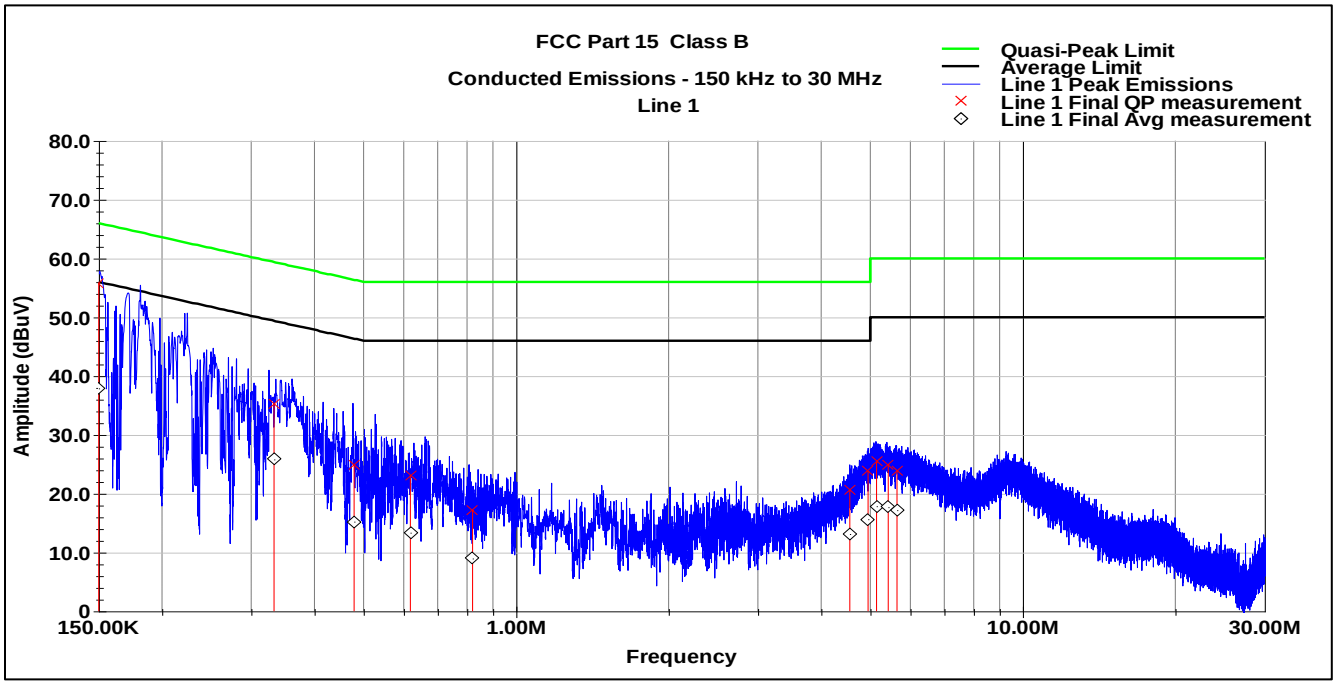
Test End Date: 10-Jul-2019 Tester: MT

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

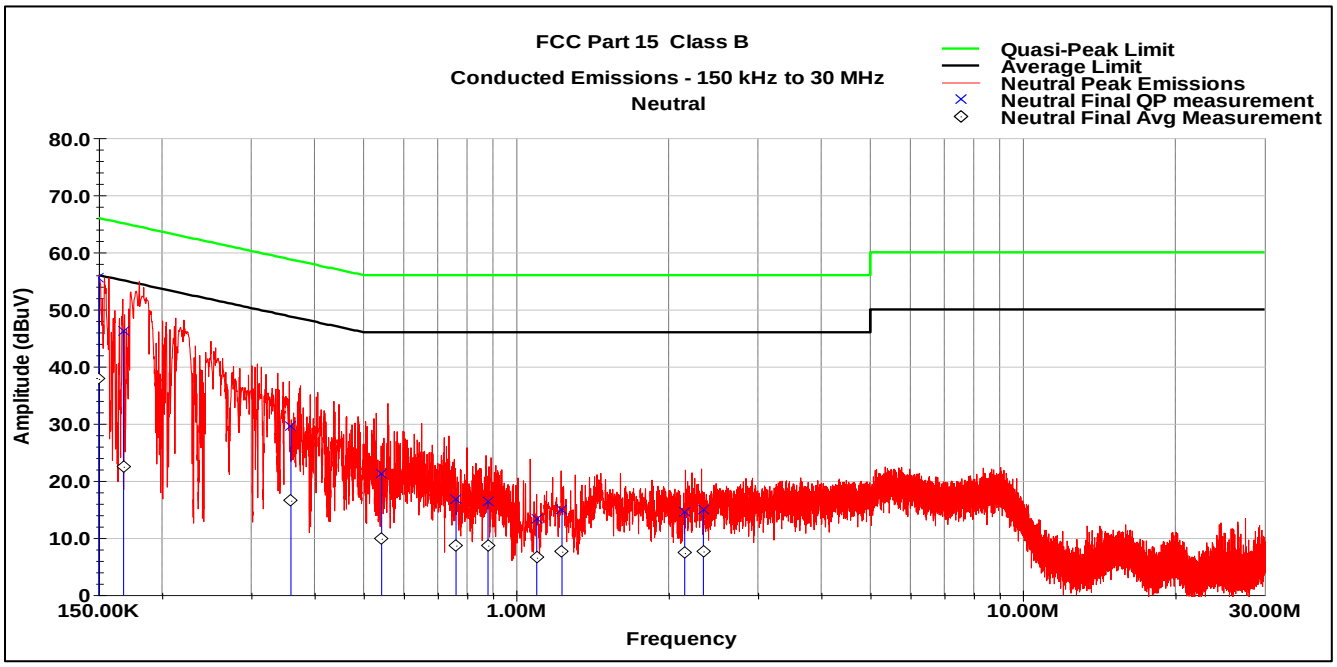
Note: The equipment calibration period is 1 year.

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

4.5 *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

5 Revision History

Revision Level	Description of changes	Revision Date
Draft	--	03 September 2019
0	Initial release	12 September 2019
1	- Corrected FCC ID and IC ID (Title page and section 2.3) - Changed note in section 1 to reference results from separate test report on u-blox module - Added AC Powerline Conducted Emissions test (sections 1 and 4)	11 December 2019
2	Updated standards references on title page	20 January 2020