



FCC ISED RF Test Report

Test Report Number	PTK-21041442-C-FCC-IC-PCB
FCC ID	2ALBDPT10
IC	23259-PT10
Applicant	Pacific Track, LLC
Applicant Address	1300 Bristol Street North, Newport Beach, CA 92660
Product Name	Telematics Device
Model (s)	PT10
Date of Receipt	07/29/2021
Date of Test	08/04/2021-08/06/2021
Report Issue Date	02/25/2022
Test Standards	47CFR Part 22 47CFR Part 24 47CFR Part 27 47CFR Part 90 RSS-130 Issue 2: Feb 2019 RSS-132 Issue 3: Jan 2013 RSS-133 Issue 6: Jan 2018 RSS-139 Issue 3: Jul 2015
Test Result	PASS

	<p>Issued by:</p> <p>Vista Compliance Laboratories 1261 Puerta Del Sol, San Clemente, CA 92673 USA www.vista-compliance.com</p>
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 <hr style="width: 80%; margin: 0 auto;"/> <p>Devin Tai (Test Technician)</p>	 <hr style="width: 80%; margin: 0 auto;"/> <p>David Zhang (Technical Manager)</p>
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REVISION HISTORY

Report Number	Version	Description	Issued Date
PTK-21041442-C-FCC-IC-PCB	01	Initial report	02/25/2022

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1 Test Summary

Test Item	Test Requirement	Test Method	Result
Field Strength of Spurious Radiation	2.1046 22.917 (a), 24.238 (a), 90.691, 27.53 (f), (g), (h), (c)(2) and (5) RSS-130(4.7.1) and (4.7.2) RSS-132 (5.5) RSS-133 (6.5) RSS-139 (6.6)	ANSI C63.26: 2015 KDB 971168 D01 Power Meas License Digital Systems v03r01 KDB 412172 D01 Determining ERP and EIRP v01r01	Pass

Note: Only radiated spurious emission test in this report, for other test item details please see module BG95-M1 original RF report (FCC ID: XMR2020BG95M1).

2 General Information

2.1 Applicant

Applicant	Pacific Track, LLC
Applicant address	1300 Bristol Street North, Suite 100, Newport Beach, CA, 92660
Manufacturer	Pacific Track, LLC
Manufacturer Address	1300 Bristol Street North, Suite 100, Newport Beach, CA, 92660

2.2 Product information

Product Name	Enhanced Cell Modem
Model Number	PT10
Family Models	N/A
Serial Number	N/A
Frequency Band	LTE B2, B4, B5, B12, B13, B25, B26, B66 and B85
Type of modulation	LTE CAT-M1: QPSK, 16QAM
Equipment Class	PCB
Antenna Information	Internal FPC antenna, P/N: WYT-CAT-F-0003 Antenna peak gain: 1 dBi (B2), 0.5 dBi (B4), 0 dBi (B5), -1.5 dBi (B12, B13), 1 dBi (B25), 0 dBi (B26), 0.5 dBi (B66), -1.5 dBi (B85)
Clock Frequencies	N/A
Input Power	12VdC (Vehicular battery)
Power Adapter Manufacturer/Model	N/A
Power Adapter SN	N/A
Hardware version	N/A
Software version	N/A
Simultaneous Transmission	N/A
Additional Info	Cellular module integrated: QUECTEL BG-95-M1Module

2.3 Test standard and method

Test standard	47CFR Part 22 47CFR Part 24 47CFR Part 27 47CFR Part 90 RSS-130 Issue 2: Feb 2019 RSS-132 Issue 3: Jan 2013 RSS-133 Issue 6: Jan 2018 RSS-139 Issue 3: Jul 2015 RSS-Gen Issue 5: Feb 2021
Test method	ANSI C63.26: 2015 KDB 971168 D01 Power Meas License Digital Systems v03r01 KDB 412172 D01 Determining ERP and EIRP v01r01

3 Test Site Information

Lab performing tests	Vista Laboratories, Inc.
Lab Address	1261 Puerta Del Sol, San Clemente, CA 92673 USA
Phone Number	+1 (949) 393-1123
Website	www.vista-compliance.com

Test Condition	Temperature	Humidity	Atmospheric Pressure
Radiated Emission Testing	23.5°C	58.2%	996 mbar

4 Modification of EUT / Deviations from Standards

N/A

5 Test Configuration and Operation

5.1 EUT Test Configuration

The EUT has the option to be powered by an vehicular 12VDC power source.
A test laptop is used to send the test commands through USB port of the EUT.
Testing was completed with worst case radio configuration.

The following software was used to monitor EUT performance

Software	Description
EMISOFT Vasona	EMC/RF Spurious emission test software used during testing
Tera term	Use command to set the EUT work at different Band/modulation etc.

5.2 Supporting Equipment

Description	Manufacturer	Model #	Serial #
Laptop	Dell	Latitude E6440	FFF4JC2

6 Uncertainty of Measurement

Test item	Measurement Uncertainty (dB)
RF Conducted Measurement (30MHz - 18GHz)	±1.5 dB
Radiated Emission (30MHz-1GHz)	±4.6 dB
Radiated Emission (1-18GHz)	±4.9 dB
Radiated Emission (18-40GHz)	±3.5 dB

7 Test Results

7.1 Strength of Spurious Radiation

7.1.1 Requirement

§ 2.1051, 22.917(a), 24.238(a), 27.53 (f), (g), (h) and (c)(2) and (5)

RSS-130(4.7.1) and (4.7.2), RSS-132(5.5), RSS-133(6.5), RSS-139(6.6)

FCC 47 CFR Part 22, Clause 22.917 (a) and FCC 47 CFR Part 24, Clause 24.238 (a)

(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

FCC 47 CFR Part 27, Clause 27.53 (c)(2) and (5)

(c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log(P)$ dB;

(5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

FCC 47 CFR Part 27, Clause 27.53 (f)

(f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

FCC 47 CFR Part 27, Clause 27.53 (g)

(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log(P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

FCC 47 CFR Part 27, Clause 27.53 (h)

(h) AWS emission limits — (1) General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB.

(3) Measurement procedure. (i) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

FCC 47 CFR Part 90, Clause 90.691

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

RSS-130, Clause 4.7.1 and 4.7.2

The unwanted emissions in any 100 kHz bandwidth on any frequency outside the low frequency edge and the high frequency edge of each frequency block range(s), shall be attenuated below the transmitter power, P (dBW), by at least $43 + 10 \log_{10} p$ (watts), dB. However, in the 100 kHz band immediately outside of the equipment's frequency block range, a resolution bandwidth of 30 kHz may be employed.

In addition to the limit outlined in section 4.7.1 above, equipment operating in the frequency bands 746- 756 MHz and 777-787 MHz shall also comply with the following restrictions:

- a) The power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power, P (dBW), by at least:
- (i) $76 + 10 \log_{10} p$ (watts), dB, for base and fixed equipment, and
 - (ii) $65 + 10 \log_{10} p$ (watts), dB, for mobile and portable equipment.
- b) The e.i.r.p. in the band 1559-1610 MHz shall not exceed -70 dBW/MHz for wideband signal and 80 dBW for discrete emission with bandwidth less than 700 Hz.

RSS-132, Clause 5.5

Mobile and base station equipment shall comply with the limits in (i) and (ii) below.

- (i) In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts).
- (ii) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.

RSS-133, Clause 6.5.1

Equipment shall comply with the limits in (i) and (ii) below.

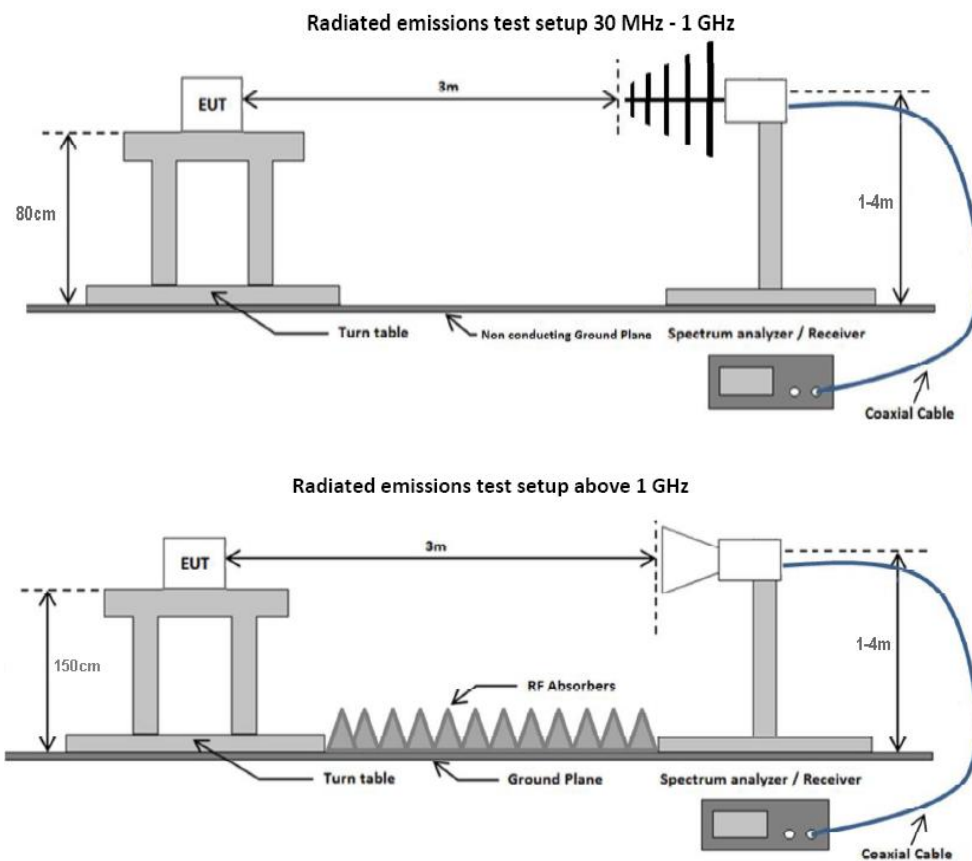
- (i) In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts).
- (ii) After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p$ (watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required.

RSS-139, Clause 6.6

(i) In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least $43 + 10 \log_{10} p$ (watts) dB.

(ii) After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least $43 + 10 \log_{10} p$ (watts) dB.

7.1.2 Test setup



7.1.3 Test Procedure

ANSI C63.26: 2015 section 5.5

KDB 971168 D01 Power Meas License Digital Systems v03r01 section 7

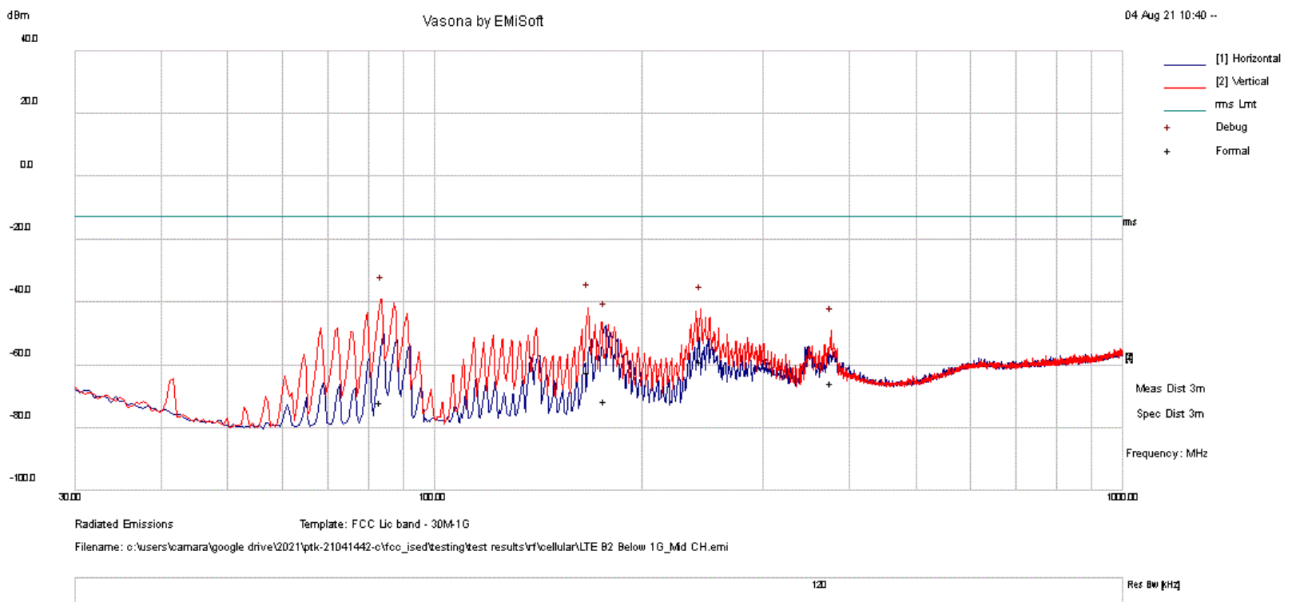
Boresight antenna mast was used during the scanning to point to EUT to maximize the emission. The process will be repeated in 3 EUT orientations.

1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. The test was carried out at the selected frequency points obtained from the EUT characterization. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:
 - a. Vertical or horizontal polarization (whichever gave the higher emission level over a full rotation of the EUT) was chosen.
 - b. The EUT was then rotated to the direction that gave the maximum emission.
 - c. Finally, the antenna height was adjusted to the height that gave the maximum emission.
3. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 300 Hz for frequency below 150KHz.
4. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 10 kHz for frequency between 150KHz – 30MHz.
5. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-Peak detection at frequency between 30MHz - 1GHz.
6. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz with Peak detection for Peak and average measurement at frequency above 1GHz.
7. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.

7.1.4 Test Result

RADIATED EMISSIONS BELOW 1 GHZ

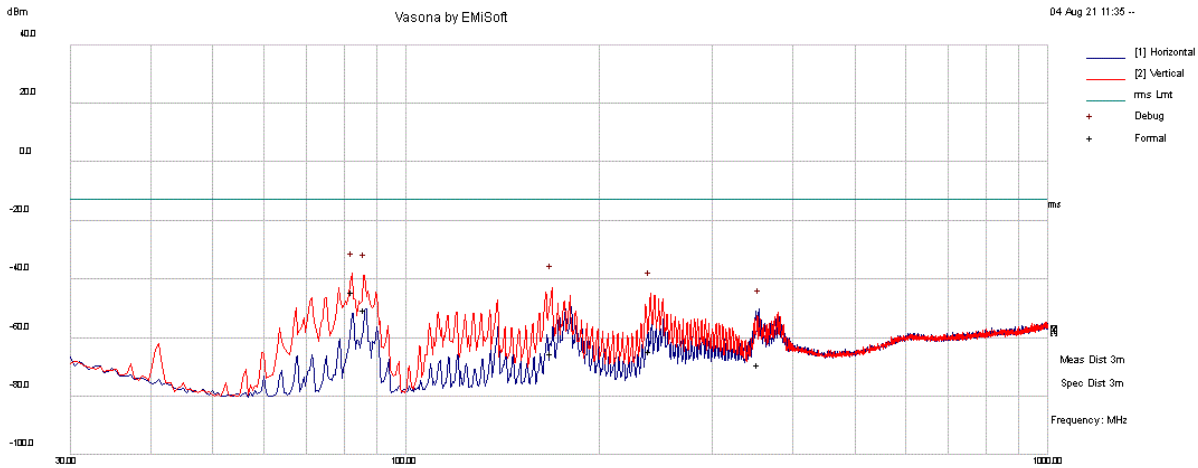
Test Standard:	Part 24E & RSS 133	Mode:	LTE Cat M1- B2
Frequency Range:	30 MHz - 1 GHz	Test Date:	08/04/2021-08/06/2021
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Devin Tai
Remark:	N/A	Test Result:	Pass



Frequency MHz	Raw dBm	Cable Loss	AF dB	Level dBm	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBm	Margin dB	Pass/Fail
83.606	-66.8	15.1	-20.2	-71.9	RMS Max	V	140	5	-13	-58.9	Pass
167.46	-60.9	16.2	-17.5	-62.2	RMS Max	V	104	237	-13	-49.2	Pass
243.49	-61	17	-14.9	-58.9	RMS Max	V	205	197	-13	-45.9	Pass
176.853	-70.5	16.3	-17.3	-71.5	RMS Max	V	140	170	-13	-58.5	Pass
376.586	-74.2	18	-9.3	-65.6	RMS Max	V	101	6	-13	-52.6	Pass

RADIATED EMISSIONS BELOW 1 GHZ

Test Standard:	Part 27 & RSS 139	Mode:	LTE Cat M1- B4
Frequency Range:	30 MHz - 1 GHz	Test Date:	08/04/2021-08/06/2021
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Devin Tai
Remark:	N/A	Test Result:	Pass



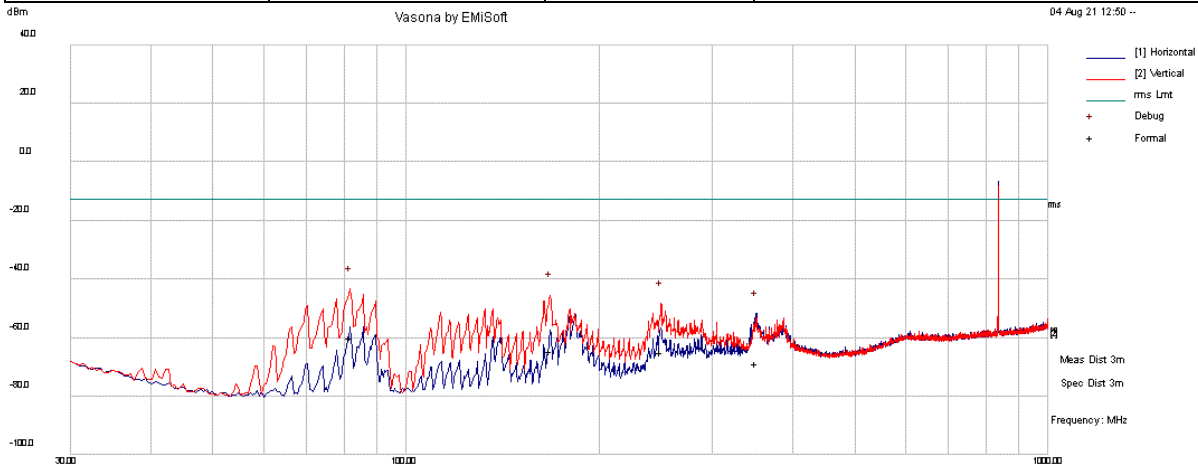
Radiated Emissions
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Res BW [Hz]

Frequency MHz	Raw dBm	Cable Loss	AF dB	Level dBm	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBm	Margin dB	Pass/Fail
82.404	-39	15.1	-20.3	-44.2	RMS Max	V	122	96	-13	-31.2	Pass
86.099	-45.2	15.2	-20.2	-50.3	RMS Max	V	130	97	-13	-37.3	Pass
168.479	-63.9	16.2	-17.5	-65.2	RMS Max	V	146	126	-13	-52.2	Pass
239.935	-66.5	16.9	-15	-64.6	RMS Max	V	100	190	-13	-51.6	Pass
354.457	-76	17.8	-10.8	-68.9	RMS Max	V	168	190	-13	-55.9	Pass

RADIATED EMISSIONS BELOW 1 GHZ

Test Standard:	Part 22H & RSS 132	Mode:	LTE Cat M1- B5
Frequency Range:	30 MHz - 1 GHz	Test Date:	08/04/2021-08/06/2021
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Devin Tai
Remark:	N/A	Test Result:	Pass



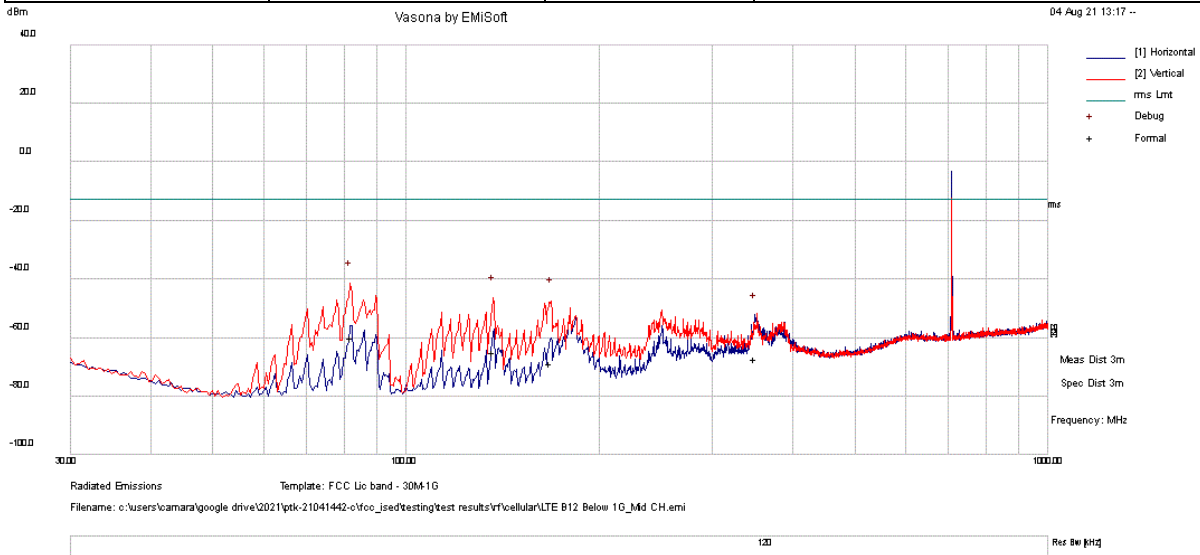
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 Filename: c:\users\camara\google drive\2021\ptk-21041442-c\fcc_issd\testing\test results\vt\cellular\LTE B5 Below 1G_Mid CH.emi

Frequency MHz	Raw dBm	Cable Loss	AF dB	Level dBm	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBm	Margin dB	Pass/Fail
81.959	-54.9	15.1	-20.3	-60	RMS Max	V	179	67	-13	-47	Pass
167.749	-63.1	16.2	-17.5	-64.4	RMS Max	V	121	130	-13	-51.4	Pass
249.898	-67.2	17	-14.6	-64.8	RMS Max	V	100	220	-13	-51.8	Pass
351.475	-75.5	17.8	-11	-68.6	RMS Max	V	118	227	-13	-55.6	Pass

Note: Frequency at around 836.5MHz is EUT fundamental emission.

RADIATED EMISSIONS BELOW 1 GHZ

Test Standard:	Part 27 & RSS 130	Mode:	LTE Cat M1- B12
Frequency Range:	30 MHz - 1 GHz	Test Date:	08/04/2021-08/06/2021
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Devin Tai
Remark:	N/A	Test Result:	Pass

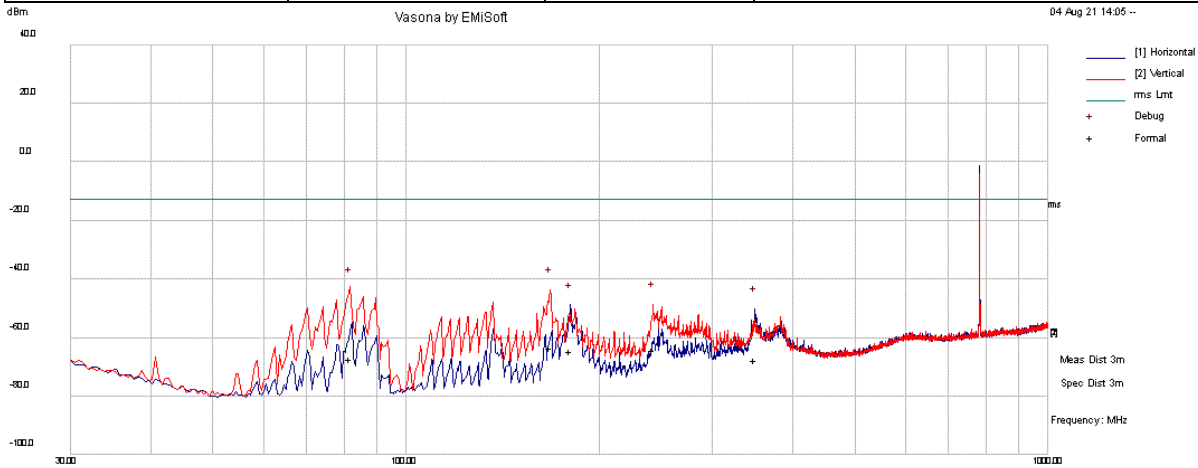


Frequency MHz	Raw dBm	Cable Loss	AF dB	Level dBm	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBm	Margin dB	Pass/Fail
82.117	-54.8	15.1	-20.3	-60	RMS Max	V	103	143	-13	-47	Pass
137.024	-62.7	15.9	-18.1	-64.9	RMS Max	V	0	262	-13	-51.9	Pass
168.141	-67.5	16.2	-17.5	-68.8	RMS Max	V	165	135	-13	-55.8	Pass
349.72	-73.9	17.8	-11.1	-67.2	RMS Max	V	100	322	-13	-54.2	Pass

Note: Frequency at around 707.5MHz is EUT fundamental emission.

RADIATED EMISSIONS BELOW 1 GHZ

Test Standard:	Part 27 & RSS 130	Mode:	LTE Cat M1- B13
Frequency Range:	30 MHz - 1 GHz	Test Date:	08/04/2021-08/06/2021
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Devin Tai
Remark:	N/A	Test Result:	Pass



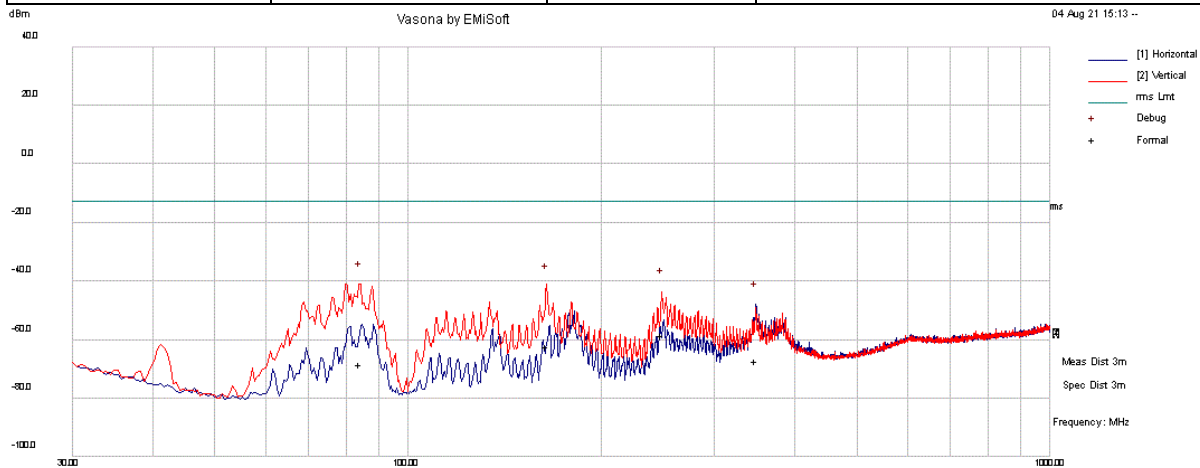
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Frequency MHz	Raw dBm	Cable Loss	AF dB	Level dBm	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBm	Margin dB	Pass/Fail
167.572	-61.9	16.2	-17.5	-63.2	RMS Max	V	0	104	-13	-50.2	Pass
81.81	-61.9	15.1	-20.3	-67.1	RMS Max	V	381	128	-13	-54.1	Pass
242.528	-66	17	-14.9	-63.9	RMS Max	V	100	176	-13	-50.9	Pass
180.659	-63.4	16.3	-17.3	-64.3	RMS Max	V	117	0	-13	-51.3	Pass
349.623	-74.4	17.8	-11.1	-67.7	RMS Max	V	100	345	-13	-54.7	Pass

Note: Frequency at around 782 MHz is EUT fundamental emission.

RADIATED EMISSIONS BELOW 1 GHZ

Test Standard:	Part 24 & RSS 133	Mode:	LTE Cat M1- B25
Frequency Range:	30 MHz - 1 GHz	Test Date:	08/04/2021-08/06/2021
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Devin Tai
Remark:	N/A	Test Result:	Pass



Radiated Emissions Template: FCC Lic band - 30M-1G
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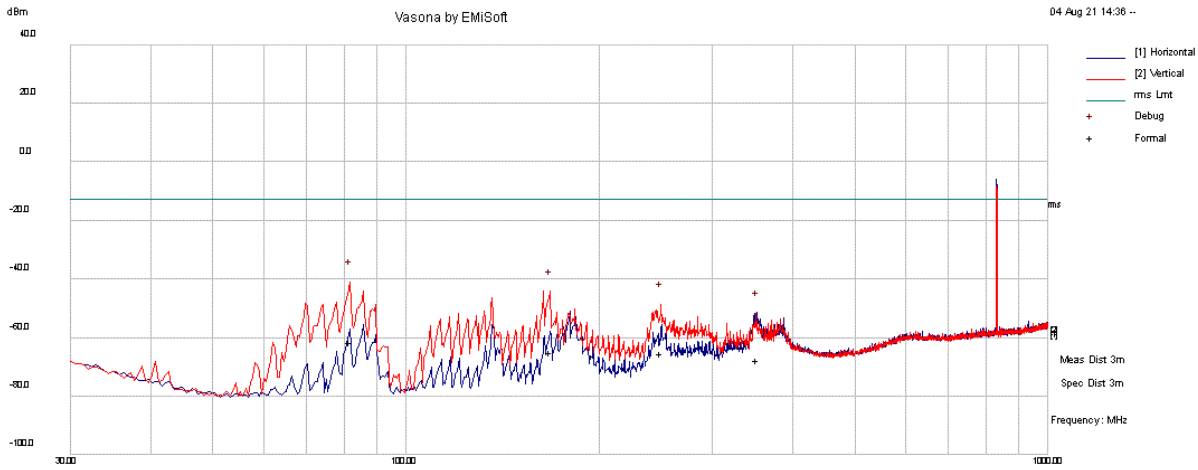
123

Res On [MHz]

Frequency MHz	Raw dBm	Cable Loss	AF dB	Level dBm	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBm	Margin dB	Pass/Fail
84.37	-63.1	15.1	-20.2	-68.2	RMS Max	V	259	94	-13	-55.2	Pass
164.548	-60.9	16.2	-17.5	-62.2	RMS Max	V	121	206	-13	-49.2	Pass
248.915	-60.8	17	-14.6	-58.4	RMS Max	V	105	176	-13	-45.4	Pass
348.219	-73.8	17.8	-11.2	-67.2	RMS Max	V	107	317	-13	-54.2	Pass

RADIATED EMISSIONS BELOW 1 GHZ

Test Standard:	Part 22H & RSS 132	Mode:	LTE Cat M1- B26
Frequency Range:	1 GHz – 18GHz	Test Date:	08/04/2021-08/06/2021
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	N/A	Test Result:	Pass



Radiated Emissions
Template: FCC Uic band - 30M-1G
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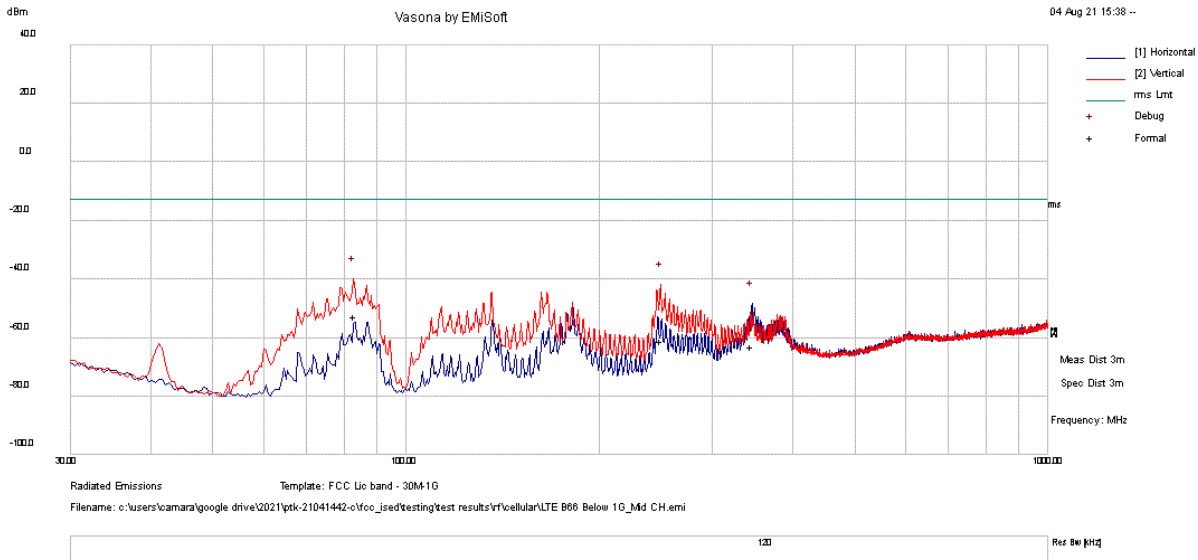
Res BW [Hz]

Frequency MHz	Raw dBm	Cable Loss	AF dB	Level dBm	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBm	Margin dB	Pass/Fail
81.783	-56.2	15.1	-20.3	-61.3	RMS Max	V	145	172	-13	-48.3	Pass
167.575	-63.7	16.2	-17.5	-65	RMS Max	V	106	258	-13	-52	Pass
249.745	-67.6	17	-14.6	-65.2	RMS Max	V	100	169	-13	-52.2	Pass
352	-74.6	17.8	-10.9	-67.7	RMS Max	V	108	0	-13	-54.7	Pass

Note: Frequency at around 831MHz is EUT fundamental emission.

RADIATED EMISSIONS BELOW 1 GHZ

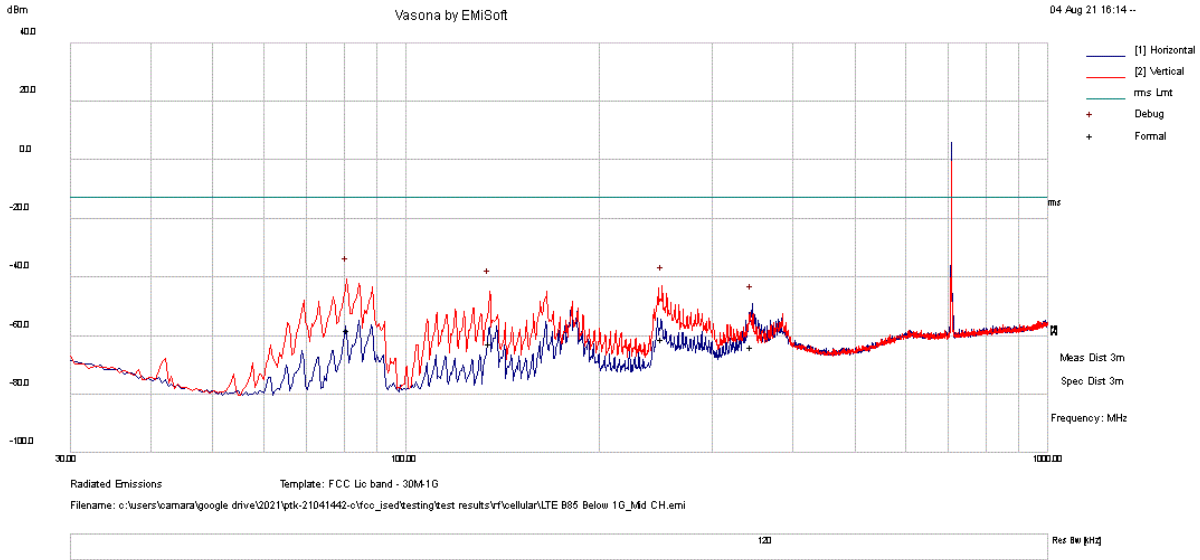
Test Standard:	Part 27 & RSS 139	Mode:	LTE Cat M1- B66
Frequency Range:	1 GHz – 18GHz	Test Date:	08/04/2021-08/06/2021
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	N/A	Test Result:	Pass



Frequency MHz	Raw dBm	Cable Loss	AF dB	Level dBm	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBm	Margin dB	Pass/Fail
83.043	-47.4	15.1	-20.2	-52.5	RMS Max	V	192	38	-13	-39.5	Pass
249.338	-63.4	17	-14.6	-61	RMS Max	V	0	162	-13	-48	Pass
345.963	-69.4	17.8	-11.3	-62.9	RMS Max	H	101	0	-13	-49.9	Pass

RADIATED EMISSIONS BELOW 1 GHZ

Test Standard:	Part 27 & RSS 130	Mode:	LTE Cat M1- B85
Frequency Range:	1 GHz – 18GHz	Test Date:	08/04/2021-08/06/2021
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	N/A	Test Result:	Pass

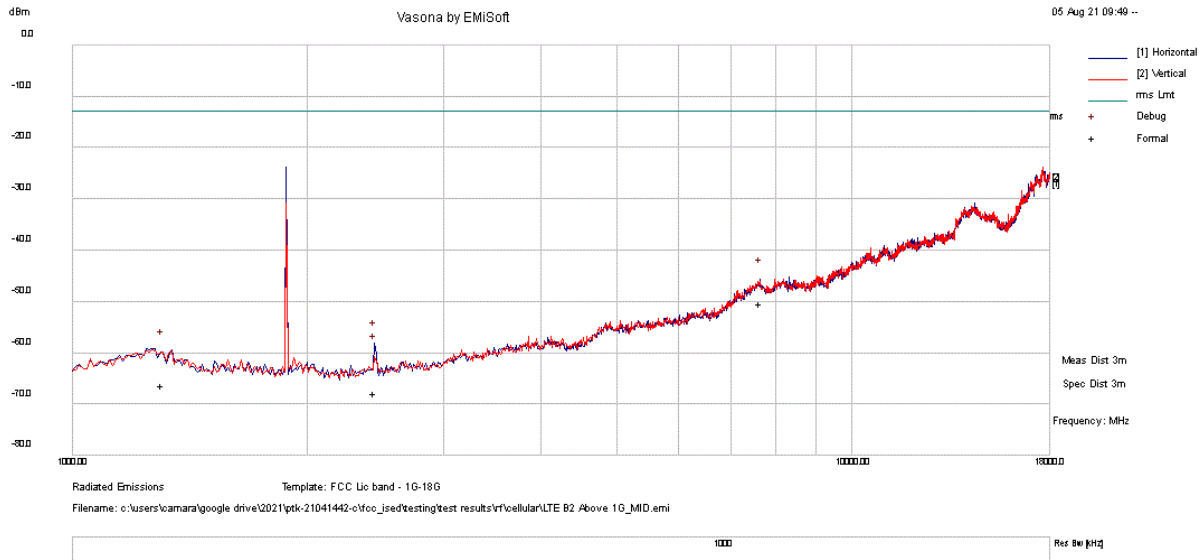


Frequency MHz	Raw dBm	Cable Loss	AF dB	Level dBm	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBm	Margin dB	Pass/Fail
81.186	-52.8	15.1	-20.3	-58	RMS Max	V	116	0	-13	-45	Pass
250.658	-63.4	17	-14.6	-60.9	RMS Max	V	100	203	-13	-47.9	Pass
135.054	-60.2	15.8	-18.1	-62.5	RMS Max	V	100	241	-13	-49.5	Pass
345.809	-70.3	17.8	-11.3	-63.8	RMS Max	H	113	271	-13	-50.8	Pass

Note: Frequency at around 707MHz is EUT fundamental emission.

RADIATED EMISSIONS 1 - 18 GHZ

Test Standard:	Part 24E & RSS 133	Mode:	LTE Cat M1- B2
Frequency Range:	1 GHz - 18GHz	Test Date:	08/04/2021-08/06/2021
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	N/A	Test Result:	Pass

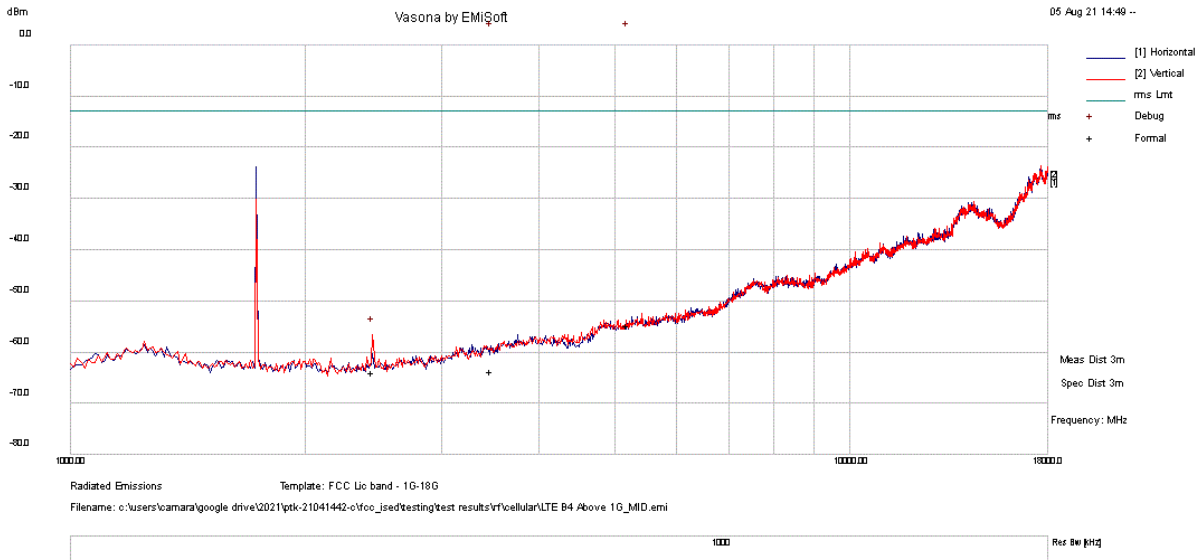


Frequency MHz	Raw dBm	Cable Loss	AF dB	Level dBm	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBm	Margin dB	Pass/Fail
7642.188	-84.5	21.6	12.6	-50.3	RMS Max	V	318	142	-13	-37.3	Pass
2443.878	-82.2	16.6	-2.1	-67.7	RMS Max	V	302	168	-13	-54.7	Pass
1302.33	-82.2	15.9	0.1	-66.2	RMS Max	V	299	320	-13	-53.2	Pass
2443.718	-82.3	16.6	-2.1	-67.7	RMS Max	V	200	106	-13	-54.7	Pass

Note: Frequency at around 1880MHz is EUT fundamental emission.

RADIATED EMISSIONS 1 - 18 GHZ

Test Standard:	Part 27 & RSS 139	Mode:	LTE Cat M1- B4
Frequency Range:	1 GHz - 18GHz	Test Date:	08/04/2021-08/06/2021
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	N/A	Test Result:	Pass

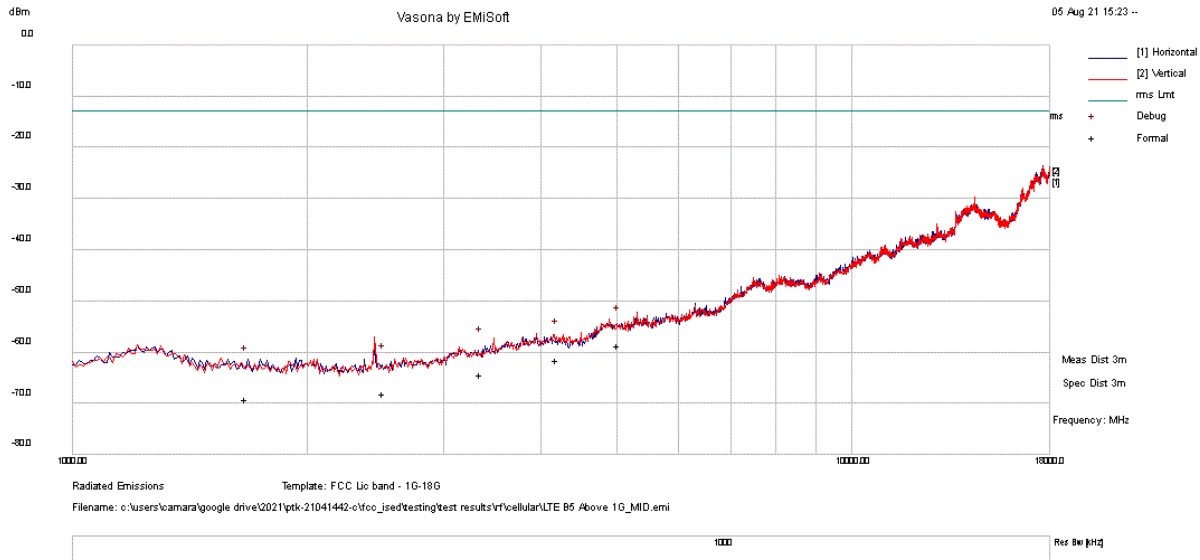


Frequency MHz	Raw dBm	Cable Loss	AF dB	Level dBm	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBm	Margin dB	Pass/Fail
3464.983	-83.3	17.6	2	-63.7	RMS Max	V	100	278	-13	-50.7	Pass
5198.333	-80.6	18.7	7.4	-54.6	RMS Max	V	143	48	-13	-41.6	Pass
2442.536	-78.4	16.6	-2.1	-63.9	RMS Max	H	236	52	-13	-50.9	Pass

Note: Frequency at around 1732.5MHz is EUT fundamental emission.

RADIATED EMISSIONS 1 - 18 GHZ

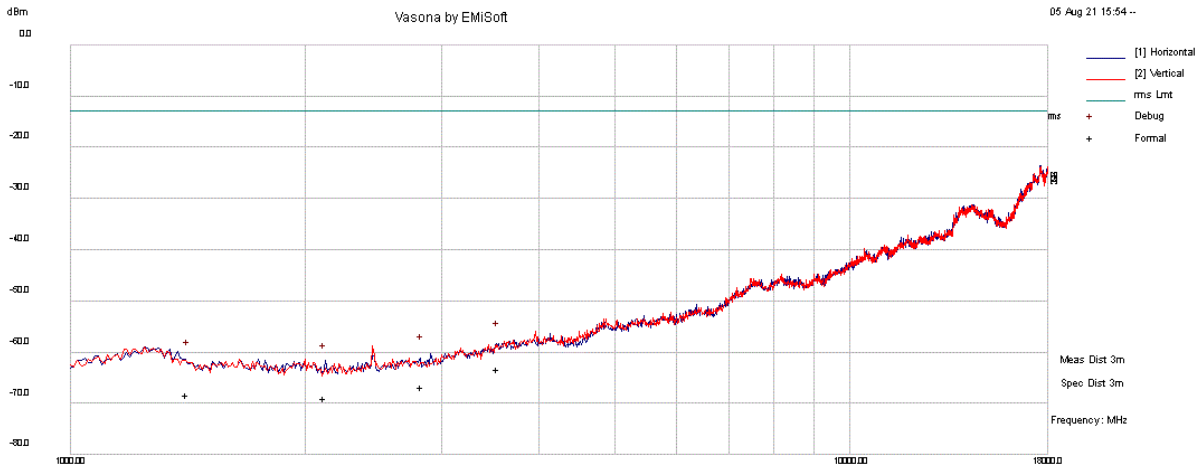
Test Standard:	Part 22H & RSS 132	Mode:	LTE Cat M1- B5
Frequency Range:	1 GHz - 18GHz	Test Date:	08/04/2021-08/06/2021
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	N/A	Test Result:	Pass



Frequency MHz	Raw dBm	Cable Loss	AF dB	Level dBm	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBm	Margin dB	Pass/Fail
5020.446	-84.4	18.7	7	-58.7	RMS Max	V	309	329	-13	-45.7	Pass
4182.528	-84	18.3	4.3	-61.4	RMS Max	V	179	0	-13	-48.4	Pass
3346.051	-83.1	17.5	1.4	-64.2	RMS Max	H	201	353	-13	-51.2	Pass
2509.031	-82.8	16.7	-1.8	-67.9	RMS Max	V	163	118	-13	-54.9	Pass
1673.457	-82.7	16.2	-2.5	-69	RMS Max	V	289	0	-13	-56	Pass

RADIATED EMISSIONS 1 - 18 GHZ

Test Standard:	Part 27 & RSS 130	Mode:	LTE Cat M1- B12
Frequency Range:	1 GHz - 18GHz	Test Date:	08/04/2021-08/06/2021
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	N/A	Test Result:	Pass



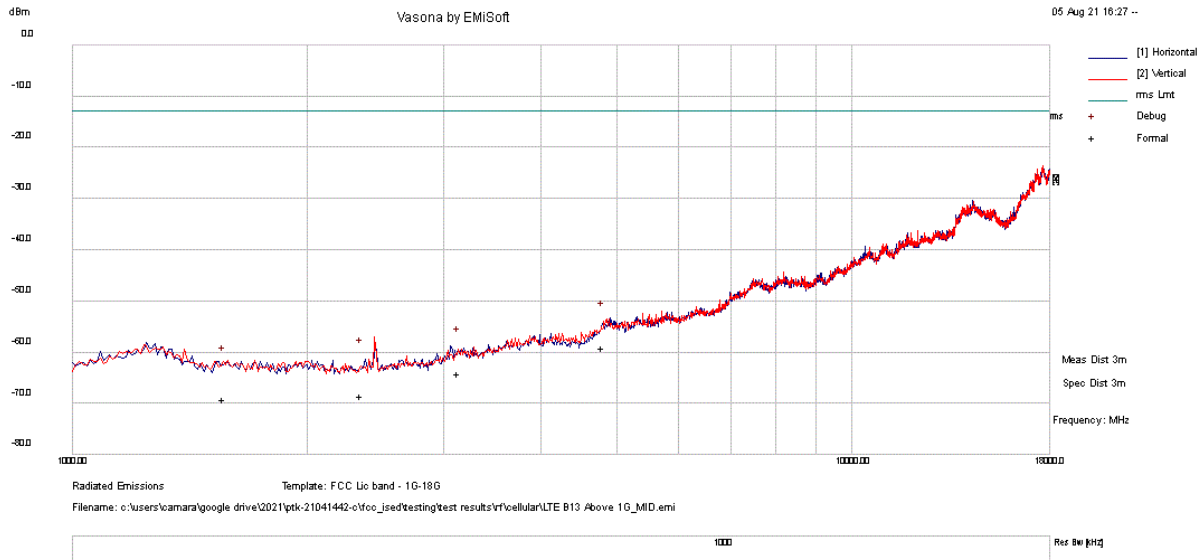
Radiated Emissions
Template: FCC Uic band - 1G-18G
Filename: c:\users\camara\google drive\2021\ptk-21041442-c\fcc_jse\testing\test results\vr\cellular\LTE B12 #Above 1G_MID.emi

Res BW [Hz]

Frequency MHz	Raw dBm	Cable Loss	AF dB	Level dBm	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBm	Margin dB	Pass/Fail
3537.572	-83.3	17.7	2.4	-63.2	RMS Max	V	263	242	-13	-50.2	Pass
2831.191	-82.8	17	-1	-66.8	RMS Max	V	224	262	-13	-53.8	Pass
1413.814	-83.5	16.1	-0.8	-68.2	RMS Max	H	278	6	-13	-55.2	Pass
2122.692	-82.8	16.3	-2.4	-68.8	RMS Max	H	279	252	-13	-55.8	Pass
3537.572	-83.3	17.7	2.4	-63.2	RMS Max	V	263	242	-13	-50.2	Pass

RADIATED EMISSIONS 1 - 18 GHZ

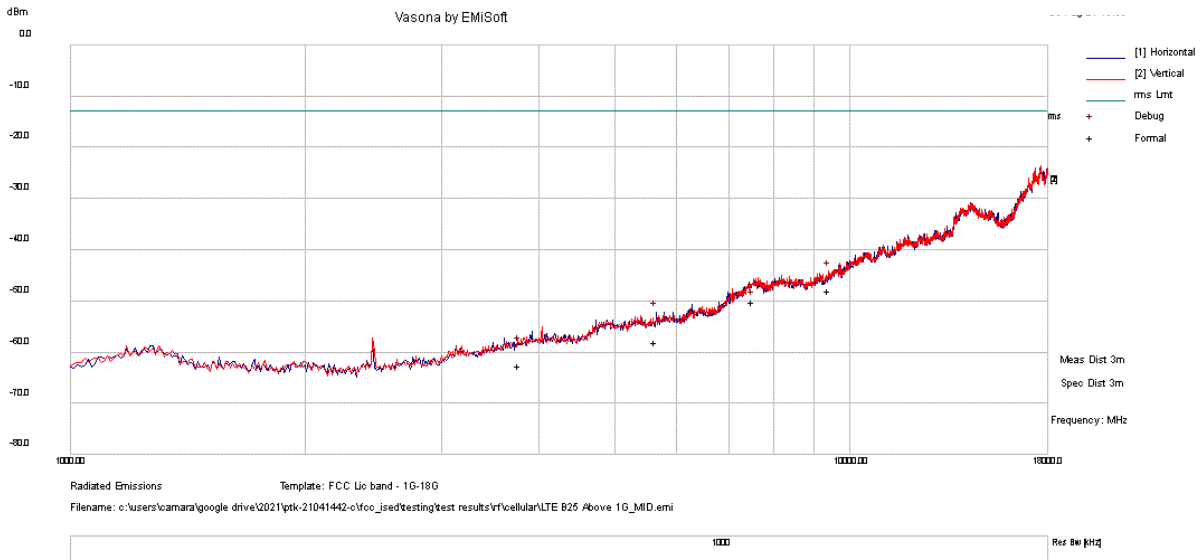
Test Standard:	Part 27 & RSS 130	Mode:	LTE Cat M1- B13
Frequency Range:	1 GHz - 18GHz	Test Date:	08/04/2021-08/06/2021
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	N/A	Test Result:	Pass



Frequency MHz	Raw dBm	Cable Loss	AF dB	Level dBm	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBm	Margin dB	Pass/Fail
4790.409	-84.2	18.6	6.5	-59.1	RMS Max	H	185	328	-13	-46.1	Pass
3128.863	-82	17.3	0.6	-64.1	RMS Max	V	103	188	-13	-51.1	Pass
2345.373	-82.7	16.6	-2.2	-68.4	RMS Max	H	400	37	-13	-55.4	Pass
1565.833	-83.1	16.2	-2.1	-69	RMS Max	V	247	0	-13	-56	Pass

RADIATED EMISSIONS 1 - 18 GHZ

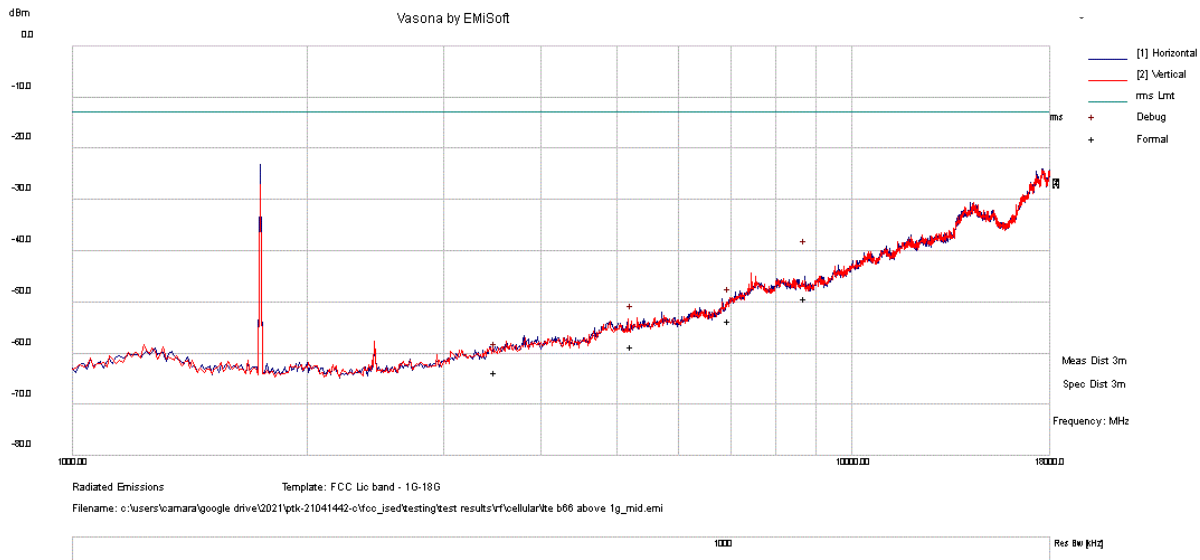
Test Standard:	Part 24E & RSS 133	Mode:	LTE Cat M1- B25
Frequency Range:	1 GHz - 18GHz	Test Date:	08/04/2021-08/06/2021
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	N/A	Test Result:	Pass



Frequency MHz	Raw dBm	Cable Loss	AF dB	Level dBm	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBm	Margin dB	Pass/Fail
9411.11	-85.2	22.3	15	-47.9	RMS Max	H	291	104	-13	-34.9	Pass
7532.423	-84.1	21.6	12.5	-50.1	RMS Max	V	381	296	-13	-37.1	Pass
5649.485	-84.2	18.9	7.3	-58	RMS Max	V	232	0	-13	-45	Pass
3764.226	-84.1	17.9	3.5	-62.6	RMS Max	H	262	19	-13	-49.6	Pass

RADIATED EMISSIONS 1 - 18 GHZ

Test Standard:	Part 27 & RSS 139	Mode:	LTE Cat M1 - B66
Frequency Range:	1 GHz - 18GHz	Test Date:	08/04/2021-08/06/2021
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	N/A	Test Result:	Pass

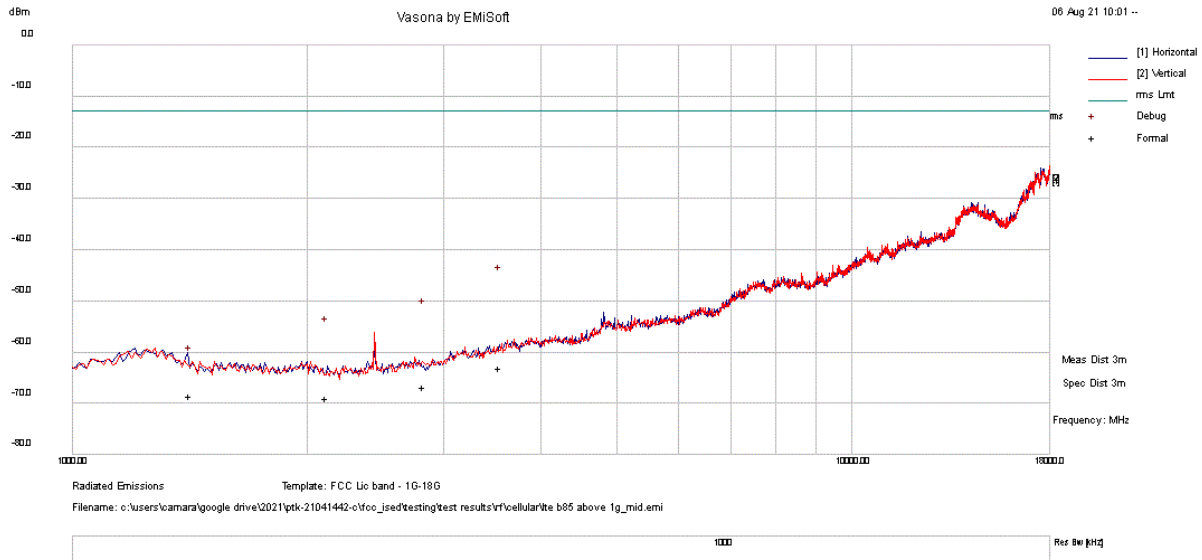


Frequency MHz	Raw dBm	Cable Loss	AF dB	Level dBm	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBm	Margin dB	Pass/Fail
8724.753	-85.4	21.7	14.6	-49.2	RMS Max	H	132	0	-13	-36.2	Pass
6980.258	-84.4	20.5	10.3	-53.6	RMS Max	V	139	247	-13	-40.6	Pass
5234.388	-84.7	18.7	7.5	-58.6	RMS Max	V	107	110	-13	-45.6	Pass
3489.65	-83.5	17.7	2.1	-63.7	RMS Max	H	169	218	-13	-50.7	Pass

Note: Frequency at around 1745MHz is EUT fundamental emission.

RADIATED EMISSIONS 1 - 18 GHZ

Test Standard:	Part 27 & RSS 130	Mode:	LTE Cat M1- B85
Frequency Range:	1 GHz - 18GHz	Test Date:	08/04/2021-08/06/2021
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Devin Tai
Remark:	N/A	Test Result:	Pass



Frequency MHz	Raw dBm	Cable Loss	AF dB	Level dBm	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBm	Margin dB	Pass/Fail
3535.888	-83.2	17.7	2.4	-63	RMS Max	V	323	359	-13	-50	Pass
2828.862	-82.7	17	-1	-66.7	RMS Max	H	400	224	-13	-53.7	Pass
2120.965	-82.9	16.3	-2.4	-68.9	RMS Max	V	355	348	-13	-55.9	Pass
1415.177	-83.7	16.1	-0.9	-68.5	RMS Max	V	118	312	-13	-55.5	Pass

18GHz - 40GHz test result

Note: no substantial emission is found other than the noise floor.
Different modes have been verified.

8 EUT and Test Setup Photos

See FCC exhibits

9 Test Instrument List

Equipment	Manufacturer	Model	Instrument Number	Cal. Date	Cal. Due
Semi-Anechoic Chamber	ETS-Lindgren	10M	VL001	10/18/2019	10/18/2021
Shielding Control Room	ETS-Lindgren	Series 81	VL006	N/A	N/A
Spectrum Analyzer	Keysight	N9020A	MY50110074	06/17/2021	06/17/2022
EMC Test Receiver	R&S	ESL6	100230	06/14/2021	06/14/2022
LISN (9KHz – 30MHz)	EMCO	3816/2	9705-1066	05/04/2021	05/04/2022
LISN (9KHz – 30MHz)	Com-Power	LI-550C	20140050	01/29/2021	01/29/2022
LISN (9KHz – 30MHz)	Com-Power	LI-550C	20140051	01/29/2021	01/29/2022
Bi-Log Antenna	ETS-Lindgren	3142E	217921	11/15/2020	11/15/2021
Horn Antenna (1-18GHz)	Electro-Metrics	EM-6961	6292	05/14/2021	05/14/2022
Horn Antenna (18-40GHz)	Com-Power	AH-840	101109	06/24/2021	06/24/2022
Preamplifier	RF Bay, Inc.	LPA-10-20	11180621	07/16/2021	07/16/2022
True RMS Multi-meter	UNI-T	UT181A	C173014829	05/05/2021	05/05/2022
Temp / Humidity / Pressure Meter	PCE Instruments	PCE-THB 40	R062028	05/15/2021	05/15/2022
RF Attenuator	Pasternack	PE7005-3	VL061	07/16/2021	07/16/2022
Preamplifier 100KHz - 40GHz	Aeroflex	33711-392-77150-11	064	07/16/2021	07/16/2022
EM Center Control	ETS-Lindgren	7006-001	160136	N/A	N/A
Turn Table	ETS-Lindgren	2181-3.03	VL002	N/A	N/A
Boresight Antenna Tower	ETS-Lindgren	2171B	VL003	N/A	N/A
Loop Antenna (9k-30MHz)	Com-Power	AL-130	121012	5/16/21	5/16/22
RE test cable(below 6GHz)	Vista	RE-6GHz-01	RE-6GHz-01	07/16/2021	07/16/2022
RE test cable (1-18GHz)	PhaseTrack	II-240	RE-18GHz-01	07/16/2021	07/16/2022
RE test cable (>18GHz)	Sucoflex	104	344903/4	07/16/2021	07/16/2022
Pulse limiter	Com-Power	LIT-930A	531727	07/16/2021	07/16/2022
CE test cable #1	FIRST RF	FRF-C-1002-001	CE-6GHz-01	07/16/2021	07/16/2022
CE test cable#2	FIRST RF	FRF-C-1002-001	CE-6GHz-02	07/16/2021	07/16/2022
Vector Signal Generator	Keysight	N5182A	US47080548	06/17/2021	06/17/2022
RF Power Amplifier (80-1000MHz)	Ophir	5226FE	1013/1815	N/A	N/A
RF Power Amplifier (700-6000MHz)	Ophir	5293FE	1063/1815	N/A	N/A
Horn Antenna (1-18GHz)	FT-RF	HA-07M18G-NF	180010HA	N/A	N/A

---END---