

FCC/ISED RF TEST REPORT



Vista Labs
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Test Report Number.....	CMP-19061922-LC-FCC-IC-PCB
Applicant.....	CalAmp
Applicant Address.....	2177 Salk Ave, Suite 200, Carlsbad, CA 92008 USA
Product Name.....	HotSpot OBD Dongle
Model Number.....	LMU3240LAW
Family Product/Model.....	N/A
FCC ID.....	APV-3240LA
ISED ID.....	5843C-3240LA
Date of EUT received.....	06/27/2019
Date of Test.....	06/27/2019 – 07/11/2019
Report Issue Date.....	07/19/2019
Test Standards.....	47CFR Part 22 47CFR Part 24 47CFR Part 27 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

Issued By:

Vista Laboratories

1261 Puerta Del Sol, San Clemente, CA 92673 USA

www.vista-compliance.com

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report. This report is not to be reproduced by any means except in full and in any case not without the written approval of Vista Laboratories.

Tested by:

Bruce Li/Test Engineer

Approved By:

David Zhang/Technical Manager



Laboratory Introduction

Vista Labs is an A2LA accredited 17025 compliant regulatory compliance testing laboratories (Cert. number: 4848-01) strategically located in Orange County, providing services in the electrical and telecommunication industries. Vista labs is also recognized testing facility for Australia (ACMA), Chinese Taipei (BSMI), Chinese Taipei (NCC), Hong Kong (OFCA), Israel (MOC), Korea (RRA), Singapore (IMDA), Vietnam (MIC), etc.

Our comprehensive testing services include safety testing, EMC emission and susceptibility testing, RF and wireless testing (including DFS).

As your partner, Vista investigates appropriate test standards, develops test plans, performs troubleshooting & failure analysis, reviews documentation, and provides test reports for a complete compliance testing and certification package.



17025 Product Testing Accreditation Certificate



17065 Product Certification Accreditation Certificate



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Product:	HotSpot OBD Dongle
Model Number:	LMU3240LAW



REVISION HISTORY

Revision	Issue Date	Description	Note
Original	07/19/2019	Original release	N/A

1 General Information

1.1 Applicant

Applicant:	CalAmp
Applicant address:	2177 Salk Ave, Suite 200, Carlsbad, CA 92008 USA
Manufacturer:	CalAmp
Manufacturer Address:	2177 Salk Ave, Suite 200, Carlsbad, CA 92008 USA

1.2 Product information

Product Name	HotSpot OBD Dongle
Model Number	LMU3240LAW
Family Model Number	N/A
Serial Number	N/A
Frequency Band	BT BDR/EDR: 2402-2480MHz BLE: 2402-2480MHz 802.11b/g/n-20MHz: 2412-2462MHz 802.11n-40MHz: 2422-2452MHz 802.11a/n-20MHz: 5725-5825MHz 802.11n-40MHz: 5755-5795MHz 802.11ac: 5775MHz WCDMA Band II: 1852.4 – 1907.6 MHz WCDMA Band V: 826.4 – 846.6 MHz LTE Band 2: 1850.7-1909.3MHz LTE Band 4: 1710.7-1754.3MHz LTE Band 5: 824.7-848.3MHz LTE Band 12: 699.7-715.3MHz
Type of modulation	BT BDR/EDR: GFSK, $\pi/4$ DQPSK, 8DPSK BLE: GFSK 802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g: OFDM-CCK (BPSK, QPSK, 16QAM, 64QAM) 802.11a/n/ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) WCDMA: QPSK LTE: QPSK, 16QAM
Equipment Class/ Category	DSS, DTS, UNII, PCB
Maximum output power	See test result
Antenna Information	LDS antenna P/N: 81XKAG15.G11 Peak Gain: 2.4GHz: 0.52 dBi, 5GHz: 1.79 dBi; Cellular B2: 2.04 dBi; B4: 2.74 dBi; B5: -0.70 dBi; B12: -0.33 dBi.
Clock Frequencies	N/A
Port/Connectors	Micro USB, CAN bus
Input Power	Vehicle Battery powered: 12-24VDC
Power Adapter Manu/Model	N/A
Power Adapter SN	N/A
Hardware version	N/A
Software version	N/A
Simultaneous Transmission	BT, WLAN and WCDMA/LTE can transmit simultaneously

Report Number:	CMP-19061922-LC-FCC-IC-PCB
Product:	HotSpot OBD Dongle
Model Number:	LMU3240LAW



Additional Info

EUT is Hot Spot OBD dongle installed into vehicle resides passenger and light duty trucks that support OBD vehicle bus, it is a single box enclosure incorporating a processor, a GPS receiver, a wireless data modem in addition to WLAN, Bluetooth capabilities with vehicle-rated power supply and Vehicle bus interface.

Report Number:	CMP-19061922-LC-FCC-IC-PCB
Product:	HotSpot OBD Dongle
Model Number:	LMU3240LAW



1.3 Test standard and method

Test standard	47CFR Part 15 Subpart B: 2019 ICES-003 Issue 6: April 2019 47CFR Part 22: 2019 47CFR Part 24: 2019 47CFR Part 27: 2019 RSS-130 Issue 2: Feb 2019 RSS-132 Issue 3: Jan 2013 RSS-133 Issue 6: Jan 2018 RSS-139 Issue 3: Jul 2015 SRSP-510 Issue 5: Feb 2009 RSS-Gen Issue 5: Apr 2018
Test method	ANSI C63.26: 2015 KDB 971168 D01 Power Meas License Digital Systems v03r01 KDB 412172 D01 Determining ERP and EIRP v01r01

1.4 Test Purpose and statement

The purpose of this test report is intended to demonstrate the compliance of product listed in section 1.2, received from company listed in section 1.1, to the requirements of standard and method listed in section 1.3. Based on our test results, we conclude that the product tested complies with the requirements of the standards indicated.

2 Test site information

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

Test condition	Test Engineer	Test Environment	Test Date
RF conducted	Bruce Li	23.5°C / 58.2%/996 mbar	06/27/2019 – 07/11/2019
Radiated	Cameron Wu	23.5°C / 58.2%/996 mbar	06/27/2019 – 07/11/2019

3 Modification of EUT

N/A

4 Test configuration and operation

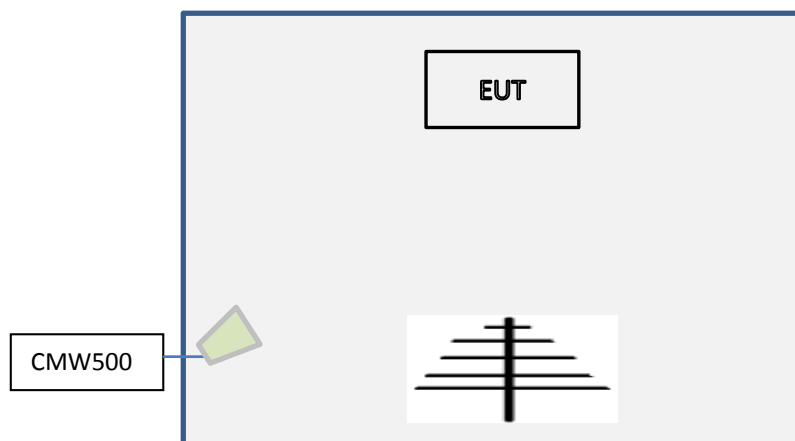
4.1 EUT test configuration

EUT is powered by external DC power supply for testing purpose. The cellular radio of EUT is connected to and controlled by CMW500, the base station emulator, communicate continuously in different modulation, test channel and data rate. For WLAN, BLE, the test software is used to set EUT to different transmission mode in terms of radio mode (WLAN, BLE), test channel, data rate, etc.

4.2 Supporting Equipment

Index	Description	Model	S/N	Brand	Remark
1	DC Power Supply	DP712	DP7B194900487	RIGOL	N/A

4.3 EUT setup diagram



4.4 EUT operation

The radio can be set to transmit continuously in different modulation, test channel and data rate.

4.5 Test software

Index	Description	Remark
1	Qualcomm Radio Control Tool	To set EUT into continuous TX and RX mode under different modulation, data rate and channel, etc.
2	EMISoft Vasona 6.0049	EMC/Spurious emission test software used during testing

Report Number:	CMP-19061922-LC-FCC-IC-PCB
Product:	HotSpot OBD Dongle
Model Number:	LMU3240LAW



6 Test Summary

FCC Rules	ISED Rules	Test Item	Section	Verdict
15.247, 15.209	RSS-247, RSS-Gen	Radiated Spurious Emissions into Restricted Frequency Bands (intentional)	8.1	Pass
2.1046 22.917 (a), 24.238 (a), 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) SRSP-510(5.1.2)	Field Strength of Spurious Radiation (licensed band)	8.2	Pass



7 Uncertainty of Measurement

Test item	Measurement Uncertainty (dB)
Radiated Emission (9KHz-30MHz)	±3.5 dB
Radiated Emission (30MHz-1GHz)	±4.6 dB
Radiated Emission (1-18GHz)	±4.9 dB
Radiated Emission (18-40GHz)	±3.5 dB

8 Test summary and result

8.1 Radiated Spurious Emissions into Restricted Frequency Bands

8.1.1 Requirement

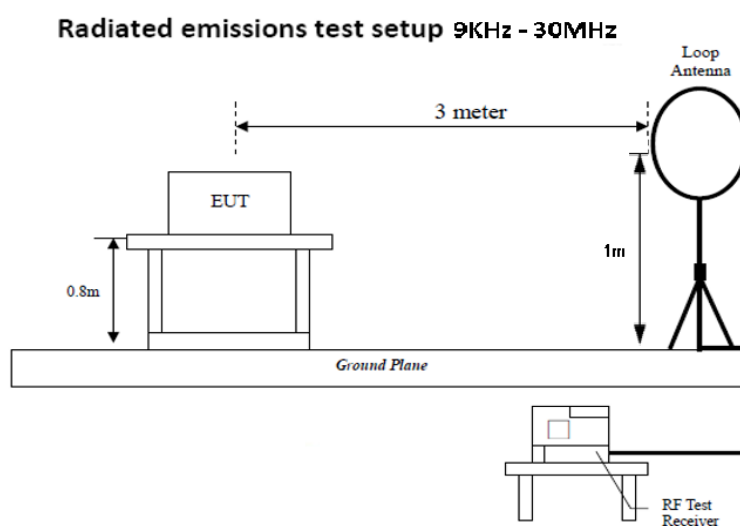
§ 15.247 (d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

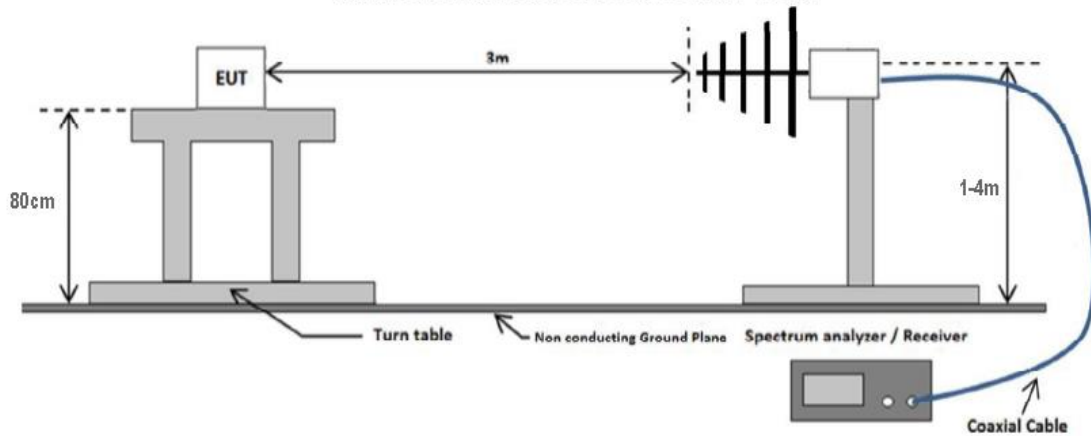
Attenuation below the general limits specified in §15.209(a) and RSS-Gen is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Frequency range (MHz)	Field Strength ($\mu\text{V}/\text{m}$)
0.009~0.490	2400/F(KHz)
0.490~1.705	24000/F(KHz)
1.705~30.0	30
30 – 88	100
88 – 216	150
216 960	200
Above 960	500

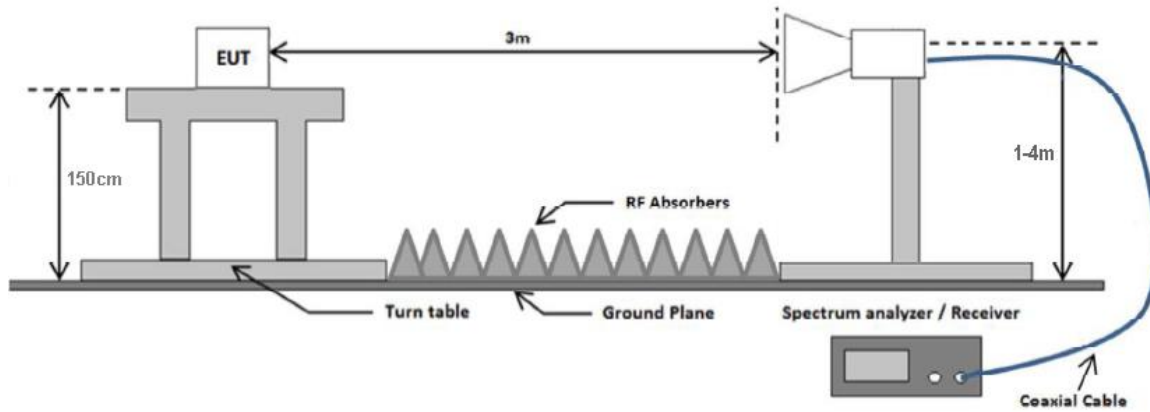
8.1.2 Test setup



Radiated emissions test setup 30 MHz - 1 GHz



Radiated emissions test setup above 1 GHz



8.1.3 Test Procedure

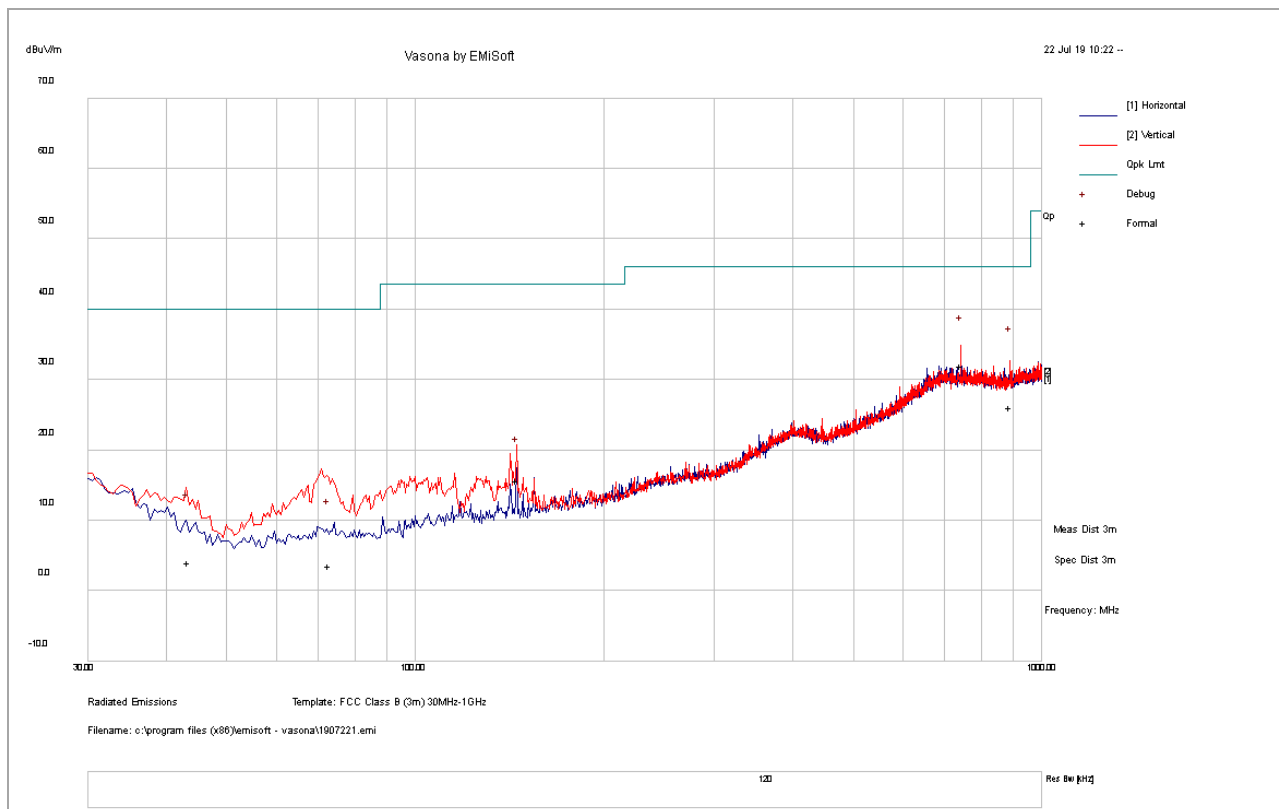
According to section 8.6 in KDB 558074 D01 DTS Meas Guidance v05r01 and subclause 11.12.2.7 Radiated spurious emission measurements in ANSI C62.10-2013 as well as the procedures for maximizing and measuring radiated emissions that are described in ANSI C63.10 was followed. Boresight antenna mast was 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.

8.1.4 Test Result

30-1000MHz test result under FCC Part 15C

Test Standard:	15.209	Mode:	11b+BLE+WCDMA B2
Frequency Range:	30-1000MHz	Test Date:	07/11/2019
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Cameron Wu
Remark:	N/A	Test Result:	Pass



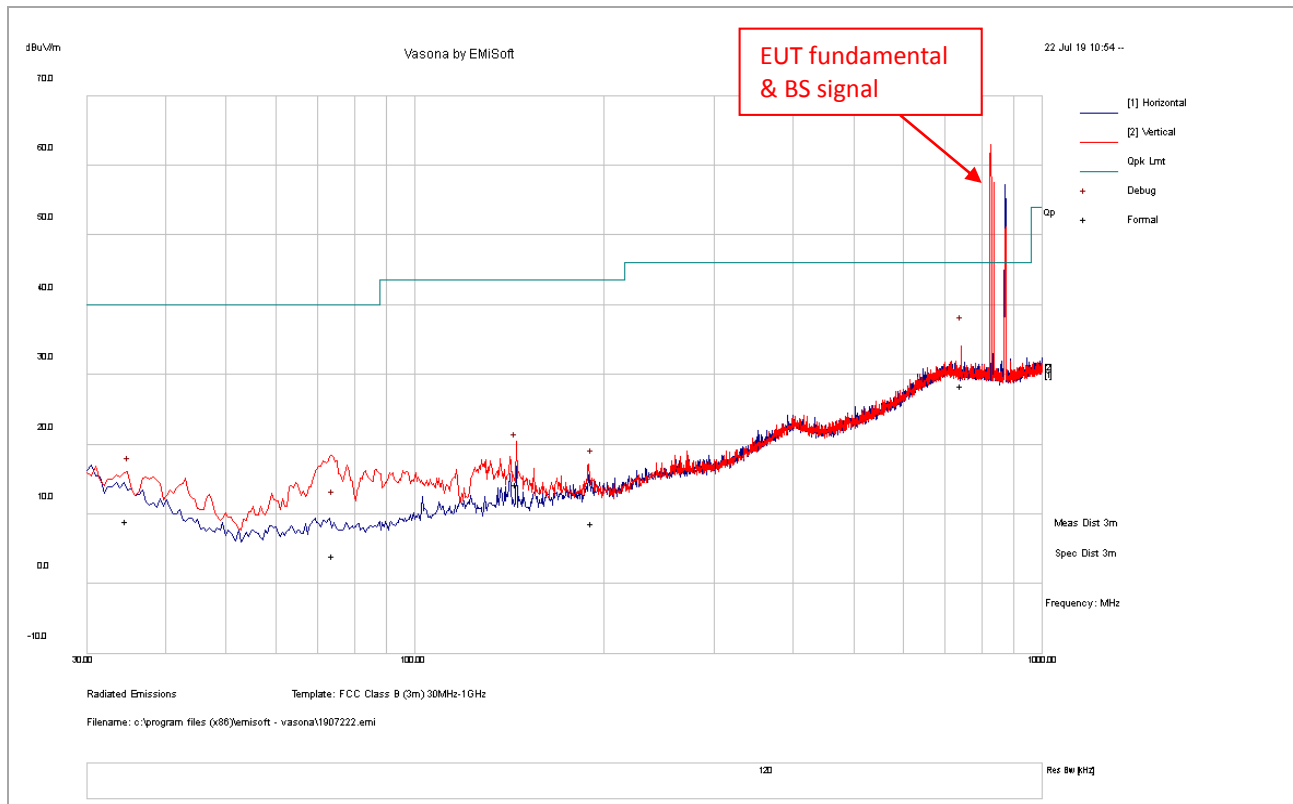
Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
741.79	31.33	7.28	-6.58	32.04	QP	H	246	69	46.00	-13.96
890.22	25.77	7.58	-7.19	26.15	QP	V	339	109	46.00	-19.85
145.19	34.15	4.19	-22.61	15.73	QP	H	181	266	43.50	-27.77
43.45	23.69	2.64	-22.25	4.08	QP	H	258	225	40.00	-35.92
72.94	24.78	3.21	-24.33	3.67	QP	H	183	46	40.00	-36.33

Note:

- 1) For below 1GHz, all different channel and modes were verified but only the worst case result is shown here.
- 2) No outstanding result was found for below 30MHz other than ambient noise floor.
- 3) EUT was tested in 3 orientations.

30-1000MHz test result under FCC Part 15C

Test Standard:	15.209	Mode:	11a 5G+BT+WCDMA B5
Frequency Range:	30-1000MHz	Test Date:	07/11/2019
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Cameron Wu
Remark:	N/A	Test Result:	Pass



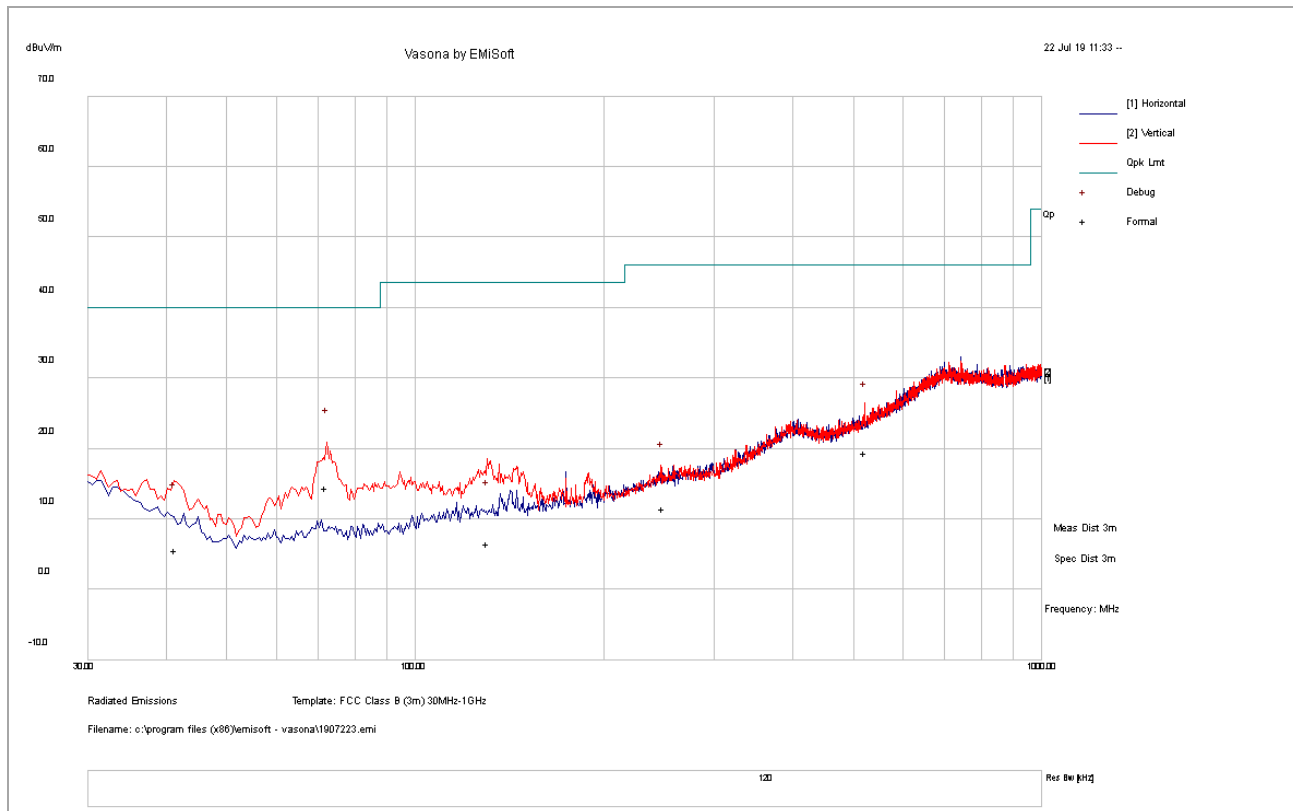
Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
741.79	27.78	7.28	-6.58	28.49	QP	H	172	95	46.00	-17.51
34.71	23.97	2.39	-17.38	8.98	QP	H	168	353	40.00	-31.02
145.18	32.80	4.19	-22.61	14.38	QP	V	178	295	43.50	-29.12
191.45	26.03	4.66	-21.91	8.78	QP	H	355	146	43.50	-34.72
73.97	25.20	3.23	-24.37	4.06	QP	H	338	330	40.00	-35.94

Note:

- 1) For below 1GHz, all different channel and modes were verified but only the worst case result is shown here.
- 2) No outstanding result was found for below 30MHz other than ambient noise floor.
- 3) EUT was tested in 3 orientations.

30-1000MHz test result under FCC Part 15C

Test Standard:	15.209	Mode:	11g + BLE +LTE B2
Frequency Range:	30-1000MHz	Test Date:	07/11/2019
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Cameron Wu
Remark:	N/A	Test Result:	Pass



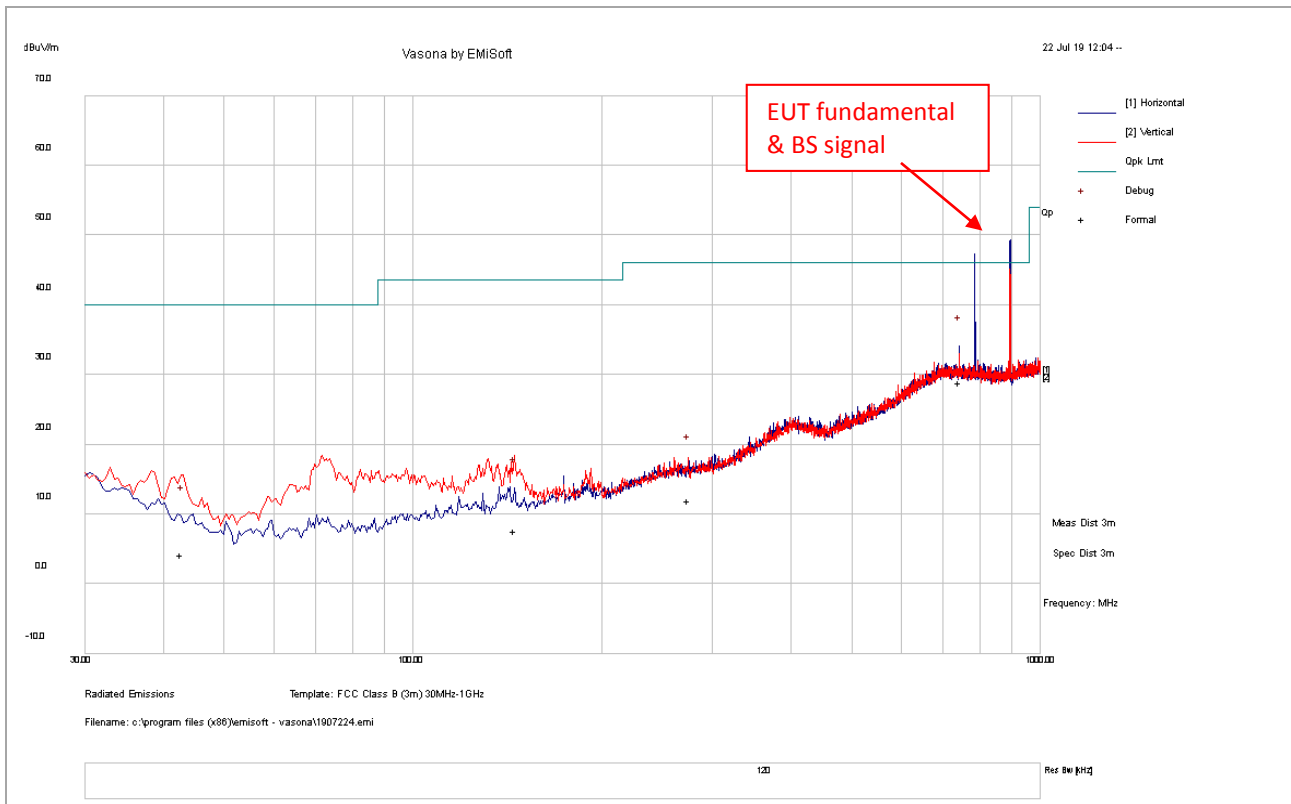
Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
72.15	35.54	3.20	-24.30	14.44	QP	V	213	172	40.00	-25.56
521.78	25.20	6.33	-12.06	19.47	QP	H	305	309	46.00	-26.53
41.39	24.24	2.58	-21.18	5.63	QP	H	148	288	40.00	-34.37
248.16	25.56	5.23	-19.34	11.46	QP	H	224	196	46.00	-34.54
130.55	25.45	4.01	-22.92	6.55	QP	H	251	106	43.50	-36.95

Note:

- 1) For below 1GHz, all different channel and modes were verified but only the worst case result is shown here.
- 2) No outstanding result was found for below 30MHz other than ambient noise floor.
- 3) EUT was tested in 3 orientations.

30-1000MHz test result under FCC Part 15C

Test Standard:	15.209	Mode:	11n 5G + BT +LTE B5
Frequency Range:	30-1000MHz	Test Date:	07/11/2019
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Cameron Wu
Remark:	N/A	Test Result:	Pass



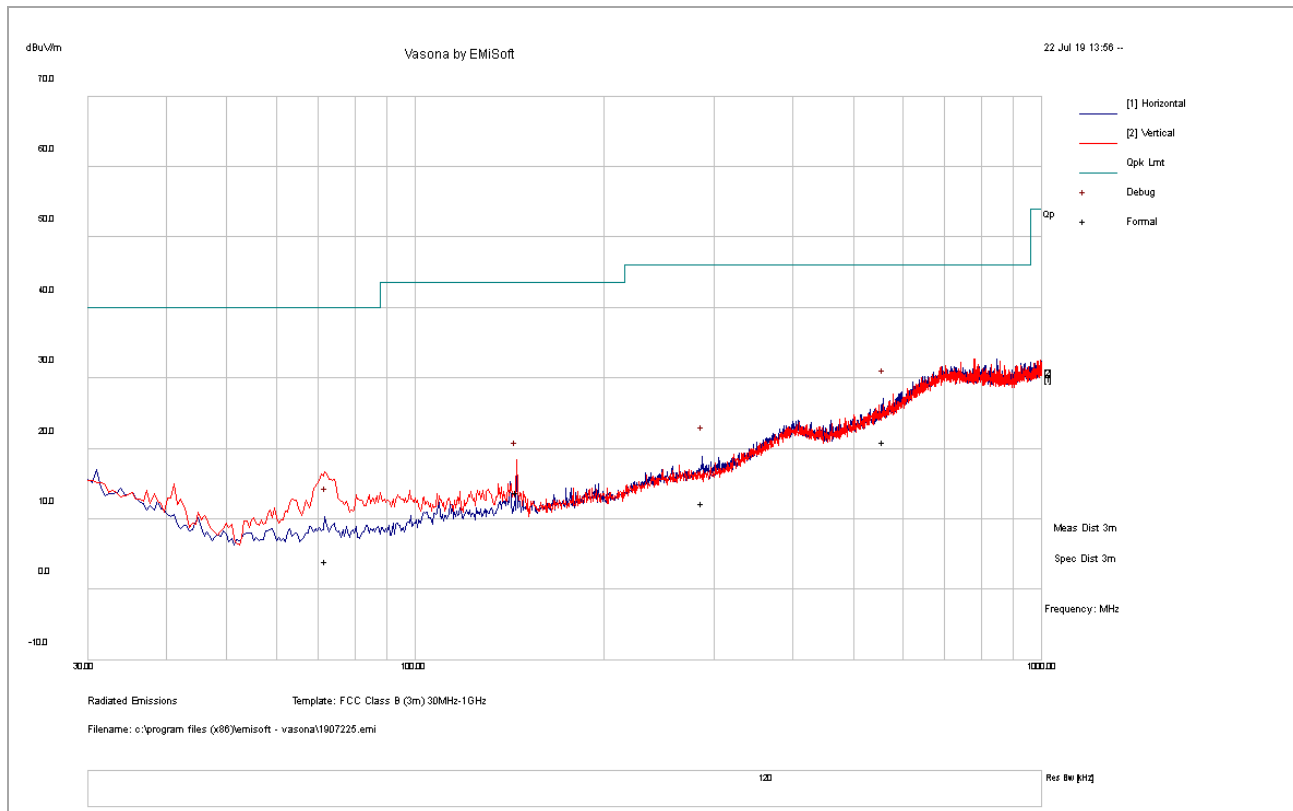
Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
741.79	28.25	7.28	-6.58	28.96	QP	H	161	142	46.00	-17.04
274.71	25.55	5.47	-18.98	12.04	QP	H	354	271	46.00	-33.96
145.40	26.05	4.19	-22.61	7.64	QP	H	314	286	43.50	-35.86
42.82	23.54	2.62	-21.92	4.24	QP	H	283	227	40.00	-35.76

Note:

- 1) For below 1GHz, all different channel and modes were verified but only the worst case result is shown here.
- 2) No outstanding result was found for below 30MHz other than ambient noise floor.
- 3) EUT was tested in 3 orientations.

30-1000MHz test result under FCC Part 15C

Test Standard:	15.209	Mode:	11n40 5G + BLE +LTE B4
Frequency Range:	30-1000MHz	Test Date:	07/11/2019
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Cameron Wu
Remark:	N/A	Test Result:	Pass



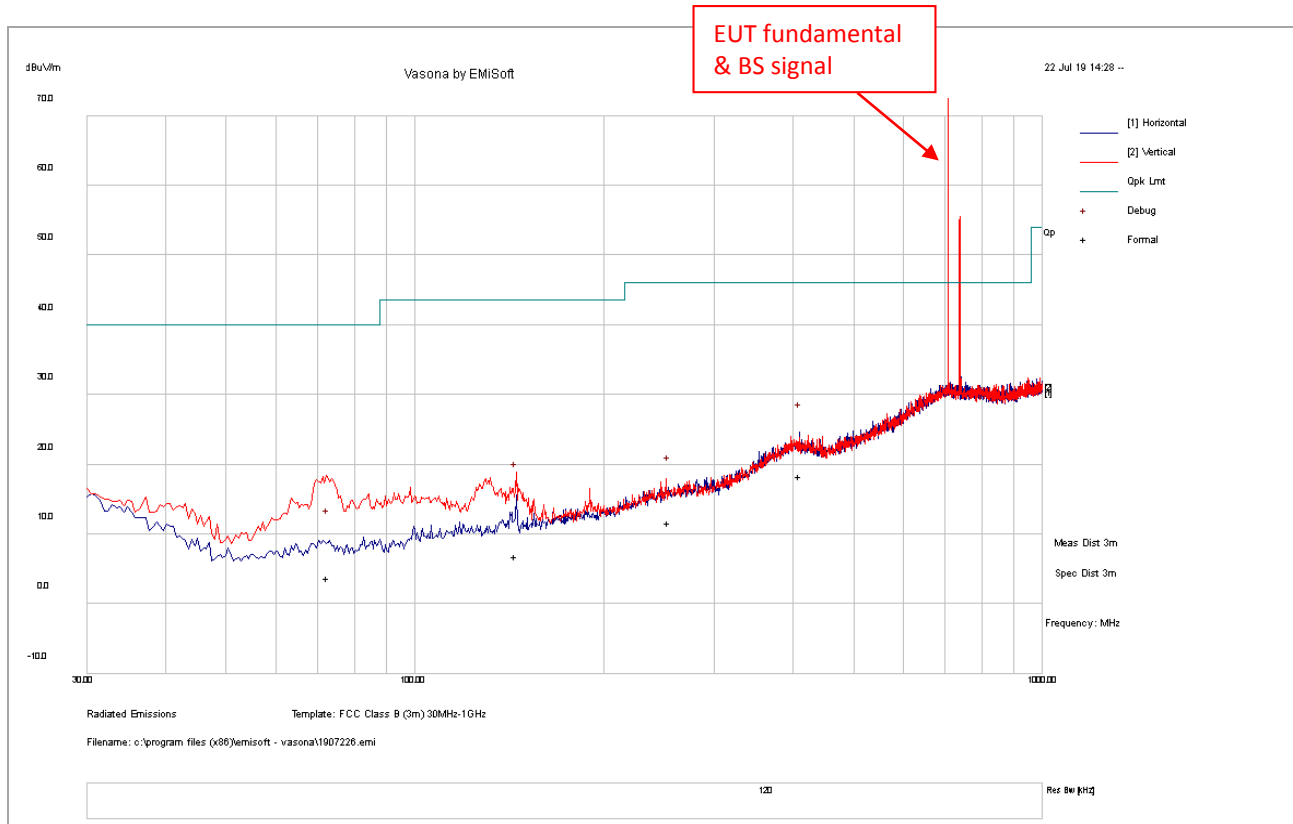
Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
558.76	25.19	6.74	-11.01	20.92	QP	H	182	144	46.00	-25.08
145.15	32.20	4.19	-22.61	13.78	QP	H	191	236	43.50	-29.72
286.79	25.63	5.57	-18.86	12.35	QP	H	121	321	46.00	-33.65
72.15	25.20	3.20	-24.29	4.11	QP	H	205	207	40.00	-35.89

Note:

- 1) For below 1GHz, all different channel and modes were verified but only the worst case result is shown here.
- 2) No outstanding result was found for below 30MHz other than ambient noise floor.
- 3) EUT was tested in 3 orientations.

30-1000MHz test result under FCC Part 15C

Test Standard:	15.209	Mode:	11ac80 5G + BT +LTE B12
Frequency Range:	30-1000MHz	Test Date:	07/11/2019
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Cameron Wu
Remark:	N/A	Test Result:	Pass



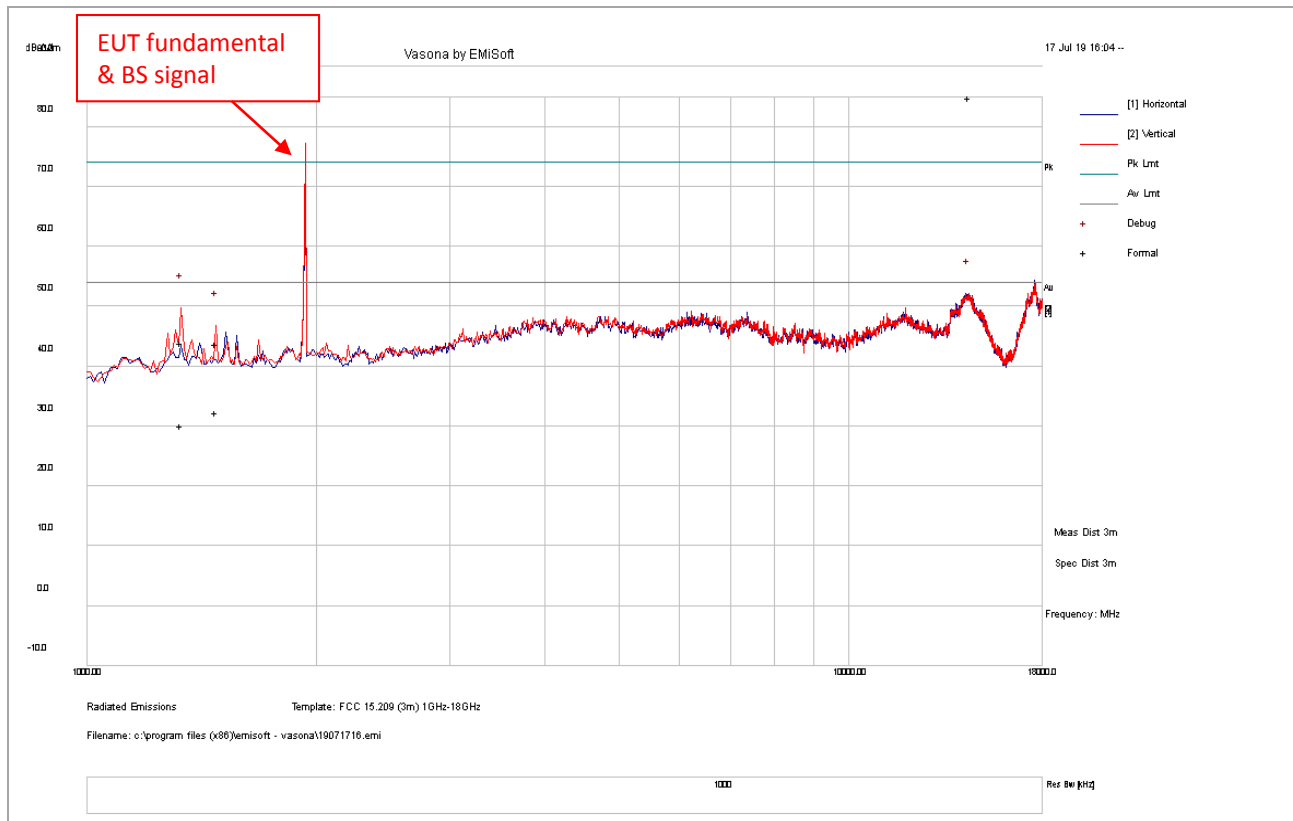
Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
410.05	25.65	6.34	-13.57	18.42	QP	H	141	221	46.00	-27.58
144.83	25.24	4.19	-22.62	6.81	QP	H	206	335	43.50	-36.69
253.19	25.57	5.28	-19.22	11.64	QP	H	100	347	46.00	-34.36
72.48	24.85	3.21	-24.31	3.75	QP	H	278	94	40.00	-36.25

Note:

- 1) For below 1GHz, all different channel and modes were verified but only the worst case result is shown here.
- 2) No outstanding result was found for below 30MHz other than ambient noise floor.
- 3) EUT was tested in 3 orientations.

1GHz – 18GHz test result under FCC Part 15C

Test Standard:	15.209	Mode:	11b+BLE+WCDMA B2
Frequency Range:	1GHz-18GHz	Test Date:	07/11/2019
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Cameron Wu
Remark:	N/A	Test Result:	Pass

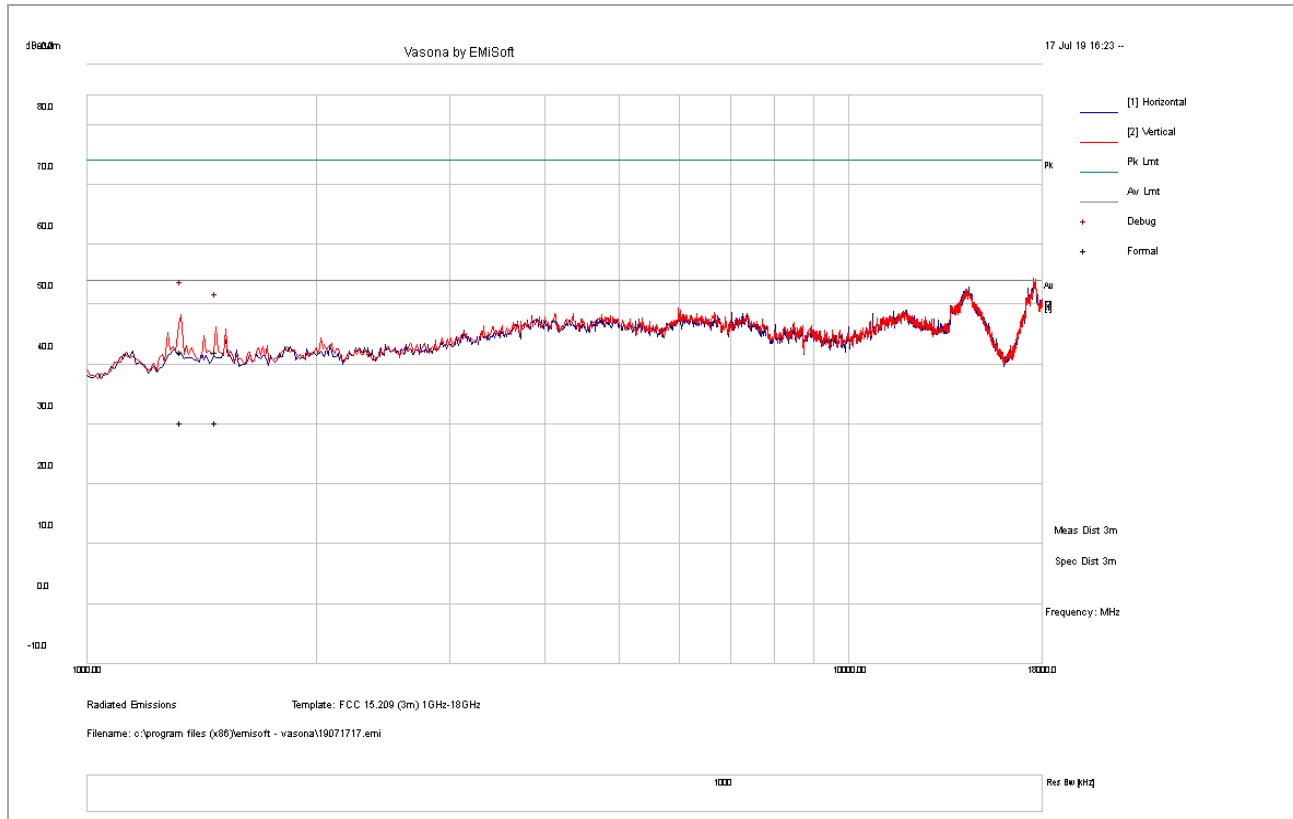


Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
1328.34	37.22	10.56	-3.81	43.97	PK	V	195	91	74	-30.03
1479.79	36.75	10.83	-3.76	43.82	PK	V	166	248	74	-30.18
1328.34	23.29	10.56	-3.81	30.04	AV	V	195	91	54	-23.96
1479.79	25.22	10.83	-3.76	32.29	AV	V	166	248	54	-21.71



1GHz – 18GHz test result under FCC Part 15C

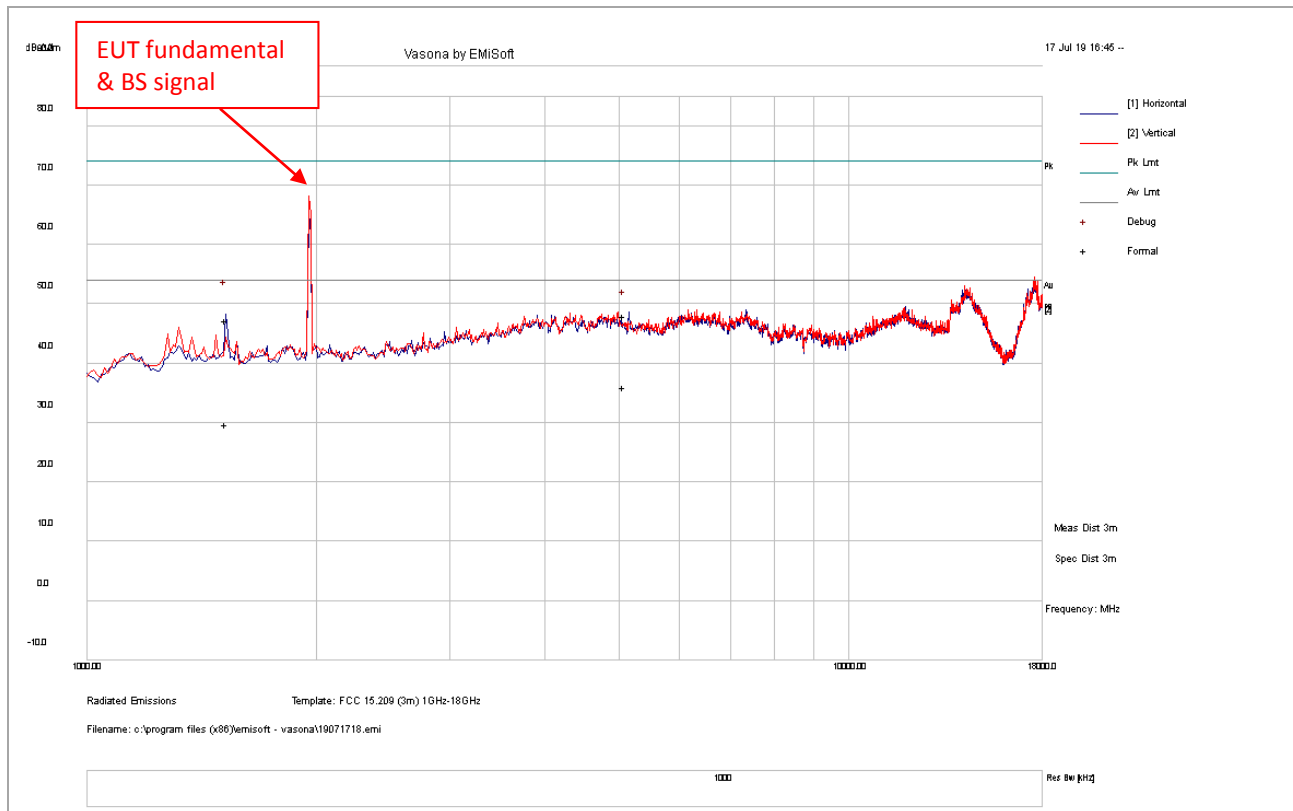
Test Standard:	15.209	Mode:	11a 5G+BT+WCDMA B5
Frequency Range:	1GHz-18GHz	Test Date:	07/11/2019
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Cameron Wu
Remark:	N/A	Test Result:	Pass



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
1330.03	35.31	10.56	-3.81	42.06	PK	V	142	58	74	-31.94
1479.65	35.01	10.83	-3.76	42.08	PK	V	212	67	74	-31.92
1330.03	23.56	10.56	-3.81	30.30	AV	V	142	58	54	-23.70
1479.65	23.26	10.83	-3.76	30.33	AV	V	212	67	54	-23.67

1GHz – 18GHz test result under FCC Part 15C

Test Standard:	15.209	Mode:	11g + BLE +LTE B2
Frequency Range:	1GHz-18GHz	Test Date:	07/11/2019
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Cameron Wu
Remark:	N/A	Test Result:	Pass

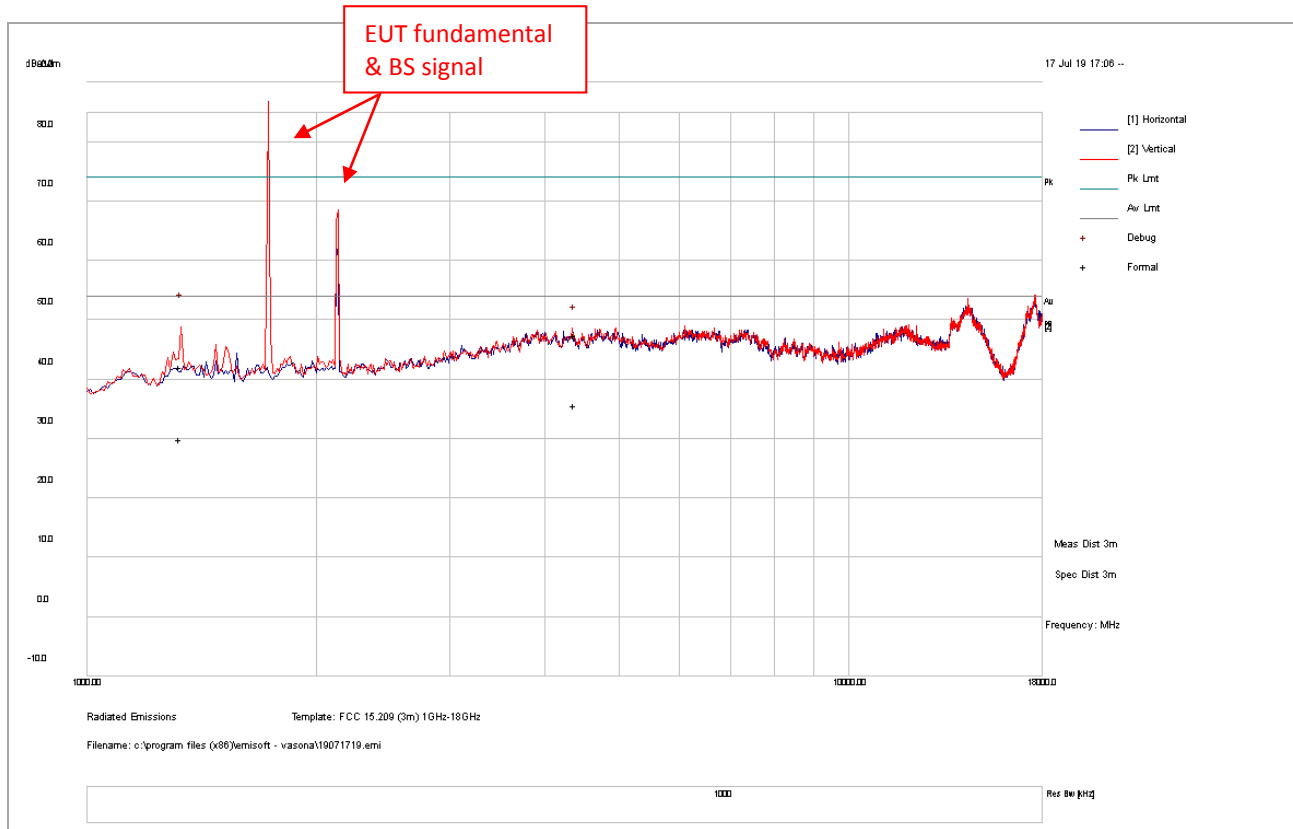


Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
1522.42	40.17	10.83	-3.71	47.29	PK	H	108	345	74	-26.71
5067.27	24.11	13.42	10.39	47.92	PK	V	301	0	74	-26.08
1522.42	22.67	10.83	-3.71	29.79	AV	H	108	345	54	-24.21
5067.27	12.18	13.42	10.39	35.99	AV	V	301	0	54	-18.02



1GHz – 18GHz test result under FCC Part 15C

Test Standard:	15.209	Mode:	11n40 5G + BLE +LTE B4
Frequency Range:	1GHz-18GHz	Test Date:	07/11/2019
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Cameron Wu
Remark:	N/A	Test Result:	Pass

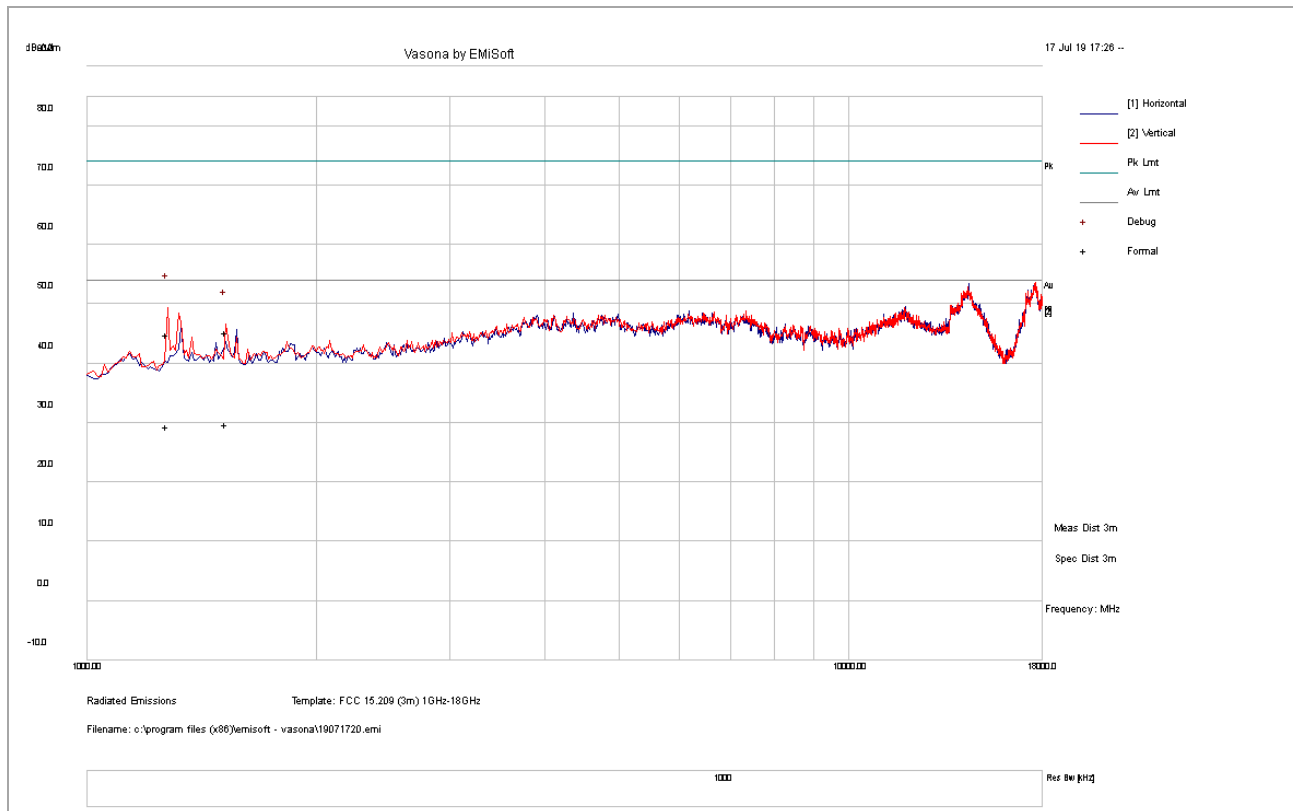


Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
1327.75	35.41	10.56	-3.81	42.16	PK	V	400	143	74	-31.84
4366.32	25.44	13.14	8.89	47.47	PK	V	101	35	74	-26.53
1327.75	23.14	10.56	-3.81	29.88	AV	V	400	143	54	-24.12
4366.32	13.63	13.14	8.89	35.66	AV	V	101	35	54	-18.34



1GHz – 18GHz test result under FCC Part 15C

Test Standard:	15.209	Mode:	11n 5G + BT +LTE B5
Frequency Range:	1GHz-18GHz	Test Date:	07/11/2019
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Cameron Wu
Remark:	N/A	Test Result:	Pass

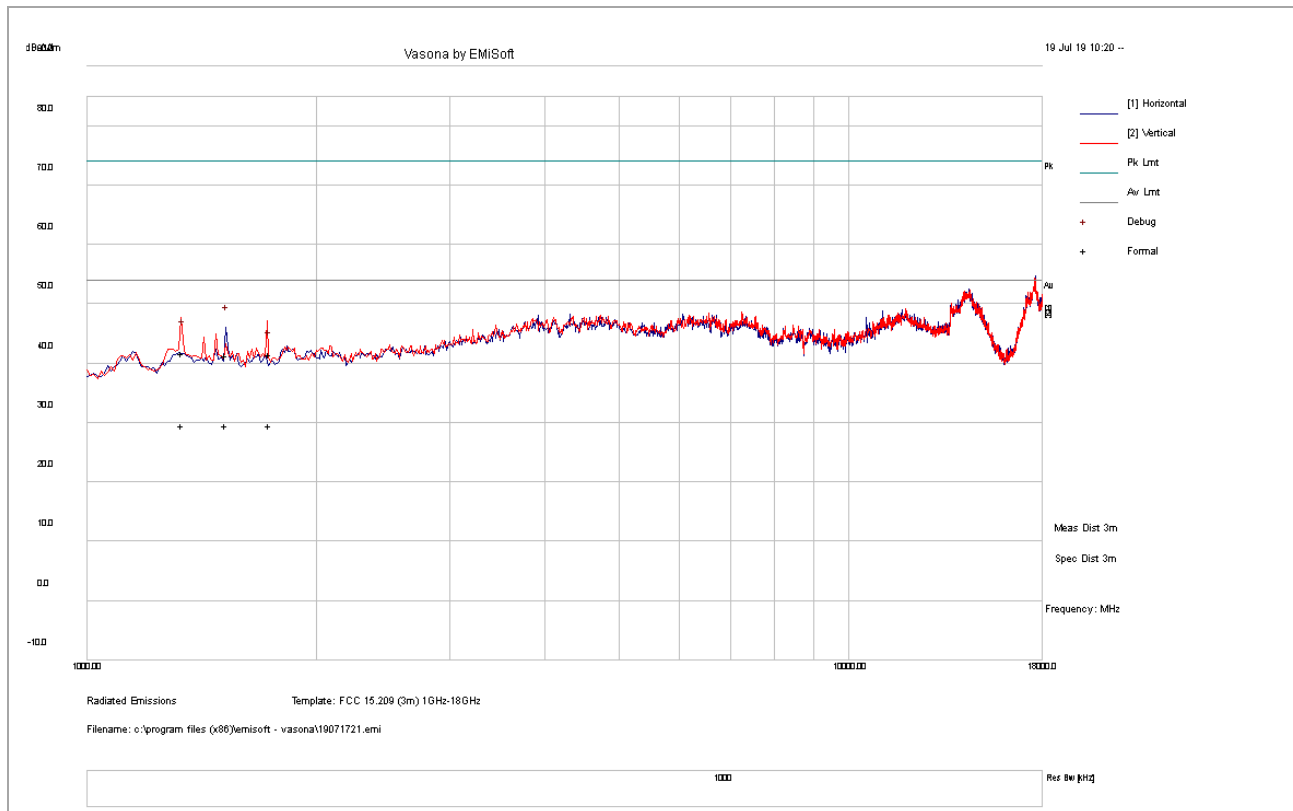


Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
1275.50	38.24	10.46	-3.87	44.83	PK	V	272	172	74	-29.17
1522.45	38.04	10.83	-3.71	45.16	PK	V	219	346	74	-28.84
1275.50	22.85	10.46	-3.87	29.44	AV	V	272	172	54	-24.56
1522.45	22.67	10.83	-3.71	29.79	AV	V	219	346	54	-24.21



1GHz – 18GHz test result under FCC Part 15C

Test Standard:	15.209	Mode:	11ac80 5G + BT +LTE B12
Frequency Range:	1GHz-18GHz	Test Date:	07/11/2019
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Cameron Wu
Remark:	N/A	Test Result:	Pass



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBμV/m	Det	Pol deg	Height cm	Table deg	Limit dBμV/m	Margin dB
1525.36	34.30	10.83	-3.70	41.43	PK	V	400	54	74	-32.57
1336.03	35.01	10.57	-3.83	41.76	PK	V	284	178	74	-32.25
1737.70	33.68	10.55	-2.62	41.61	PK	V	292	19	74	-32.39
1525.36	22.44	10.83	-3.70	29.56	AV	V	400	54	54	-24.44
1336.03	22.84	10.57	-3.83	29.59	AV	V	284	178	54	-24.41
1737.70	21.62	10.55	-2.62	29.54	AV	V	292	19	54	-24.46

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Product:	HotSpot OBD Dongle
Model Number:	LMU3240LAW



18GHz – 25GHz test result

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

8.2 Field Strength of Spurious Radiation

8.2.1 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.

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.

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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 $43 + 10 \log_{10} p(\text{watts})$.

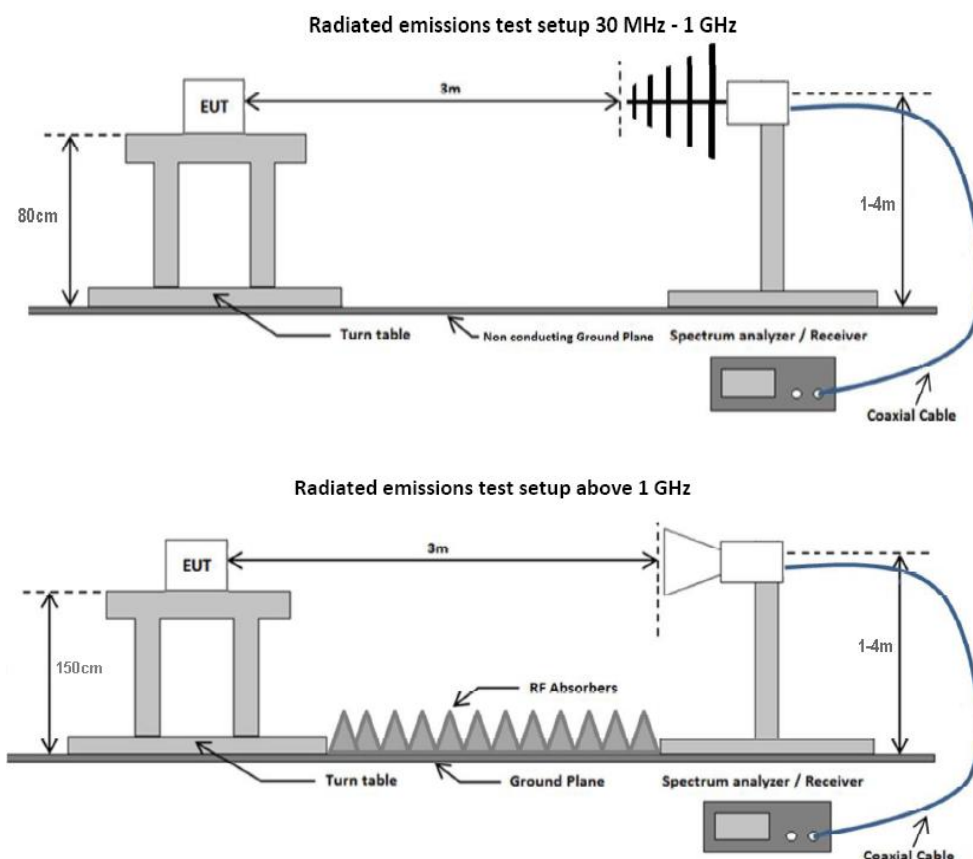
(ii) After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p(\text{watts})$. If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required.

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 $43 + 10 \log_{10} p(\text{watts})$ 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 $43 + 10 \log_{10} p(\text{watts})$ dB.

8.2.2 Test setup



8.2.3 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.

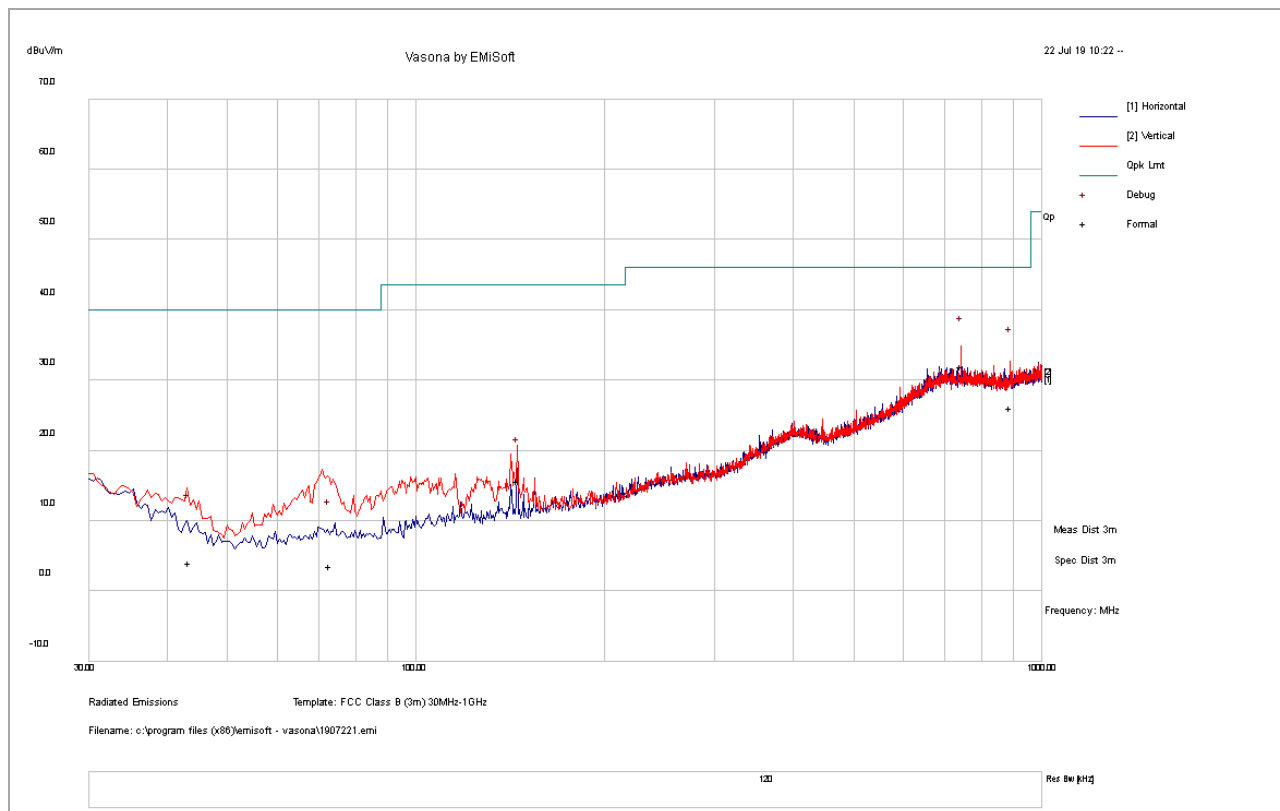
1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. The test was carried out at the selected frequency points obtained from the EUT characterization. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting 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. Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter.
8. Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a non-radiating cable. With the antennas at both ends horizontally polarized, and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained.
9. Steps 2 - 8 were repeated for the next frequency point, until all selected frequency points were measured

8.2.4 Test Result

Test Standard:	Part 24E & RSS 133	Mode:	11b+BLE+WCDMA B2
Frequency Range:	30-1000MHz	Test Date:	07/11/2019
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Cameron Wu
Remark:	N/A	Test Result:	Pass



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBm	Det	Pol deg	Height cm	Table deg	Limit dBm	Margin dB
741.79	-63.9	7.28	-6.58	-63.19	RMS	H	246	69	-13	-50.19
890.22	-69.46	7.58	-7.19	-69.08	RMS	V	339	109	-13	-56.08
145.19	-61.08	4.19	-22.61	-79.5	RMS	H	181	266	-13	-66.5
43.45	-71.54	2.64	-22.25	-91.15	RMS	H	258	225	-13	-78.15
72.94	-70.45	3.21	-24.33	-91.56	RMS	H	183	46	-13	-78.56

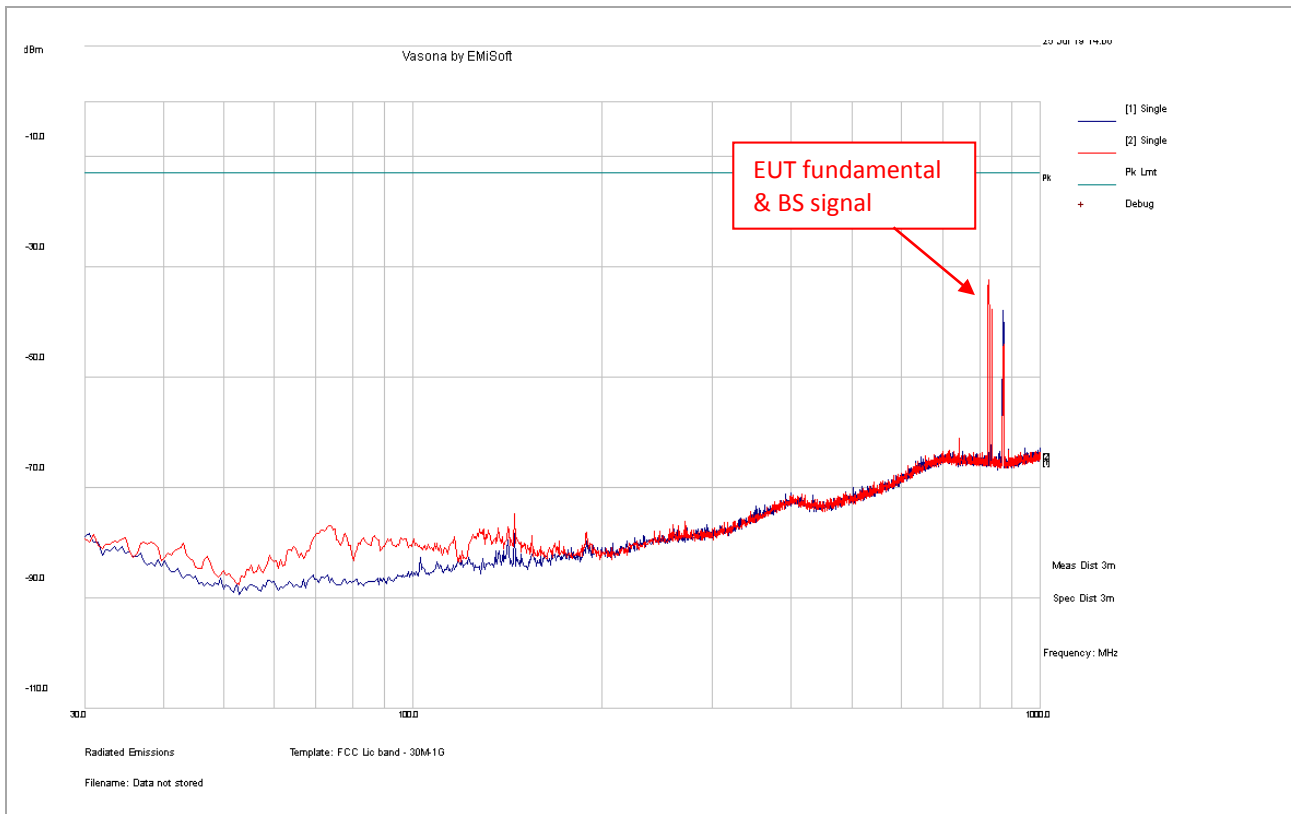
Note:

- 1) All different channel and modes were verified but only the worst case result is shown here.
- 2) All different modes have been verified and the worst case result is presented here.
- 3) EUT was tested in 3 orientations.
- 4) Final substitution measurement is not necessary as margin is over 20 dB.

Report Number: CMP-19061922-LC-FCC-IC-PCB
Product: HotSpot OBD Dongle
Model Number: LMU3240LAW



Test Standard:	Part 22 & RSS 132	Mode:	11a 5G+BT+WCDMA B5
Frequency Range:	30-1000MHz	Test Date:	07/11/2019
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Cameron Wu
Remark:	N/A	Test Result:	Pass



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBm	Det	Pol deg	Height cm	Table deg	Limit dBm	Margin dB
741.79	-67.45	7.28	-6.58	-66.74	RMS	H	172	95	-13	-53.74
34.71	-71.26	2.39	-17.38	-86.25	RMS	H	168	353	-13	-73.25
145.18	-62.43	4.19	-22.61	-80.85	RMS	V	178	295	-13	-67.85
191.45	-69.2	4.66	-21.91	-86.45	RMS	H	355	146	-13	-73.45
73.97	-70.03	3.23	-24.37	-91.17	RMS	H	338	330	-13	-78.17

Note:

- 1) All different channel and modes were verified but only the worst case result is shown here.
- 2) All different modes have been verified and the worst case result is presented here.
- 3) EUT was tested in 3 orientations.
- 4) Final substitution measurement is not necessary as margin is over 20 dB.



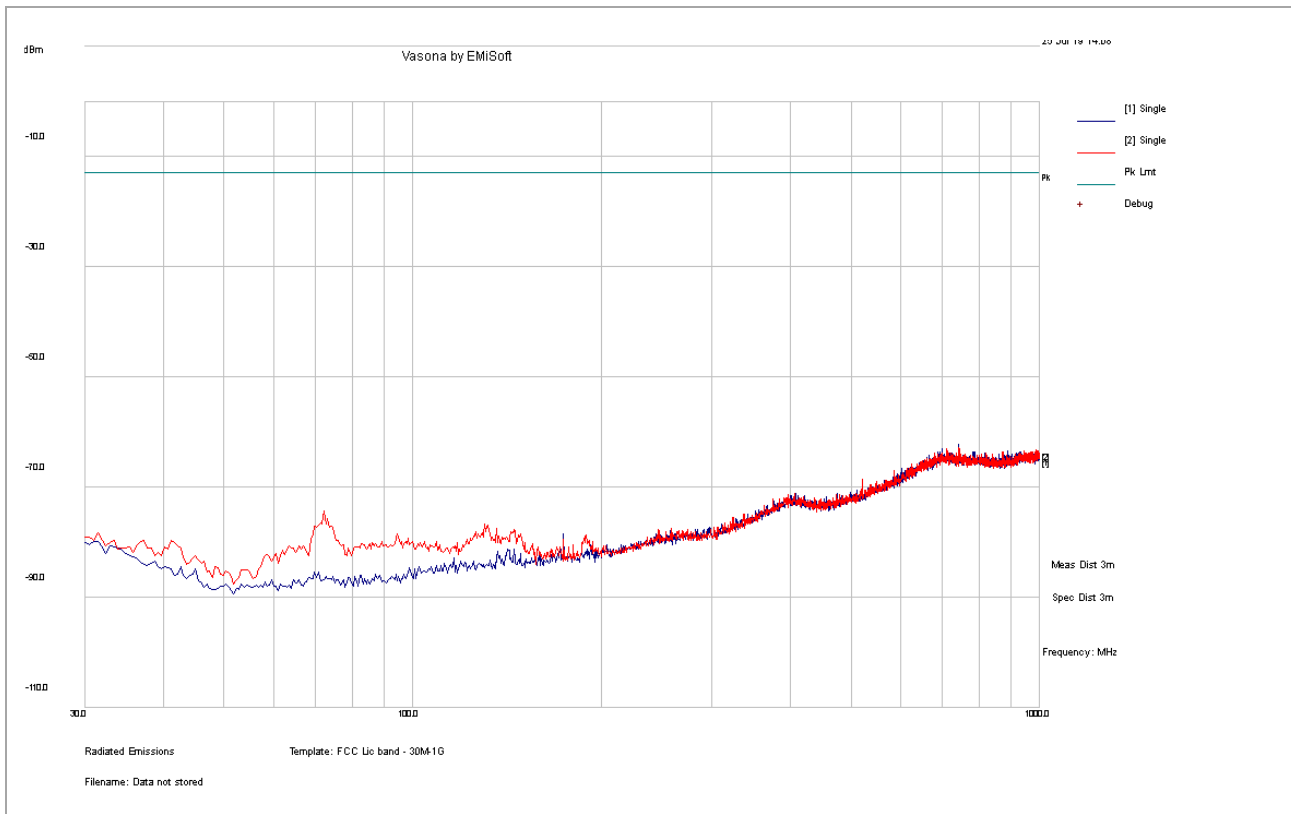
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Product Certification
International Approval

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Report Number: CMP-19061922-LC-FCC-IC-PCB
Product: HotSpot OBD Dongle
Model Number: LMU3240LAW



Test Standard:	Part 24E & RSS 133	Mode:	11g + BLE +LTE B2
Frequency Range:	30-1000MHz	Test Date:	07/11/2019
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Cameron Wu
Remark:	N/A	Test Result:	Pass



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBm	Det	Pol deg	Height cm	Table deg	Limit dBm	Margin dB
72.15	-59.69	3.2	-24.3	-80.79	RMS	V	213	172	-13	-67.79
521.78	-70.03	6.33	-12.06	-75.76	RMS	H	305	309	-13	-62.76
41.39	-70.99	2.58	-21.18	-89.6	RMS	H	148	288	-13	-76.6
248.16	-69.67	5.23	-19.34	-83.77	RMS	H	224	196	-13	-70.77
130.55	-69.78	4.01	-22.92	-88.68	RMS	H	251	106	-13	-75.68

Note:

- 1) All different channel and modes were verified but only the worst case result is shown here.
- 2) All different modes have been verified and the worst case result is presented here.
- 3) EUT was tested in 3 orientations.
- 4) Final substitution measurement is not necessary as margin is over 20 dB.



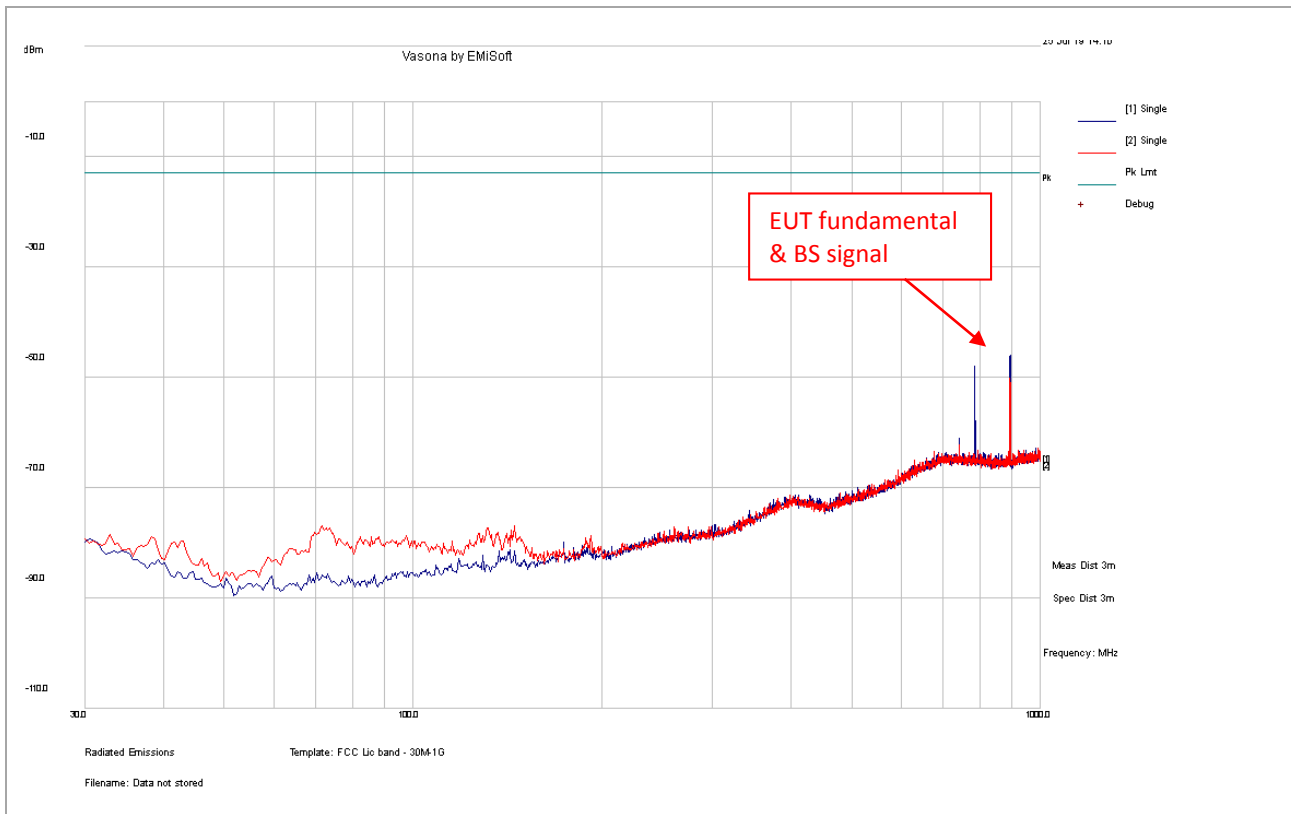
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Product: HotSpot OBD Dongle
Model Number: LMU3240LAW



Test Standard:	Part 22 & RSS 132	Mode:	11n 5G + BT +LTE B5
Frequency Range:	30-1000MHz	Test Date:	07/11/2019
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Cameron Wu
Remark:	N/A	Test Result:	Pass



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBm	Det	Pol deg	Height cm	Table deg	Limit dBm	Margin dB
741.79	-66.98	7.28	-6.58	-66.27	RMS	H	161	142	-13	-53.27
274.71	-69.68	5.47	-18.98	-83.19	RMS	H	354	271	-13	-70.19
145.4	-69.18	4.19	-22.61	-87.59	RMS	H	314	286	-13	-74.59
42.82	-71.69	2.62	-21.92	-90.99	RMS	H	283	227	-13	-77.99

Note:

- 1) All different channel and modes were verified but only the worst case result is shown here.
- 2) All different modes have been verified and the worst case result is presented here.
- 3) EUT was tested in 3 orientations.
- 4) Final substitution measurement is not necessary as margin is over 20 dB.



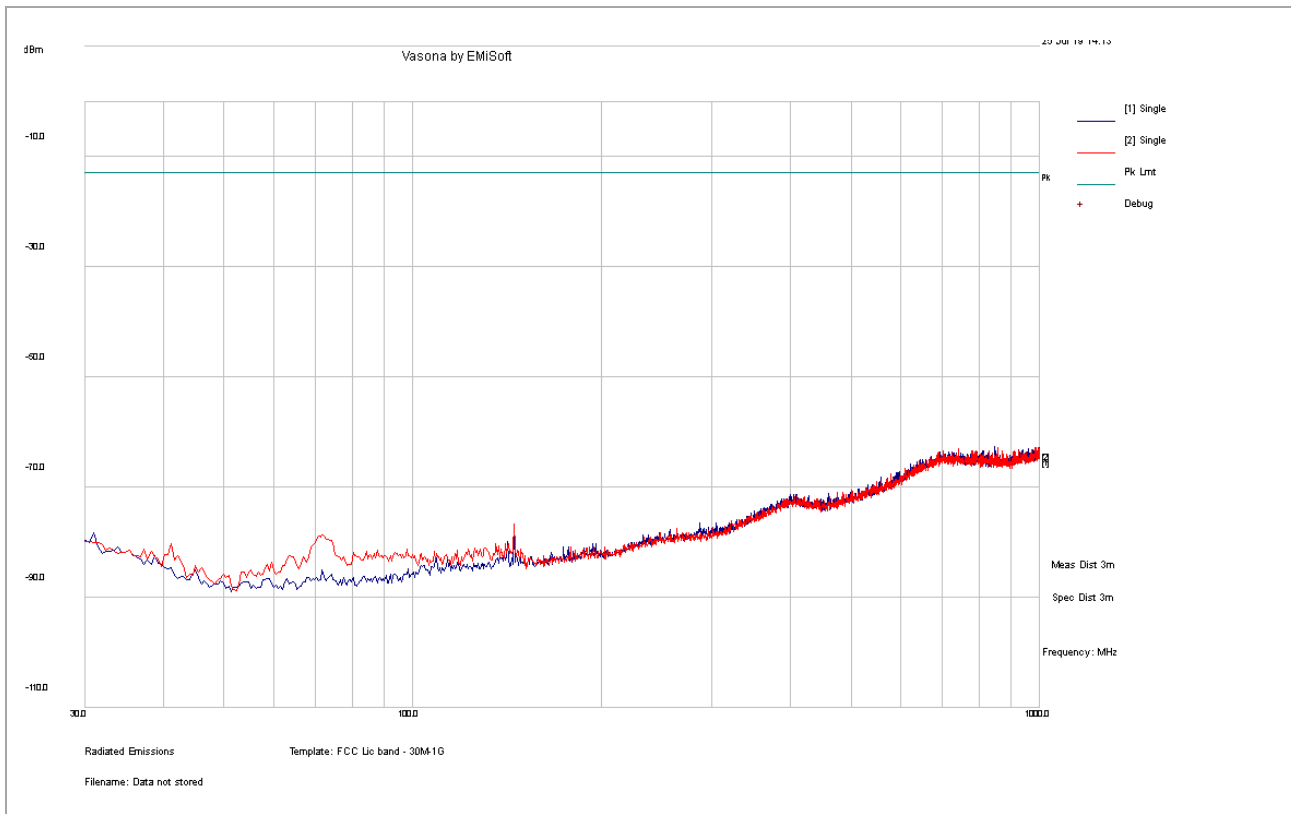
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Product: HotSpot OBD Dongle
Model Number: LMU3240LAW



Test Standard:	Part 27 & RSS 139	Mode:	11n40 5G + BLE +LTE B4
Frequency Range:	30-1000MHz	Test Date:	07/11/2019
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Cameron Wu
Remark:	N/A	Test Result:	Pass



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBm	Det	Pol deg	Height cm	Table deg	Limit dBm	Margin dB
558.76	-70.04	6.74	-11.01	-74.31	RMS	H	182	144	-13	-61.31
145.15	-63.03	4.19	-22.61	-81.45	RMS	H	191	236	-13	-68.45
286.79	-69.6	5.57	-18.86	-82.88	RMS	H	121	321	-13	-69.88
72.15	-70.03	3.2	-24.29	-91.12	RMS	H	205	207	-13	-78.12

Note:

- 1) All different channel and modes were verified but only the worst case result is shown here.
- 2) All different modes have been verified and the worst case result is presented here.
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- 4) Final substitution measurement is not necessary as margin is over 20 dB.



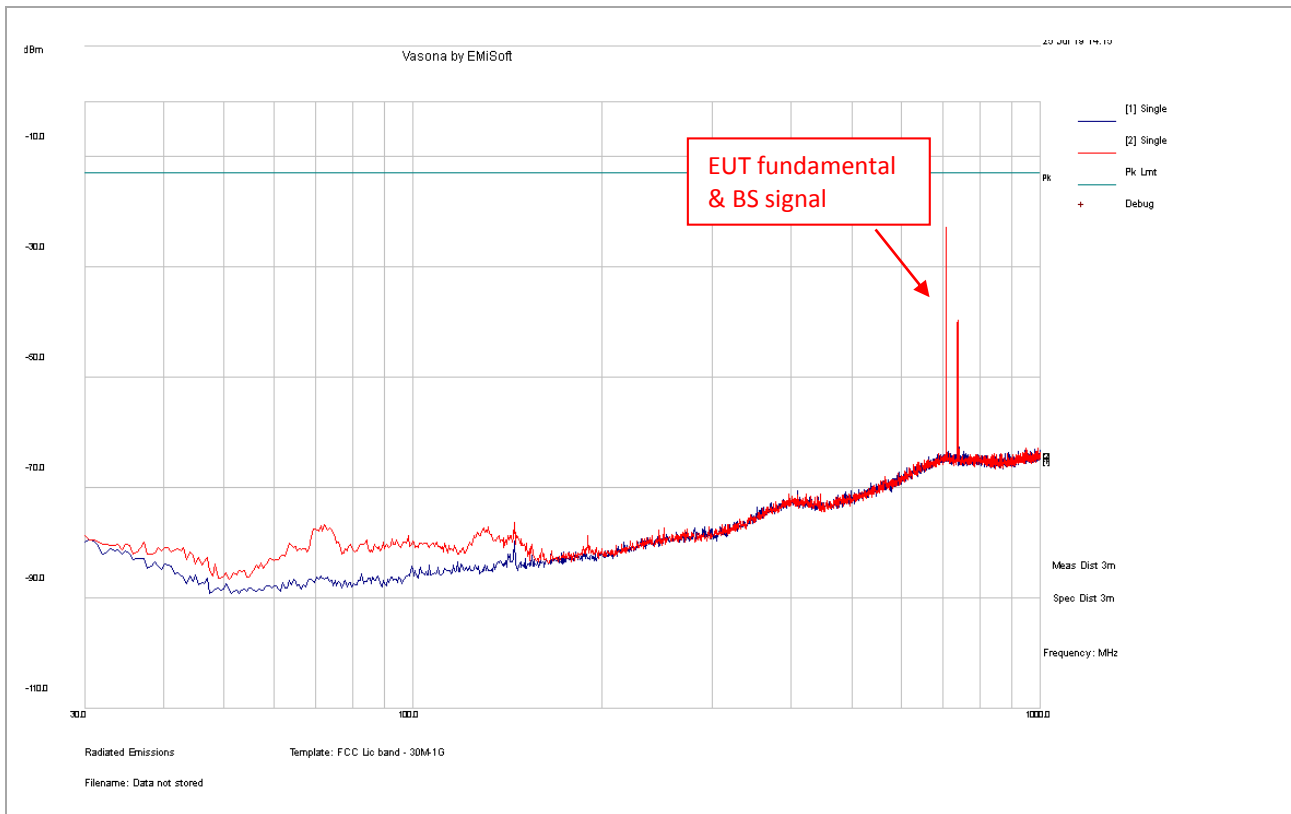
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Product: HotSpot OBD Dongle
Model Number: LMU3240LAW



Test Standard:	Part 27 & RSS 130	Mode:	11ac80 5G + BT +LTE B12
Frequency Range:	30-1000MHz	Test Date:	07/11/2019
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Cameron Wu
Remark:	N/A	Test Result:	Pass



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBm	Det	Pol deg	Height cm	Table deg	Limit dBm	Margin dB
410.05	-69.58	6.34	-13.57	-76.81	RMS	H	141	221	-13	-63.81
144.83	-69.99	4.19	-22.62	-88.42	RMS	H	206	335	-13	-75.42
253.19	-69.66	5.28	-19.22	-83.59	RMS	H	100	347	-13	-70.59
72.48	-70.38	3.21	-24.31	-91.48	RMS	H	278	94	-13	-78.48

Note:

- 1) All different channel and modes were verified but only the worst case result is shown here.
- 2) All different modes have been verified and the worst case result is presented here.
- 3) EUT was tested in 3 orientations.
- 4) Final substitution measurement is not necessary as margin is over 20 dB.



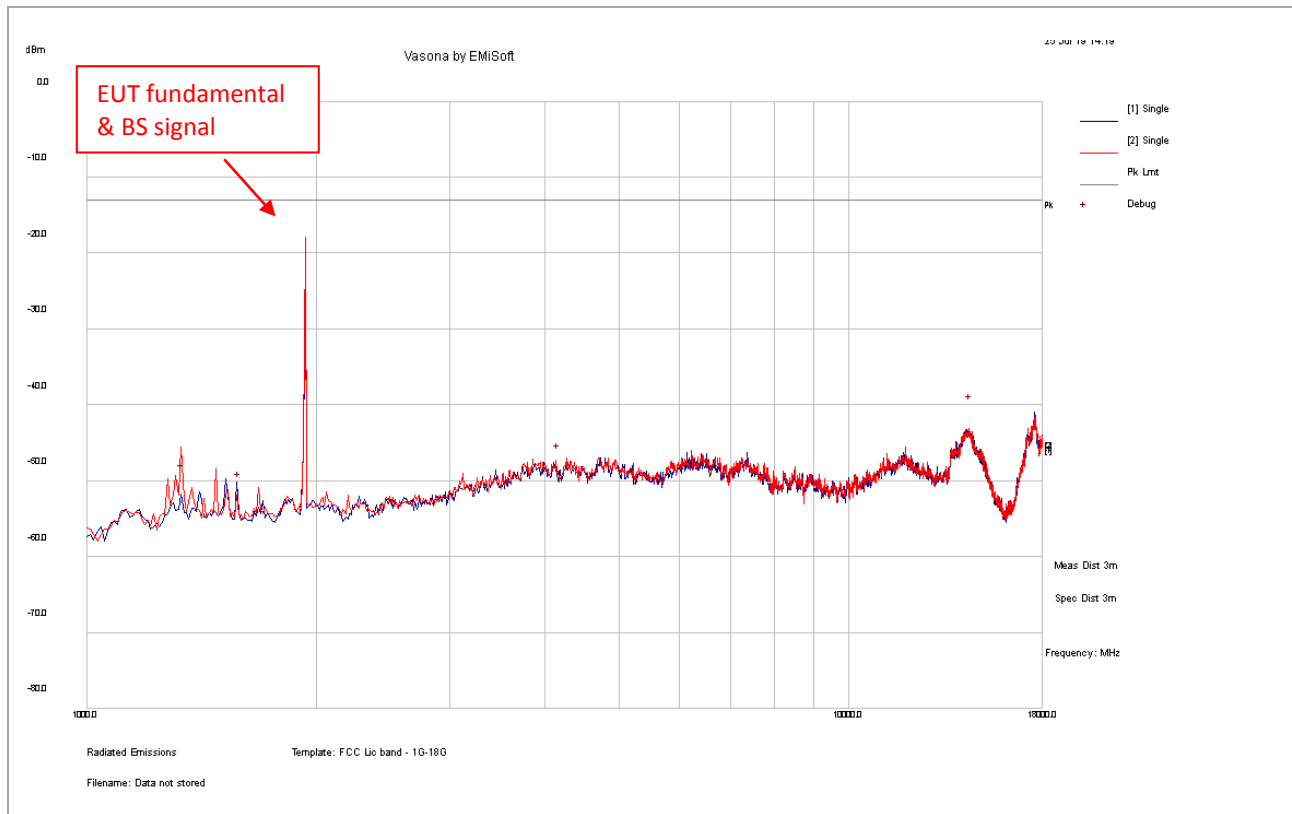
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Product: HotSpot OBD Dongle
Model Number: LMU3240LAW



Test Standard:	Part 24E & RSS 133	Mode:	11b+BLE+WCDMA B2
Frequency Range:	1GHz -18GH	Test Date:	07/11/2019
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Cameron Wu
Remark:	N/A	Test Result:	Pass



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBm	Det	Pol deg	Height cm	Table deg	Limit dBm	Margin dB
1333.21	-57.70	13.42	-8.36	-52.65	RMS	V	154	7	-13	-39.65
4157.66	-59.58	14.76	-5.14	-49.96	RMS	V	178	323	-13	-36.96
1583.39	-58.21	13.57	-9.07	-53.71	RMS	H	296	334	-13	-40.71
14450.13	-53.95	5.70	4.69	-43.56	RMS	H	268	183	-13	-30.56

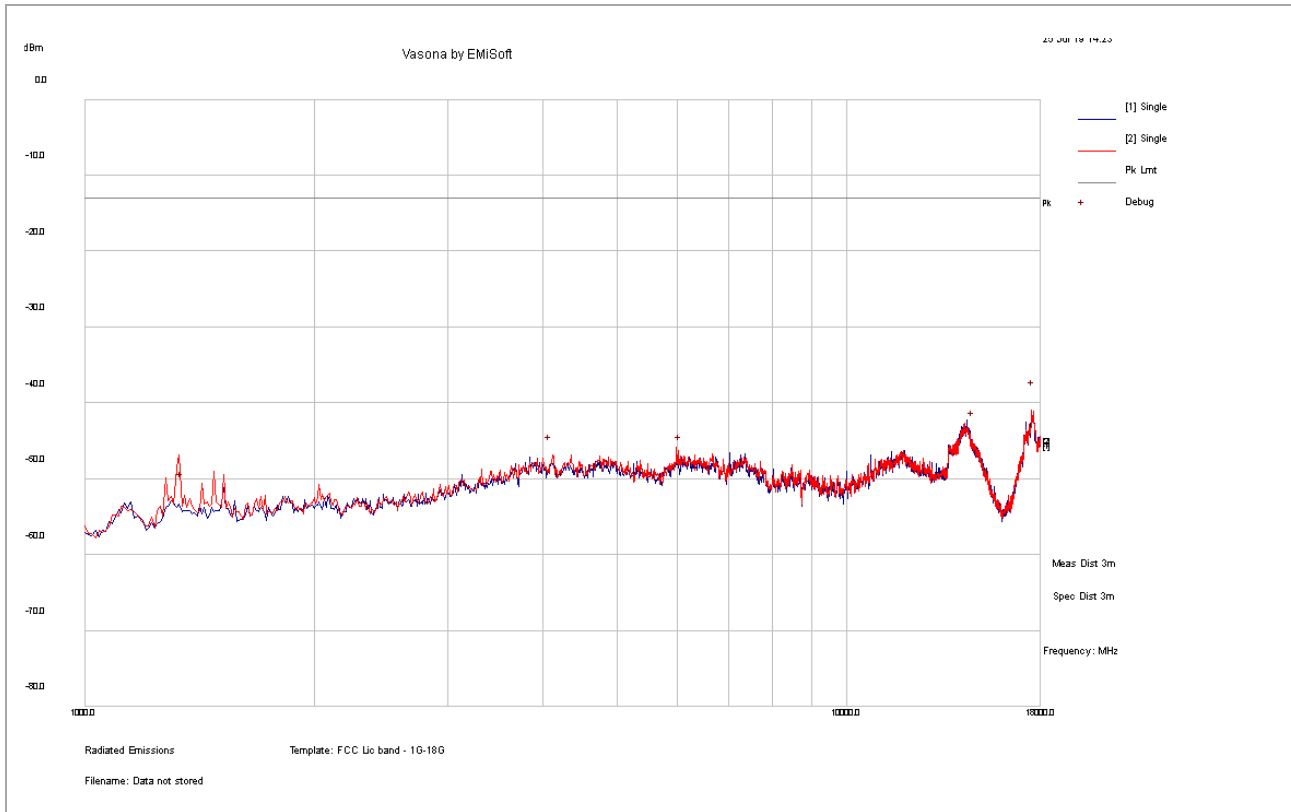
Note:

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- 3) EUT was tested in 3 orientations.
- 4) Final substitution measurement is not necessary as margin is over 20 dB.

Report Number: CMP-19061922-LC-FCC-IC-PCB
Product: HotSpot OBD Dongle
Model Number: LMU3240LAW



Test Standard:	Part 22 & RSS 132	Mode:	11a 5G+BT+WCDMA B5
Frequency Range:	1GHz -18GH	Test Date:	07/11/2019
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Cameron Wu
Remark:	N/A	Test Result:	Pass



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBm	Det	Pol deg	Height cm	Table deg	Limit dBm	Margin dB
1337.07	-59.15	13.42	-8.38	-54.11	RMS	H	238	223	-13	-41.11
4074.39	-58.57	14.70	-5.22	-49.09	RMS	H	238	188	-13	-36.09
14639.31	-57.03	5.75	5.23	-46.05	RMS	H	287	229	-13	-33.05
6036.42	-63.13	15.42	-1.43	-49.14	RMS	H	271	244	-13	-36.14
17563.16	-57.08	6.55	8.60	-41.93	RMS	V	180	340	-13	-28.93

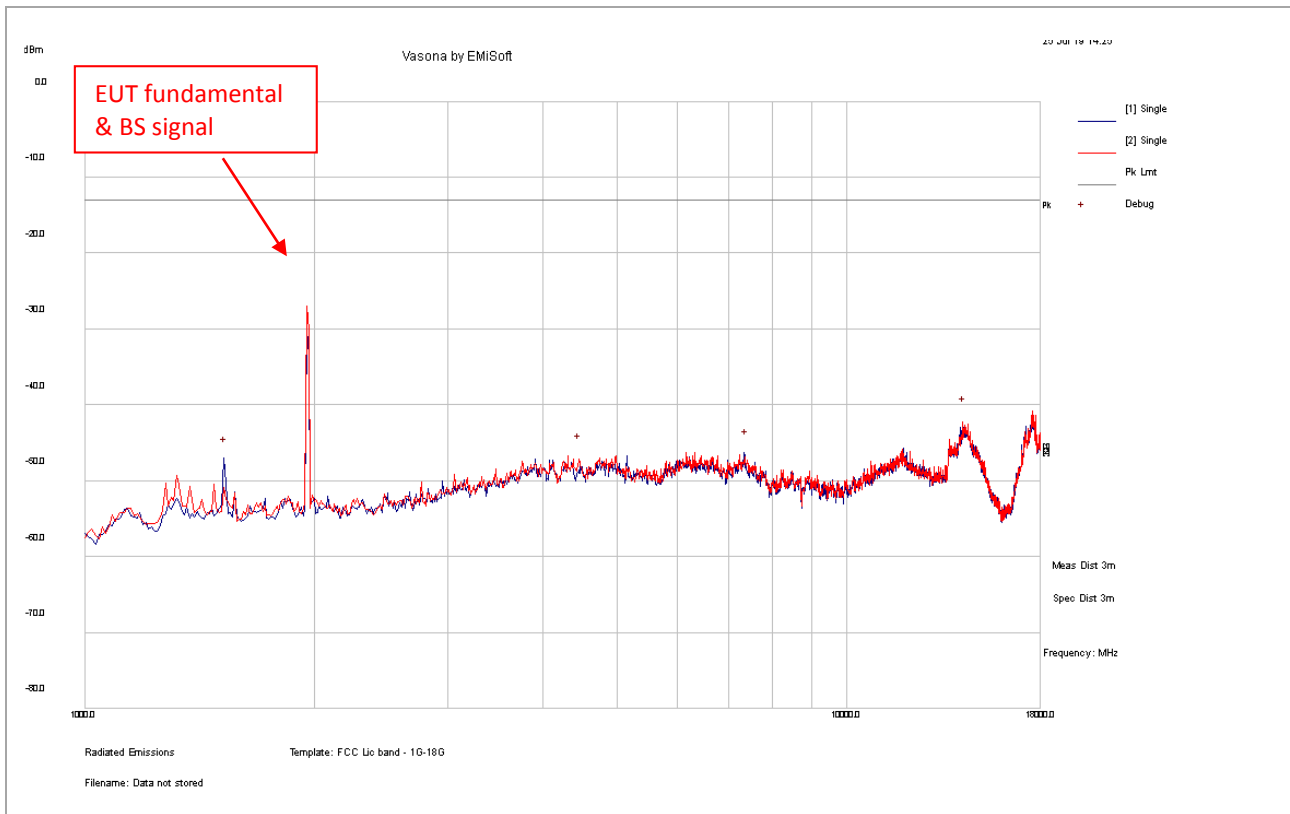
Note:

- 1) All different channel and modes were verified but only the worst case result is shown here.
- 2) All different modes have been verified and the worst case result is presented here.
- 3) EUT was tested in 3 orientations.
- 4) Final substitution measurement is not necessary as margin is over 20 dB.

Report Number: CMP-19061922-LC-FCC-IC-PCB
Product: HotSpot OBD Dongle
Model Number: LMU3240LAW



Test Standard:	Part 24E & RSS 133	Mode:	11g + BLE +LTE B2
Frequency Range:	1GHz -18GH	Test Date:	07/11/2019
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Cameron Wu
Remark:	N/A	Test Result:	Pass



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBm	Det	Pol deg	Height cm	Table deg	Limit dBm	Margin dB
1527.21	-53.65	13.52	-8.96	-49.09	RMS	V	170	256	-13	-36.09
4456.32	-59.04	14.86	-4.55	-48.73	RMS	V	226	315	-13	-35.73
14263.40	-53.36	5.66	3.94	-43.76	RMS	H	177	164	-13	-30.76
7390.07	-61.97	15.89	-1.99	-48.08	RMS	V	250	126	-13	-35.08

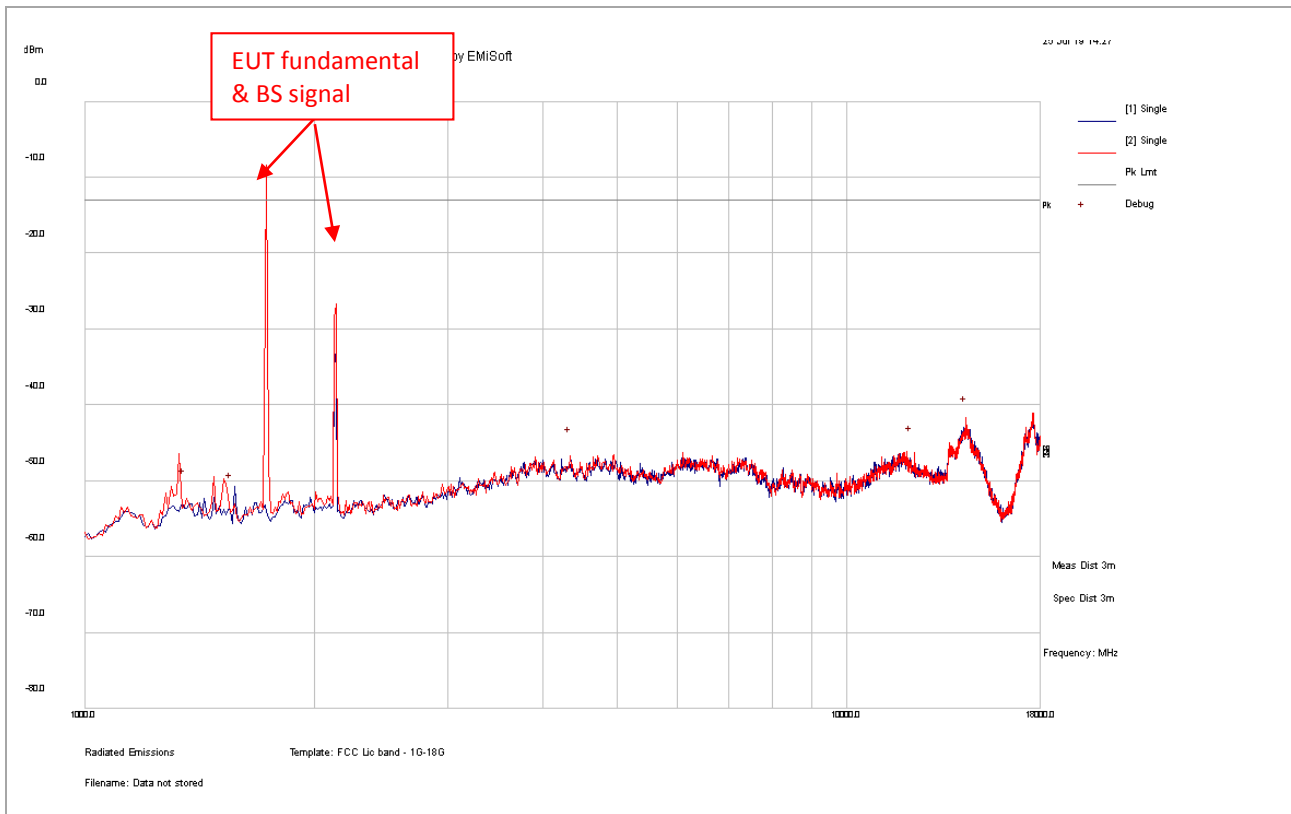
Note:

- 1) All different channel and modes were verified but only the worst case result is shown here.
- 2) All different modes have been verified and the worst case result is presented here.
- 3) EUT was tested in 3 orientations.
- 4) Final substitution measurement is not necessary as margin is over 20 dB.

Report Number: CMP-19061922-LC-FCC-IC-PCB
Product: HotSpot OBD Dongle
Model Number: LMU3240LAW



Test Standard:	Part 27 & RSS 139	Mode:	11n40 5G + BLE +LTE B4
Frequency Range:	1GHz -18GH	Test Date:	07/11/2019
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Cameron Wu
Remark:	N/A	Test Result:	Pass



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBm	Det	Pol deg	Height cm	Table deg	Limit dBm	Margin dB
1346.77	-58.34	13.43	-8.44	-53.35	RMS	H	225	279	-13	-40.35
1551.68	-58.44	13.54	-9.01	-53.91	RMS	H	223	106	-13	-40.91
4323.10	-57.83	14.80	-4.85	-47.88	RMS	V	152	201	-13	-34.88
12131.87	-67.18	17.12	2.34	-47.72	RMS	V	122	265	-13	-34.72
14304.69	-53.63	5.66	4.12	-43.85	RMS	V	243	37	-13	-30.85

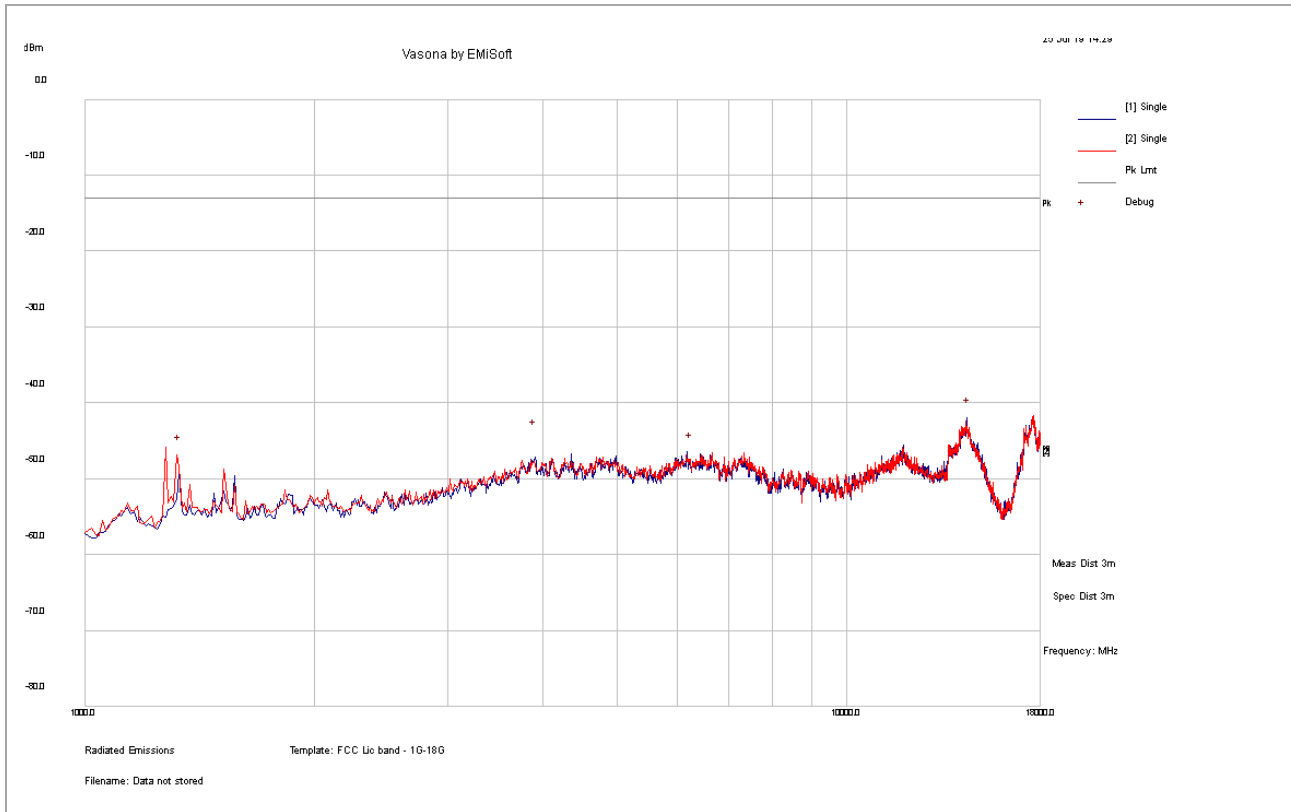
Note:

- 1) All different channel and modes were verified but only the worst case result is shown here.
- 2) All different modes have been verified and the worst case result is presented here.
- 3) EUT was tested in 3 orientations.
- 4) Final substitution measurement is not necessary as margin is over 20 dB.

Report Number: CMP-19061922-LC-FCC-IC-PCB
Product: HotSpot OBD Dongle
Model Number: LMU3240LAW



Test Standard:	Part 22 & RSS 132	Mode:	11n 5G + BT +LTE B5
Frequency Range:	1GHz -18GH	Test Date:	07/11/2019
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Cameron Wu
Remark:	N/A	Test Result:	Pass



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBm	Det	Pol deg	Height cm	Table deg	Limit dBm	Margin dB
1329.37	-54.19	13.41	-8.34	-49.12	RMS	V	176	353	-13	-36.12
3901.52	-56.90	14.62	-4.89	-47.17	RMS	H	255	319	-13	-34.17
6258.50	-62.81	15.52	-1.53	-48.82	RMS	H	161	140	-13	-35.82
14450.13	-54.71	5.70	4.69	-44.32	RMS	V	270	269	-13	-31.32

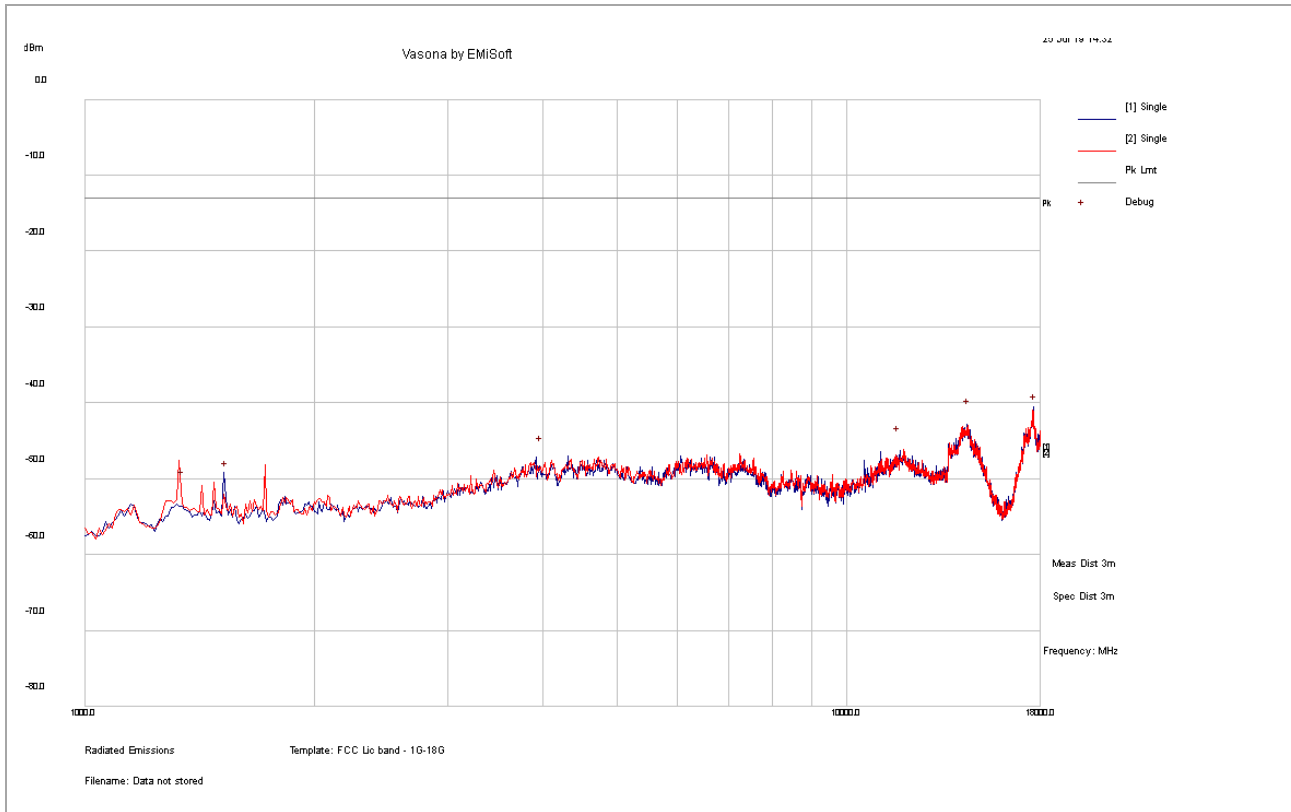
Note:

- 1) All different channel and modes were verified but only the worst case result is shown here.
- 2) All different modes have been verified and the worst case result is presented here.
- 3) EUT was tested in 3 orientations.
- 4) Final substitution measurement is not necessary as margin is over 20 dB.

Report Number: CMP-19061922-LC-FCC-IC-PCB
Product: HotSpot OBD Dongle
Model Number: LMU3240LAW



Test Standard:	Part 27 & RSS 130	Mode:	11ac80 5G + BT +LTE B12
Frequency Range:	1GHz -18GH	Test Date:	07/11/2019
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Cameron Wu
Remark:	N/A	Test Result:	Pass



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBm	Det	Pol deg	Height cm	Table deg	Limit dBm	Margin dB
1342.88	-58.75	13.42	-8.42	-53.74	RMS	H	132	209	-13	-40.74
1531.63	-57.16	13.52	-8.97	-52.61	RMS	V	277	93	-13	-39.61
3969.77	-58.82	14.65	-5.08	-49.25	RMS	H	165	268	-13	-36.25
11701.38	-66.82	17.04	1.81	-47.97	RMS	H	164	63	-13	-34.97
14491.96	-54.94	5.70	4.85	-44.39	RMS	H	174	144	-13	-31.39
17690.53	-58.80	6.55	8.43	-43.82	RMS	V	138	66	-13	-30.82

Note:

- 1) All different channel and modes were verified but only the worst case result is shown here.
- 2) All different modes have been verified and the worst case result is presented here.
- 3) EUT was tested in 3 orientations.
- 4) Final substitution measurement is not necessary as margin is over 20 dB.

Report Number:	CMP-19061922-LC-FCC-IC-PCB
Product:	HotSpot OBD Dongle
Model Number:	LMU3240LAW



18GHz – 25GHz test result

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



9 Test instrument list

Equipment	Manufacturer	Model	Serial Number	Cal. Date	Cal. Due
Semi-Anechoic Chamber	ETS-Lindgren	10M	VL001	5/11/2019	5/11/2020
Shielding Control Room	ETS-Lindgren	Series 81	VL006	N/A	N/A
Spectrum Analyzer	Keysight	N9020A	MY50110074	5/4/2019	5/4/2020
EMC Test Receiver	R&S	ESL6	100230	5/7/2019	5/7/2020
LISN (9KHz – 30MHz)	EMCO	3816/2	9705-1066	5/4/2019	5/4/2020
Bi-Log Antenna	ETS-Lindgren	3142E	217921	11/15/2018	11/15/2019
Horn Antenna (1-18GHz)	Electro-Metrics	EM-6961	6292	5/2/2019	5/2/2020
Horn Antenna (18-40GHz)	Com-Power	AH-840	101109	5/2/2019	5/2/2020
Preamplifier	RF Bay, Inc.	LPA-10-20	11180621	5/10/2019	5/10/2020
True RMS Multi-meter	UNI-T	UT181A	C173014829	5/10/2019	5/10/2020
Temp / Humidity / Pressure Meter	PCE Instruments	PCE-THB 40	R062028	5/9/2019	5/9/2020
RF Attenuator	Pasternack	PE7005-3	VL061	5/10/2019	5/10/2020
Preamplifier 100KHz - 40GHz	Aeroflex	33711-392-77150-11	064	5/10/2019	5/10/2020
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	5/9/2019	5/9/2020
RE test cable(below 6GHz)	Vista	RE-6GHz-01	RE-6GHz-01	5/10/2019	5/10/2020
RE test cable (1-18GHz)	PhaseTrack	II-240	RE-18GHz-01	5/10/2019	5/10/2020
RE test cable (>18GHz)	Sucoflex	104	344903/4	5/10/2019	5/10/2020
Pulse limiter	Com-Power	LIT-930A	531727	5/15/2019	5/15/2020
CE test cable #1	FIRST RF	FRF-C-1002-001	CE-6GHz-01	5/10/2019	5/10/2020
CE test cable#2	FIRST RF	FRF-C-1002-001	CE-6GHz-02	5/9/2019	5/9/2020
Wideband Communication	R&S	CMW500	147508	5/8/2019	5/8/2020