

FCC DTS RF TEST REPORT



Vista Labs
TEST • CERTIFY • COMPLY

Test Report Number..... **CMP-19092722-LC-FCC-IC-DTS**

Applicant..... **CalAmp**

Applicant Address..... **2177 Salk Ave, Suite 200, Carlsbad, CA 92008 USA**

Product Name..... **Fleet Management and Tracking Device**

Model Number..... **LMU2630MB**

Family Product/Model..... **N/A**

FCC ID..... **APV-2630MB**

ISED ID..... **5843C-2630MB**

Date of EUT received..... **10/11/2019**

Date of Test..... **10/11/2019 – 10/30/2019**

Report Issue Date..... **11/01/2019**

Test Standards..... **47CFR Part 15.247**
RSS-247 Issue2: Feb 2017

Test Result..... **Pass**

Issued By:

Vista Laboratories

1261 Puerta Del Sol, San Clemente, CA 92673 USA

www.vista-compliance.com

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Tested by:

Bruce Li/Test Engineer

Approved By:

David Zhang/Technical Manager

Report Number:	CMP-19092722-LC-FCC-IC-DTS
Product:	Fleet Management and Tracking Device
Model Number:	LMU2630MB



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



Electromagnetic Compatibility
Radio Frequency
Product Certification
International Approval

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REVISION HISTORY

Revision	Issue Date	Description	Note
Original	11/01/2019	Original release	N/A

Report Number:	CMP-19092722-LC-FCC-IC-DTS
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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	Fleet Management and Tracking Device
Model Number	LMU2630MB
Family Model Number	N/A
Serial Number	N/A
Frequency Band	BLE: 2402-2480MHz GSM850: 824.2 - 848.8 MHz GSM1900: 1850.2 - 1909.8 MHz LTE CAT-M1 Band 2: 1850.7-1909.3MHz LTE CAT-M1 Band 4: 1710.7-1754.3MHz LTE CAT-M1 Band 5: 824.7-848.3MHz LTE CAT-M1 Band 12: 699.7-715.3MHz LTE CAT-M1 Band 13: 779.5-784.5 MHz LTE CAT-M1 Band 25: 1850.7 - 1914.3 MHz
Type of modulation	BLE: GFSK GSM: GMSK, 8PSK LTE CAT-M1: QPSK, 16QAM
Equipment Class/ Category	DTS, PCB
Maximum output power	See test result
Antenna Information	Bluetooth ceramic antenna, peak Gain: 1.88dBi; P/N: 1001312 Cellular LPWA antenna: peak gain: 3.1dBi; P/N: 1004795
Clock Frequencies	12MHz, 24MHz, 26MHz
Port/Connectors	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 and GSM/LTE can transmit simultaneously
Additional Info	N/A

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1.3 Test standard and method

Test standard	47CFR Part 15.247
Test method	ANSI C63.10: 2013 558074 D01 15.247 Meas Guidance v05r02

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.

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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	10/11/2019 – 10/30/2019
Radiated	Bruce Li	23.5°C / 58.2%/996 mbar	10/11/2019 – 10/30/2019

3 Modification of EUT

The EUT is an engineering test sample loaded with RF testing firmware specifically designed to support the RF TX/RX measurement in different aspects.

4 Test configuration and operation

4.1 EUT test configuration

EUT is powered by external DC power supply for testing purpose. EUT's RF antenna port is connected to spectrum analyzer through RF test cable for measurement. The test software is used to set EUT to different transmission mode in terms of radio mode, test channel, data rate, etc.

4.2 EUT test mode

Radio	Channel	Frequency (MHz)
BLE	0	2402
BLE	19	2440
BLE	39	2480

4.3 Supporting Equipment

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

4.4 EUT setup diagram



4.5 EUT operation

The operation, control and display are done by the built-in buttons and OLED display.

4.6 Test software

Index	Description	Remark
1	Putty.exe	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

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5 EUT and test setup pictures

See FCC filing

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6 Test Summary

FCC Rules	ISED Rules	Test Item	Section	Verdict
§15.203	-	Antenna Requirement	8.1	Pass
§15.207 (a)	RSS-Gen §8.8	AC Power Line Conducted Emissions	N/A	N/A
-	RSS-Gen §6.7	Occupied Bandwidth	8.2	Pass
§15.247 (a)(2)	RSS-247 §5.2	DTS (6 dB) Channel Bandwidth	8.3	Pass
§15.247(b)(3)	RSS-247 §5.4	Conducted Maximum Output Power	8.4	Pass
§15.247(e)	RSS-247 §5.2	Power Spectral Density	8.5	Pass
§15.247(d)	RSS-247 §5.5	Conducted Band-Edge & Unwanted Emissions	8.6	Pass
§15.205, §15.209	RSS-247 §5.5	Radiated Emissions & Unwanted Emissions into Restricted Frequency Bands	8.7	Pass

Note1: EUT is powered by Vehicle mains. It does not connect to public AC mains. This item is not applicable.

7 Uncertainty of Measurement

Test item	Measurement Uncertainty (dB)
RF Output Power (Conducted)	±1.2 dB
Power Spectral Density	±0.9 dB
Unwanted Emission (conducted)	±2.6 dB
Occupied Channel Bandwidth	±5 %
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

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8 Test summary and result

8.1 Antenna Requirement

8.1.1 Requirement

Per § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

8.1.2 Result

Analysis:

- EUT uses on board ceramic antenna for Bluetooth. No standard RF connector is used.

Conclusion:

EUT complies with antenna requirement in § 15.203.

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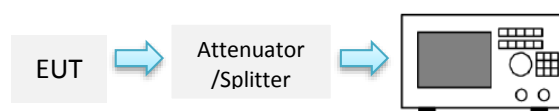
8.2 DTS (6 dB) Bandwidth

8.2.1 Requirement

§ 15.247 (a)(2), RSS-247 §5.2

Systems using digital modulation techniques may operate in the 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz bands. The minimum 6 dB bandwidth shall be at least 500 KHz.

8.2.2 Test setup



8.2.3 Test Procedure

According to section 8.2, option 2, in KDB 558074 D01 DTS Meas Guidance v05r02 and subclause 11.8 of ANSI C63.10-2013:

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described above (i.e., RBW = 100 kHz, VBW $\geq 3 \times$ RBW, peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Use automatic bandwidth measurement capability on instrument to obtain BW result.

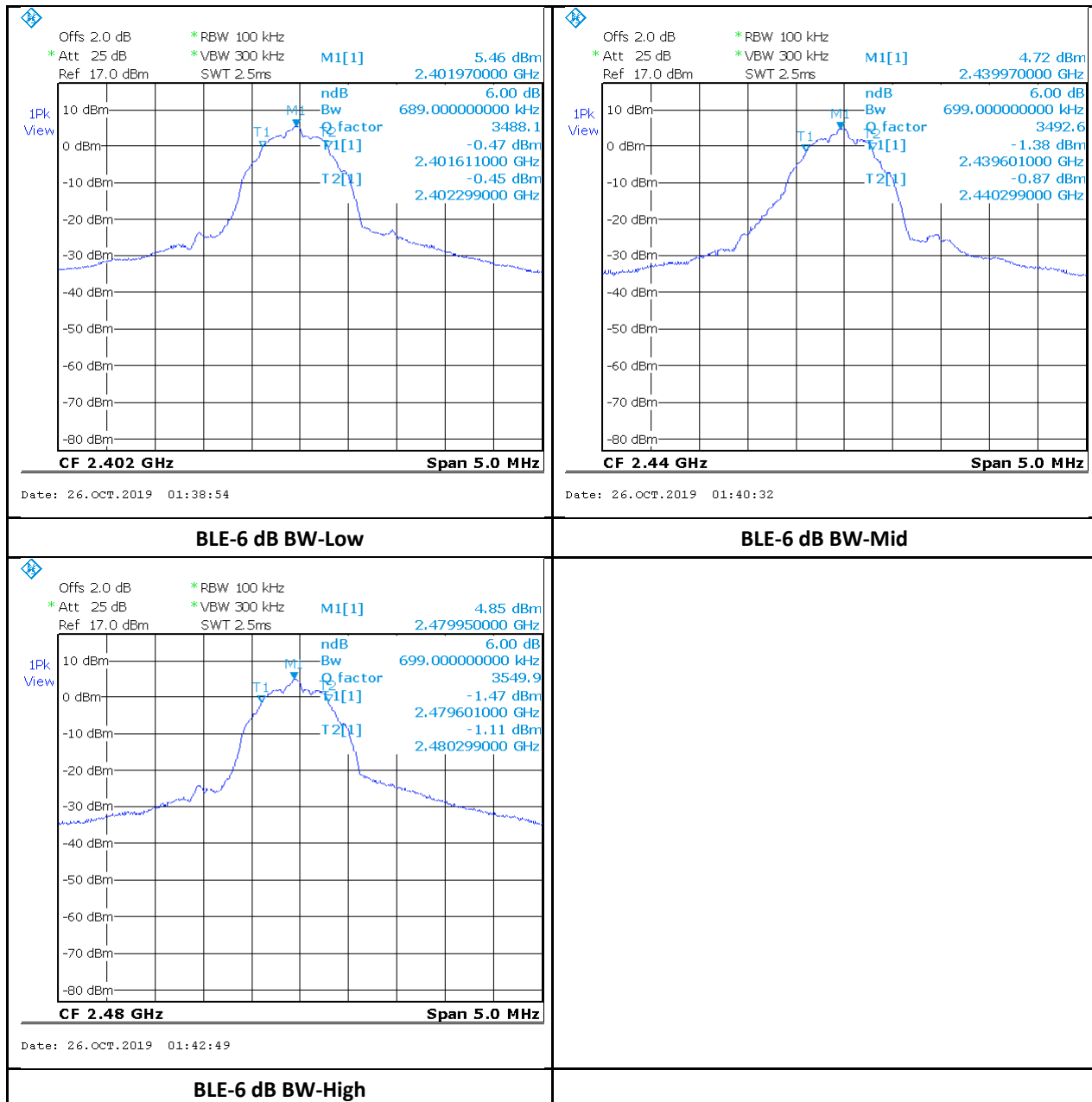
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8.2.4 Test Result

Mode/ Bandwidth	Frequency (MHz)	Data rate	Measured Bandwidth (KHz)	Minimum Bandwidth (KHz)	Result
BLE	2402	1Mbps	689	500	Pass
BLE	2440	1Mbps	699	500	Pass
BLE	2480	1Mbps	699	500	Pass

8.2.5 Test Plots



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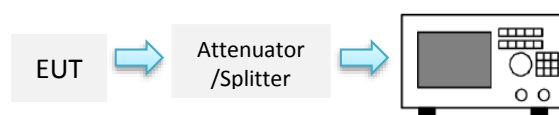
8.3 Occupied Bandwidth (99%)

8.3.1 Requirement

RSS-Gen §6.7

The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

8.3.2 Test setup



8.3.3 Test Procedure

According to section RSS-Gen §6.7

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described above (i.e., RBW = 100 kHz, VBW $\geq 3 \times$ RBW, peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.

1. Set RBW = 1% to 5% of the actual occupied BW.
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Span = large enough to capture all products of the modulation process
7. Allow the trace to stabilize.
8. Use automatic bandwidth measurement capability on instrument to obtain BW result.

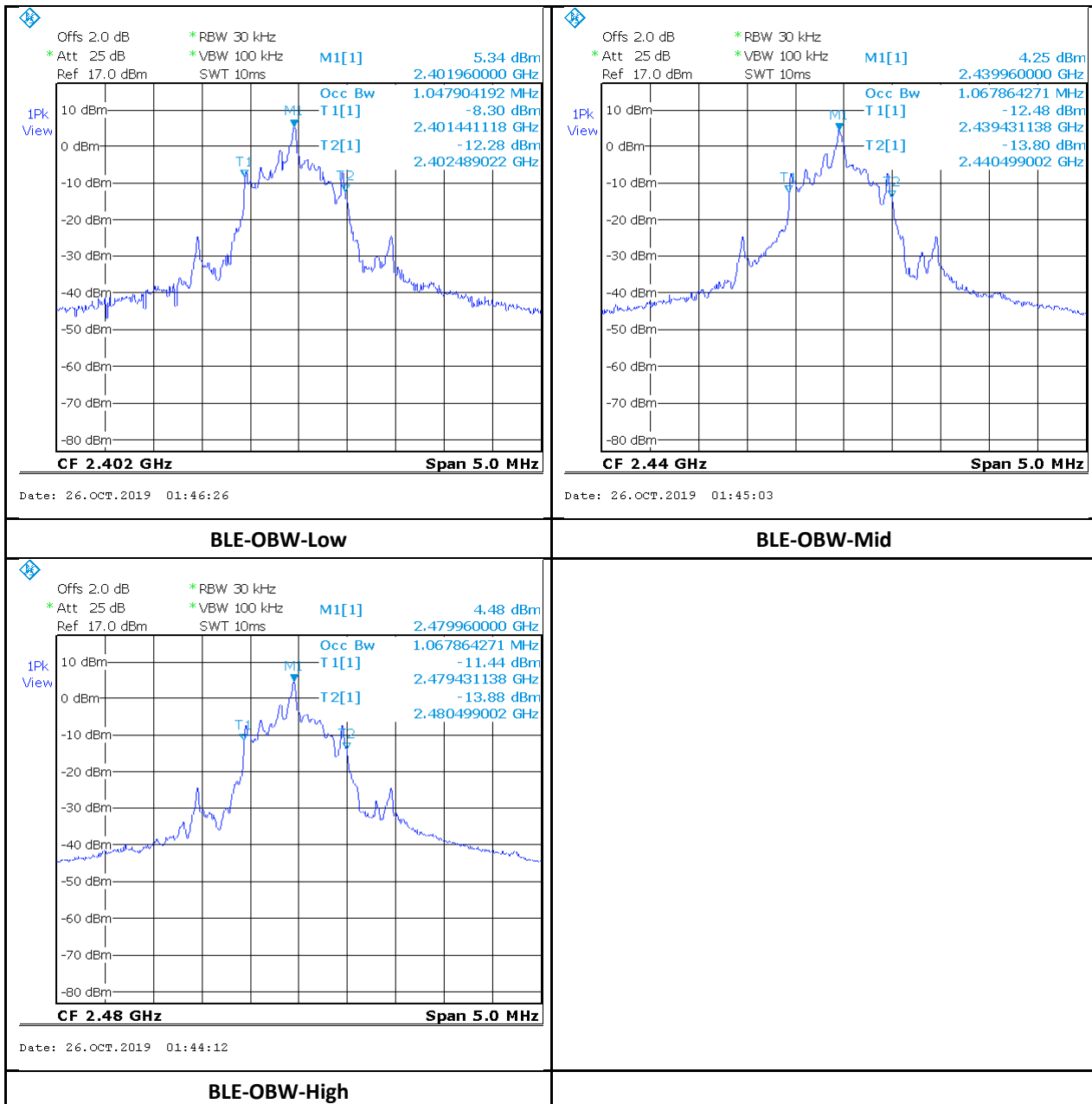
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8.3.4 Test Result

Mode/ Bandwidth	Frequency (MHz)	Data rate	Measured 99% OBW (KHz)	Limit (KHz)	Result
BLE	2402	1Mbps	1047.9	500	Pass
BLE	2440	1Mbps	1067.9	500	Pass
BLE	2480	1Mbps	1067.9	500	Pass

8.3.5 Test Plots



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8.4 Maximum Output Power

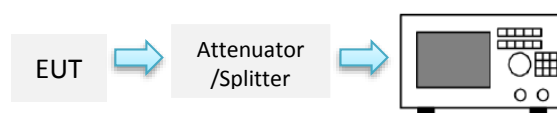
8.4.1 Requirement

§ 15.247 (b)(3), RSS-247 §5.4

or systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: the maximum output power is 1 Watt.

If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

8.4.2 Test setup



8.4.3 Test Procedure

For BLE, power measurement is according to subclause 11.9.1.1 of ANSI C63.10-2013:

1. Set the RBW $\geq$ DTS bandwidth
2. Set VBW $\geq 3 \times$ RBW.
2. Set SPAN $\geq 3 \times$ RBW.
3. Sweep time = auto couple.
4. Detector = peak.
5. Trace mode = max hold
6. Allow trace to fully stabilize.
7. Use peak marker function to determine the peak amplitude level.

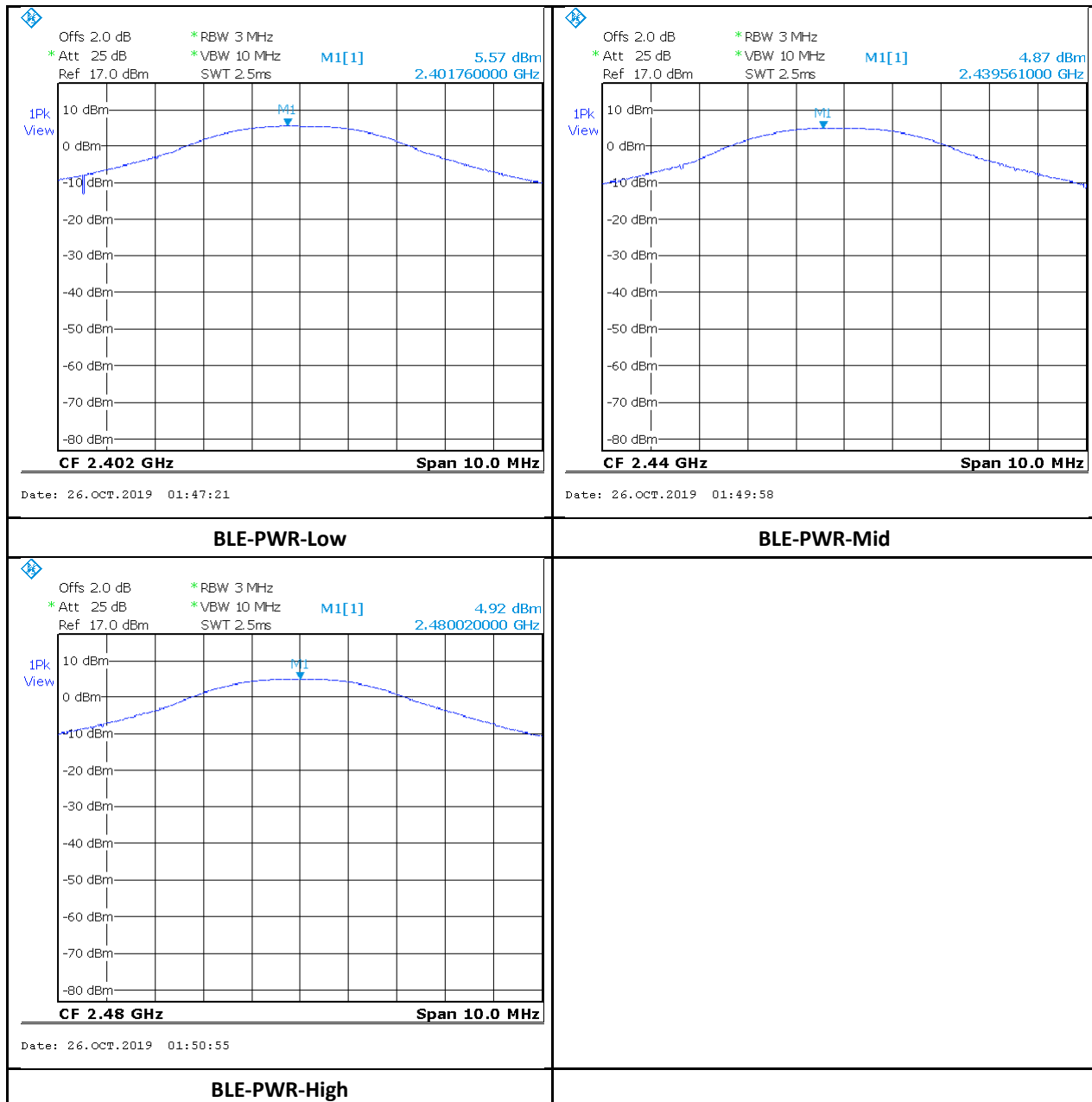
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8.4.4 Test Result

Mode/ Bandwidth	Frequency (MHz)	Data rate	Measured Output Power (dBm)	Max Output Power (dBm)	Result
BLE	2402	1Mbps	5.57	30	Pass
BLE	2440	1Mbps	4.87	30	Pass
BLE	2480	1Mbps	4.92	30	Pass

8.4.5 Test Plots



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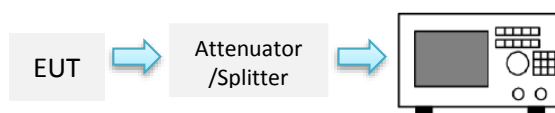
8.5 Power Spectral Density

8.5.1 Requirement

§ 15.247 (e), RSS-247 §5.2

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power is used to determine the power spectral density.

8.5.2 Test setup



8.5.3 Test Procedure

According to section 8.4 in KDB 558074 D01 DTS Meas Guidance v05r02 and subclause 11.10.2 PKPSD of ANSI C63.10-2013:

1. Set analyser centre frequency to DTS channel centre frequency.
2. Set the span to 1.5 X DTS bandwidth.
3. Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
4. Set the VBW $\geq 3 \times \text{RBW}$.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

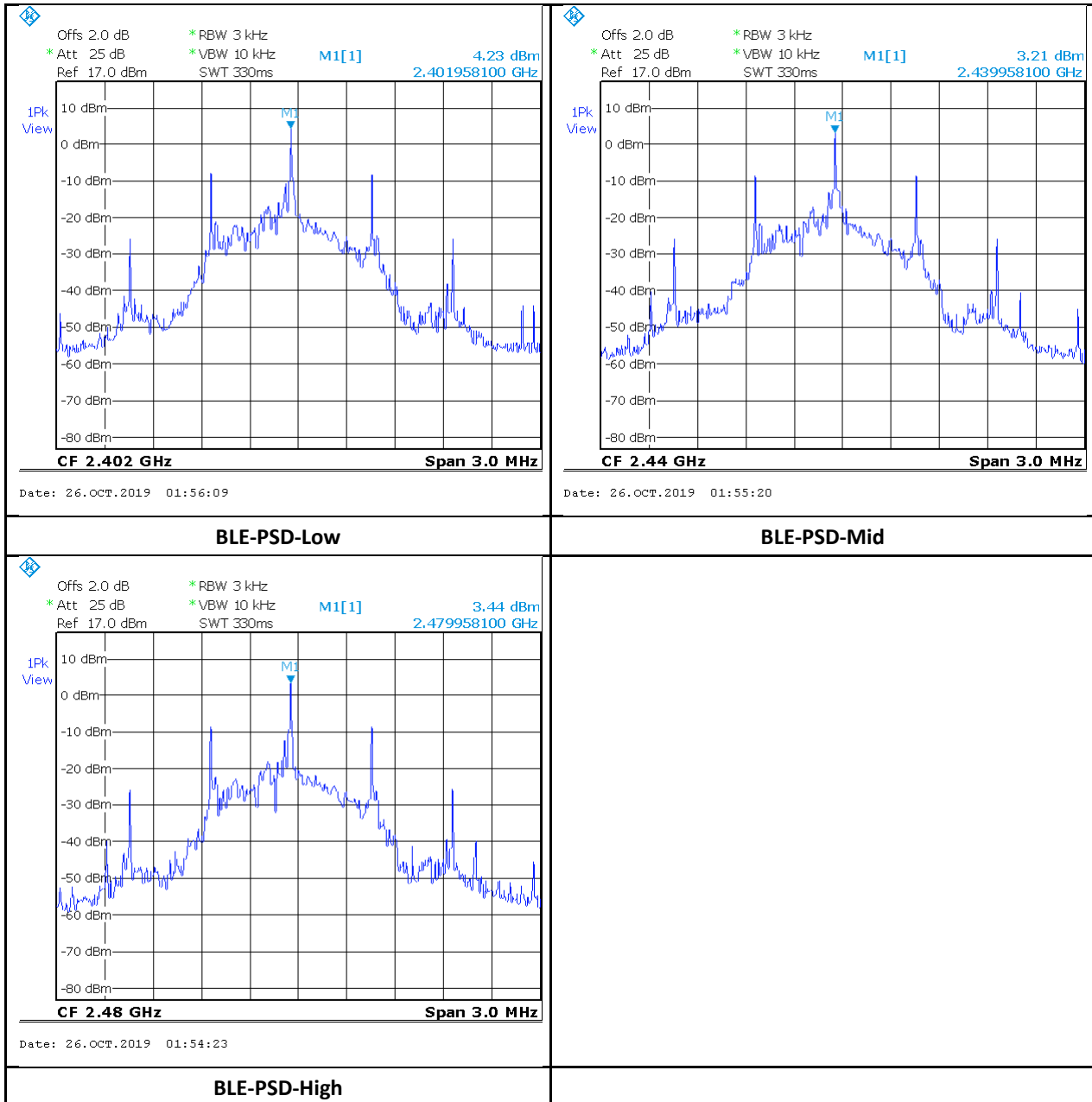
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8.5.4 Test Result

Mode/ Bandwidth	Frequency (MHz)	Data rate	Measured PSD (dBm/3KHz)	Max PSD (dBm/3KHz)	Result
BLE	2402	1Mbps	4.23	8	Pass
BLE	2440	1Mbps	3.21	8	Pass
BLE	2480	1Mbps	3.44	8	Pass

8.5.5 Test Plots



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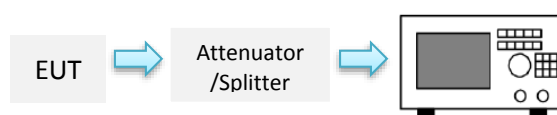
8.6 Conducted Band-Edge & Unwanted Emissions Measurement

8.6.1 Requirement

§ 15.247 (d), RSS-247 §5.5

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.

8.6.2 Test setup



8.6.3 Test Procedure

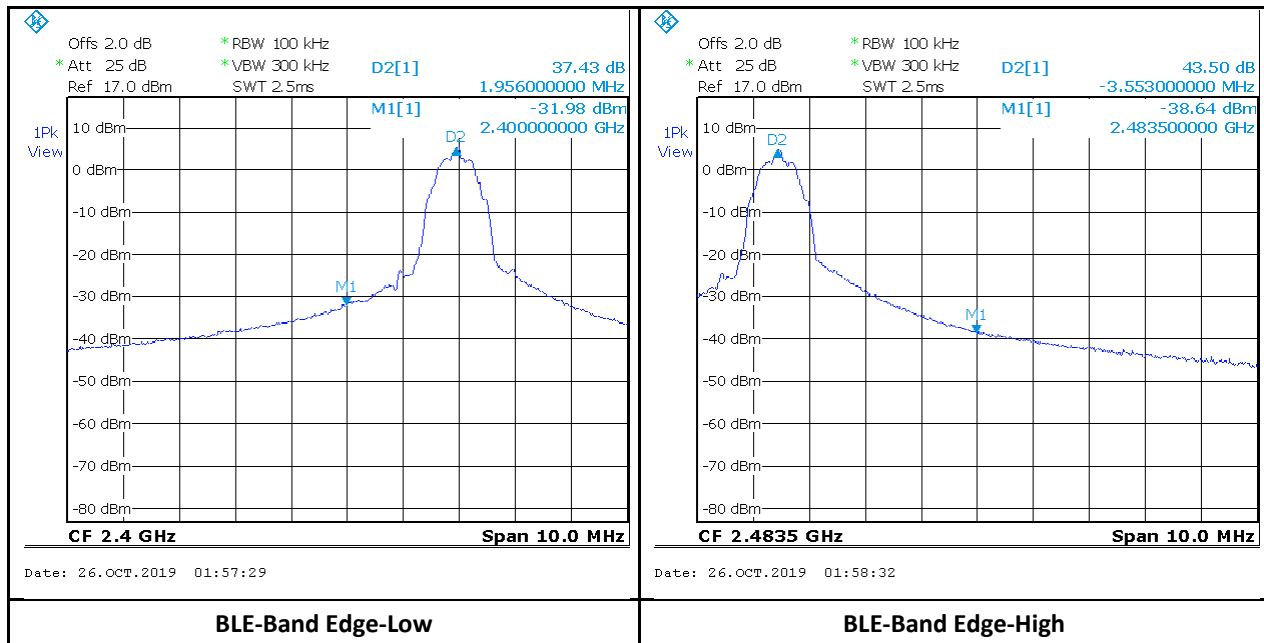
According to section 8.5 Emission level measurement, in KDB 558074 D01 DTS Meas Guidance v05r02 and subclause 11.11.3 in ANSI C63.10-2013:

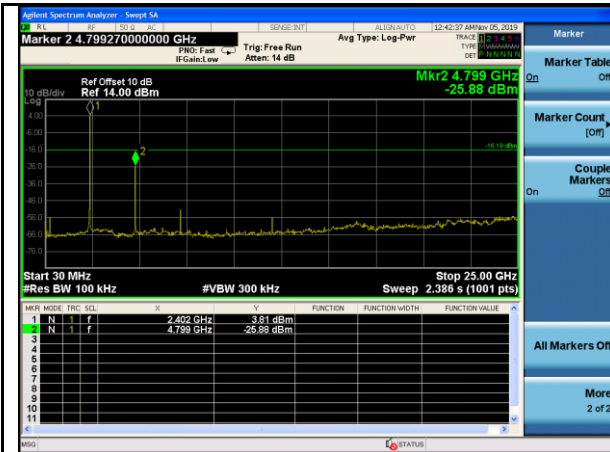
1. Set the centre frequency and span to encompass frequency range to be measured.
2. Set the RBW = 100 kHz.
3. Set the VBW $\geq 3 \times$ RBW.
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the maximum amplitude level.

8.6.4 Test Result

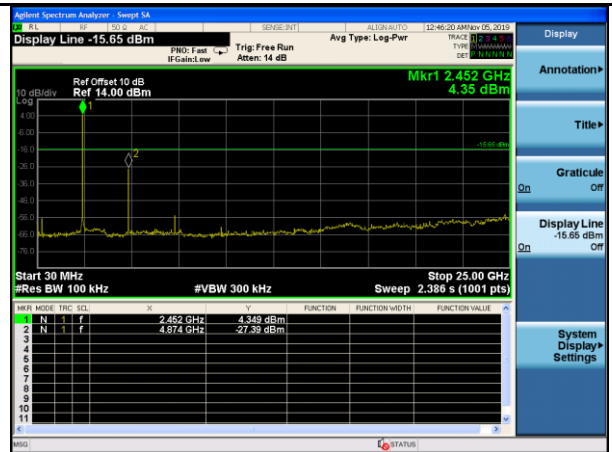
See test plots

8.6.5 Test Plots

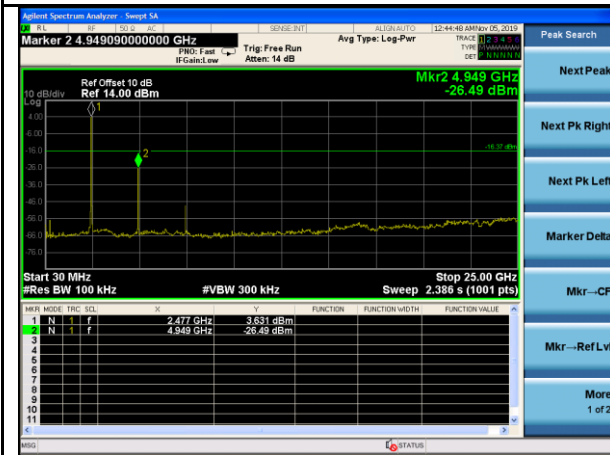




BLE-Out Of Band Emission-Low



BLE-Out Of Band Emission-Mid



BLE-Out Of Band Emission-High

8.7 Radiated Band-Edge & Spurious Emissions into Restricted Frequency Bands

8.7.1 Requirement

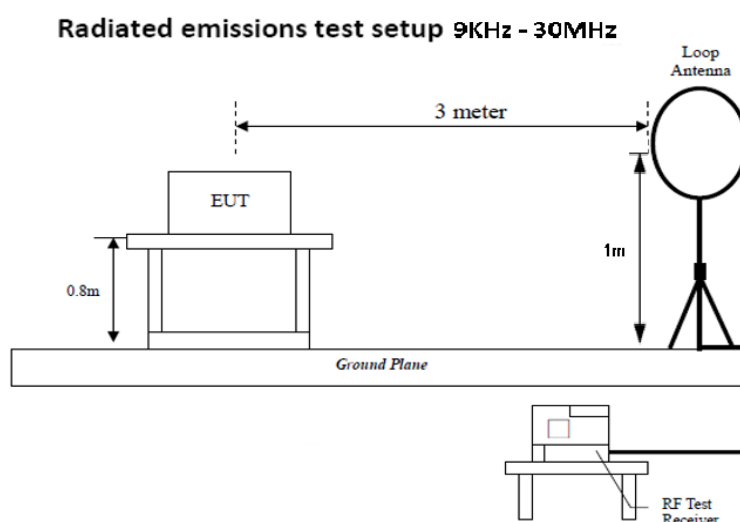
§ 15.247 (d), RSS-247 §5.5

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.

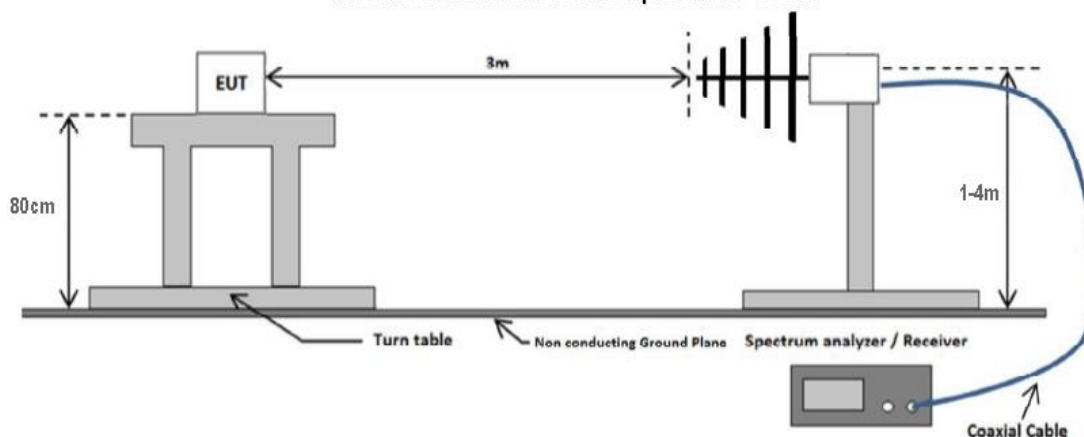
Attenuation below the general limits specified in §15.209(a) and RSS-Gen is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Frequency range (MHz)	Field Strength ($\mu\text{V/m}$)
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

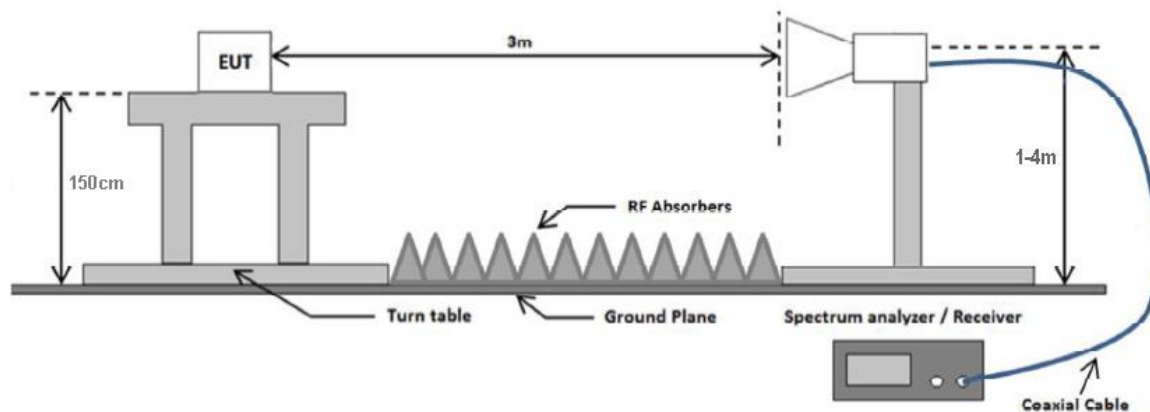
8.7.2 Test setup



Radiated emissions test setup 30 MHz - 1 GHz



Radiated emissions test setup above 1 GHz



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8.7.3 Test Procedure

According to section 8.6 in KDB 558074 D01 DTS Meas Guidance v05r02 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.

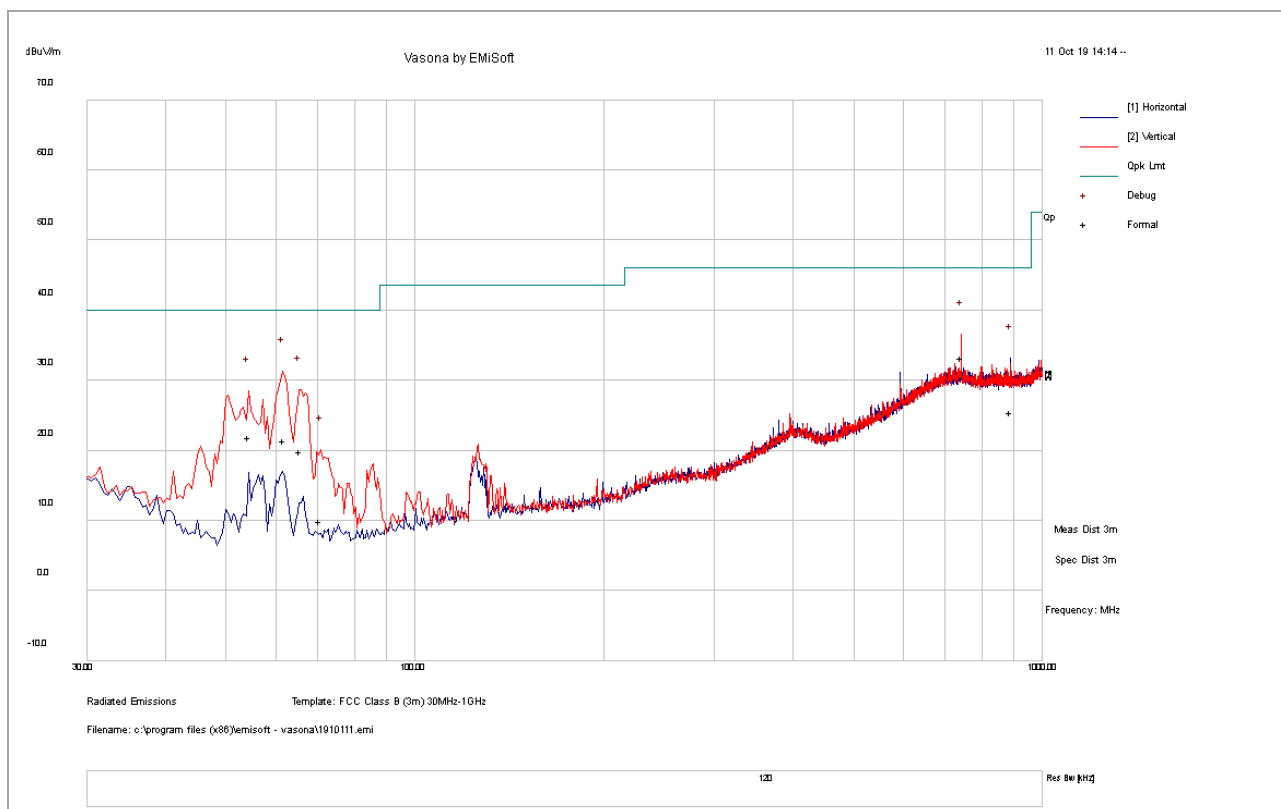
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Model Number:	LMU2630MB



8.7.4 Test Result

30-1000MHz test result

Test Standard:	15.209, 15.247	Mode:	BLE-Mid CH
Frequency Range:	30-1000MHz	Test Date:	10/11/2019
Antenna Type/Polarity:	Bi-Log/Hor & Ver	Test Personnel:	Bruce Li
Remark:	N/A	Test Result:	Pass



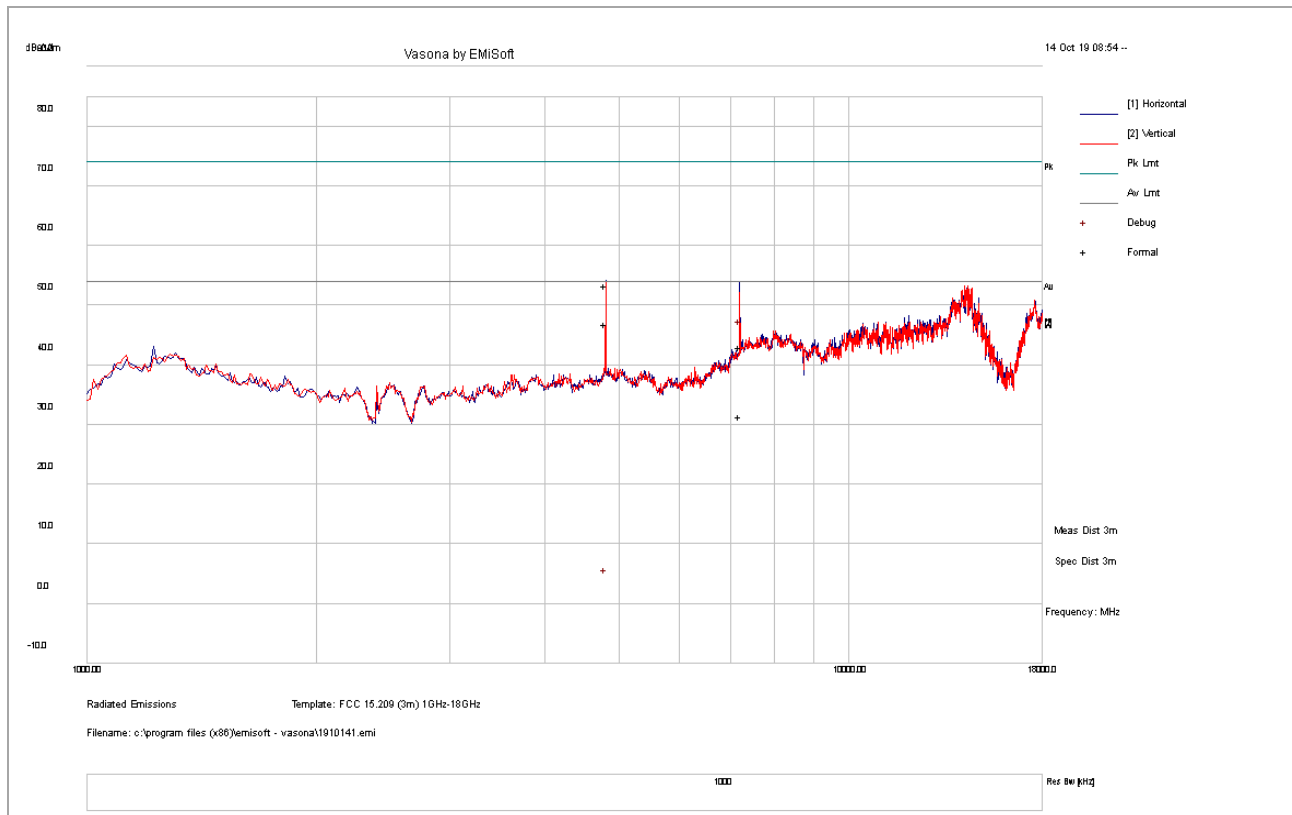
Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
61.74	42.97	3.03	-24.59	21.41	QP	V	224	4	40.00	-18.59
741.78	32.53	7.28	-6.58	33.24	QP	V	373	179	46.00	-12.76
65.62	41.23	3.09	-24.40	19.92	QP	V	187	280	40.00	-20.08
54.46	43.78	2.89	-24.73	21.93	QP	V	133	336	40.00	-18.07
890.62	25.15	7.58	-7.19	25.54	QP	H	322	317	46.00	-20.46
70.61	31.02	3.18	-24.23	9.97	QP	V	116	7	40.00	-30.03

Note:

- 1) For below 1GHz, all different channel and modes were verified but only the worst case result is shown here.

1GHz – 18GHz test result

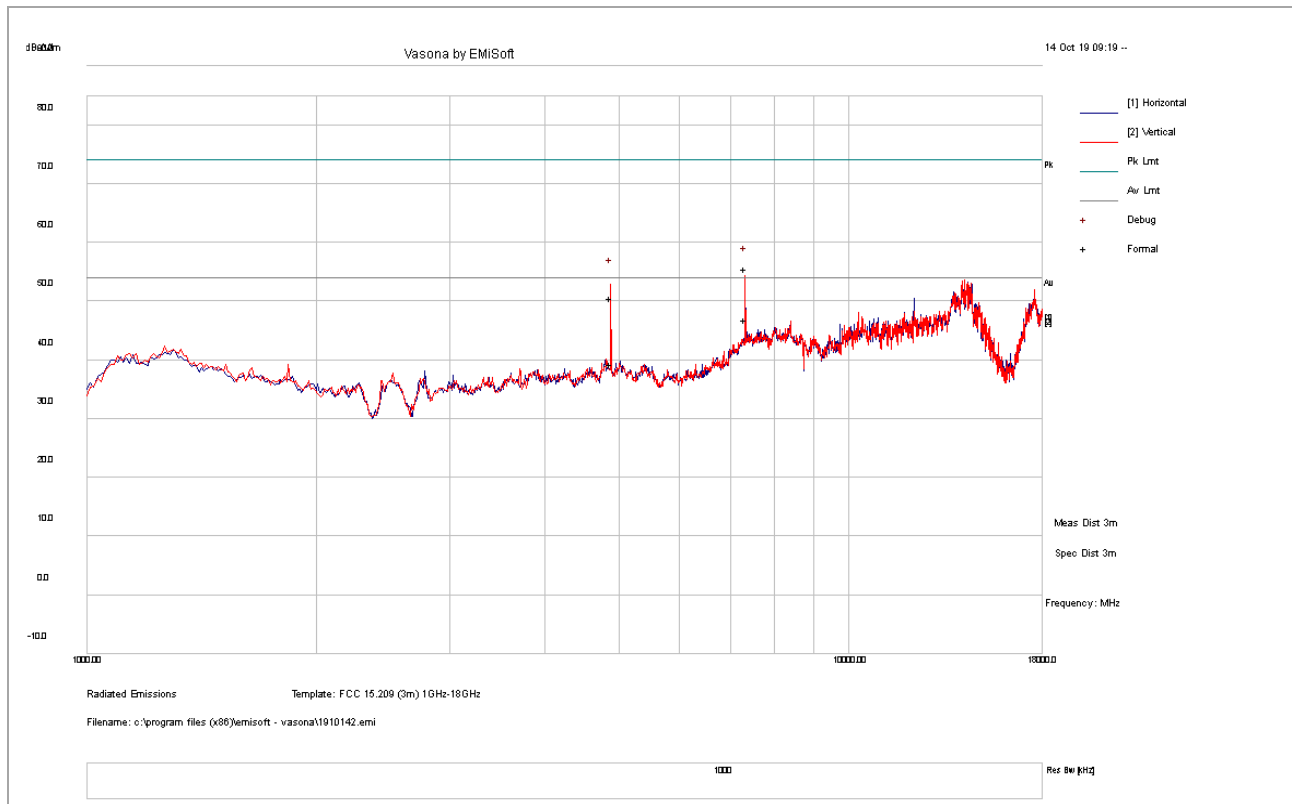
Test Standard:	15.209, 15.247	Mode:	BLE-Low CH
Frequency Range:	1GHz-18GHz	Test Date:	10/14/2019
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Bruce Li
Remark:	N/A	Test Result:	Pass



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
7204.00	30.90	20.45	-8.36	43.00	PK	V	333	157	74	-31.00
4804.00	49.48	17.35	-13.43	53.41	PK	V	109	97	74	-20.60
7204.00	19.31	20.45	-8.36	31.40	AV	V	333	157	54	-22.60
4804.00	43.05	17.35	-13.43	46.97	AV	V	109	97	54	-7.03

1GHz – 18GHz test result

Test Standard:	15.209, 15.247	Mode:	BLE-Mid CH
Frequency Range:	1GHz-18GHz	Test Date:	10/14/2019
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Bruce Li
Remark:	N/A	Test Result:	Pass



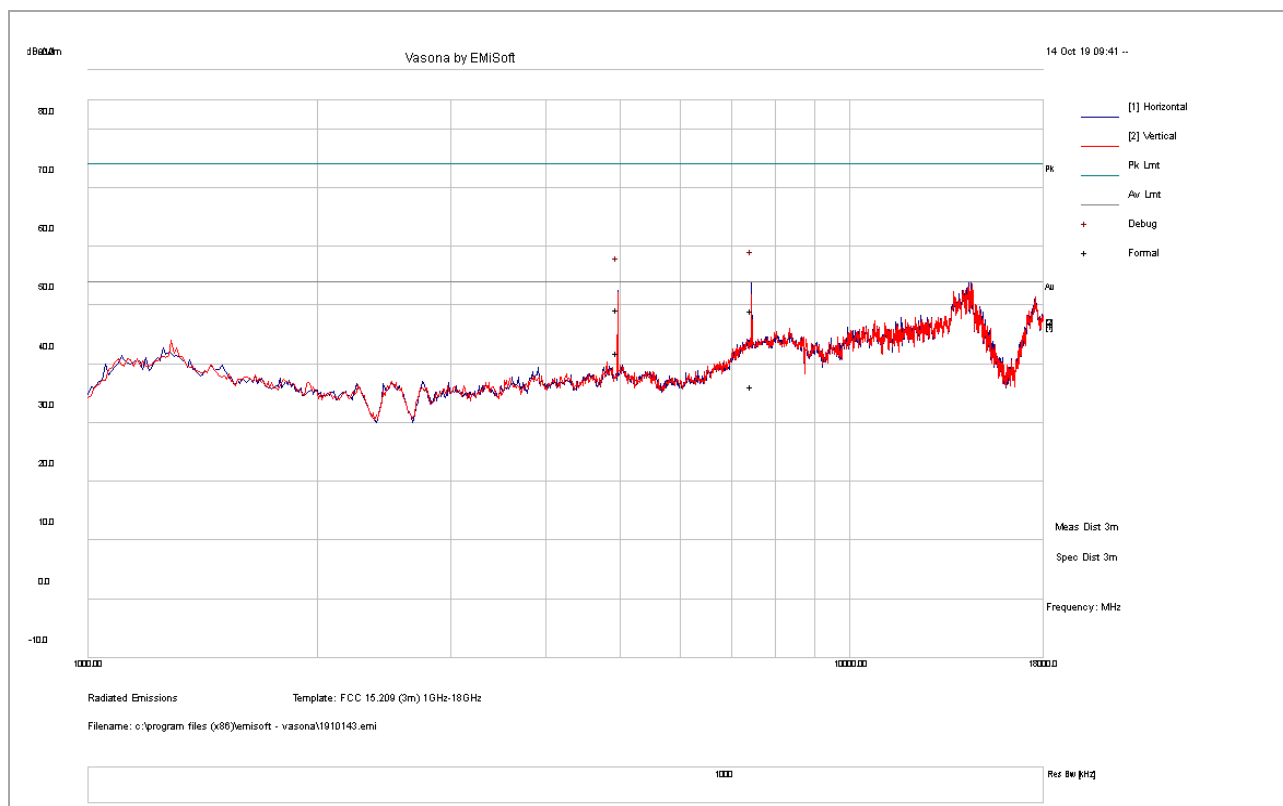
Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
7320.11	42.89	20.67	-7.91	55.66	PK	V	175	152	74	-18.35
4879.32	46.45	17.37	-13.27	50.55	PK	V	110	146	74	-23.45
7320.11	34.12	20.67	-7.91	46.89	AV	V	175	152	54	-7.11
4879.32	35.23	17.37	-13.27	39.34	AV	V	110	146	54	-14.67

Report Number:	CMP-19092722-LC-FCC-IC-DTS
Product:	Fleet Management and Tracking Device
Model Number:	LMU2630MB



1GHz – 18GHz test result

Test Standard:	15.209, 15.247	Mode:	BLE-High CH
Frequency Range:	1GHz-18GHz	Test Date:	10/14/2019
Antenna Type/Polarity:	Horn/Hor & Ver	Test Personnel:	Bruce Li
Remark:	N/A	Test Result:	BLE-Low CH



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
7441.09	35.80	20.90	-7.64	49.07	PK	V	168	200	74	-24.93
4960.15	45.14	17.39	-13.24	49.29	PK	V	121	285	74	-24.72
7441.09	22.91	20.90	-7.64	36.18	AV	V	168	200	54	-17.82
4960.15	37.78	17.39	-13.24	41.92	AV	V	121	285	54	-12.08

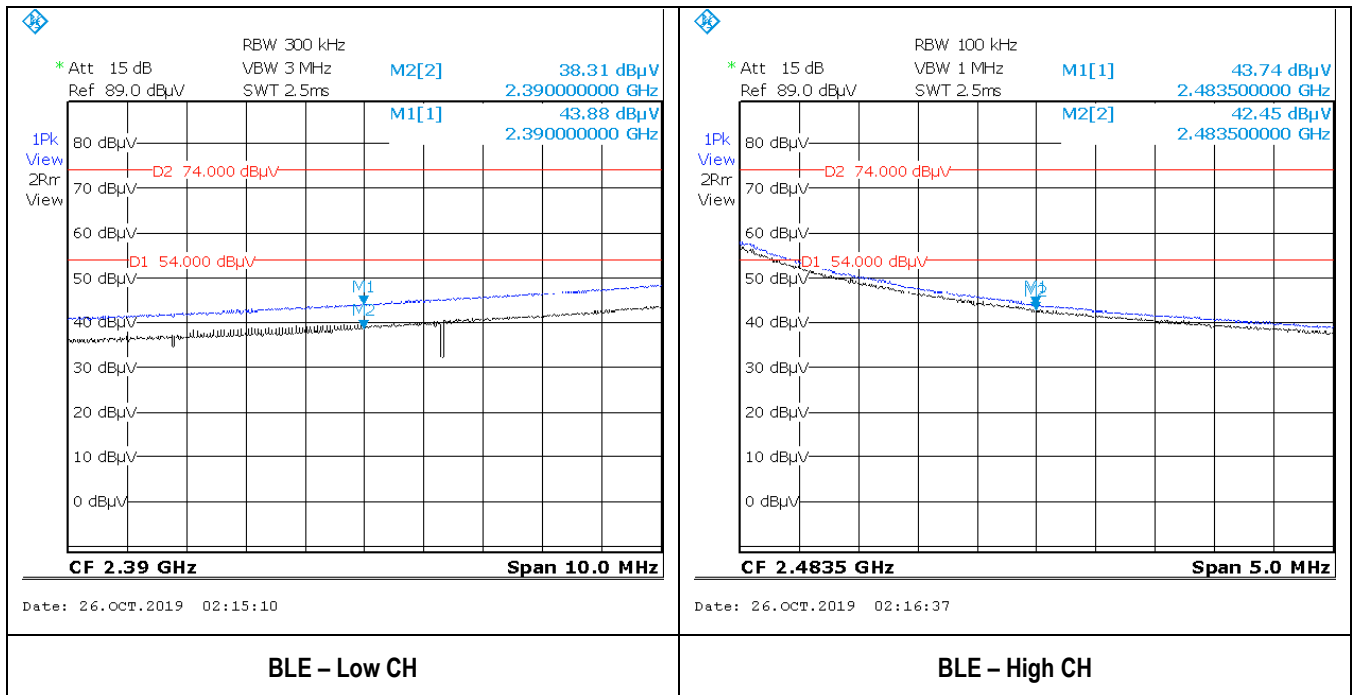
Report Number:	CMP-19092722-LC-FCC-IC-DTS
Product:	Fleet Management and Tracking Device
Model Number:	LMU2630MB



18GHz – 40GHz test result

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

Restricted Band Measurement Result



Report Number:	CMP-19092722-LC-FCC-IC-DTS
Product:	Fleet Management and Tracking Device
Model Number:	LMU2630MB



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	ANRITSU	MT8821C	6262010316	10/23/2019	10/23/2020